

# **Annual European Community greenhouse gas inventory 1990-2001 and inventory report 2003**

**Submission to the UNFCCC Secretariat**

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# Executive summary

## ***ES.1. Background information on greenhouse gas inventories***

The European Community, as a Party to the United Nations Framework Convention on Climate Change (UNFCCC), reports annually on greenhouse gas (GHG) inventories within the area covered by its Member States.

The legal basis for the compilation of the EC inventory is Council Decision 99/296/EC amending Council Decision 93/389/EC for a monitoring mechanism of Community CO<sub>2</sub> and other greenhouse gas emissions<sup>1</sup>. The purpose of this decision is to monitor all anthropogenic GHG emissions not controlled by the Montreal Protocol in the Member States and to evaluate progress towards meeting GHG reduction commitments under the UNFCCC and the Kyoto Protocol.

The EC GHG inventory is compiled on the basis of the inventories of the 15 EC Member States. It is the direct sum of the 15 national inventories, except for the reference approach for CO<sub>2</sub> from fossil fuels developed by the Intergovernmental Panel on Climate Change (IPCC). The main institutions involved in the compilation of the EC GHG inventory are the Member States, the European Commission - DG Environment (DG ENV), the European Environment Agency (EEA) and its European Topic Centre on Air and Climate Change (ETC-ACC), Eurostat, and the Joint Research Centre (JRC).

The process of compilation of the EC GHG inventory is as follows: Member States submit their annual GHG inventories by 31 December each year to the European Commission (DG ENV). Then, EEA/ETC-ACC, Eurostat and JRC perform initial checks on the submitted data. On 1 March, the draft EC GHG inventory and inventory report are circulated to Member States for reviewing and commenting. Member States check their national data and information used in the EC inventory report, send updates, if necessary, and review the EC inventory report itself by 1 April. The final EC GHG inventory and inventory report are prepared by EEA/ETC-ACC by 15 April for submission by the European Commission to the UNFCCC secretariat.

## ***ES.2. Summary of emission and removal related trends***

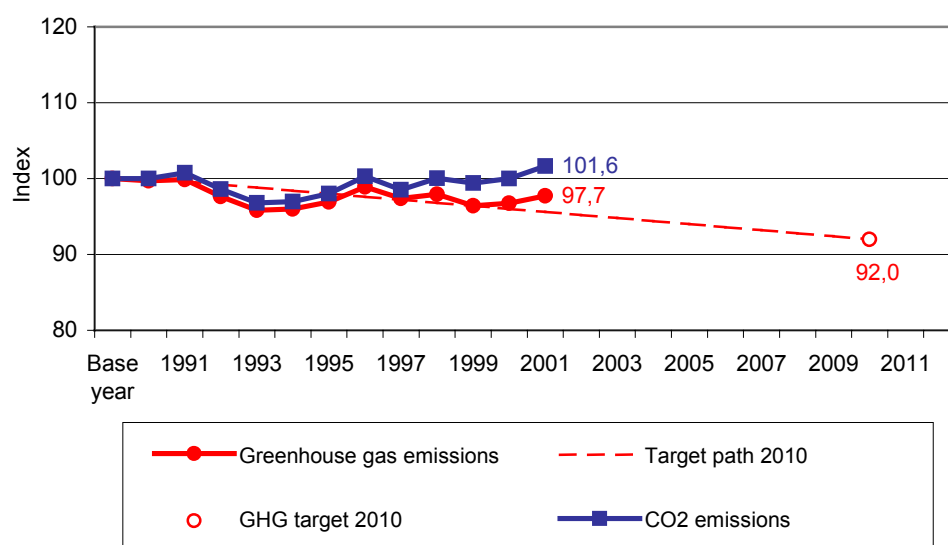
Total GHG emissions without land-use change and forestry (LUCF) in the EC decreased between the base year and 2001 by 95.735 Gg (-2,3 %). In the Kyoto Protocol, the EC agreed to reduce its GHG emissions by 8 % by 2008-2012, from 1990 levels. Assuming a linear target path from 1990 to 2010, total EC GHG emissions were 2,1 index points above this target path in 2001 (see Figure ES1).

CO<sub>2</sub> is by far the most important GHG, accounting for 82 % of total EC emissions in 2001. In 2001, EC CO<sub>2</sub> emissions without LUCF were 1,6 % above 1990 levels.

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<sup>1</sup> OJ L 117, 5.5.1999, p. 35

Figure ES1: EC GHG emissions 1990-2001 compared with target for 2008-2012 (excl LUCF)



**Note (1):** The linear target path is not intended as an approximation of past and future emission trends. It provides a measure of how close the EC emissions in 2001 are to a linear path of emissions reductions from 1990 to the Kyoto target for 2008-2012, assuming that only domestic measures will be used. Therefore, it does not deliver a measure of (possible) compliance of the EC with its GHG targets in 2008-2012, but aims at evaluating overall EC GHG emissions in 2001. The unit is index points with 1990 emissions being 100.

**Note (2):** GHG emission data for the EC as a whole do not include emissions and removals from LUCF. In addition, no adjustments for temperature variations or electricity trade are considered.

**Note (3):** For fluorinated gases the base year 1995 was used for all Member States, which is in line with the base year indicated so far by most MS individually.

Table ES1 gives an overview of the main trends in EC GHG emissions and removals for 1990-2001. In 2001 CO<sub>2</sub> emissions made up 82 % of the total GHG emissions in the EC. This was an increase of 54.417 Gg (1,6 %) compared to 1990. This increase was compensated by decreases in CH<sub>4</sub> and N<sub>2</sub>O emissions in the same period: CH<sub>4</sub> decreased by 84.557 Gg (-20,4 %) and N<sub>2</sub>O decreased by 64.452 Gg (-15,8 %). Fluorinated gases showed opposing trends. While HFC and SF<sub>6</sub> emissions increased by 17.715 Gg (69,0 %) and 1.226 Gg (14,7 %), PFC emissions decreased by 7.875 Gg (-58,8 %).

Table ES1: Overview of EC GHG emissions and removals from 1990 to 2001 in CO<sub>2</sub> equivalents (Gg)

GREENHOUSE GAS EMISSIONS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	CO <sub>2</sub> equivalent (Gg)											
Net CO <sub>2</sub> emissions/removals	3.137.195	3.138.005	3.080.042	3.009.213	3.026.711	3.071.406	3.139.324	3.079.282	3.138.854	3.109.487	3.148.754	3.180.074
CO <sub>2</sub> emissions (without LUCF)	3.329.139	3.354.486	3.282.261	3.222.223	3.227.362	3.262.960	3.339.599	3.279.607	3.329.936	3.308.900	3.329.314	3.383.556
CH <sub>4</sub>	414.145	404.840	393.880	384.199	374.686	370.569	366.408	357.279	350.730	343.154	335.189	329.588
N <sub>2</sub> O	408.947	402.710	391.975	383.328	388.660	389.434	396.282	394.276	372.024	351.055	349.367	344.495
HFCs	25.668	24.425	25.991	28.453	33.088	39.255	43.692	49.753	54.070	41.449	45.033	43.383
PFCs	13.403	11.808	9.643	8.258	7.523	7.679	7.717	7.358	7.063	6.885	6.163	5.527
SF <sub>6</sub>	8.311	8.940	9.594	10.365	11.269	12.709	12.839	12.827	12.187	9.890	9.765	9.537
Total (with net CO <sub>2</sub> emissions/removals)	4.007.668	3.990.728	3.911.125	3.823.817	3.841.937	3.891.053	3.966.262	3.900.775	3.934.928	3.861.919	3.894.272	3.912.604
Total (without LUCF)	4.191.729	4.199.406	4.105.362	4.028.907	4.034.691	4.074.811	4.158.724	4.093.280	4.117.858	4.053.531	4.066.658	4.108.256

### ES.3. Overview of source and sink category emission estimates and trends

Table ES2 gives an overview of EC GHG emissions in the main source categories for 1990-2001. The emissions from the largest source category 'Energy' with an 81 % share of the total emissions, increased by 34.170 (1,0 %). This increase was offset by decreases in the second-, third- and fourth-largest categories: emissions from 'Agriculture' decreased by 33.543 Gg (-7,7 %), emissions from 'Industrial Processes' by 50.861 Gg (-16,8 %), and emissions from 'Waste' by 32.498 Gg (-24,1 %).

**Table ES2: Overview of EC GHG emissions in the main source categories 1990 to 2001 in CO<sub>2</sub> equivalents (Gg)**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	CO <sub>2</sub> equivalent (Gg)											
1. Energy	3.309.531	3.343.140	3.273.632	3.213.816	3.206.413	3.236.580	3.315.931	3.249.818	3.299.503	3.274.547	3.288.521	3.343.702
2. Industrial Processes	302.005	290.366	282.760	274.908	287.732	299.731	302.536	307.258	287.768	251.500	255.935	251.143
3. Solvent and Other Product Use	9.559	9.469	9.258	8.860	8.827	8.857	8.872	8.939	8.974	8.936	9.039	8.771
4. Agriculture	433.768	423.311	412.802	407.912	409.350	408.989	412.257	412.354	410.496	410.097	406.816	400.225
5. Land-Use Change and Forestry	-184.060	-208.678	-194.237	-205.090	-192.753	-183.758	-192.462	-192.506	-182.930	-191.612	-172.386	-195.652
6. Waste	134.998	131.282	125.080	121.631	120.452	118.728	117.210	113.134	109.172	106.473	104.392	102.501
7. Other	1.865	1.835	1.828	1.776	1.918	1.937	1.929	1.778	1.946	1.978	1.954	1.914

Table ES3 gives an overview of Member States contribution to the EC GHG emissions for 1990-2001. The largest emitter with a 24,2 % share of the total EC emissions in the year 2001 was Germany with 993.505 Gg and the smallest with a 0,15 % share was Luxembourg with 6.077 Gg.

Germany reduced its emissions significantly (-18 %) between 1990 and 2001, although the emissions increased again between 2000 and 2001 (1,2 %). Similarly, the second-largest emitter, the United Kingdom reduced its emissions by 12 % between 1990 and 2001, though they increased between 2000 and 2001 by 1,3 %. The third-largest emitter, France, stabilised its 2001 emissions at the level of 1990, despite a 0,5 % increase compared to 2000. The smallest emitter Luxembourg decreased its emissions continuously from 1990 to 2001; the overall reduction from the 1990 level was 44 %.

**Table ES3: Overview of MS contribution to EC GHG emissions excluding LUCF from 1990 to 2001 in CO<sub>2</sub> equivalents (Gg)**

Member State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	78.073	82.241	75.291	76.580	77.768	80.797	84.624	84.146	83.819	82.123	81.951	85.880
Belgium	141.216	147.107	145.641	144.038	147.636	151.773	154.182	149.243	153.403	150.054	149.943	150.169
Denmark	69.217	79.910	73.459	76.209	80.039	77.335	90.778	80.945	75.797	72.750	68.181	69.410
Finland	77.233	75.281	72.173	72.829	79.195	76.652	82.122	81.056	78.512	77.831	75.391	80.888
France	560.775	583.739	573.892	552.304	548.945	558.052	573.851	566.525	582.082	564.074	557.909	560.757
Germany	1.211.579	1.158.262	1.104.970	1.086.585	1.065.314	1.058.861	1.077.642	1.040.112	1.015.984	982.932	981.468	993.505
Greece	104.755	104.760	106.172	106.714	109.238	110.429	114.220	119.504	124.343	123.697	129.652	132.176
Ireland	53.420	54.461	55.284	54.983	56.707	57.583	59.249	62.030	64.124	66.256	68.184	70.018
Italy	508.629	510.208	507.441	498.038	492.169	520.385	514.671	521.598	532.608	538.627	543.751	545.355
Luxembourg	10.883	10.455	10.303	10.595	10.257	7.792	7.851	6.851	5.919	6.029	5.996	6.077
Netherlands	210.004	217.795	216.651	219.569	220.869	223.314	232.901	220.330	225.156	216.446	216.816	219.694
Portugal	61.441	63.251	67.322	65.617	66.253	69.972	67.496	69.670	74.577	82.880	82.256	83.823
Spain	287.609	294.203	303.051	291.330	306.069	319.363	311.373	332.546	343.082	371.057	387.104	382.789
Sweden	72.756	72.873	72.042	71.881	76.679	75.085	78.687	73.772	74.907	72.239	68.949	70.485
United Kingdom	744.139	744.862	721.671	701.635	697.555	687.417	709.075	684.952	683.543	646.537	649.107	657.232
<b>EU15</b>	<b>4.191.729</b>	<b>4.199.406</b>	<b>4.105.362</b>	<b>4.028.907</b>	<b>4.034.691</b>	<b>4.074.811</b>	<b>4.158.724</b>	<b>4.093.280</b>	<b>4.117.858</b>	<b>4.053.531</b>	<b>4.066.658</b>	<b>4.108.256</b>

#### **ES.4. Information on indirect GHG and SO<sub>2</sub> emissions**

CO, NO<sub>x</sub>, NMVOC and SO<sub>2</sub> emissions have to be reported to the UNFCCC secretariat because they influence climate change indirectly: CO, NO<sub>x</sub> and NMVOC are precursor substances for ozone which itself is a greenhouse gas. Sulphur emissions produce microscopic particles (aerosols) that can reflect sunlight back out into space and also affect cloud formation. Table ES4 shows the total indirect GHG and SO<sub>2</sub> emissions in the EC between 1990-2001. All emissions were reduced significantly from the 1990 levels: the largest reduction was achieved for SO<sub>2</sub> (-63,6 %) followed by CO (-40,2 %), NMVOC (-29,4 %) and NO<sub>x</sub> (-25,8 %).

**Table ES4: Overview of EC indirect GHG emissions 1990 to 2001 in Gg**

GREENHOUSE GAS EMISSIONS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	Gg											
NO <sub>x</sub>	13.402	13.295	12.985	12.568	11.995	11.673	11.566	11.083	10.774	10.417	10.129	9.941
CO	50.387	48.511	46.579	44.189	41.955	40.446	39.219	37.417	35.539	33.536	30.996	30.118
NMVOC	17.026	16.486	15.978	15.301	15.172	13.874	14.113	14.013	13.181	12.787	12.215	12.014
SO <sub>2</sub>	16.375	14.871	13.692	12.452	11.300	10.184	8.880	7.997	7.603	6.819	6.177	5.963



# Chapter 1: Introduction to the EC GHG inventory

This report is the annual submission of the European Community (EC) to the United Nations Framework Convention on Climate Change (UNFCCC). It presents the greenhouse gas (GHG) inventory of the EC, the process and the methods used for the compilation of the EC inventory as well as GHG inventory data of the individual EC Member States for the years 1990-2001. The GHG inventory data of the EC MS are the basis of the EC GHG inventory. The data published in this report are also the basis of the progress evaluation report of the European Commission (due in October 2003), required under Council Decision 99/296/EC for a monitoring mechanism of Community CO<sub>2</sub> and other greenhouse gas emissions.

This report aims to present transparent information on the process and methods used for compiling the EC GHG inventory. It addresses the relevant aspects at EC level, but does not describe particular sectoral methodologies of the MS GHG inventories. Detailed information on methodologies used by the MS is available in the national MS inventory reports, submitted separately to the UNFCCC secretariat. However, several chapters in this report compile information provided by the MS, where additional insights can be gained. In many cases this MS information is presented in summary overview tables.

The EC GHG inventory has been compiled according to Council Decision 99/296/EC for a monitoring mechanism of Community CO<sub>2</sub> and other greenhouse gas emissions<sup>2</sup> and is based on data delivered by the Member States before 4 April 2003. The EC GHG inventory is the direct sum of the 15 national inventories, except for the IPCC reference approach for CO<sub>2</sub> from fossil fuels. Since the data are revised and updated for all years, they replace EC data previously published, in particular, in the 2002 submission by the European Commission to the UNFCCC Secretariat *Annual European Community Greenhouse Gas Inventory and Inventory Report 1990-2000* (EEA, 2002a) and in the report *Greenhouse gas emission trends in Europe, 1990-2000* (EEA, 2002b).

## **1.1. Background information on GHG gas inventories and climate change**

The annual EC GHG inventory is required for two purposes:

First, the EC, as the only regional economic integration organisation having joined the United Nations Framework Convention on Climate Change (UNFCCC) as a Party, has to report annually on GHG inventories within the area covered by its Member States (MS).

Second, under the Monitoring Mechanism, the European Commission has to assess annually whether the actual and projected progress of MS is sufficient to ensure fulfilment of the EC's commitments under the UNFCCC and the Kyoto Protocol. For this purpose, the Commission has to prepare a progress evaluation report, which has to be forwarded to the European Parliament and the Council by October each year. The annual EC inventory is an important element for the evaluation of actual progress.

The legal basis for the compilation of the EC inventory is Council Decision 99/296/EC amending Council Decision 93/389/EC for a monitoring mechanism of Community CO<sub>2</sub> and other greenhouse gas emissions. The purpose of this decision is to monitor all anthropogenic GHG emissions not controlled by the Montreal Protocol in the EC MS and to evaluate

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<sup>2</sup> OJ L 117, 5.5.1999, p. 35

progress towards meeting GHG reduction commitments under the UNFCCC and the Kyoto Protocol.

Under the provisions of Art 3.2 of Council Decision 99/296/EC, the MS shall report to the Commission each year, not later than 31 December:

- their anthropogenic CO<sub>2</sub> emissions by sources and removals by sinks for the previous calendar year;
- final national inventory data on emissions by sources and removals by sinks for the other GHG for the previous year but one and provisional emission data (inventories) for the previous year.

Other GHG include the five other Kyoto Protocol GHG: methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>). In addition, annual information on emissions of the following gases shall be provided: carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), non methane volatile organic compounds (NMVOCs) and sulphur oxides, in line with the reporting requirements under the UNFCCC.

The reporting requirements for the MS under Council Decision 99/296/EC are elaborated in Guidelines under this Decision, in particular “Part 1: Guidelines for Member States and EC annual inventories” (European Commission, 2000). According to the Decision and these Guidelines the reporting requirements are exactly the same as for the UNFCCC, regarding content and format. The EC and its MS use the *UNFCCC guidelines on reporting and review* (document FCCC/CP/1999/7), and prepare inventory information in the Common Reporting Format (CRF) and the "National Inventory Report" that contains background information.

In accordance with UNFCCC guidelines, the EC and its MS use the IPCC “Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories” (IPCC, 2000), which is consistent with the “Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories” (IPCC, 1997). The use of this report by countries is expected to lead to higher quality inventories and more reliable estimates of the magnitude of absolute and trend uncertainties in reported GHG inventories.

## **1.2. A description of the institutional arrangements for inventory preparation**

The main institutions involved in the compilation of the EC GHG inventory are the EC MS, the European Commission - DG Environment (DG ENV), the European Environment Agency (EEA) and its European Topic Centre on Air and Climate Change (ETC-ACC), Eurostat, and the Joint Research Centre (JRC). Table 1 shows the main institutions and persons involved in the compilation and submission of the EC inventory.

**Table 1: List of institutions and experts responsible for the compilation of MS inventories and for the preparation of the EC inventory**

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European Commission	Jos Delbeke, Lars Müller European Commission, Directorate-General Environment Rue de la Loi 200, B-1049 Brussels, Belgium
European Environment Agency (EEA)	Andre Jol, Andreas Barkman European Environment Agency Kongens Nytorv 6, DK 1050 Copenhagen, Denmark
European Topic Centre on Air and Climate Change (ETC-ACC)	Manfred Ritter, Bernd Gügele, Kati Huttunen European Topic Centre on Air and Climate Change Federal Environment Agency Spittelauer Laende 5, 1090 Vienna, Austria
Eurostat	Nikolaos Roubanis Statistical Office of the European Communities, Eurostat Jean Monnet Building, L-2920 Luxembourg
Joint Research Centre (JRC)	Frank Raes Joint Research Centre, Institute for Environment and Sustainability, Climate Change Unit Via Enrico Fermi, 21020 Ispra (VA), Italy

### 1.2.1. The EC Member States

All EC MS are Parties to the UNFCCC. Therefore, all MS have to prepare individual GHG inventories in accordance with UNFCCC reporting guidelines and to submit those inventories to the Commission by 31 December every year.

Apart from submitting their national GHG inventories and inventory reports the MS take part in the reviewing and commenting phase of the draft EC inventory report, which is sent to the

MS by 1 March each year. The purpose of circulating the draft EC inventory report is to improve the quality of the EC inventory. The MS check their national data and information used in the EC inventory report and send updates, if necessary. In addition, they comment on the general aspects of the EC inventory report.

The MS also take part in the Monitoring Committee established under Council Decision 99/296/EC. The purpose of the Monitoring Committee is to assist the European Commission in its tasks under Council Decision 99/296/EC.

### 1.2.2. The European Commission, Directorate-General Environment (DG ENV)

The European Commission, Directorate-General Environment (DG ENV) in consultation with the EC MS has the overall responsibility for the EC inventory. The European Commission is the official receiver of the MS national inventories and inventory reports under Council Decision 99/296/EC and the official supplier of the EC inventory and inventory report to the UNFCCC secretariat. In the actual compilation of the EC inventory and inventory report, DG ENV is assisted by the European Environment Agency (EEA) including its European Topic Centre on Air and Climate Change (ETC-ACC) and by Eurostat and the Joint Research Centre (JRC).

The consultation between DG ENV and the MS takes place in the Monitoring Committee (established under Article 8 of Council Decision 99/296/EC). The Monitoring Committee is composed of the representatives of the MS and chaired by the representative of the Commission (DG ENV). Procedures within the Committee for decision-making, adoption of measures and voting are also outlined in Council Decision 99/296/EC. In order to facilitate decision making in the Monitoring Committee, three working groups have been established: Working Group 1 “Annual inventories”, Working Group 2 “Assessment of progress (effect of policies and measures, projections)” and Working Group 3 “Emission trading”.

The objectives and tasks of Working Group 1 under the Monitoring Mechanism Committee include:

- The promotion of the timely delivery of national annual GHG inventories as required under the Monitoring Mechanism,
- The improvement of the quality of GHG inventories on all relevant aspects (transparency, consistency, comparability, completeness, accuracy and use of good practices),
- The exchange of practical experience on inventory preparation, on all quality aspects and on the use of national methodologies for GHG estimation,
- The evaluation of the current organisational aspects of the preparation process of the EC inventory and the preparation of proposals for improvements where needed.

### 1.2.3. The European Environment Agency (EEA)

The European Environment Agency (EEA) assists the Commission in the compilation of the annual EC inventory through the work of the European Topic Centre on Air and Climate Change (ETC-ACC). The activities of the EEA/ETC-ACC include:

- Initial checks of MS submissions in co-operation with Eurostat, and JRC, up to 1 March and compilation of results from initial checks (status reports, consistency and completeness reports);
- Consultation with MS in order to clarify data and other information provided;

- Preparation and circulation of the draft EC inventory and inventory report by 1 March based on MS submissions;
- Preparation of the final EC inventory and inventory report by 15 April (to be submitted by the Commission to the UNFCCC secretariat);
- Assisting MS in their reporting of GHG inventories by means of supplying software tools.

The tasks of the EEA and the ETC-ACC are facilitated by the European Environmental Information and Observation Network (EIONET), which consists of the EEA as central node (supported by European Topic Centres) and national institutions in the EEA member countries that supply and/or analyse national data on the environment (see <http://eionet.eea.eu.int/>).

#### 1.2.4. The European Topic Centre on Air and Climate Change (ETC-ACC)

The European Topic Centre on Air and Climate Change (ETC-ACC) was established by a contract between the lead organisation National Institute of Public Health and the Environment - RIVM (The Netherlands) and EEA in March 2001. The ETC-ACC involves 13 organisations and institutions in nine European countries. The technical annex for the 2003 work plan for the ETC-ACC and an implementation plan specify the specific tasks of the ETC-ACC partner organisations with regard to the preparation of the EC inventory. The Federal Environment Agency Austria (UBA Vienna) is the task leader for the compilation of the EC annual inventory in the ETC-ACC, including all tasks mentioned above.

The EEA/ETC-ACC provides software tools for MS to compile national GHG inventories and to convert their national inventory from CORINAIR-SNAP source category codes into the required CRF source categories. The main software tools are CollectER, for compiling and updating national emission inventories, and ReportER, for reporting the emissions in the required format, e.g. CRF. In addition, separate software tools are available to prepare estimates of emissions from agriculture and road transport. These tools are being used by several EC MS. The EEA/ETC-ACC adapts the tools regularly to latest changes in reporting requirements. The tools are available at <http://etc-acc.eionet.eu.int/>.

#### 1.2.5. Eurostat

Based on Eurostat energy balance data, Eurostat compiles annually by 31 March estimates of the EC CO<sub>2</sub> emissions from fossil fuels using the IPCC reference approach. Eurostat compares these estimates with national estimates of CO<sub>2</sub> emissions from fossil fuels prepared by MS and provides information summarising and explaining these differences. In order to improve the consistency of MS and Eurostat energy data, a project on harmonisation of energy balances has started between Eurostat and national statistical offices. In addition, Eurostat is leading an EU project aimed at improving estimates of GHG emissions from international aviation.

#### 1.2.6. Joint Research Centre (JRC)

The Joint Research Centre (JRC) assists in the improvement of methodologies for the LULUCF sector. It does so (1) by intercomparing methodologies used by the MS for estimating emissions and removals with a focus on LULUCF and (2) by providing EU-wide estimates with various models/methods for emissions and removals with a focus on LULUCF (including inverse modelling using measurement of ambient air concentrations of GHGs). In addition, the JRC is leading a project for improving the methodologies used for estimating GHG emissions from agriculture.

### 1.3. A description of the process of inventory preparation

The annual process of compilation of the EC inventory is summarised in Table 2. The EC MS should submit their annual GHG inventory by 31 December each year to the European Commission (DG ENV). Then, EEA/ETC-ACC, Eurostat and JRC perform initial checks of the submitted data up to 1 March. ETC-ACC transfers the nationally submitted data from the CRF (Common Reporting Format) tables into spreadsheets. From these spreadsheets the data are transferred into the EC CRF tables and into the ETC-ACC database.

**Table 2: Annual process of submission and review of MS inventories and compilation of the EC inventory** <sup>1)</sup>

Element	Who	When	What
1. Submission of annual inventory by MS	Member States	31 December annually	Anthropogenic CO <sub>2</sub> emissions and CO <sub>2</sub> removals by sinks, for the year n-1 Emissions by source and removals by sinks of the other GHG; Final data for the year n-2 and provisional data for the year n-1 <sup>2)</sup>
2. Initial check of MS submissions	European Commission (DG ENV, Eurostat, JRC), assisted by EEA/ETC-ACC	up to 1 March	Initial checks (by EEA/ETC-ACC) Comparison of energy data in MS IPCC Reference Approach with Eurostat energy data (by Eurostat and MS) and comparison of MS and JRC's LULUCF inventory estimates
3. Compilation and circulation of draft EC inventory and inventory report	European Commission (DG ENV), assisted by EEA/ETC-ACC	1 March	Draft EC inventory (by EEA), based on MS inventories and additional information where needed Circulation of the draft EC inventory on 1 March
4. Submission of updated or additional data by MS	Member States	up to 1 April	Updated or additional data submitted by MS <sup>3)</sup>
5. Final annual EC inventory	European Commission (DG ENV), assisted by EEA/ETC-ACC	15 April	Submission of the final annual EC inventory to UNFCCC. This inventory will also be used to evaluate progress as part of the Monitoring Mechanism
6. Additional review of MS submissions and EC inventory	European Commission (DG ENV, Eurostat, JRC), assisted by EEA/ETC-ACC	June to December	Additional review aimed at improving the next annual MS and EC inventories In November Eurostat makes available to MS energy balance data (1990 to inventory year)

1) In accordance with Council Decision 1999/296/EC

2) In accordance with Art. 3(1) and 3(2) of Council Decision 1999/296/EC

3) Preferably updating is limited to the following situations: to remove major inconsistencies, to fill major gaps or to provide essential additional information. Documentation should be included describing which data are updated or are additional, compared to the submission of 31 December.

On 1 March, the draft EC GHG inventory and inventory report are circulated to the EC MS for reviewing and commenting. The MS check their national data and information used in the EC inventory report and send updates, if necessary, and review the EC inventory report by 1 April. This procedure should assure the timely submission of the EC GHG inventory and inventory report to the UNFCCC secretariat and it should guarantee that the EC submission to the UNFCCC secretariat is consistent with the MS UNFCCC submissions.

The final EC GHG inventory and inventory report is prepared by EEA/ETC-ACC by 15 April for submission to the UNFCCC secretariat. In late April the inventory and the inventory report are published on the EEA web site (<http://www.eea.eu.int>) and the data are made available through the EEA data warehouse (<http://dataservice.eea.eu.int/dataservice>). In addition, the EC inventory report is published by EEA as a printed report, with a CD-ROM including the data.

#### **1.4. General description of methodologies and data sources used**

The inventory is compiled in accordance with the recommendations for inventories set out in the UNFCCC *Guidelines for the Preparation of National Communications by Parties included in Annex 1 to the Convention, Part 1: UNFCCC Reporting Guidelines on Annual Inventories*, to the extent possible<sup>4</sup>. In addition, the *Revised IPCC 1996 Guidelines for National Greenhouse Gas Inventories* have been applied and also the *IPCC Good Practice Guidance*, where appropriate and feasible. At EC level, Council Decision 99/296/EC and the guidelines thereunder have been used for the compilation of the EC GHG inventory.

The EC greenhouse gas inventory is compiled on basis of the inventories of the 15 EC Member States. The reference approach is calculated for the EC on basis of Eurostat energy data (see Chapter 3.5) and the key source analysis (Chapter 1.5) is separately performed at EC level.

Since MS use different national methodologies, background activity data or emission factors in accordance with IPCC guidelines, these methodologies are reflected in the EC GHG inventory data. In general, no additional methodological information can be provided at EC level except summaries of methodologies used by MS. However, in some areas possibilities of quality improvement were defined for the estimation at MS level, and work was started in these areas including energy background data, emissions from international bunkers, emissions and removals from LUCF, and emissions from agriculture.

The EC CRF Table Summary 3 in Annex 2 provides information on methodologies and emission factors used by the Member States. These tables have been compiled on basis of the information provided by the MS in their CRF Tables Summary 3. The sector specific chapters list the methodologies and emission factors used by the Member States for each EC key source. Annex 5 includes the CRF Tables Summary 3 for those MS that submitted these tables in 2002.

#### **1.5. Description of key source categories**

A key source analysis has been carried out according to the Tier 1 method (quantitative approach) described in IPCC (2000). A key source category is defined as an emission source that has a significant influence on a country's GHG inventory in terms of the absolute level of emissions, the trend in emissions, or both. The basis of the analysis is IPCC (2000), but the source categories adopted for the analysis at EC level are more aggregated than those suggested in IPCC (2000) because of lack of data at a more disaggregated level.

In addition to the key source analysis at EC level, the MS provide a national key source analysis which can differ from the assessment at EC level. The EC key source analysis is not intended to replace key source analysis by MS. The key source analysis at EC level is carried out to identify those source categories for which overviews of MS methodologies, emission factors and quality estimates are provided.

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<sup>4</sup> The UNFCCC guidelines were revised in 2002 (FCCC/CP/2002/8, 28 March 2003). Parties should start using the revised guidelines for reporting the annual inventories due in the year 2004. However, the structure of the NIR as included in the revised guidelines was already used for the EC inventory report 2003, in order to make the report more transparent.

To identify key source categories of the EC, the following procedure was applied:

1. Starting point for the key source identification for this report was the CRF Table Summary 1.A. of the EC GHG inventory. All source categories where GHG emissions occur were listed, at the most disaggregated level available at EC level and split by gas. This way, a list of 68 source categories was identified.
2. For the base year only a level assessment was carried out. For all years starting from 1991 a level and a trend assessment was performed. Annex 1 shows the key sources identified in the level and trend assessments for all years from the base year to 2001.
3. This procedure resulted in the identification of 28 key source categories for the EC for 2001. The EC key sources are listed in Table 3 and ranked according to their level contribution to total EC GHG emissions in 2001. They cover 98,1 % of total EC GHG emissions in 2001.

**Table 3: EC GHG source categories identified as key sources (emissions in Gg of CO<sub>2</sub> equivalents)**

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	2001	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.119.301	-25.133	-2%	27,2%	27,2%
1.A.3. Transport	CO <sub>2</sub>	695.003	833.925	138.922	20%	20,3%	47,5%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	655.763	20.667	3%	16,0%	63,5%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	585.160	-57.189	-9%	14,2%	77,8%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	196.818	-17.670	-8%	4,8%	82,5%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	131.631	-12.460	-9%	3,2%	85,7%
2.A. Mineral Products	CO <sub>2</sub>	106.934	105.952	-982	-1%	2,6%	88,3%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	80.295	-30.687	-28%	2,0%	90,3%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	49.167	-56.929	-54%	1,2%	91,5%
4.B. Manure Management	CH <sub>4</sub>	45.172	45.268	97	0%	1,1%	92,6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	31.383	25.216	409%	0,8%	93,3%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	28.338	-4.631	-14%	0,7%	94,0%
1.A.3. Transport	N <sub>2</sub> O	11.660	26.361	14.701	126%	0,6%	94,7%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.856	-1.847	-7%	0,6%	95,3%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.562	-1.933	-8%	0,5%	95,8%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.377	-870	-5%	0,4%	96,2%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	15.277	-33.233	-69%	0,4%	96,5%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	11.957	-20.416	-63%	0,3%	96,8%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.769	-2.116	-16%	0,3%	97,1%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.081	-1.202	-13%	0,2%	97,3%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.739	-2.713	-26%	0,2%	97,5%
1.A.5. Other	CO <sub>2</sub>	20.076	7.307	-12.770	-64%	0,2%	97,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	6.543	-3.074	-32%	0,2%	97,8%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.579	-913	-14%	0,1%	98,0%
2 C Metal Production	PFC	5.637	3.100	-2.537	-45%	0,1%	98,0%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	1.946	-1.262	-39%	0,0%	98,1%
2.G. Other	CO <sub>2</sub>	1.111	1.295	184	17%	0,0%	98,1%
6.D. Other	CO <sub>2</sub>	881	420	-461	-52%	0,0%	98,1%

In the subsequent sectoral chapters (Chapters 3-9) for each key source an overview table is presented which includes the MS contributions to the EC key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates.

## 1.6. Information on the QA/QC plan

The EC GHG inventory is based on the annual inventories of the EC MS. Therefore, the quality of the EC inventory depends on the quality of the MS inventories, the QA/QC procedures of the MS and the quality of the compilation process of the EC inventory.



## 1.6.1 QA/QC of the EC Inventory

The initial checks of MS submissions are an essential component of the annual QA/QC procedure at EC level. The initial checks include two elements; checking the completeness of the MS CRF tables and checking the consistency of MS GHG data.

The checks of completeness of MS submissions are carried out by ETC-ACC by using a similar status report form as used by the UNFCCC secretariat. The completed status reports are made available to MS (through the EIONET and the circulation on 1 March); then MS can check the status reports and update information, if needed. The status reports of the MS submissions as by 4 April 2003 are included in Annex 3 of this report.

The consistency check of MS data primarily aims at the identification of main problems in time series or sub-category sums. In addition, the ETC-ACC identifies problems by comparison with the previous year's inventory submission of the MS and checks the availability of the CRF tables needed for the compilation of the EC inventory. The results of these checks are documented in the consistency and completeness report and are made available to the MS, in order to obtain, if needed, revised emission estimates or additional information before 1 April.

After the initial checks of the emission data, the ETC-ACC transfers the national data from the CRF tables into spreadsheets and into the ETC-ACC database on emissions of GHG and air pollutants. The version of the data received by ETC-ACC are numbered, in order to be traced back to their source. The ETC-ACC database is a relational database (MS ACCESS) and maintained and managed by UBA Vienna. A number of further checks are carried out during the compilation of the EC inventory and before submitting the final EC GHG inventory and inventory report.

**Table 4: Quality Control activities related to the EC inventory at the UBA Vienna**

Main types of checks	Check report	Checks
Initial checks of MS submissions	Status report	Complete status report form for each MS submission
	Consistency and completeness report <sup>1)</sup>	Check deviations in time series of +/-10% annually and +/-50% over the whole time period
		Check time series against previous submissions (document deviation +/-5%)
		Check sub-categories sum
		Check information availability in those CRF tables that are needed for the compilation of the EC inventory
		Check consistency between NIR and CRF
Checks during the preparation of the EC inventory	Preparation report	Check that known data gaps that result in incomplete source category emission estimates are documented
		Check that MS submissions using the same input data (e.g. energy consumption, animal population data) report comparable values (i.e. analogous in magnitude) for the data (in case that these activity data are reported at EC level)
		Document any further findings and procedures applied
		Specify exact data source (e.g. are data taken from Table 1.A or Table 10)
Checks before the final submission of the CRF	CRF Tables	Confirm that estimates are reported for all source categories and for all years from the appropriate base year to the period of the current inventory
		Check that emissions data are correctly (1) aggregated from lower reporting levels to higher reporting levels when preparing summaries and (2) transcribed between different intermediate sheets
		Check that the number of significant digits or decimal places for common parameters, conversion factors, emission factors, or activity data are consistent across source categories; total emissions should also be reported consistently (in terms of significant digits or decimal places) across source categories

	Inventory report	Check the inventory report (layout, consistency, tables and figures, references, general format)
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1) The consistency and completeness reports have been sent to the MS on 1 March and are available from the EEA on request.

Sector specific checks and activities to improve the quality of the EC inventory are performed by Eurostat in the energy sector (see Chapters 3.3 and 3.6) and by JRC in the sectors agriculture and LUCF (see Chapters 6.3 and 7.2).

The circulation of the draft EC inventory and inventory report on 1 March to the EC MS for reviewing and commenting is also an element to improve the quality of the EC inventory and inventory report. The MS check their national data and information used in the EC inventory report and send updates, if necessary, and review the EC inventory report. This procedure should assure the timely submission of the EC GHG inventory and inventory report to the UNFCCC secretariat and it should guarantee that the EC submission to the UNFCCC secretariat is consistent with the MS UNFCCC submissions.

Finally, also the detailed analysis of GHG emission trends of the EC and each EC Member State after the submission of the EC inventory to the UNFCCC contributes to the improvement of the quality of the EC GHG inventory. This analysis is carried out in the annual EC GHG trend report (see EEA, 2002b); the report identifies sectoral indicators, for socio-economic driving forces of greenhouse gas emissions, by using data from Eurostat or from Member States' detailed inventories. In addition, it compares and analyses Member States' emission trends in the EC key sources and provides main explanations, either socio-economic developments or policies and measures, for these trends in some Member States.

#### 1.6.2. Overview of QA/QC procedures in place at MS level

The following Table 5 gives an overview of QA/QC procedures in place at MS level. The information is taken from the latest available MS National Inventory Reports.

**Table 5: Overview of QA/QC procedures in place at MS level as by 1 April 2003 (mainly excerpts from MS national inventory reports 2002 and 2003)**

	Short description of the QA/QC procedures in place extracted from MS national inventory reports	Source
Austria	The Austrian Federal Environment Agency as the responsible body for compiling the national GHG emissions inventory is currently implementing a quality management following EN 45000, a series of European standards similar to the ISO 9000 series. The Federal Environment Agency has decided to implement a quality management system based on the European standard EN 45004, which specifies general criteria for the operation of various types of bodies performing inspections. The full implementation of the system was foreseen for June 2001, the accreditation of the Federal Environment Agency as inspection body according to EN 45004 is foreseen for 2003. The QA/QC system which is currently implemented at the Federal Environment Agency is fully compatible with the requirements of the IPCC Good Practice Guidance (IPCC, 2000).	Federal Environment Agency - Austria (2001)
Denmark	In the preparation of Denmark's annual emission inventories normal and common Quality Control procedures are performed. Work on Quality Assurance and documentation is carried out as a result of the UNFCCC's in-depth-reviews, latest resulting in the report "Report of the individual review of the greenhouse gas inventory of Denmark submitted in the year 2001". Work to improve QA/QC procedures in preparing the Danish emission inventories is included in a planned project to implement GPG and improve reporting as a consequence of Kyoto Protocol.	National Environmental Research Institute (2002)
Finland	The quality management system for the national GHG inventory is currently under development and will be implemented in the inventory of the year 2002 emissions. Statistics Finland as the National Inventory Agency will coordinate the project. The expert institutes participating in the inventory are presently building up quality systems for the inventories in their areas of expertise. The annually reported CRF tables are archived both at the Finnish Environment Institute and Statistics Finland. The method descriptions together with documents of the original data sources are archived at the Finnish Environment Institute with the exception of confidential activity data in the energy sector that are archived at Statistics Finland. The present inventory of the year 2001 emissions is not verified by a third party but in the interministerial working group.	Ministry of the Environment (2003a)
France	All actions concerning the improvement of QA/QC will be reinforced, in particular by adaptation of QA/QC instruments and procedures, extended consultation with experts in different fields, the ISO 9001 certification of the institution compiling the inventory, etc.	CITEPA (2001)
Ireland	Ireland has not yet developed formal quality assurance and quality control (QA/QC) systems on the scale recommended by the IPCC good practice guidance. The inventory preparation process employed in Ireland does incorporate a number of activities that may be regarded as fundamental elements of quality control. The emission estimates for the most important source sectors (Energy and Agriculture) are produced in three computational systems simultaneously. Firstly, simple spreadsheets are used to undertake a considerable amount of preparatory calculations and to subsequently derive the emissions estimates by combining activity data and emission factors at the most appropriate level of disaggregation. Conversion to IPCC source categories is part of this process. Secondly, the greenhouse gas emission estimates are derived by the CollectER software, as part of a much wider range of emission inventories stored in the database. Thirdly, the IPCC software is used to produce emissions in the major source categories because the results may be directly imported into the CRF file, providing a convenient starting point in the preparation of the annual CRF. This duplication provides rigorous internal checking of the calculation process and it ensures that there is consistency of application regarding units, aggregation, inputs that are common to several source categories and, in the case of Energy, the inclusion of emissions estimates supplied by contributing bodies. Simple comparison of source category totals at IPCC Level 1 or Level 2 and at the national scale provides convenient completeness checks and immediate identification of gross errors or omissions.	Environmental Protection Agency (2002)
Netherlands	In 1997, the quality assurance system ISO 9001 has been introduced to ascertain the quality of the monitoring process related to the Pollutant Emission Register (PER). All procedural activities by the Inspectorate for Environmental Protection of the Ministry of Housing, Spatial Planning and the Environment (VROM/HIMH), the Netherlands Organisation for Applied Scientific Research (TNO) and the National Institute of Public Health and Environment (RIVM) are subject to this quality control as well as the maintenance of the PER database by RIVM. However, the activities of actual data collection and emission calculations by the Task Groups are not yet part of the formal ISO quality assurance program. A number of external reviews have been conducted regarding GHG emission data in recent years, although the contents of the PER as a whole is not subjected to regular external reviews. An inventory improvement programme was started with the creation of the Working Group Emission Monitoring of GHG (WEB). In 2001, the WEB started a two-phase project, to develop a QA/QC system for the Dutch NIR/CRF process which is in line with the QA/QC guidelines from the UNFCCC and the IPCC. The first phase evaluated existing practices; the second phase is directed to develop and implement the QA/QC system itself and started in 2002.	Olivier, J.G.J., Brandes, L.J., Peters, J.A.H.W. and Coenen, P.W.H.G. (2002)

Sweden	Sweden has begun an initial quality assurance (QA), but the QA/QC plan is not fully adopted yet. Apart from the UNFCCC's In-Depth-Reviews and individual reviews on the inventories resulting in the report "Report of the individual review of the GHG inventory of Sweden submitted in the year 2001", Quality Assurance (QA) with independent review of the inventories has partly been made in 2002 and will be further developed in 2003 and 2004. The IPCC has developed guidance on good practice, which also includes good practice guidance on QA/QC. For some parts of the Swedish Emission Inventories the good practice has been implemented, except for QA. Sweden will during the next years improve its Emission Inventories and will include further elaboration of how formal QA/QC procedures could be implemented upon the full adoption of the IPCC's Good Practice Guidance.	Swedish Environmental Protection Agency (2003)
UK	The UK QA/QC system complies with the Tier 1 procedures outlined in the Good Practice Guidance (IPCC, 2000). Plans are underway to develop the system and extend the range of activities so that the system complies with Tier 2. A detailed QA/QC activities schedule until 2004 is presented including external peer reviews for key sources. The Inventory has been subject to ISO 9000 since 1994 and is liable to audit by Lloyds and the AEAT internal QA auditors. The National Atmospheric Emissions Inventory has been audited favourably by Lloyds on two occasions in the last four years. The emphasis of these audits was on authorisation of personnel to work on inventories, document control, data tracking and spreadsheet checking. As part of the Inventory management structure there is a nominated officer responsible for the QA/QC system –the QA/QC Co-ordinator. Special QA/QC activities undertaken in 2000-2002 included verification of the inventory, revision of halocarbon estimates, expert peer review of fuel combustion sources of carbon dioxide, revision of estimates of methane emissions from landfill, in depth review of the UK National Inventory by the UNFCCC, September 2002, review of the estimation of emissions from aviation in the UK greenhouse gas inventory and compliance check of the current UK National Inventory Report structure to the proposed requirements of the UNFCCC.	National Environmental Technology Centre (2002, 2003)

### **1.7. General uncertainty evaluation**

The CRF Table 7 in Annex 2 shows information on completeness and quality of GHG emissions for the EC key sources. These estimates are based on the information provided by the MS in their CRF Tables 7. The overview tables in Chapters 3-9 provide this information for each EC key source.

Table 6 gives an overview of information provided by MS on uncertainty estimates in their latest available National Inventory Reports and presents summarised results of these estimates. The overview table provides general information on uncertainty estimates of the MS and quantified uncertainty estimates at total gas level, if available.

**Table 6: Overview of uncertainty estimates available from MS (mainly excerpts from MS national inventory reports)**

	Uncertainty estimates extracted from MS national inventory reports	Source															
Austria	<p>Uncertainty analysis including systematic and random uncertainty was carried out for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O for 1990 and 1997. The results of the calculations are as follows:</p> <table><tr><td>Total uncertainty</td><td>CO<sub>2</sub></td><td>CH<sub>4</sub></td><td>N<sub>2</sub>O</td><td>Total GHG emissions (excluding fluorinated gases)</td></tr><tr><td>1990</td><td>2,3 %</td><td>48,3 %</td><td>89,6 %</td><td>9,8 %</td></tr><tr><td>1997</td><td>2,1 %</td><td>47,4 %</td><td>85,9 %</td><td>8,9 %</td></tr></table>	Total uncertainty	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total GHG emissions (excluding fluorinated gases)	1990	2,3 %	48,3 %	89,6 %	9,8 %	1997	2,1 %	47,4 %	85,9 %	8,9 %	Federal Environment Agency - Austria (2001)
Total uncertainty	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total GHG emissions (excluding fluorinated gases)													
1990	2,3 %	48,3 %	89,6 %	9,8 %													
1997	2,1 %	47,4 %	85,9 %	8,9 %													
Denmark	<p>The National Inventory Report refers to Denmark's 2<sup>nd</sup> National Communication where the uncertainty of NMVOC, CH<sub>4</sub> and N<sub>2</sub>O is assumed to be the highest (perhaps with an uncertainty factor 2). The uncertainty of CO and NO<sub>x</sub> inventories is assumed to be less than 30-40 % and the uncertainty of CO<sub>2</sub> may be as low as 1-2 %. Applying the methodology mentioned in Annex 1 of the Reporting Instructions of the Revised 1996 IPCC Guidelines for National GHG Inventories these estimates lead to an overall uncertainty of the GHG emissions in CO<sub>2</sub> equivalents of +/- 23 %. This estimate does not take into account the 35 % uncertainty of the GWP-factors. Sensitivity analysis shows that it is the huge uncertainty of N<sub>2</sub>O emissions from agricultural soils, which are the key factor for overall uncertainty of the Danish GHG inventory. Work is underway to implement uncertainty according to GPG. The results of this work are expected to be included in the Danish NIR 2004.</p>	National Environmental Research Institute (2002)															
Finland	<p>In the year 2001 inventory, the uncertainty assessment was performed for the first time using the Monte Carlo simulation (Tier 2 method). The uncertainties in the input parameters were estimated using the IPCC default uncertainties, expert elicitation, domestic and international literature and available measurement data. A separate report on the uncertainty estimates (Monni and Syri 2003) will be published in 2003. According to the calculations, the uncertainty estimates for 2001 were as follows:</p> <table><tr><td>Total GHGs</td><td>CO<sub>2</sub></td><td>CH<sub>4</sub></td><td>N<sub>2</sub>O</td><td>Fluorinated gases</td></tr><tr><td>-5/+6%</td><td>-4/+6%</td><td>-19/+20%</td><td>-33/+40%</td><td>-53/+32%</td></tr></table> <p>The share of CO<sub>2</sub> emissions from fuel combustion, which has low uncertainties, is large in Finland, thus resulting in a rather low total inventory uncertainty, though some input parameters in other emission categories have very large uncertainties.</p>	Total GHGs	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Fluorinated gases	-5/+6%	-4/+6%	-19/+20%	-33/+40%	-53/+32%	Ministry of the Environment (2003a)					
Total GHGs	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Fluorinated gases													
-5/+6%	-4/+6%	-19/+20%	-33/+40%	-53/+32%													
France	<p>Work is underway for estimating uncertainties of GHG emissions according to the Good Practice Guidance (IPCC, 2000). The uncertainties of CO<sub>2</sub> and SO<sub>2</sub> from energy use are assumed to be less than 5 %.</p>	CITEPA (2001)															
Germany	<p>The report states that partly emission uncertainties are considerable. This is due to uncertainties of activity data and emission factors and - to a much lesser extent - to a lack of information on emission causing activities. In general, the uncertainty of combustion-related emissions is considerably lower than uncertainty of non-combustion related emissions. The uncertainties are estimated to be higher for emissions after 1999 because they have to be considered as preliminary estimates. For qualitative estimates of emission uncertainties the report refers to the relevant CRF Tables.</p>	Bericht 2002 der Bundesrepublik Deutschland (2002)															
Ireland	<p>The Tier 1 method provided by IPCC (2000) has been used to make an uncertainty estimate of the Irish inventory time series for the years 1990-2000. This analysis results in an overall uncertainty of approximately 11 percent in the 2000 inventory of greenhouse gases and a trend uncertainty of 5 percent for the period 1990 to 2000. This outcome is determined largely by the uncertainty in the estimate of N<sub>2</sub>O emissions from agricultural soils, where an emission factor uncertainty of 100 percent is assumed in order to complete the analysis. This highlights the need for more reliable data on this particular emission source in Ireland. Two-thirds of total Irish emissions, i.e. the proportion contributed by CO<sub>2</sub>, are estimated to have an uncertainty of less than 2 percent. When CH<sub>4</sub> is included, bringing the proportion up to 85 percent, the total uncertainty remains less than 4 percent, even though there are large uncertainties assigned to the CH<sub>4</sub> emission factors in most source categories. However, it is the influence of N<sub>2</sub>O that leads to a substantial uncertainty in total emissions. This influence is not as large in the case of the trend, due to the modest change in emissions of N<sub>2</sub>O from 1990 to 2000 and the relatively small share of this gas in total emissions. The impact of HFC, PFC and SF<sub>6</sub> on inventory uncertainty in the year 2000 is negligible because these gases account for less than 1 percent of total emissions.</p>	Environmental Protection Agency (2002)															

	Uncertainty estimates extracted from MS national inventory reports	Source																								
Netherlands	<p>The Netherlands estimated uncertainty in annual emissions and in emission trends by applying the IPCC Tier 1 uncertainty approach at the level of the IPCC list of possible key sources. The results of the uncertainty estimates for 2000 CO<sub>2</sub> equivalent emissions is as follows:</p> <table><tr><td>Total GHG</td><td>CO<sub>2</sub></td><td>CH<sub>4</sub></td><td>N<sub>2</sub>O</td><td>HFCs</td><td>PFCs</td><td>SF<sub>6</sub></td></tr><tr><td>±4 %</td><td>±3 %</td><td>±25 %</td><td>±50 %</td><td>±50 %</td><td>±50 %</td><td>±50 %</td></tr></table> <p>The results of the uncertainty estimates for the trend 1990-2000 CO<sub>2</sub> equivalent emissions is as follows:</p> <table><tr><td>Total GHG</td><td>CO<sub>2</sub></td><td>CH<sub>4</sub></td><td>N<sub>2</sub>O</td><td>Fluorinated gases</td></tr><tr><td>±3 %</td><td>±3 %</td><td>±7 %</td><td>±12 %</td><td>±11 %</td></tr></table>	Total GHG	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	±4 %	±3 %	±25 %	±50 %	±50 %	±50 %	±50 %	Total GHG	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Fluorinated gases	±3 %	±3 %	±7 %	±12 %	±11 %	Olivier, J.G.J, Brandes, L.J., Peters, J.A.H.W. and Coenen, P.W.H.G. (2002)
Total GHG	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>																				
±4 %	±3 %	±25 %	±50 %	±50 %	±50 %	±50 %																				
Total GHG	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Fluorinated gases																						
±3 %	±3 %	±7 %	±12 %	±11 %																						
Spain	The Spanish report mentions that the assessment of uncertainty (estimation of emission quality) is shown in Table 7 of the CRF using the quality codes H (high), M (medium), and L (low). This ordinal classification of quality is only a first stage in the analysis of the uncertainty associated with the inventory estimations. Work is now in progress for the implementation of a quantitative estimation of uncertainty in accordance with the approach recommended in IPCC (2000).	Ministry of the Environment (2003b)																								
Sweden	The uncertainty in reported emissions arises from the uncertainty in the activity data, uncertainty in emission factors and uncertainty arising from whether all (major) sources of emissions are included in the inventory. For most sectors Swedish official statistics are used as activity data, except for industrial processes, emissions from F-gases and for solvent use where information comes from the industries annual Environmental Reports. Used emission factors originate either from measurements from existing Swedish plants or from comparable European installations, where IPCC default emission factors are not used. In 2003 validation of uncertainties for the emission estimates will be started. It is assumed that the uncertainty is largest for the inventories of CH <sub>4</sub> and N <sub>2</sub> O, perhaps with an uncertainty factor of 2, for NMVOC, which have been recalculated possibly in the order of 50%, while the uncertainty on the CO, SO <sub>2</sub> and NO <sub>x</sub> inventories is assumed to be less than 30 - 40% and the uncertainty with the CO <sub>2</sub> may be as low as 1 - 2%.	Swedish Environment al Protection Agency (2003)																								
UK	<p>Quantitative estimates of the uncertainties in the emissions were calculated by using Monte Carlo simulation. This corresponds to the IPCC Tier 2 approach discussed in the Good Practice Guidance (IPCC, 2000). The results for the UK are as follows (calculated as 2s/E where s is the standard deviation and E is the mean, calculated in the simulation):</p> <table><tr><td></td><td>Total GHG</td><td>CO<sub>2</sub></td><td>CH<sub>4</sub></td><td>N<sub>2</sub>O</td><td>HFCs</td><td>PFCs</td><td>SF<sub>6</sub></td></tr><tr><td>Emissions 2001</td><td>13%</td><td>2,2%</td><td>14%</td><td>204%</td><td>25%</td><td>19%</td><td>13%</td></tr><tr><td>Range of likely % change 2001 and 1990</td><td>-15% / -10%</td><td>-6,9% / -4,2%</td><td>-49% / -31%</td><td>-73% / -17%</td><td>-47% / 9%</td><td>-76% / -59%</td><td>103% / 192%</td></tr></table> <p>The Tier 1 approach based on the error propagation equations suggests an uncertainty of 17 % in the combined GWP total emissions in 2001. The analysis also estimates an uncertainty of 2 % in the trend between 1990 and 2000.</p>		Total GHG	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Emissions 2001	13%	2,2%	14%	204%	25%	19%	13%	Range of likely % change 2001 and 1990	-15% / -10%	-6,9% / -4,2%	-49% / -31%	-73% / -17%	-47% / 9%	-76% / -59%	103% / 192%	National Environmental Technology Centre (2003)
	Total GHG	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>																			
Emissions 2001	13%	2,2%	14%	204%	25%	19%	13%																			
Range of likely % change 2001 and 1990	-15% / -10%	-6,9% / -4,2%	-49% / -31%	-73% / -17%	-47% / 9%	-76% / -59%	103% / 192%																			

## 1.8. General assessment of the completeness

### 1.8.1. Completeness of MS submissions

The EC GHG inventory is compiled on basis of the inventories of the 15 EC MS. Therefore, the completeness of the EC inventory depends on the completeness of the Member States submissions.

Table 7 summarises timeliness and completeness of the MS submissions as by 4 April 2003. It shows that nine MS submitted their GHG inventories in time to the European Commission, i.e. by 31 December 2002. Eleven MS submitted all or almost all tables (i.e. more than 90 %) of the CRF tables for 1990-2001. All MS provided information on fluorinated gases, but there are still some data gaps in the time series 1990-2001. The completeness of national submissions with regard to individual CRF tables in the 2003 submission can be found in the status reports in Annex 3. In addition, MS information on the completeness of their emission estimates at source level can be seen from the overview tables in Chapters 3-8 and in the CRF Tables 7 of the MS in Annex 5.

**Table 7: Date of submissions (updates submitted), years covered and CRF Tables available from MS by 4 April 2003**

MS	Submission dates	Latest data available	Years covered	CRF Tables <sup>1)</sup>
Austria	30 Dec 2002	2001	1990 - 2001	All
Belgium	23 Dec 2002	2001	1990 - 2001	Summary Tables, Sectoral Report Tables
	31 Mar 2003	2001	1990 - 2001	All
Denmark	27 Dec 2002	2001	1990 - 2001	All
	31 Mar 2003	2001	1990 - 2001	All
	4 Apr 2003	2001	1990 - 2001	All
Finland	12 Dec 2002	2001	1990 - 2001	All
	28 Mar 2003	2001	1990 - 2001	All
France	30 Dec 2002	2001	1990 - 2001	All
Germany	31 Jan 2003	2001	1990 - 2001	All
	1 Apr 2003	2001	1990 - 2001	All
Greece	31 Mar 2003	2001	2001	All, except Trend Table 10
Ireland	23 Dec 2002	2001	1990 - 2001	Full CRF only for 2001; no fluorinated gases for 2001
	28 Mar 2003	2001	1990 - 2001	All
Italy	31 Mar 2003	2001	1990 - 2001	Full CRF only for 2001
Luxembourg	15 Jan 2003	2001	2001	Summary Table 1A, Summary Report 3, Overview Table 7
Netherlands	17 Dec 2002	2001	1990 - 2001	All
	28 Feb 2003	2001	1990 - 2001	All
	28 Mar 2003	2001	1990 - 2001	All
Portugal	31 Mar 2003 / 4 Apr 2003	2001	1990 - 2001	All
Spain	14 Feb 2003	2001	1990 - 2001	All
	31 Mar 2003	2001	1990 - 2001	All
Sweden	20 Dec 2002	2001	1990 - 2001	All
	31 Mar 2003	2001	1990 - 2001	All
United Kingdom	24 Dec 2002	2001	1990 - 2001	All
	31 Mar 2003	2001	1990 - 2001	All

1) All = all or almost all (more than approx. 90 %) of the CRF Tables (see Annex 3 for more detail)

Table 8 shows the availability of MS National Inventory Reports and/or additional inventory information and a short characterisation of the information provided for the 2003 submission.



**Table 8: National Inventory Reports and additional information available from MS as by 5 April 2003**

MS	2002	2003	Characterisation of the report 2003
Austria	-	Federal Environment Agency - Austria (2002)	Short report including methodological changes with regard to the previous submission and emission trends.
Belgium	-	-	
Denmark	National Environmental Research Institute (2002)	-	
Finland	Ministry of the Environment (2002a)	Ministry of the Environment (2002b, 2003a)	National Inventory Report including general information on the inventory, emission trends, sector and source specific methodological information, recalculations and inventory improvements.
France	CITEPA (2001)	-	
Germany	Bericht 2001 der Bundesrepublik Deutschland (2001)	Bericht 2002 der Bundesrepublik Deutschland (2002)	Short report including mainly information on emission trends, projections, and policies and measures.
Greece	-	-	
Ireland	Environmental Protection Agency (2002)	-	
Italy	-	-	
Luxembourg	-	-	
Netherlands	Olivier, J.G.J, Brandes, L.J., Peters, J.A.H.W. and Coenen, P.W.H.G. (2002)	Olivier, J.G.J, Brandes, L.J., and Coenen, P.W.H.G. (2002)	Short draft national inventory report mainly including information on methodological changes.
Portugal	-	-	
Spain	Ministry of the Environment (2002c)	Ministry of the Environment (2003b)	Report including information on general methodology, development of inventory principles, recalculations, emissions trends, and key source analysis
Sweden	Swedish Environmental Protection Agency (2002a)	Swedish Environmental Protection Agency (2002b, 2003)	National inventory report including general information on the inventory, sector and source specific methodological information, key source analysis, and future inventory improvements.
United Kingdom	National Environmental Technology Centre (2002),	Goodwin (2002), National Environmental Technology Centre (2003)	Final draft national inventory report including general information on the inventory, emission trends, sector and source specific methodological information, methodological changes, uncertainty estimates, QA/QC, and verification

### 1.8.2. Data gaps and gap filling

The EC GHG inventory is compiled by using the inventory submissions of the 15 EC MS. For data gaps in MS inventory submissions, the following procedure is applied by EEA/ETC-ACC:

#### 1. If emission data are available for previous years:

- For CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub>, emissions reported for the most recent previous year are taken as an approximated estimate for the missing year.
- For CO<sub>2</sub> emissions of all CRF categories except sector 1 'Energy' also the emissions reported for the most recent previous year are taken as an approximated estimate for the missing year.
- For CO<sub>2</sub> emissions of CRF sector 1 'Energy' the latest data reported by the MS is used and extrapolated on the basis of percentage changes of CO<sub>2</sub> emissions from fossil fuel combustion as estimated for more recent years by Eurostat for this MS. The Eurostat estimates are compiled using the IPCC reference approach and energy balance data provided annually by MS.

2. If emission data are not available for any year between 1990 and 2001, data gaps are not filled.

The following data gaps existed by 4 April 2003:

**Table 9: Overview of data gaps by 4 April 2003**

Member State	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>
Belgium				1990-1994	1990-1994	1990-1994
Greece						1990-2001
Ireland				1990-1994	1990-1994	1990-1994
Luxembourg	1991-1993 <sup>1)</sup>	1991-1993	1991-1993	1990-2000	1990-2000	1990-2000

1) Luxembourg provided total CO<sub>2</sub> emissions for 1991-1993 but without sector and category split

For the EC inventory 2003, the data gap procedure has been applied for the following MS, years and gases (Table 10):

- For Belgium and Ireland, fluorinated gas emissions were estimated for 1990-1994 on basis of 1995 data.
- For Luxembourg, fluorinated gas emissions were estimated for 1990-2000 on basis of 2001 data. Emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O were estimated for 1991-1993 on basis of 1990 data. For the sector split of CO<sub>2</sub> emissions 1991-1993, which was not provided by Luxembourg, the split of 1990 was extrapolated by the percentage change of total CO<sub>2</sub> emissions for these years (which is available from Luxembourg).

No gaps were filled for Greece for SF<sub>6</sub>.

**Table 10: Data gap filling for Belgium, Ireland and Luxembourg (Gg of CO<sub>2</sub> equivalents)**

Belgium	1990	1991	1992	1993	1994	1995
HFC	339	339	339	339	339	339
PFC	0	0	0	0	0	0
SF <sub>6</sub>	96	96	96	96	96	96

Ireland	1990	1991	1992	1993	1994	1995
HFC	21	21	21	21	21	21
PFC	75	75	75	75	75	75
SF <sub>6</sub>	83	83	83	83	83	83

Luxembourg	1990	1991	1992	1993	1994	1995
HFC	43	43	43	43	43	43
PFC	0	0	0	0	0	0
SF <sub>6</sub>	4	4	4	4	4	4
Luxembourg	1996	1997	1998	1999	2000	2001
HFC	43	43	43	43	43	43
PFC	0	0	0	0	0	0
SF <sub>6</sub>	4	4	4	4	4	4

Luxembourg	Most recent previous year reported:	Data gap filling for years:		
	1990	1991	1992	1993
CH <sub>4</sub>	498	498	498	498
N <sub>2</sub> O	208	208	208	208
Total CO <sub>2</sub> emissions without LUCF as reported by Luxembourg	10.152	9.724	9.572	9.864
Percentage change applied to CO <sub>2</sub> emissions at sectoral and source category level		-4,2%	-5,7%	-2,8%

Note: Values are shaded for estimates derived by gap filling.

### 1.8.3. Data basis of the EC GHG inventory

The EC GHG inventory 2003 data consist of:

1. the GHG submissions of the MS to the Commission in 2003 (if available, data were taken from CRF Tables Summary 1.A; in a few cases also data from CRF Tables 10 was used),
2. previous GHG submissions, in cases where MS did not provide the complete time series for each gas in 2003, and
3. emission estimates derived from data gap filling in cases where no data was available for a specific gas and year (used only in few cases).

Tables 11-14 show the data basis of the EC GHG inventory 2003. Values in white cells without a frame are data provided by MS in 2003 in the CRF Tables Summary 1.A. Light shaded values are taken from MS 2003 CRF Tables 10. Framed cells indicate that the emission data has been taken from MS submissions in previous years. Dark shaded values derive from gap filling. 'NE' ('not estimated') indicates that data are not available and that no gap filling has been made.

**Table 11: Data basis of CO<sub>2</sub> emissions excluding LUCF in Gg**

MS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	60.113	63.595	58.455	59.307	59.744	62.627	66.629	66.208	66.333	65.020	64.928	69.120
Belgium	117.749	123.571	122.714	120.887	123.805	127.454	130.233	125.728	129.322	126.472	126.331	126.803
Denmark	52.659	63.383	57.563	59.928	63.919	61.130	74.556	65.209	60.050	57.279	52.764	54.355
Finland	62.459	61.062	58.662	59.164	65.459	62.676	68.123	66.832	64.594	64.065	62.283	67.692
France	395.272	419.932	412.421	392.875	388.587	394.869	408.732	403.076	425.366	412.793	407.199	411.353
Germany	1.014.439	975.769	928.081	917.989	903.792	898.758	920.871	889.597	881.384	854.741	857.968	870.762
Greece	84.336	84.230	85.774	85.847	87.479	87.644	90.163	94.668	99.419	98.626	103.727	105.875
Ireland	31.797	32.535	33.113	32.680	34.114	34.759	35.954	38.312	40.250	42.133	44.092	46.460
Italy	428.178	427.977	427.786	418.542	412.964	438.985	434.113	439.523	451.095	456.587	460.965	460.760
Luxembourg	10.152	9.724	9.572	9.864	9.547	7.078	7.098	6.086	5.179	5.432	5.399	5.482
Netherlands	159.270	167.521	165.733	167.934	168.770	172.402	180.304	168.669	173.788	170.686	173.840	179.855
Portugal	43.809	45.616	50.056	48.727	49.115	52.546	49.941	52.104	56.699	64.199	63.493	64.892
Spain	227.400	234.223	242.189	232.475	242.710	254.386	241.884	261.700	270.604	295.512	308.201	307.248
Sweden	56.489	56.762	56.003	55.677	60.304	59.031	62.464	57.623	58.775	56.649	53.766	55.269
United Kingdom	585.016	588.587	574.138	560.326	557.054	548.617	568.533	544.271	547.079	538.706	544.359	557.628
<b>EU15</b>	<b>3.329.139</b>	<b>3.354.486</b>	<b>3.282.261</b>	<b>3.222.223</b>	<b>3.227.362</b>	<b>3.262.960</b>	<b>3.339.599</b>	<b>3.279.607</b>	<b>3.329.936</b>	<b>3.308.900</b>	<b>3.329.314</b>	<b>3.383.556</b>

Note: Values in white cells without a frame are data provided by MS in 2003 in the CRF Tables Summary 1.A. Light shaded values are taken from MS 2003 CRF Tables 10. Framed cells indicate that the emission data have been taken from MS submissions in previous years. Dark shaded values derive from gap filling. 'NE' ('not estimated') indicates that data are not available and that no gap filling has been made.

**Table 12: Data basis of CH<sub>4</sub> emissions in CO<sub>2</sub> equivalents (Gg)**

MS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	10.672	10.552	10.280	10.318	10.168	10.074	9.955	9.609	9.442	9.300	9.134	9.074
Belgium	11.212	11.599	11.336	11.286	11.428	11.261	11.182	11.108	11.175	10.901	10.716	10.401
Denmark	5.672	5.728	5.735	5.858	5.882	5.958	6.030	5.920	5.802	5.473	5.535	5.606
Finland	6.339	6.283	6.194	6.183	6.132	6.117	6.052	5.965	5.764	5.653	5.427	5.368
France	70.249	70.441	70.146	70.357	70.272	70.730	70.244	67.120	66.714	65.875	65.666	64.718
Germany	99.134	89.104	82.100	75.701	71.300	66.806	62.741	60.789	57.845	56.245	52.717	50.338
Greece	8.744	8.706	9.008	9.108	9.365	9.497	9.814	9.924	10.442	10.413	10.890	11.123
Ireland	11.900	12.183	12.344	12.441	12.506	12.595	12.769	12.955	12.970	12.885	12.785	12.563
Italy	38.659	39.068	37.322	36.931	37.311	37.857	37.713	37.676	37.128	36.717	36.546	36.420
Luxembourg	498	498	498	498	460	464	501	507	480	483	478	473
Netherlands	27.140	27.479	26.315	25.745	25.260	24.574	24.648	23.102	22.357	21.787	20.648	20.435
Portugal	10.124	10.127	9.983	9.700	9.962	9.997	10.031	10.133	10.206	10.654	10.689	10.788
Spain	30.286	30.562	31.609	32.004	33.080	33.758	35.426	36.453	37.698	38.089	39.317	40.329
Sweden	6.631	6.605	6.708	6.754	6.678	6.589	6.553	6.461	6.310	6.113	5.862	5.846
United Kingdom	76.885	75.904	74.303	71.316	64.882	64.292	62.748	59.557	56.397	52.567	48.781	46.105
<b>EU15</b>	<b>414.145</b>	<b>404.840</b>	<b>393.880</b>	<b>384.199</b>	<b>374.686</b>	<b>370.569</b>	<b>366.408</b>	<b>357.279</b>	<b>350.730</b>	<b>343.154</b>	<b>335.189</b>	<b>329.538</b>

Note: Values in white cells without a frame are data provided by MS in 2003 in the CRF Tables Summary 1.A. Light shaded values are taken from MS 2003 CRF Tables 10. Framed cells indicate that the emission data have been taken from MS submissions in previous years. Dark shaded values derive from gap filling. 'NE' ('not estimated') indicates that data are not available and that no gap filling has been made.

**Table 13: Data basis of N<sub>2</sub>O emissions in CO<sub>2</sub> equivalents (Gg)**

EC Member State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	5.804	6.431	5.247	6.072	6.752	6.360	6.154	6.445	6.252	6.177	6.153	5.951
Belgium	12.164	11.847	11.500	11.771	12.306	12.959	12.472	12.009	12.511	12.209	12.122	11.980
Denmark	10.843	10.737	10.068	10.193	9.976	9.903	9.758	9.343	9.382	9.314	9.090	8.749
Finland	8.340	7.868	7.280	7.448	7.562	7.762	7.797	8.015	7.856	7.715	7.105	7.095
France	94.992	94.544	93.258	91.744	92.945	94.550	95.947	96.440	89.363	83.606	81.344	80.297
Germany	87.904	83.136	84.100	80.530	77.609	78.546	80.181	75.720	62.257	59.004	59.345	60.227
Greece	10.623	10.521	10.467	10.143	10.258	9.899	10.337	10.628	10.625	10.418	11.010	10.744
Ireland	9.544	9.564	9.647	9.683	9.908	10.050	10.263	10.422	10.648	10.826	10.760	10.400
Italy	40.870	42.219	41.411	41.635	40.784	41.998	41.536	42.735	42.409	43.292	43.529	44.349
Luxembourg	208	208	208	208	214	213	216	233	236	90	94	97
Netherlands	16.544	16.807	17.950	18.663	18.313	18.178	17.946	17.786	17.629	17.367	16.659	16.067
Portugal	7.508	7.507	7.283	7.191	7.176	7.424	7.519	7.427	7.660	8.003	8.031	8.073
Spain	26.635	26.390	25.644	23.732	25.960	25.690	28.006	27.361	28.080	29.410	30.799	29.483
Sweden	9.109	8.986	8.823	8.926	9.133	8.825	9.031	8.938	9.120	8.705	8.600	8.630
United Kingdom	67.859	65.945	59.091	55.389	59.765	57.075	59.118	60.775	57.995	44.918	44.726	42.353
<b>EU15</b>	<b>408.947</b>	<b>402.710</b>	<b>391.975</b>	<b>383.328</b>	<b>388.660</b>	<b>389.434</b>	<b>396.282</b>	<b>394.276</b>	<b>372.024</b>	<b>351.055</b>	<b>349.367</b>	<b>344.495</b>

Note: Values in white cells without a frame are data provided by MS in 2003 in the CRF Tables Summary 1.A. Light shaded values are taken from MS 2003 CRF Tables 10. Framed cells indicate that the emission data have been taken from MS submissions in previous years. Dark shaded values derive from gap filling. 'NE' ('not estimated') indicates that data are not available and that no gap filling has been made.

**Table 14: Data availability of actual HFC, PFC and SF<sub>6</sub> emissions in CO<sub>2</sub> equivalents (Gg)**

MS		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	HFC	4	6	9	12	17	546	625	718	816	870	1033	1033
	PFC	963	974	576	48	54	16	15	18	21	25	25	25
	SF <sub>6</sub>	518	683	725	823	1033	1175	1246	1148	955	730	677	677
Belgium	HFC	339	339	339	339	339	339	418	527	631	804	1014	1227
	PFC	0	0	0	0	0	0	0	0	0	0	0	0
	SF <sub>6</sub>	96	96	96	96	96	96	213	206	96	0	109	105
Denmark	HFC	0	0	4	96	141	236	371	392	489	598	705	647
	PFC	0	0	0	0	0	1	3	7	15	20	28	22
	SF <sub>6</sub>	43	62	89	135	122	107	61	73	59	65	59	30
Finland	HFC	0	0	0	0	7	29	77	168	245	319	502	657
	PFC	0	0	0	0	0	0	0	0	0	28	22	20
	SF <sub>6</sub>	94	67	37	34	35	69	72	76	53	52	51	55
France	HFC	2252	1510	1067	807	821	1645	2532	3445	4105	5173	7334	8290
	PFC	3192	2472	2142	1641	1415	1331	1451	1503	1662	1919	1672	1400
	SF <sub>6</sub>	2195	2216	2238	2262	2288	2314	2330	2330	2271	2109	2096	2101
Germany	HFC	3510	3547	3677	4950	5178	6360	5768	6356	6979	7280	6630	8130
	PFC	2696	2356	2138	2012	1627	1759	1723	1377	1481	1247	790	723
	SF <sub>6</sub>	3896	4350	4876	5401	5808	6633	6359	6274	6038	4414	4018	3325
Greece	HFC	935	1107	908	1638	2209	3369	3916	4194	4053	4156	4281	4410
	PFC	258	258	252	153	94	83	72	165	204	132	148	81
	SF <sub>6</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ireland	HFC	21	21	21	21	21	21	58	79	104	152	190	231
	PFC	75	75	75	75	75	75	103	131	62	196	305	297
	SF <sub>6</sub>	83	83	83	83	83	83	101	132	91	63	52	67
Italy	HFC	351	355	359	355	482	671	449	751	1170	1437	1986	2730
	PFC	237	231	206	204	212	272	177	184	201	190	232	302
	SF <sub>6</sub>	333	356	358	370	416	601	683	729	605	405	483	795
Luxembourg	HFC	43	43	43	43	43	43	43	43	43	43	43	43
	PFC	0	0	0	0	0	0	0	0	0	0	0	0
	SF <sub>6</sub>	4	4	4	4	4	4	4	4	4	4	4	4
Netherlands	HFC	4432	3452	4447	4998	6487	6018	7676	8307	9360	4897	3875	1584
	PFC	2432	2437	2099	2118	1890	1867	2042	2154	1728	1444	1526	1456
	SF <sub>6</sub>	187	100	106	110	148	275	285	311	295	265	269	296
Portugal	HFC	0	0	0	0	0	0	0	2	6	19	37	62
	PFC	0	0	0	0	0	0	0	0	0	0	0	0
	SF <sub>6</sub>	0	0	0	0	0	5	5	5	5	6	6	7
Spain	HFC	2403	2179	2763	2258	3458	4645	5197	6126	5809	7164	8171	5288
	PFC	828	787	782	794	785	790	759	784	750	696	405	229
	SF <sub>6</sub>	56	61	64	67	76	94	101	122	141	185	211	212
Sweden	HFC	4	7	10	31	72	127	178	271	302	351	373	372
	PFC	440	427	414	402	390	391	351	324	309	329	270	267
	SF <sub>6</sub>	83	86	85	91	101	121	110	155	91	92	78	100
United Kingdom	HFC	11374	11859	12346	12905	13814	15205	16384	18377	19958	8186	8861	8678
	PFC	2281	1790	959	811	980	1094	1022	710	630	659	738	706
	SF <sub>6</sub>	724	776	833	889	1061	1133	1271	1263	1485	1501	1642	1762
Total	HFC	25.668	24.425	25.991	28.453	33.088	39.255	43.692	49.753	54.070	41.449	45.033	43.383
	PFC	13.403	11.808	9.643	8.258	7.523	7.679	7.717	7.358	7.063	6.885	6.163	5.527
	SF <sub>6</sub>	8.311	8.940	9.594	10.365	11.269	12.709	12.839	12.827	12.187	9.890	9.765	9.537

Note: Values in white cells without a frame are data provided by MS in 2003 in the CRF Tables Summary I.A. Light shaded values are taken from MS 2003 CRF Tables 10. Framed cells indicate that the emission data have been taken from MS submissions in previous years. Dark shaded values derive from gap filling. 'NE' ('not estimated') indicates that data are not available and that no gap filling has been made.

#### 1.8.4. Geographical coverage of the EC inventory

Table 15 shows the geographical coverage of the MS national GHG inventories as submitted under the Monitoring Mechanism. As the MS national GHG inventories are used for the compilation of EC GHG inventory, the table also shows the geographical coverage of the EC inventory.

**Table 15: Geographical coverage of the EC inventory**

MS	Geographical coverage
Austria	Austria
Belgium	Belgium
Denmark	Denmark (excluding Greenland and the Faroe Islands)
Finland	Finland and Ahvenanmaa (Aaland)
France	France, the Overseas Departments (Guadeloupe, Martinique, Guyana and Reunion) and the Overseas Territories (New Caledonia, Wallis et Futuna, French Polynesia, Mayotte, Saint-Pierre et Miquelon)
Germany	Germany
Greece	Greece
Ireland	Ireland
Italy	Italy

Luxembourg	Luxembourg
Netherlands	Netherlands including a twelve miles zone from the coastline and inland water bodies, emissions from offshore oil and gas production at the Netherland's part of the continental shelf, excluded are Arube and the Netherlands Antilles
Portugal	Portugal, Madeira, Azores
Spain	Spanish part of Iberian Mainland, Canary Islands, Balearic Islands, Ceuta and Melilla
Sweden	Sweden
United Kingdom	England, Scotland, Wales, Northern Ireland

### 1.9. Differences between EC submission and MS submissions in 2002

In the UNFCCC draft synthesis and assessment report of the EC GHG inventory 2002, inconsistencies between the EC submission 2002 (for the inventory 2000) and the sum of the EC MS submissions 2002 to the UNFCCC secretariat were identified.

**Table 16: Inconsistencies between the EC submission 2002 and the sum of the EC MS submissions 2002 (Gg for 2000)**

	Sum of MS submissions 2002	EC submission 2002	Difference
CO <sub>2</sub>	3.324.800	3.333.697	8.897
CO <sub>2</sub> removals	-180.681	-181.437	756
CH <sub>4</sub>	16.275	16.282	7
N <sub>2</sub> O	1.091	1.096	5

Source: UNFCCC draft synthesis and assessment report 2002

The most important reason for these inconsistencies between the EC CRF submission and the sum of the EC MS submissions in 2002 is the reporting in category 5 of CRF Table Summary 1.A. Footnote five requires Parties to report net emissions (emissions - removals) from LUCF in each sub-category 5 and in the total sum of category 5. Only a single number should be placed in either the CO<sub>2</sub> emissions or CO<sub>2</sub> removals column, as appropriate. 13 Member States reported net removals from LUCF for 2000, two Member States (Greece and the United Kingdom) reported net CO<sub>2</sub> emissions. At EC level, CO<sub>2</sub> removals were larger than CO<sub>2</sub> emissions. Therefore, net removals were reported that resulted from adding the net removals of the 13 MS and deducting the net emissions of Greece and the UK. This means that total CO<sub>2</sub> emissions at EC level do not include net emissions from LUCF of Greece and the UK. (These net emissions from LUCF of Greece and the UK reduce net removals of the EC.) The sum of CO<sub>2</sub> emissions of the national submissions to the UNFCCC secretariat includes net emissions of Greece and the UK and therefore is higher (see Table 17). Therefore, also the sum of CO<sub>2</sub> removals in the national submissions to the UNFCCC is higher.

A second reason for inconsistencies are data updates of Greece, Ireland and Italy provided to the UNFCCC after 15 April 2002, which could therefore not be included in the EC inventory (which was submitted to the UNFCCC on 15 April 2002).

Table 17 shows the differences in the submissions between the EC submission 2002 and the sum of the EC MS submissions 2002.

**Table 17: Breakdown of the inconsistencies between the EC submission 2002 and the sum of the EC MS submissions 2002 (Gg for 2000)**

	Total CO <sub>2</sub> emissions			Net CO <sub>2</sub> emissions/removals from LUCF		
	EC submission 2002	MS submission 2002	Differential	EC submission 2002	MS submission 2002	Differential
Austria	66.102	66.102	0	-7.633	-7.633	0
Belgium	127.040	127.040	0	-1.823	-1.823	0
Denmark	52.852	52.852	0	-995	-995	0
Finland	62.305	62.305	0	-11.953	-11.953	0
France	401.923	401.923	0	-63.247	-63.247	0
Germany	857.908	857.908	0	-16.826	-16.826	0
Greece	103.727	107.602	-3.875	3.875	0	3.875
Ireland	43.815	43.925	-110	-6.505	-33	-6.473
Italy	461.822	463.381	-1.559	-16.444	-16.444	0
Luxembourg	5.399	5.399	0	-295	-295	0
Netherlands	173.527	173.527	0	-1.413	-1.413	0
Portugal	63.150	63.150	0	-4.216	-4.216	0
Spain	306.632	306.632	0	-29.252	-29.252	0
Sweden	55.855	55.855	0	-27.306	-27.306	0
UK	542.743	546.097	-3.354	3.354	0	3.354
<b>EU</b>	<b>3.324.800</b>	<b>3.333.698</b>	<b>-8.898</b>	<b>-180.681</b>	<b>-181.437</b>	<b>756</b>

	Total CH <sub>4</sub> emissions			Total N <sub>2</sub> O emissions		
	EC submission 2002	MS submission 2002	Differential	EC submission 2002	MS submission 2002	Differential
Austria	448	448	0	8	8	0
Belgium	524	524	0	43	43	0
Denmark	274	274	0	29	29	0
Finland	187	187	0	23	23	0
France	2.871	2.871	0	248	248	0
Germany	2.885	2.885	0	194	194	0
Greece	519	518	0,5	36	36	0,0
Ireland	610	610	-0,5	31	31	-0,2
Italy	1.794	1.801	-6,9	134	139	-4,9
Luxembourg	23	23	0	0,3	0,3	0
Netherlands	983	983	0	55	55	0
Portugal	625	625	0	27	27	0
Spain	1.827	1.827	0	98	98	0
Sweden	280	280	0	22	22	0
UK	2.427	2.427	0	142	142	0
<b>EU</b>	<b>16.275</b>	<b>16.283</b>	<b>-8</b>	<b>1.091</b>	<b>1.096</b>	<b>-5</b>

Note All values are in Gg and for the inventory year 2000. Remaining inconsistencies are due to rounding.

## Chapter 2: EC GHG emission trends

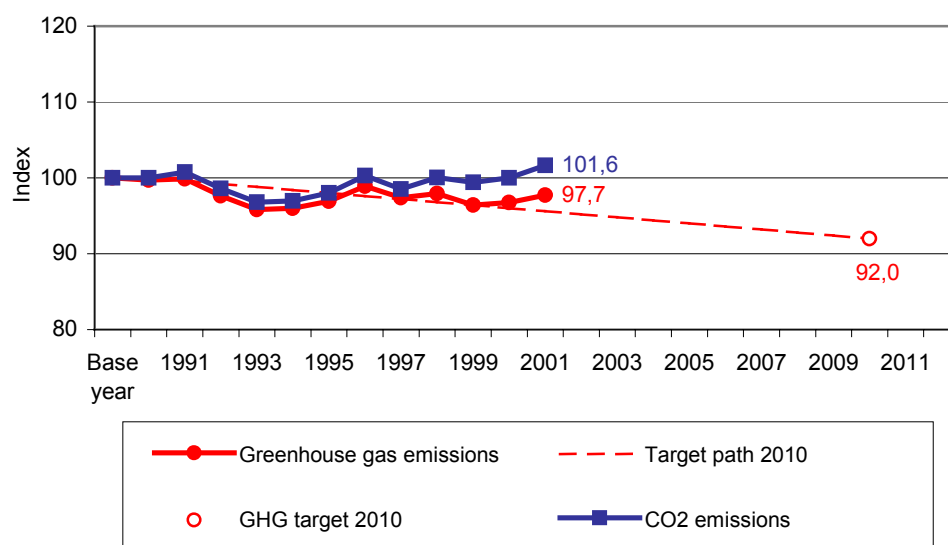
This chapter presents the main GHG emission trends in the EC. First, aggregate results are described as regards total GHG emissions and progress towards fulfilling the EC Kyoto target. Then, emission trends are briefly analysed at gas and source level and a short overview of MS contribution to EC GHG trends is given. The EEA will provide a more detailed analysis on the EC GHG emission trends in its report *Greenhouse gas emission trends in Europe, 1990-2001*. Finally, also the trends of indirect GHG and SO<sub>2</sub> emissions are presented.

### 2.1. Aggregated GHG emission trends

Total GHG emissions without land-use change and forestry (LUCF) in the EC decreased between the base year and 2001 by 95.735 Gg (-2,3 %). In the Kyoto Protocol, the EC agreed to reduce its GHG emissions by 8 % by 2008-2012, from 1990 levels. Assuming a linear target path from 1990 to 2010, total EC GHG emissions were 2,1 index points above this target path in 2001 (Figure 1).

CO<sub>2</sub> is by far the most important GHG, accounting for 82 % of total EC emissions in 2001. In 2001, EC CO<sub>2</sub> emissions without LUCF were 1,6 % above 1990 levels.

Figure 2: EC GHG emissions 1990-2001 compared with target 2008-2012 (excl LUCF)



**Note (1):** The linear target path is not intended as an approximation of past and future emission trends. It provides a measure of how close the EC emissions in 2001 are to a linear path of emissions reductions from 1990 to the Kyoto target for 2008-2012, assuming that only domestic measures will be used. Therefore, it does not deliver a measure of (possible) compliance of the EC with its GHG targets in 2008-2012, but aims at evaluating overall EC GHG emissions in 2001. The unit is index points with 1990 emissions being 100.

**Note (2):** GHG emission data for the EC as a whole do not include emissions and removals from LUCF. In addition, no adjustments for temperature variations or electricity trade are considered.

**Note (3):** For fluorinated gases the base year 1995 was used for all Member States, which is in line with the base year indicated so far by most MS individually.



## 2.2. GHG emission trends by gas

Table 18 gives an overview of the main trends in EC GHG emissions and removals for 1990-2001. In 2001 CO<sub>2</sub> emissions made up 82 % of the total GHG emissions in the EC. This was an increase of 54.417 Gg (1,6 %) compared to 1990. This increase was compensated by decreases in CH<sub>4</sub> and N<sub>2</sub>O emissions in the same period: CH<sub>4</sub> decreased by 84.557 Gg (-20,4 %) and N<sub>2</sub>O decreased by 64.452 Gg (-15,8 %). Fluorinated gases showed opposing trends. While HFC and SF<sub>6</sub> emissions increased by 17.715 Gg (69,0 %) and 1.226 Gg (14,7 %), PFC emissions decreased by 7.875 Gg (-58,8 %).

Table 18: Overview of EC GHG emissions and removals from 1990 to 2001 in CO<sub>2</sub> equivalents (Gg)

GREENHOUSE GAS EMISSIONS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	CO <sub>2</sub> equivalent (Gg)											
Net CO <sub>2</sub> emissions/removals	3.137.195	3.138.005	3.080.042	3.009.213	3.026.711	3.071.406	3.139.324	3.079.282	3.138.854	3.109.487	3.148.754	3.180.074
CO <sub>2</sub> emissions (without LUCF)	3.329.139	3.354.486	3.282.261	3.222.223	3.227.362	3.262.960	3.339.599	3.279.607	3.329.936	3.308.900	3.329.314	3.383.556
CH <sub>4</sub>	414.145	404.840	393.880	384.199	374.686	370.569	366.408	357.279	350.730	343.154	335.189	329.588
N <sub>2</sub> O	408.947	402.710	391.975	383.328	388.660	389.434	396.282	394.276	372.024	351.055	349.367	344.495
HFCs	25.668	24.425	25.991	28.453	33.088	39.255	43.692	49.753	54.070	41.449	45.033	43.383
PFCs	13.403	11.808	9.643	8.258	7.523	7.679	7.717	7.358	7.063	6.885	6.163	5.527
SF <sub>6</sub>	8.311	8.940	9.594	10.365	11.269	12.709	12.839	12.827	12.187	9.890	9.765	9.537
Total (with net CO <sub>2</sub> emissions/removals)	4.007.668	3.990.728	3.911.125	3.823.817	3.841.937	3.891.053	3.966.262	3.900.775	3.934.928	3.861.919	3.894.272	3.912.604
Total (without LUCF)	4.191.729	4.199.406	4.105.362	4.028.907	4.034.691	4.074.811	4.158.724	4.093.280	4.117.858	4.053.531	4.066.658	4.108.256

## 2.3. GHG emission trends by source

Table 19 gives an overview of EC GHG emissions in the main source categories for 1990-2001. The emissions from the largest source category 'Energy' with an 81 % share of the total emissions, increased by 34.170 (1,0 %). This increase was offset by decreases in the second-, third- and fourth-largest categories: emissions from 'Agriculture' decreased by 33.543 Gg (-7,7 %), emissions from 'Industrial Processes' by 50.861 Gg (-16,8 %), and emissions from 'Waste' by 32.498 Gg (-24,1 %).

Table 19: Overview of EC GHG emissions in the main source categories 1990 to 2001 in CO<sub>2</sub> equivalents (Gg)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	CO <sub>2</sub> equivalent (Gg)											
1. Energy	3.309.531	3.343.140	3.273.632	3.213.816	3.206.413	3.236.580	3.315.931	3.249.818	3.299.503	3.274.547	3.288.521	3.343.702
2. Industrial Processes	302.005	290.366	282.760	274.908	287.732	299.731	302.536	307.258	287.768	251.500	255.935	251.143
3. Solvent and Other Product Use	9.559	9.469	9.258	8.860	8.827	8.857	8.872	8.939	8.974	8.936	9.039	8.771
4. Agriculture	433.768	423.311	412.802	407.912	409.350	408.989	412.257	412.354	410.496	410.097	406.816	400.225
5. Land-Use Change and Forestry	-184.060	-208.678	-194.237	-205.090	-192.753	-183.758	-192.462	-192.506	-182.930	-191.612	-172.386	-195.652
6. Waste	134.998	131.282	125.080	121.631	120.452	118.728	117.210	113.134	109.172	106.473	104.392	102.501
7. Other	1.865	1.835	1.828	1.776	1.918	1.937	1.929	1.778	1.946	1.978	1.954	1.914

## 2.4. GHG emission trends by MS

Table 20 gives an overview of MS contribution to the EC GHG emissions for 1990-2001. The largest emitter with a 24,2 % share of the total EC emissions in the year 2001 was Germany with 993.505 Gg and the smallest with a 0,15 % share was Luxembourg with 6.077 Gg.

Germany reduced its emissions significantly (-18 %) between 1990 and 2001, although the emissions increased again between 2000 and 2001 (1,2 %). Similarly, the second-largest emitter, the United Kingdom reduced its emissions by 12 % between 1990 and 2001, though they increased between 2000 and 2001 by 1,3 %. The third-largest emitter, France, stabilised its 2001 emissions at the level of 1990, despite a 0,5 % increase compared to 2000. The smallest emitter Luxembourg decreased its emissions continuously from 1990 to 2001; the overall reduction from the 1990 level was 44 %.

**Table 20: Overview of MS contribution to EC GHG emissions excluding LUCF from 1990 to 2001 in CO<sub>2</sub> equivalents (Gg)**

Member State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	78.073	82.241	75.291	76.580	77.768	80.797	84.624	84.146	83.819	82.123	81.951	85.880
Belgium	141.216	147.107	145.641	144.038	147.636	151.773	154.182	149.243	153.403	150.054	149.943	150.169
Denmark	69.217	79.910	73.459	76.209	80.039	77.335	90.778	80.945	75.797	72.750	68.181	69.410
Finland	77.233	75.281	72.173	72.829	79.195	76.652	82.122	81.056	78.512	77.831	75.391	80.888
France	560.775	583.739	573.892	552.304	548.945	558.052	573.851	566.525	582.082	564.074	557.909	560.757
Germany	1.211.579	1.158.262	1.104.970	1.086.585	1.065.314	1.058.861	1.077.642	1.040.112	1.015.984	982.932	981.468	993.505
Greece	104.755	104.760	106.172	106.714	109.238	110.429	114.220	119.504	124.343	123.697	129.652	132.176
Ireland	53.420	54.461	55.284	54.983	56.707	57.583	59.249	62.030	64.124	66.256	68.184	70.018
Italy	508.629	510.208	507.441	498.038	492.169	520.385	514.671	521.598	532.608	538.627	543.751	545.355
Luxembourg	10.883	10.455	10.303	10.595	10.257	7.792	7.851	6.851	5.919	6.029	5.996	6.077
Netherlands	210.004	217.795	216.651	219.569	220.869	223.314	232.901	220.330	225.156	216.446	216.816	219.694
Portugal	61.441	63.251	67.322	65.617	66.253	69.972	67.496	69.670	74.577	82.880	82.256	83.823
Spain	287.609	294.203	303.051	291.330	306.069	319.363	311.373	332.546	343.082	371.057	387.104	382.789
Sweden	72.756	72.873	72.042	71.881	76.679	75.085	78.687	73.772	74.907	72.239	68.949	70.485
United Kingdom	744.139	744.862	721.671	701.635	697.555	687.417	709.075	684.952	683.543	646.537	649.107	657.232
<b>EU15</b>	<b>4.191.729</b>	<b>4.199.406</b>	<b>4.105.362</b>	<b>4.028.907</b>	<b>4.034.691</b>	<b>4.074.811</b>	<b>4.158.724</b>	<b>4.093.280</b>	<b>4.117.858</b>	<b>4.053.531</b>	<b>4.066.658</b>	<b>4.108.256</b>

## 2.5. Emission trends for indirect GHG and SO<sub>2</sub>

CO, NO<sub>x</sub>, NMVOC and SO<sub>2</sub> emissions have to be reported to the UNFCCC secretariat because they influence climate change indirectly: CO, NO<sub>x</sub> and NMVOC are precursor substances for ozone which itself is a greenhouse gas. Sulphur emissions produce microscopic particles (aerosols) that can reflect sunlight back out into space and also affect cloud formation. Table 21 shows the total indirect GHG and SO<sub>2</sub> emissions in the EC between 1990-2001. All emissions were reduced significantly from the 1990 levels: the largest reduction was achieved in SO<sub>2</sub> (-63,6 %) followed by CO (-40,2 %), NMVOC (-29,4 %) and NO<sub>x</sub> (-25,8 %).

**Table 21: Overview of EC indirect GHG emissions 1990 to 2001 in Gg**

GREENHOUSE GAS EMISSIONS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	Gg											
NO <sub>x</sub>	13.402	13.295	12.985	12.368	11.995	11.673	11.566	11.083	10.774	10.417	10.129	9.941
CO	50.387	48.511	46.579	44.189	41.955	40.446	39.219	37.417	35.539	33.536	30.996	30.118
NMVOC	17.026	16.486	15.978	15.301	15.172	13.874	14.113	14.013	13.181	12.787	12.215	12.014
SO <sub>2</sub>	16.375	14.871	13.692	12.452	11.300	10.184	8.880	7.997	7.603	6.819	6.177	5.963

Table 22 shows the NO<sub>x</sub> emissions of the EC MS between 1990-2001. The largest emitters, the United Kingdom, Germany and France, that made up 47,9 % of the total NO<sub>x</sub> emissions in 2001, reduced their emissions from the 1990 levels. This was counterbalanced by increases from Greece, Ireland, Spain and Portugal. All other EC MS reduced their emissions.

**Table 22: Overview of MS contribution to EC NO<sub>x</sub> emissions from 1990 to 2001 in Gg**

Member State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	204	209	200	197	191	188	207	195	203	193	196	199
Belgium	337	353	364	360	365	359	349	326	341	305	326	315
Denmark	272	319	275	276	281	264	307	267	239	220	206	202
Finland	311	290	283	282	282	259	268	260	253	248	236	210
France	1.958	2.035	1.991	1.869	1.822	1.784	1.752	1.688	1.668	1.593	1.517	1.488
Germany	2.729	2.514	2.323	2.208	2.055	1.984	1.897	1.784	1.675	1.619	1.584	1.592
Greece	290	298	297	292	299	296	306	310	334	326	317	331
Ireland	116	118	129	117	114	114	118	117	120	117	123	132
Italy	1.952	2.011	2.027	1.923	1.792	1.764	1.763	1.693	1.600	1.490	1.372	1.317
Luxembourg	22	22	22	22	22	20	22	18	17	16	17	17
Netherlands	570	551	539	519	493	487	474	445	428	430	413	411
Portugal	287	303	325	319	324	337	332	339	363	385	406	399
Spain	1.259	1.302	1.334	1.307	1.330	1.343	1.307	1.346	1.344	1.401	1.420	1.393
Sweden	334	334	319	307	320	296	295	280	267	259	252	251
United Kingdom	2.763	2.637	2.558	2.371	2.306	2.178	2.168	2.016	1.923	1.815	1.742	1.687
<b>EU15</b>	<b>13.402</b>	<b>13.295</b>	<b>12.985</b>	<b>12.368</b>	<b>11.995</b>	<b>11.673</b>	<b>11.566</b>	<b>11.083</b>	<b>10.774</b>	<b>10.417</b>	<b>10.129</b>	<b>9.941</b>

Table 23 shows the CO emissions of the EC MS between 1990-2001. The largest emitters, France, Italy and Germany that made up 53,8 % of the total CO emissions in 2001, reduced their emissions from the 1990 levels. This was counterbalanced by the increases from Finland and Greece. All other EC MS reduced their emissions.

**Table 23: Overview of MS contribution to EC CO emissions from 1990 to 2001 in Gg**

Member State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	1.238	1.246	1.198	1.167	1.117	1.030	1.050	985	953	907	859	860
Belgium	1.265	1.286	1.326	1.305	1.232	1.188	1.215	1.045	1.168	1.050	1.099	1.028
Denmark	715	755	745	749	720	703	709	666	602	572	579	587
Finland	549	495	467	447	433	424	463	460	452	545	535	603
France	11.096	10.981	10.511	9.924	9.217	9.052	8.441	7.980	7.757	7.228	6.714	6.439
Germany	11.213	9.515	8.351	7.704	7.065	6.532	6.109	5.955	5.424	5.143	4.768	4.797
Greece	1.298	1.290	1.320	1.285	1.264	1.254	1.354	1.356	1.489	1.386	1.395	1.366
Ireland	397	391	391	347	326	301	303	308	313	281	275	270
Italy	7.863	8.024	7.968	7.769	7.573	7.796	7.341	7.211	6.346	6.072	5.207	4.965
Luxembourg	172	172	172	172	145	104	102	80	50	49	49	53
Netherlands	1.121	1.023	966	949	905	855	867	786	741	704	681	662
Portugal	1.077	1.148	1.241	1.225	1.205	1.191	1.171	1.133	1.133	1.101	1.085	1.057
Spain	3.798	3.868	3.933	3.713	3.674	3.302	3.424	3.267	3.250	2.994	2.886	2.857
Sweden	1.135	1.098	1.090	1.045	1.027	1.015	1.000	899	952	909	833	808
United Kingdom	7.450	7.219	6.900	6.389	6.053	5.700	5.671	5.285	4.907	4.596	4.031	3.765
<b>EU15</b>	<b>50.387</b>	<b>48.511</b>	<b>46.579</b>	<b>44.189</b>	<b>41.955</b>	<b>40.446</b>	<b>39.219</b>	<b>37.417</b>	<b>35.539</b>	<b>33.536</b>	<b>30.996</b>	<b>30.118</b>

Table 24 shows the NMVOC emissions of the EC MS between 1990-2001. The largest emitters France, Spain and Germany that made up 58,5 % of the total NMVOC emissions in 2001, reduced their emissions from the 1990 levels. This was counterbalanced by the increases from Greece and Portugal. All other EC MS reduced their emissions.

**Table 24: Overview of MS contribution to EC NMVOC emissions from 1990 to 2001 in Gg**

Member State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	345	323	293	282	270	271	269	250	242	237	232	232
Belgium	322	325	331	327	316	308	294	277	286	253	255	249
Denmark	171	173	171	170	167	162	161	154	147	144	128	124
Finland	236	213	206	196	191	182	207	204	160	178	162	156
France	3.751	3.735	3.666	3.526	3.482	3.436	3.201	3.288	3.109	3.147	3.003	3.002
Germany	3.221	2.796	2.539	2.326	2.158	2.020	1.892	1.823	1.735	1.663	1.605	1.606
Greece	255	253	261	270	274	273	284	285	290	291	305	268
Ireland	106	107	110	101	103	101	107	111	113	94	85	83
Italy	2.259	2.312	2.333	2.347	2.350	2.358	2.298	2.277	1.768	1.674	1.512	1.464
Luxembourg	19	19	19	19	18	17	17	17	15	12	13	12
Netherlands	492	461	436	403	388	363	306	271	302	291	278	271
Portugal	379	408	435	442	443	464	439	500	532	484	477	485
Spain	2.546	2.528	2.455	2.309	2.499	1.549	2.344	2.374	2.450	2.473	2.436	2.422
Sweden	498	478	460	427	408	399	389	354	339	319	304	303
United Kingdom	2.425	2.357	2.263	2.154	2.104	1.971	1.905	1.830	1.693	1.527	1.419	1.337
<b>EU15</b>	<b>17.026</b>	<b>16.486</b>	<b>15.978</b>	<b>15.301</b>	<b>15.172</b>	<b>13.874</b>	<b>14.113</b>	<b>14.013</b>	<b>13.181</b>	<b>12.787</b>	<b>12.215</b>	<b>12.014</b>

Table 25 shows the SO<sub>2</sub> emissions of the EC MS between 1990-2001. The largest emitters, Spain, the United Kingdom and Italy that made up 54,7 % of the total SO<sub>2</sub> emissions in 2001, reduced their emissions from the 1990 levels. This was counterbalanced by the increases from Portugal. All other EC MS reduced their emissions.

**Table 25: Overview of MS contribution to EC SO<sub>2</sub> emissions from 1990 to 2001 in Gg**

Member State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Austria	79	72	59	58	52	52	51	46	43	39	38	37
Belgium	353	359	354	327	281	259	256	227	216	178	170	162
Denmark	180	239	186	152	156	149	179	109	74	54	28	25
Finland	237	194	141	122	115	97	105	99	89	85	76	87
France	1.365	1.488	1.325	1.163	1.117	1.053	1.026	881	905	781	712	668
Germany	5.321	3.996	3.307	2.945	2.473	1.939	1.340	1.039	835	738	638	650
Greece	493	532	546	545	517	541	525	521	528	540	483	485
Ireland	183	180	170	161	175	161	147	166	176	157	131	126
Italy	1.652	1.550	1.404	1.305	1.274	1.217	1.137	1.035	1.039	924	758	709
Luxembourg	15	15	15	15	15	15	15	6	4	4	3	3
Netherlands	202	164	157	150	137	142	134	116	108	103	92	89
Portugal	288	283	343	308	279	318	261	265	299	315	288	310
Spain	2.181	2.166	2.136	2.007	1.954	1.805	1.578	1.745	1.610	1.617	1.516	1.424
Sweden	106	99	88	78	80	73	97	70	67	54	57	60
United Kingdom	3.719	3.535	3.461	3.115	2.676	2.365	2.030	1.671	1.609	1.229	1.188	1.127
<b>EU15</b>	<b>16.375</b>	<b>14.871</b>	<b>13.692</b>	<b>12.452</b>	<b>11.300</b>	<b>10.184</b>	<b>8.880</b>	<b>7.997</b>	<b>7.603</b>	<b>6.819</b>	<b>6.177</b>	<b>5.963</b>

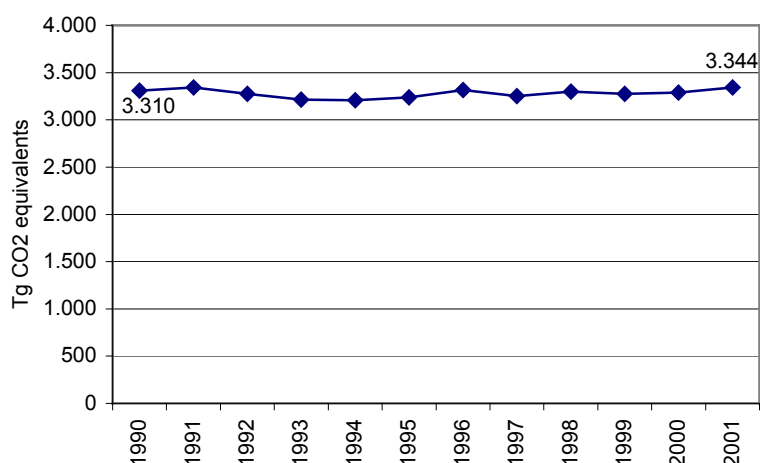
## Chapter 3: Energy (CRF sector 1)

This chapter starts with an overview on emission trends in CRF sector 1 ‘Energy’. Then a section on methodological issues and uncertainty presents for each EC key source an overview table which includes the MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. In addition, the chapter includes sections on sector specific QA/QC, recalculations, the reference approach and international bunkers.

### 3.1. Overview of sector

CRF sector 1 ‘Energy’ contributes 81 % of the total GHG emissions and is thereby the largest emitting sector in the EC. The most important energy-related gas is CO<sub>2</sub> that makes up 79 % of the total GHG emissions. Total GHG emissions from this sector increased by 1 % from 3.310 Tg in 1990 to 3.344 Tg in 2001 (Figure 3). In 2001, emissions increased by 1,7 % compared to 2000.

Figure 3: EC GHG emissions 1990-2001 from CRF sector 1 ‘Energy’ in Tg



### 3.2. Methodological issues and uncertainties

Tables 26-36 present for each EC key source in CRF sector 1 an overview on MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. Therefore, the overview tables also aim at making transparent the compilation of CRF Summary Table 3 and CRF Table 7 of the EC submission.

**Table 26: MS contribution to CO<sub>2</sub> emissions from 1.A.1. 'Energy Industries' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	412.896	345.293	30,85%	31,28%	CS	CS	ALL	H
United Kingdom	228.090	199.229	17,80%	12,75%	T2	CS	ALL	H
Italy	138.957	155.279	13,87%	10,35%	D, T2	CS	ALL	H
Spain	77.030	98.417	8,79%	12,33%	CS, C	PS, C	ALL	H
Netherlands	51.305	64.776	5,79%	7,80%	CS/T2	PS, CS	ALL/IE	H
France	67.636	57.487	5,14%	4,63%	C	CS	ALL	H
Greece	43.302	55.579	4,97%	7,07%	C	C, CS	ALL	
Finland	18.517	26.762	2,39%	4,62%	CS (T2)	CS, PS, D	ALL	H
Belgium	28.572	26.669	2,38%	0,68%			F	
Denmark	26.202	26.375	2,36%	0,40%	C	CS	ALL	H
Portugal	16.199	21.953	1,96%	3,27%	C, T2	C	ALL	H
Ireland	11.057	17.145	1,53%	3,38%	T1	PS, CS	FULL	H
Austria	13.225	14.375	1,28%	0,77%	C	CS	ALL	H
Sweden	10.169	9.697	0,87%	0,13%	CS	CS	ALL	H
Luxembourg	1.277	266	0,02%	0,53%	C	C	ALL	H-M
EU15	1.144.434	1.119.301	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D, PS	ALL, IE	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 27: MS contribution to CO<sub>2</sub> emissions from 1.A.2. 'Manufacturing Industries and Construction' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	196.457	132.536	22,65%	46,83%	CS	CS	ALL	H
United Kingdom	94.132	90.144	15,41%	4,43%	T2	CS	ALL	H
France	82.620	83.514	14,27%	8,32%	C	CS	ALL	H
Italy	84.033	77.095	13,18%	0,55%	D, T2	CS	ALL	H
Spain	44.532	59.781	10,22%	19,38%	CS, C	PS, C	ALL	H
Netherlands	41.888	40.197	6,87%	2,06%	CS/T2	PS, CS		
Belgium	33.181	33.589	5,74%	3,39%			FULL	
Finland	14.358	13.855	2,37%	0,78%	CS (T2)	CS/PS/D	ALL	H
Sweden	11.567	12.695	2,17%	2,18%	CS	CS	ALL	H
Portugal	8.166	11.324	1,94%	3,92%	C, T2	C	ALL	H
Greece	9.792	10.390	1,78%	1,48%	C	C	ALL	
Austria	6.927	7.752	1,32%	1,45%	C	CS	ALL	H
Denmark	5.605	5.909	1,01%	0,81%	C	CS	ALL	H
Ireland	3.833	4.726	0,81%	1,25%	T1	PS, CS	FULL	H
Luxembourg	5.258	1.651	0,28%	3,17%	C	C	ALL	H-M
EU15	642.348	585.160	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D, PS	ALL	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 28: MS contribution to CO<sub>2</sub> emissions from 1.A.3. 'Transport' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	162.281	178.313	21,38%	20,22%	CS	CS	ALL	H
France	119.135	140.670	16,87%	2,81%	C/CS	C/M/CS	ALL	H
Italy	102.023	125.191	15,01%	3,42%	D, T2	CS	ALL	H
United Kingdom	116.753	123.165	14,77%	20,86%	T2	CS	ALL	H
Spain	57.497	89.341	10,71%	25,08%	C	C	ALL	H
Netherlands	29.122	35.608	4,27%	0,82%	CS/T2	CS	ALL	H
Belgium	19.610	24.162	2,90%	0,78%			FULL	
Greece	18.039	22.448	2,69%	0,99%	C	C	ALL	
Sweden	18.337	19.848	2,38%	2,65%	CS	CS	ALL	H
Portugal	10.701	19.077	2,29%	7,69%	C	C	ALL	H
Austria	12.739	18.887	2,26%	4,44%	M	CS	ALL	H
Finland	12.475	12.569	1,51%	2,96%	CS (M)	CS	ALL	H
Denmark	10.404	12.077	1,45%	0,50%	M/C	CS	ALL	H
Ireland	5.020	11.063	1,33%	6,21%	T1	CS	FULL	H
Luxembourg	870	1.504	0,18%	0,57%	C	C	ALL	H-M
EU15	695.003	833.925	100,00%	100,00%	C,CS,D,M,T1, T2	C, CS, M	ALL	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 29: MS contribution to N<sub>2</sub>O emissions from 1.A.3. 'Transport' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	3.058	6.465	24,52%	7,97%	CS	CS	ALL	M
United Kingdom	1.348	4.457	16,91%	25,00%	T2/T3	D	ALL	L
France	1.626	3.959	15,02%	5,03%	C/CS	C/M/CS	ALL	L
Italy	1.731	3.454	13,10%	8,14%	D, T3	D, C	ALL	M
Spain	778	2.165	8,21%	7,20%	C	C	ALL	L
Austria	486	855	3,24%	4,32%	M	CS	ALL	M
Belgium	306	851	3,23%	2,81%			FULL	
Greece	515	719	2,73%	7,90%	C	C	ALL	
Sweden	428	706	2,68%	4,66%	CS	CS	ALL	L
Finland	631	693	2,63%	12,99%	CS (M)	CS/M	ALL	L
Netherlands	371	612	2,32%	4,03%	CS/T3(road); T1(rest)	CS(road)/ D(rest)	ALL	L
Portugal	137	567	2,15%	4,56%	C	C	ALL	M
Ireland	87	414	1,57%	3,86%	T1	C	FULL	L
Denmark	147	393	1,49%	1,10%	M/C	M/C	ALL	L
Luxembourg	12	53	0,20%	0,44%	C	C	ALL	H-M
EU15	11.660	26.361	100,00%	100,00%	C, CS, D, M, T1, T2, T3	C, CS, D, M	ALL	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 30: MS contribution to CO<sub>2</sub> emissions from 1.A.4. 'Other Sectors' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	203.439	187.893	28,65%	38,60%	CS	CS	ALL	H
United Kingdom	112.538	121.109	18,47%	8,55%	T2	CS	ALL	H
France	94.381	103.859	15,84%	11,16%	C	CS	ALL	H
Italy	75.664	78.120	11,91%	0,01%	D, T2	CS	ALL	H
Netherlands	34.185	36.134	5,51%	1,46%	CS/T2	CS	ALL	H
Spain	25.953	33.928	5,17%	12,42%	C	C	ALL	H
Belgium	27.630	30.817	4,70%	3,98%			F	
Austria	13.638	14.658	2,24%	1,00%	CS	CS	ALL	H
Ireland	9.726	10.414	1,59%	0,65%	T1	CS	FULL	H
Greece	5.341	9.300	1,42%	6,59%	C	C	ALL	
Sweden	10.597	7.757	1,18%	5,55%	CS	CS	ALL	H
Denmark	8.959	7.688	1,17%	2,72%	C	CS	ALL	H
Portugal	4.197	6.637	1,01%	4,01%	C, T2	C	ALL	H
Finland	7.571	6.022	0,92%	3,13%	CS (T2, T1)	CS/D	ALL	M
Luxembourg	1.277	1.426	0,22%	0,19%	C	C	ALL	H-M
EU15	635.096	655.763	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D	ALL	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 31: MS contribution to CH<sub>4</sub> emissions from 1.A.4 'Other Sectors' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
France	3.043	2.979	38,49%	21,85%	CS	CS	ALL	L
United Kingdom	1.468	844	10,90%	7,33%	T2	CS/C/D	ALL	L
Germany	2.684	654	8,45%	40,14%	CS	CS	ALL	M
Spain	838	651	8,41%	0,93%	C	C	ALL	L
Italy	319	553	7,14%	9,53%	D, T2	D, C	ALL	M
Netherlands	425	429	5,54%	3,43%	CS/T2	CS	ALL	M
Finland	268	323	4,18%	3,75%	CS (T2, T1)	CS/PS	ALL	L
Portugal	349	305	3,94%	1,41%	C+T2	C	ALL	M
Sweden	221	237	3,07%	2,23%	CS	CS	ALL	M
Austria	386	217	2,81%	2,07%	CS	CS	ALL	L
Greece	163	208	2,69%	2,62%	C	C	ALL	
Denmark	81	166	2,14%	3,18%	C	CS/C	ALL	M
Belgium	106	114	1,47%	1,06%			F	
Ireland	89	50	0,65%	0,46%	T1	C	FULL	L
Luxembourg	12	9	0,12%	0,01%	C	C	ALL	H-M
EU15	10.453	7.739	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D, PS	ALL	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001



**Table 32: MS contribution to CO<sub>2</sub> emissions from 1.A.5 'Other' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
United Kingdom	5.265	2.984	40,84%	26,03%	T2	CS	ALL	M
Germany	11.760	2.317	31,70%	47,84%	CS	CS	ALL	H
Finland	972	1.284	17,58%	22,67%	CS (T2, T1)	CS/D	ALL	M
Italy	1.041	354	4,84%	0,61%	D, T2	CS	ALL	H
Sweden	910	271	3,70%	1,47%	CS	CS	PART	L
Denmark	119	97	1,33%	1,31%				
Netherlands	1	0	0,00%	0,01%	CS/T2	CS	ALL/IE	M
Portugal	8	0	0,00%	0,07%	C+T2	C		
Spain	0	0	0,00%	0,00%	NE		IE	
France	0	0	0,00%	0,00%	C	CS	NO	
Greece	0	0	0,00%	0,00%			NO	
Belgium	0	NE	0,00%	0,00%			NE	
Ireland	NO	NO	0,00%	0,00%	NA	NA	NE	NE
Austria	0	0	0,00%	0,00%			NO	NO
Luxembourg	0	0	0,00%	0,00%	NA	NA	ALL	H-M
EU15	20.076	7.307	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D	ALL, IE, NE, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 33: MS contribution to 1.B.1. 'Fugitive CO<sub>2</sub> Emissions from Solid Fuels' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Finland	3.500	3.500	43,31%	43,25%	CS	CS	ALL	L
United Kingdom	3.000	2.217	27,44%	37,65%	T2/T3	CS	ALL	M
Spain	2.522	2.073	25,66%	11,63%	CS, C	PS, C	ALL	H
Sweden	253	291	3,60%	6,75%	CS	CS	ALL	L
Portugal	9	0	0,00%	0,72%	MB		ALL	H
Germany	NE	NE	0,00%	0,00%	NO	NO	NO	
France	0	0	0,00%	0,00%	C	CS	IE	H
Greece	0	0	0,00%	0,00%				
Denmark	0	0	0,00%	0,00%	NO		NO	
Italy	-	0	0,00%	0,00%			NO	
Belgium	0	0	0,00%	0,00%			P	
Ireland	NO	0	0,00%	0,00%	NA	NA	NO	NA
Austria	0	0	0,00%	0,00%			ALL	H
Netherlands	0	0	0,00%	0,00%	IE		IE	
Luxembourg	0	0	0,00%	0,00%	NA	NA	ALL	H-M
EU15	9.283	8.081	100,00%	100,00%	C, CS, MB, T2, T3	C, CS, PS	ALL, IE, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 34: MS contribution to 1.B.1. 'Fugitive CH<sub>4</sub> Emissions from Solid Fuels' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	23.945	5.852	38,31%	41,85%	CS	CS	ALL	L
United Kingdom	17.203	5.110	33,45%	7,63%	T2	CS	ALL	M
France	4.331	1.679	10,99%	7,81%	C	CS	ALL	M
Greece	926	1.400	9,17%	27,48%	T1	D	ALL	
Spain	1.789	1.057	6,92%	12,24%	T1	CS	ALL	M
Denmark	72	69	0,45%	1,14%	D	D	ALL	L
Italy	117	64	0,42%	0,68%	D, C	D, CS	ALL	M
Belgium	38	24	0,16%	0,29%			P	
Finland	21	21	0,14%	0,36%	CS	CS	ALL	L
Austria	0	0	0,00%	0,00%	C	CS	PART	L
Sweden	0	0	0,00%	0,00%	CS	CS	ALL	L
Portugal	66	0	0,00%	0,52%	C, T2	C	PART	M
Ireland	0	0	0,00%	0,00%	NA	NA	NO	NA
Netherlands	0	0	0,00%	0,00%	IE		IE	
Luxembourg	0	0	0,00%	0,00%	NA	NA	ALL	H-M
EU15	48.510	15.277	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D	ALL, IE, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 35: MS contribution to 1.B.2. 'Fugitive CO<sub>2</sub> Emissions from Oil and Natural Gas' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
United Kingdom	9.138	5.658	34,55%	49,63%	T3	CS	ALL	H
France	4.306	4.208	25,69%	1,96%	C	CS	ALL	H
Spain	1.779	2.193	13,39%	8,27%			ALL	H
Netherlands	308	1.666	10,17%	22,58%	CS/T3 (>97 T1)	CS	PART	L
Italy	999	1.293	7,90%	5,67%	C, CS	CS	ALL	M
Denmark	240	633	3,87%	6,67%	C	C	ALL	L
Portugal	155	347	2,12%	3,29%	MB		PART	M
Austria	120	207	1,26%	1,53%	C, CS	CS, PS	ALL	L
Ireland	139	134	0,82%	0,03%	T1	CS	FULL	M
Finland	42	23	0,14%	0,28%	CS	PS	PART	M
Sweden	22	15	0,09%	0,09%	CS	CS	ALL	L
Germany	NE	NE	0,00%	0,00%	NE	NE	NE	
Belgium	NE	NE	0,00%	0,00%			P	
Luxembourg	0	0	0,00%	0,00%	C	C	ALL	H-M
Greece	0	0	0,00%	0,00%				
EU15	17.247	16.377	100,00%	100,00%	C, CS, MB, T1, T3	C, CS, PS	ALL, NE, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 36: MS contribution to 1.B.2. 'Fugitive CH<sub>4</sub> Emissions from Oil and Natural Gas' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
United Kingdom	10.779	8.502	30,00%	18,51%	T3	CS	ALL	M
Germany	7.628	7.422	26,19%	21,01%	CS	CS	ALL	M
Italy	6.665	5.085	17,94%	15,64%	C, CS	CS	ALL	H
Netherlands	3.754	2.821	9,95%	9,85%	CS/T1	CS	ALL	L
France	2.471	1.903	6,72%	5,37%	C	CS	ALL	M
Spain	584	993	3,50%	11,91%	CS, C	PS, C	ALL	M
Belgium	748	864	3,05%	5,38%			P	
Portugal	38	199	0,70%	4,02%	C, T2	C	PART	M
Greece	5	177	0,62%	4,20%	C	C	ALL	
Austria	95	126	0,44%	1,09%	C	CS	ALL	L
Ireland	151	103	0,36%	0,64%	T1	CS	FULL	M
Denmark	21	78	0,28%	1,46%	C	C	ALL	L
Luxembourg	28	46	0,16%	0,54%	C	C	ALL	H-M
Finland	4	19	0,07%	0,39%	CS	PS	PART	M
Sweden	0	0	0,00%	0,00%	CS	CS	ALL	L
EU15	32.969	28.338	100,00%	100,00%	C,CS,T1,T2,T3	C, CS, PS	ALL, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

### 3.3. Sector-specific QA/QC

The main sector specific QA/QC activity is the project lead by Eurostat on the harmonisation of the energy data used for energy balances and CO<sub>2</sub> inventories. The work programme for this project foresees that Member States perform the following tasks:

- examine the energy data used by the two submissions (CRF to UNFCCC and the European Commission, DG Environment, and joint questionnaires to Eurostat and IEA) for 1990, 1995 and 2000 and identify and explain the differences;
- establish a procedure at national level that will eliminate discrepancies in the two reporting mechanisms in future; this procedure will be agreed with Eurostat;
- provide the updated energy data in the form of annual questionnaires for the period 1990-2000 ensuring comparable data under the two reporting mechanisms.

At the end of year 2000 the first countries co-financed to carry out this work were Denmark, Sweden, the Netherlands and Norway. In 2001 Eurostat continued this project with the provision of grants to Austria, Germany, France and the United Kingdom. In 2002 grants were issued for Ireland, Italy and Portugal. In 2003 a call for proposals for grants will be launched to the remaining EC countries not yet participating to this project. Denmark, Sweden, Austria, the Netherlands, and the United Kingdom have already submitted the final report to Eurostat.

Following the submission of each Member State's final report, Eurostat will update information in its database and will be in the position to produce CO<sub>2</sub> emission figures based on the energy balances, with minimum deviation from those reported by the Member States and a full understanding of any discrepancies. This will help to improve the quality of the EC GHG inventory for sector 1 'Energy'.

### 3.4. Sector-specific recalculations

Table 37 shows that in the energy sector the largest recalculations in absolute terms were made for CO<sub>2</sub>. However, in relative terms the recalculations of CO<sub>2</sub> emissions in the energy sector were below 0,5 %.

**Table 37: Recalculations of total greenhouse gas emissions and recalculations of greenhouse gas emissions in CRF sector 1 'Energy' for the years 1990 and 2000 by gas in Gg and percent**

1990	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	-5.604	-0,18%	-12.361	-2,90%	7.999	2,00%	1.242	5,08%	-143	-1,05%	-129	-1,52%
Energy	-9.543	-0,30%	-1.161	-1,16%	-123	-0,26%	NO	NO	NO	NO	NO	NO
2000												
Total emissions and removals	4.635	0,15%	-6.581	-1,93%	11.256	3,33%	4.362	-4,76%	-683	-9,98%	810	9,05%
Energy	9.928	0,31%	-1.332	-2,15%	3.184	5,79%	NO	NO	NO	NO	NO	NO

### 3.5. Comparison sectoral approach/reference approach

The IPCC reference approach for CO<sub>2</sub> from fossil fuels for the EC is based on Eurostat energy data (New Cronos database, version October 2002). Energy statistics are submitted to Eurostat by MS on an annual basis with the five joint Eurostat/IEA/UNECE questionnaires on Solid Fuels, Oil, Natural Gas, Electricity & Heat, and Renewables & Wastes. On the basis of this information Eurostat compiles the annual energy balances which are used for the estimation of CO<sub>2</sub> emissions from fossil fuels by MS and for the EC as a whole.

The Eurostat data for the EC IPCC reference approach includes activity data, net calorific values and carbon emission factors. In the CRF Tables 1.A(b) some fuel categories are grouped and average net calorific values are used: 'Orimulsion' is included in 'Residual Fuel Oil'. 'Natural Gas Liquids' is included in 'Crude oil'. 'Other Kerosene' is included in 'Total Kerosene'. 'Anthracite', 'Coking Coal' and 'Other Bituminous Coal' are referred to in the Eurostat New Cronos database as 'Hard coal' and are included in CRF Tables 1.A(b) under 'Other Bituminous Coal'. 'Sub-bituminous Coal' and 'Peat' are included in 'Lignite'. 'Solid Biomass', 'Liquid Biomass' and 'Gas Biomass' is included in 'Total Biomass'. For international bunkers, only fuel consumption for international navigation is available separately; data on international aviation are not estimated separately. Therefore, total CO<sub>2</sub> emissions as estimated with the IPCC reference approach on basis of Eurostat data include CO<sub>2</sub> emissions from international aviation. For the calculation of CO<sub>2</sub> emissions, the IPCC default carbon emission factors adjusted for the fraction non-oxidised are used in the Eurostat New Cronos database.

The IPCC reference approach method at EC level is a three-step process:

Step 1: For each MS, annual data on energy production, imports, exports, international bunkers (except international aviation) and stock changes are available in the Eurostat database in fuel specific units (i.e. kt (=1000 tons) for solid fuels and petroleum products, TJ for natural gas). The apparent consumption in TJ is calculated for each MS by using country-specific average net calorific values. These net calorific values are updated annually for solid fuels together with the energy data in the New Cronos database; for petroleum products the

net calorific values are kept constant. For groups of fuels average weighted net calorific values are used, which is the case for 'Other Bituminous Coal' and 'Lignite'.

**Step 2:** The EC CRF Tables 1.A(b) are calculated by adding the relevant MS activity and emission data, as calculated under step 1. The net calorific values provided for the EC in CRF Tables 1.A(b) are calculated from dividing apparent consumption in TJ by apparent consumption in fuel specific units for each fuel. Therefore, these net calorific values are 'implied calorific values'; there are no fuel specific net calorific values at EC level.

**Step 3:** For the calculations of carbon stored in Tables 1.A(d), Eurostat data on non-energy use of fuels are used, as reported by MS in the joint questionnaire. For the fraction of carbon stored and carbon emission factors IPCC default values are taken (IPCC, 1997).

Table 38 shows the apparent energy consumption and CO<sub>2</sub> emissions from fossil fuel combustion from 1990-2000 as provided in Tables 1.A(b) in the annex. Total fossil fuel energy consumption increased by 6,7 % between 1990 and 2000, whereas CO<sub>2</sub> emissions from fossil fuel combustion increased by 0,6 %.

**Table 38: Apparent EC energy consumption (in TJ) and EC CO<sub>2</sub> emissions from fossil fuel combustion (in Gg)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Liquid fuels	22.761.496	23.482.133	23.817.546	23.543.083	23.722.534	24.016.584	24.503.293	24.496.382	25.054.141	24.886.527	24.470.374
Solid fuels	12.561.949	11.859.600	11.056.226	10.283.864	10.133.182	9.901.371	9.783.665	9.305.916	9.295.693	8.626.103	8.945.734
Gaseous fuels	9.298.421	10.036.650	9.929.083	10.562.050	10.621.111	11.446.721	12.778.070	12.669.683	13.211.329	13.799.696	14.179.877
Total energy consumption	44.621.865	45.378.382	44.802.854	44.388.997	44.476.826	45.364.676	47.065.027	46.471.982	47.561.162	47.312.327	47.595.985
CO <sub>2</sub> emissions	3.200.404	3.213.914	3.148.460	3.100.972	3.092.535	3.131.112	3.235.276	3.169.289	3.239.958	3.197.927	3.219.475

Table 39 summarises the percentage deviation of CO<sub>2</sub> emissions from the IPCC reference approach applied to the EC based on Eurostat data and the sectoral approach available from MS. The main reason for this difference is that Eurostat energy data do not separate fuel combustion from international aviation. If fuel combustion from international aviation is added to the sectoral approach (from MS), the percentage differences are much smaller.

**Table 39: Differences between EC CO<sub>2</sub> emissions from fuel combustion (CRF 1A) using the IPCC reference approach (Eurostat data) and sectoral approach (MS data)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Percentage difference between reference approach (Eurostat data) and sectoral approach (MS data)	2,02%	1,29%	1,37%	1,63%	1,42%	1,57%	2,27%	2,23%	2,84%	2,25%	2,34%
Percentage difference between reference approach (Eurostat) and sectoral approach (MS) including emissions from international aviation	0,23%	-0,45%	-0,55%	-0,50%	-0,79%	-0,71%	-0,10%	-0,34%	0,09%	-0,67%	-0,73%

Differences are also observed when comparing the estimates for CO<sub>2</sub> emissions from fossil fuels from the IPCC reference approach of the EC MS with the estimates from the reference approach calculated using Eurostat energy balance data. Table 40 provides an overview by MS on differences between the Eurostat and national reference approach for the years 1990 and 2000, as far as available. The differences can occur due to differences in the basic energy data or due to differences when calculating CO<sub>2</sub> emissions from the basic energy data.

Main reasons for diverging energy data:

- A main reason for differences in the basic energy data is the exclusion of fuels from international aviation in the national reference approach (in Eurostat data this exclusion is not possible).
- A second reason for differences is the use of different calorific values (CV) mainly for oil products, BKB (lignite briquettes) and patent fuels. For BKB and patent fuels, Eurostat is using the same CV for all countries which differs from the calorific values used by the MS.
- A third reason for diverging MS and Eurostat estimates are small differences in the basic energy balance data reported by MS to Eurostat (in the joint questionnaires) and to the Commission and the UNFCCC (in the CRF tables).

To resolve these differences Eurostat launched a project for harmonisation of the two (joint questionnaires and CRF) reporting systems of energy data and for revision of reported energy data back to 1990 (see Chapter 3.3).

Main reasons for diverging CO<sub>2</sub> emissions:

- A main reason for diverging CO<sub>2</sub> emissions are differences in the treatment of non-energy use of fossil fuels and carbon stored.
- A second reason is the use of country specific emission factors. The Eurostat reference approach uses the IPCC default emission factors.

**Table 40: Comparison between Eurostat and national Reference Approach for CO<sub>2</sub> from fuel combustion (CRF 1A)<sup>6</sup>**

**Austria**

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	442.065	29.594	434.126	27.381	-1,8%	-7,5%
Solid fossil fuels	169.442	16.283	168.733	13.503	-0,4%	-17,1%
Gaseous fossil fuels	219.239	11.898	219.239	11.463	0,0%	-3,7%
<b>Total</b>	<b>830.746</b>	<b>57.775</b>	<b>822.098</b>	<b>52.347</b>	<b>-1,0%</b>	<b>-9,4%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	497.098	33.554	487.982	31.435	-1,8%	-6,3%
Solid fossil fuels	152.796	14.773	149.283	10.993	-2,3%	-25,6%
Gaseous fossil fuels	273.551	15.057	275.682	14.876	0,8%	-1,2%
<b>Total</b>	<b>923.446</b>	<b>63.383</b>	<b>912.947</b>	<b>57.305</b>	<b>-1,1%</b>	<b>-9,6%</b>

<sup>6</sup> Minus means that MS-based estimates are lower than the Eurostat-based estimates. MS data exclude emissions from international aviation.

# Denmark

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	339.472	23.752	318.411	22.426	-6,2%	-5,6%
Solid fossil fuels	218.500	20.532	254.880	24.130	16,6%	17,5%
Gaseous fossil fuels	76.098	4.248	76.098	4.269	0,0%	0,5%
<b>Total</b>	<b>634.070</b>	<b>48.531</b>	<b>649.389</b>	<b>50.824</b>	<b>2,4%</b>	<b>4,7%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	378.168	26.989	333.259	24.020	-11,9%	-11,0%
Solid fossil fuels	168.018	15.792	166.862	15.801	-0,7%	0,1%
Gaseous fossil fuels	186.258	10.397	186.511	10.463	0,1%	0,6%
<b>Total</b>	<b>732.444</b>	<b>53.178</b>	<b>686.632</b>	<b>50.285</b>	<b>-6,3%</b>	<b>-5,4%</b>

# Finland

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	417.506	27.122	441.576	29.436	5,8%	8,5%
Solid fossil fuels	212.396	20.432	223.400	21.943	5,2%	7,4%
Gaseous fossil fuels	94.646	5.263	91.620	5.121	-3,2%	-2,7%
<b>Total</b>	<b>724.548</b>	<b>52.817</b>	<b>756.596</b>	<b>56.500</b>	<b>4,4%</b>	<b>7,0%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	391.633	26.775	393.294	26.757	0,4%	-0,1%
Solid fossil fuels	211.306	20.345	217.906	21.001	3,1%	3,2%
Gaseous fossil fuels	143.281	7.969	143.640	7.992	0,3%	0,3%
<b>Total</b>	<b>746.219</b>	<b>55.090</b>	<b>754.841</b>	<b>55.751</b>	<b>1,2%</b>	<b>1,2%</b>

# France

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	3.655.354	238.450	3.533.651	220.991	-3,3%	-7,3%
Solid fossil fuels	824.313	77.749	754.302	70.353	-8,5%	-9,5%
Gaseous fossil fuels	1.030.510	55.888	1.089.913	59.174	5,8%	5,9%
<b>Total</b>	<b>5.510.178</b>	<b>372.087</b>	<b>5.377.866</b>	<b>350.517</b>	<b>-2,4%</b>	<b>-5,8%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	3.685.327	236.022	3.427.318	207.753	-7,0%	-12,0%
Solid fossil fuels	625.542	59.065	597.202	55.719	-4,5%	-5,7%
Gaseous fossil fuels	1.471.283	80.147	1.478.539	80.550	0,5%	0,5%
<b>Total</b>	<b>5.782.152</b>	<b>375.234</b>	<b>5.503.059</b>	<b>344.022</b>	<b>-4,8%</b>	<b>-8,3%</b>

# Germany

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	5.190.871	333.697	5.034.262	327.838	-3,0%	-1,8%
Solid fossil fuels	5.572.479	539.954	5.508.185	566.742	-1,2%	5,0%
Gaseous fossil fuels	2.302.935	126.616	2.302.935	123.971	0,0%	-2,1%
<b>Total</b>	<b>13.066.285</b>	<b>1.000.267</b>	<b>12.845.382</b>	<b>1.018.551</b>	<b>-1,7%</b>	<b>1,8%</b>

# Ireland

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	195.789	13.739	165.588	12.323	-15,4%	-10,3%
Solid fossil fuels	148.001	14.209	147.417	14.334	-0,4%	0,9%
Gaseous fossil fuels	79.289	4.055	78.586	4.318	-0,9%	6,5%
<b>Total</b>	<b>423.079</b>	<b>32.003</b>	<b>391.591</b>	<b>30.975</b>	<b>-7,4%</b>	<b>-3,2%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	323.594	23.109	329.417	24.209	1,8%	4,8%
Solid fossil fuels	110.962	10.610	117.021	11.171	5,5%	5,3%
Gaseous fossil fuels	143.856	7.702	144.152	7.920	0,2%	2,8%
<b>Total</b>	<b>578.413</b>	<b>41.421</b>	<b>590.590</b>	<b>43.300</b>	<b>2,1%</b>	<b>4,5%</b>

# Netherlands

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	993.490	55.873	943.000	52.284	-5,1%	-6,4%
Solid fossil fuels	383.073	35.841	367.000	34.741	-4,2%	-3,1%
Gaseous fossil fuels	1.289.950	70.053	1.305.000	72.533	1,2%	3,5%
<b>Total</b>	<b>2.666.513</b>	<b>161.767</b>	<b>2.615.000</b>	<b>159.558</b>	<b>-1,9%</b>	<b>-1,4%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	1.165.009	69.052	1.070.000	56.585	-8,2%	-18,1%
Solid fossil fuels	334.049	31.331	332.000	31.863	-0,6%	1,7%
Gaseous fossil fuels	1.453.264	78.973	1.469.000	81.662	1,1%	3,4%
<b>Total</b>	<b>2.952.322</b>	<b>179.356</b>	<b>2.871.000</b>	<b>170.110</b>	<b>-2,8%</b>	<b>-5,2%</b>

# Portugal

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	486.835	30.346	491.139	30.430	0,9%	0,3%
Solid fossil fuels	108.009	10.146	115.571	10.463	7,0%	3,1%
Gaseous fossil fuels	0	0	0	0	-	-
<b>Total</b>	<b>594.844</b>	<b>40.492</b>	<b>606.709</b>	<b>40.892</b>	<b>2,0%</b>	<b>1,0%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	632.862	40.405	651.821	41.709	3,0%	3,2%
Solid fossil fuels	159.227	14.936	159.649	14.390	0,3%	-3,7%
Gaseous fossil fuels	85.152	4.753	98.843	5.517	16,1%	16,1%
<b>Total</b>	<b>877.241</b>	<b>60.094</b>	<b>910.313</b>	<b>61.616</b>	<b>3,8%</b>	<b>2,5%</b>



## Spain

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	1.885.284	123.278	1.870.202	120.742	-0,8%	-2,1%
Solid fossil fuels	790.770	74.899	795.407	78.399	0,6%	4,7%
Gaseous fossil fuels	208.105	11.296	212.036	11.315	1,9%	0,2%
<b>Total</b>	<b>2.884.159</b>	<b>209.472</b>	<b>2.877.644</b>	<b>210.457</b>	<b>-0,2%</b>	<b>0,5%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	2.637.596	172.329	2.562.299	163.667	-2,9%	-5,0%
Solid fossil fuels	864.260	81.231	876.258	85.834	1,4%	5,7%
Gaseous fossil fuels	637.193	35.161	659.187	36.732	3,5%	4,5%
<b>Total</b>	<b>4.139.049</b>	<b>288.721</b>	<b>4.097.744</b>	<b>286.233</b>	<b>-1,0%</b>	<b>-0,9%</b>

## Sweden

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	599.659	38.079	628.365	40.879	4,8%	7,4%
Solid fossil fuels	112.065	10.687	121.965	11.170	8,8%	4,5%
Gaseous fossil fuels	22.126	1.235	21.536	1.217	-2,7%	-1,5%
<b>Total</b>	<b>733.850</b>	<b>50.000</b>	<b>771.865</b>	<b>53.266</b>	<b>5,2%</b>	<b>6,5%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	586.990	36.582	612.182	40.499	4,3%	10,7%
Solid fossil fuels	102.246	9.773	104.760	9.705	2,5%	-0,7%
Gaseous fossil fuels	29.257	1.633	29.393	1.661	0,5%	1,7%
<b>Total</b>	<b>718.494</b>	<b>47.987</b>	<b>746.335</b>	<b>51.865</b>	<b>3,9%</b>	<b>8,1%</b>

## United Kingdom

1990	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	3.445.693	228.294	3.263.134	214.244	-5,3%	-6,2%
Solid fossil fuels	2.614.886	245.575	2.626.382	241.511	0,4%	-1,7%
Gaseous fossil fuels	1.976.219	108.101	1.976.478	113.553	0,0%	5,0%
<b>Total</b>	<b>8.036.799</b>	<b>581.971</b>	<b>7.865.994</b>	<b>569.308</b>	<b>-2,1%</b>	<b>-2,2%</b>
2000	Eurostat reference approach		National reference approach		Percentage difference	
	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)	Apparent consumption (TJ)	CO <sub>2</sub> emissions (Gg)
Liquid fossil fuels	3.363.593	222.267	3.110.181	202.191	-7,5%	-9,0%
Solid fossil fuels	1.490.057	139.837	1.495.702	136.726	0,4%	-2,2%
Gaseous fossil fuels	3.663.439	203.544	3.659.007	210.923	-0,1%	3,6%
<b>Total</b>	<b>8.517.089</b>	<b>565.648</b>	<b>8.264.890</b>	<b>549.840</b>	<b>-3,0%</b>	<b>-2,8%</b>

### 3.6. International bunker fuels

International bunker emissions of the EC inventory are the sum of the international bunker emissions of the MS. A project shared between the Commission (Eurostat and DG Environment), Eurocontrol and EEA has been initiated to improve the quality of the estimates of CO<sub>2</sub> emissions from international aviation.

In a first phase of the project, Eurocontrol, the European Organisation for the Safety of Air Navigation and responsible for the coordination of the European air traffic management

system, provided Eurostat with aggregated air traffic data covering the years 1996-2000. Eurostat has used these data to produce estimates of fuel consumption and emissions of CO, CO<sub>2</sub>, hydrocarbons, NO<sub>x</sub> and SO<sub>2</sub>, split between domestic and international flights. Estimated fuel consumption has been compared with the figures provided in national inventories and with energy statistics for a number of European countries.

The main results of these first investigations are as follows: Estimations of fuel consumption based on European air traffic data are largely compatible with statistics on fuel sold. Similarly, the split between domestic and international fuel consumption as reported in European inventories is largely compatible with traffic-based estimates. The reasons for remaining discrepancies need to be further investigated and may include: (1) the fact that aircrafts do not refuel during every landing and take-off cycle; (2) the inclusion or non-inclusion of overseas territories in the compared data sets.

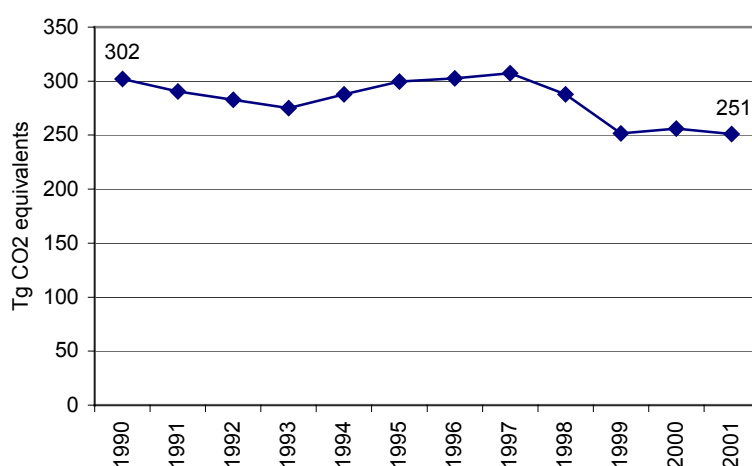
## Chapter 4: Industrial processes (CRF sector 2)

This chapter starts with an overview on emission trends in CRF sector 2 ‘Industrial processes’. Then a section on methodological issues and uncertainty presents for each EC key source an overview table which includes the MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. In addition, the chapter includes a section on recalculations. A section on sector specific QA/QC is not included as such activities have not yet started in this sector.

### 4.1. Overview of sector

CRF sector 2 ‘Industrial processes’ is the third-largest sector contributing 6 % to the total EC GHG emissions. The most important GHG from the ‘Industrial processes’ are CO<sub>2</sub> (3 % of the total GHG emissions) and N<sub>2</sub>O (1 % of the total GHG emissions). The emissions from this sector decreased by 17 % from 302 Tg in 1990 to 251 Tg in 2001 (Figure 4). In 2001, the emissions decreased by 2 % compared to 2000.

Figure 4: EC GHG emissions 1990-2001 from CRF sector 2 ‘Industrial processes’ in Tg



### 4.2. Methodological issues and uncertainties

Tables 41-49 present for each EC key source in CRF sector 2 an overview on MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. Therefore, the overview tables also aim at making transparent the compilation of CRF Summary Table 3 and CRF Table 7 of the EC submission.

**Table 41: MS contribution to CO<sub>2</sub> emissions from 2.A. ‘Mineral Products’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	24.512	21.802	20,58%	14,77%	CS	CS	ALL	H
Italy	18.223	18.473	17,44%	2,49%	D	D	ALL	M
Spain	14.076	17.457	16,48%	20,86%	CS, C, D, T2	CS, C, D, T2	PART	H
France	14.945	12.231	11,54%	15,32%	C	CS	ALL	H
Greece	6.984	7.752	7,32%	4,95%	C	C	ALL	
United Kingdom	9.629	7.702	7,27%	10,93%	T2	D	PART	H
Belgium	4.569	5.875	5,54%	8,01%			F	
Portugal	3.426	4.330	4,09%	5,56%	D, C	D, C	PART	M
Austria	3.975	3.074	2,90%	5,14%	C, CS	CS	PART	M
Ireland	941	1.833	1,73%	5,35%	D	D	PART	M
Sweden	1.765	1.630	1,54%	0,71%	CS	CS	ALL	H
Denmark	1.005	1.464	1,38%	2,78%	CS	CS	ALL	M
Finland	1.175	1.042	0,98%	0,73%	D	PS/D	PART	H
Netherlands	1.124	805	0,76%	1,83%	CS/T2 (clinker)	PS, CS	ALL	M
Luxembourg	585	483	0,46%	0,57%	C	C	ALL	H-M
EU15	106.934	105.952	100,00%	100,00%	C, CS, D, T2	C, CS, D, PS, T2	ALL, PART	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 42: MS contribution to CO<sub>2</sub> emissions from 2.B. ‘Chemical Industry’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
France	3.029	2.649	24,60%	3,61%	C	CS	ALL	H
Germany	2.190	1.811	16,82%	0,60%	CS	CS	ALL	H
Belgium	778	1.562	14,50%	28,02%			F	
United Kingdom	1.358	1.373	12,75%	7,31%	T1	CS	ALL	H
Ireland	989	1.037	9,63%	6,48%	D, T1a	D	PART	M
Italy	2.237	694	6,45%	36,14%	D	D, C, CS	ALL	M
Spain	673	603	5,60%	1,25%	C, D	C, D	ALL	H
Portugal	633	507	4,70%	0,69%	MB, D, C	D, C	ALL	H
Austria	424	462	4,29%	3,33%	C	PS	PART	M
Sweden	104	71	0,66%	0,50%	CS	CS	ALL	H
Greece	470	0	0,00%	12,07%	C	C	ALL	
Netherlands	0	0	0,00%	0,00%	CS/IE	PS/CS	ALL	M
Finland	0	0	0,00%	0,00%	NO	NO	NE	NE
Denmark	0	0	0,00%	0,00%				
Luxembourg	0	0	0,00%	0,00%	C	C	ALL	H-M
EU15	12.884	10.769	100,00%	100,00%	C, CS, D, MB, T1, T1a	C, CS, D, PS	ALL, NE, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 43: MS contribution to N<sub>2</sub>O emissions from 2.B. 'Chemical Industry' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
France	24.347	11.338	23,06%	0,20%	C	CS/PS	ALL	M
Italy	7.252	8.874	18,05%	20,59%	D	D, CS	ALL	M
Germany	25.547	6.632	13,49%	19,45%	CS	CS	ALL	M
Netherlands	7.554	6.564	13,35%	11,44%	CS/T2	PS	CS	L
United Kingdom	29.270	5.386	10,95%	30,55%	PS	CS	ALL	M
Belgium	3.559	4.031	8,20%	8,90%			F	
Spain	2.884	2.044	4,16%	2,64%	C	CS, C	ALL	M
Finland	1.595	1.260	2,56%	1,94%	D	PS	ALL	L
Austria	907	786	1,60%	1,37%	C	PS	PART	M
Portugal	603	606	1,23%	1,22%	D, C	D, C	ALL	M
Ireland	1.035	584	1,19%	0,39%	D	CS	PART	L
Greece	713	567	1,15%	0,88%	C	C	ALL	
Sweden	829	495	1,01%	0,41%	C	CS	ALL	H
Denmark	0	0	0,00%	0,00%				
Luxembourg	0	0	0,00%	0,00%	C	C	ALL	H-M
EU15	106.096	49.167	100,00%	100,00%	C, CS, D, PS, T2	C, CS, D, PS	ALL, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 44: MS contribution to CO<sub>2</sub> emissions from 2.C. 'Metal Production' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Austria	8.461	9.245	38,75%	28,09%	C	CS, PS	PART	M
France	4.559	2.892	12,12%	27,02%	C	CS	ALL	H
Sweden	2.445	2.808	11,77%	10,87%	CS	CS	ALL	H
United Kingdom	3.161	2.738	11,48%	3,95%	T2	CS	ALL	H
Spain	1.579	1.947	8,16%	9,72%	C	C	ALL	H
Italy	1.804	1.585	6,64%	1,81%	D, C	D, C, CS	ALL	M
Belgium	1.671	1.391	5,83%	3,24%			F	
Germany	904	797	3,34%	0,86%	CS	CS	ALL	H
Greece	232	251	1,05%	0,72%	C	C	ALL	
Luxembourg	850	139	0,58%	13,12%	C	C	ALL	H-M
Portugal	35	62	0,26%	0,60%	D+C	D+C	ALL	H
Netherlands	0	0	0,00%	0,00%	CS/IE	PS, CS	ALL	M
Denmark	0	0	0,00%	0,00%				
Finland	0	0	0,00%	0,00%	NO	NO	IE	IE
Ireland	0	0	0,00%	0,00%	NA	NA	NO	NA
EU15	25.702	23.856	100,00%	100,00%	C, CS, D, T2	C, CS, D, PS	ALL, IE, PART	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 45: MS contribution to PFC emissions from 2.C. ‘Metal Production’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Netherlands	2.398	1.320	42,59%	37,06%	CS/T2/T3b	PS	NO	
France	2.290	584	18,84%	1,32%			ALL	H
Germany	2.486	372	11,98%	15,67%	T3a	T3a	ALL	H
Sweden	440	259	8,36%	7,72%	T2	CS	ALL	H
United Kingdom	2.031	225	7,24%	17,09%	T2/PS	CS	ALL	M
Spain	828	176	5,66%	2,42%	NO		ALL	H
Italy	-	83	2,69%	4,53%	D, T1	CS	ALL	M
Greece	258	81	2,62%	0,69%			ALL	
Austria	937	0	0,00%	13,50%			NO	NO
Portugal	0	0	0,00%	0,00%	D	D	PART	L
Denmark	0	0	0,00%	0,00%				
Belgium	0	0	0,00%	0,00%				
Finland	0	0	0,00%	0,00%	NO	NO	NO	NO
Ireland	0	0	0,00%	0,00%	NA	NA	NO	NA
Luxembourg	-	-	0,00%	0,00%				
EU15	11.668	3.100	100,00%	100,00%	CS, D, PS, T1, T2, T3a, T3b	CS, D, PS, T3a	ALL, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 46: MS contribution to HFC emissions from 2.E. ‘Production of Halocarbons and SF<sub>6</sub>’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Greece	935	3.744	31,31%	31,96%	T1	D		
United Kingdom	11.373	3.176	26,56%	22,20%	T2/PS	CS	ALL	H
Spain	2.403	2.993	25,03%	17,83%	D, CS, T2	D, PS, T2	ALL	H
Netherlands	4.432	641	5,36%	14,43%	CS/T2	PS	ALL	M
France	2.230	282	2,36%	7,65%	CS	CS	ALL	M
Italy	-	22	0,19%	0,22%	CS	CS	ALL	M
Germany	3.510	1.098	0,00%	5,71%	T1	T1	ALL	H
Denmark	0	0	0,00%	0,00%	NO		NO	
Belgium	0	0	0,00%	0,00%			F	
Finland	0	0	0,00%	0,00%	NO	NO	NO	NO
Portugal	0	0	0,00%	0,00%			ALL	H
Ireland	0	0	0,00%	0,00%	NA	NA	NO	NA
Austria	0	0	0,00%	0,00%			NO	NO
Sweden	NO	0	0,00%	0,00%	NO	NO	NO	NO
Luxembourg	-	-	0,00%	0,00%	NA	NA		
EU15	24.883	11.957	100,00%	100,00%	CS, D, PS, T1, T2	CS, D, PS, T1, T2	ALL	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 47: MS contribution to HFC emissions from 2.F. ‘Consumption of Halocarbons and SF<sub>6</sub>’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
France	23	8.008	25,52%	11,28%	CS/T2	CS	ALL	M
Germany	NE	7.032	22,41%	12,81%	T2	T2	ALL	H
United Kingdom	1	5.502	17,53%	9,92%	T2	D/CS	ALL	H
Italy	-	2.708	8,63%	4,93%	D, T2	CS	PART	M
Spain	0	2.295	7,31%	4,18%	D, CS, T2	D, PS, T2	ALL	L
Belgium	339	1.227	3,91%	47,39%			F	
Austria	4	1.033	3,29%	1,34%	CS	CS	PART	M
Netherlands	0	943	3,00%	1,72%	M, CS/T2	CS	ALL	M
Greece	0	666	2,12%	1,21%			PART	
Finland	0	657	2,09%	1,19%	T2, T1a & T1b	D	ALL	M
Denmark	0	647	2,06%	1,18%	M/CS	CS	ALL	M
Sweden	4	372	1,19%	0,11%	T2	CS, D	ALL/PART	M
Ireland	21	231	0,74%	2,61%	NA	NA	FULL	M
Portugal	0	62	0,20%	0,11%	D	D	PART	L
Luxembourg	-	-	0,00%	0,00%	C	C		
EU15	390	31.383	100,00%	100,00%	C, CS, D, M, T1a, T1b, T2	C, CS, D, PS, T2	ALL, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 48: MS contribution to SF<sub>6</sub> emissions from 2.F. ‘Consumption of Halocarbons and SF<sub>6</sub>’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	3.728	2.741	41,89%	40,57%	CS/T2/T1	CS/T2/T1	ALL	H
United Kingdom	246	997	15,24%	21,19%	T2	CS	ALL	H
France	1.060	966	14,76%	6,07%	CS/T2	CS	ALL	M
Austria	264	669	10,23%	11,01%	CS	CS	PART	M
Italy	-	345	5,27%	10,09%	D, T3c	CS	ALL	M
Netherlands	187	296	4,53%	2,61%	T2/T3b	PS/CS/D	PART	L
Spain	56	212	3,24%	4,40%	CS, T2	CS, T2	All	M
Belgium	96	105	1,61%	0,02%			F	
Ireland	83	67	1,02%	0,74%	NA	NA	FULL	M
Finland	94	55	0,84%	1,45%	T2, T1a & T1b	D	ALL	M
Sweden	83	53	0,80%	1,16%	T2	CS	ALL	M
Denmark	12	30	0,47%	0,50%	M/CS	CS	ALL	M
Portugal	0	7	0,10%	0,19%	D	CS	PART	H
Greece	0	0	0,00%	0,00%			NE	
Luxembourg	-	-	0,00%	0,00%	C	C		
EU15	5.910	6.543	100,00%	100,00%	C, CS, D, M, T1, T1a, T1b, T2, T3b, T3c	C, CS, D, PS, T1, T2	ALL, NE, PART	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 49: MS contribution to CO<sub>2</sub> emissions from 2.G. 'Other' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Belgium	654	976	75,39%	50,00%			P	
Netherlands	457	319	24,61%	50,00%	CS	PS/CS	ALL	H
Germany	NO	NO	0,00%	0,00%	NO	NO	NO	
France	0	0	0,00%	0,00%			NO	
United Kingdom	0	0	0,00%	0,00%				
Spain	0	0	0,00%	0,00%	NO		NO	
Italy	-	0	0,00%	0,00%			NO	
Austria	0	0	0,00%	0,00%			NO	NO
Denmark	0	0	0,00%	0,00%				
Greece	0	0	0,00%	0,00%			NO	
Finland	0	0	0,00%	0,00%			NO	NO
Sweden	0	0	0,00%	0,00%	CS	CS	ALL	M
Portugal	0	0	0,00%	0,00%				
Ireland	NO	NO	0,00%	0,00%	NA	NA	NE	NE
Luxembourg	0	0	0,00%	0,00%	NA	NA	ALL	H-M
EU15	1.111	1.295	100,00%	100,00%	CS	CS, PS	ALL, NE, PART	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

Table 50 provides an overview of emission allocations in the iron and steel production and in the cement production for those MS which provided the relevant information.



**Table 50: Energy and process related CO<sub>2</sub> emissions reported in IPCC categories 1A2a, 1A2f, 2A1 and 2C1 (iron and steel industry and cement industry)**

	MS reporting	MS explanation	Information source
<b>Austria</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	The emission declaration of the iron and steel industry includes emissions of all activities of this sector which are allocated under SNAP 040202. The standard transformation of SNAP to IPCC allocates the emissions to sector 2C1	Table 1, Table 2(I) and Table 9 (CRF_2002_2001)
Cement industry	MS reports emissions from 2A1	Emissions of cement industry are reported as total emissions and not for the different fuel types.	Table 2(I) and Table 9 (CRF_2002_2001)
<b>Belgium</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	No specific explanation available	Table 1 and Table 2(I) (CRF2001BELG_2003)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (CRF2001BELG_2003)
<b>Denmark</b>			
Iron and steel industry	MS reports that emissions from 1A2a and 2C1 are IE and 0 respectively	Danish energy statistics states energy consumption of manufacturing industry as a whole. Thus all energy consumption of 1A2 is included in 1A2f.	Table 1, Table 2(I) and Table 9 (April 2003_DK2001_UN2)
Cement industry	MS reports emissions from 2A1	Danish energy statistics states energy consumption of manufacturing industry as a whole. Thus all energy consumption of 1A2 is included in 1A2f.	Table 2(I) and Table 9 (April 2003_DK2001_UN2)
<b>Finland</b>			
Iron and steel industry	MS reports emissions from 1A2a MS reports that CO <sub>2</sub> emissions from 2C1 are included elsewhere (IE)	CO <sub>2</sub> emissions from C1 'Iron and Steel Production' have been included in 1A2a 'Iron and Steel'. The calculation method gives more accurate total CO <sub>2</sub> emissions (no double counting, completeness) compared to more or less arbitrary allocation of coke and BF gases between energy use and process use.	Table 1, Table 2(I) and Table 9 (Fi01un03)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (Fi01un03)
<b>France</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	No specific explanation available	Table 1 and Table 2(I) (CRF_France_01)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (CRF_France_01)
<b>Germany</b>			
Iron and steel industry	MS reports that emissions from 1A2a are included elsewhere (IE) MS reports that emissions from 2C1 are not estimated (NE)	No specific explanation available	Table 1 and Table 2(I).A-G (Germany - 2002 - 2001)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (Germany - 2002 - 2001)
<b>Greece</b>			
Iron and steel industry	MS reports emissions from 1A2a MS reports that emissions from 2C1 are 0	No specific explanation available	Table 1 and Table 2(I) (Greece - Submission 2003 - 2001)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (Greece - Submission 2003 - 2001)
<b>Ireland</b>			
Iron and steel industry	MS reports emissions from 1A2a MS reports that emissions from 2C1 are not occurring (NO)	No specific explanation available	Table 1 and Table 2(I).A-G (CRF2001_2003_IE)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (CRF2001_2003_IE)
<b>Italy</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	CO <sub>2</sub> emissions from pig iron, sinter and coke production are not relevant and considered in the combustion processes	Table 1 and Table 2(I).A-G (CRF-ITA2001)

Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (CRF-ITA2001)
<b>Luxembourg</b>			
Iron and steel industry	Reporting not detailed enough	No specific explanation available	No sectoral (background) tables available
Cement industry	Reporting not detailed enough	No specific explanation available	No sectoral (background) tables available
<b>Netherlands</b>			
Iron and steel industry	MS reports emissions from 1A2a MS reports that emissions from 2C1 are IE	IE in C. 'Metal Production' and in D 'Other Production' are allocated under 1.A.2. 'Manufacturing Industries and Construction'.	Table 1 and Table 2(I) A-G (Netherlands - Submission 2003 v 2.0 - 2001)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (Netherlands - Submission 2003 v 2.0 - 2001)
<b>Portugal</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	No specific explanation available	Table 1 and Table 2(I) (Portugal-2003-2001 v3)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (Portugal-2003-2001 v3)
<b>Spain</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	No specific explanation available	Table 1 and Table 2(I) (Year 2001 - Common Reporting Format V1.01)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (Year 2001 - Common Reporting Format V1.01)
<b>Sweden</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	No specific explanation available	Table 1 and Table 2(I) (SE-2003-2001)
Cement industry	MS reports emissions from 2A1	No specific explanation available	Table 2(I) (SE-2003-2001)
<b>United Kingdom</b>			
Iron and steel industry	MS reports emissions from 1A2a and 2C1	Emissions from blast furnace gas used for energy are reported in 1A2.	Table 1 and Table 2(I) A-G (common_reporting_format_v1.01_uk_2003_01)
Cement industry	MS reports emissions from 2A1	More specific explanation available in National Environmental Technology Centre (2003)	Table 2(I) (common_reporting_format_v1.01_uk_2003_01)

### 4.3. Sector-specific recalculations

Table 51 shows that in the industrial processes sector the largest recalculations in absolute terms were made for CO<sub>2</sub>. In relative terms, the largest recalculations were made for N<sub>2</sub>O emissions in the year 2000.

**Table 51: Recalculations of total greenhouse gas emissions and recalculations of greenhouse gas emissions in CRF sector 2 'Industrial processes' for the years 1990 and 2000 by gas in Gg and percent**

1990	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	-5.604	-0,18%	-12.361	-2,90%	7.999	2,00%	1.242	5,08%	-143	-1,05%	-129	-1,52%
Industrial Processes	-4.953	-3,24%	-3	-0,50%	950	0,90%	1.242	5,08%	-143	-1,05%	-129	-1,52%
<b>2000</b>												
Total emissions and removals	4.635	0,15%	-6.581	-1,93%	11.256	3,33%	4.362	-4,76%	-683	-9,98%	810	9,05%
Industrial Processes	-5.820	-3,87%	-24	-5,20%	3.355	7,22%	4.362	-4,76%	-683	-9,98%	810	9,05%

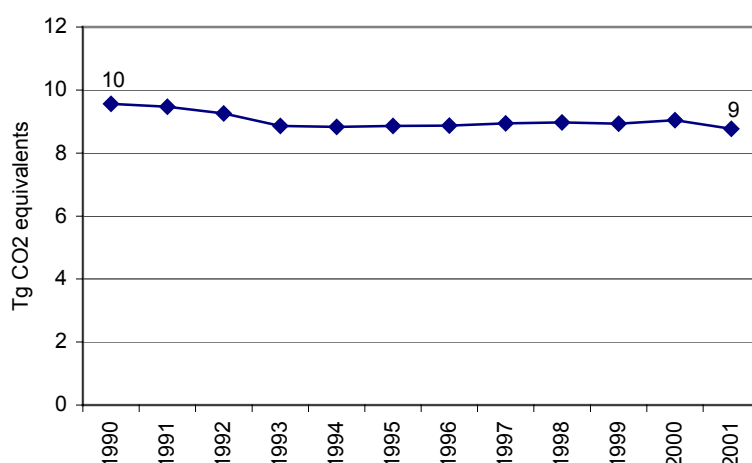
## Chapter 5: Solvent and other product use (CRF sector 3)

This chapter provides two short sections on emission trends and on recalculations in CRF sector 3 'Solvent and other product use'. No section on methodological issues and uncertainty is included in this chapter because the sector does not contain an EC key source.<sup>7</sup> Neither is included a section on sector specific QA/QC as no such activities are performed in this sector.

### 5.1. Overview of sector

CRF sector 3 'Solvent and other product use' contributes less than 1 % of the total EC GHG emissions. The most important GHG from 'Solvent and other product use' is CO<sub>2</sub> (0,13 % of the total GHG emissions). The emissions from this sector decreased by 8 % from 10 Tg in 1990 to 9 Tg in 2001 (Figure 5). In 2001, the emissions decreased by 3 % compared to 2000.

Figure 5: EC GHG emissions 1990-2001 from CRF sector 3 'Solvent and other product use' in Tg



### 5.2. Sector-specific recalculations

Table 52 shows that in the solvent sector only minor recalculations were made (in particular in absolute terms).

Table 52: Recalculations of total greenhouse gas emissions and recalculations of greenhouse gas emissions in CRF sector 3 'Solvent and other product use' for the years 1990 and 2000 by gas in Gg and percent

1990	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	-5.604	-0,18%	-12.361	-2,90%	7.999	2,00%	1.242	5,08%	-143	-1,05%	-129	-1,52%
Solvent and other product use	342	5,97%	0	0,00%	152	4,56%	NO	NO	NO	NO	NO	NO
<b>2000</b>												
Total emissions and removals	4.635	0,15%	-6.581	-1,93%	11.256	3,33%	4.362	-4,76%	-683	-9,98%	810	9,05%
Solvent and other product use	212	3,96%	0	0,00%	31	0,90%	NO	NO	NO	NO	NO	NO

<sup>7</sup> In this report, overview tables on methodologies and on uncertainties are only presented for the EC key sources as identified in Chapter 1.5. For information on sector specific methods used by the MS see MS submissions.

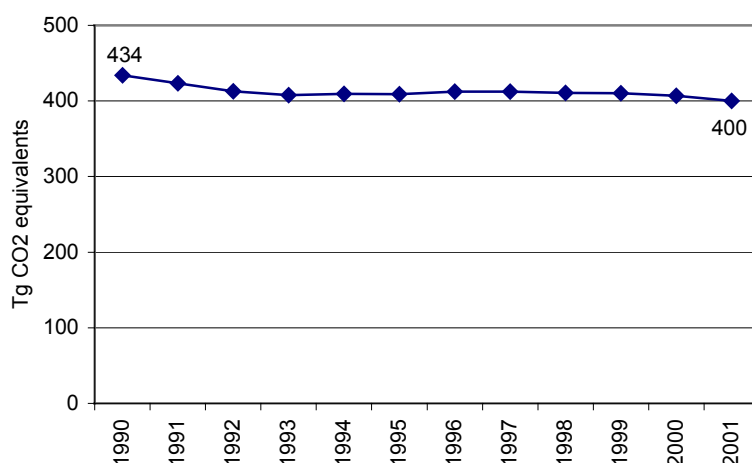
## Chapter 6: Agriculture (CRF sector 4)

This chapter starts with an overview on emission trends in CRF sector 4 ‘Agriculture’. Then a section on methodological issues and uncertainty presents for each EC key source an overview table which includes the MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. In addition, the chapter provides information on sector specific QA/QC and on recalculations.

### 6.1. Overview of the sector

CRF sector 4 ‘Agriculture’ contributes 10 % of the total EC GHG emissions, making it the second-largest sector after the sector ‘Energy’. The most important GHG from ‘Agriculture’ are N<sub>2</sub>O (5 % of the total emissions) and CH<sub>4</sub> (4 % of the total GHG emissions). Total emissions from this sector decreased by 8 % from 434 Tg in 1990 to 400 Tg in 2001 (Figure 6). In 2001, emissions decreased by 2 % compared to 2000.

Figure 6: EC GHG emissions 1990-2001 from CRF sector 4 ‘Agriculture’ in Tg



### 6.2. Methodological issues and uncertainties

Tables 53-57 present for each EC key source in CRF sector 3 an overview on MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. Therefore, the overview tables also aim at making transparent the compilation of CRF Summary Table 3 and CRF Table 7 of the EC submission.

**Table 53: MS contribution to CH<sub>4</sub> emissions from 4.A. 'Enteric Fermentation' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
France	30.854	29.324	22,28%	8,87%	C	CS	ALL	M
Germany	28.037	20.952	15,92%	36,32%	C/D	C/D	ALL	H
United Kingdom	19.122	17.074	12,97%	3,07%	T2	D/CS	ALL	M
Spain	12.651	14.607	11,10%	23,76%	CS, T1, T2	T1, T2	ALL	M
Italy	13.625	12.781	9,71%	2,60%	D, T1, T2	D, CS	ALL	H
Ireland	9.180	9.677	7,35%	10,06%	D	CS, D	FULL	M
Netherlands	8.439	6.766	5,14%	7,35%	cattle 90: T2; rest: T1	cattle: CS; rest: D	ALL	M
Belgium	4.617	4.205	3,19%	0,10%			F	
Austria	3.555	3.150	2,39%	0,76%	T1, T2	D, CS	ALL	M
Greece	2.976	3.000	2,28%	2,20%	T1	D	ALL	
Sweden	3.027	2.875	2,18%	0,86%	T1, CS	D, CS	ALL	H
Denmark	3.189	2.747	2,09%	1,29%	T1/T2	CS	ALL	H
Portugal	2.606	2.581	1,96%	1,57%	T1	D	ALL	M
Finland	1.868	1.565	1,19%	1,11%	T1, T2	CS/D	ALL	M
Luxembourg	346	328	0,25%	0,09%	C	C	ALL	M
EU15	144.091	131.631	100,00%	100,00%	C, CS, D, T1, T2	C, CS, D, T1, T2	ALL	H, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 54: MS contribution to CH<sub>4</sub> emissions from 4.B. 'Manure Management' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
France	14.851	14.336	31,67%	9,82%	CS/T2	T2	ALL	M
Spain	6.221	8.570	18,93%	42,00%	CS, T1, T2	T1, T2	ALL	M
Germany	5.653	4.442	9,81%	22,01%	C/D	C/D	ALL	H
Italy	4.013	3.946	8,72%	1,35%	D, T1, T2	D, CS	ALL	H
Portugal	3.464	3.098	6,84%	6,72%	T2	D (CS)	ALL	M
Belgium	2.385	2.581	5,70%	3,45%			F	
United Kingdom	2.329	2.121	4,68%	3,84%	T2	D/CS	ALL	M
Netherlands	2.173	1.856	4,10%	5,78%	CS/T2	CS (=D,corrected)	ALL	L
Ireland	1.261	1.396	3,08%	2,37%	D	CS, D	FULL	M
Austria	867	910	2,01%	0,73%	T1, T2	D, CS	ALL	M
Denmark	900	884	1,95%	0,31%	T2	CS	ALL	M
Greece	497	490	1,08%	0,14%	T1	D	ALL	
Sweden	336	411	0,91%	1,35%	T1, T2	D, CS	ALL	H
Finland	199	204	0,45%	0,09%	T2	CS/D	ALL	M
Luxembourg	24	23	0,05%	0,03%	C	C	ALL	M
EU15	45.172	45.268	100,00%	100,00%	C,CS,D,T1,T2	C,CS,D,T1,T2	ALL	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 55: MS contribution to N<sub>2</sub>O emissions from 4.B. 'Manure Management' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Germany	8.190	6.454	29,93%	40,66%	C/D	C/D	ALL	H
Italy	3.846	4.213	19,54%	26,18%	D	D, CS	ALL	H
France	3.074	2.937	13,62%	4,43%	T2	T2	ALL	M
Spain	1.632	1.614	7,49%	4,47%	CS, D	D	ALL	M
United Kingdom	1.514	1.379	6,39%	0,40%	T1	D/CS	ALL	M
Portugal	1.127	1.212	5,62%	6,80%	T2	D (CS)	ALL	M
Austria	748	709	3,29%	0,86%			NE	NE
Ireland	627	684	3,17%	4,15%	D	CS, D	FULL	M
Sweden	741	554	2,57%	4,81%	T1, T2	D, CS	ALL	M
Belgium	474	484	2,24%	1,85%			F	
Denmark	462	442	2,05%	0,67%			ALL	M
Finland	554	400	1,86%	4,13%	D	D/CS	ALL	L
Greece	301	291	1,35%	0,55%	T1	D	ALL	
Netherlands	205	189	0,88%	0,05%	CS	CS	ALL	L
Luxembourg	0	0	0,00%	0,00%			ALL	M
EU15	23.495	21.562	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D, T2	ALL, NE	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 56: MS contribution to CO<sub>2</sub> emissions from 4.D. 'Agricultural Soils' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Finland	3.208	1.946	100,00%	0,00%	D	D/CS	ALL	L
France	0	0	0,00%	0,00%			NO	
Germany	NE	NE	0,00%	0,00%	NE	NE	NE	
United Kingdom	IE	IE	0,00%	0,00%	IE	IE		
Italy	-	0	0,00%	0,00%			NO	
Spain	0	0	0,00%	0,00%	NO		NO	
Denmark	0	0	0,00%	0,00%	NE		NE	
Netherlands	NE	NE	0,00%	0,00%	NE		NE	
Ireland	IE	IE	0,00%	0,00%	NA	NA	IE	NA
Greece	-	0	0,00%	0,00%				
Belgium	0	0	0,00%	0,00%			P	
Portugal	NE	NE	0,00%	0,00%				
Sweden	IE	IE	0,00%	0,00%			IE	
Austria	0	0	0,00%	0,00%			NE	NE
Luxembourg	0	0	0,00%	0,00%	C	C	ALL	M
EU15	3.208	1.946	100,00%	100,00%	C, D	C, D, CS	ALL, IE, NE, PART	L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 57: MS contribution to N<sub>2</sub>O emissions from 4.D. ‘Agricultural Soils’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
France	55.802	51.611	26,22%	2,74%	T2	T2	ALL	L
Germany	39.800	33.386	16,96%	21,16%	CS	CS	ALL	H
United Kingdom	30.353	25.807	13,11%	13,80%	T1a/T1b	D	ALL	L
Italy	19.736	20.026	10,17%	12,93%	D	D, CS	ALL	H
Spain	16.277	17.532	8,91%	17,52%	CS, D	CS, D	ALL	L
Denmark	9.797	7.477	3,80%	10,21%	CS/M	CS/M	ALL	M
Ireland	6.870	7.414	3,77%	7,49%	D	CS, D	FULL	M
Netherlands	6.674	6.978	3,55%	5,76%	CS/T1b (D&I)	CS	ALL	L
Greece	6.501	6.031	3,06%	0,44%	T1	D	ALL	
Sweden	5.428	5.027	2,55%	0,31%	D, C	CS	ALL	M
Belgium	5.074	4.730	2,40%	0,50%			F	
Portugal	4.791	4.634	2,35%	1,60%	D	D	ALL	M
Finland	4.269	3.336	1,69%	3,93%	D	D/CS	ALL	L
Austria	2.970	2.831	1,44%	0,71%	T1	D	ALL	M
Luxembourg	146	0	0,00%	0,90%	C	C	ALL	M
EU15	214.489	196.818	100,00%	100,00%	C, CS, D, M, T1a, T1b, T2	C, CS, D, M, T2	ALL	H, L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

### 6.3. Sector-specific QA/QC

The main sector specific QA/QC activity is the project lead by JRC on comparison of methods used by MS for emission calculations and emission projections in the agricultural sector. As a first activity under this project, a workshop on “Inventories and Projections of Greenhouse Gas Emissions from Agriculture” was held at the European Environment Agency in February 2003.

The workshop focused on the emissions of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) induced by activities in the agricultural sector, not considering changes of carbon stocks in agricultural soils, but including emissions of ammonia (NH<sub>3</sub>). The consideration of ammonia emissions allows the validation of the N<sub>2</sub>O emission sources and it further strengthens the link between greenhouse gas and air pollutant emission inventories reported under the UNFCCC, the EC GHG Monitoring Mechanism, the UNECE Long-Range Transboundary Air Pollution Convention, and the EU National Emission Ceiling Directive.

Objectives of the workshop were to compare MS methodologies and to identify and explain the main differences. The longer term objective is to further improve the methods used for inventories and projections in the different Member States and to identify how national and common agricultural policies could be integrated in EU-wide emission scenarios. The workshop will be followed by a project lead by JRC to improve the quality of national (MS) GHG emissions from agriculture and a project by EEA/ETC-ACC to improve reporting of GHG emission projections.



## 6.4. Sector-specific recalculations

Table 58 shows that in the agriculture sector the largest recalculations in absolute and relative terms were made for CH<sub>4</sub>. Also N<sub>2</sub>O emissions were recalculated by more than 2 % in both years 1990 and 2000.

**Table 58: Recalculations of total greenhouse gas emissions and recalculations of greenhouse gas emissions in CRF sector 4 'Agriculture' for the years 1990 and 2000 by gas in Gg and percent**

1990	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	-5.604	-0,18%	-12.361	-2,90%	7.999	2,00%	1.242	5,08%	-143	-1,05%	-129	-1,52%
Agriculture	-7	-0,21%	10.948	6,04%	6.483	2,80%	NO	NO	NO	NO	NO	NO
<b>2000</b>												
Total emissions and removals	4.635	0,15%	-6.581	-1,93%	11.256	3,33%	4.362	-4,76%	-683	-9,98%	810	9,05%
Agriculture	-22	-1,09%	11.658	6,93%	5.645	2,58%	NO	NO	NO	NO	NO	NO

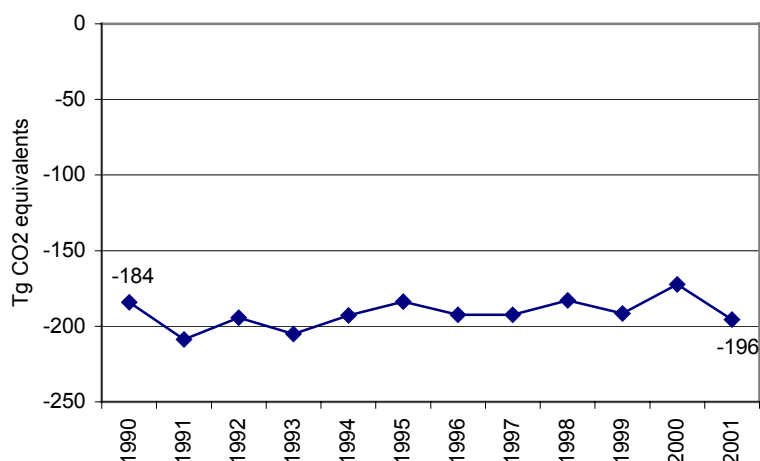
## Chapter 7: LUCF (CRF sector 5)

This chapter starts with an overview on emission removal trends in CRF sector 5 ‘LUCF’. No section on methodological issues and uncertainty is included in this chapter because the sector does not contain an EC key source.<sup>8</sup> In addition, information on sector specific QA/QC and on recalculations is provided.

### 7.1. Overview of sector

CRF sector 5 ‘LUCF’ is both a source and a sink of GHG emissions. In 2001, net GHG emissions from LUCF (emissions minus removals) were -196 Tg in the EC (Figure 7), which was -5 % of total EC GHG emissions. They decreased by 6 % from 1990 to 2001 and by 13,5 % from 2000 to 2001. Net GHG emissions from LUCF have been below 1990 levels for the past decade except in the years 1995, 1998 and 2000.

Figure 7: EC net GHG emissions (emissions minus removals) 1990-2001 from CRF sector 5 ‘LUCF’ in Tg



### 7.2. Sector-specific QA/QC

Emissions and removals from LUCF of the EC are the sum of MS emissions and removals. In accordance with IPCC guidelines, MS use different methodologies, including data collection methods and frequencies, definitions and conversion factors in the estimation of LUCF data.

The EU initiated an action under the intergovernmental framework for European Cooperation in the field of Scientific and Technical Research (COST E21) “Contribution of Forests and Forestry to Mitigate Greenhouse Effects” with the objective to exchange experience and knowledge to improve the quality of GHG inventory compilation for forests in Europe.

<sup>8</sup> In this report, overview tables on methodologies and on uncertainties are only presented for the EC key sources as identified in Chapter 1.5. In accordance with the IPCC (2000), the LUCF sector is not included in the key source analysis. For information on sector specific methods used by the MS see MS submissions in Annex 5.

In addition, the JRC is working with the MS on a separate complementary project to facilitate the comparability of LUCF estimates. In 2002, the following activities to compare and improve methodologies on the calculations of emissions and removals from LUCF within EU Member States have started:

As a first step, in February 2002 a workshop was organised by JRC on the LUCF reporting, particularly dedicated to carbon emissions and removals in forests. During this workshop, for the LUCF category 5A the following parameters were recognised to be relevant factors contributing to differences in reporting between MS and to the overall uncertainties of the GHG inventories of the sector:

- definition of forest and forest area in the MS national forest inventories (NFI) and components included in the reporting;
- expansion factors from wood volume to (total) carbon mass;
- inclusion of belowground biomass/growth;
- data sources for wood harvest and estimation of soil carbon.

One of the outcomes of the workshop was the set up of a pilot project with a limited number of EC MS to identify differences in reporting of Land-Use, Land-Use Change and Forestry to UNFCCC, and to propose and test possibilities to improve the comparability and quality of inventory data. The main focus of this pilot project is steered upon carbon reporting in IPCC category 5A (changes in forest and other woody biomass stocks), but other categories of the LUCF sector will also be considered (particularly forest soils). The following MS volunteered for participation in the project: Austria, Denmark, Finland, Italy, Sweden and United Kingdom, while Spain and Ireland participated as “observers”.

In December 2002, a workshop was held under this pilot project. The main outcomes as regards main differences identified and possible improvements are as follows:

Identification of differences:

- Forest definitions;
- Biomass expansion factors (BEFs) (different components are included under “stem volume”, the BEF is different for stocks and growth);
- The local use and export/import of wood and the effective reliability of harvest/market statistics.

Possible improvements:

- Homogenous forest definitions, compatible with FAO and maintaining consistencies with past national inventories, were discussed.
- MS reports should include more detailed information on what is included in the BEFs.
- A reliability check of BEFs should be performed. In this respect, a common effort was envisaged. The situation will improve in the future when results from research and inventory efforts will become available (e.g. Finnish work on BEF, 2002-2004)
- The database of wood densities for European tree species should be updated, with country-specific recent data (wood industry can be a data source).

- Efforts should be concentrated on whole mineral soil and peat carbon stocks including the forest floor, as well as on land areas/land use types/land management measures where more rapid and reliably detectable changes can be expected.

### 7.3. Sector-specific recalculations

Table 59 shows that in the LUCF sector the large recalculations in absolute terms were made for CO<sub>2</sub> in the year 1990.

**Table 59: Recalculations of total greenhouse gas emissions and recalculations of net greenhouse gas emissions in CRF sector 5 'LUCF' for the years 1990 and 2000 by gas in Gg and percent**

1990	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	-5.604	-0,18%	-12.361	-2,90%	7.999	2,00%	1.242	5,08%	-143	-1,05%	-129	-1,52%
LUCF (net)	7.060	-3,55%	-41	-1,82%	-120	-2,08%	NO	NO	NO	NO	NO	NO
<b>2000</b>												
Total emissions and removals	4.635	0,15%	-6.581	-1,93%	11.256	3,33%	4.362	-4,76%	-683	-9,98%	810	9,05%
LUCF (net)	121	-0,07%	-81	-3,18%	-235	-3,97%	NO	NO	NO	NO	NO	NO

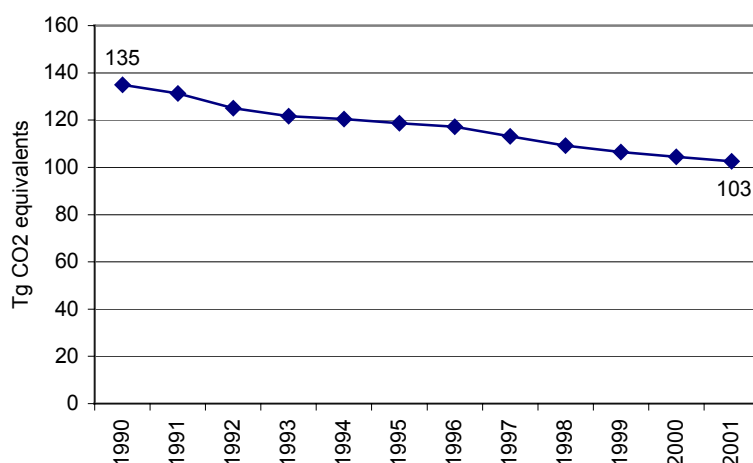
## Chapter 8: Waste (CRF sector 6)

This chapter starts with an overview on emission trends in CRF sector 6 ‘Waste’. Then a section on methodological issues and uncertainty presents for each EC key source an overview table which includes the MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. In addition, the chapter includes information on recalculations. A section on sector specific QA/QC is not included as such activities have not yet started in this sector.

### 8.1. Overview of sector

CRF sector 6 ‘Waste’ is the fourth-largest sector in the EC, contributing with CH<sub>4</sub> 2 % of the total GHG emissions in the EC. Both CO<sub>2</sub> and N<sub>2</sub>O contribute less than 1 % to the total GHG emissions. Total emissions from ‘Waste’ have been decreasing by 24 % from 135 Tg in 1990 to 103 Tg in 2001 (Figure 8). In 2001, emissions decreased by 1,8 % compared to 2000.

Figure 8: EC GHG emissions 1990-2001 from CRF sector 6 ‘Waste’ in Tg



### 8.2. Methodological issues and uncertainties

Tables 60-62 present for each EC key source in CRF sector 6 an overview on MS contributions to the key source in terms of level and trend, and information on methodologies, emission factors, completeness and qualitative uncertainty estimates. Therefore, the overview tables also aim at making transparent the compilation of CRF Summary Table 3 and CRF Table 7 of the EC submission.

**Table 60: MS contribution to CH<sub>4</sub> emissions from 6.A ‘Solid Waste Disposal on Land’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Spain	5.391	10.485	13,06%	18,49%	T2	CS, T2	ALL	M
Germany	28.285	10.252	12,77%	28,67%	T1	CS	T1	M
United Kingdom	23.760	10.231	12,74%	19,54%	M	CS	ALL	L
France	10.461	10.067	12,54%	7,01%	CS/T2	CS/T2	ALL	M
Italy	9.526	9.556	11,90%	7,48%	D, T2	D, CS	ALL	M
Netherlands	11.802	8.181	10,19%	1,01%	M, CS, T2	CS	ALL	M
Greece	2.811	5.039	6,28%	8,44%	T1	D	ALL	
Austria	4.929	3.842	4,79%	0,78%	CS	CS	ALL	L
Portugal	2.422	3.511	4,37%	4,94%	T2	T2+CS	ALL	M
Finland	3.679	2.901	3,61%	0,67%	T2	D/CS	ALL	M
Sweden	2.554	1.972	2,46%	0,35%	T2	D, CS	ALL	M
Belgium	2.829	1.767	2,20%	0,79%			P	
Ireland	1.158	1.276	1,59%	1,23%	T2	CS, D	FULL	M
Denmark	1.310	1.168	1,45%	0,62%	CS/M	CS/M	ALL	M
Luxembourg	64	48	0,06%	0,00%	C	C	ALL	M
EU15	110.982	80.295	100,00%	100,00%	C, CS, D, M, T1, T2	C, CS, D, M, T2	ALL, PART	L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 61: MS contribution to N<sub>2</sub>O emissions from 6.B ‘Wastewater Handling’ and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
United Kingdom	1.033	1.110	19,89%	10,58%	T1	D	PART	L
France	1.130	1.094	19,60%	5,84%	CS/T2	CS/T2	ALL	L
Spain	1.002	1.085	19,45%	10,67%			ALL	L
Italy	968	986	17,67%	7,35%	D	C, CS	ALL	M
Portugal	448	565	10,13%	8,59%	D	D	ALL	L
Netherlands	126	194	3,47%	4,09%	CS/T2	CS	ALL	L
Sweden	195	146	2,62%	1,04%			NE	
Finland	141	110	1,97%	0,54%	CS	CS	ALL	L
Belgium	71	102	1,83%	1,96%			P	
Germany	1.290	93	1,67%	48,42%	CS	CS	CS	L
Ireland	60	66	1,18%	0,67%	NA	NA	PART	M
Austria	22	24	0,43%	0,24%	T1	D, CS	ALL	L
Luxembourg	6	6	0,10%	0,01%	C	C	ALL	M
Denmark	0	0	0,00%	0,00%	NE		NE	
Greece	0	0	0,00%	0,00%			NE	
EU15	6.492	5.579	100,00%	100,00%	C,CS,D,T1,T2	C, CS, D, T2	ALL, NE, PART	L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

**Table 62: MS contribution to CO<sub>2</sub> emissions from 6.D 'Other' and information on methods applied and quality of these emission estimates**

Member State	GHG emissions in 1990 (Gg CO <sub>2</sub> equivalents)	GHG emissions in 2001 (Gg CO <sub>2</sub> equivalents)	Percentage contribution to level	Percentage contribution to trend	Methods applied <sup>1)</sup>	EF <sup>1)</sup>	Estimate <sup>2)</sup>	Quality <sup>2)</sup>
Netherlands	881	350	83,26%	50,00%	CS	CS	ALL	M
Belgium	0	70	16,74%	50,00%			P	
Germany	NO	NO	0,00%	0,00%	NO	NO	NO	
France	0	0	0,00%	0,00%			ALL	L
United Kingdom	0	0	0,00%	0,00%			NO	
Spain	0	0	0,00%	0,00%	NO		NO	
Italy	-	0	0,00%	0,00%			NO	
Austria	0	0	0,00%	0,00%			NE	NE
Denmark	0	0	0,00%	0,00%				
Greece	0	0	0,00%	0,00%			NO	
Finland	0	0	0,00%	0,00%			NO	NO
Sweden	NE	NE	0,00%	0,00%				
Portugal	0	0	0,00%	0,00%	T2	T2+CS	ALL	M
Ireland	NO	0	0,00%	0,00%	NA	NA	NE	NE
Luxembourg	0	0	0,00%	0,00%	C	C	ALL	M
EU15	881	420	100,00%	100,00%	C, CS, T2	C, CS, T2	ALL, NE, PART	L, M

1) Information source: CRF Summary Tables 3 for 2001

2) Information source: CRF Tables 7 for 2001

### 8.3. Sector-specific recalculations

Table 63 shows that in the waste sector large recalculations were made for CH<sub>4</sub> in absolute and relative terms. For both years 1990 and 2000, CH<sub>4</sub> emissions from waste as provided in this submission are more than 15 % lower than the values provided in the previous submission.

**Table 63: Recalculations of total greenhouse gas emissions and recalculations of greenhouse gas emissions in CRF sector 6 'Waste' for the years 1990 and 2000 by gas in Gg and percent**

1990	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	-5.604	-0,18%	-12.361	-2,90%	7.999	2,00%	1.242	5,08%	-143	-1,05%	-129	-1,52%
Waste	1.496	23,71%	-22.104	-15,54%	658	10,35%	NO	NO	NO	NO	NO	NO
2000												
Total emissions and removals	4.635	0,15%	-6.581	-1,93%	11.256	3,33%	4.362	-4,76%	-683	-9,98%	810	9,05%
Waste	216	3,36%	-16.802	-15,50%	-724	-10,52%	NO	NO	NO	NO	NO	NO

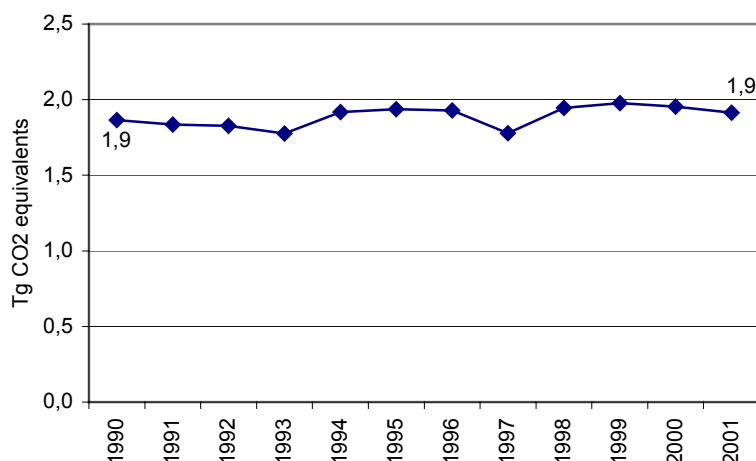
## Chapter 9: Other (CRF sector 7)

This chapter provides two short sections on emission trends and on recalculations in CRF sector 7 'Other'. No section on methodological issues and uncertainty is included in this chapter because the sector does not contain an EC key source.<sup>9</sup> Neither is included a section on sector specific QA/QC as no such activities are performed in this sector.

### 9.1. Overview of sector

CRF sector 'Other' is the smallest sector contributing 0,05 % to overall EC GHG emissions. The most important gases from the CRF sector 'Other' are N<sub>2</sub>O (0,03 % of the total GHG emissions) and CO<sub>2</sub> (0,02 % of the total GHG emissions). Total emissions from 'Other' have slightly increased since 1990 (Figure 9).

Figure 9: EC GHG emissions 1990-2001 from CRF sector 7 'Other' in Tg



### 9.2. Sector-specific recalculations

Table 64 shows that in CRF sector 7 'Other' only minor recalculations were made for 1990 and 2000.

Table 64: Recalculations of total greenhouse gas emissions and recalculations of greenhouse gas emissions in CRF sector 7 'Other' for the years 1990 and 2000 by gas in Gg and percent

1990	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	-5.604	-0,18%	-12.361	-2,90%	7.999	2,00%	1.242	5,08%	-143	-1,05%	-129	-1,52%
Other	0	0,03%	0	-0,62%	0	0,00%	NO	NO	NO	NO	NO	NO
2000												
	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent	Gg	percent
Total emissions and removals	4.635	0,15%	-6.581	-1,93%	11.256	3,33%	4.362	-4,76%	-683	-9,98%	810	9,05%
Other	0	0,06%	0	0,72%	0	0,00%	NO	NO	NO	NO	NO	NO

<sup>9</sup> In this report, overview tables on methodologies and on uncertainties are only presented for the EC key sources as identified in Chapter 1.5. For information on sector specific methods used by the MS see MS submissions.



## Chapter 10: Recalculations and improvements

### **10.1. *Explanations and justifications for recalculations***

Table 65 provides an overview of the main reasons for recalculating emissions in the year 1990 for each MS, which provided the relevant information. For each MS those three sources have been identified which had the largest recalculations in absolute terms. In addition, all recalculations of more than 1.000 Gg are presented. For more detailed explanatory information on recalculations see the information provided in the MS submissions in Annex 5.

**Table 65: Main recalculations in the EC MS for the year 1990 and MS explanation for recalculations given in the CRF or the inventory report**

	<b>Absolute difference between latest and previous submission used for the EC inventory (Gg CO<sub>2</sub> equivalents)</b>	<b>MS explanation for recalculation</b>	<b>Information source of reasons for recalculations</b>
<b>Austria</b>			
Total emissions excluding LUCF	685		
N <sub>2</sub> O from 4.D. agricultural soils	1.946	New study: for the first time direct emissions and indirect emissions as well as emissions from nitrogen input through grazing animal excreta have been estimated.	Federal Environment Agency - Austria (2002)
CO <sub>2</sub> from 1.A.2. manufacturing industries	-1.523	Revision of the energy balance. The new energy balance also allowed to remove some double counting.	Federal Environment Agency - Austria (2002)
CO <sub>2</sub> from 1.A.1. energy industries	-1.171	Revision of the energy balance. The new energy balance also allowed to remove some double counting.	Federal Environment Agency - Austria (2002)
<b>Belgium</b>			
Total emissions excluding LUCF	-1.909		
N <sub>2</sub> O from 4.B manure management	-1.426	No information available	No information available
CO <sub>2</sub> from 1.A.4. other sectors	-375	No information available	No information available
CH <sub>4</sub> from 6.A. solid waste disposal on land	-359	No information available	No information available
<b>Denmark</b>			
Total emissions excluding LUCF	-215		
CH <sub>4</sub> from 1.B.2. oil and natural gas	-172	Emission factors and activity data changed according to new knowledge.	CRF Table 8(b) (April2003 DK1990 UN4)
CH <sub>4</sub> from 1.A.4 other sectors	-46	Emission factors of some fuels have been changed. Consistency of factors has been improved.	CRF Table 8(b) (April2003 DK1990 UN4)
CH <sub>4</sub> from 4.A enteric fermentation	37	Changes in activity data: horses on small farms and on riding schools have been included	CRF Table 8(b) (April2003 DK1990 UN4)
<b>Finland</b>			
Total emissions excluding LUCF	140		
CH <sub>4</sub> from 6.B. waste water handling	117	Changes in activity data: population is used also; uncollected wastewaters included	CRF Table 8(b) (Fi90UN03)
N <sub>2</sub> O from 4.D. agricultural soils	-104	Changes in activity data: N fraction in crop residue corrected	CRF Table 8(b) (Fi90UN03)
CH <sub>4</sub> from 4.A. enteric fermentation	44	Changes in activity data: reindeers added	CRF Table 8(b) (Fi90UN03)
<b>France</b>			
Total emissions excluding LUCF	8.970		
CH <sub>4</sub> from 4.B. manure management	11.333	IPCC emission factors are used instead of country specific emission factors; livestock updated since 1990 after AGRESTE revision; addition of piglet stocks (20 to 50 kg)	CRF Table 8(b) (CRF_France_01)
CH <sub>4</sub> from 6.A. solid waste disposal on land	-7.358	Calculation parameters updated since 1990	CRF Table 8(b) (CRF_France_01)

N <sub>2</sub> O from 4.D. agricultural soils	3.827	Livestock updated since 1990 after AGRESTE revision; addition of N <sub>2</sub> O emissions resulting from NO <sub>x</sub> and NH <sub>3</sub> deposition since 1990; sewage sludge as fertilizer has been added since 1990	CRF Table 8(b) (CRF_France_01)
CO <sub>2</sub> from 1.A.2. manufacturing industries	-2.304	New methodology applied to calculate CO <sub>2</sub> emissions since 1990 for primary lead production and primary zinc production; review of consumption since 1990 after modification of French statistics for industry combustion plants and other mobile sources and machinery in industry; consumption updated since 1990 for some activities; for cement works, waste substitution is now included in energy consumption	CRF Table 8(b) (CRF_France_01)
CO <sub>2</sub> from 1.A.1. energy industries	2.144	Waste incineration plant with energy recovery transferred from category 6C to 1A1a for CRF	CRF Table 8(b) (CRF_France_01)
CO <sub>2</sub> from 2.A. mineral products	1.333	Review of CO <sub>2</sub> emission factors since 1990 because of a mistake	CRF Table 8(b) (CRF_France_01)
<b>Germany</b>			
Total emissions excluding LUCF	-11.186		
CH <sub>4</sub> from 6.A. solid waste disposal on land	-10.393	No information available	No information available
N <sub>2</sub> O from 4.B. manure management	-9.581	No information available	No information available
N <sub>2</sub> O from 4.D. agricultural soils	8.874	No information available	No information available
CH <sub>4</sub> from 1.B.1. solid fuels	-1.822	No information available	No information available
<b>Greece</b>			
Total emissions excluding LUCF	0	No information available	No information available
<b>Ireland</b>			
Total emissions excluding LUCF	-10		
CH <sub>4</sub> from 6.A. solid waste disposal on land	-622	Improved historical time series of the amount of solid waste disposed in landfills and for the corresponding DOC in solid wastes based on further development of the National Waste Database and other sources. The fraction of DOC dissimilated has been revised from 0.7 to 0.6, in line with GPG.	CRF Table 8(b) (CRF1990_2003_IE)
N <sub>2</sub> O from 4.D. agricultural soils	425	(1) Revision of input N excretion due to recalculated livestock populations; (2) Fertilizer N data revised to three year average for period ending in the inventory year; (3) minor modifications to fractions FracGASF and FracGASM for the same reasons as they are taken from NH <sub>3</sub> inventory; (4) value of 0.1 adopted for FracLEACH; (5) emission estimates of N <sub>2</sub> O have been included for N-fixing crops and crop residues	CRF Table 8(b) (CRF1990_2003_IE)
CH <sub>4</sub> from 4.A. enteric fermentation	-325	Changes in activity data: all important livestock populations have been recalculated on the basis of three-year average ending in the inventory year and taking into account some minor revisions to published agricultural statistics.	CRF Table 8(b) (CRF1990_2003_IE)
<b>Italy</b>			
Total emissions excluding LUCF	-13.504		
CO <sub>2</sub> from 2.A. mineral products	-5.970	No information available	No information available
CO <sub>2</sub> from 1.A.1. energy industries	-3.970	No information available	No information available
CO <sub>2</sub> from 1.A.2. manufacturing industries	-2.875	No information available	No information available
<b>Luxembourg</b>			
Total emissions excluding LUCF	47		
HFC and SF <sub>6</sub> emissions	47	Gap filling	See Chapter 1.8.2
<b>Netherlands</b>			
Total emissions excluding LUCF	-337		
CO <sub>2</sub> from 1.A.4. other sectors	-458	Change in source allocation (see 6.D. and 1.A.1)	CRF Table 8(b) (Netherlands - Submission 2003 v 2.0 - 1990)

CO <sub>2</sub> from 6.D. other	381	Errors from previous submission eliminated. Emissions from combustion of fossil fuels in waste sector were identified and placed in 1.A.1 and 1.A.4. Some emissions were previous year placed in the wrong sector. Furthermore the identification of biomass as fuel was improved leading to less CO <sub>2</sub> emissions.	CRF Table 8(b) (Netherlands - Submission 2003 v 2.0 - 1990)
CO <sub>2</sub> from 1.A.1. energy industries	-208	Change in source allocation (see 6.D. and 1.A.4)	CRF Table 8(b) (Netherlands - Submission 2003 v 2.0 - 1990)
<b>Portugal</b>			
Total emissions excluding LUCF	-3.665		
CH <sub>4</sub> from 6.A. solid waste disposal on land	-3.128	Change in method (industrial waste): change from Default method Tier 1 to FOD method Tier 2 Change in activity data (time series revised): population, waste collection rates. New time series estimated for municipal and industrial waste disposed on land, based on per capita MSW generation rates.	CRF Table 8(b) (Portugal-2003-1990_v3)
CO <sub>2</sub> from 1.A.2. manufacturing industries	-631	CO <sub>2</sub> emissions factors revised Change in activity data: energy data statistics revised by the Portuguese Energy Authority	CRF Table 8(b) (Portugal-2003-1990_v3)
CO <sub>2</sub> from 1.A.4. other sectors	576	CO <sub>2</sub> emissions factors revised Change in activity data: energy data statistics revised by the Portuguese Energy Authority	CRF Table 8(b) (Portugal-2003-1990_v3)
<b>Spain</b>			
Total emissions excluding LUCF	1.181		
CH <sub>4</sub> from 4.B. manure management	393	Emission factor sheep, goats and pigs age categories: The ages of certain categories of animals (sheep, goats, pigs) have been changed and this has led to a change in the factor for the excretion of N for some categories in these species. Activity data extensive-intensive pig husbandry: It has been separated into two different censuses for pig herds: one for extensive grazing and another for intensive grazing. This implies a variation in the percentage per province and type of animals in meadow grazing (extensive), thus leading to a variation in the emissions from dung treatments (both CH <sub>4</sub> and N <sub>2</sub> O). Activity data sheep and goat age categories: Some of the age categories of sheep and goat herds in the census have been revised. This has resulted in a larger number of restocking lambs and fewer lambs slaughtered. Activity data poultry heads: The algorithm for the calculation of the number of heads of poultry has been revised in accordance with the proposal from the MAPA, thus leading to an increase in their number.	CRF Table 8(b) (Year 1990 - Common Reporting Format V1.01)
CO <sub>2</sub> from 1.A.1. energy industries	313	Emission factor petroleum refining: In the course of the 2002 data verification process the LHV values for refinery gas from one refinery plant have been revised upwards (by around 15%) as they appeared with abnormally low values for the period 1990-1993. Additional reporting in petroleum refining: The new inventory edition has incorporated the installations for the petrochemical part of one petroleum refinery that was not included in the previous submission.	CRF Table 8(b) (Year 1990 - Common Reporting Format V1.01)
N <sub>2</sub> O from 4.D. agricultural soils	254	Emission factor: The FRACGASM parameter (fraction of N emitted as NO <sub>x</sub> or NH <sub>3</sub> ) was amended and it has been decided to calculate it on the basis of the emission factors of NH <sub>3</sub> and NO <sub>x</sub> instead of taking a default value. Activity data crop surface and production: At the date of the close of the previous year, only the Ministry of Agriculture (MAPA) yearbooks up to 1996 were available. A new yearbook has since appeared for 1998 (the one for 1997 has not yet been published) and so the data have been reviewed in the light of this new publication. For subsequent years, the data provided by the MAPA advanced statistical data base. Activity data organic crop fertilization: In view of the difficulties of obtaining a consistent series of historic data for organic crop fertilization with the data from the successive MAPA Good Farming Practices documents, it has been decided to take the 1997 Good Farming Practices for the set of years 1990-2001 included in this inventory.	CRF Table 8(b) (Year 1990 - Common Reporting Format V1.01)

<b>Sweden</b>			
Total emissions excluding LUCF	2.190		
N <sub>2</sub> O from 4.D. agricultural soils	1.637	Emission factors for a few sources were updated. Minor corrections in some of the activity data.	CRF Table 8(b) (SE-2003-1990)
CO <sub>2</sub> from 1.A.5 other	826	Emissions from military use has been separated from transport sector.	CRF Table 8(b) (SE-2003-1990)
CO <sub>2</sub> from 1.A.3. transport	-400	New method and new emission factors	CRF Table 8(b) (SE-2003-1990)
<b>United Kingdom</b>			
Total emissions excluding LUCF	1.647		
CO <sub>2</sub> from 6.C. waste incineration	1.140	Changes in emission factors and activity data: Environment Agency data New source: waste incineration of chemicals	CRF Table 8(b) (common_reporting_format_v1.01_uk_2003_90)
CO <sub>2</sub> from 1.A.3 transport	172	Revisions to vehicle fuel consumption	CRF Table 8(b) (common_reporting_format_v1.01_uk_2003_90)
CH <sub>4</sub> from 6.A. solid waste disposal on land	303	Changes in emission factors: model used to estimate CH <sub>4</sub> emissions updated Changes in activity data: estimates of solid waste disposed to land updated	CRF Table 8(b) (common_reporting_format_v1.01_uk_2003_90)

## 10.2. Implications for emission levels

Table 66 provides the differences of total EC GHG emissions between the latest submission and the previous submission in absolute and relative terms. The table shows that due to recalculations, total EC 1990 GHG emissions excluding LUCF have decreased in the latest submission compare to the previous submission by 15.895 Gg (-0,38 %). In contrast to this, EC GHG emissions for the year 2000 have increased by 7.381 Gg (+0,18 %) due to recalculations.

**Table 66: Overview of recalculations of EC total GHG emissions (difference between latest submission and previous submission in Gg CO<sub>2</sub> equivalents and in percent)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total CO <sub>2</sub> equivalent emissions including LUCF (absolute)	-8.996	-11.161	-6.595	4.828	1.795	1.438	8.251	7.714	12.853	11.719	7.186
Total CO <sub>2</sub> equivalent emissions including LUCF (percent)	-0,22%	-0,28%	-0,17%	0,13%	0,05%	0,04%	0,21%	0,20%	0,33%	0,30%	0,18%
Total CO <sub>2</sub> equivalent emissions excluding LUCF (absolute)	-15.895	-17.918	-13.048	-1.582	-4.684	-4.942	1.849	1.174	6.298	5.334	7.381
Total CO <sub>2</sub> equivalent emissions excluding LUCF (percent)	-0,38%	-0,42%	-0,32%	-0,04%	-0,12%	-0,12%	0,04%	0,03%	0,15%	0,13%	0,18%

Table 67 provides an overview of recalculations for the EC key source categories for the years 1990 and 2000 (see Chapter 4.8 for information on identification of EC key sources). The table shows that the largest recalculations in absolute terms were made in the key source categories CH<sub>4</sub> from 6.A. 'Solid Waste disposal on Land', N<sub>2</sub>O from 4.D. 'Agricultural Soils' and CH<sub>4</sub> from 4.B. 'Manure Management'.

**Table 67: Recalculations for the EC key source categories 1990 and 2000 (difference between latest submission and previous submission in Gg of CO<sub>2</sub> equivalents and in percent)**

Greenhouse Gas Source Categories	Gas	Recalculations 1990		Recalculations 2000	
		(Gg CO <sub>2</sub> equivalents)	(%)	(Gg CO <sub>2</sub> equivalents)	(%)
1.A.1. Energy Industries	CO <sub>2</sub>	-2579	-0,22%	10514	0,96%
1.A.2. Manufacturing Industries	CO <sub>2</sub>	-7384	-1,14%	-3765	-0,63%
1.A.3. Transport	CO <sub>2</sub>	236	0,03%	652	0,08%
1.A.3. Transport	N <sub>2</sub> O	-21	-0,18%	1152	4,86%
1.A.4. Other Sectors	CO <sub>2</sub>	-847	-0,13%	1760	0,28%
1.A.4. Other Sectors	CH <sub>4</sub>	-55	-0,52%	3	0,04%
1.A.5. Other	CO <sub>2</sub>	645	3,32%	535	7,54%
1.B.1. Solid Fuels	CO <sub>2</sub>	0	0,00%	-334	-4,13%
1.B.1. Solid Fuels	CH <sub>4</sub>	-1800	-3,58%	-1606	-7,80%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	387	2,29%	567	3,70%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	540	1,66%	174	0,62%
2.A. Mineral Products	CO <sub>2</sub>	-5003	-4,47%	-3533	-3,18%
2.B. Chemical Industry	CO <sub>2</sub>	156	1,22%	-355	-3,19%
2.B. Chemical Industry	N <sub>2</sub> O	970	0,92%	3355	7,23%
2.C. Metal Production	CO <sub>2</sub>	39	0,15%	-48	-0,20%
2.C. Metal Production	PFC	-157	-1,33%	-973	-21,08%
2.E. Production of Halocarbons and SF <sub>6</sub>	HFC	3510	16,42%	641	3,65%
2.F. Consumption of Halocarbons and SF <sub>6</sub>	HFC	28	7,87%	-4921	-16,56%
2.F. Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	-131	-2,17%	-45	-0,65%
2.G. Other	CO <sub>2</sub>	-140	-11,20%	-1882	-60,03%
4.A. Enteric Fermentation	CH <sub>4</sub>	100	0,07%	879	0,67%
4.B. Manure Management	CH <sub>4</sub>	12077	36,49%	11957	36,10%
4.B. Manure Management	N <sub>2</sub> O	-9962	-29,77%	-7751	-26,64%
4.D. Agricultural Soils	CO <sub>2</sub>	-7	-0,21%	-22	-1,09%
4.D. Agricultural Soils	N <sub>2</sub> O	16446	8,30%	13374	7,05%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	-22034	-16,56%	-16712	-16,94%
6.B. Waste-water Handling	N <sub>2</sub> O	860	15,26%	-457	-7,58%
6.D. Other	CO <sub>2</sub>	381	76,07%	-32	-7,15%

Table 68 and Table 69 give an overview of absolute and percentage changes of MS emissions due to recalculations for 1990-2000. Large recalculations in absolute terms were made by France, Germany and Italy (early 1990s). In relative terms, the highest recalculations were made by Portugal.

**Table 68: Contribution of MS to EC recalculations of total GHG emissions excluding LUCF for 1990-2000 (difference between latest submission and previous submission Gg of CO<sub>2</sub> equivalents)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Austria	685	927	398	1.810	1.608	2.191	4.673	2.827	4.360	2.392	2.196
Belgium	-1.909	-1.335	-1.710	-1.699	-2.015	-1.770	-1.619	-1.684	-793	-1.148	-1.987
Denmark	-144	-247	-133	-122	-112	-44	-158	-161	-184	-166	-324
Finland	140	471	805	1.161	1.443	1.484	1.586	1.678	1.679	1.700	1.432
France	8.970	9.466	10.652	11.314	11.693	10.962	11.125	12.856	15.110	15.522	15.610
Germany	-11.186	-10.751	-11.057	-9.234	-8.815	-12.320	-6.715	-8.042	-10.491	-10.887	-9.952
Greece	0	0	0	0	0	0	0	0	0	0	0
Ireland	-10	365	572	513	341	338	401	735	471	981	1.907
Italy	-13.504	-12.855	-12.057	-8.912	-8.326	-7.720	-7.116	-4.256	-3.782	-892	287
Luxembourg	47	-925	-901	-759	-2.405	47	47	47	47	47	47
Netherlands	-337	-3.733	-1.864	-1.103	-1.738	-294	-1.314	-3.621	-1.377	-1.381	-100
Portugal	-3.665	-3.688	-2.845	-3.194	-2.862	-3.327	-4.176	-4.130	-3.203	-2.725	-2.444
Spain	1.181	632	278	3.692	1.397	1.229	474	1.378	1.152	137	1.117
Sweden	2.190	1.933	2.916	2.698	3.045	2.342	2.265	2.347	2.362	1.734	-408
UK	1.647	1.821	1.899	2.252	2.063	1.943	2.376	1.200	946	23	1
<b>EU15</b>	<b>-15.895</b>	<b>-17.918</b>	<b>-13.048</b>	<b>-1.582</b>	<b>-4.684</b>	<b>-4.942</b>	<b>1.849</b>	<b>1.174</b>	<b>6.298</b>	<b>5.334</b>	<b>7.381</b>

**Table 69: Contribution of MS to EC recalculations of total GHG emissions excluding LUCF for 1990-2000 (difference between latest submission and previous submission in percent)**

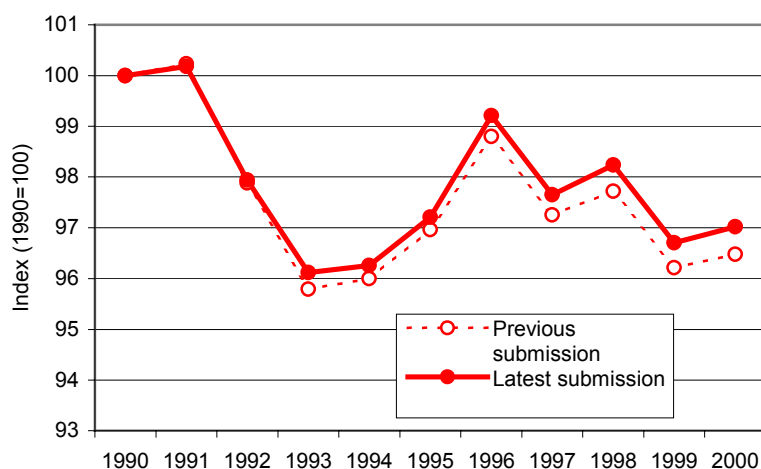
MS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Austria	0,89	1,14	0,53	2,42	2,11	2,79	5,85	3,48	5,49	3,00	2,75
Belgium	-1,33	-0,90	-1,16	-1,17	-1,35	-1,15	-1,04	-1,12	-0,51	-0,76	-1,31
Denmark	-0,21	-0,31	-0,18	-0,16	-0,14	-0,06	-0,17	-0,20	-0,24	-0,23	-0,47
Finland	0,18	0,63	1,13	1,62	1,86	1,97	1,97	2,11	2,19	2,23	1,94
France	1,63	1,65	1,89	2,09	2,18	2,00	1,98	2,32	2,66	2,83	2,88
Germany	-0,91	-0,92	-0,99	-0,84	-0,82	-1,15	-0,62	-0,77	-1,02	-1,10	-1,00
Greece	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Ireland	-0,02	0,68	1,05	0,94	0,60	0,59	0,68	1,20	0,74	1,50	2,88
Italy	-2,59	-2,46	-2,32	-1,76	-1,66	-1,46	-1,36	-0,81	-0,70	-0,17	0,05
Luxembourg	0,43	-8,13	-8,05	-6,68	-18,99	0,60	0,60	0,68	0,79	0,78	0,78
Netherlands	-0,16	-1,69	-0,85	-0,50	-0,78	-0,13	-0,56	-1,62	-0,61	-0,63	-0,05
Portugal	-5,63	-5,51	-4,06	-4,64	-4,14	-4,54	-5,83	-5,60	-4,12	-3,18	-2,89
Spain	0,41	0,22	0,09	1,28	0,46	0,39	0,15	0,42	0,34	0,04	0,29
Sweden	3,10	2,72	4,22	3,90	4,14	3,22	2,96	3,29	3,26	2,46	-0,59
UK	0,22	0,25	0,26	0,32	0,30	0,28	0,34	0,18	0,14	0,00	0,00
<b>EU15</b>	<b>-0,38</b>	<b>-0,42</b>	<b>-0,32</b>	<b>-0,04</b>	<b>-0,12</b>	<b>-0,12</b>	<b>0,04</b>	<b>0,03</b>	<b>0,15</b>	<b>0,13</b>	<b>0,18</b>

### 10.3. Implications for emission trends, including series consistency

Figure 10 shows that due to the recalculations the emission trend in the EC has changed slightly. Due to the fact that the 1990 emission have been reduced in the latest submission compared to the previous submission and the 2000 emissions have been increased, the trend 1990-2000 has also changed. In the previous submission the trend of greenhouse gas emissions excluding LUCF between 1990 and 2000 was -3,5 %. In the latest submission this trend has changed to -3 %.



Figure 10: Comparison of EC GHG emission trends 1990-2000 (excl. LUCF) of the latest and the previous submission



#### 10.4. Recalculations, including in response to the review process, and planned improvements to the inventory

Several activities are ongoing at EC level with a view to improve the EC GHG inventory system:

- A proposal for an EU 'Greenhouse gas inventory system' under the Kyoto Protocol has been drafted and discussed in the Monitoring Committee under Council Decision 99/296/EC.
- In 2003, the legal basis of the compilation of the EC inventory and the EC inventory system (Council Decision 99/296/EC) will be revised in order to be fully in accordance with the Kyoto Protocol and the Marrakech Accords of November 2001 and additional implementation provisions will be elaborated.
- A number of sector specific QA/QC activities will continue: Eurostat is working with national statistical offices on harmonisation of energy balance data (see Chapter 3.3). In addition, Eurostat is involved in an EU project on aimed at improving estimates of emissions from international aviation (see Chapter 3.6). The JRC is working with MS on the quality improvement of estimates of emissions and removals from LUCF and from agriculture (see Chapters 7.2 and 6.3 respectively). In addition, the QA/QC activities performed during the compilation process of the EC inventory will be further extended.
- The EEA-ETC will gradually extend and adapt the ETC database in close cooperation with the UNFCCC secretariat in order to include the detailed sectoral emission data submitted by the MS and in order to further extend the EC CRF submission by compiling the relevant sectoral tables at EU level.

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## Units and abbreviations

t	1 tonne (metric) = 1 megagram (Mg) = $10^6$ g
Mg	1 megagram = $10^6$ g = 1 tonne (t)
Gg	1 gigagram = $10^9$ g = 1 kilotonne (kt)
Tg	1 teragram = $10^{12}$ g = 1 megatonne (Mt)
TJ	1 terajoule
BKB	lignite briquettes
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
COP	Conference of the Parties
CRF	Common Reporting Format
CV	calorific value
DG ENV	European Commission, Directorate-General Environment
EC	European Community
EEA	European Environment Agency
EIONET	European Environmental Information and Observation Network
ETC-ACC	European Topic Centre on Air and Climate Change
EU	European Union
GHG	greenhouse gas
GPG	Good Practice Guidance
GWP	global warming potential
HFCs	hydrofluorocarbons
JRC	Joint Research Centre
F-gases	fluorinated gases (HFCs, PFCs, SF <sub>6</sub> )
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LUCF	land-use change and forestry
LULUCF	land-use, land-use change and forestry
MS	member state
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NE	not estimated
NIR	National Inventory Report
NO	not occurring
PFCs	perfluorocarbons

QA/QC	quality assurance / quality control
RIVM	National Institute of Public Health and the Environment (The Netherlands)
SF <sub>6</sub>	sulphur hexafluoride
UBA Vienna	Federal Environment Agency Austria
UNFCCC	United Nations Framework Convention on Climate Change

## **Annex 1: Key sources**

This Annex includes the calculation tables for the EC key source categories in order to make the EC key source analysis more transparent. The grey shaded source categories are identified as key sources.

# Level assessment for the base year

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year (Gg)	Level assessment	Cumulative total
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	27,2%	27,2%
1.A.3. Transport	CO <sub>2</sub>	695.003	16,5%	43,8%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	15,3%	59,1%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	15,1%	74,2%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	5,1%	79,3%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	3,4%	82,7%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	2,6%	85,3%
2.A. Mineral Products	CO <sub>2</sub>	106.934	2,5%	87,9%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	2,5%	90,4%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	1,2%	91,6%
4.B. Manure Management	CH <sub>4</sub>	45.172	1,1%	92,6%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	0,8%	93,4%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	0,8%	94,2%
2.C. Metal Production	CO <sub>2</sub>	25.702	0,6%	94,8%
4.B. Manure Management	N <sub>2</sub> O	23.495	0,6%	95,4%
1.A.5. Other	CO <sub>2</sub>	20.076	0,5%	95,8%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	0,4%	96,3%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	0,3%	96,6%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	0,3%	96,9%
1.A.3. Transport	N <sub>2</sub> O	11.660	0,3%	97,2%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	0,3%	97,4%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	0,2%	97,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	0,2%	97,9%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	0,2%	98,1%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	0,2%	98,4%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	0,2%	98,6%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	0,2%	98,7%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	0,2%	98,9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	0,1%	99,0%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	0,1%	99,2%
2 C Metal Production	PFC	5.637	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4.782	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	0,1%	99,5%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	0,1%	99,6%
2 C Metal Production	SF <sub>6</sub>	2.320	0,1%	99,6%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	0,1%	99,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	0,0%	99,7%
2.D. Other Production	CO <sub>2</sub>	1.299	0,0%	99,7%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	0,0%	99,8%
2.G. Other	CO <sub>2</sub>	1.111	0,0%	99,8%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	0,0%	99,9%
6.D. Other	CO <sub>2</sub>	881	0,0%	99,9%
6.D. Other	CH <sub>4</sub>	801	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	0,0%	99,9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	0,0%	99,9%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	0,0%	100,0%
2 B Chemical Industry	HFC	0	0,0%	100,0%
2 B Chemical Industry	PFC	0	0,0%	100,0%



# Level assessment for 1991

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1991	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1,144,434	1,150,783	6,349	1%	27,4%	27,4%
1.A.3. Transport	CO <sub>2</sub>	695,003	708,465	13,462	2%	16,9%	44,3%
1.A.4. Other Sectors	CO <sub>2</sub>	635,096	676,565	41,469	7%	16,1%	60,4%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642,348	619,577	-22,771	-4%	14,8%	75,2%
4.D. Agricultural Soils	N <sub>2</sub> O	214,489	210,406	-4,083	-2%	5,0%	80,2%
4.A. Enteric Fermentation	CH <sub>4</sub>	144,091	140,530	-3,561	-2%	3,3%	83,5%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110,982	109,078	-1,904	-2%	2,6%	86,1%
2.B. Chemical Industry	N <sub>2</sub> O	106,096	104,018	-2,078	-2%	2,5%	88,6%
2.A. Mineral Products	CO <sub>2</sub>	106,934	101,655	-5,279	-5%	2,4%	91,0%
1.B.1. Solid Fuels	CH <sub>4</sub>	48,510	46,178	-2,332	-5%	1,1%	92,1%
4.B. Manure Management	CH <sub>4</sub>	45,172	43,814	-1,358	-3%	1,0%	93,2%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32,969	33,194	225	1%	0,8%	93,9%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32,373	23,574	-8,799	-27%	0,6%	94,5%
2.C. Metal Production	CO <sub>2</sub>	25,702	23,004	-2,698	-10%	0,5%	95,1%
4.B. Manure Management	N <sub>2</sub> O	23,495	22,519	-977	-4%	0,5%	95,6%
1.A.5. Other	CO <sub>2</sub>	20,076	17,595	-2,481	-12%	0,4%	96,0%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17,247	15,959	-1,288	-7%	0,4%	96,4%
1.A.1. Energy Industries	N <sub>2</sub> O	14,606	14,909	302	2%	0,4%	96,7%
1.A.3. Transport	N <sub>2</sub> O	11,660	12,899	1,239	11%	0,3%	97,1%
2.B. Chemical Industry	CO <sub>2</sub>	12,884	12,054	-831	-6%	0,3%	97,3%
1.A.4. Other Sectors	N <sub>2</sub> O	10,765	11,207	443	4%	0,3%	97,6%
1.A.4. Other Sectors	CH <sub>4</sub>	10,453	10,705	252	2%	0,3%	97,9%
2 C Metal Production	PFC	5,637	10,134	4,497	80%	0,2%	98,1%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9,583	9,244	-339	-4%	0,2%	98,3%
1.B.1. Solid Fuels	CO <sub>2</sub>	9,283	8,557	-726	-8%	0,2%	98,5%
6.B. Waste-water Handling	CH <sub>4</sub>	7,696	7,296	-400	-5%	0,2%	98,7%
6.C. Waste Incineration	CO <sub>2</sub>	6,660	6,636	-24	0%	0,2%	98,9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9,617	6,491	-3,125	-32%	0,2%	99,0%
3. Solvent and Other Product Use	CO <sub>2</sub>	6,067	6,012	-55	-1%	0,1%	99,2%
6.B. Waste-water Handling	N <sub>2</sub> O	6,492	5,687	-805	-12%	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4,782	4,565	-217	-5%	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3,492	3,457	-36	-1%	0,1%	99,5%
4.D. Agricultural Soils	CO <sub>2</sub>	3,208	2,806	-402	-13%	0,1%	99,6%
2.G. Other	CO <sub>2</sub>	1,111	2,751	1,640	148%	0,1%	99,6%
4.C. Rice Cultivation	CH <sub>4</sub>	2,303	2,243	-60	-3%	0,1%	99,7%
2 C Metal Production	SF <sub>6</sub>	2,320	2,089	-232	-10%	0,0%	99,7%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1,231	1,189	-42	-3%	0,0%	99,7%
7. Other	N <sub>2</sub> O	1,181	1,178	-3	0%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1,299	1,130	-170	-13%	0,0%	99,8%
1.A.1. Energy Industries	CH <sub>4</sub>	1,026	1,051	25	2%	0,0%	99,8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1,595	894	-701	-44%	0,0%	99,8%
6.D. Other	CH <sub>4</sub>	801	845	45	6%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	845	141	20%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	615	-26	-4%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	577	55	10%	0,0%	99,9%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	549	374	214%	0,0%	99,9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6,167	452	-5,715	-93%	0,0%	99,9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	440	-4	-1%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	404	-12	-3%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	367	67	22%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	321	58	22%	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	305	-71	-19%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	149	-1	0%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	128	-10	-7%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	83	-11	-12%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	78	73	1350%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	42	0	1%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	42	-16	-28%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	20	-9	-31%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	23%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-32%	0,0%	100,0%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0,0%	100,0%

# Trend assessment for 1991

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1991	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	676.565	41.469	7%	1.0%	28.8%	28.8%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	619.577	-22.771	-4%	0.5%	15.1%	43.9%
1.A.3. Transport	CO <sub>2</sub>	695.003	708.465	13.462	2%	0.3%	9.7%	53.6%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	23.574	-8.799	-27%	0.2%	6.0%	59.6%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144.434	1,150.783	6.349	1%	0.2%	5.1%	64.6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	452	-5.715	-93%	0.1%	3.9%	68.5%
2.A. Mineral Products	CO <sub>2</sub>	106.934	101.655	-5.279	-5%	0.1%	3.5%	72.1%
2 C Metal Production	PFC	5.637	10.134	4.497	80%	0.1%	3.1%	75.2%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	210.406	-4.083	-2%	0.1%	2.7%	77.8%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	140.530	-3.561	-2%	0.1%	2.3%	80.1%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	6.491	-3.125	-32%	0.1%	2.1%	82.3%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.004	-2.698	-10%	0.1%	1.8%	84.1%
1.A.5. Other	CO <sub>2</sub>	20.076	17.595	-2.481	-12%	0.1%	1.7%	85.8%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	46.178	-2.332	-5%	0.1%	1.6%	87.3%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	104.018	-2.078	-2%	0.0%	1.4%	88.7%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	109.078	-1.904	-2%	0.0%	1.2%	89.9%
2.G. Other	CO <sub>2</sub>	1.111	2.751	1.640	148%	0.0%	1.1%	91.0%
4.B. Manure Management	CH <sub>4</sub>	45.172	43.814	-1.358	-3%	0.0%	0.9%	91.9%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.959	-1.288	-7%	0.0%	0.9%	92.8%
1.A.3. Transport	N <sub>2</sub> O	11.660	12.899	1.239	11%	0.0%	0.9%	93.7%
4.B. Manure Management	N <sub>2</sub> O	23.495	22.519	-977	-4%	0.0%	0.7%	94.3%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0.0%	0.6%	94.9%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	12.054	-831	-6%	0.0%	0.6%	95.5%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.687	-805	-12%	0.0%	0.5%	96.0%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.557	-726	-8%	0.0%	0.5%	96.5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	894	-701	-44%	0.0%	0.5%	97.0%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	11.207	443	4%	0.0%	0.3%	97.3%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.806	-402	-13%	0.0%	0.3%	97.6%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.296	-400	-5%	0.0%	0.3%	97.9%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	549	374	214%	0.0%	0.3%	98.1%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	9.244	-339	-4%	0.0%	0.2%	98.3%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.909	302	2%	0.0%	0.2%	98.5%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	10.705	252	2%	0.0%	0.2%	98.7%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	33.194	225	1%	0.0%	0.2%	98.9%
2 C Metal Production	SF <sub>6</sub>	2.320	2.089	-232	-10%	0.0%	0.2%	99.1%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.565	-217	-5%	0.0%	0.1%	99.2%
2.D. Other Production	CO <sub>2</sub>	1.299	1.130	-170	-13%	0.0%	0.1%	99.3%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0.0%	0.1%	99.4%
6.C. Waste Incineration	CH <sub>4</sub>	704	845	141	20%	0.0%	0.1%	99.5%
2.G. Other	CH <sub>4</sub>	5	78	73	1350%	0.0%	0.0%	99.6%
2.B. Chemical Industry	CH <sub>4</sub>	376	305	-71	-19%	0.0%	0.0%	99.6%
1.A.5. Other	N <sub>2</sub> O	300	367	67	22%	0.0%	0.0%	99.7%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	321	58	22%	0.0%	0.0%	99.7%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.243	-60	-3%	0.0%	0.0%	99.8%
6.C. Waste Incineration	N <sub>2</sub> O	522	577	55	10%	0.0%	0.0%	99.8%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	6.012	-55	-1%	0.0%	0.0%	99.8%
6.D. Other	CH <sub>4</sub>	801	845	45	6%	0.0%	0.0%	99.9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.189	-42	-3%	0.0%	0.0%	99.9%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.457	-36	-1%	0.0%	0.0%	99.9%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.051	25	2%	0.0%	0.0%	99.9%
7. Other	CO <sub>2</sub>	641	615	-26	-4%	0.0%	0.0%	99.9%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.636	-24	0%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	42	-16	-28%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	83	-11	-12%	0.0%	0.0%	100.0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	404	-12	-3%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	128	-10	-7%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	20	-9	-31%	0.0%	0.0%	100.0%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	440	-4	-1%	0.0%	0.0%	100.0%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	23%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-32%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	149	-1	0%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	42	0	1%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industrv	PFC	0	0	0	0%	0.0%	0.0%	100.0%

# Level assessment for 1992

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1992	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.115.919	-28.515	-2%	27,2%	27,2%
1.A.3. Transport	CO <sub>2</sub>	695.003	732.835	37.832	5%	17,9%	45,0%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	645.749	10.653	2%	15,7%	60,8%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	597.349	-44.999	-7%	14,6%	75,3%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	203.707	-10.782	-5%	5,0%	80,3%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	137.728	-6.363	-4%	3,4%	83,6%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	103.429	-7.553	-7%	2,5%	86,2%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	100.394	-5.703	-5%	2,4%	88,6%
2.A. Mineral Products	CO <sub>2</sub>	106.934	100.051	-6.883	-6%	2,4%	91,1%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	44.652	-3.858	-8%	1,1%	92,1%
4.B. Manure Management	CH <sub>4</sub>	45.172	43.963	-1.208	-3%	1,1%	93,2%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	33.214	245	1%	0,8%	94,0%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	24.977	-7.396	-23%	0,6%	94,6%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.990	-1.505	-6%	0,5%	95,2%
2.C. Metal Production	CO <sub>2</sub>	25.702	21.182	-4.520	-18%	0,5%	95,7%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.848	-1.400	-8%	0,4%	96,1%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.882	276	2%	0,4%	96,4%
1.A.3. Transport	N <sub>2</sub> O	11.660	14.168	2.508	22%	0,3%	96,8%
1.A.5. Other	CO <sub>2</sub>	20.076	13.923	-6.153	-31%	0,3%	97,1%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	11.542	-1.343	-10%	0,3%	97,4%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	10.756	-8	0%	0,3%	97,7%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	9.797	-656	-6%	0,2%	97,9%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	9.004	-579	-6%	0,2%	98,1%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.357	-926	-10%	0,2%	98,3%
2 C Metal Production	PFC	5.637	8.075	2.438	43%	0,2%	98,5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	7.167	-2.450	-25%	0,2%	98,7%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.095	-601	-8%	0,2%	98,9%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.670	10	0%	0,2%	99,0%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.779	-288	-5%	0,1%	99,2%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.273	-1.219	-19%	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.502	-279	-6%	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.478	-14	0%	0,1%	99,5%
2.G. Other	CO <sub>2</sub>	1.111	2.352	1.241	112%	0,1%	99,5%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.312	-896	-28%	0,1%	99,6%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.223	-80	-3%	0,1%	99,7%
2 C Metal Production	SF <sub>6</sub>	2.320	2.065	-255	-11%	0,1%	99,7%
2.D. Other Production	CO <sub>2</sub>	1.299	1.416	117	9%	0,0%	99,7%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0,0%	99,8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.122	-109	-9%	0,0%	99,8%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.083	57	6%	0,0%	99,8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	913	-683	-43%	0,0%	99,8%
6.D. Other	CH <sub>4</sub>	801	906	105	13%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	782	78	11%	0,0%	99,9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	612	-5.555	-90%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	608	-33	-5%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	558	36	7%	0,0%	99,9%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	450	275	157%	0,0%	99,9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	413	-31	-7%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	369	106	40%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	352	52	17%	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	326	-50	-13%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	318	-98	-24%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	149	-1	0%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	118	-20	-15%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	82	77	1428%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	78	-17	-18%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	42	0	1%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	36	-21	-37%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	18	-11	-38%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	22%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-2	-48%	0,0%	100,0%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	#DIV/0!	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	0	0	#DIV/0!	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	#DIV/0!	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	#DIV/0!	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0,0%	100,0%

# Trend assessment for 1992

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1992	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	732.835	37.832	5%	1.3%	30.3%	30.3%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	597.349	-44.999	-7%	0.7%	16.8%	47.1%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	645.749	10.653	2%	0.6%	14.3%	61.3%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	24.977	-7.396	-23%	0.2%	3.7%	65.1%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	203.707	-10.782	-5%	0.1%	3.2%	68.3%
1.A.5. Other	CO <sub>2</sub>	20.076	13.923	-6.153	-31%	0.1%	3.2%	71.5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	612	-5.555	-90%	0.1%	3.0%	74.5%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	103.429	-7.553	-7%	0.1%	2.8%	77.3%
2.A. Mineral Products	CO <sub>2</sub>	106.934	100.051	-6.883	-6%	0.1%	2.5%	79.7%
2.C. Metal Production	CO <sub>2</sub>	25.702	21.182	-4.520	-18%	0.1%	2.2%	81.9%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	100.394	-5.703	-5%	0.1%	1.8%	83.7%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	137.728	-6.363	-4%	0.1%	1.7%	85.4%
1.A.3. Transport	N <sub>2</sub> O	11.660	14.168	2.508	22%	0.1%	1.6%	87.0%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	44.652	-3.858	-8%	0.1%	1.5%	88.5%
2 C Metal Production	PFC	5.637	8.075	2.438	43%	0.1%	1.4%	90.0%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	7.167	-2.450	-25%	0.1%	1.2%	91.2%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144.434	1,115.919	-28.515	-2%	0.0%	1.0%	92.2%
2.G. Other	CO <sub>2</sub>	1.111	2.352	1.241	112%	0.0%	0.7%	92.9%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.273	-1.219	-19%	0.0%	0.6%	93.5%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	11.542	-1.343	-10%	0.0%	0.6%	94.1%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	33.214	245	1%	0.0%	0.6%	94.7%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.848	-1.400	-8%	0.0%	0.6%	95.2%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.990	-1.505	-6%	0.0%	0.5%	95.8%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0.0%	0.5%	96.3%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.312	-896	-28%	0.0%	0.5%	96.7%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.357	-926	-10%	0.0%	0.4%	97.1%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	913	-683	-43%	0.0%	0.4%	97.5%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.882	276	2%	0.0%	0.3%	97.8%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.095	-601	-8%	0.0%	0.2%	98.1%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	9.797	-656	-6%	0.0%	0.2%	98.3%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	9.004	-579	-6%	0.0%	0.2%	98.5%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	450	275	157%	0.0%	0.2%	98.6%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	10.756	-8	0%	0.0%	0.1%	98.8%
2 C Metal Production	SF <sub>6</sub>	2.320	2.065	-255	-11%	0.0%	0.1%	98.9%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.502	-279	-6%	0.0%	0.1%	99.0%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.670	10	0%	0.0%	0.1%	99.1%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0.0%	0.1%	99.2%
4.B. Manure Management	CH <sub>4</sub>	45.172	43.963	-1.208	-3%	0.0%	0.1%	99.3%
2.D. Other Production	CO <sub>2</sub>	1.299	1.416	117	9%	0.0%	0.1%	99.3%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.779	-288	-5%	0.0%	0.1%	99.4%
6.D. Other	CH <sub>4</sub>	801	906	105	13%	0.0%	0.1%	99.5%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	369	106	40%	0.0%	0.1%	99.6%
6.C. Waste Incineration	CH <sub>4</sub>	704	782	78	11%	0.0%	0.1%	99.6%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	318	-98	-24%	0.0%	0.0%	99.7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.083	57	6%	0.0%	0.0%	99.7%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.122	-109	-9%	0.0%	0.0%	99.7%
2.G. Other	CH <sub>4</sub>	5	82	77	1428%	0.0%	0.0%	99.8%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.478	-14	0%	0.0%	0.0%	99.8%
1.A.5. Other	N <sub>2</sub> O	300	352	52	17%	0.0%	0.0%	99.9%
6.C. Waste Incineration	N <sub>2</sub> O	522	558	36	7%	0.0%	0.0%	99.9%
2.B. Chemical Industry	CH <sub>4</sub>	376	326	-50	-13%	0.0%	0.0%	99.9%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.223	-80	-3%	0.0%	0.0%	99.9%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0.0%	0.0%	99.9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	413	-31	-7%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	36	-21	-37%	0.0%	0.0%	100.0%
7. Other	CO <sub>2</sub>	641	608	-33	-5%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	118	-20	-15%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	78	-17	-18%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	18	-11	-38%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	149	-1	0%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	22%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-2	-48%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	42	0	1%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industrv	PFC	0	0	0	0%	0.0%	0.0%	100.0%

# Level assessment for 1993

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1993	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.061.507	-82.927	-7%	26,4%	26.4%
1.A.3. Transport	CO <sub>2</sub>	695.003	739.790	44.787	6%	18,4%	44.7%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	657.348	22.252	4%	16,3%	61.0%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	577.751	-64.597	-10%	14,3%	75.4%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	200.347	-14.142	-7%	5,0%	80.4%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	136.741	-7.350	-5%	3,4%	83.8%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	99.812	-11.170	-10%	2,5%	86.2%
2.A. Mineral Products	CO <sub>2</sub>	106.934	96.861	-10.073	-9%	2,4%	88.6%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	95.146	-10.950	-10%	2,4%	91.0%
4.B. Manure Management	CH <sub>4</sub>	45.172	43.961	-1.211	-3%	1,1%	92.1%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	39.873	-8.637	-18%	1,0%	93.1%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	33.516	547	2%	0,8%	93.9%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	25.921	-6.452	-20%	0,6%	94.6%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.743	-1.753	-7%	0,5%	95.1%
2.C. Metal Production	CO <sub>2</sub>	25.702	21.644	-4.059	-16%	0,5%	95.6%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.025	-1.222	-7%	0,4%	96.0%
1.A.3. Transport	N <sub>2</sub> O	11.660	15.561	3.901	33%	0,4%	96.4%
1.A.5. Other	CO <sub>2</sub>	20.076	14.760	-5.316	-26%	0,4%	96.8%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.075	-531	-4%	0,3%	97.1%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	10.748	-16	0%	0,3%	97.4%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.487	-2.398	-19%	0,3%	97.7%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	9.538	-915	-9%	0,2%	97.9%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.643	-940	-10%	0,2%	98.1%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	7.844	-1.773	-18%	0,2%	98.3%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.700	-1.584	-17%	0,2%	98.5%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.098	-597	-8%	0,2%	98.7%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.748	88	1%	0,2%	98.8%
2 C Metal Production	PFC	5.637	6.601	964	17%	0,2%	99.0%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.368	-699	-12%	0,1%	99.1%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.322	-1.170	-18%	0,1%	99.3%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.320	-462	-10%	0,1%	99.4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.492	0	0%	0,1%	99.5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.228	-74	-3%	0,1%	99.5%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.222	-987	-31%	0,1%	99.6%
2 C Metal Production	SF <sub>6</sub>	2.320	2.147	-173	-7%	0,1%	99.6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	2.134	-4.034	-65%	0,1%	99.7%
2.G. Other	CO <sub>2</sub>	1.111	1.858	748	67%	0,0%	99.7%
2.D. Other Production	CO <sub>2</sub>	1.299	1.241	-58	-4%	0,0%	99.8%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0,0%	99.8%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.128	102	10%	0,0%	99.8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.102	-493	-31%	0,0%	99.8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.085	-146	-12%	0,0%	99.9%
6.D. Other	CH <sub>4</sub>	801	956	155	19%	0,0%	99.9%
6.C. Waste Incineration	CH <sub>4</sub>	704	778	74	11%	0,0%	99.9%
6.C. Waste Incineration	N <sub>2</sub> O	522	563	41	8%	0,0%	99.9%
7. Other	CO <sub>2</sub>	641	556	-85	-13%	0,0%	99.9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	366	-79	-18%	0,0%	99.9%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	357	94	36%	0,0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	351	176	101%	0,0%	100.0%
1.A.5. Other	N <sub>2</sub> O	300	337	36	12%	0,0%	100.0%
2.B. Chemical Industry	CH <sub>4</sub>	376	293	-82	-22%	0,0%	100.0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	157	-258	-62%	0,0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-2	-1%	0,0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	127	-11	-8%	0,0%	100.0%
2.G. Other	CH <sub>4</sub>	5	108	102	1897%	0,0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	75	-20	-21%	0,0%	100.0%
2.G. Other	N <sub>2</sub> O	41	43	2	4%	0,0%	100.0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0,0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	31	-27	-47%	0,0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	15	-14	-47%	0,0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	23%	0,0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-31%	0,0%	100.0%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0,0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	#DIV/0!	0,0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	#DIV/0!	0,0%	100.0%
2 B Chemical Industry	HFC	0	0	0	#DIV/0!	0,0%	100.0%
2 B Chemical Industry	PFC	0	0	0	#DIV/0!	0,0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0,0%	100.0%

# Trend assessment for 1993

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1993	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	739.790	44.787	6%	1.9%	27.6%	27.6%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	657.348	22.252	4%	1.3%	18.2%	45.9%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	577.751	-64.597	-10%	1.0%	14.2%	60.1%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144.434	1,061.507	-82.927	-7%	0.9%	13.3%	73.4%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	39.873	-8.637	-18%	0.2%	2.5%	75.9%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	99.812	-11.170	-10%	0.2%	2.5%	78.3%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	95.146	-10.950	-10%	0.2%	2.5%	80.8%
2.A. Mineral Products	CO <sub>2</sub>	106.934	96.861	-10.073	-9%	0.1%	2.1%	82.9%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	200.347	-14.142	-7%	0.1%	2.0%	84.9%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	25.921	-6.452	-20%	0.1%	1.9%	86.8%
1.A.5. Other	CO <sub>2</sub>	20.076	14.760	-5.316	-26%	0.1%	1.7%	88.5%
1.A.3. Transport	N <sub>2</sub> O	11.660	15.561	3.901	33%	0.1%	1.6%	90.1%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	2.134	-4.034	-65%	0.1%	1.4%	91.5%
2.C. Metal Production	CO <sub>2</sub>	25.702	21.644	-4.059	-16%	0.1%	1.1%	92.7%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	33.516	547	2%	0.0%	0.7%	93.4%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.487	-2.398	-19%	0.0%	0.7%	94.1%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	7.844	-1.773	-18%	0.0%	0.5%	94.6%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	136.741	-7.350	-5%	0.0%	0.5%	95.1%
2 C Metal Production	PFC	5.637	6.601	964	17%	0.0%	0.4%	95.6%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.700	-1.584	-17%	0.0%	0.4%	96.0%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.322	-1.170	-18%	0.0%	0.3%	96.3%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.222	-987	-31%	0.0%	0.3%	96.7%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0.0%	0.3%	97.0%
2.G. Other	CO <sub>2</sub>	1.111	1.858	748	67%	0.0%	0.3%	97.3%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.743	-1.753	-7%	0.0%	0.3%	97.6%
4.B. Manure Management	CH <sub>4</sub>	45.172	43.961	-1.211	-3%	0.0%	0.2%	97.8%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.643	-940	-10%	0.0%	0.2%	98.0%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.025	-1.222	-7%	0.0%	0.2%	98.2%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	9.538	-915	-9%	0.0%	0.2%	98.4%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.368	-699	-12%	0.0%	0.2%	98.6%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	10.748	-16	0%	0.0%	0.2%	98.7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.102	-493	-31%	0.0%	0.2%	98.9%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.748	88	1%	0.0%	0.1%	99.0%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.098	-597	-8%	0.0%	0.1%	99.1%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.320	-462	-10%	0.0%	0.1%	99.2%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	157	-258	-62%	0.0%	0.1%	99.3%
6.D. Other	CH <sub>4</sub>	801	956	155	19%	0.0%	0.1%	99.4%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	351	176	101%	0.0%	0.1%	99.5%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0.0%	0.1%	99.5%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.492	0	0%	0.0%	0.1%	99.6%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.128	102	10%	0.0%	0.1%	99.6%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	357	94	36%	0.0%	0.0%	99.7%
6.C. Waste Incineration	CH <sub>4</sub>	704	778	74	11%	0.0%	0.0%	99.7%
2.G. Other	CH <sub>4</sub>	5	108	102	1897%	0.0%	0.0%	99.7%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.085	-146	-12%	0.0%	0.0%	99.8%
2 C Metal Production	SF <sub>6</sub>	2.320	2.147	-173	-7%	0.0%	0.0%	99.8%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.075	-531	-4%	0.0%	0.0%	99.8%
2.B. Chemical Industry	CH <sub>4</sub>	376	293	-82	-22%	0.0%	0.0%	99.9%
6.C. Waste Incineration	N <sub>2</sub> O	522	563	41	8%	0.0%	0.0%	99.9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	366	-79	-18%	0.0%	0.0%	99.9%
7. Other	CO <sub>2</sub>	641	556	-85	-13%	0.0%	0.0%	99.9%
1.A.5. Other	N <sub>2</sub> O	300	337	36	12%	0.0%	0.0%	99.9%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	31	-27	-47%	0.0%	0.0%	100.0%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.228	-74	-3%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	75	-20	-21%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	15	-14	-47%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	127	-11	-8%	0.0%	0.0%	100.0%
2.D. Other Production	CO <sub>2</sub>	1.299	1.241	-58	-4%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-2	-1%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	43	2	4%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	23%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-31%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%

# Level assessment for 1994

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1994	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.069.428	-75.005	-7%	26,5%	26,5%
1.A.3. Transport	CO <sub>2</sub>	695.003	743.244	48.241	7%	18,4%	44,9%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	626.290	-8.806	-1%	15,5%	60,5%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	597.112	-45.236	-7%	14,8%	75,3%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	201.294	-13.195	-6%	5,0%	80,3%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	136.843	-7.248	-5%	3,4%	83,7%
2.A. Mineral Products	CO <sub>2</sub>	106.934	101.298	-5.636	-5%	2,5%	86,2%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	98.650	-12.332	-11%	2,4%	88,6%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	97.864	-8.233	-8%	2,4%	91,0%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.240	-932	-2%	1,1%	92,1%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	33.300	331	1%	0,8%	93,0%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	31.996	-16.514	-34%	0,8%	93,8%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	29.381	-2.992	-9%	0,7%	94,5%
2.C. Metal Production	CO <sub>2</sub>	25.702	22.569	-3.133	-12%	0,6%	95,0%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.825	-1.671	-7%	0,5%	95,6%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	18.474	1.227	7%	0,5%	96,0%
1.A.3. Transport	N <sub>2</sub> O	11.660	16.921	5.261	45%	0,4%	96,5%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.361	-246	-2%	0,4%	96,8%
1.A.5. Other	CO <sub>2</sub>	20.076	13.170	-6.906	-34%	0,3%	97,1%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.564	-2.321	-18%	0,3%	97,4%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	10.168	-597	-6%	0,3%	97,7%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	9.030	-553	-6%	0,2%	97,9%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	8.563	-1.890	-18%	0,2%	98,1%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	8.482	-1.135	-12%	0,2%	98,3%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.245	-2.038	-22%	0,2%	98,5%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.216	-479	-6%	0,2%	98,7%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.701	41	1%	0,2%	98,8%
2 C Metal Production	PFC	5.637	5.739	103	2%	0,1%	99,0%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.337	-1.155	-18%	0,1%	99,1%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.326	-741	-12%	0,1%	99,2%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.161	-620	-13%	0,1%	99,3%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.501	9	0%	0,1%	99,4%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	3.181	-2.986	-48%	0,1%	99,5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.423	120	5%	0,1%	99,6%
2 C Metal Production	SF <sub>6</sub>	2.320	2.368	48	2%	0,1%	99,6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.060	-1.148	-36%	0,1%	99,7%
2.G. Other	CO <sub>2</sub>	1.111	1.675	564	51%	0,0%	99,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.324	-272	-17%	0,0%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.239	213	21%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.223	-76	-6%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0,0%	99,8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.138	-93	-8%	0,0%	99,9%
6.D. Other	CH <sub>4</sub>	801	960	159	20%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	750	46	7%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	692	51	8%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	548	25	5%	0,0%	99,9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	361	-83	-19%	0,0%	99,9%
2.B. Chemical Industry	CH <sub>4</sub>	376	339	-37	-10%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	319	19	6%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	290	27	10%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	248	73	42%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	223	128	135%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	157	-259	-62%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-3	-2%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	136	-3	-2%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	116	110	2046%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	48	5	12%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	42	1	1%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	27	-30	-53%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	17	-12	-41%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	34%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	3	-1	-18%	0,0%	100,0%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	#DIV/0!	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	0	0	#DIV/0!	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	#DIV/0!	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	#DIV/0!	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0,0%	100,0%

# Trend assessment for 1994

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1994	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	743.244	48.241	7%	2.0%	35.8%	35.8%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144,434	1,069,428	-75,005	-7%	0.7%	13.7%	49.5%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642,348	597,112	-45,236	-7%	0.5%	9.1%	58.6%
1.A.4. Other Sectors	CO <sub>2</sub>	635,096	626,290	-8,806	-1%	0.4%	7.9%	66.5%
1.B.1. Solid Fuels	CH <sub>4</sub>	48,510	31,996	-16,514	-34%	0.4%	6.9%	73.4%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110,982	98,650	-12,332	-11%	0.2%	3.7%	77.1%
1.A.5. Other	CO <sub>2</sub>	20,076	13,170	-6,906	-34%	0.2%	2.9%	79.9%
1.A.3. Transport	N <sub>2</sub> O	11,660	16,921	5,261	45%	0.1%	2.7%	82.6%
4.D. Agricultural Soils	N <sub>2</sub> O	214,489	201,294	-13,195	-6%	0.1%	2.2%	84.8%
2.B. Chemical Industry	N <sub>2</sub> O	106,096	97,864	-8,233	-8%	0.1%	1.9%	86.6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6,167	3,181	-2,986	-48%	0.1%	1.3%	87.9%
2.C. Metal Production	CO <sub>2</sub>	25,702	22,569	-3,133	-12%	0.1%	1.0%	88.9%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17,247	18,474	1,227	7%	0.0%	0.9%	89.8%
2.B. Chemical Industry	CO <sub>2</sub>	12,884	10,564	-2,321	-18%	0.0%	0.8%	90.7%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32,373	29,381	-2,992	-9%	0.0%	0.8%	91.5%
1.B.1. Solid Fuels	CO <sub>2</sub>	9,283	7,245	-2,038	-22%	0.0%	0.8%	92.3%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32,969	33,300	331	1%	0.0%	0.8%	93.0%
1.A.4. Other Sectors	CH <sub>4</sub>	10,453	8,563	-1,890	-18%	0.0%	0.7%	93.7%
4.A. Enteric Fermentation	CH <sub>4</sub>	144,091	136,843	-7,248	-5%	0.0%	0.7%	94.4%
2.A. Mineral Products	CO <sub>2</sub>	106,934	101,298	-5,636	-5%	0.0%	0.6%	95.0%
4.D. Agricultural Soils	CO <sub>2</sub>	3,208	2,060	-1,148	-36%	0.0%	0.5%	95.5%
6.B. Waste-water Handling	N <sub>2</sub> O	6,492	5,337	-1,155	-18%	0.0%	0.4%	95.9%
4.B. Manure Management	CH <sub>4</sub>	45,172	44,240	-932	-2%	0.0%	0.4%	96.4%
6.D. Other	CO <sub>2</sub>	881	0	-881	-100%	0.0%	0.4%	96.8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9,617	8,482	-1,135	-12%	0.0%	0.4%	97.1%
4.B. Manure Management	N <sub>2</sub> O	23,495	21,825	-1,671	-7%	0.0%	0.3%	97.5%
2.G. Other	CO <sub>2</sub>	1,111	1,675	564	51%	0.0%	0.3%	97.7%
3. Solvent and Other Product Use	CO <sub>2</sub>	6,067	5,326	-741	-12%	0.0%	0.2%	98.0%
1.A.3. Transport	CH <sub>4</sub>	4,782	4,161	-620	-13%	0.0%	0.2%	98.2%
1.A.1. Energy Industries	N <sub>2</sub> O	14,606	14,361	-246	-2%	0.0%	0.2%	98.3%
2 C Metal Production	PFC	5,637	5,739	103	2%	0.0%	0.2%	98.5%
6.C. Waste Incineration	CO <sub>2</sub>	6,660	6,701	41	1%	0.0%	0.1%	98.6%
1.A.1. Energy Industries	CH <sub>4</sub>	1,026	1,239	213	21%	0.0%	0.1%	98.8%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	157	-259	-62%	0.0%	0.1%	98.9%
4.C. Rice Cultivation	CH <sub>4</sub>	2,303	2,423	120	5%	0.0%	0.1%	99.0%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1,595	1,324	-272	-17%	0.0%	0.1%	99.1%
6.D. Other	CH <sub>4</sub>	801	960	159	20%	0.0%	0.1%	99.2%
6.B. Waste-water Handling	CH <sub>4</sub>	7,696	7,216	-479	-6%	0.0%	0.1%	99.2%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9,583	9,030	-553	-6%	0.0%	0.1%	99.3%
1.A.4. Other Sectors	N <sub>2</sub> O	10,765	10,168	-597	-6%	0.0%	0.1%	99.4%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	0	-167	-100%	0.0%	0.1%	99.5%
3. Solvent and Other Product Use	N <sub>2</sub> O	3,492	3,501	9	0%	0.0%	0.1%	99.5%
2 C Metal Production	SF <sub>6</sub>	2,320	2,368	48	2%	0.0%	0.1%	99.6%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	223	128	135%	0.0%	0.1%	99.7%
2.G. Other	CH <sub>4</sub>	5	116	110	2046%	0.0%	0.1%	99.7%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	248	73	42%	0.0%	0.0%	99.8%
7. Other	CO <sub>2</sub>	641	692	51	8%	0.0%	0.0%	99.8%
6.C. Waste Incineration	CH <sub>4</sub>	704	750	46	7%	0.0%	0.0%	99.8%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	361	-83	-19%	0.0%	0.0%	99.9%
6.C. Waste Incineration	N <sub>2</sub> O	522	548	25	5%	0.0%	0.0%	99.9%
7. Other	N <sub>2</sub> O	1,181	1,178	-3	0%	0.0%	0.0%	99.9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1,231	1,138	-93	-8%	0.0%	0.0%	99.9%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	290	27	10%	0.0%	0.0%	99.9%
1.A.5. Other	N <sub>2</sub> O	300	319	19	6%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	27	-30	-53%	0.0%	0.0%	100.0%
2.D. Other Production	CO <sub>2</sub>	1,299	1,223	-76	-6%	0.0%	0.0%	100.0%
2.B. Chemical Industry	CH <sub>4</sub>	376	339	-37	-10%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	17	-12	-41%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	48	5	12%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-3	-2%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	136	-3	-2%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	34%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	42	1	1%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	3	-1	-18%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%



# Level assessment for 1995

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1995	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.079.944	-64.490	-6%	26,5%	26,5%
1.A.3. Transport	CO <sub>2</sub>	695.003	752.889	57.886	8%	18,5%	45,0%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	633.655	-1.441	0%	15,6%	60,6%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	604.249	-38.099	-6%	14,8%	75,4%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	201.510	-12.979	-6%	4,9%	80,3%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	136.691	-7.400	-5%	3,4%	83,7%
2.A. Mineral Products	CO <sub>2</sub>	106.934	103.242	-3.691	-3%	2,5%	86,2%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	97.486	-8.610	-8%	2,4%	88,6%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	96.560	-14.422	-13%	2,4%	91,0%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.319	-853	-2%	1,1%	92,1%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	33.487	-15.023	-31%	0,8%	92,9%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	32.373	0	0%	0,8%	93,7%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	30.731	-2.238	-7%	0,8%	94,4%
2.C. Metal Production	CO <sub>2</sub>	25.702	24.759	-943	-4%	0,6%	95,1%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.710	-1.785	-8%	0,5%	95,6%
1.A.3. Transport	N <sub>2</sub> O	11.660	18.334	6.674	57%	0,5%	96,0%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.886	-1.361	-8%	0,4%	96,4%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.534	-72	0%	0,4%	96,8%
1.A.5. Other	CO <sub>2</sub>	20.076	12.120	-7.957	-40%	0,3%	97,1%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	11.490	-1.394	-11%	0,3%	97,4%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	9.617	0	0%	0,2%	97,6%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.468	-1.296	-12%	0,2%	97,8%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	9.339	-245	-3%	0,2%	98,1%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.761	-2.692	-26%	0,2%	98,3%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.187	-508	-7%	0,2%	98,4%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.122	-2.161	-23%	0,2%	98,6%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.269	-390	-6%	0,2%	98,8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	6.167	0	0%	0,2%	98,9%
2 C Metal Production	PFC	5.637	5.637	0	0%	0,1%	99,1%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.375	-1.117	-17%	0,1%	99,2%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.338	-729	-12%	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.062	-720	-15%	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.519	27	1%	0,1%	99,5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.398	96	4%	0,1%	99,6%
2 C Metal Production	SF <sub>6</sub>	2.320	2.320	0	0%	0,1%	99,6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	1.718	-1.490	-46%	0,0%	99,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.595	0	0%	0,0%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.447	421	41%	0,0%	99,7%
2.G. Other	CO <sub>2</sub>	1.111	1.336	225	20%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.207	-93	-7%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.194	13	1%	0,0%	99,8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.145	-85	-7%	0,0%	99,9%
6.D. Other	CH <sub>4</sub>	801	999	198	25%	0,0%	99,9%
6.D. Other	CO <sub>2</sub>	881	910	29	3%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	744	41	6%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	700	59	9%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	546	24	5%	0,0%	99,9%
2.B. Chemical Industry	CH <sub>4</sub>	376	356	-20	-5%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	350	-94	-21%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	294	-7	-2%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	167	0	0%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	147	-269	-65%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	146	-4	-2%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	132	-6	-5%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	124	-139	-53%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	74	-21	-22%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	44	3	6%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	43	0	1%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	36	-21	-37%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	19	-10	-33%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	12	12	-	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	10	3	48%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	6	1	5%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	3	-1	-22%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%

# Trend assessment for 1995

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1995	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	752.889	57.886	8%	2.0%	36.5%	36.5%
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.079.944	-64.490	-6%	0.7%	13.5%	50.0%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	604.249	-38.099	-6%	0.5%	8.4%	58.4%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	633.655	-1.441	0%	0.5%	8.3%	66.7%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	33.487	-15.023	-31%	0.3%	6.2%	73.0%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	96.560	-14.422	-13%	0.3%	5.1%	78.0%
1.A.5. Other	CO <sub>2</sub>	20.076	12.120	-7.957	-40%	0.2%	3.4%	81.4%
1.A.3. Transport	N <sub>2</sub> O	11.660	18.334	6.674	57%	0.2%	3.2%	84.6%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	201.510	-12.979	-6%	0.2%	2.9%	87.6%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	97.486	-8.610	-8%	0.1%	2.5%	90.0%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	136.691	-7.400	-5%	0.1%	1.4%	91.4%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.761	-2.692	-26%	0.1%	1.1%	92.5%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.122	-2.161	-23%	0.0%	0.9%	93.4%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	1.718	-1.490	-46%	0.0%	0.6%	94.0%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	30.731	-2.238	-7%	0.0%	0.6%	94.6%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.710	-1.785	-8%	0.0%	0.5%	95.0%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	11.490	-1.394	-11%	0.0%	0.5%	95.5%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	32.373	0	0%	0.0%	0.5%	96.0%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.468	-1.296	-12%	0.0%	0.4%	96.4%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.375	-1.117	-17%	0.0%	0.4%	96.8%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.886	-1.361	-8%	0.0%	0.4%	97.2%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.062	-720	-15%	0.0%	0.3%	97.5%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.338	-729	-12%	0.0%	0.2%	97.7%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.319	-853	-2%	0.0%	0.2%	98.0%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.447	421	41%	0.0%	0.2%	98.2%
2.A. Mineral Products	CO <sub>2</sub>	106.934	103.242	-3.691	-3%	0.0%	0.2%	98.4%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.534	-72	0%	0.0%	0.2%	98.5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	9.617	0	0%	0.0%	0.1%	98.7%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.187	-508	-7%	0.0%	0.1%	98.8%
2.G. Other	CO <sub>2</sub>	1.111	1.336	225	20%	0.0%	0.1%	98.9%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	147	-269	-65%	0.0%	0.1%	99.0%
6.D. Other	CH <sub>4</sub>	801	999	198	25%	0.0%	0.1%	99.1%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	6.167	0	0%	0.0%	0.1%	99.2%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.269	-390	-6%	0.0%	0.1%	99.3%
2 C Metal Production	PFC	5.637	5.637	0	0%	0.0%	0.1%	99.4%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.398	96	4%	0.0%	0.1%	99.5%
2.C. Metal Production	CO <sub>2</sub>	25.702	24.759	-943	-4%	0.0%	0.1%	99.5%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.519	27	1%	0.0%	0.1%	99.6%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	124	-139	-53%	0.0%	0.1%	99.7%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	350	-94	-21%	0.0%	0.0%	99.7%
7. Other	CO <sub>2</sub>	641	700	59	9%	0.0%	0.0%	99.7%
2 C Metal Production	SF <sub>6</sub>	2.320	2.320	0	0%	0.0%	0.0%	99.8%
6.C. Waste Incineration	CH <sub>4</sub>	704	744	41	6%	0.0%	0.0%	99.8%
6.D. Other	CO <sub>2</sub>	881	910	29	3%	0.0%	0.0%	99.8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.207	-93	-7%	0.0%	0.0%	99.8%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	9.339	-245	-3%	0.0%	0.0%	99.9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.595	0	0%	0.0%	0.0%	99.9%
7. Other	N <sub>2</sub> O	1.181	1.194	13	1%	0.0%	0.0%	99.9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.145	-85	-7%	0.0%	0.0%	99.9%
6.C. Waste Incineration	N <sub>2</sub> O	522	546	24	5%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	36	-21	-37%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	74	-21	-22%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	12	12	-	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	19	-10	-33%	0.0%	0.0%	100.0%
2.B. Chemical Industry	CH <sub>4</sub>	376	356	-20	-5%	0.0%	0.0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0.0%	0.0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	167	0	0%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	44	2	6%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	10	3	48%	0.0%	0.0%	100.0%
1.A.5. Other	N <sub>2</sub> O	300	294	-7	-2%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	132	-6	-5%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	43	0	1%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	146	-4	-2%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	3	-1	-22%	0.0%	0.0%	100.0%
2.G. Other	CH <sub>4</sub>	5	6	0	5%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%

**Level assessment for 1996**

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1996	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.093.426	-51.008	-4%	26,3%	26,3%
1.A.3. Transport	CO <sub>2</sub>	695.003	769.248	74.245	11%	18,5%	44,8%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	697.081	61.985	10%	16,8%	61,6%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	591.759	-50.589	-8%	14,2%	75,8%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	203.973	-10.516	-5%	4,9%	80,7%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	137.233	-6.858	-5%	3,3%	84,0%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	100.684	-5.412	-5%	2,4%	86,4%
2.A. Mineral Products	CO <sub>2</sub>	106.934	99.457	-7.477	-7%	2,4%	88,8%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	94.374	-16.608	-15%	2,3%	91,1%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.219	-952	-2%	1,1%	92,2%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	33.715	1.342	4%	0,8%	93,0%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	31.073	-1.896	-6%	0,7%	93,7%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	29.796	-18.714	-39%	0,7%	94,4%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.716	-1.987	-8%	0,6%	95,0%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.781	-1.714	-7%	0,5%	95,5%
1.A.3. Transport	N <sub>2</sub> O	11.660	19.746	8.086	69%	0,5%	96,0%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.256	-991	-6%	0,4%	96,4%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.895	288	2%	0,4%	96,8%
1.A.5. Other	CO <sub>2</sub>	20.076	11.866	-8.210	-41%	0,3%	97,0%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	11.079	-1.805	-14%	0,3%	97,3%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.670	-1.095	-10%	0,2%	97,5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	9.485	3.317	54%	0,2%	97,8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	9.305	-312	-3%	0,2%	98,0%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.423	-1.161	-12%	0,2%	98,2%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	8.198	-2.255	-22%	0,2%	98,4%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.356	-1.927	-21%	0,2%	98,6%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.285	-411	-5%	0,2%	98,7%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.648	-11	0%	0,2%	98,9%
2 C Metal Production	PFC	5.637	5.538	-99	-2%	0,1%	99,0%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.416	-1.076	-17%	0,1%	99,2%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.341	-726	-12%	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.034	-748	-16%	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.531	38	1%	0,1%	99,5%
2 C Metal Production	SF <sub>6</sub>	2.320	2.681	360	16%	0,1%	99,5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.557	254	11%	0,1%	99,6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.827	232	15%	0,0%	99,6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	1.818	-1.390	-43%	0,0%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.601	575	56%	0,0%	99,7%
2.G. Other	CO <sub>2</sub>	1.111	1.444	333	30%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.266	-33	-3%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.189	8	1%	0,0%	99,8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.100	-130	-11%	0,0%	99,8%
6.D. Other	CH <sub>4</sub>	801	1.065	264	33%	0,0%	99,9%
6.D. Other	CO <sub>2</sub>	881	1.056	175	20%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	752	48	7%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	699	58	9%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	532	9	2%	0,0%	99,9%
2.B. Chemical Industry	CH <sub>4</sub>	376	431	55	15%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	370	-74	-17%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	291	-10	-3%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	167	0	0%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	159	-256	-62%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	145	-4	-3%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	132	-6	-5%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	82	-181	-69%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	80	-15	-16%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	44	3	7%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	30	-27	-47%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	18	-10	-36%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	11	3	49%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	7	1	27%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-29%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%

# Trend assessment for 1996

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1996	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	769.248	74.245	11%	2.0%	24.5%	24.5%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	697.081	61.985	10%	1.7%	20.6%	45.1%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	591.759	-50.589	-8%	1.1%	13.1%	58.2%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144.434	1,093.426	-51.008	-4%	0.9%	11.6%	69.8%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	29.796	-18.714	-39%	0.4%	5.5%	75.2%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	94.374	-16.608	-15%	0.4%	4.6%	79.9%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	203.973	-10.516	-5%	0.2%	2.5%	82.3%
1.A.3. Transport	N <sub>2</sub> O	11.660	19.746	8.086	69%	0.2%	2.5%	84.8%
1.A.5. Other	CO <sub>2</sub>	20.076	11.866	-8.210	-41%	0.2%	2.4%	87.2%
2.A. Mineral Products	CO <sub>2</sub>	106.934	99.457	-7.477	-7%	0.2%	1.9%	89.1%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	137.233	-6.858	-5%	0.1%	1.6%	90.7%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	100.684	-5.412	-5%	0.1%	1.3%	92.0%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	9.485	3.317	54%	0.1%	1.0%	93.0%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	8.198	-2.255	-22%	0.1%	0.6%	93.6%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.356	-1.927	-21%	0.0%	0.5%	94.2%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.716	-1.987	-8%	0.0%	0.5%	94.7%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	33.715	1.342	4%	0.0%	0.5%	95.2%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	11.079	-1.805	-14%	0.0%	0.5%	95.7%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	31.073	-1.896	-6%	0.0%	0.5%	96.1%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.781	-1.714	-7%	0.0%	0.4%	96.6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	1.818	-1.390	-43%	0.0%	0.4%	97.0%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.423	-1.161	-12%	0.0%	0.3%	97.3%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.416	-1.076	-17%	0.0%	0.3%	97.6%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.670	-1.095	-10%	0.0%	0.3%	97.9%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.256	-991	-6%	0.0%	0.2%	98.1%
1.A.3. Transport	CH <sub>4</sub>	4.782	4.034	-748	-16%	0.0%	0.2%	98.3%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.341	-726	-12%	0.0%	0.2%	98.5%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.601	575	56%	0.0%	0.2%	98.7%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.219	-952	-2%	0.0%	0.1%	98.9%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.895	288	2%	0.0%	0.1%	99.0%
2 C Metal Production	SF <sub>6</sub>	2.320	2.681	360	16%	0.0%	0.1%	99.1%
2.G. Other	CO <sub>2</sub>	1.111	1.444	333	30%	0.0%	0.1%	99.2%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.285	-411	-5%	0.0%	0.1%	99.3%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.557	254	11%	0.0%	0.1%	99.4%
6.D. Other	CH <sub>4</sub>	801	1.065	264	33%	0.0%	0.1%	99.5%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	159	-256	-62%	0.0%	0.1%	99.6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.827	232	15%	0.0%	0.1%	99.6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	9.305	-312	-3%	0.0%	0.1%	99.7%
6.D. Other	CO <sub>2</sub>	881	1.056	175	20%	0.0%	0.1%	99.7%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	82	-181	-69%	0.0%	0.1%	99.8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.100	-130	-11%	0.0%	0.0%	99.8%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.531	38	1%	0.0%	0.0%	99.9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	370	-74	-17%	0.0%	0.0%	99.9%
7. Other	CO <sub>2</sub>	641	699	58	9%	0.0%	0.0%	99.9%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.648	-11	0%	0.0%	0.0%	99.9%
2.B. Chemical Industry	CH <sub>4</sub>	376	431	55	15%	0.0%	0.0%	99.9%
6.C. Waste Incineration	CH <sub>4</sub>	704	752	48	7%	0.0%	0.0%	99.9%
2 C Metal Production	PFC	5.637	5.538	-99	-2%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	30	-27	-47%	0.0%	0.0%	100.0%
7. Other	N <sub>2</sub> O	1.181	1.189	8	1%	0.0%	0.0%	100.0%
2.D. Other Production	CO <sub>2</sub>	1.299	1.266	-33	-3%	0.0%	0.0%	100.0%
6.C. Waste Incineration	N <sub>2</sub> O	522	532	9	2%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	80	-15	-16%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	18	-10	-36%	0.0%	0.0%	100.0%
1.A.5. Other	N <sub>2</sub> O	300	291	-10	-3%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	132	-6	-5%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	11	3	49%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	44	3	7%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	145	-4	-3%	0.0%	0.0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0.0%	0.0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	167	0	0%	0.0%	0.0%	100.0%
2.G. Other	CH <sub>4</sub>	5	7	1	27%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-29%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	42	-1	-2%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%

**Level assessment for 1997**

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1997	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.058.364	-86.070	-8%	25,9%	25,9%
1.A.3. Transport	CO <sub>2</sub>	695.003	778.309	83.306	12%	19,0%	44,9%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	650.014	14.918	2%	15,9%	60,8%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	602.615	-39.734	-6%	14,7%	75,5%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	205.198	-9.291	-4%	5,0%	80,5%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	135.464	-8.627	-6%	3,3%	83,8%
2.A. Mineral Products	CO <sub>2</sub>	106.934	102.528	-4.406	-4%	2,5%	86,3%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	96.468	-9.628	-9%	2,4%	88,7%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	90.387	-20.595	-19%	2,2%	90,9%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.530	-642	-1%	1,1%	92,0%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	36.217	3.844	12%	0,9%	92,9%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	29.738	-3.231	-10%	0,7%	93,6%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	27.960	-20.550	-42%	0,7%	94,3%
2.C. Metal Production	CO <sub>2</sub>	25.702	24.126	-1.576	-6%	0,6%	94,9%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.888	-1.607	-7%	0,5%	95,4%
1.A.3. Transport	N <sub>2</sub> O	11.660	20.964	9.304	80%	0,5%	95,9%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.778	-1.469	-9%	0,4%	96,3%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.628	22	0%	0,4%	96,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	12.743	6.575	107%	0,3%	97,0%
1.A.5. Other	CO <sub>2</sub>	20.076	10.769	-9.307	-46%	0,3%	97,2%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.742	-2.143	-17%	0,3%	97,5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	9.441	-176	-2%	0,2%	97,7%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.074	-1.690	-16%	0,2%	98,0%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.919	-664	-7%	0,2%	98,2%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.073	-1.210	-13%	0,2%	98,4%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.687	-2.766	-26%	0,2%	98,6%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.410	-286	-4%	0,2%	98,7%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.070	-590	-9%	0,1%	98,9%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.418	-1.074	-17%	0,1%	99,0%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.404	-663	-11%	0,1%	99,2%
2 C Metal Production	PFC	5.637	5.305	-332	-6%	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.818	-963	-20%	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.535	43	1%	0,1%	99,5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.541	238	10%	0,1%	99,5%
2 C Metal Production	SF <sub>6</sub>	2.320	2.463	142	6%	0,1%	99,6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.055	-1.153	-36%	0,1%	99,6%
2.G. Other	CO <sub>2</sub>	1.111	1.716	606	55%	0,0%	99,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.694	98	6%	0,0%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.624	598	58%	0,0%	99,8%
6.D. Other	CO <sub>2</sub>	881	1.245	364	41%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.181	-119	-9%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0,0%	99,8%
6.D. Other	CH <sub>4</sub>	801	1.173	372	46%	0,0%	99,9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.098	-132	-11%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	826	122	17%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	558	-82	-13%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	540	18	3%	0,0%	99,9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	386	-59	-13%	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	349	-27	-7%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	282	-18	-6%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	191	24	14%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	148	-268	-65%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	145	-5	-3%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	132	-7	-5%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	69	-26	-28%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	66	-198	-75%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	48	6	15%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	42	-1	-3%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	30	-28	-49%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	19	-10	-35%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	10	3	47%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	6	1	17%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-2	-45%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%

# Trend assessment for 1997

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1997	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	778.309	83.306	12%	2.6%	32.1%	32.1%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144,434	1,058,364	-86,070	-8%	1.4%	17.6%	49.7%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	650.014	14.918	2%	0.8%	10.0%	59.7%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642,348	602,615	-39,734	-6%	0.6%	7.2%	66.9%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	27.960	-20.550	-42%	0.5%	6.1%	73.0%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	90.387	-20.595	-19%	0.4%	5.6%	78.6%
1.A.3. Transport	N <sub>2</sub> O	11.660	20.964	9.304	80%	0.2%	3.0%	81.6%
1.A.5. Other	CO <sub>2</sub>	20.076	10.769	-9.307	-46%	0.2%	2.8%	84.4%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	96.468	-9.628	-9%	0.2%	2.2%	86.5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	12.743	6.575	107%	0.2%	2.1%	88.6%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	135.464	-8.627	-6%	0.1%	1.5%	90.2%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	36.217	3.844	12%	0.1%	1.5%	91.6%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	205.198	-9.291	-4%	0.1%	1.1%	92.8%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.687	-2.766	-26%	0.1%	0.8%	93.6%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	29.738	-3.231	-10%	0.1%	0.7%	94.3%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.742	-2.143	-17%	0.0%	0.6%	94.9%
2.A. Mineral Products	CO <sub>2</sub>	106.934	102.528	-4.406	-4%	0.0%	0.5%	95.4%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.074	-1.690	-16%	0.0%	0.4%	95.8%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.055	-1.153	-36%	0.0%	0.3%	96.2%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.778	-1.469	-9%	0.0%	0.3%	96.5%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.888	-1.607	-7%	0.0%	0.3%	96.8%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.073	-1.210	-13%	0.0%	0.3%	97.1%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.418	-1.074	-17%	0.0%	0.3%	97.4%
2.C. Metal Production	CO <sub>2</sub>	25.702	24.126	-1.576	-6%	0.0%	0.3%	97.7%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.818	-963	-20%	0.0%	0.3%	97.9%
2.G. Other	CO <sub>2</sub>	1.111	1.716	606	55%	0.0%	0.2%	98.1%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.624	598	58%	0.0%	0.2%	98.3%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.530	-642	-1%	0.0%	0.2%	98.5%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.404	-663	-11%	0.0%	0.2%	98.7%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.070	-590	-9%	0.0%	0.1%	98.8%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.919	-664	-7%	0.0%	0.1%	98.9%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	14.628	22	0%	0.0%	0.1%	99.1%
6.D. Other	CH <sub>4</sub>	801	1.173	372	46%	0.0%	0.1%	99.2%
6.D. Other	CO <sub>2</sub>	881	1.245	364	41%	0.0%	0.1%	99.3%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.541	238	10%	0.0%	0.1%	99.4%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	148	-268	-65%	0.0%	0.1%	99.5%
2 C Metal Production	SF <sub>6</sub>	2.320	2.463	142	6%	0.0%	0.1%	99.5%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	66	-198	-75%	0.0%	0.1%	99.6%
2 C Metal Production	PFC	5.637	5.305	-332	-6%	0.0%	0.1%	99.7%
6.C. Waste Incineration	CH <sub>4</sub>	704	826	122	17%	0.0%	0.0%	99.7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.694	98	6%	0.0%	0.0%	99.8%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.535	43	1%	0.0%	0.0%	99.8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.098	-132	-11%	0.0%	0.0%	99.8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.181	-119	-9%	0.0%	0.0%	99.9%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.410	-286	-4%	0.0%	0.0%	99.9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	9.441	-176	-2%	0.0%	0.0%	99.9%
7. Other	CO <sub>2</sub>	641	558	-82	-13%	0.0%	0.0%	99.9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	386	-59	-13%	0.0%	0.0%	99.9%
6.C. Waste Incineration	N <sub>2</sub> O	522	540	18	3%	0.0%	0.0%	99.9%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	191	24	14%	0.0%	0.0%	100.0%
7. Other	N <sub>2</sub> O	1.181	1.178	-3	0%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	30	-28	-49%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	69	-26	-28%	0.0%	0.0%	100.0%
2.B. Chemical Industry	CH <sub>4</sub>	376	349	-27	-7%	0.0%	0.0%	100.0%
1.A.5. Other	N <sub>2</sub> O	300	282	-18	-6%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	19	-10	-35%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	48	6	15%	0.0%	0.0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	10	3	47%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	132	-7	-5%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-2	-45%	0.0%	0.0%	100.0%
2.G. Other	CH <sub>4</sub>	5	6	1	17%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	145	-5	-3%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	42	-1	-3%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%

**Level assessment for 1998**

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1998	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.088.645	-55.789	-5%	26,5%	26,5%
1.A.3. Transport	CO <sub>2</sub>	695.003	802.558	107.555	15%	19,5%	45,9%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	650.818	15.723	2%	15,8%	61,8%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	598.874	-43.474	-7%	14,6%	76,3%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	203.993	-10.496	-5%	5,0%	81,3%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	134.664	-9.427	-7%	3,3%	84,5%
2.A. Mineral Products	CO <sub>2</sub>	106.934	104.698	-2.236	-2%	2,5%	87,1%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	87.315	-23.667	-21%	2,1%	89,2%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	73.243	-32.854	-31%	1,8%	91,0%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.939	-233	-1%	1,1%	92,1%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	37.080	4.707	15%	0,9%	93,0%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	29.488	-3.481	-11%	0,7%	93,7%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	24.937	-23.573	-49%	0,6%	94,3%
2.C. Metal Production	CO <sub>2</sub>	25.702	22.763	-2.940	-11%	0,6%	94,9%
1.A.3. Transport	N <sub>2</sub> O	11.660	22.577	10.917	94%	0,5%	95,4%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.826	-1.669	-7%	0,5%	95,9%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.210	-1.037	-6%	0,4%	96,3%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	15.777	9.610	156%	0,4%	96,7%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	15.227	621	4%	0,4%	97,1%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.877	-2.008	-16%	0,3%	97,3%
1.A.5. Other	CO <sub>2</sub>	20.076	9.736	-10.340	-52%	0,2%	97,6%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.252	-1.513	-14%	0,2%	97,8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	9.182	-435	-5%	0,2%	98,0%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.851	-732	-8%	0,2%	98,2%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.970	-1.314	-14%	0,2%	98,4%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.661	-2.792	-27%	0,2%	98,6%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.596	-100	-1%	0,2%	98,8%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	5.741	-919	-14%	0,1%	98,9%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.470	-1.022	-16%	0,1%	99,1%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.448	-619	-10%	0,1%	99,2%
2 C Metal Production	PFC	5.637	5.138	-499	-9%	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.698	-1.084	-23%	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.526	34	1%	0,1%	99,5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.419	116	5%	0,1%	99,6%
2 C Metal Production	SF <sub>6</sub>	2.320	2.182	-139	-6%	0,1%	99,6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.024	-1.184	-37%	0,0%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.660	634	62%	0,0%	99,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.548	-47	-3%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.205	-94	-7%	0,0%	99,8%
6.D. Other	CH <sub>4</sub>	801	1.199	399	50%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.184	3	0%	0,0%	99,8%
2.G. Other	CO <sub>2</sub>	1.111	1.140	30	3%	0,0%	99,9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.086	-145	-12%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	799	95	13%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	721	80	12%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	539	16	3%	0,0%	99,9%
6.D. Other	CO <sub>2</sub>	881	455	-426	-48%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	339	-105	-24%	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	316	-60	-16%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	215	48	29%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	157	-144	-48%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	147	-269	-65%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	144	-6	-4%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	130	-8	-6%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	65	-30	-31%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	59	-205	-78%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	46	5	11%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	41	-2	-6%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	27	-31	-54%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	19	-10	-34%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	30%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	8	3	50%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-30%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%

# Trend assessment for 1998

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1998	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	802.558	107.555	15%	3.0%	33.8%	33.8%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144,434	1,088,645	-55,789	-5%	0.8%	8.9%	42.7%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	73.243	-32.854	-31%	0.8%	8.5%	51.2%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642,348	598,874	-43,474	-7%	0.8%	8.4%	59.6%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	650.818	15.723	2%	0.7%	8.0%	67.6%
1.B.1. Solid Fuels	CH <sub>4</sub>	48,510	24,937	-23,573	-49%	0.6%	6.3%	73.9%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110,982	87,315	-23,667	-21%	0.5%	5.9%	79.8%
1.A.3. Transport	N <sub>2</sub> O	11,660	22,577	10,917	94%	0.3%	3.1%	82.9%
1.A.5. Other	CO <sub>2</sub>	20,076	9,736	-10,340	-52%	0.2%	2.8%	85.6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6,167	15,777	9,610	156%	0.2%	2.7%	88.3%
4.A. Enteric Fermentation	CH <sub>4</sub>	144,091	134,664	-9,427	-7%	0.2%	1.8%	90.1%
4.D. Agricultural Soils	N <sub>2</sub> O	214,489	203,993	-10,496	-5%	0.2%	1.7%	91.8%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32,373	37,080	4,707	15%	0.1%	1.5%	93.3%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32,969	29,488	-3,481	-11%	0.1%	0.8%	94.1%
1.A.4. Other Sectors	CH <sub>4</sub>	10,453	7,661	-2,792	-27%	0.1%	0.7%	94.8%
2.C. Metal Production	CO <sub>2</sub>	25,702	22,763	-2,940	-11%	0.1%	0.7%	95.5%
2.B. Chemical Industry	CO <sub>2</sub>	12,884	10,877	-2,008	-16%	0.0%	0.5%	95.9%
1.A.4. Other Sectors	N <sub>2</sub> O	10,765	9,252	-1,513	-14%	0.0%	0.4%	96.3%
4.B. Manure Management	N <sub>2</sub> O	23,495	21,826	-1,669	-7%	0.0%	0.3%	96.6%
1.B.1. Solid Fuels	CO <sub>2</sub>	9,283	7,970	-1,314	-14%	0.0%	0.3%	96.9%
4.D. Agricultural Soils	CO <sub>2</sub>	3,208	2,024	-1,184	-37%	0.0%	0.3%	97.2%
1.A.3. Transport	CH <sub>4</sub>	4,782	3,698	-1,084	-23%	0.0%	0.3%	97.5%
1.A.1. Energy Industries	N <sub>2</sub> O	14,606	15,227	621	4%	0.0%	0.3%	97.8%
6.B. Waste-water Handling	N <sub>2</sub> O	6,492	5,470	-1,022	-16%	0.0%	0.2%	98.0%
6.C. Waste Incineration	CO <sub>2</sub>	6,660	5,741	-919	-14%	0.0%	0.2%	98.2%
4.B. Manure Management	CH <sub>4</sub>	45,172	44,939	-233	-1%	0.0%	0.2%	98.4%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17,247	16,210	-1,037	-6%	0.0%	0.2%	98.6%
1.A.1. Energy Industries	CH <sub>4</sub>	1,026	1,660	634	62%	0.0%	0.2%	98.8%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9,583	8,851	-732	-8%	0.0%	0.1%	99.0%
3. Solvent and Other Product Use	CO <sub>2</sub>	6,067	5,448	-619	-10%	0.0%	0.1%	99.1%
6.D. Other	CH <sub>4</sub>	801	1,199	399	50%	0.0%	0.1%	99.2%
6.D. Other	CO <sub>2</sub>	881	455	-426	-48%	0.0%	0.1%	99.3%
2 C Metal Production	PFC	5,637	5,138	-499	-9%	0.0%	0.1%	99.4%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	147	-269	-65%	0.0%	0.1%	99.5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9,617	9,182	-435	-5%	0.0%	0.1%	99.6%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	59	-205	-78%	0.0%	0.1%	99.6%
4.C. Rice Cultivation	CH <sub>4</sub>	2,303	2,419	116	5%	0.0%	0.0%	99.7%
1.A.5. Other	N <sub>2</sub> O	300	157	-144	-48%	0.0%	0.0%	99.7%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1,231	1,086	-145	-12%	0.0%	0.0%	99.7%
6.C. Waste Incineration	CH <sub>4</sub>	704	799	95	13%	0.0%	0.0%	99.8%
3. Solvent and Other Product Use	N <sub>2</sub> O	3,492	3,526	34	1%	0.0%	0.0%	99.8%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	339	-105	-24%	0.0%	0.0%	99.8%
7. Other	CO <sub>2</sub>	641	721	80	12%	0.0%	0.0%	99.8%
2 C Metal Production	SF <sub>6</sub>	2,320	2,182	-139	-6%	0.0%	0.0%	99.9%
2.D. Other Production	CO <sub>2</sub>	1,299	1,205	-94	-7%	0.0%	0.0%	99.9%
6.B. Waste-water Handling	CH <sub>4</sub>	7,696	7,596	-100	-1%	0.0%	0.0%	99.9%
2.G. Other	CO <sub>2</sub>	1,111	1,140	30	3%	0.0%	0.0%	99.9%
2.B. Chemical Industry	CH <sub>4</sub>	376	316	-60	-16%	0.0%	0.0%	99.9%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	215	48	29%	0.0%	0.0%	99.9%
2.A. Mineral Products	CO <sub>2</sub>	106,934	104,698	-2,236	-2%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	27	-31	-54%	0.0%	0.0%	100.0%
7. Other	N <sub>2</sub> O	1,181	1,184	3	0%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	65	-30	-31%	0.0%	0.0%	100.0%
6.C. Waste Incineration	N <sub>2</sub> O	522	539	16	3%	0.0%	0.0%	100.0%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1,595	1,548	-47	-3%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	19	-10	-34%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	46	5	11%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	130	-8	-6%	0.0%	0.0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	175	0	0%	0.0%	0.0%	100.0%
2.G. Other	CH <sub>4</sub>	5	8	3	50%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	144	-6	-4%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	30%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	41	-2	-6%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-30%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%



**Level assessment for 1999**

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1999	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.070.061	-74.373	-6%	26,4%	26,4%
1.A.3. Transport	CO <sub>2</sub>	695.003	822.186	127.183	18%	20,3%	46,7%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	636.724	1.628	0%	15,7%	62,4%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	590.241	-52.108	-8%	14,6%	77,0%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	204.504	-9.985	-5%	5,0%	82,0%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	134.098	-9.993	-7%	3,3%	85,3%
2.A. Mineral Products	CO <sub>2</sub>	106.934	105.931	-1.003	-1%	2,6%	88,0%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	83.902	-27.080	-24%	2,1%	90,0%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	50.435	-55.662	-52%	1,2%	91,3%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.715	-457	-1%	1,1%	92,4%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	28.883	-4.086	-12%	0,7%	93,1%
1.A.3. Transport	N <sub>2</sub> O	11.660	23.999	12.339	106%	0,6%	93,7%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.640	-2.062	-8%	0,6%	94,3%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	22.359	-26.150	-54%	0,6%	94,8%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.816	-1.679	-7%	0,5%	95,4%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	21.152	-11.221	-35%	0,5%	95,9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	18.817	12.650	205%	0,5%	96,3%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.098	-1.150	-7%	0,4%	96,7%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	15.117	510	3%	0,4%	97,1%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.329	-2.556	-20%	0,3%	97,4%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.384	-1.380	-13%	0,2%	97,6%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.834	-749	-8%	0,2%	97,8%
1.A.5. Other	CO <sub>2</sub>	20.076	8.258	-11.819	-59%	0,2%	98,0%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.999	-1.285	-14%	0,2%	98,2%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.640	-2.813	-27%	0,2%	98,4%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.622	-74	-1%	0,2%	98,6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	7.224	-2.393	-25%	0,2%	98,8%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	5.749	-911	-14%	0,1%	98,9%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.485	-1.007	-16%	0,1%	99,1%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.435	-632	-10%	0,1%	99,2%
2 C Metal Production	PFC	5.637	4.667	-970	-17%	0,1%	99,3%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.538	-1.244	-26%	0,1%	99,4%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.502	9	0%	0,1%	99,5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.349	46	2%	0,1%	99,5%
2 C Metal Production	SF <sub>6</sub>	2.320	2.067	-253	-11%	0,1%	99,6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.007	-1.201	-37%	0,0%	99,6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.943	348	22%	0,0%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.902	876	85%	0,0%	99,7%
2.D. Other Production	CO <sub>2</sub>	1.299	1.296	-3	0%	0,0%	99,8%
6.D. Other	CH <sub>4</sub>	801	1.274	474	59%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.186	5	0%	0,0%	99,8%
2.G. Other	CO <sub>2</sub>	1.111	1.121	11	1%	0,0%	99,9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.104	-127	-10%	0,0%	99,9%
6.D. Other	CO <sub>2</sub>	881	1.022	141	16%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	811	107	15%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	751	110	17%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	543	20	4%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	324	-120	-27%	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	306	-70	-19%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	191	24	14%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	143	-6	-4%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	140	-276	-66%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	129	-171	-57%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	129	-10	-7%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	84	-91	-52%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	67	-28	-29%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	58	16	39%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	54	-209	-79%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	41	-2	-5%	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	23	-35	-61%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	17	-12	-42%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	11	11	-	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	33%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	6	1	15%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-35%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%

# Trend assessment for 1999

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	1999	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	822.186	127.183	18%	3.9%	36.2%	36.2%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	50.435	-55.662	-52%	1.3%	12.3%	48.5%
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.070.061	-74.373	-6%	0.9%	7.9%	56.4%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	590.241	-52.108	-8%	0.7%	6.9%	63.3%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	636.724	1.628	0%	0.6%	5.8%	69.2%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	22.359	-26.150	-54%	0.6%	5.8%	75.0%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	83.902	-27.080	-24%	0.6%	5.5%	80.4%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	18.817	12.650	205%	0.3%	3.1%	83.5%
1.A.3. Transport	N <sub>2</sub> O	11.660	23.999	12.339	106%	0.3%	3.0%	86.5%
1.A.5. Other	CO <sub>2</sub>	20.076	8.258	-11.819	-59%	0.3%	2.6%	89.2%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	21.152	-11.221	-35%	0.3%	2.4%	91.6%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	134.098	-9.993	-7%	0.1%	1.1%	92.7%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	28.883	-4.086	-12%	0.1%	0.7%	93.4%
2.A. Mineral Products	CO <sub>2</sub>	106.934	105.931	-1.003	-1%	0.1%	0.7%	94.1%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.640	-2.813	-27%	0.1%	0.6%	94.7%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	204.504	-9.985	-5%	0.1%	0.5%	95.2%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.329	-2.556	-20%	0.1%	0.5%	95.7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	7.224	-2.393	-25%	0.1%	0.5%	96.2%
4.B. Manure Management	CH <sub>4</sub>	45.172	44.715	-457	-1%	0.0%	0.3%	96.5%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.640	-2.062	-8%	0.0%	0.3%	96.7%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.007	-1.201	-37%	0.0%	0.3%	97.0%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.538	-1.244	-26%	0.0%	0.3%	97.3%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	15.117	510	3%	0.0%	0.2%	97.5%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.384	-1.380	-13%	0.0%	0.2%	97.7%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.999	-1.285	-14%	0.0%	0.2%	98.0%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.902	876	85%	0.0%	0.2%	98.2%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.816	-1.679	-7%	0.0%	0.2%	98.4%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.485	-1.007	-16%	0.0%	0.2%	98.6%
2 C Metal Production	PFC	5.637	4.667	-970	-17%	0.0%	0.2%	98.7%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	5.749	-911	-14%	0.0%	0.2%	98.9%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.098	-1.150	-7%	0.0%	0.1%	99.0%
6.D. Other	CH <sub>4</sub>	801	1.274	474	59%	0.0%	0.1%	99.2%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.435	-632	-10%	0.0%	0.1%	99.3%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	1.943	348	22%	0.0%	0.1%	99.3%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.834	-749	-8%	0.0%	0.1%	99.4%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	140	-276	-66%	0.0%	0.1%	99.5%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.622	-74	-1%	0.0%	0.0%	99.6%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	54	-209	-79%	0.0%	0.0%	99.6%
6.D. Other	CO <sub>2</sub>	881	1.022	141	16%	0.0%	0.0%	99.6%
2 C Metal Production	SF <sub>6</sub>	2.320	2.067	-253	-11%	0.0%	0.0%	99.7%
1.A.5. Other	N <sub>2</sub> O	300	129	-171	-57%	0.0%	0.0%	99.7%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.502	9	0%	0.0%	0.0%	99.8%
7. Other	CO <sub>2</sub>	641	751	110	17%	0.0%	0.0%	99.8%
6.C. Waste Incineration	CH <sub>4</sub>	704	811	107	15%	0.0%	0.0%	99.8%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.349	46	2%	0.0%	0.0%	99.8%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	324	-120	-27%	0.0%	0.0%	99.9%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	84	-91	-52%	0.0%	0.0%	99.9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.104	-127	-10%	0.0%	0.0%	99.9%
2.B. Chemical Industry	CH <sub>4</sub>	376	306	-70	-19%	0.0%	0.0%	99.9%
2.G. Other	CO <sub>2</sub>	1.111	1.121	11	1%	0.0%	0.0%	99.9%
7. Other	N <sub>2</sub> O	1.181	1.186	5	0%	0.0%	0.0%	99.9%
2.D. Other Production	CO <sub>2</sub>	1.299	1.296	-3	0%	0.0%	0.0%	100.0%
6.C. Waste Incineration	N <sub>2</sub> O	522	543	20	4%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	23	-35	-61%	0.0%	0.0%	100.0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	191	24	14%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	67	-28	-29%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	58	16	39%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	17	-12	-42%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	11	11	#DIV/0!	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	129	-10	-7%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	33%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-35%	0.0%	0.0%	100.0%
2.G. Other	CH <sub>4</sub>	5	6	1	15%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	143	-6	-4%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	41	-2	-5%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%

**Level assessment for 2000**

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	2000	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.102.660	-41.774	-4%	27,1%	27,1%
1.A.3. Transport	CO <sub>2</sub>	695.003	823.606	128.603	19%	20,3%	47,4%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	621.237	-13.858	-2%	15,3%	62,7%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	590.851	-51.498	-8%	14,5%	77,2%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	203.101	-11.388	-5%	5,0%	82,2%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	132.246	-11.846	-8%	3,3%	85,5%
2.A. Mineral Products	CO <sub>2</sub>	106.934	107.476	542	1%	2,6%	88,1%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	81.929	-29.053	-26%	2,0%	90,1%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	49.777	-56.319	-53%	1,2%	91,4%
4.B. Manure Management	CH <sub>4</sub>	45.172	45.076	-96	0%	1,1%	92,5%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	28.135	-4.834	-15%	0,7%	93,2%
1.A.3. Transport	N <sub>2</sub> O	11.660	24.873	13.213	113%	0,6%	93,8%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	24.801	18.634	302%	0,6%	94,4%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.976	-1.727	-7%	0,6%	95,0%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.349	-2.147	-9%	0,5%	95,5%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	18.995	-29.515	-61%	0,5%	96,0%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	18.203	-14.170	-44%	0,4%	96,4%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.880	-1.368	-8%	0,4%	96,8%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	15.297	691	5%	0,4%	97,2%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.781	-2.103	-16%	0,3%	97,4%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.345	-1.419	-13%	0,2%	97,7%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.500	-1.084	-11%	0,2%	97,9%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.764	-1.519	-16%	0,2%	98,1%
1.A.5. Other	CO <sub>2</sub>	20.076	7.625	-12.451	-62%	0,2%	98,3%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.532	-163	-2%	0,2%	98,5%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.254	-3.199	-31%	0,2%	98,6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	6.864	-2.753	-29%	0,2%	98,8%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.150	-510	-8%	0,2%	99,0%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.573	-919	-14%	0,1%	99,1%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.565	-502	-8%	0,1%	99,2%
2 C Metal Production	PFC	5.637	3.641	-1.996	-35%	0,1%	99,3%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.474	-18	-1%	0,1%	99,4%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.206	-1.576	-33%	0,1%	99,5%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.356	53	2%	0,1%	99,5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	2.205	610	38%	0,1%	99,6%
2 C Metal Production	SF <sub>6</sub>	2.320	2.189	-131	-6%	0,1%	99,6%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.023	-1.185	-37%	0,0%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.959	933	91%	0,0%	99,7%
6.D. Other	CH <sub>4</sub>	801	1.351	551	69%	0,0%	99,8%
2.G. Other	CO <sub>2</sub>	1.111	1.253	142	13%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.223	-77	-6%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.184	3	0%	0,0%	99,9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.123	-108	-9%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	759	55	8%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	730	90	14%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	550	27	5%	0,0%	99,9%
6.D. Other	CO <sub>2</sub>	881	420	-461	-52%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	369	-75	-17%	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	273	-103	-27%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	215	48	29%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	152	-264	-64%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-3	-2%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	135	-165	-55%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	134	-4	-3%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	93	-170	-65%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	85	-90	-52%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	51	-44	-46%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	50	8	20%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	40	-3	-7%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	34	34	-	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	22	-35	-61%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	17	-12	-43%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	27%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	6	0	5%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	3	-1	-29%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%

# Trend assessment for 2000

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	2000	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	823.606	128.603	19%	3.9%	37.7%	37.7%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	49.777	-56.319	-53%	1.3%	13.2%	50.9%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	590.851	-51.498	-8%	0.8%	7.6%	58.5%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	18.995	-29.515	-61%	0.7%	7.0%	65.4%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	81.929	-29.053	-26%	0.6%	6.3%	71.7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	24.801	18.634	302%	0.5%	4.7%	76.4%
1.A.3. Transport	N <sub>2</sub> O	11.660	24.873	13.213	113%	0.3%	3.4%	79.8%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	18.203	-14.170	-44%	0.3%	3.3%	83.1%
1.A.5. Other	CO <sub>2</sub>	20.076	7.625	-12.451	-62%	0.3%	2.9%	86.0%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	132.246	-11.846	-8%	0.2%	1.8%	87.8%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	621.237	-13.858	-2%	0.2%	1.8%	89.5%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	203.101	-11.388	-5%	0.1%	1.1%	90.6%
2.A. Mineral Products	CO <sub>2</sub>	106.934	107.476	542	1%	0.1%	1.0%	91.6%
1.A.1. Energy Industries	CO <sub>2</sub>	1,144.434	1,102.660	-41.774	-4%	0.1%	1.0%	92.6%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	28.135	-4.834	-15%	0.1%	0.9%	93.6%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.254	-3.199	-31%	0.1%	0.7%	94.3%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	6.864	-2.753	-29%	0.1%	0.6%	94.9%
2 C Metal Production	PFC	5.637	3.641	-1.996	-35%	0.0%	0.5%	95.3%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.781	-2.103	-16%	0.0%	0.4%	95.8%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.206	-1.576	-33%	0.0%	0.4%	96.1%
4.B. Manure Management	CH <sub>4</sub>	45.172	45.076	-96	0%	0.0%	0.3%	96.5%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.349	-2.147	-9%	0.0%	0.3%	96.8%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	7.764	-1.519	-16%	0.0%	0.3%	97.1%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	15.297	691	5%	0.0%	0.3%	97.4%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	2.023	-1.185	-37%	0.0%	0.3%	97.7%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.345	-1.419	-13%	0.0%	0.3%	97.9%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	1.959	933	91%	0.0%	0.2%	98.2%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.976	-1.727	-7%	0.0%	0.2%	98.4%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	15.880	-1.368	-8%	0.0%	0.2%	98.6%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.500	-1.084	-11%	0.0%	0.2%	98.8%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.573	-919	-14%	0.0%	0.2%	99.0%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	2.205	610	38%	0.0%	0.2%	99.1%
6.D. Other	CH <sub>4</sub>	801	1.351	551	69%	0.0%	0.1%	99.3%
6.D. Other	CO <sub>2</sub>	881	420	-461	-52%	0.0%	0.1%	99.4%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.565	-502	-8%	0.0%	0.1%	99.4%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.150	-510	-8%	0.0%	0.1%	99.5%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	152	-264	-64%	0.0%	0.1%	99.6%
2.G. Other	CO <sub>2</sub>	1.111	1.253	142	13%	0.0%	0.0%	99.6%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	93	-170	-65%	0.0%	0.0%	99.7%
1.A.5. Other	N <sub>2</sub> O	300	135	-165	-55%	0.0%	0.0%	99.7%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.356	53	2%	0.0%	0.0%	99.7%
7. Other	CO <sub>2</sub>	641	730	90	14%	0.0%	0.0%	99.8%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.474	-18	-1%	0.0%	0.0%	99.8%
2.B. Chemical Industry	CH <sub>4</sub>	376	273	-103	-27%	0.0%	0.0%	99.8%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.532	-163	-2%	0.0%	0.0%	99.8%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	85	-90	-52%	0.0%	0.0%	99.9%
6.C. Waste Incineration	CH <sub>4</sub>	704	759	55	8%	0.0%	0.0%	99.9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.123	-108	-9%	0.0%	0.0%	99.9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	369	-75	-17%	0.0%	0.0%	99.9%
2 C Metal Production	SF <sub>6</sub>	2.320	2.189	-131	-6%	0.0%	0.0%	99.9%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	215	48	29%	0.0%	0.0%	99.9%
6.C. Waste Incineration	N <sub>2</sub> O	522	550	27	5%	0.0%	0.0%	99.9%
7. Other	N <sub>2</sub> O	1.181	1.184	3	0%	0.0%	0.0%	100.0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	51	-44	-46%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	34	34	-	0.0%	0.0%	100.0%
2.D. Other Production	CO <sub>2</sub>	1.299	1.223	-77	-6%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	22	-35	-61%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	17	-12	-43%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	50	8	20%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	9	2	27%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-3	-2%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	40	-3	-7%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	3	-1	-29%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	134	-4	-3%	0.0%	0.0%	100.0%
2.G. Other	CH <sub>4</sub>	5	6	0	5%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%

**Level assessment for 2001**

GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	2001	Absolute change	% change	Level assessment	Cumulative total
		(Gg)					
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.119.301	-25.133	-2%	27,2%	27,2%
1.A.3. Transport	CO <sub>2</sub>	695.003	833.925	138.922	20%	20,3%	47,5%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	655.763	20.667	3%	16,0%	63,5%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	585.160	-57.189	-9%	14,2%	77,8%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	196.818	-17.670	-8%	4,8%	82,5%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	131.631	-12.460	-9%	3,2%	85,7%
2.A. Mineral Products	CO <sub>2</sub>	106.934	105.952	-982	-1%	2,6%	88,3%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	80.295	-30.687	-28%	2,0%	90,3%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	49.167	-56.929	-54%	1,2%	91,5%
4.B. Manure Management	CH <sub>4</sub>	45.172	45.268	97	0%	1,1%	92,6%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	31.383	25.216	409%	0,8%	93,3%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	28.338	-4.631	-14%	0,7%	94,0%
1.A.3. Transport	N <sub>2</sub> O	11.660	26.361	14.701	126%	0,6%	94,7%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.856	-1.847	-7%	0,6%	95,3%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.562	-1.933	-8%	0,5%	95,8%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.377	-870	-5%	0,4%	96,2%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	16.040	1.434	10%	0,4%	96,6%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	15.277	-33.233	-69%	0,4%	96,9%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	11.957	-20.416	-63%	0,3%	97,2%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.769	-2.116	-16%	0,3%	97,5%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.531	-1.234	-11%	0,2%	97,7%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.082	-1.502	-16%	0,2%	97,9%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.081	-1.202	-13%	0,2%	98,1%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.739	-2.713	-26%	0,2%	98,3%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.384	-312	-4%	0,2%	98,5%
1.A.5. Other	CO <sub>2</sub>	20.076	7.307	-12.770	-64%	0,2%	98,7%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	6.543	-3.074	-32%	0,2%	98,8%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.065	-594	-9%	0,1%	99,0%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.579	-913	-14%	0,1%	99,1%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.389	-678	-11%	0,1%	99,2%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.382	-110	-3%	0,1%	99,3%
2 C Metal Production	PFC	5.637	3.100	-2.537	-45%	0,1%	99,4%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.049	-1.733	-36%	0,1%	99,5%
2 C Metal Production	SF <sub>6</sub>	2.320	2.751	431	19%	0,1%	99,5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	2.347	751	47%	0,1%	99,6%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.339	36	2%	0,1%	99,7%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	2.095	1.069	104%	0,1%	99,7%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	1.946	-1.262	-39%	0,0%	99,7%
6.D. Other	CH <sub>4</sub>	801	1.398	597	75%	0,0%	99,8%
2.G. Other	CO <sub>2</sub>	1.111	1.295	184	17%	0,0%	99,8%
7. Other	N <sub>2</sub> O	1.181	1.184	3	0%	0,0%	99,8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.168	-131	-10%	0,0%	99,9%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.111	-120	-10%	0,0%	99,9%
6.C. Waste Incineration	CH <sub>4</sub>	704	740	37	5%	0,0%	99,9%
7. Other	CO <sub>2</sub>	641	690	50	8%	0,0%	99,9%
6.C. Waste Incineration	N <sub>2</sub> O	522	493	-29	-6%	0,0%	99,9%
6.D. Other	CO <sub>2</sub>	881	420	-461	-52%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	367	-77	-17%	0,0%	100,0%
2.B. Chemical Industry	CH <sub>4</sub>	376	263	-113	-30%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	239	72	43%	0,0%	100,0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-3	-2%	0,0%	100,0%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	146	-269	-65%	0,0%	100,0%
2.C. Metal Production	CH <sub>4</sub>	138	120	-18	-13%	0,0%	100,0%
1.A.5. Other	N <sub>2</sub> O	300	94	-207	-69%	0,0%	100,0%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	91	-172	-65%	0,0%	100,0%
2.G. Other	N <sub>2</sub> O	41	81	39	95%	0,0%	100,0%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	81	-95	-54%	0,0%	100,0%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	50	-45	-48%	0,0%	100,0%
7. Other	CH <sub>4</sub>	43	39	-4	-10%	0,0%	100,0%
6.D. Other	N <sub>2</sub> O	0	34	34	-	0,0%	100,0%
1.A.5. Other	CH <sub>4</sub>	57	21	-36	-63%	0,0%	100,0%
2.A. Mineral Products	CH <sub>4</sub>	29	16	-13	-46%	0,0%	100,0%
2.G. Other	CH <sub>4</sub>	5	6	1	17%	0,0%	100,0%
2.C. Metal Production	N <sub>2</sub> O	7	4	-4	-50%	0,0%	100,0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-1	-34%	0,0%	100,0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	HFC	0	0	0	0%	0,0%	100,0%
2 B Chemical Industry	PFC	0	0	0	0%	0,0%	100,0%

# Trend assessment for 2001

Trend assessment for 2001								
GREENHOUSE GAS SOURCE CATEGORIES	Gas	Base year	2001	Absolute change	% change	Trend assessment	Percentage contribution to Trend	Cumulative Total
		(Gg)						
1.A.3. Transport	CO <sub>2</sub>	695.003	833.925	138.922	20%	3.8%	32.4%	32.4%
2.B. Chemical Industry	N <sub>2</sub> O	106.096	49.167	-56.929	-54%	1.4%	11.5%	43.9%
1.A.2. Manufacturing Industries and Construction	CO <sub>2</sub>	642.348	585.160	-57.189	-9%	1.1%	9.0%	52.9%
1.A.4. Other Sectors	CO <sub>2</sub>	635.096	655.763	20.667	3%	0.9%	7.3%	60.2%
1.B.1. Solid Fuels	CH <sub>4</sub>	48.510	15.277	-33.233	-69%	0.8%	6.8%	67.0%
6.A. Solid Waste Disposal on Land	CH <sub>4</sub>	110.982	80.295	-30.687	-28%	0.7%	5.9%	72.9%
2 F Consumption of Halocarbons and SF <sub>6</sub>	HFC	6.167	31.383	25.216	409%	0.6%	5.3%	78.2%
2 E Production of Halocarbons and SF <sub>6</sub>	HFC	32.373	11.957	-20.416	-63%	0.5%	4.1%	82.3%
1.A.3. Transport	N <sub>2</sub> O	11.660	26.361	14.701	126%	0.4%	3.1%	85.5%
4.D. Agricultural Soils	N <sub>2</sub> O	214.489	196.818	-17.670	-8%	0.3%	2.7%	88.2%
1.A.5. Other	CO <sub>2</sub>	20.076	7.307	-12.770	-64%	0.3%	2.6%	90.8%
4.A. Enteric Fermentation	CH <sub>4</sub>	144.091	131.631	-12.460	-9%	0.2%	1.9%	92.7%
1.B.2. Oil and Natural Gas	CH <sub>4</sub>	32.969	28.338	-4.631	-14%	0.1%	0.8%	93.5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	9.617	6.543	-3.074	-32%	0.1%	0.6%	94.1%
1.A.4. Other Sectors	CH <sub>4</sub>	10.453	7.739	-2.713	-26%	0.1%	0.5%	94.7%
2 C Metal Production	PFC	5.637	3.100	-2.537	-45%	0.1%	0.5%	95.2%
2.B. Chemical Industry	CO <sub>2</sub>	12.884	10.769	-2.116	-16%	0.0%	0.4%	95.5%
1.A.1. Energy Industries	N <sub>2</sub> O	14.606	16.040	1.434	10%	0.0%	0.4%	95.9%
1.A.3. Transport	CH <sub>4</sub>	4.782	3.049	-1.733	-36%	0.0%	0.3%	96.3%
2.A. Mineral Products	CO <sub>2</sub>	106.934	105.952	-982	-1%	0.0%	0.3%	96.6%
4.B. Manure Management	N <sub>2</sub> O	23.495	21.562	-1.933	-8%	0.0%	0.3%	96.9%
1.A.2. Manufacturing Industries and Construction	N <sub>2</sub> O	9.583	8.082	-1.502	-16%	0.0%	0.3%	97.1%
2.C. Metal Production	CO <sub>2</sub>	25.702	23.856	-1.847	-7%	0.0%	0.3%	97.4%
4.D. Agricultural Soils	CO <sub>2</sub>	3.208	1.946	-1.262	-39%	0.0%	0.3%	97.6%
4.B. Manure Management	CH <sub>4</sub>	45.172	45.268	97	0%	0.0%	0.2%	97.9%
1.A.1. Energy Industries	CH <sub>4</sub>	1.026	2.095	1.069	104%	0.0%	0.2%	98.1%
1.B.1. Solid Fuels	CO <sub>2</sub>	9.283	8.081	-1.202	-13%	0.0%	0.2%	98.3%
1.A.4. Other Sectors	N <sub>2</sub> O	10.765	9.531	-1.234	-11%	0.0%	0.2%	98.5%
2 F Consumption of Halocarbons and SF <sub>6</sub>	PFC	1.595	2.347	751	47%	0.0%	0.2%	98.7%
6.B. Waste-water Handling	N <sub>2</sub> O	6.492	5.579	-913	-14%	0.0%	0.2%	98.8%
6.D. Other	CH <sub>4</sub>	801	1.398	597	75%	0.0%	0.1%	99.0%
3. Solvent and Other Product Use	CO <sub>2</sub>	6.067	5.389	-678	-11%	0.0%	0.1%	99.1%
1.A.1. Energy Industries	CO <sub>2</sub>	1.144.434	1.119.301	-25.133	-2%	0.0%	0.1%	99.2%
1.B.2. Oil and Natural Gas	CO <sub>2</sub>	17.247	16.377	-870	-5%	0.0%	0.1%	99.3%
2 C Metal Production	SF <sub>6</sub>	2.320	2.751	431	19%	0.0%	0.1%	99.4%
6.C. Waste Incineration	CO <sub>2</sub>	6.660	6.065	-594	-9%	0.0%	0.1%	99.5%
6.D. Other	CO <sub>2</sub>	881	420	-461	-52%	0.0%	0.1%	99.6%
4.F. Field Burning of Agricultural Residues	CH <sub>4</sub>	416	146	-269	-65%	0.0%	0.1%	99.6%
2.G. Other	CO <sub>2</sub>	1.111	1.295	184	17%	0.0%	0.0%	99.7%
1.A.5. Other	N <sub>2</sub> O	300	94	-207	-69%	0.0%	0.0%	99.7%
6.A. Solid Waste Disposal on Land	CO <sub>2</sub>	263	91	-172	-65%	0.0%	0.0%	99.8%
6.B. Waste-water Handling	CH <sub>4</sub>	7.696	7.384	-312	-4%	0.0%	0.0%	99.8%
2.B. Chemical Industry	CH <sub>4</sub>	376	263	-113	-30%	0.0%	0.0%	99.8%
2.D. Other Production	CO <sub>2</sub>	1.299	1.168	-131	-10%	0.0%	0.0%	99.8%
1.A.2. Manufacturing Industries and Construction	CH <sub>4</sub>	1.231	1.111	-120	-10%	0.0%	0.0%	99.9%
2 E Production of Halocarbons and SF <sub>6</sub>	PFC	175	81	-95	-54%	0.0%	0.0%	99.9%
4.C. Rice Cultivation	CH <sub>4</sub>	2.303	2.339	36	2%	0.0%	0.0%	99.9%
2 E Production of Halocarbons and SF <sub>6</sub>	SF <sub>6</sub>	167	239	72	43%	0.0%	0.0%	99.9%
4.F. Field Burning of Agricultural Residues	N <sub>2</sub> O	444	367	-77	-17%	0.0%	0.0%	99.9%
7. Other	CO <sub>2</sub>	641	690	50	8%	0.0%	0.0%	99.9%
6.C. Waste Incineration	CH <sub>4</sub>	704	740	37	5%	0.0%	0.0%	99.9%
1.B.2. Oil and Natural Gas	N <sub>2</sub> O	95	50	-45	-48%	0.0%	0.0%	100.0%
2.G. Other	N <sub>2</sub> O	41	81	39	95%	0.0%	0.0%	100.0%
1.A.5. Other	CH <sub>4</sub>	57	21	-36	-63%	0.0%	0.0%	100.0%
6.D. Other	N <sub>2</sub> O	0	34	34	-	0.0%	0.0%	100.0%
3. Solvent and Other Product Use	N <sub>2</sub> O	3.492	3.382	-110	-3%	0.0%	0.0%	100.0%
7. Other	N <sub>2</sub> O	1.181	1.184	3	0%	0.0%	0.0%	100.0%
6.C. Waste Incineration	N <sub>2</sub> O	522	493	-29	-6%	0.0%	0.0%	100.0%
2.C. Metal Production	CH <sub>4</sub>	138	120	-18	-13%	0.0%	0.0%	100.0%
2.A. Mineral Products	CH <sub>4</sub>	29	16	-13	-46%	0.0%	0.0%	100.0%
2.C. Metal Production	N <sub>2</sub> O	7	4	-4	-50%	0.0%	0.0%	100.0%
7. Other	CH <sub>4</sub>	43	39	-4	-10%	0.0%	0.0%	100.0%
1.B.1. Solid Fuels	N <sub>2</sub> O	4	2	-2	-34%	0.0%	0.0%	100.0%
2.G. Other	CH <sub>4</sub>	5	6	1	17%	0.0%	0.0%	100.0%
4.D. Agricultural Soils	CH <sub>4</sub>	150	147	-3	-2%	0.0%	0.0%	100.0%
2.A. Mineral Products	N <sub>2</sub> O	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	HFC	0	0	0	0%	0.0%	0.0%	100.0%
2 B Chemical Industry	PFC	0	0	0	0%	0.0%	0.0%	100.0%

## Annex 2: CRF Tables of the European Community

The following tables are included in this report in printed form:

CRF Tables		Years
Summary 1.A	Summary report for national GHG inventories	2001
Summary 1.B	Short summary report for national GHG inventories	2001
Summary 2	Summary report for CO <sub>2</sub> equivalent emissions	2001
Summary 3	Summary report for methods and emission factors used	2001
Table 1.A(b)	CO <sub>2</sub> from fuel combustion activities - Reference approach	2000
Table 1.A(c)	Comparison of CO <sub>2</sub> emissions from fossil fuel combustion	2000
Table 1.A(d)	Feedstocks and Non-Energy Use of Fuels	2000
Table 7	Overview table for national GHG inventories	2001
Table 8(a)	Recalculation - Recalculated data	2000
Table 10	Emission trends	2001
Table 11	Check list of reported inventory information	2001

These tables and also all other CRF tables are available electronically on CD-ROM and on the EEA website. For the completeness of the EC GHG submission see Chapter 1.8.

**SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)**

(Sheet 1 of 3)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO <sub>2</sub>	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs <sup>(1)</sup>		PFCs <sup>(1)</sup>		SF <sub>6</sub>		NO <sub>x</sub>	CO	NM VOC	SO <sub>2</sub>
		emissions	removals			P	A	P	A	P	A				
		(Gg)				CO <sub>2</sub> equivalent (Gg)				(Gg)					
<b>Total National Emissions and Removals</b>		<b>3.383,555,51</b>	<b>-203.481,41</b>	<b>15.694,67</b>	<b>1.111,27</b>	<b>NE</b>	<b>43.383,02</b>	<b>NE</b>	<b>5.527,39</b>	<b>NE</b>	<b>0,40</b>	<b>9.941,50</b>	<b>30.117,96</b>	<b>12.013,59</b>	<b>5.963,15</b>
<b>1. Energy</b>		<b>3.225.913,21</b>		<b>2.744,26</b>	<b>194,06</b>							<b>9.749,31</b>	<b>26.647,80</b>	<b>4.787,76</b>	<b>5.728,74</b>
A. Fuel Combustion	Reference Approach <sup>(2)</sup>	NE													
	Sectoral Approach <sup>(2)</sup>	3.201.454,86		667,37	193,89							9.723,29	26.566,94	3.981,39	5.512,12
1. Energy Industries		1.119.300,79		99,77	51,74							1.802,23	423,55	62,79	3.677,54
2. Manufacturing Industries and Construction		585.159,69		52,89	26,07							1.307,57	3.299,66	129,94	1.116,27
3. Transport		833.924,92		145,17	85,04							5.307,76	16.470,16	2.897,20	284,79
4. Other Sectors		655.762,94		368,54	30,74							1.266,00	6.276,39	883,06	424,30
5. Other		7.306,51		1,00	0,30							39,73	97,18	8,41	9,22
B. Fugitive Emissions from Fuels		24.458,35		2.076,89	0,17							26,01	80,86	806,37	216,62
1. Solid Fuels		8.081,14		727,47	0,01							1,14	45,22	5,79	7,28
2. Oil and Natural Gas		16.377,21		1.349,42	0,16							24,87	35,64	800,58	209,34
<b>2. Industrial Processes</b>		<b>143.039,73</b>		<b>19,28</b>	<b>158,88</b>	<b>NE</b>	<b>43.383,02</b>	<b>NE</b>	<b>5.527,39</b>	<b>NE</b>	<b>0,40</b>	<b>85,30</b>	<b>2.482,43</b>	<b>862,08</b>	<b>225,65</b>
A. Mineral Products		105.952,22		0,75	0,00							12,61	20,63	283,20	42,73
B. Chemical Industry		10.768,73		12,51	158,60	NE	0,00	NE	0,00	NE	0,00	31,03	159,83	278,01	87,79
C. Metal Production		23.855,58		5,72	0,01				3.099,94		0,12	18,72	2.182,68	16,75	60,65
D. Other Production <sup>(3)</sup>		1.168,49										16,36	19,41	268,46	15,59
E. Production of Halocarbons and SF <sub>6</sub>							11.956,85		80,50		0,01				
F. Consumption of Halocarbons and SF <sub>6</sub>						NE	31.383,12	NE	2.346,95	NE	0,27				
G. Other		1.294,72		0,30	0,26	NE	43,06	NE	0,00	NE	0,00	0,00	0,00	15,67	0,00

P = Potential emissions based on Tier 1 approach of the IPCC Guidelines.

A = Actual emissions based on Tier 2 approach of the IPCC Guidelines.

<sup>(1)</sup> The emissions of HFCs and PFCs are to be expressed as CO<sub>2</sub> equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II) of this common reporting format.

<sup>(2)</sup> For verification purposes, countries are asked to report the results of their calculations using the Reference approach and to explain any differences with the Sectoral approach. Where possible, the calculation using the Sectoral approach should be used for estimating national totals. Do not include the results of both the Reference approach and the Sectoral approach in national totals.

<sup>(3)</sup> Other Production includes Pulp and Paper and Food and Drink Production

**Note:** The numbering of footnotes to all tables containing more than one sheet continue to the next sheet. Common footnotes are given only once at the first point of reference



**SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)**

(Sheet 2 of 3)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub>	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs <sup>(1)</sup>		PFCs <sup>(1)</sup>		SF <sub>6</sub>		NO <sub>x</sub>	CO	NM VOC	SO <sub>2</sub>
	emissions	removals			P	A	P	A	P	A				
	(Gg)				CO <sub>2</sub> equivalent (Gg)				(Gg)					
<b>3. Solvent and Other Product Use</b>	5,389,26			10,91							0,00	0,00	3,561,14	0,00
<b>4. Agriculture</b>	1,945,79	0,00	8,549,12	705,64							66,22	146,25	542,55	0,00
A. Enteric Fermentation			6,268,15											
B. Manure Management			2,155,62	69,55									0,65	
C. Rice Cultivation			111,40										0,09	
D. Agricultural Soils	<sup>(4)</sup> 1945,79	<sup>(4)</sup> 0,00	6,98	634,90							25,57		532,53	
E. Prescribed Burning of Savannas			0,00	0,00							0,00	0,00	0,00	
F. Field Burning of Agricultural Residues			6,97	1,18							40,65	146,25	9,28	
G. Other			0,00	0,00							0,00	0,00	0,00	0,00
<b>5. Land-Use Change and Forestry</b>	<sup>(5)</sup> 0,00	<sup>(5)</sup> -203,481,41	103,13	18,27							4,46	80,87	2,162,46	0,00
A. Changes in Forest and Other Woody Biomass Stocks	<sup>(5)</sup> 0,00	<sup>(5)</sup> -237,225,46												
B. Forest and Grassland Conversion	10,518,25		16,42	0,86							2,30	80,87	0,00	
C. Abandonment of Managed Lands	<sup>(5)</sup> 0,00	<sup>(5)</sup> -201,58												
D. CO <sub>2</sub> Emissions and Removals from Soil	<sup>(5)</sup> 23,842,10	<sup>(5)</sup> -169,40												
E. Other	<sup>(5)</sup> 0,00	<sup>(5)</sup> -245,32	86,70	17,41							2,17	0,00	2,162,46	0,00
<b>6. Waste</b>	6,577,07		4,277,04	19,70							36,13	758,63	97,60	8,74
A. Solid Waste Disposal on Land	<sup>(6)</sup> 91,28		3,823,59									16,77	26,00	
B. Wastewater Handling			351,62	18,00							0,00	0,00	4,51	
C. Waste Incineration	<sup>(6)</sup> 6,065,40		35,26	1,59							33,64	740,46	47,50	8,13
D. Other	420,39		66,57	0,11							2,49	1,40	19,60	0,61
<b>7. Other (please specify)</b>	690,44	0,00	1,85	3,82	0,00	0,03	0,00	0,00	0,00	0,00	0,07	1,98	0,00	0,02

<sup>(4)</sup> 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).

<sup>(5)</sup> Please do not provide an estimate of both CO<sub>2</sub> emissions and CO<sub>2</sub> removals. "Net" emissions (emissions - removals) of CO<sub>2</sub> should be estimated and a single number placed in either the CO<sub>2</sub> emissions or CO<sub>2</sub> removals column, as appropriate. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).

<sup>(6)</sup> Note that CO<sub>2</sub> from Waste Disposal and Incineration source categories should only be included if it stems from non-biogenic or inorganic waste streams.

**SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)**  
**(Sheet 3 of 3)**

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub> emissions	CO <sub>2</sub> removals	CH <sub>4</sub>	N <sub>2</sub> O	HFCs		PFCs		SF <sub>6</sub>		NO <sub>x</sub>	CO	NMVOC	SO <sub>2</sub>
					P	A	P	A	P	A				
	(Gg)				CO <sub>2</sub> equivalent (Gg)				(Gg)					
<b>Memo Items:</b> <sup>(7)</sup>														
<b>International Bunkers</b>	236.170,78		14,40	14,99							1.909,87	365,56	225,63	1.145,71
Aviation	102.220,54		5,40	2,19							403,48	244,30	92,41	21,52
Marine	133.950,23		9,00	12,80							1.506,40	121,26	133,22	1.124,19
<b>Multilateral Operations</b>	0,00		0,00	0,00							0,00	0,00	0,00	0,00
<b>CO<sub>2</sub> Emissions from Biomass</b>	165.707,78													

<sup>(7)</sup> Memo Items are not included in the national totals.

**SUMMARY 1.B SHORT SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7B)**

(Sheet 1 of 1)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO <sub>2</sub> emissions	CO <sub>2</sub> removals	CH <sub>4</sub>	N <sub>2</sub> O	HFCs <sup>(1)</sup>		PFCs <sup>(1)</sup>		SF <sub>6</sub>		NO <sub>x</sub>	CO	NMVOC	SO <sub>2</sub>
						P	A	P	A	P	A				
		(Gg)					CO <sub>2</sub> equivalent (Gg)				(Gg)				
Total National Emissions and Removals		3.383.555,51	-203.481,41	15.694,67	1.111,27	NE	43.383,02	NE	5.527,39	NE	0,40	9.941,50	30.117,96	12.013,59	5.963,15
1. Energy		3.225.913,21		2.744,26	194,06							9.749,31	26.647,80	4.787,76	5.728,74
A. Fuel Combustion	Reference Approach <sup>(2)</sup>	NE													
	Sectoral Approach <sup>(2)</sup>	3.201.454,86		667,37	193,89							9.723,29	26.566,94	3.981,39	5.512,12
B. Fugitive Emissions from Fuels		24.458,35		2.076,89	0,17							26,01	80,86	806,37	216,62
2. Industrial Processes		143.039,73		19,28	158,88	NE	43.383,02	NE	5.527,39	NE	0,40	85,30	2.482,43	862,08	225,65
3. Solvent and Other Product Use		5.389,26			10,91							0,00	0,00	3.561,14	0,00
4. Agriculture <sup>(3)</sup>		1.945,79	0,00	8.549,12	705,64							66,22	146,25	542,55	0,00
5. Land-Use Change and Forestry <sup>(4)</sup>		0,00	-203.481,41	103,13	18,27							4,46	80,87	2.162,46	0,00
6. Waste		6.577,07		4.277,04	19,70							36,13	758,63	97,60	8,74
7. Other		690,44	0,00	1,85	3,82	0,00	0,03	0,00	0,00	0,00	0,00	0,07	1,98	0,00	0,02
Memo Items:															
International Bunkers		236.170,78		14,40	14,99							1.909,87	365,56	225,63	1.145,71
Aviation		102.220,54		5,40	2,19							403,48	244,30	92,41	21,52
Marine		133.950,23		9,00	12,80							1.506,40	121,26	133,22	1.124,19
Multilateral Operations		0,00		0,00	0,00							0,00	0,00	0,00	0,00
CO <sub>2</sub> Emissions from Biomass		165.707,78													

P = Potential emissions based on Tier 1 approach of the IPCC Guidelines.

A = Actual emissions based on Tier 2 approach of the IPCC Guidelines.

<sup>(1)</sup> The emissions of HFCs and PFCs are to be expressed as CO<sub>2</sub> equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II) of this common reporting format.

<sup>(2)</sup> For verification purposes, countries are asked to report the results of their calculations using the Reference approach and to explain any differences with the Sectoral approach in document box of Table 1.A(c). Where possible, the calculations using the Sectoral approach should be used for estimating national totals. Do not include the results of both the Reference approach and the Sectoral approach in national totals.

<sup>(3)</sup> See footnote 4 to Summary 1.A.

<sup>(4)</sup> Please do not provide an estimate of both CO<sub>2</sub> emissions and CO<sub>2</sub> removals. "Net" emissions (emissions - removals) of CO<sub>2</sub> should be estimated and a single number placed in either the CO<sub>2</sub> emissions or CO<sub>2</sub> removals column, as appropriate. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).

**SUMMARY 2 SUMMARY REPORT FOR CO<sub>2</sub> EQUIVALENT EMISSIONS**  
(Sheet 1 of 1)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub> <sup>(1)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Total
	CO <sub>2</sub> equivalent (Gg)						
<b>Total (Net Emissions)<sup>(1)</sup></b>	<b>3.180.074,10</b>	<b>329.588,15</b>	<b>344.494,63</b>	<b>43.383,02</b>	<b>5.527,39</b>	<b>9.536,63</b>	<b>3.912.603,92</b>
<b>1. Energy</b>	<b>3.225.913,21</b>	<b>57.629,45</b>	<b>60.159,07</b>				<b>3.343.701,73</b>
A. Fuel Combustion (Sectoral Approach)	3.201.454,86	14.014,81	60.107,11				3.275.576,78
1. Energy Industries	1.119.300,79	2.095,18	16.040,02				1.137.436,00
2. Manufacturing Industries and Construction	585.159,69	1.110,73	8.081,53				594.351,95
3. Transport	833.924,92	3.048,54	26.361,01				863.334,47
4. Other Sectors	655.762,94	7.739,28	9.530,68				673.032,90
5. Other	7.306,51	21,08	93,86				7.421,46
B. Fugitive Emissions from Fuels	24.458,35	43.614,65	51,96				68.124,95
1. Solid Fuels	8.081,14	15.276,78	2,32				23.360,24
2. Oil and Natural Gas	16.377,21	28.337,86	49,64				44.764,71
<b>2. Industrial Processes</b>	<b>143.039,73</b>	<b>404,95</b>	<b>49.251,66</b>	<b>43.383,02</b>	<b>5.527,39</b>	<b>9.536,63</b>	<b>251.143,38</b>
A. Mineral Products	105.952,22	15,65	0,00				105.967,87
B. Chemical Industry	10.768,73	262,76	49.167,42	0,00	0,00	0,00	60.198,91
C. Metal Production	23.855,58	120,20	3,52		3.099,94	2.751,08	29.830,32
D. Other Production	1.168,49						1.168,49
E. Production of Halocarbons and SF <sub>6</sub>				11.956,85	80,50	239,00	12.276,35
F. Consumption of Halocarbons and SF <sub>6</sub>				31.383,12	2.346,95	6.543,03	40.273,10
G. Other	1.294,72	6,34	80,72	43,06	0,00	3,51	1.428,36
<b>3. Solvent and Other Product Use</b>	<b>5.389,26</b>		<b>3.382,08</b>				<b>8.771,34</b>
<b>4. Agriculture</b>	<b>1.945,79</b>	<b>179.531,45</b>	<b>218.747,73</b>				<b>400.224,97</b>
A. Enteric Fermentation		131.631,06					131.631,06
B. Manure Management		45.268,12	21.561,93				66.830,05
C. Rice Cultivation		2.339,30					2.339,30
D. Agricultural Soils <sup>(2)</sup>	1.945,79	146,66	196.818,47				198.910,92
E. Prescribed Burning of Savannas		0,00	0,00				0,00
F. Field Burning of Agricultural Residues		146,31	367,33				513,64
G. Other		0,00	0,00				0,00
<b>5. Land-Use Change and Forestry<sup>(1)</sup></b>	<b>-203.481,41</b>	<b>2.165,64</b>	<b>5.663,87</b>				<b>-195.651,90</b>
<b>6. Waste</b>	<b>6.577,07</b>	<b>89.817,78</b>	<b>6.105,74</b>				<b>102.500,59</b>
A. Solid Waste Disposal on Land	91,28	80.295,45					80.386,73
B. Wastewater Handling		7.383,93	5.578,60				12.962,53
C. Waste Incineration	6.065,40	740,45	493,04				7.298,88
D. Other	420,39	1.397,96	34,10				1.852,45
<b>7. Other (please specify)</b>	<b>690,44</b>	<b>38,88</b>	<b>1.184,26</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>1.913,59</b>
							0,00
<b>Memo Items:</b>							
<b>International Bunkers</b>	<b>236.170,78</b>	<b>302,40</b>	<b>4.647,64</b>				<b>241.120,81</b>
Aviation	102.220,54	113,48	679,62				103.013,64
Marine	133.950,23	188,92	3.968,02				138.107,17
<b>Multilateral Operations</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>				<b>0,00</b>
<b>CO<sub>2</sub> Emissions from Biomass</b>	<b>165.707,78</b>						<b>165.707,78</b>

<sup>(1)</sup> For CO<sub>2</sub> emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).

<sup>(2)</sup> See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub> emissions	CO <sub>2</sub> removals	Net CO <sub>2</sub> emissions / removals	CH <sub>4</sub>	N <sub>2</sub> O	Total emissions
<b>Land-Use Change and Forestry</b>	CO <sub>2</sub> equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	0,00	-237.225,46	-237.225,46			-237.225,46
B. Forest and Grassland Conversion	10.518,25		10.518,25	344,88	266,60	11.129,73
C. Abandonment of Managed Lands	0,00	-201,58	-201,58			-201,58
D. CO <sub>2</sub> Emissions and Removals from Soil	23.842,10	-169,40	23.672,70			23.672,70
E. Other	0,00	-245,32	-245,32	1.820,75	5.397,27	6.972,70
Total CO <sub>2</sub> Equivalent Emissions from Land-Use Change and Forestry	34.360,35	-237.841,75	-203.481,41	2.165,64	5.663,87	-195.651,90
Total CO <sub>2</sub> Equivalent Emissions without Land-Use Change and Forestry <sup>(a)</sup>						4.108.255,82
Total CO <sub>2</sub> Equivalent Emissions with Land-Use Change and Forestry <sup>(a)</sup>						3.912.603,92

<sup>(a)</sup> The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry. Note that these totals will differ from the totals reported in Table 10s5 if Parties report non-CO<sub>2</sub> emissions from LUCF.

SUMMARY 3 SUMMARY REPORT FOR METHODS AND EMISSION FACTORS USED  
(Sheet 1 of 2)

European Community  
2001  
2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>
1. Energy	NE	NE	NE	NE	NE	NE						
A. Fuel Combustion	NE	NE	NE	NE	NE	NE						
1. Energy Industries	C, CS, D, T1, T2	C, CS, D, PS	NE	NE	NE	NE						
2. Manufacturing Industries and Construction	C, CS, D, T1, T2	C, CS, D, PS	NE	NE	NE	NE						
3. Transport	C, CS, D, M, T1, T2	C, CS, M	NE	NE	C, CS, D, M, T1, T2, T3	C, CS, D, M						
4. Other Sectors	C, CS, D, T1, T2	C, CS, D	C, CS, D, T1, T2	C, CS, D, PS	NE	NE						
5. Other	C, CS, D, T1, T2	C, CS, D	NE	NE	NE	NE						
B. Fugitive Emissions from Fuels	NE	NE	NE	NE	NE	NE						
1. Solid Fuels	C, CS, MB, T2, T3	C, CS, PS	C, CS, D, T1, T2	C, CS, D	NE	NE						
2. Oil and Natural Gas	C, CS, MB, T1, T3	C, CS, PS	C, CS, T1, T2, T3	C, CS, PS	NE	NE						
2. Industrial Processes	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
A. Mineral Products	C, CS, D, T2	C, CS, D, PS, T2	NE	NE	NE	NE						
B. Chemical Industry	C, CS, D, MB, T1, T1a	C, CS, D, PS	NE	NE	C, CS, D, PS, T2	C, CS, D, PS	NE	NE	NE	NE	NE	NE
C. Metal Production	C, CS, D, T2	C, CS, D, PS	NE	NE	NE	NE			CS, D, PS, T1, T2, T3a, T3b	CS, D, PS, T3a	NE	NE
D. Other Production	NE	NE										
E. Production of Halocarbons and SF <sub>6</sub>							CS, D, PS, T1, T2	CS, D, PS, T1, T2	NE	NE	NE	NE
F. Consumption of Halocarbons and SF <sub>6</sub>							C, CS, D, M, T1a, T1b, T2	C, CS, D, PS, T2	NE	NE	C, CS, D, M, T1, T1a, T1b, T2, T3b, T3c	C, CS, D, PS, T1, T2
G. Other	CS	CS, PS	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

<sup>(1)</sup> Use the following notation keys to specify the method applied: D (IPCC default), RA (Reference Approach), T1 (IPCC Tier 1), T1a, T1b, T1c (IPCC Tier 1a, Tier 1b and Tier 1c, respectively), T2 (IPCC Tier 2) T3 (IPCC Tier 3), C (CORINAIR), CS (Country Specific), M (Model). If using more than one method, enumerate the relevant methods. Explanations of any modifications to the default IPCC methods, as well as information on the proper use of methods per source category where more than one method is indicated, and explanations on the country specific methods, should be provided in the documentation box of the relevant Sectoral background data table.

<sup>(2)</sup> Use the following notation keys to specify the emission factor used: D (IPCC default), C (CORINAIR), CS (Country Specific), PS (Plant Specific), M (Model). Where a mix of emission factors has been used, use different notations in one and the same cells with further explanation in the documentation box of the relevant Sectoral background data table.

**SUMMARY 3 SUMMARY REPORT FOR METHODS AND EMISSION FACTORS USED**  
(Sheet 2 of 2)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>	
	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>	Method applied <sup>(1)</sup>	Emission factor <sup>(2)</sup>
<b>3. Solvent and Other Product Use</b>	NE	NE			NE	NE						
<b>4. Agriculture</b>	NE	NE	NE	NE	NE	NE						
A. Enteric Fermentation			C, CS, D, T1, T2	C, CS, D, T1, T2								
B. Manure Management			C, CS, D, T1, T2	C, CS, D, T1, T2	C, CS, D, T1, T2	C, CS, D, T2						
C. Rice Cultivation			NE	NE								
D. Agricultural Soils	C, D	C, D, CS	NE	NE	C, CS, D, M, T1a, T1b, T2	C, CS, D, M, T2						
E. Prescribed Burning of Savannas			NE	NE	NE	NE						
F. Field Burning of Agricultural Residues			NE	NE	NE	NE						
G. Other	NE	NE	NE	NE	NE	NE						
<b>5. Land-Use Change and Forestry</b>	NE	NE	NE	NE	NE	NE						
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE										
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE						
C. Abandonment of Managed Lands	NE	NE										
D. CO <sub>2</sub> Emissions and Removals from Soil	NE	NE										
E. Other	NE	NE	NE	NE	NE	NE						
<b>6. Waste</b>	NE	NE	NE	NE	NE	NE						
A. Solid Waste Disposal on Land	NE	NE	C, CS, M, D, T1, T2	C, CS, D, M, T2								
B. Wastewater Handling			NE	NE	C, CS, D, T1, T2	C, CS, D, T2						
C. Waste Incineration	NE	NE	NE	NE	NE	NE						
D. Other	C, CS, T2	C, CS, T2	NE	NE	NE	NE						
<b>7. Other (please specify)</b>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

(1) Use the following notation keys to specify the method applied: D (IPCC default), RA (Reference Approach), T1 (IPCC Tier 1), T1a, T1b, T1c (IPCC Tier 1a, Tier 1b and Tier 1c, respectively), T2 (IPCC Tier 2), T3 (IPCC Tier 3), C (CORINAIR), CS (Country Specific). If using more than one method, enumerate the relevant methods. Explanations of any modifications to the default IPCC methods, as well as information on the proper use of methods per source category where more than one method is indicated, and explanations on the country specific methods, should be provided in the documentation box of the relevant Sectoral background data table.

(2) Use the following notation keys to specify the emission factor used: D (IPCC default), C (CORINAIR), CS (Country Specific), PS (Plant Specific). Where a mix of emission factors has been used, use different notations in one and the same cells with further explanation in the documentation box of the relevant Sectoral background data table.

**TABLE 1.A(b) SECTORAL BACKGROUND DATA FOR ENERGY**  
**CO<sub>2</sub> from Fuel Combustion Activities - Reference Approach (IPCC Worksheet 1-1)**  
**(Sheet 1 of 1)**

European Community

2000

2003

FUEL TYPES			Unit	Production	Imports	Exports	International bunkers	Stock change	Apparent consumption	Conversion factor <sup>(1)</sup> (TJ/Unit)	<sup>(1)</sup>	Apparent consumption (TJ)	Carbon emission factor (t C/TJ)	Carbon content (Gg C)	Carbon stored (Gg C)	Net carbon emissions (Gg C)	Fraction of carbon oxidized	Actual CO <sub>2</sub> emissions (Gg CO <sub>2</sub> )
Liquid Fossil	Primary Fuels	Crude Oil	kt	157,348.00	550,902.00	107,206.00		1,580.00	602,624.00	42.05	NCV	25,339,408.39	19.80	501,720.29		501,720.29	1.00	1,839,641.05
		Orimulsion		IE	IE	IE		IE	IE		NCV	IE		IE		IE	1.00	IE
		Natural Gas Liquids		IE	IE	IE		IE	IE		NCV	IE		IE		IE	1.00	IE
	Secondary Fuels	Gasoline	kt	307	30,110.00	45,828.00	0.00	149.00	-15,262.00	44.00	NCV	-671,528.00	18.71	-12,564.96	174.95	-12,739.91	1.00	-46,713.00
		Total Kerosene	kt		16,004.00	10,407.00	NE	-532.00	5,065.00	43.00	NCV	217,795.00	19.31	4,204.53	170.59	4,033.94	1.00	14,791.13
		Other Kerosene			IE	IE	NE	IE	IE		NCV	IE		IE		IE	1.00	IE
		Shale Oil			0.00	0.00		0.00	0.00		NCV	0.00		0.00		0.00	1.00	0.00
		Gas / Diesel Oil	kt	400	67,123.00	58,782.00	8,663.00	-2,438.00	-2,360.00	42.30	NCV	-99,828.00	20.00	-1,996.36	1,841.56	-3,837.92	1.00	-14,072.37
		Residual Fuel Oil	kt		43,928.00	41,803.00	34,620.00	-358.00	-32,853.00	42.82	NCV	-1,406,697.34	20.89	-29,384.50	1,482.70	-30,867.20	1.00	-113,179.74
		LPG	kt		10,018.00	6,545.00		-129.00	3,344.00	46.00	NCV	153,824.00	17.03	2,619.32	2,757.80	-138.49	1.00	-507.78
		Ethane & Refinery gas	kt		0.00	5.00		3.00	-2.00	50.00	NCV	-100.00	18.02	-1.80	1,551.71	-1,553.51	1.00	-5,696.21
		Naphtha	kt		27,125.00	18,805.00		-220.00	8,100.00	44.00	NCV	356,400.00	19.80	7,056.72	26,606.45	-19,549.73	1.00	-71,682.34
		Bitumen	kt		3,248.00	3,633.00		-27.00	-412.00	37.70	NCV	-15,532.40	21.78	-338.30	13,604.91	-13,943.20	1.00	-51,125.07
		Lubricants	kt		3,222.00	4,844.00	335.00	-225.00	-2,182.00	42.30	NCV	-92,298.60	19.80	-1,827.51	2,196.87	-4,024.38	1.00	-14,756.06
		Petroleum Coke	kt		10,256.00	1,392.00		-526.00	8,338.00	31.40	NCV	261,813.20	27.23	7,127.86	535.15	6,592.72	1.00	24,173.30
		Refinery Feedstocks	kt		20,382.00	9,170.00		-221.00	10,991.00	42.50	NCV	467,117.50	19.80	9,248.93		9,248.93	1.00	33,912.73
		White Spirit	kt		872.00	745.00		-27.00	100.00	44.00	NCV	4,400.00	19.80	87.12	339.77	-252.65	1.00	-926.38
		Other Oil	kt		6,165.00	6,389.00		-1,256.00	-1,480.00	30.00	NCV	-44,400.00	19.80	-879.12	2,081.08	-2,960.20	1.00	-10,854.06
Liquid Fossil Totals												24,470,373.76		485,072.21	53,343.52	431,728.69		1,583,005.21
Solid Fossil	Primary Fuels	Anthracite <sup>(2)</sup>		IE	IE	IE		IE	IE		NCV	IE		IE		IE	1.00	IE
		Coking Coal		IE	IE	IE		IE	IE		NCV	IE		IE		IE	1.00	IE
		Other Bit. Coal	kt	86,089.00	168,060.00	11,663.00	NO	8,927.00	251,413.00	26.11	NCV	6,564,616.90	25.61	168,124.22		168,124.22	1.00	616,455.46
		Sub-bit. Coal		IE	IE	IE	NO	IE	IE		NCV	IE		IE		IE	1.00	IE
		Lignite	kt	252,103.00	8,072.00	81.00		1,156.00	261,250.00	8.14	NCV	2,127,439.83	27.05	57,542.99		57,542.99	1.00	210,990.97
		Oil Shale		NO	0.00	0.00		0.00	0.00		NCV	0.00		0.00		0.00	1.00	0.00
		Peat		IE	IE	IE		IE	IE		NCV	IE		IE		IE	1.00	IE
	Secondary Fuels	BKB	kt		289.00	547.00		73.00	-185.00	20.00	NCV	-3,700.00	25.28	-93.55		-93.55	1.00	-343.02
		Patent Fuels	kt		131.00	150.00		47.00	28.00	29.30	NCV	820.40	25.28	20.74		20.74	1.00	76.06
		Coke Oven/Gas Coke	kt			12,215.00	3,272.00		59.00	9,002.00	28.50	NCV	256,557.00	28.91	7,417.06		7,417.06	1.00
Solid Fuel Totals												8,945,734.13		233,011.46	0.00	233,011.46		854,375.36
Gaseous Fossil		Natural Gas (Dry)	TJ	8,865,465.00	9,485,980.00	2,291,539.00		-304,487.00	15,755,419.00	0.90	NCV	14,179,877.10	15.22	215,867.36	2,568.84	213,298.52	1.00	782,094.56
Total												47,595,984.98		933,951.04	55,912.36	878,038.67		3,219,475.14
Biomass total												2,258,104.00		NE	0.00	NE		NE
		Solid Biomass	TJ	IE	0.00	0.00		0.00	0.00		NCV	IE		IE		IE	1.00	IE
		Liquid Biomass		IE	0.00	0.00		0.00	0.00		NCV	IE		IE		IE	1.00	IE
		Gas Biomass		IE	0.00	0.00		0.00	0.00		NCV	IE		IE		IE	1.00	IE

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

<sup>(2)</sup> If Anthracite is not separately available, include with Other Bituminous Coal.

**TABLE 1.A(c) COMPARISON OF CO<sub>2</sub> EMISSIONS FROM FUEL COMBUSTION**  
(Sheet 1 of 1)

European Community

2000

2003

FUEL TYPES	Reference approach		National approach <sup>(1)</sup>		Difference <sup>(2)</sup>	
	Energy consumption (PJ)	CO <sub>2</sub> emissions (Gg)	Energy consumption (PJ)	CO <sub>2</sub> emissions (Gg)	Energy consumption (%)	CO <sub>2</sub> emissions (%)
Liquid Fuels (excluding international bunkers)	24.470,37	1.583.005,21	NE	NE	100,00	100,00
Solid Fuels (excluding international bunkers)	8.945,73	854.375,36	NE	NE	100,00	100,00
Gaseous Fuels	14.179,88	782.094,56	NE	NE	100,00	100,00
Other <sup>(3)</sup>	NE	NE	NE	NE		
<b>Total <sup>(3)</sup></b>	<b>47.595,98</b>	<b>3.219.475,14</b>	<b>NE</b>	<b>3.145.979,51</b>	<b>100,00</b>	<b>2,34</b>

<sup>(1)</sup> "National approach" is used to indicate the approach (if different from the Reference approach) followed by the Party to estimate its CO<sub>2</sub> emissions from fuel combustion reported in the national GHG inventory.

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

<sup>(3)</sup> Emissions from biomass are not included.

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

**Documentation Box:**

See chapter 3.5 of the EC Inventory Report 2003.




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

European Community

2000

2003

FUEL TYPE <sup>(1)</sup>	ACTIVITY DATA AND RELATED INFORMATION		IMPLIED EMISSION FACTOR	ESTIMATE
	Fuel quantity	Fraction of carbon stored	Carbon emission factor	of carbon stored in non-energy use of fuels
	(TJ)		(t C/TJ)	(Gg C)
Naphtha <sup>(2)</sup>	1.679.700,00	0,80	19,80	26.606,45
Lubricants	221.905,80	0,50	19,80	2.196,87
Bitumen	624.651,30	1,00	21,78	13.604,91
Coal Oils and Tars (from Coking Coal)	NE	NE	NE	NE
Natural Gas <sup>(2)</sup>	511.339,00	0,33	15,22	2.568,84
Gas/Diesel Oil <sup>(2)</sup>	184.174,20	0,50	20,00	1.841,56
LPG <sup>(2)</sup>	202.446,00	0,80	17,03	2.757,80
Butane <sup>(2)</sup>	NE	NE	NE	NE
Ethane <sup>(2)</sup>	NE	NE	NE	NE
Other (please specify) 				
Motor Spirit	18.700,00	0,50	18,71	174,95
Ethane&Refinery gas	107.650,00	0,80	18,02	1.551,71
Kerosenes, jet fuels	17.673,00	0,50	19,31	170,59
Residual fuel oil	141.960,00	0,50	20,89	1.482,70
White spirit	34.320,00	0,50	19,80	339,77
Petroleum coke	39.312,80	0,50	27,23	535,15
Other petr. Prod.	210.210,00	0,50	19,80	2.081,08

Additional information <sup>(a)</sup>

CO <sub>2</sub> not emitted	Subtracted from energy sector (specify source category)
(Gg CO <sub>2</sub> )	
97.556,98	
8.055,18	
49.884,65	
0,00	
9.419,09	
6.752,38	
10.111,93	
0,00	
0,00	
641,48	
5.689,60	
625,49	
5.436,57	
1.245,82	
1.962,20	
7.630,62	


<sup>(1)</sup> Where fuels are used in different industries, please enter in different rows.

<sup>(2)</sup> Enter these fuels when they are used as feedstocks.

<sup>(a)</sup> The fuel lines continue from the table to the left.

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

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

Associated CO <sub>2</sub> emissions (Gg)	Allocated under (Specify source category) <sup>(a)</sup> 
	<sup>(a)</sup> e.g. Industrial Processes, Waste Incineration, etc.

**TABLE 7 OVERVIEW TABLE<sup>(1)</sup> FOR NATIONAL GREENHOUSE GAS INVENTORIES - COMPLETENESS AND QUALITY OF ESTIMATES**  
(Sheet 1 of 3)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>		NO <sub>x</sub>		CO		NMVOC		SO <sub>2</sub>	
	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality
<b>Total National Emissions and Removals</b>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>1 Energy</b>	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
A. Fuel Combustion Activities																				
Reference Approach	NE	NE																		
Sectoral Approach	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
1. Energy Industries	ALL, IE	H, M	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
2. Manufacturing Industries and Construction	ALL	H, M	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
3. Transport	ALL	H, M	NE	NE	ALL	H, L, M							NE	NE	NE	NE	NE	NE	NE	NE
4. Other Sectors	ALL	H, M	ALL	H, L, M	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
5. Other	ALL, IE, NE, PART	H, L, M	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
B. Fugitive Emissions from Fuels	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
1. Solid Fuels	ALL, IE, PART	H, L, M	ALL, IE, PART	H, L, M	NE	NE														
2. Oil and Natural Gas	ALL, NE, PART	H, L, M	ALL, PART	H, L, M	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
<b>2 Industrial Processes</b>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
A. Mineral Products	ALL, PART	H, M	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
B. Chemical Industry	ALL, NE, PART	H, L, M	NE	NE	ALL, PART	H, L, M	NE	NE	NE	NE			NE	NE	NE	NE	NE	NE	NE	NE
C. Metal Production	ALL, IE, PART	H, M	NE	NE	N	NE			ALL, PART	H, L, M	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. Other Production	NE	NE											NE	NE	NE	NE	NE	NE	NE	NE
E. Production of Halocarbons and SF <sub>6</sub>							ALL	H, M	NE	NE	NE	NE								

<sup>(1)</sup> This table is intended to be used by Parties to summarize their own assessment of completeness (e.g. partial, full estimate, not estimated) and quality (high, medium, low) of major source/sink inventory estimates. The latter could be understood as a quality assessment of the uncertainty of the estimates. This table might change once the IPCC completes its work on managing uncertainties of GHG inventories. The title of the table was kept for consistency with the current table in the IPCC Guidelines.

**Note:** To fill in the table use the notation key as given in the IPCC Guidelines (Volume 1. Reporting Instructions, Tables. 37)

**TABLE 7 OVERVIEW TABLE FOR NATIONAL GREENHOUSE GAS INVENTORIES - COMPLETENESS AND QUALITY OF ESTIMATES**  
(Sheet 2 of 3)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>		NO <sub>x</sub>		CO		NMVOC		SO <sub>2</sub>	
	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality
<b>2 Industrial Processes (continued)</b>																				
F. Consumption of Halocarbons and SF <sub>6</sub>																				
Potential <sup>(2)</sup>							NE	NE	NE	NE	NE	NE								
Actual <sup>(3)</sup>							ALL, PART	H, L, M	NE	NE	ALL, NE, PART	H, L, M								
G. Other	ALL, NE, PART	H, M	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>3 Solvent and Other Product Use</b>	NE	NE			NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
<b>4 Agriculture</b>	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
A. Enteric Fermentation			ALL	H, M																
B. Manure Management			ALL	H, L, M	ALL, NE	H, L, M											NE	NE		
C. Rice Cultivation			NE	NE													NE	NE		
D. Agricultural Soils	ALL, IE, NE, PART	L, M	NE	NE	ALL	H, L, M											NE	NE		
E. Prescribed Burning of Savannas			NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
F. Field Burning of Agricultural Residues			NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
G. Other			NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
<b>5 Land-Use Change and Forestry</b>	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE																		
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE		

<sup>(2)</sup> Potential emissions based on Tier 1 approach of the IPCC Guidelines.

<sup>(3)</sup> Actual emissions based on Tier 2 approach of the IPCC Guidelines.

**TABLE 7 OVERVIEW TABLE FOR NATIONAL GREENHOUSE GAS INVENTORIES - COMPLETENESS AND QUALITY OF ESTIMATES**  
(Sheet 3 of 3)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		HFCs		PFCs		SF <sub>6</sub>		NO <sub>x</sub>		CO		NMVOC		SO <sub>2</sub>	
	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality
<b>5 Land-Use Change and Forestry (continued)</b>																				
C. Abandonment of Managed Lands	NE	NE																		
D. CO <sub>2</sub> Emissions and Removals from Soil	NE	NE																		
E. Other	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
<b>6 Waste</b>	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
A. Solid Waste Disposal on Land	NE	NE	ALL, PART	L, M											NE	NE	NE	NE	NE	NE
B. Wastewater Handling			NE		ALL, NE, PART	L, M							NE	NE	NE	NE	NE	NE	NE	NE
C. Waste Incineration	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
D. Other	ALL, NE, PART	L, M	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
<b>7 Other (please specify)</b>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>Memo Items:</b>																				
<b>International Bunkers</b>	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
Aviation	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
Marine	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
<b>Multilateral Operations</b>	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE	NE	NE	NE	NE
<b>CO<sub>2</sub> Emissions from Biomass</b>	NE	NE																		

TABLE 8(a) RECALCULATION - RECALCULATED DATA

European Community

Recalculated year: 2000

2000

(Sheet 1 of 2)

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO <sub>2</sub>			CH <sub>4</sub>			N <sub>2</sub> O		
		Previous submission	Latest submission	Difference <sup>(1)</sup>	Previous submission	Latest submission	Difference <sup>(1)</sup>	Previous submission	Latest submission	Difference <sup>(1)</sup>
		CO <sub>2</sub> equivalent (Gg)		(%)	CO <sub>2</sub> equivalent (Gg)		(%)	CO <sub>2</sub> equivalent (Gg)		(%)
<b>Total National Emissions and Removals</b>		<b>3.144.118,65</b>	<b>3.148.753,85</b>	<b>0,15</b>	<b>341.770,48</b>	<b>335.189,48</b>	<b>-1,93</b>	<b>338.111,25</b>	<b>349.367,32</b>	<b>3,33</b>
<b>1. Energy</b>		<b>3.159.695,38</b>	<b>3.169.623,26</b>	<b>0,31</b>	<b>62.026,33</b>	<b>60.693,92</b>	<b>-2,15</b>	<b>55.019,82</b>	<b>58.203,52</b>	<b>5,79</b>
1.A.	Fuel Combustion Activities	3.136.284,09	3.145.979,51	0,31	13.463,37	13.563,31	0,74	54.966,58	58.150,14	5,79
1.A.1.	Energy Industries	1.092.146,22	1.102.660,03	0,96	1.655,65	1.958,58	18,30	14.769,15	15.296,87	3,57
1.A.2.	Manufacturing Industries and Construction	594.615,34	590.850,78	-0,63	1.313,23	1.122,65	-14,51	8.456,10	8.499,76	0,52
1.A.3.	Transport	822.954,46	823.606,21	0,08	3.227,03	3.205,98	-0,65	23.721,31	24.873,25	4,86
1.A.4.	Other Sectors	619.477,52	621.237,43	0,28	7.250,93	7.253,71	0,04	7.926,01	9.345,28	17,91
1.A.5.	Other	7.090,54	7.625,06	7,54	16,53	22,40	35,51	94,01	134,99	43,59
1.B.	Fugitive Emissions from Fuels	23.411,29	23.643,76	0,99	48.562,96	47.130,61	-2,95	53,24	53,38	0,26
1.B.1.	Solid fuel	8.098,30	7.764,03	-4,13	20.601,41	18.995,13	-7,80	2,37	2,51	5,76
1.B.2.	Oil and Natural Gas	15.313,00	15.879,73	3,70	27.961,55	28.135,47	0,62	50,87	50,87	0,00
<b>2. Industrial Processes</b>		<b>150.528,17</b>	<b>144.708,15</b>	<b>-3,87</b>	<b>452,96</b>	<b>429,43</b>	<b>-5,20</b>	<b>46.480,79</b>	<b>49.835,89</b>	<b>7,22</b>
2.A.	Mineral Products	111.009,09	107.475,74	-3,18	16,02	16,56	3,35	0,00	0,00	#DIV/0!
2.B.	Chemical Industry	11.136,03	10.781,11	-3,19	297,88	272,96	-8,36	46.422,22	49.777,32	7,23
2.C.	Metal Production	24.023,82	23.975,78	-0,20	133,81	134,24	0,33	8,97	8,97	0,00
2.D.	Other Production	1.224,73	1.222,65	-0,17						
2.G.	Other	3.134,50	1.252,87	-60,03	5,26	5,66	7,67	49,60	49,60	0,00
<b>3. Solvent and Other Product Use</b>		<b>5.353,34</b>	<b>5.565,07</b>	<b>3,96</b>				<b>3.443,04</b>	<b>3.473,97</b>	<b>0,90</b>
<b>4. Agriculture</b>		<b>2.045,62</b>	<b>2.023,38</b>	<b>-1,09</b>	<b>168.316,69</b>	<b>179.975,01</b>	<b>6,93</b>	<b>219.172,77</b>	<b>224.818,10</b>	<b>2,58</b>
4.A.	Enteric Fermentation				131.366,52	132.245,59	0,67			
4.B.	Manure Management				33.118,34	45.075,62	36,10	29.100,08	21.348,67	-26,64
4.C.	Rice Cultivation				2.335,67	2.355,53	0,85			
4.D.	Agricultural Soils <sup>(2)</sup>	2.045,62	2.023,38	-1,09	1.342,23	146,66	-89,07	189.726,41	203.100,61	7,05
4.E.	Prescribed Burning of Savannas				0,00	0,00	#DIV/0!	0,00	0,00	#DIV/0!
4.F.	Field Burning of Agricultural Residues				153,94	151,61	-1,51	346,28	368,82	6,51
4.G.	Other				0,00	0,00	#DIV/0!	0,00	0,00	#DIV/0!
<b>5. Land-Use Change and Forestry (net) <sup>(3)</sup></b>		<b>-180.681,00</b>	<b>-180.559,95</b>	<b>-0,07</b>	<b>2.560,66</b>	<b>2.479,17</b>	<b>-3,18</b>	<b>5.930,06</b>	<b>5.694,89</b>	<b>-3,97</b>
5.A.	Changes in Forest and Other Woody Biomass Stocks	-220.738,67	-223.547,56	1,27						
5.B.	Forest and Grassland Conversion	12.107,98	14.107,98	16,52	655,41	658,70	0,50	283,32	298,45	5,34
5.C.	Abandonment of Managed Lands	-208,27	-203,63	-2,23						
5.D.	CO <sub>2</sub> Emissions and Removals from Soil	28.441,88	29.367,18	3,25						
5.E.	Other	-283,92	-283,92	0,00	1.905,25	1.820,48	-4,45	5.646,73	5.396,44	-4,43

<sup>(1)</sup> Estimate the percentage change due to recalculation with respect to the previous submission (Percentage change = 100% x [(LS-PS)/PS], where LS = Latest submission and PS = Previous submission.

All cases of recalculation of the estimate of the source/sink category, should be addressed and explained in Table 8(b) of this common reporting format.

<sup>(2)</sup> See footnote 4 to Summary 1.A of this common reporting format.

<sup>(3)</sup> Net CO<sub>2</sub> emissions/removals to be reported

TABLE 8(a) RECALCULATION - RECALCULATED DATA

European Community

Recalculated year: 2000

2000

(Sheet 2 of 2)

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO <sub>2</sub>			CH <sub>4</sub>			N <sub>2</sub> O		
		Previous submission	Latest submission	Difference <sup>(1)</sup>	Previous submission	Latest submission	Difference <sup>(1)</sup>	Previous submission	Latest submission	Difference <sup>(1)</sup>
		CO <sub>2</sub> equivalent (Gg)		(%)	CO <sub>2</sub> equivalent (Gg)		(%)	CO <sub>2</sub> equivalent (Gg)		(%)
6. Waste		6.447,14	6.663,51	3,36	108.374,02	91.571,84	-15,50	6.880,88	6.157,06	-10,52
6.A.	Solid Waste Disposal on Land	31,99	93,10	191,01	98.641,21	81.929,48	-16,94			
6.B.	Wastewater Handling				7.071,95	7.532,38	6,51	6.030,46	5.573,21	-7,58
6.C.	Waste Incineration	5.962,41	6.150,02	3,15	895,81	758,89	-15,28	850,36	549,75	-35,35
6.D.	Other	452,74	420,39	-7,15	1.765,05	1.351,09	-23,45	0,06	34,10	61.355,60
7. Other (please specify)		730,00	730,42	0,06	39,82	40,11	0,72	1.183,90	1.183,90	0,00
Memo Items:										
International Bunkers		232.247,49	222.536,15	-4,18	238,47	187,39	-21,42	1.423,31	1.462,84	2,78
Multilateral Operations		0,00	0,00	#DIV/0!	0,00	0,00	#DIV/0!	0,00	0,00	#DIV/0!
CO <sub>2</sub> Emissions from Biomass		143.768,08	148.965,24	3,61						

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		HFCs			PFCs			SF <sub>6</sub>		
		Previous submission	Latest submission	Difference <sup>(1)</sup>	Previous submission	Latest submission	Difference <sup>(1)</sup>	Previous submission	Latest submission	Difference <sup>(1)</sup>
		CO <sub>2</sub> equivalent (Gg)		(%)	CO <sub>2</sub> equivalent (Gg)		(%)	CO <sub>2</sub> equivalent (Gg)		(%)
Total Actual Emissions		47.284,75	45.033,49	-4,76	6.845,78	6.162,62	-9,98	8.955,00	9.765,02	9,05
2.C.3.	Aluminium Production				4.613,46	3.640,88	-21,08	2.046,34	2.189,41	6,99
2.E.	Production of Halocarbons and SF <sub>6</sub>	17.561,99	18.203,07	3,65	84,70	84,70	0,00	0,00	215,10	#DIV/0!
2.F.	Consumption of Halocarbons and SF <sub>6</sub>	29.722,76	24.801,40	-16,56	2.147,62	2.205,38	2,69	6.908,65	6.863,57	-0,65
	Other	0,00	43,06	#DIV/0!	0,00	0,00	#DIV/0!	0,00	3,51	#DIV/0!
Potential Emissions from Consumption of HFCs/PFCs and SF <sub>6</sub>		-	NE	#WERT!	-	NE	#WERT!	#WERT!	#WERT!	#WERT!

		Previous submission	Latest submission	Difference <sup>(1)</sup>
		CO <sub>2</sub> equivalent (Gg)		(%)
Total CO <sub>2</sub> Equivalent Emissions with Land-Use Change and Forestry <sup>(3)</sup>		3.887.085,92	3.894.271,78	0,18
Total CO <sub>2</sub> Equivalent Emissions without Land-Use Change and Forestry <sup>(3)</sup>		4.059.276,19	4.066.657,67	0,18

<sup>(3)</sup> The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

**TABLE 10 EMISSIONS TRENDS (CO<sub>2</sub>)**  
(Sheet 1 of 5)

European Community

2001

2003

	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	(Gg)												
<b>1. Energy</b>	<b>3,163,488.00</b>	<b>3,163,488.00</b>	<b>3,197,502.04</b>	<b>3,129,979.22</b>	<b>3,074,881.30</b>	<b>3,074,964.52</b>	<b>3,105,864.98</b>	<b>3,186,992.75</b>	<b>3,123,921.84</b>	<b>3,174,811.98</b>	<b>3,151,565.46</b>	<b>3,169,623.26</b>	<b>3,225,913.21</b>
A. Fuel Combustion (Sectoral Approach)	3,136,957.17	3,136,957.17	3,172,985.26	3,105,774.21	3,051,156.30	3,049,244.64	3,082,856.21	3,163,380.10	3,100,070.53	3,150,631.91	3,127,469.18	3,145,979.51	3,201,454.86
1. Energy Industries	1,144,433.92	1,144,433.92	1,150,782.91	1,115,919.12	1,061,507.17	1,069,428.47	1,079,943.71	1,093,426.05	1,058,364.11	1,088,645.40	1,070,060.53	1,102,660.03	1,119,300.79
2. Manufacturing Industries and Construction	642,348.42	642,348.42	619,577.23	597,349.05	577,751.02	597,112.47	604,249.28	591,759.44	602,614.73	598,874.10	590,240.63	590,850.78	585,159.69
3. Transport	695,002.97	695,002.97	708,465.16	732,834.51	739,790.26	743,243.75	752,888.72	769,247.68	778,308.94	802,557.68	822,186.21	823,606.21	833,924.92
4. Other Sectors	635,095.56	635,095.56	676,564.89	645,748.70	657,347.99	626,290.01	633,655.00	697,080.82	650,013.79	650,818.38	636,724.05	621,237.43	655,762.94
5. Other	20,076.29	20,076.29	17,595.07	13,922.83	14,759.87	13,169.93	12,119.50	11,866.11	10,768.98	9,736.36	8,257.75	7,625.06	7,306.51
B. Fugitive Emissions from Fuels	26,530.83	26,530.83	24,516.78	24,205.01	23,724.99	25,719.88	23,008.77	23,612.65	23,851.31	24,180.07	24,096.28	23,643.76	24,458.35
1. Solid Fuels	9,283.37	9,283.37	8,557.41	8,357.46	7,699.74	7,245.50	7,122.38	7,356.30	8,073.06	7,969.83	7,998.75	7,764.03	8,081.14
2. Oil and Natural Gas	17,247.46	17,247.46	15,959.38	15,847.55	16,025.26	18,474.38	15,886.39	16,256.35	15,778.26	16,210.23	16,097.53	15,879.73	16,377.21
<b>2. Industrial Processes</b>	<b>147,930.64</b>	<b>147,930.64</b>	<b>140,593.60</b>	<b>136,543.33</b>	<b>132,090.51</b>	<b>137,329.00</b>	<b>142,034.09</b>	<b>136,961.46</b>	<b>140,287.78</b>	<b>140,677.61</b>	<b>142,317.43</b>	<b>144,708.15</b>	<b>143,039.73</b>
A. Mineral Products	106,933.77	106,933.77	101,655.15	100,051.01	96,860.86	101,298.03	103,242.36	99,456.76	102,527.90	104,697.97	105,931.16	107,475.74	105,952.22
B. Chemical Industry	12,884.46	12,884.46	12,053.53	11,541.82	10,486.57	10,563.86	11,490.07	11,079.28	10,741.54	10,876.54	10,328.57	10,781.11	10,768.73
C. Metal Production	25,702.43	25,702.43	23,004.32	21,182.19	21,643.59	22,569.44	24,759.26	23,715.66	24,126.12	22,762.89	23,639.93	23,975.78	23,855.58
D. Other Production	1,299.35	1,299.35	1,129.51	1,416.39	1,241.20	1,222.92	1,206.59	1,265.93	1,180.75	1,204.99	1,296.42	1,222.65	1,168.49
E. Production of Halocarbons and SF <sub>6</sub>													
F. Consumption of Halocarbons and SF <sub>6</sub>													
G. Other	1,110.64	1,110.64	2,751.09	2,351.94	1,858.30	1,674.76	1,335.80	1,443.83	1,716.46	1,140.21	1,121.35	1,252.87	1,294.72
<b>3. Solvent and Other Product Use</b>	<b>6,067.05</b>	<b>6,067.05</b>	<b>6,012.30</b>	<b>5,779.41</b>	<b>5,368.12</b>	<b>5,325.79</b>	<b>5,338.17</b>	<b>5,341.05</b>	<b>5,403.88</b>	<b>5,448.26</b>	<b>5,434.59</b>	<b>5,565.07</b>	<b>5,389.26</b>
<b>4. Agriculture</b>	<b>3,208.20</b>	<b>3,208.20</b>	<b>2,806.11</b>	<b>2,311.88</b>	<b>2,221.67</b>	<b>2,060.29</b>	<b>1,718.40</b>	<b>1,818.25</b>	<b>2,054.75</b>	<b>2,024.20</b>	<b>2,007.22</b>	<b>2,023.38</b>	<b>1,945.79</b>
A. Enteric Fermentation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Manure Management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Rice Cultivation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Agricultural Soils <sup>(2)</sup>	3,208.20	3,208.20	2,806.11	2,311.88	2,221.67	2,060.29	1,718.40	1,818.25	2,054.75	2,024.20	2,007.22	2,023.38	1,945.79
E. Prescribed Burning of Savannas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Field Burning of Agricultural Residues	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>5. Land-Use Change and Forestry<sup>(3)</sup></b>	<b>-191,943.21</b>	<b>-191,943.21</b>	<b>-216,481.27</b>	<b>-202,218.93</b>	<b>-213,009.40</b>	<b>-200,650.95</b>	<b>-191,553.82</b>	<b>-200,274.12</b>	<b>-200,325.05</b>	<b>-191,082.15</b>	<b>-199,412.90</b>	<b>-180,559.95</b>	<b>-203,481.41</b>
A. Changes in Forest and Other Woody Biomass Stocks	-231,102.94	-231,102.94	-255,529.96	-243,152.86	-252,336.36	-239,200.85	-229,408.70	-238,432.04	-239,726.00	-233,220.71	-237,448.77	-223,547.56	-237,225.46
B. Forest and Grassland Conversion	10,175.70	10,175.70	9,361.62	11,232.43	10,733.72	10,487.94	9,875.70	9,899.70	10,015.88	13,491.20	10,361.42	14,107.98	10,518.25
C. Abandonment of Managed Lands	-150.01	-150.01	-151.73	-167.25	-179.77	-189.82	-196.26	-199.17	-201.41	-201.52	-201.48	-203.63	-201.58
D. CO <sub>2</sub> Emissions and Removals from Soil	29,442.46	29,442.46	30,136.21	30,177.18	29,092.46	28,462.99	28,325.59	28,688.41	29,871.63	29,245.33	28,154.33	29,367.18	23,672.70
E. Other	-308.43	-308.43	-297.40	-308.43	-319.46	-211.21	-150.15	-231.02	-285.15	-396.45	-278.40	-283.92	-245.32
<b>6. Waste</b>	<b>7,804.29</b>	<b>7,804.29</b>	<b>6,957.31</b>	<b>7,039.25</b>	<b>7,105.29</b>	<b>6,991.06</b>	<b>7,304.23</b>	<b>7,786.22</b>	<b>7,380.27</b>	<b>6,253.93</b>	<b>6,824.86</b>	<b>6,663.51</b>	<b>6,577.07</b>
A. Solid Waste Disposal on Land	263.35	263.35	321.38	369.46	357.01	290.25	124.48	82.07	65.54	58.73	54.00	93.10	91.28
B. Waste-water Handling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Waste Incineration	6,659.85	6,659.85	6,635.93	6,669.79	6,748.28	6,700.81	6,269.49	6,648.44	6,069.52	5,740.60	5,749.01	6,150.02	6,065.40
D. Other	881.09	881.09	0.00	0.00	0.00	0.00	910.26	1,055.71	1,245.20	454.60	1,021.86	420.39	420.39
<b>7. Other (please specify)</b>	<b>640.50</b>	<b>640.50</b>	<b>614.76</b>	<b>607.51</b>	<b>555.98</b>	<b>691.52</b>	<b>699.85</b>	<b>698.87</b>	<b>558.10</b>	<b>720.50</b>	<b>750.57</b>	<b>730.42</b>	<b>690.44</b>
<b>Total Emissions/Removals with LUCF<sup>(4)</sup></b>	<b>3,137,195.48</b>	<b>3,137,195.48</b>	<b>3,138,004.85</b>	<b>3,080,041.67</b>	<b>3,009,213.46</b>	<b>3,026,711.23</b>	<b>3,071,405.90</b>	<b>3,139,324.50</b>	<b>3,079,281.57</b>	<b>3,138,854.33</b>	<b>3,109,487.23</b>	<b>3,148,753.85</b>	<b>3,180,074.10</b>
<b>Total Emissions without LUCF<sup>(4)</sup></b>	<b>3,329,138.69</b>	<b>3,329,138.69</b>	<b>3,354,486.11</b>	<b>3,282,260.60</b>	<b>3,222,222.86</b>	<b>3,227,362.18</b>	<b>3,262,959.72</b>	<b>3,339,598.62</b>	<b>3,279,606.61</b>	<b>3,329,936.48</b>	<b>3,308,900.14</b>	<b>3,329,313.80</b>	<b>3,383,555.51</b>
<b>Memo Items:</b>													
<b>International Bunkers</b>	<b>155,520.74</b>	<b>155,520.74</b>	<b>156,259.98</b>	<b>160,510.17</b>	<b>169,193.34</b>	<b>169,029.57</b>	<b>172,905.64</b>	<b>184,914.05</b>	<b>200,620.57</b>	<b>212,059.55</b>	<b>211,855.51</b>	<b>222,536.15</b>	<b>236,170.78</b>
Aviation	56,160.02	56,160.02	55,543.05	59,966.10	65,242.89	67,852.29	70,512.29	74,989.33	80,096.66	86,320.26	92,177.77	97,267.69	102,220.54
Marine	99,360.72	99,360.72	100,716.93	100,544.07	103,950.45	101,177.28	102,393.35	109,924.72	120,523.90	125,739.29	119,677.74	125,268.46	133,950.23
<b>Multilateral Operations</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>CO<sub>2</sub> Emissions from Biomass</b>	<b>119,994.60</b>	<b>119,994.60</b>	<b>127,683.76</b>	<b>126,148.94</b>	<b>131,069.03</b>	<b>129,686.50</b>	<b>135,391.46</b>	<b>143,668.25</b>	<b>146,146.44</b>	<b>147,606.08</b>	<b>150,320.12</b>	<b>148,965.24</b>	<b>165,707.78</b>

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

<sup>(2)</sup> See footnote 4 to Summary 1.A of this common reporting format.

<sup>(3)</sup> 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 (+).

<sup>(4)</sup> 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 10 EMISSIONS TRENDS (CH<sub>4</sub>)**  
(Sheet 2 of 5)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	(Gg)												
<b>Total Emissions</b>	<b>19,721.17</b>	<b>19,721.17</b>	<b>19,278.10</b>	<b>18,756.21</b>	<b>18,295.21</b>	<b>17,842.20</b>	<b>17,646.15</b>	<b>17,448.01</b>	<b>17,013.31</b>	<b>16,701.43</b>	<b>16,340.64</b>	<b>15,961.40</b>	<b>15,694.67</b>
<b>1. Energy</b>	<b>4,715.59</b>	<b>4,715.59</b>	<b>4,615.37</b>	<b>4,495.53</b>	<b>4,261.44</b>	<b>3,829.73</b>	<b>3,746.18</b>	<b>3,611.06</b>	<b>3,426.42</b>	<b>3,264.57</b>	<b>3,116.62</b>	<b>2,890.19</b>	<b>2,744.26</b>
A. Fuel Combustion (Sectoral Approach)	835.65	835.65	835.75	787.63	766.71	720.40	688.17	712.56	678.91	672.91	676.53	645.87	667.37
1. Energy Industries	48.86	48.86	50.04	51.58	53.70	59.00	68.92	76.26	77.35	79.04	90.59	93.27	99.77
2. Manufacturing Industries and Construction	58.60	58.60	56.61	53.43	51.66	54.20	54.53	52.39	52.30	51.70	52.57	53.46	52.89
3. Transport	227.70	227.70	217.36	214.40	205.70	198.16	193.44	192.08	181.82	176.10	168.48	152.67	145.17
4. Other Sectors	497.74	497.74	509.75	466.50	454.19	407.75	369.56	390.36	366.03	364.80	363.80	345.41	368.54
5. Other	2.74	2.74	1.98	1.72	1.46	1.29	1.71	1.45	1.41	1.27	1.08	1.07	1.00
B. Fugitive Emissions from Fuels	3,879.94	3,879.94	3,779.62	3,707.90	3,494.74	3,109.33	3,058.01	2,898.49	2,747.51	2,591.67	2,440.09	2,244.31	2,076.89
1. Solid Fuels	2,309.98	2,309.98	2,198.94	2,126.26	1,898.71	1,523.60	1,594.62	1,418.84	1,331.41	1,187.46	1,064.72	904.53	727.47
2. Oil and Natural Gas	1,569.96	1,569.96	1,580.69	1,581.64	1,596.02	1,585.73	1,463.40	1,479.66	1,416.10	1,404.21	1,375.37	1,339.78	1,349.42
<b>2. Industrial Processes</b>	<b>26.10</b>	<b>26.10</b>	<b>25.28</b>	<b>25.93</b>	<b>25.90</b>	<b>28.93</b>	<b>24.43</b>	<b>28.01</b>	<b>24.07</b>	<b>22.54</b>	<b>21.79</b>	<b>20.45</b>	<b>19.28</b>
A. Mineral Products	1.37	1.37	0.95	0.85	0.73	0.81	0.91	0.88	0.89	0.91	0.80	0.79	0.75
B. Chemical Industry	17.89	17.89	14.50	15.53	13.97	16.14	16.96	20.53	16.62	15.04	14.57	13.00	12.51
C. Metal Production	6.58	6.58	6.10	5.62	6.07	6.46	6.29	6.27	6.26	6.20	6.13	6.39	5.72
D. Other Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Production of Halocarbons and SF <sub>6</sub>													
F. Consumption of Halocarbons and SF <sub>6</sub>													
G. Other	0.26	0.26	3.73	3.93	5.13	5.52	0.27	0.33	0.30	0.39	0.29	0.27	0.30
<b>3. Solvent and Other Product Use</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>4. Agriculture</b>	<b>9,149.09</b>	<b>9,149.09</b>	<b>8,911.41</b>	<b>8,780.03</b>	<b>8,725.48</b>	<b>8,752.82</b>	<b>8,747.68</b>	<b>8,776.89</b>	<b>8,706.06</b>	<b>8,681.58</b>	<b>8,640.24</b>	<b>8,570.24</b>	<b>8,549.12</b>
A. Enteric Fermentation	6,861.49	6,861.49	6,691.93	6,558.49	6,511.48	6,516.33	6,509.09	6,534.92	6,450.68	6,412.59	6,385.63	6,297.41	6,268.15
B. Manure Management	2,151.03	2,151.03	2,086.37	2,093.49	2,093.37	2,106.67	2,110.42	2,105.68	2,120.47	2,139.95	2,129.29	2,146.46	2,155.62
C. Rice Cultivation	109.66	109.66	106.79	105.84	106.12	115.37	114.21	121.78	121.00	115.20	111.85	112.17	111.40
D. Agricultural Soils	7.12	7.12	7.09	7.09	7.02	6.98	6.95	6.92	6.89	6.86	6.83	6.98	6.98
E. Prescribed Burning of Savannas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Field Burning of Agricultural Residues	19.79	19.79	19.24	15.13	7.49	7.47	7.00	7.59	7.03	6.98	6.65	7.22	6.97
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>5. Land-Use Change and Forestry</b>	<b>105.37</b>	<b>105.37</b>	<b>101.94</b>	<b>109.27</b>	<b>106.87</b>	<b>105.77</b>	<b>102.42</b>	<b>102.65</b>	<b>102.63</b>	<b>116.09</b>	<b>102.44</b>	<b>118.06</b>	<b>103.13</b>
A. Changes in Forest and Other Woody Biomass Stocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Forest and Grassland Conversion	18.71	18.71	15.28	22.61	20.19	19.11	15.76	16.00	15.97	29.41	15.76	31.37	16.42
C. Abandonment of Managed Lands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. CO <sub>2</sub> Emissions and Removals from Soil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Other	86.66	86.66	86.66	86.66	86.68	86.66	86.66	86.65	86.66	86.68	86.69	86.69	86.70
<b>6. Waste</b>	<b>5,722.97</b>	<b>5,722.97</b>	<b>5,622.10</b>	<b>5,343.44</b>	<b>5,173.52</b>	<b>5,122.65</b>	<b>5,023.37</b>	<b>4,927.41</b>	<b>4,752.15</b>	<b>4,614.72</b>	<b>4,457.60</b>	<b>4,360.56</b>	<b>4,277.04</b>
A. Solid Waste Disposal on Land	5,284.86	5,284.86	5,194.20	4,925.21	4,752.95	4,697.61	4,598.10	4,493.98	4,304.12	4,157.87	3,995.34	3,901.40	3,823.59
B. Waste-water Handling	366.47	366.47	347.42	337.85	338.02	343.64	342.26	346.90	352.84	361.71	362.96	358.68	351.62
C. Waste Incineration	33.52	33.52	40.22	37.26	37.04	35.70	35.45	35.82	39.33	38.03	38.61	36.14	35.26
D. Other	38.12	38.12	40.25	43.13	45.50	45.70	47.56	50.70	55.85	57.10	60.69	64.34	66.57
<b>7. Other (please specify)</b>	<b>2.05</b>	<b>2.05</b>	<b>2.00</b>	<b>2.00</b>	<b>2.00</b>	<b>2.30</b>	<b>2.06</b>	<b>2.00</b>	<b>1.98</b>	<b>1.94</b>	<b>1.95</b>	<b>1.91</b>	<b>1.85</b>
<b>Memo Items:</b>													
<b>International Bunkers</b>	<b>7.12</b>	<b>7.12</b>	<b>6.91</b>	<b>7.14</b>	<b>7.29</b>	<b>7.50</b>	<b>7.84</b>	<b>8.31</b>	<b>8.89</b>	<b>9.53</b>	<b>8.24</b>	<b>8.92</b>	<b>14.40</b>
Aviation	4.48	4.48	4.29	4.42	4.44	4.64	4.86	5.17	5.43	5.75	4.81	5.16	5.40
Marine	2.64	2.64	2.61	2.72	2.85	2.86	2.98	3.15	3.47	3.79	3.43	3.76	9.00
<b>Multilateral Operations</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>CO<sub>2</sub> Emissions from Biomass</b>													



**TABLE 10 EMISSIONS TRENDS (N<sub>2</sub>O)**  
(Sheet 3 of 5)

European Community

2001

2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	(Gg)												
<b>Total Emissions</b>	<b>1,319,18</b>	<b>1,319,18</b>	<b>1,299,06</b>	<b>1,264,44</b>	<b>1,236,54</b>	<b>1,253,74</b>	<b>1,256,24</b>	<b>1,278,33</b>	<b>1,271,86</b>	<b>1,200,08</b>	<b>1,132,43</b>	<b>1,126,99</b>	<b>1,111,27</b>
<b>1. Energy</b>	<b>151,66</b>	<b>151,66</b>	<b>157,15</b>	<b>158,86</b>	<b>159,50</b>	<b>164,59</b>	<b>167,89</b>	<b>171,31</b>	<b>174,01</b>	<b>181,08</b>	<b>185,59</b>	<b>187,75</b>	<b>194,06</b>
A. Fuel Combustion (Sectoral Approach)	151,35	151,35	156,87	158,60	159,25	163,87	167,64	171,04	173,78	180,86	185,37	187,58	193,89
1. Energy Industries	47,12	47,12	48,09	48,01	45,40	46,32	46,88	48,05	47,19	49,12	48,76	49,34	51,74
2. Manufacturing Industries and Construction	30,91	30,91	29,82	29,05	27,88	29,13	30,12	27,17	28,77	28,55	28,50	27,42	26,07
3. Transport	37,61	37,61	41,61	45,70	50,20	54,58	59,14	63,70	67,63	72,83	77,42	80,24	85,04
4. Other Sectors	34,72	34,72	36,15	34,70	34,67	32,80	30,54	31,19	29,27	29,84	30,27	30,15	30,74
5. Other	0,97	0,97	1,18	1,14	1,09	1,03	0,95	0,94	0,91	0,51	0,42	0,44	0,30
B. Fugitive Emissions from Fuels	0,32	0,32	0,28	0,26	0,25	0,73	0,25	0,27	0,23	0,22	0,22	0,17	0,17
1. Solid Fuels	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
2. Oil and Natural Gas	0,31	0,31	0,27	0,25	0,24	0,72	0,24	0,26	0,22	0,21	0,22	0,16	0,16
<b>2. Industrial Processes</b>	<b>342,40</b>	<b>342,40</b>	<b>335,71</b>	<b>324,01</b>	<b>307,09</b>	<b>315,86</b>	<b>314,65</b>	<b>324,96</b>	<b>311,38</b>	<b>236,44</b>	<b>162,91</b>	<b>160,76</b>	<b>158,88</b>
A. Mineral Products	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Chemical Industry	342,25	342,25	335,54	323,85	306,92	315,69	314,47	324,79	311,19	236,27	162,69	160,57	158,60
C. Metal Production	0,02	0,02	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,01
D. Other Production	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
E. Production of Halocarbons and SF <sub>6</sub>													
F. Consumption of Halocarbons and SF <sub>6</sub>													
G. Other	0,13	0,13	0,14	0,13	0,14	0,14	0,14	0,14	0,15	0,15	0,19	0,16	0,26
<b>3. Solvent and Other Product Use</b>	<b>11,27</b>	<b>11,27</b>	<b>11,15</b>	<b>11,22</b>	<b>11,27</b>	<b>11,29</b>	<b>11,35</b>	<b>11,39</b>	<b>11,40</b>	<b>11,37</b>	<b>11,30</b>	<b>11,21</b>	<b>10,91</b>
<b>4. Agriculture</b>	<b>769,12</b>	<b>769,12</b>	<b>752,79</b>	<b>729,39</b>	<b>717,60</b>	<b>720,90</b>	<b>721,19</b>	<b>729,43</b>	<b>733,78</b>	<b>729,54</b>	<b>731,11</b>	<b>725,22</b>	<b>705,64</b>
A. Enteric Fermentation	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Manure Management	75,79	75,79	72,64	70,93	70,14	70,40	70,03	70,26	70,61	70,41	70,37	68,87	69,55
C. Rice Cultivation	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Agricultural Soils	691,90	691,90	678,73	657,12	646,28	649,34	650,03	657,98	661,93	658,04	659,69	655,16	634,90
E. Prescribed Burning of Savannas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
F. Field Burning of Agricultural Residues	1,43	1,43	1,42	1,33	1,18	1,17	1,13	1,19	1,24	1,10	1,05	1,19	1,18
G. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>5. Land-Use Change and Forestry</b>	<b>18,29</b>	<b>18,29</b>	<b>18,27</b>	<b>18,35</b>	<b>18,31</b>	<b>18,31</b>	<b>18,21</b>	<b>18,25</b>	<b>18,27</b>	<b>18,43</b>	<b>18,23</b>	<b>18,37</b>	<b>18,27</b>
A. Changes in Forest and Other Woody Biomass Stocks	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Forest and Grassland Conversion	0,89	0,89	0,86	0,94	0,90	0,94	0,84	0,88	0,87	1,03	0,82	0,96	0,86
C. Abandonment of Managed Lands	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. CO <sub>2</sub> Emissions and Removals from Soil	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
E. Other	17,40	17,40	17,40	17,40	17,41	17,37	17,37	17,36	17,40	17,41	17,41	17,41	17,41
<b>6. Waste</b>	<b>22,62</b>	<b>22,62</b>	<b>20,20</b>	<b>18,80</b>	<b>18,97</b>	<b>18,98</b>	<b>19,14</b>	<b>19,19</b>	<b>19,22</b>	<b>19,38</b>	<b>19,48</b>	<b>19,86</b>	<b>19,70</b>
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	0,00
B. Waste-water Handling	20,94	20,94	18,34	17,01	17,17	17,22	17,34	17,47	17,48	17,64	17,69	17,98	18,00
C. Waste Incineration	1,69	1,69	1,86	1,80	1,82	1,77	1,76	1,72	1,74	1,74	1,75	1,77	1,59
D. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,00	0,00	0,04	0,11	0,11
<b>7. Other (please specify)</b>	<b>3,81</b>	<b>3,81</b>	<b>3,80</b>	<b>3,80</b>	<b>3,80</b>	<b>3,80</b>	<b>3,85</b>	<b>3,83</b>	<b>3,80</b>	<b>3,82</b>	<b>3,83</b>	<b>3,82</b>	<b>3,82</b>
<b>Memo Items:</b>													
<b>International Bunkers</b>	<b>4,11</b>	<b>4,11</b>	<b>4,45</b>	<b>4,23</b>	<b>4,24</b>	<b>4,13</b>	<b>4,25</b>	<b>4,50</b>	<b>4,83</b>	<b>5,27</b>	<b>4,76</b>	<b>4,72</b>	<b>14,99</b>
Aviation	1,53	1,53	1,51	1,56	1,62	1,70	1,85	1,90	2,00	2,14	1,82	1,99	2,19
Marine	2,58	2,58	2,95	2,68	2,62	2,43	2,40	2,60	2,83	3,14	2,94	2,73	12,80
<b>Multilateral Operations</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>
<b>CO<sub>2</sub> Emissions from Biomass</b>													

**TABLE 10 EMISSION TRENDS ( HFCs, PFCs and SF<sub>6</sub> )**  
(Sheet 4 of 5)

European Community

2001

2003

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>39.254,65</b>	<b>25.667,57</b>	<b>24.424,60</b>	<b>25.991,34</b>	<b>28.453,45</b>	<b>33.087,52</b>	<b>39.254,65</b>	<b>43.691,64</b>	<b>49.753,34</b>	<b>54.070,03</b>	<b>41.448,86</b>	<b>45.033,49</b>
HFC-23	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-32	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-41	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-43-10mee	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-125	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-134	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-134a	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-152a	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-143	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-143a	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-227ea	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-236fa	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFC-245ca	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>Emissions of PFCs<sup>(5)</sup> - CO<sub>2</sub> equivalent (Gg)</b>	<b>7.679,46</b>	<b>13.402,51</b>	<b>11.808,33</b>	<b>9.643,12</b>	<b>8.257,79</b>	<b>7.523,24</b>	<b>7.679,46</b>	<b>7.717,20</b>	<b>7.357,74</b>	<b>7.062,74</b>	<b>6.884,56</b>	<b>6.162,62</b>
CF <sub>4</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C <sub>2</sub> F <sub>6</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C <sub>3</sub> F <sub>8</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C <sub>4</sub> F <sub>10</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
c-C <sub>4</sub> F <sub>8</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C <sub>5</sub> F <sub>12</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C <sub>6</sub> F <sub>14</sub>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>Emissions of SF<sub>6</sub><sup>(5)</sup> - CO<sub>2</sub> equivalent (Gg)</b>	<b>12.709,38</b>	<b>8.311,03</b>	<b>8.940,06</b>	<b>9.593,55</b>	<b>10.364,82</b>	<b>11.269,27</b>	<b>12.709,38</b>	<b>12.838,94</b>	<b>12.827,00</b>	<b>12.186,85</b>	<b>9.889,97</b>	<b>9.765,02</b>
SF <sub>6</sub>	0,53	0,35	0,37	0,40	0,43	0,47	0,53	0,54	0,54	0,51	0,41	0,41

**TABLE 10 EMISSION TRENDS (SUMMARY)**  
(Sheet 5 of 5)

European Community

2001

2003

GREENHOUSE GAS EMISSIONS	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	CO <sub>2</sub> equivalent (Gg)												
Net CO <sub>2</sub> emissions/removals	3.137.195,48	3.137.195,48	3.138.004,85	3.080.041,67	3.009.213,46	3.026.711,23	3.071.405,90	3.139.324,50	3.079.281,57	3.138.854,33	3.109.487,23	3.148.753,85	3.180.074,10
CO <sub>2</sub> emissions (without LUCF) <sup>(6)</sup>	3.329.138,69	3.329.138,69	3.354.486,11	3.282.260,60	3.222.222,86	3.227.362,18	3.262.959,72	3.339.598,62	3.279.606,61	3.329.936,48	3.308.900,14	3.329.313,80	3.383.555,51
CH <sub>4</sub>	414.144,67	414.144,67	404.840,15	393.880,34	384.199,39	374.686,19	370.569,13	366.408,18	357.279,41	350.730,13	343.153,53	335.189,48	329.588,15
N <sub>2</sub> O	408.947,02	408.947,02	402.710,07	391.975,11	383.328,29	388.659,94	389.434,21	396.281,88	394.275,64	372.023,85	351.054,65	349.367,32	344.494,63
HFCs	39.254,65	25.667,57	24.424,60	25.991,34	28.453,45	33.087,52	39.254,65	43.691,64	49.753,34	54.070,03	41.448,86	45.033,49	43.383,02
PFCs	7.679,46	13.402,51	11.808,33	9.643,12	8.257,79	7.523,24	7.679,46	7.717,20	7.357,74	7.062,74	6.884,56	6.162,62	5.527,39
SF <sub>6</sub>	12.709,38	8.311,03	8.940,06	9.593,55	10.364,82	11.269,27	12.709,38	12.838,94	12.827,00	12.186,85	9.889,97	9.765,02	9.536,63
<b>Total (with net CO<sub>2</sub> emissions/removals)</b>	<b>4.019.930,66</b>	<b>4.007.668,28</b>	<b>3.990.728,05</b>	<b>3.911.125,15</b>	<b>3.823.817,20</b>	<b>3.841.937,39</b>	<b>3.891.052,72</b>	<b>3.966.262,34</b>	<b>3.900.774,71</b>	<b>3.934.927,93</b>	<b>3.861.918,81</b>	<b>3.894.271,78</b>	<b>3.912.603,92</b>
<b>Total (without LUCF)</b>	<b>4.203.991,01</b>	<b>4.191.728,63</b>	<b>4.199.406,05</b>	<b>4.105.362,21</b>	<b>4.028.907,07</b>	<b>4.034.690,53</b>	<b>4.074.811,16</b>	<b>4.158.724,41</b>	<b>4.093.280,26</b>	<b>4.117.857,95</b>	<b>4.053.530,55</b>	<b>4.066.657,67</b>	<b>4.108.255,82</b>

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	CO <sub>2</sub> equivalent (Gg)												
1. Energy	3.309.531,47	3.309.531,47	3.343.139,98	3.273.631,72	3.213.816,13	3.206.412,78	3.236.579,83	3.315.931,19	3.249.818,23	3.299.502,56	3.274.547,16	3.288.520,70	3.343.701,73
2. Industrial Processes	314.266,98	302.004,59	290.366,44	282.759,84	274.908,03	287.731,69	299.730,97	302.536,10	307.257,58	287.768,28	251.500,26	255.934,60	251.143,38
3. Solvent and Other Product Use	9.559,29	9.559,29	9.468,86	9.257,78	8.860,45	8.826,92	8.856,96	8.871,57	8.939,30	8.974,04	8.936,26	9.039,04	8.771,34
4. Agriculture	433.767,51	433.767,51	423.310,67	412.802,13	407.912,05	409.349,59	408.989,46	412.256,95	412.353,93	410.495,94	410.096,56	406.816,49	400.224,97
5. Land-Use Change and Forestry <sup>(7)</sup>	-184.060,35	-184.060,35	-208.677,99	-194.237,06	-205.089,87	-192.753,14	-183.758,44	-192.462,07	-192.505,56	-182.930,02	-191.611,74	-172.385,89	-195.651,90
6. Waste	134.998,13	134.998,13	131.282,23	125.080,14	121.631,34	120.451,74	118.727,75	117.209,73	113.133,55	109.171,51	106.472,79	104.392,42	102.500,59
7. Other	1.864,53	1.864,53	1.834,76	1.827,51	1.775,98	1.917,82	1.936,71	1.929,41	1.777,70	1.945,61	1.977,52	1.954,42	1.913,59

<sup>(6)</sup> The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report G<sub>g</sub>missions and removals from Land-Use Change and Forestry.

<sup>(7)</sup> Net emissions.

<sup>(8)</sup> The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry. Note that these totals will differ from the totals reported in Table Summary2 if Parties report non-CO<sub>2</sub> emissions from LUCF.

**TABLE 11 CHECK LIST OF REPORTED INVENTORY INFORMATION<sup>(1)</sup>**

**Party:** European Community **Year:** 2001

Contact info:	Focal point for national GHG inventories:	Mr. Bernd Guegele		
	Address:	Spittelauer Lände 5, A-1090 VIENNA		
	Telephone:	+43 (1) 31304 5952	Fax: +43 (1) 31304 5959	E-mail: guegele@ubavie.gv.at
	Main institution preparing the inventory:	EEA / ETC-ACC		

General info:	Date of submission:	15. Apr 03		
	Base years:	1990	PFCs, HFCs, SF <sub>6</sub> :	1995
	Year covered in the submission:	2001		
	Gases covered:	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, PFC, SF <sub>6</sub> , NO <sub>x</sub> , CO, NMVOC, SO <sub>2</sub>		
	Omissions in geographic coverage:			

<b>Tables:</b>		Energy	Ind. Processes	Solvent Use	LUCF	Agriculture	Waste
	Sectoral report tables:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sectoral background data tables:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Summary 1 (IPCC Summary tables):	IPCC Table 7A:		<input checked="" type="checkbox"/>	IPCC Table 7B:		<input checked="" type="checkbox"/>
	Summary 2 (CO <sub>2</sub> equivalent emissions):			<input checked="" type="checkbox"/>			
	Summary 3 (Methods/Emission factors):			<input checked="" type="checkbox"/>			
	Overview Table 7: (Uncertainty)	IPCC Table 8A:		<input checked="" type="checkbox"/>	National information:		<input checked="" type="checkbox"/>
	Recalculation tables:			<input checked="" type="checkbox"/>			
	Completeness table:			<input checked="" type="checkbox"/>			
	Trend table:			<input checked="" type="checkbox"/>			

<b>CO<sub>2</sub></b>	Comparison of CO <sub>2</sub> from fuel combustion:	Worksheet 1-1	Percentage of difference	Explanation of differences
		<input type="checkbox"/>	0,00	<input type="checkbox"/>

<b>Recalculation:</b>		Energy	Ind. Processes	Solvent Use	LUCF	Agriculture	Waste
	CO <sub>2</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	CH <sub>4</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	N <sub>2</sub> O	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	HFCs, PFCs, SF <sub>6</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Explanations:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Recalculation tables for all recalculated years			<input type="checkbox"/>			
	Full CRF for the recalculated base year			<input type="checkbox"/>			

<b>HFCs, PFCs, SF<sub>6</sub></b>		HFCs		PFCs		SF <sub>6</sub>	
	Disaggregation by species:	<input type="checkbox"/>		<input type="checkbox"/>			
	Production of Halocarbons/SF <sub>6</sub> :	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
	Consumption of Halocarbons/SF <sub>6</sub> :	Actual	Potential	Actual	Potential	Actual	Potential
	Potential/Actual emission ratio:	0,00		0,00		0,00	

Reference to National Inventory Report and/or national inventory web site: Annual European Community Greenhouse Gas Inventory 1990-2001 and Inventory Report 2003, Technical Report (www.eea.eu.int).

CRF - Common Reporting Format.  
LUCF - Land-Use Change and Forestry.

<sup>(1)</sup> For each omission, give an explanation for the reasons by inserting a comment to the corresponding cell.