EEA Technical report | No 14/2007

Annual European Community LRTAP Convention Emission Inventory report 1990–2005

Submission to EMEP through the Executive Secretary of the UNECE

ISSN 1725–2237

European Environment Agency

Annual European Community LRTAP Convention Emission Inventory report 1990–2005

Submission to EMEP through the Executive Secretary of the UNECE

European Environment Agency

Cover design: EEA
Layout: EEA

Luxembourg: Office for Official Publications of the European Communities, 2007

ISBN 978-92-9167-970-6
EEA Technical series: ISSN 1725-2237
Annual report series: ISSN 1830-8139

DOI 10.2800/12142

European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark
Tel.: +45 33 36 71 00
Fax: +45 33 36 71 99
Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

Contents

Acknowledgements

This report was prepared by the European Environment Agency's European Topic Centre for Air and Climate Change (ETC/ACC). The lead author was Katarina Mareckova. Other authors were, in alphabetical order, Michael Gager, Bernd Gugele and Elisabeth Kampel. The EEA project managers were Peder Gabrielsen and Martin Adams. André Zuber was the responsible desk officer from the European Commission. The project managers gratefully acknowledge the technical support received from Zuzana Eleničová in the preparation of this report.

Title of report	**Annual European Community LRTAP Convention Emission Inventory report 1990–2005**
Contact names	André Zuber (DG Environment) Peder Gabrielsen (EEA) Martin Adams (EEA) Katarina Mareckova (ETC/ACC)
Organisation	European Commission, DG Environment; European Environment Agency
Address of the European Commission	European Commission DG Environment BU5 06/123 1049 Brussels
Phone	+32 2 29 84995
E-mail	andre.zuber@ec.europa.eu
Address of the European Environment Agency	European Environment Agency Kongens Nytorv 6 1050 Copenhagen Denmark
Phone	+45 33 36 71 00
Fax	+45 33 36 71 99
E-mail	peder.gabrielsen@eea.europa.eu

Executive summary

This is the annual European Community Long-range Transboundary Air Pollution (LRTAP) Convention Emission Inventory report. The report, and its accompanying data, are provided by the European Commission (on behalf of the European Community), as an official submission to the secretariat for the Executive Body of the LRTAP Convention.

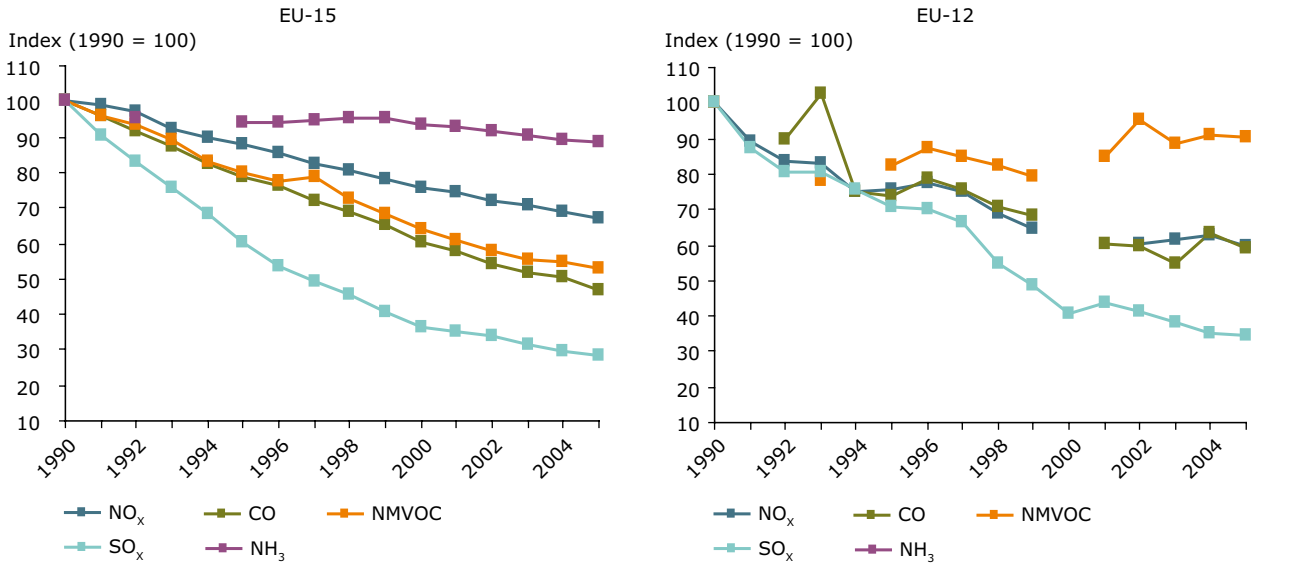
Under the LRTAP Convention, Parties are requested to report emission data for a number of important air pollutants, including sulphur oxides (SO_X), nitrogen oxides (NO_X), non-methane volatile organic compounds (NMVOCs), ammonia (NH_3), carbon monoxide (CO), heavy metals (HMs), persistent organic pollutants (POPs), and primary particulate matter (PM).

The subsequent sections of this report provide general information on the institutional arrangements and data sources that underpin the European Community's LRTAP Convention Inventory (Chapter 1), emission trends by pollutant (Chapter 2), the contribution made to emissions by key categories (Chapter 3) and the recalculations that have been made to previously-reported emission estimates (Chapter 4) by the EU-27 Member States (MS) *).

Emission trends

Due to gaps in the data reported by MS, aggregated EU-15 *) and EU-12 *) totals have been calculated for NO_X, CO, NMVOCs, SO_X, and NH_3 only. Across the EU-27, the reported emissions of nitrogen oxides in 2005 had decreased by more than 34 %, and sulphur dioxide by around 70 % since 1990. Significant reductions have also occurred for the other pollutants during this period. A reduction in emissions has taken place across many of the sectors reported by countries including transport, energy, agriculture and waste.

EU-15 and EU-12 emission trends for NO_X, CO, NMVOCs, SO_X and NH_3 between 1990 and 2005



Note: To enable presentation of provisional emission trends, in some instances (due to non-reporting of data) emissions have been aggregated without including data for all of the EU-15 and EU-12 Member States. Gaps in the trend curves appear for years where a) emissions have not been reported by one or more countries and b) the totals from the available data (in the expert judgement of ETC/ACC), would significantly have changed the overall trend shown. Further details are provided in Chapter 2 of the report.

*) **EU-15** refers to the 15 Member States up to 30 April 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.
EU-12 refers to the Member States that have joined the European Community since 1 May 2004: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic and Slovenia.
EU-27: EU-15 plus EU-12.

The following figures show the specific EU-15 and EU-12 emission trends for NO_X, CO, NMVOCs and SO_X between 1990 and 2005, and for NH_3 for 1990 and 1995–2002. The largest reductions in percentage terms have been achieved for SO_X emissions (– 72 % in EU-15 and – 65 % in EU-12), followed by CO (– 53 % in EU-15 and – 41% in EU-12, without consideration of data from Malta which were not reported for 2005), NMVOC (– 47 % in EU-15 and – 10 % in EU-12) and NO_X (– 33 % in EU-15 and – 40 % in EU-12). The NH_3 emissions decreased in EU-15 by 11.8 % between 1990 and 2005 (without consideration of data from Greece and Luxembourg which have not been reported).

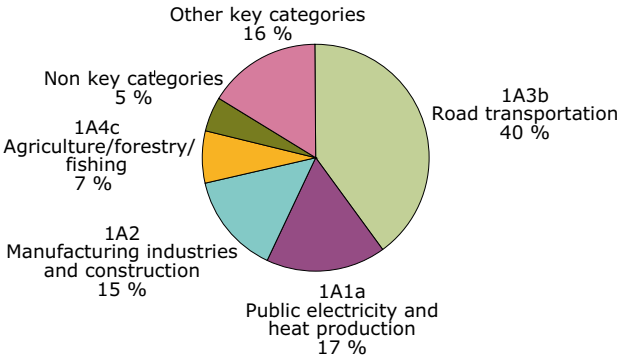
Main sources of emissions

For each of the main air pollutants, a Key Category Analysis (KCA) ([1]) was performed to identify the sectors that contribute most to emissions of a given pollutant. The following graphs present the results of the KCA for EU-15 and EU-12 in 2005. The importance of the road transport sector is clear — it is the most significant source of NO_X, CO_2 and NMVOC. The energy-generation 'public electricity and heat production' sector is the category with the highest share of total SO_X emissions in both the EU-15 and EU-12, and is also significant for NO_X emissions. The emissions caused by activities within the manufacturing and construction industries also contribute significantly to emissions of NO_X, CO, and SO_X. The relative share of pollutant emissions from individual Member States for each key category source is described in further detail within the report.

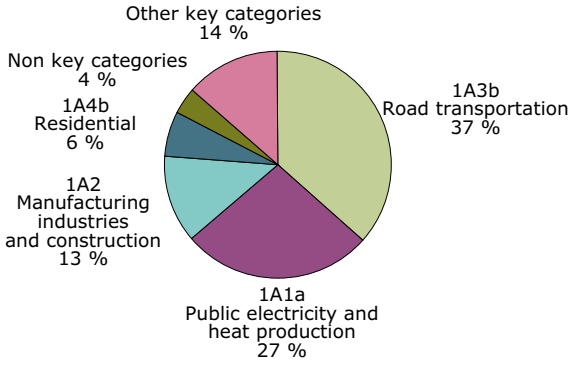
([1]) A key category is the one which has significant influence on a country's total inventory in terms of absolute level of emissions, the trend in emission levels, or both ('Good practice guidance and uncertainty management' (IPCC, 2000)).

Contribution of key categories to EU-15 and EU-12 emissions of NO_x, CO, NMVOCs, and SO_x in 2005

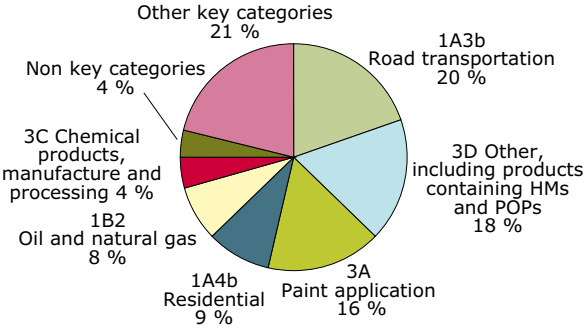
EU-15: NO_x key categories



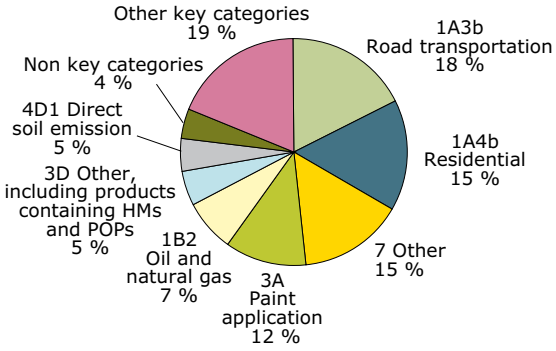
EU-12: NO_x key categories



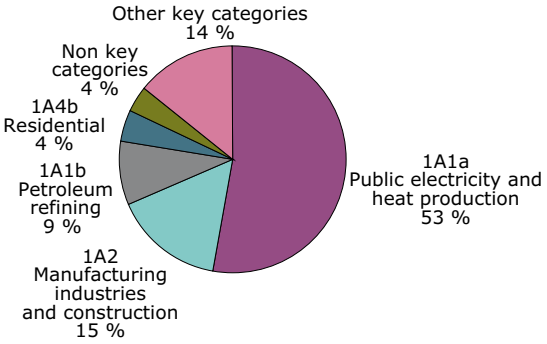
EU-15: NMVOC key categories



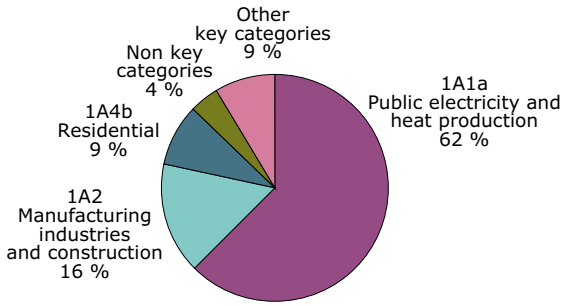
EU-12: NMVOC key categories



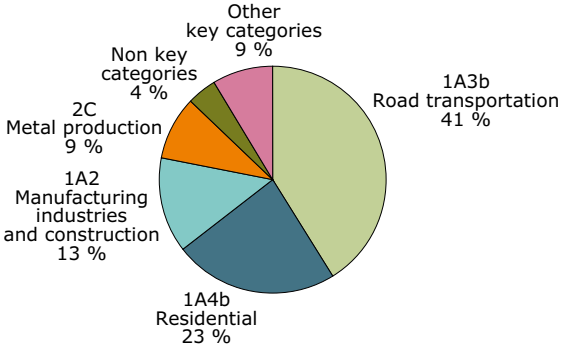
EU-15: SO_x key categories



EU-12: SO_x key categories



EU-15: CO key categories



1 Introduction

This is the annual European Community Long-range Transboundary Air Pollution (LRTAP) Convention Emission Inventory report. The report, and its accompanying data, are provided by the European Commission (on behalf of the European Community), as an official submission to the Secretariat for the Executive Body of the LRTAP Convention.

The report provides general information on the institutional arrangements that lie behind the European Community's Inventory (Chapter 1), an overview of data availability (Chapter 2), emission trends by pollutant contribution of key categories (Chapter 3) and recalculations of previously-reported emission estimates (Chapter 4) for the EU-27 Member States. Due to gaps in the emissions data reported by Member States, EU-15 and EU-12 totals were estimated for nitrogen oxides (NO_X), carbon monoxide (CO), non-methane volatile organic compounds (NMVOCs), sulphur oxides (SO_X) and ammonia (NH_3).

A number of annexes accompany this inventory report:

- Annex A provides a more detailed overview of data availability for NO_X, CO, NMVOCs, SO_X, NH_3, particulate matter (PM), heavy metals (HMs) and persistent organic pollutants (POPs) (EU-15 only);
- Annex B provides the status reports for the EU Member States;
- Annex C provides the Tables IV 1A for the years 1990–2005 for the EU-27;
- Annex D provides the European Community NO_X emissions 1987–1989;
- Annex E provides emissions of PM, HMs and POPs submitted by the EU-27 Member States;
- Annex F provides results of key categories analyses for EU-12 and EU-15;
- Annex G provides a compilation of gridded data reported by Member States;
- Annex H provides a compilation of Large Point Source (LPS) data reported by Member States.

Compared to last year's report, new elements in the 2007 inventory report include the compilation of PM trend tables (Annex D), the provision of recalculation tables, key category analyses and the comparison of inventories for EU-12 Member States. In addition, a new item in this year's report is the overview of gridded data and large point sources (LPS) which are reported every five years by Parties to the LRTAP Convention. Any emissions projection data that Member States may have reported in 2007 under the LRTAP Convention are not included in the scope of this report ([2]).

Throughout this report, 'European Community' refers to the 27 Member States: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

Note:

- EU-15 refers to the 15 Member States up to 30 April 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.
- EU-12 refers to the Member States that have joined the European Community since 1 May 2004: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic and Slovenia.

([2]) The European Community NEC Directive Status Report 2006 (EEA Technical Report 2007 in preparation) provides an assessment of the 2010 air emission projections reported by Member States to the European Commission/EEA.

1.1 Background

1.1.1 Reporting obligations under the Convention on Long-range Transboundary Air Pollution

The United Nations Economic Commission for Europe's Convention on Long-range Transboundary Air Pollution (UNECE LRTAP Convention) was ratified by the European Community in 1982. Article 2 of the Convention states that 'the Contracting Parties, taking due account of the facts and problems involved, are determined to protect man and his environment against air pollution and shall endeavour to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution'.

The Convention has set up a process for negotiating concrete measures to control specific pollutants through legally binding protocols. Since 1984, eight protocols have entered into force. The 1999 Protocol to abate acidification, eutrophication and ground-level ozone entered into force on 17 May 2005. Table 1 presents the status of ratification of each protocol by the European Community. The status differs in the individual Member States.

According to the 2007 work plan for the implementation of the LRTAP Convention, Parties are requested to report their emissions data on sulphur oxides (SO_X), nitrogen oxides (NO_X), non-methane volatile organic compounds (NMVOCs), ammonia (NH_3), carbon monoxide (CO), heavy metals (HMs), persistent organic pollutants (POPs) and primary particulate matter (PM) to the Secretariat. The deadline for submission of 2005 data was 15 February 2007. Gridded data (for the years 1990, 1995, 2000 and 2005, if not already reported) and large point source data (both of which are reported on a five-yearly basis) should have been submitted from Parties to the Secretariat by 1 March 2007. All submissions should be reported using the Nomenclature for Reporting (NFR) formats in accordance with the EMEP 2002 Reporting Guidelines [1].

Table 1 European Community's status of ratification of the LRTAP Convention and related protocols

Convention and emission-related protocols	Status of ratification
The 1979 Convention on Long-range Transboundary Air Pollution	Signed and ratified (approval)
The 1984 Protocol on long-term financing of the cooperative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe	Signed and ratified (approval)
The 1985 Protocol on the reduction of sulphur emissions or their transboundary fluxes by at least 30 percent	Not signed
The 1988 Protocol concerning the control of emissions of nitrogen oxides or their transboundary fluxes	Ratified (accession)
The 1991 Protocol concerning the control of emissions of volatile organic compounds or their transboundary fluxes	Signed
The 1994 Protocol on further reduction of sulphur emissions	Signed and ratified (approval)
The 1998 Protocol on persistent organic pollutants	Signed and ratified (approval)
The 1998 Protocol on heavy metals	Signed and ratified (approval)
The 1999 Protocol to abate acidification, eutrophication and ground-level ozone	Ratified (accession)

1.1.2 Reporting obligations under the NEC Directive and the EU Monitoring Mechanism

The Member States also report their emissions of SO_2, NO_X, NMVOCs and NH_3 under the NEC Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants (NECD) ([3]), and emissions of NO_X, CO, NMVOC and SO_2 emissions under the EU Greenhouse Gas Monitoring Mechanism (EU-MM) ([4]) for the United Nations Framework Convention on Climate Change (UNFCCC). This information should also be delivered by Member States to the European Environment Agency's (EEA's) Eionet Central Data Repository (CDR). Table 2 provides an overview of the different air emissions reporting obligations for the EU Member States.

The three reporting obligations differ in the number and type of air pollutants, the geographical coverage of countries (e.g. France, Spain, Portugal, the United Kingdom), and the inclusion of domestic and international aviation and navigation in the national total, but for most countries the differences are minimal. The LRTAP Convention and UNFCCC inventories differ only in the pollutants included and slightly in the sector split. The major differences are summarised in Table 3.

Table 2 Overview of air emission reporting obligations in the European Community, 2006–2007

Legal obligation		Reporting requirements	Annual reporting deadline for EU Member States	Annual reporting deadline for the EU
LRTAP Convention	1979 Convention on Long-range Transboundary Air Pollution	Emissions of SO_X (as SO_2), NO_X (as NO_2), NH_3, NMVOCs, CO, heavy metals (HMs), persistent organic pollutants (POPs), and particulate matter (PM)	15 February	15 February
EU NECD	Directive 2001/81/EC on National Emission Ceilings for Certain Atmospheric Pollutants	Emissions of SO_2, NO_X, NMVOCs and NH_3	31 December	-
EU Monitoring Mechanism/ UNFCCC	Council Decision 280/2004/ EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol.	Emissions of CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NO_X, CO, NMVOC and SO_2	15 January (to the European Commission) 15 April (to the UNFCCC)	15 April

Table 3 Major differences between the reporting obligations under NECD, LRTAP Convention and EU Greenhouse Gas Monitoring Mechanism

	NECD	LRTAP Convention (NFR [a])	EU-MM (CRF [b])
Air pollutants	NO_X, SO_X, VOCs, NH_3	NO_X, SO_X, CO, NMVOC, NH_3, HMs, POPs, PM	NO_X, SO_X, NMVOC, CO
Domestic aviation (Landing and take-off cycle (LTO))	Included in national total	Included in national total	Included in national total
Domestic aviation (cruise)	*Not included in national total*	Included in national total	Included in national total
International aviation (LTO)	Included in national total	*Not included in national total*	*Not included in national total*
International aviation (cruise)	*Not included in national total*	*Not included in national total*	*Not included in national total*
International inland shipping	Included in national total	*Not included in national total*	*Not included in national total*
International maritime	*Not included in national total*	*Not included in national total*	*Not included in national total*
Road transport	Emissions calculated based on fuel sold or consumed		Emissions calculated based on fuel sold

Note: a) NFR = Nomenclature for reporting — sectoral classification system developed by UNECE/EMEP for the reporting of air emissions;

b) CRF = sectoral classification system developed by UNFCCC/IPCC for reporting of GHGs.

([3]) Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants. OJ L 309, 27.11.2001, p. 22.

([4]) Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol, OJ L 49, 19.2.2004, p. 1.

1.2 Institutional arrangements

1.2.1 EMEP/UNECE

The Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) is one of three subsidiary bodies to the LRTAP Convention. The EMEP programme provides scientific support to the Convention on:

a) Atmospheric monitoring and modelling;

b) Emission inventories and emission projections;

c) Integrated assessment modelling.

The Convention, which now has 51 Parties, identifies the Executive Secretary of the United Nations Economic Commission for Europe (UNECE) as its secretariat.

1.2.2 Member States

Member States are responsible for choosing activity data, emission factors and other parameters used for their national inventories. Member States should also follow the EMEP reporting guidelines [1] and are requested to use the joint EMEP/Corinair Emission Inventory Guidebook [2] prepared by the UNECE/EMEP Task Force on Emission Inventories and Projections (TFEIP).

Member States are also responsible for establishing Quality Assurance and Quality Control (QA/QC) programmes for their inventories. Where Member States compile an inventory report, a description of the QA/QC activities should be described within.

Apart from submitting their national LRTAP inventories and inventory reports, the Member States also take part in the annual review and commenting phase of the draft European Community Inventory report. The purpose of circulating the draft Community Inventory report is to improve the quality of the EC Inventory. The Member States should check their national data and information used in the inventory report and send updates, if necessary. In addition, they may comment on general aspects of the inventory report.

1.2.3 European Environment Agency and the European Topic Centre on Air and Climate Change

The European Environment Agency

The European Environment Agency (EEA) assists DG Environment of the European Commission in the compilation of the annual European Community LRTAP Inventory. The activities of EEA include:

- overall coordination and management of the inventory compilation process;
- coordination of activities of the EEA's European Topic Centre on Air and Climate Change (ETC/ACC) who undertake the data checking, compilation and draft report writing tasks;
- communication with the European Commission;
- communications with Member States;
- circulation of the draft European Community Inventory and Inventory report;
- hosting the official inventory database and web dissemination of data and inventory report.

The European Topic Centre on Air and Climate Change

The current European Topic Centre on Air and Climate Change (ETC/ACC) was established by a contract between the lead organisation Milieu- en Natuurplanbureau (MNP) in the Netherlands and the EEA in 2006. The ETC/ACC involves 11 organisations and institutions in eight European countries. The technical annex for the 2007 work plan for the ETC/ACC and an implementation plan detail the specific tasks of the ETC/ACC partner organisations with regard to the preparation of the European Community Inventory. These activities include:

- initial checks and testing of Member States' submissions in cooperation with EMEP, and compilation of results from initial checks (status reports, country reports);

- consultation with Member States (via EEA) in order to clarify data and other information provided;
- preparation of the draft European Community Inventory and Inventory report by 30 June based on Member States' submissions;
- preparation of the final European Community Inventory and Inventory report by September (subsequently submitted by the Commission to the UNECE).

The tasks of the EEA and the ETC/ACC are facilitated by the European environmental information and observation network (Eionet) ([5]), which consists of the EEA (supported by its European Topic Centres) and a supporting network of experts from national environment agencies and other bodies that deal with environmental information (see http://eionet.europa.eu). Member States are requested to use the Central Data Repository under the Eionet Reportnet tools for making their LRTAP Convention submissions available to the European Commission and the EEA (see http://cdr.eionet.europa.eu).

1.3 Inventory preparation process

There is no specific European Community directive that implements the requirements to estimate the air emissions and prepare air emission inventories for the LRTAP Convention. The legal reporting obligation for the individual Member States and for the European Community remains the 1979 LRTAP Convention. Within the European Community, the Member States are requested to post a copy of their official submission to the LRTAP Convention in the Eionet Reportnet Central Data Repository (CDR) by 15 February each year. EEA-ETC/ACC subsequently collects the data from CDR and compiles the European Community LRTAP Convention Inventory database, producing a European Community LRTAP Convention Inventory and Inventory report.

Within this legal and procedural framework, preparation of the annual LRTAP Convention Inventory involves the Member States providing their data, the European Commission and EEA receiving the data, and finally the EEA and its ETC-ACC compiling the data and preparing the actual inventory. The inventory and accompanying documentation are subsequently made publicly available through the website of the EEA. A flowchart diagram illustrating the data flow that is used to compile the European Community LRTAP Convention Emission Inventory is presented in Figure 1.

1.4 Methods and data sources

The European Community LRTAP Convention Inventory is the sum of the Member States' inventories submitted to the UNECE/EEA. In the case of missing data in the respective 2007 submissions, Member States' emissions that have been provided in previous LRTAP reporting cycles and/or officially reported under NECD or EU-MM are filled in.

An overview, by pollutant, of available emission data submissions at the EEA is provided in Table 4. Due to data gaps and lack of an agreed data gap-filling procedure, total European Community emissions can be estimated only for some years for NO_X, CO, NMVOCs, SO_X and NH_3.

1.4.1 Data gaps and gap filling

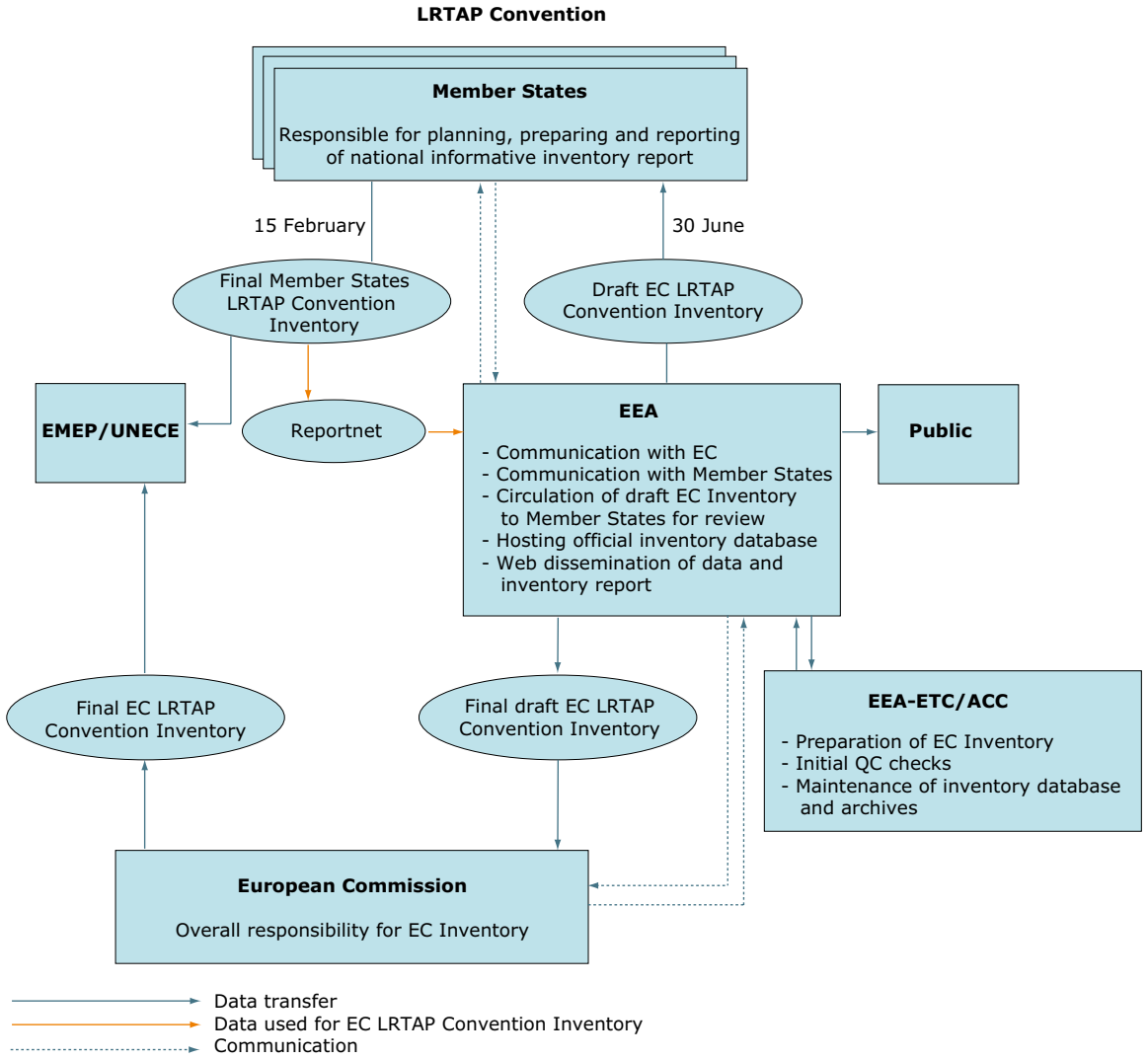
Tables 4 and 5 show that Member States' submissions contain a lot of gaps. There is presently no formal procedure that would enable the missing data in Member States' inventories to be provided. In order to generate a complete EU-27 inventory, a formal procedure for filling data gaps must be elaborated and adopted. One option for the future may be to apply the same general principle and methods as used in the EU Greenhouse Gas Monitoring Mechanism EU-MM (Decision 280/2004/EC) when compiling the EU GHG inventory and inventory report.

When estimates are not included in Member States' LRTAP Inventory submissions to the European Community, gap-filling methods are needed for the following purposes:

1. To complete specific years in the inventory time-series for a specific Member State:
   - for the most recent inventory year(s);
   - for some years of the time series from 1990 to the most recent year.

([5]) Council Regulation (EC) No 933/1999 of 29 April 1999 amending Regulation (EEC) No 1210/90 on the establishment of the European Environment Agency and Eionet. A brochure describing the structure, working methods, outputs and activities of Eionet is available at http://reports.eea.europa.eu/brochure_2004_3/en.

Figure 1 Data flow for the compilation of the European Community LRTAP Emission Inventory



2. To complete individual source categories for individual Member States that did not estimate specific source categories for any year of the time series, instead reporting 'Not estimated' (NE). Gap-filling methods are used for major gaps when it is considered highly probable that emissions from these source categories exist in the Member States concerned.

3. To provide complete NFR data tables for the European Community when some Member States provide only national total emissions. In this case, the gap-filling methods are used to further disaggregate the emission estimates provided by Member States.

4. To enable the presentation of consistent trends for the European Community.

For Member States which did not provide their LRTAP Convention Inventory submission to the EEA, the emissions of air pollutants (SO_X, NO_X, CO, NMVOC and NH_3) officially reported by Member States under NECD and/or EU-MM have been used to fill gaps where possible. This enables provisional emission trends to be provided and the most significant emission sources of the various pollutants to be determined. As noted earlier, the three reporting obligations differ mainly in the number and type of air pollutants, the geographical coverage of some countries and the inclusion of domestic and international aviation and navigation in national totals. However, for most of the countries the differences in reported SO_X, NO_X, CO, NMVOC and NH_3 emissions are considered negligible [3]. No gap-filling has taken place for the MS inventories and EU-27 inventory presented in the accompanying annexes.

Table 4 Overview of air pollutants and years covered in NFR tables received from Member States' LRTAP Convention submissions in 2007

Member State	SO_2, NO_x, CO, NH_3, NMVOC	Cd, Hg, Pb	Additional HM	$PM_{2.5}$, PM_{10}	TSP	POPs (PAH, DIOX, HCB)
Austria	1980–2005	1985–2005	–	1990–2005	1990–2005	1985–2005
Belgium	1991–1994 2004–2005	1991–1994 2004–2005	–	1991–94 2004–05	np	1991–1994 2004–2005
Bulgaria	2005	2005	–	np	np	2005
Cyprus	1990–2005	1990–2005	–	2000–2005	2000–2005	1990–2005
Czech Republic	2005	2005	2005	2005	2005	2005
Denmark	1980–2005	1990–2005	1990–2005	2000–2005	2000–2005	1990–2005
Estonia	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005
Finland	2005	2005	2005	2005	2005	2005, HCB 1990–2004
France	1980–2005	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005
Germany	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005
Greece	2005	np	–	np	np	np
Hungary	2005	2005	2005	2005	2005	2005
Ireland	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005
Italy	np	np	–	np	np	np
Latvia	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005
Lithuania	2005	2005	2005	2005	2005	2005
Luxembourg	np	np	–	np	np	np
Malta	2004–2005	2004–2005	2004–2005	2004–2005	np	np
Netherlands	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005
Poland	2005	2005	–	2005	2005	2005
Portugal	1990–2005	1990–2005	1990–2005	1990–2005	1990–2005	np
Romania	2005	2005	2005	2005	2005	2005
Slovak Republic	1990–2005	1990,1992 1994–2005	1990,1992 1994–2005	2000–2005	1990–2005	1990,1995 1997–2005
Slovenia	1990–2005	1990–2005	–	2000–2005	2000–2005	1990–2005
Spain	1990–2005	1990–2005	1990–2005	2000–2005	2000–2005	1990–2005
Sweden	1980–2005	1990–2005	1990–2005	1990–2005	1980–2005	1980–2005
United Kingdom	1980–2005	1980–2005	1980–2005	1980–2005	np	1990–2005

Note: np = not provided.

Reporting of additional HM is not obligatory for Parties.

Finland has subsequently submitted HCB trends 1990–2004, and Poland has provided updated emissions of HM, POPs and PM.

Table 5 Overview — data sources for SO_x, NO_x, CO and NMVOC and NH_3 emissions used for the European Community Inventory compilation

Member State	New NFR as provided LRTAP Convention submission under Eionet	New NFR as provided under NEC Directive	CRF as provided under EU-MM
Austria	1990–2005		
Belgium	1990–1995, 2000–2005		1996–1999
Denmark	1990–2005		
Finland	2001–2005		1990–2000
France	1990–2005		
Germany	1990–2005		
Greece	1990–2005		
Ireland	1990–2005		
Italy	1990–2004	2005 (NO_x, NMVOC, SO_2, NH_3)	2005 (CO)
Luxembourg			1990–2005
Netherlands	1990–2005		
Portugal	1990–2005		
Spain	1990–2005		
Sweden	1990–2005		
United Kingdom	1990–2005		
Bulgaria	2002–2005		1990–2001
Cyprus	1990–2005		
Czech Republic*	2002–2005		1990–2001
Estonia	1990–2005		
Hungary**	2003–2005	1990 (totals)	1991–2002
Latvia	1990–2005		
Lithuania***	2002–2005		1990–2001
Malta****	2003–2005 (NO_x, NMVOC, SO_x, NH_3)		1990–2000 (SO_2 only totals)
Poland*****	2001 (CO, NMVOC, SO_x, NH_3), 2002–2005		1990–2000, 2001 (NO_x)
Romania	2005		1990–2004
Slovak Republic	2000–2005		1990–1999
Slovenia******	1990–1999 (nat.total); 2000–2005		

Note:

* Czech Republic: emissions from 1990 to 2001 are provided in CDR. However only national totals are provided and these seem to be not consistent with data reported for 2002–2005, therefore 1990–2001 emissions submitted under the EU-MM in March 2007 are used in this report and inventory.

** Hungary: 1990 emissions submitted to EU-MM were not consistent with other years, therefore the emissions presented in the NECD Program 2007 are used.

*** Lithuania: 2003 and 2004 emissions are imported from EMEP WebDab, since they were not submitted to CDR.

**** Malta: historical emissions were submitted under EU-MM in 2004, but only national totals were provided.

***** Poland: CLRTAP emission totals for NO_x for 2000 and 2001 and CO and NMVOC for 2000 were summed from the available sectoral emissions but are not consistent with other years and are therefore not included in the European Community Inventory.

****** Slovenia data for 1990–1999 were provided only as national totals to UNECE.

For other pollutants (PM, HM, POPs), the EU-27 trends cannot be compiled and therefore an analysis of the main emissions sources could be not performed due to gaps in the reported data. MS data for emission trends submitted to UNECE are presented in Annex E.

1.4.2 Gridded data and LPS

Gridded data

According to the 2007 work plan for the implementation of the LRTAP Convention and the EMEP Reporting Guidelines (chapter V, sections A and C), Parties to the Convention are requested to report gridded data for the years 1990, 1995, 2000 and 2005 (if not previously reported) to the LRTAP Secretariat every five years.

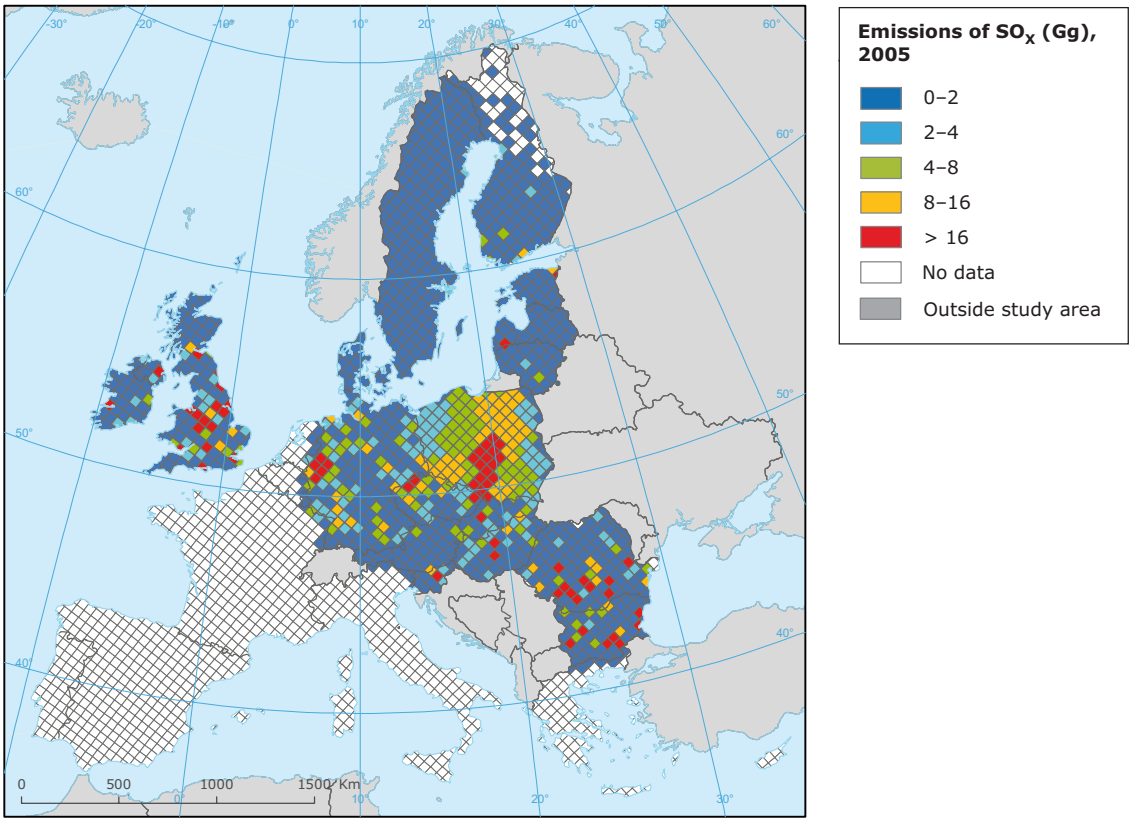
In 2007, gridded data were reported by seventeen Member States via EEA's Reportnet Central Data Repository: Austria, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Germany, Hungary, Ireland, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia, Sweden and United Kingdom.

These data were subsequently compiled and processed into the format required for reporting in the EMEP reporting template file Table IV 3A. The final Table IV 3A results are available from Annex G to this report and comprise spatially disaggregated national totals for the pollutants SO_X, NO_X, NH_3, NMVOC, CO, PM, POPs and HM.

The work began in February 2007, and the grid fraction file ([6]) made available by EMEP as at 22 March was used to check the consistency of data received by countries. The grid fraction file defines the fraction (in percent) of grid cells belonging to a particular country. Clarification from countries was sought where discrepancies were noted (e.g. the reporting of emissions outside national borders). Countries which did not submit gridded data in 2007 are encouraged to report this way in the future.

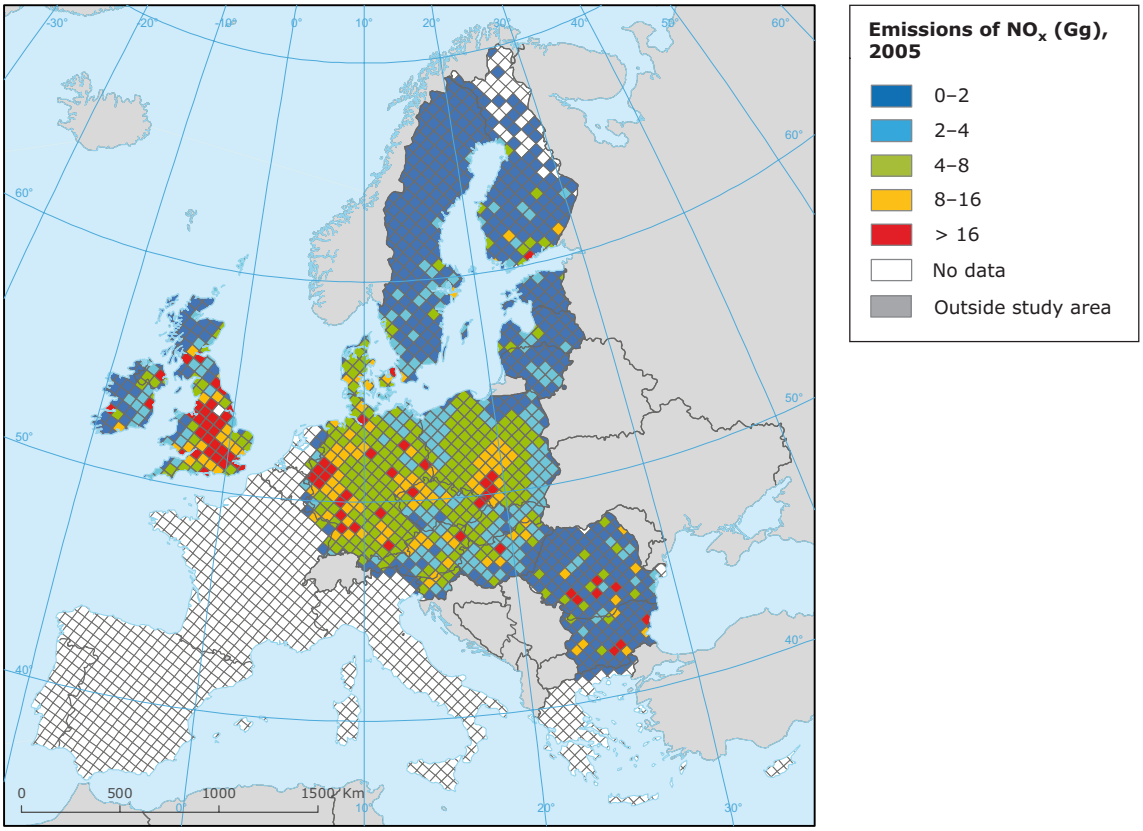
The following maps show the gridded data reported by Member States.

Map 1 Emissions of SO_x in 2005

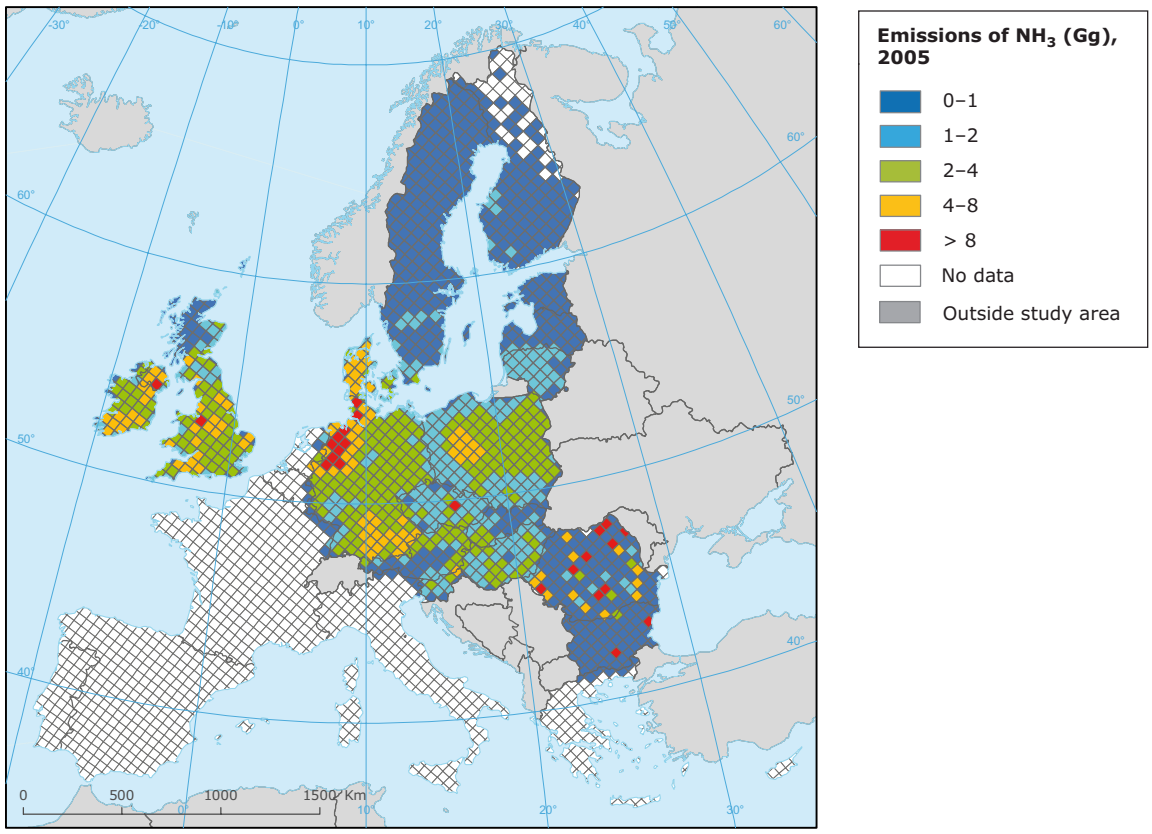


([6]) http://www.emep.int/grid/emep50official_country_grid_fraction.txt.

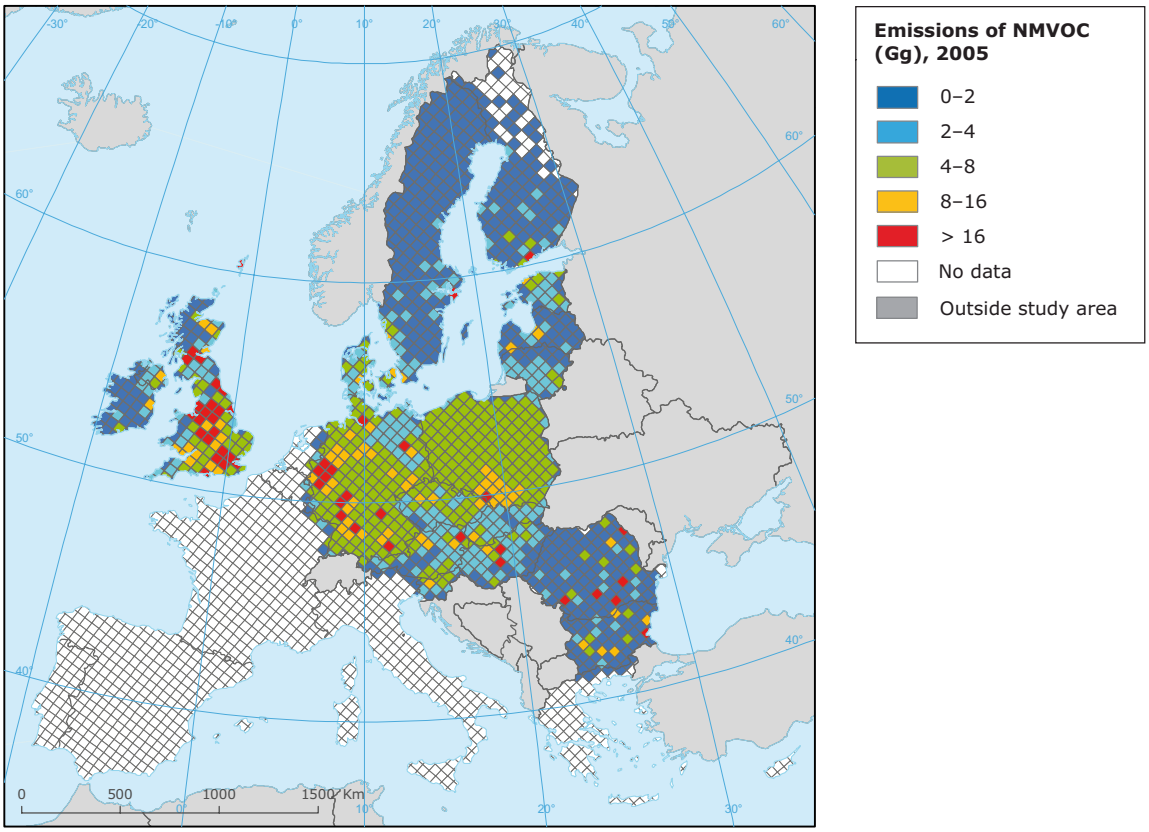
Map 2 Emissions of NO_x in 2005



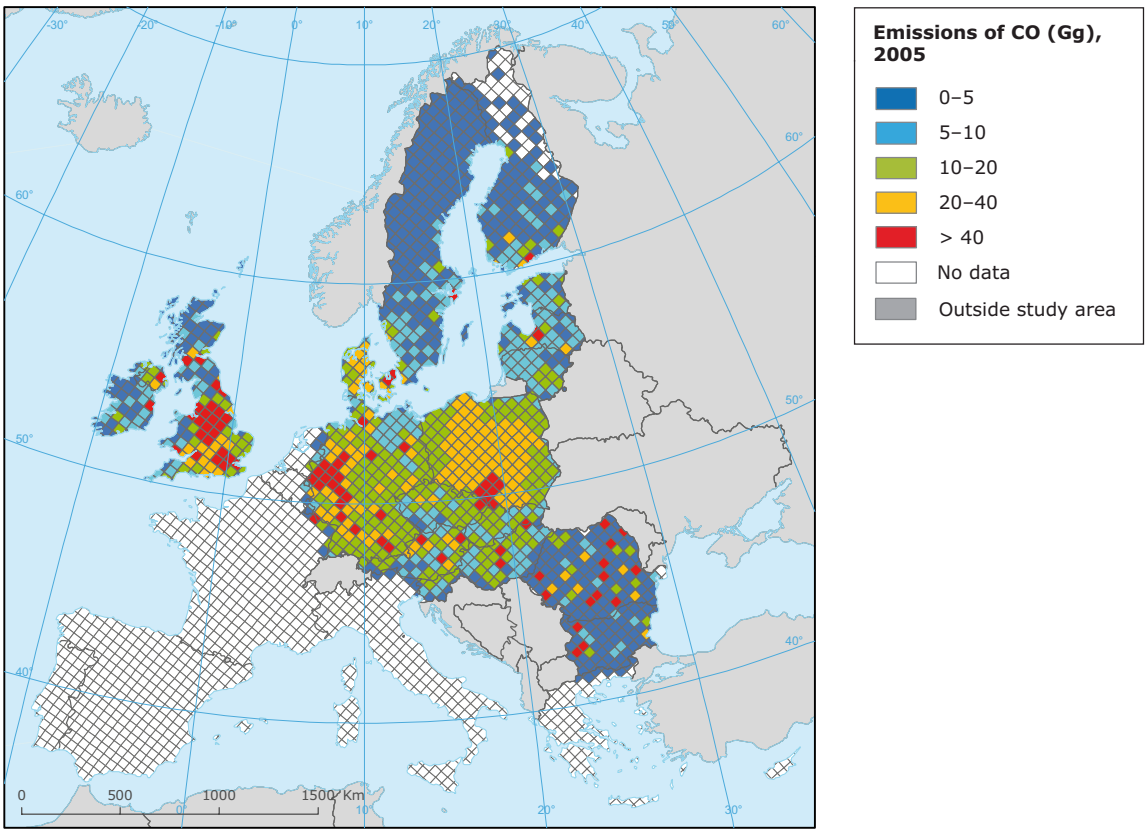
Map 3 Emissions of NH_3 in 2005



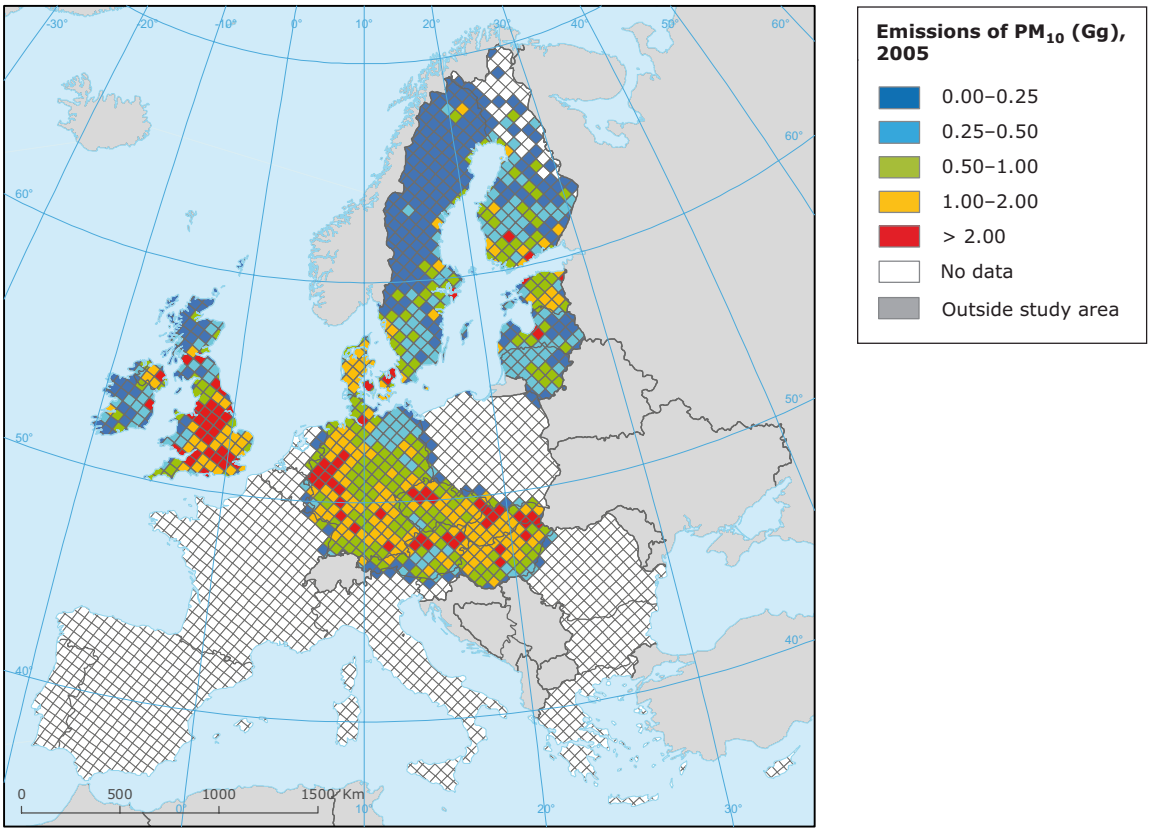
Map 4 Emissions of NMVOC in 2005



Map 5 Emissions of CO in 2005



Map 6 Emissions of PM_{10} in 2005



LPS data

In addition to gridded data, according to the EMEP Reporting Guidelines (chapter V, section A and C), every five years Parties within the geographical scope of EMEP should provide data for the year 2000 and every fifth year on large point sources (LPS). The data requested include: type of source, geographical coordinates (latitude, longitude), emission quantities of the pollutants and, where appropriate, effective chimney height.

Eleven Member States (Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Latvia, Lithuania, Slovak Republic, Slovenia and Spain) reported LPS data to EEA via the Reportnet CDR (Table IV 3C: template file for LPS data for each relevant aggregated NFR). These data were compiled into one file. The final Table IV 3C results are available in Annex H to this report.

1.5 Key categories

Key categories ([7]) were identified using a level analysis of 2005 emissions. The categories responsible for 95 % of the emissions of a given pollutant are classified as key categories.

The key categories for NO_X, CO, NMVOCs and SO_X emissions in 2005 are shown in Table 6. They are significant because of their contribution to EU-15 or EU-12 total emissions for each pollutant. Key category analysis (KCA) for other gases could not be determined because the sectoral data that were submitted are not complete. The key categories shown (most important first), together contribute more than 95 % of total emissions. For NO_X eleven key categories were identified, eight for CO, 15 for NMVOC and ten for SO_X.

([7]) A key category is the one which has significant influence on a country's total inventory in terms of absolute level of emissions, the trend in emissions, or both [4].

Table 6 Results of key category analysis for EU-15 and EU-12 in 2005: cumulative contribution of sources to total emissions (in descending order)

NO_x — Key categories			
EU–15		**EU–12**	
1 A 3 b Road transportation	40.2 %	1 A 3 b Road transportation	36.8 %
1 A 1 a Public electricity and heat production	57.0 %	1 A 1 a Public electricity and heat production	63.6 %
1 A 2 Manufacturing industries and construction	71.6 %	1 A 2 Manufacturing industries and construction	76.2 %
1 A 4 c Agriculture/Forestry/Fishing	78.9 %	1 A 4 b Residential	82.6 %
1 A 4 b Residential	83.5 %	1 A 4 c Agriculture/Forestry/Fishing	88.1 %
1 A 3 d ii National navigation	87.5 %	1 A 3 e Other	90.7 %
1 A 4 a Commercial/Institutional	89.6 %	2 B Chemical industry	92.6 %
4 D 1 Direct soil emission	91.4 %	1 A 4 a Commercial/Institutional	94.4 %
1 A 1 b Petroleum refining	93.2 %	1 A 3 c Railways	96.1 %
1 A 1 c Manufacture of solid fuels and other energy industries	94.4 %		
1 A 3 c Railways	95.3 %		

CO — Key categories			
EU–15		**EU–12**	
1 A 3 b Road transportation	41.3 %	1 A 4 b Residential	40.9 %
1 A 4 b Residential	64.5 %	1 A 3 b Road transportation	68.6 %
1 A 2 Manufacturing industries and construction	78.0 %	6 C Waste incineration	78.6 %
2 C Metal production	87.4 %	1 A 4 c Agriculture/Forestry/Fishing	85.8 %
6 C Waste incineration	90.2 %	1 A 2 Manufacturing industries and construction	92.5 %
1 A 4 c Agriculture/Forestry/Fishing	92.4 %	2 C Metal production	94.3 %
1 A 3 d ii National navigation	94.4 %	1 A 4 a Commercial/Institutional	95.9 %
1 A 1 a Public electricity and heat production	96.0 %		

NNWOC — Key categories			
EU–15		**EU–12**	
1 A 3 b Road transportation	19.7 %	1 A 3 b Road transportation	17.9 %
3 D Other including products containing hms and pops (please specify in a covering note)	37.2 %	1 A 4 b Residential	33.4 %
3 A Paint application	53.5 %	7 Other	48.2 %
1 A 4 b Residential	62.6 %	3 A Paint application	59.8 %
1 B 2 Oil and natural gas	70.3 %	1 B 2 Oil and natural gas	67.2 %
3 C Chemical products, manufacture and processing	74.8 %	3 D Other including products containing HMs and POPs	72.2 %
2 D Other production	78.3 %	4 D 1 Direct soil emission	77.1 %
2 A Mineral products	81.5 %	3 C Chemical products, manufacture and processing	81.1 %
1 A 3 d ii National navigation	83.9 %	3 B Degreasing and dry cleaning	84.2 %
4 D 1 Direct soil emission	86.2 %	2 D Other production	87.1 %
2 B Chemical industry	88.4 %	1 A 4 c Agriculture/Forestry/Fishing	89.5 %
3 B Degreasing and dry cleaning	90.5 %	1 A 2 Manufacturing industries and construction	91.3 %
1 A 4 c Agriculture/Forestry/Fishing	92.4 %	1 A 1 a Public electricity and heat production	93.1 %
1 A 2 Manufacturing industries and construction	94.1 %	2 B Chemical industry	94.8 %
4 B Manure management	95.7 %	2 A Mineral products	96.1 %

SO_x — Key categories			
EU–15		**EU–12**	
1 A 1 a Public electricity and heat production	52.6 %	1 A 1 a Public electricity and heat production	62.4 %
1 A 2 Manufacturing industries and construction	68.0 %	1 A 2 Manufacturing industries and construction	78.3 %
1 A 1 b Petroleum refining	77.2 %	1 A 4 b Residential	87.2 %
1 A 4 b Residential	81.6 %	1 A 4 a Commercial/institutional	90.2 %
1 A 3 d ii National navigation	85.3 %	1 A 1 b Petroleum refining	93.0 %
1 B 2 Oil and natural gas	88.8 %	1 A 4 c Agriculture/Forestry/Fishing	94.5 %
1 A 4 a Commercial/Institutional	90.7 %	1 A 1 c Manufacture of solid fuels and other energy industries	95.8 %
2 B Chemical industry	92.5 %		
2 C Metal production	94.3 %		
1 A 1 c Manufacture of solid fuels and other energy industries	95.6 %		

The key category analysis performed for the EU-15 and EU-12 geographical regions resulted in broadly similar results. There are small differences in the number of key categories per pollutant and in the contribution of single key categories to EU-15 and EU-12 total emissions. For example, National navigation is not identified as a key category in EU-12, but it is for EU-15. Most differences occurred for NMVOC, where the sector Solvents has higher importance in EU-15 than in EU-12. For NO_X and SO_X, the EU-15 needs more key categories to explain 95% of emissions, which concludes lower shares of single key categories than for EU-12.

For EU-15, 95 % of CO emissions result from eight categories. In contrast, NMVOC emission sources are more diverse, as 15 key categories were identified. The results of the KCA also show that the category 'Road transportation (1A3b)' is the most important key category for NO_X, CO and NMVOC. 'Public electricity and heat production' (1A1a) is responsible for significant NO_X and SO_X emissions, and 'Manufacturing industries and construction' (1A2) also contributes significantly to NO_X, CO and SO_X emissions. Detailed information on the top ten key categories with the highest contributions to the EU-15 total emissions in 2005 is presented by pollutant in Chapter 3.

In EU-12, 95 % of NO_X emissions can be explained by looking at eight key categories; Road transportation and Public electricity and heat production categories are responsible for more than 60 %. Fifteen key categories were identified to explain 95 % of NMVOC emissions. The four largest contributing categories each have a share of between 10 and 20 % of the emissions total. The KCA for SO_X identified seven key categories, of which the Public electricity and heat production category alone contributes more than 60 % of the total.

1.6 QA/QC and verification methods

Member States are encouraged to use appropriate quality assurance and quality control (QA/QC) procedures to ensure data quality and to verify and validate their emissions data. These procedures should be consistent with those described in the EMEP/Corinair Guidebook [2].

There is no formal QA/QC plan available for the European Community Inventory. The main activities to enhance the quality of the inventory are the checks performed by the EEA/ETC-ACC on the status of each MS submission. For this purpose, the EEA-ETC/ACC fills out a status report form similar to those prepared in the UNFCCC greenhouse gas submission process (included in Annex B of this report). In addition, the internal consistency of the NFR tables IV 1A are checked before the compilation of the EU-27 tables.

All inventory documents (submissions, inventory masterfile, inventory report, status reports and related correspondence) are archived electronically at the EEA-ETC/ACC. Revisions of data sets are recorded.

More detailed quality assurance activities are performed by the EEA-ETC/ACC and EMEP in an annual review process. The review process includes checks on timeliness, consistency, accuracy, completeness and comparability of actual MS inventory submissions. Results of testing are submitted to the Member States and used to improve the quality of the national emission inventories. Results of this review are separately published each year in a joint EMEP/EEA review report ([8]).

1.7 General uncertainty evaluation

Any quantification of uncertainty in the European Community Inventory first requires the provision of detailed underpinning information on emission uncertainties from Member States. An evaluation of uncertainty at the European Community level (including all EU-27 Member States) has therefore not been performed, as sufficient information from Member States has not been reported.

1.8 General assessment of completeness

In the 2007 reporting cycle, Member States were obliged to provide inventories to UNECE (with a copy to CDR) not later than 15 February 2007. Submissions should contain emissions of SO_X (as SO_2), NO_X (as NO_2), NH_3, NMVOCs, CO, HMs, POPs and PM. Details of the reporting requirements are provided at the end of this report and on the EMEP website (http://www.emep.int/emis2007/reportinginstructions.html).

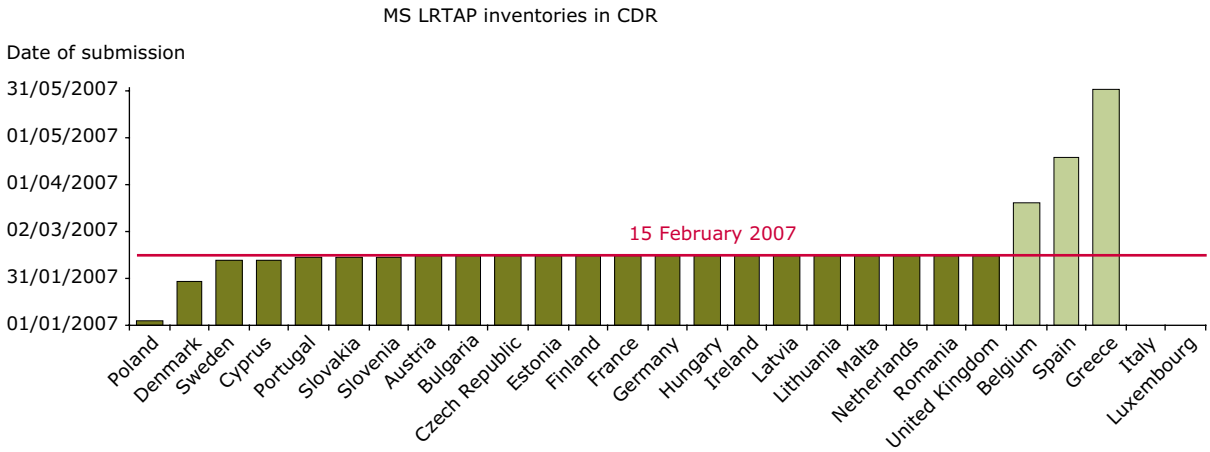
([8]) A summary of the results of the review performed in 2007 are available in [3].

For the inventory prepared in 2007, 25 out of 27 EU Member States provided data (Figure 2, Table 4 and Table 7). United Kingdom, Belgium, Spain and Greece did not submit in time; Italy and Luxembourg did not submit a LRTAP Inventory for the year 2005. Fifteen MS posted more than one submission on CDR with additional data or revised inventories. Note that Table 7 does not refer to data submitted in previous years.

Due to data gaps (and the lack of an agreed gap-filling procedure that might be used to fill gaps where they exist), total European Community emissions can only be estimated for some years and some pollutants (NO_X, CO, NMVOC, SO_X and NH_3).

Annex A provides a detailed overview of data availability for NO_X, CO, NMVOCs, SO_X, NH_3, PM, HMs and POPs for each EU-15 Member State. Data reported for PM, POPs and HMs are presented in Annex E.

Figure 2 Overview of first submission dates



Note: CDR — the Central Data Repository of the EEA/Eionet's Reportnet.

Table 7 Date of receipt of inventory submission by the EEA, years covered and information provided by Member States by 1 June 2007

	Annual reporting					Minimum 5 year reporting			
Member State	**Submission date *)**	**Re-submission date**	**NFR template**	**Other format**	**IIR 2007**	**Projections table 2a**	**Activity data (table 2b,c,d,e)**	**Gridded data (totals, 3a, 3b)**	**Emissions LPS (3c)**
Austria	15.02.2007				x	x	x	3A	np
Belgium	20.03.2007		1991–1994, 2004–2005		np	np	np	3A	np
Bulgaria	15.02.2007	19.04.2007	2005		x	2010, 2015, 2020	x	3A: 2005	2000, 2005
Cyprus	12.02.2007	15.05.2007	1990–2005		short	2010	x	np	2005
Czech Republic	15.02.2007	23.04.2007	2005		np	2010	x	np	np
Denmark	29.01.2007	15.02.2007	1980–2005		x	x	1990, 1995, 2000, 2005	3A,3B: 2000, 2005	1990, 1995, 2000, 2005
Estonia	15.02.2007	02.03.2007	1990–2005		np	np	2005, except 2C	3A: 1990, 1995, 2000, 05 3B: 2000, 05	1990, 1995, 2000, 2005
Finland	15.02.2007	14.03.2007	2005		x	2010	2005	2005	2005
France	15.02.2007				x	2010	1990, 1995, 2000, 2005	np	np
Germany	15.02.2007	22.06.2007	1990–2005		np	2010	Except 2C	1990, 1995, 2000, 2005	np
Greece	01.06.2007	23.08.2007	2003, 2005		x	np	np	np	np
Hungary	15.02.2007	01.03.2007	2005		np	np	np	np	np
Ireland	15.02.2007	14.03.2007	1990–2005		np	np	np	np	1990, 1995, 2000, 2005
Italy	np		np		np	np	np	np	np
Latvia	15.02.2007	15.05.2007	1990–2005		x	2010, 2015, 2020	1990, 1995, 2000, 2005	2000, 2005	2000, 2005
Lithuania	15.02.2007		2005		x	2010, 2020	2005	2005	2005
Luxembourg	np		np			np	np	np	np
Malta	15.02.2007	21.02.2007	2004–2005		np	np	np	np	np
Netherlands	15.02.2007		1990–2005		np	x	np	np	np
Poland	04.01.2007	15.02.2007, Aug 2007	2005		x	2010	05,10	np	np
Portugal	14.02.2007		1990–2005		np	np	1991–2005	np	np
Romania	15.02.2007	01.03.2007	2005		np	np	2005	2005	np
Slovak Republic	14.02.2007		2000–2005	1990–1999	x	x	Except 2C	3A: 1990, 1995, 2000, 2005	x
Slovenia	14.02.2007	02.03.2007 07.05.2007	2000–2005	1980–1999	np	x	x	3A: 2005	x
Spain	18.04.2007		1990–2005		np	x	x	x	x
Sweden	12.02.2007	21.02.2007	1980–2005		x	x	np	2005	np
United Kingdom	15.02.2007	02.03.2007	1980–2005		np	x	1990, 1995, 2000, 2005	2004	np

Note: *) refers to submission of inventory data; submission of other data is possible at different dates.
IIR — Submission of an Informative Inventory Report (IIR) is not mandatory for Parties.
np = not provided; x = provided.

2 Trend in total emissions

Total emissions of air pollutants for the EU-27 cannot be estimated for all years because of a lack of data. EU-27 totals are only available for NO_X, CO, NMVOC and SO_X for the years 1990 and 1998, 2003, 2004 and 2005, whereby CO is not available for 2003, 2004 and 2005. EU-27 totals for NH_3 are not available for any year (see Table 8). Data reported for particulate matter (PM), persistent organic pollutants (POPs), and heavy metals (HM) are presented in Annex E.

For EU-15 and EU-12, Figures 3 and 4 and Table 8 show EU-15 and EU-12 emission trends for NO_X, CO, NMVOCs and SO_X between 1990 and 2005 from available data. The largest reductions in relative terms have been achieved for SO_X emissions (– 72 % in EU-15 and – 65 % in EU-12), followed by CO (– 53 % in EU-15 and by approximately – 41% in EU-12 without consideration of data from Malta which was not reported for 2005), NMVOC (– 47 % in EU-15 and about – 10 % in EU-12) and NO_X (– 33 % in EU-15 and – 40% in EU-12). NH_3 emissions decreased in EU-15 by 11.8 % between 1990 and 2005 (without consideration of data from Luxembourg which has not been reported, and assuming constant NH_3 emissions from Greece after 2002).

The following sections show the contribution of the European Community Member States to the EU-15, EU-12, and EU-27 total emissions for NO_X, CO, NMVOCs, SO_X and NH_3.

2.1 NO_X emission trends

Between 1990 and 2005, total NO_X emissions in the EU-15 decreased by almost 35 %. Four Member States (Austria, Greece, Portugal and Spain) reported increases in this period, with the highest in Spain (22 %). France, Germany, Italy, Spain and United Kingdom reported NO_X emissions in 2005, all above 1 000 Gg. The change of total NO_X emissions in the EU-15 between 2004 and 2005 was small — a

Figure 3 EU-15 and EU-12 emission trends for NO_X, CO, NMVOCs, SO_X and NH_3, between 1990 and 2005

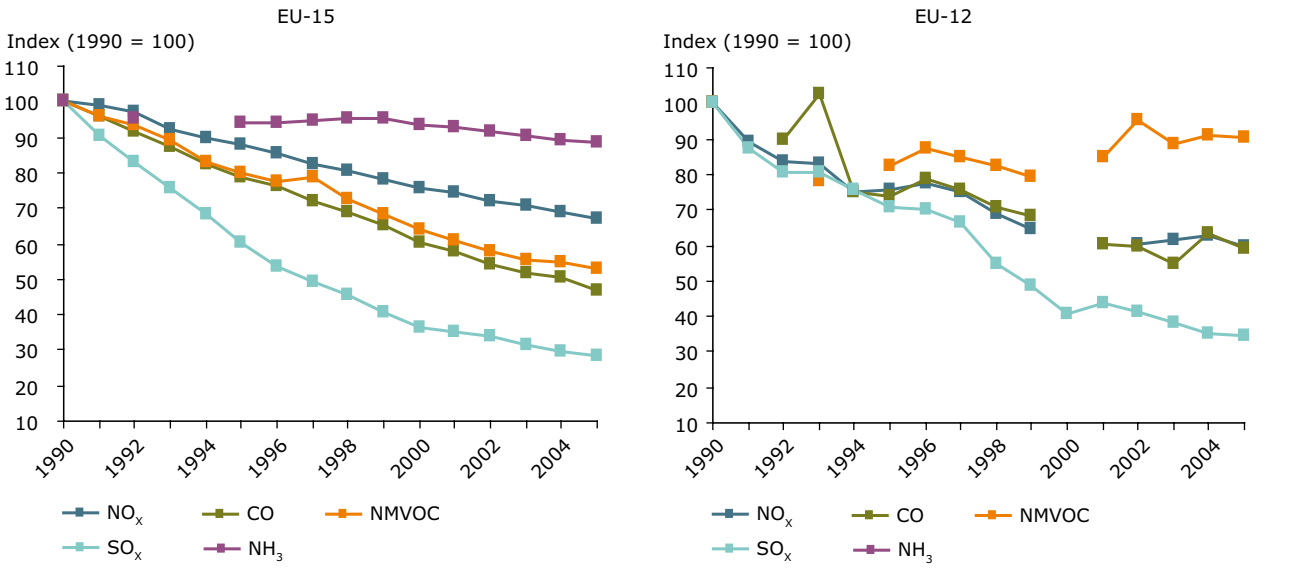
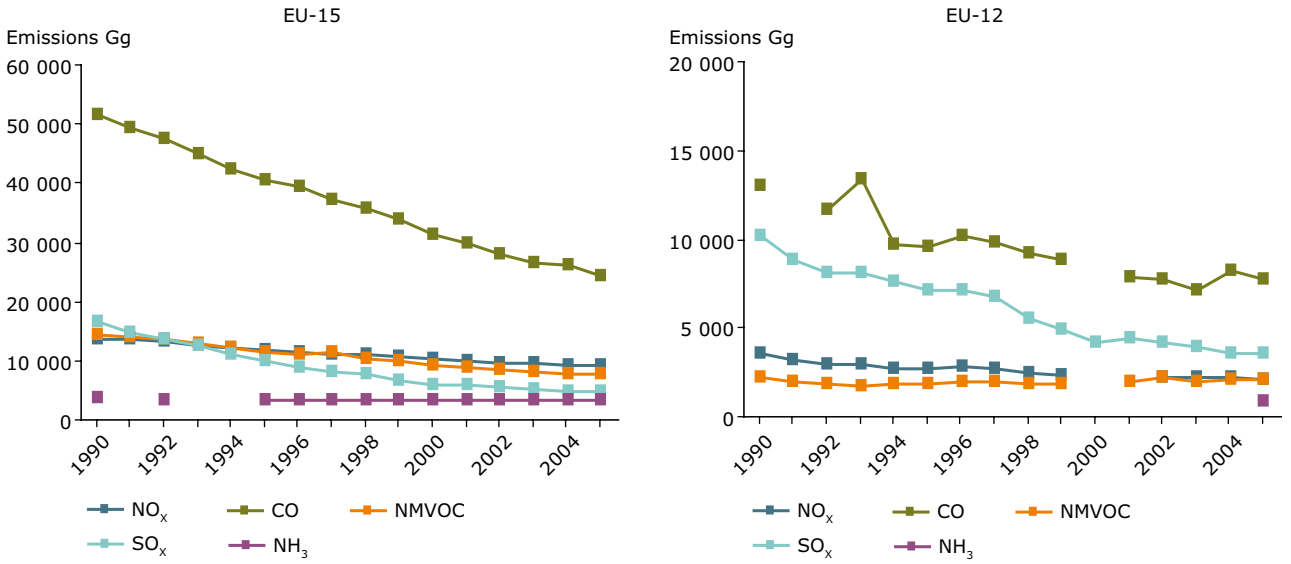


Figure 4 EU-15 and EU-12 emission trends for NO_x, CO, NMVOCs, SO_x and NH_3 between 1990 and 2005



Note: To enable presentation of provisional emission trends, in some instances (due to non-reporting of data) emissions have been aggregated without including data for all of the EU-15 and EU-12 Member States. Gaps in the trend curves appear for years where a) emissions have not been reported by one or more countries and b) the totals from the available data (in the expert judgement of ETC/ACC), would significantly have changed the overall trend shown.

The following data were not reported by Member States:

- EU-15: NH_3 emissions from Luxembourg for 1991–1992 and 2003–2005; and from Finland for 1991 and 1993–1994. For Greece, NH_3 emissions for 2003–2005 were assumed to be the same as the reported emissions for 2002 (following confirmation from Greece that after 1998 these emissions are considered to be constant);
- EU-12: NH_3 emissions were not provided by Bulgaria for 1990–2000; Lithuania for 1990–2001; Romania for 1990–2004. Malta did not report emissions of NO_x (2002), CO (2001–2005), NMVOC and SO_x (2001–2002). Poland did not provide consistent NO_x emissions for 2000–2001, CO emissions for 1991 and 2000, and NMVOC emissions for 2000.

Table 8 Total EU-15, EU-12 and EU-27 emissions of NO_x, CO, NMVOCs, SO_x and NH_3 (Gg)

EU-15	1990	1995	2000	2001	2002	2003	2004	2005	Change 1990–2005	Change 2004–2005
NO_x	13 570	11 912	10 284	10 078	9 745	9 637	9 372	9 090	– 33.0 %	– 3.0 %
CO	51 557	40 629	31 192	29 809	27 797	26 610	25 974	24 194	– 53.1 %	– 6.9 %
NMVOC	14 493	11 581	9 289	8 857	8 380	8 057	7 906	7 645	– 47.3 %	– 3.3 %
SO_x	16 492	9 904	6 034	5 805	5 586	5 150	4 918	4 635	– 71.9 %	– 5.8 %
NH_3	3 629	3 417	3 391	3 369	3 317	3 271	3 245	3 202	– 11.8 %	– 1.3 %
EU-12	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Change 1990–2005**	**Change 2004–2005**
NO_x	3 576	2 703	NE	NE	2 165	2 210	2 240	2 145	– 40.0 %	– 4.3 %
CO **	12 987	9 595	NE	7 842	7 754	7 078	8 216	7 685	– 40.8 %	– 6.5 %
NMVOC	2 256	1 856	NE	1 909	2 148	1 997	2 054	2 034	– 9.8 %	– 1.0 %
SO_x	10 128	7 164	4 144	4 428	4 162	3 873	3 536	3 513	– 65.3 %	– 0.7 %
NH_3	NE	NE	NE	NE	NE	NE	NE	840	NE	NE
EU-27	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Change 1990–2005**	**Change 2004–2005**
NO_x	17 146	14 616	NE	NE	11 910	11 846	11 613	11 235	– 34.5 %	– 3.3 %
CO**	64 544	50 224	NE	37 651	35 551	33 689	34 190	31 878	– 50.6 %	– 6.8 %
NMVOC	16 749	13 436	NE	10 765	10 527	10 053	9 960	9 678	– 42.2 %	– 2.8 %
SO_x	26 621	17 067	10 179	10 233	9 749	9 023	8 454	8 147	– 69.4 %	– 3.6 %
NH_3	NE	NE	NE	NE	NE	NE	NE	4 043	NE	NE

Note: Minus values indicate that a reduction of emissions has occurred.
** Refer also to the notes of the preceding table.

decrease of 3 %, mainly caused by the reduction achieved in Germany, Italy and United Kingdom (Table 9).

All new Member States reported NO_x emissions for 2005. Poland had the highest level of NO_x emissions of the new Member States, followed by Romania, Czech Republic and Bulgaria. Between 1990 and 2005 the total NO_x emissions in the EU-12 decreased by 40 %. All new MS except Malta and Cyprus reported decreased emissions since 1990. Between 2004 and 2005 the change in NO_x emissions in the EU-12 was 4.3 % (Table 9).

Overall, between 1990 and 2005, NO_x emissions decreased in the EU-27 by 34.5 % and between 2004 and 2005 by 3.3 %. EU-27 NO_x emissions in 2005 accounted for 11 235 Gg (Table 9).

Figure 5 shows that the five most important key categories of the EU-15 decreased between 1990 and 2005. NO_x emissions from road transport, which

Table 9 Member States' contribution to European Community emissions of NO_x (Gg)

	NO_x trends								Change in %		Share in EU-27	
NO_x in Gg	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**1990–2005**	**2004–2005**	**1990**	**2005**
Austria	211	192	205	214	220	229	225	225	6.6 %	0.2 %	1.2 %	2.0 %
Belgium	382	372	330	316	300	297	299	293	– 23.3 %	– 1.9 %	2.2 %	2.6 %
Denmark	274	264	207	204	202	210	195	186	– 32.1 %	– 4.5 %	1.6 %	1.7 %
Finland	294	245	210	222	208	219	203	177	– 39.8 %	– 12.7 %	1.7 %	1.6 %
France	1 841	1 655	1 407	1 350	1 298	1 257	1 234	1 207	– 34.5 %	– 2.2 %	10.7 %	10.7 %
Germany	2 861	2 170	1 817	1 774	1 683	1 626	1 578	1 443	– 49.6 %	– 8.6 %	16.7 %	12.8 %
Greece	300	321	330	344	341	343	317	332	10.6 %	4.7 %	1.7 %	3.0 %
Ireland	124	125	133	135	126	120	119	119	– 4.1 %	0.3 %	0.7 %	1.1 %
Italy	1 943	1 808	1 373	1 352	1 258	1 245	1 173	1 127	– 42.0 %	– 3.9 %	11.3 %	10.0 %
Luxembourg	14	11	10	9	10	10	8	8	– 42.9 %	– 5.2 %	0.1 %	0.1 %
Netherlands	558	468	394	383	375	373	355	344	– 38.3 %	– 3.0 %	3.3 %	3.1 %
Portugal	243	274	284	285	293	271	271	275	13.1 %	1.5 %	1.4 %	2.4 %
Spain	1 244	1 344	1 457	1 439	1 492	1 493	1 524	1 522	22.4 %	– 0.1 %	7.3 %	13.5 %
Sweden	314	280	231	223	219	215	209	205	– 34.7 %	– 2.0 %	1.8 %	1.8 %
United Kingdom	2 966	2 384	1 897	1 828	1 721	1 728	1 664	1 627	– 45.2 %	– 2.2 %	17.3 %	14.5 %
EU-15	**13 570**	**11 912**	**10 284**	**10 078**	**9 745**	**9 637**	**9 372**	**9 090**	**– 33.0 %**	**– 3.0 %**	**79.1 %**	**80.9 %**
Bulgaria	242	151	128	138	197	209	216	233	– 3.6 %	8.2 %	1.4 %	2.1 %
Cyprus	14	18	22	21	22	21	18	17	19.5 %	– 5.7 %	0.1 %	0.2 %
Czech Republic	742	430	396	332	318	323	328	278	– 62.5 %	– 15.2 %	4.3 %	2.5 %
Estonia	74	38	35	37	40	39	37	32	– 56.4 %	– 12.7 %	0.4 %	0.3 %
Hungary	238	185	185	183	183	180	185	203	– 14.7 %	9.6 %	1.4 %	1.8 %
Latvia	67	40	38	38	39	40	40	41	– 37.7 %	2.8 %	0.4 %	0.4 %
Lithuania	136	51	46	44	51	53	55	58	– 57.7 %	5.4 %	0.8 %	0.5 %
Malta	10	10	10	NE	NE	12	12	12	20.0 %	– 1.1 %	0.1 %	0.1 %
Poland	1 280	1 120	NE	NE	796	808	804	811	– 36.6 %	0.8 %	7.5 %	7.2 %
Romania	484	411	319	337	360	372	390	303	– 37.3 %	– 22.2 %	2.8 %	2.7 %
Slovak Republic	226	182	109	109	101	98	98	98	– 56.7 %	– 0.1 %	1.3 %	0.9 %
Slovenia	63	67	59	59	58	55	58	58	– 8.4 %	0.4 %	0.4 %	0.5 %
EU-12	**3 576**	**2 703**	**NE**	**NE**	**2 165**	**2 210**	**2 240**	**2 145**	**– 40.0 %**	**– 4.3 %**	**20.9 %**	**19.1 %**
EU-27	**17 146**	**14 616**	**NE**	**NE**	**11 910**	**11 846**	**11 613**	**11 235**	**– 34.5 %**	**– 3.3 %**	**100.0 %**	**100.0 %**

Note: EU-12 and EU-27 emissions of NO_x for 2002 do not include data from Malta as these have not been reported.

NE — Not estimated.

contributes more than 40 % of total NO_x emissions, decreased by 42 %. Four countries (Austria, Greece, Portugal and Spain) reported increases between 1990 and 2005. France, Germany and United Kingdom achieved the highest absolute reduction. The reduction in the United Kingdom is due to the introduction of catalytic converters on cars and stricter regulation of emissions from heavy goods vehicles [5]. In France the reduction is also due to catalytic converters along with a reduction in the intensity of activities that emit NO_x [6].

Figure 6 shows that for the EU-12, emissions from the five most important key categories decreased between 2004 and 2005. However, between 2000 and 2005 emissions increased from the following categories: Road transportation (+ 46 %), Residential (+ 114 %) and Agriculture/forestry/fishing (+ 1 399 %).

In Chapter 3 the contribution of EU Member States to the first ten key categories of NO_x is presented by sector.

Figure 5 NO_x emissions from key categories in EU-15 (a) Trend in NO_x emissions in EU-15 from the five most important key categories, 1990–2005 and (b) Contribution of key categories to EU-15 emissions, 2005

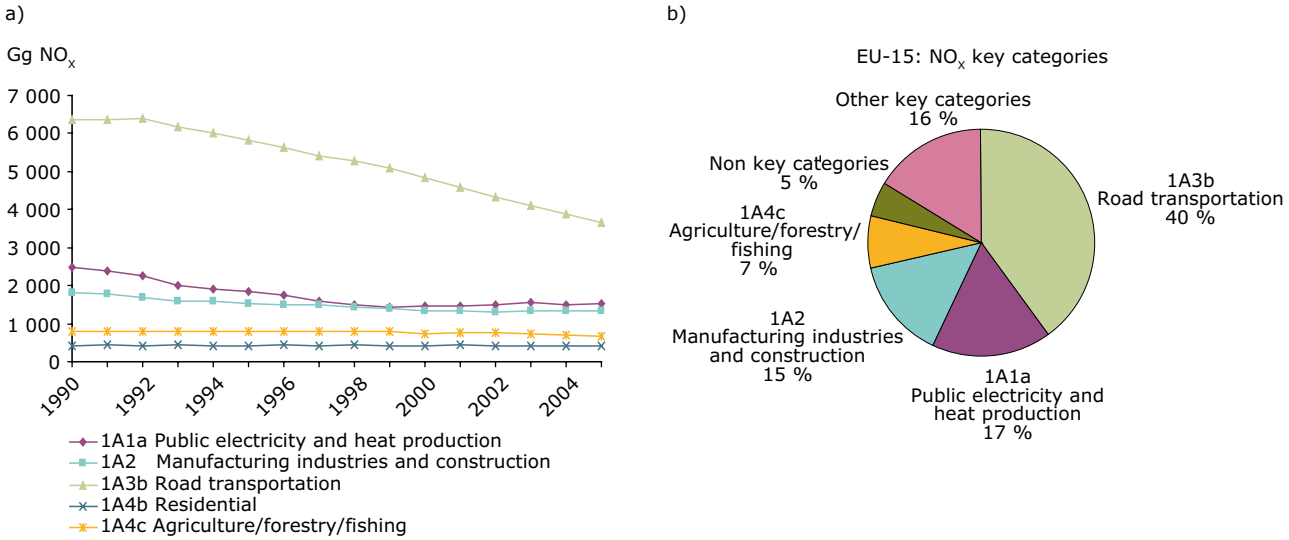
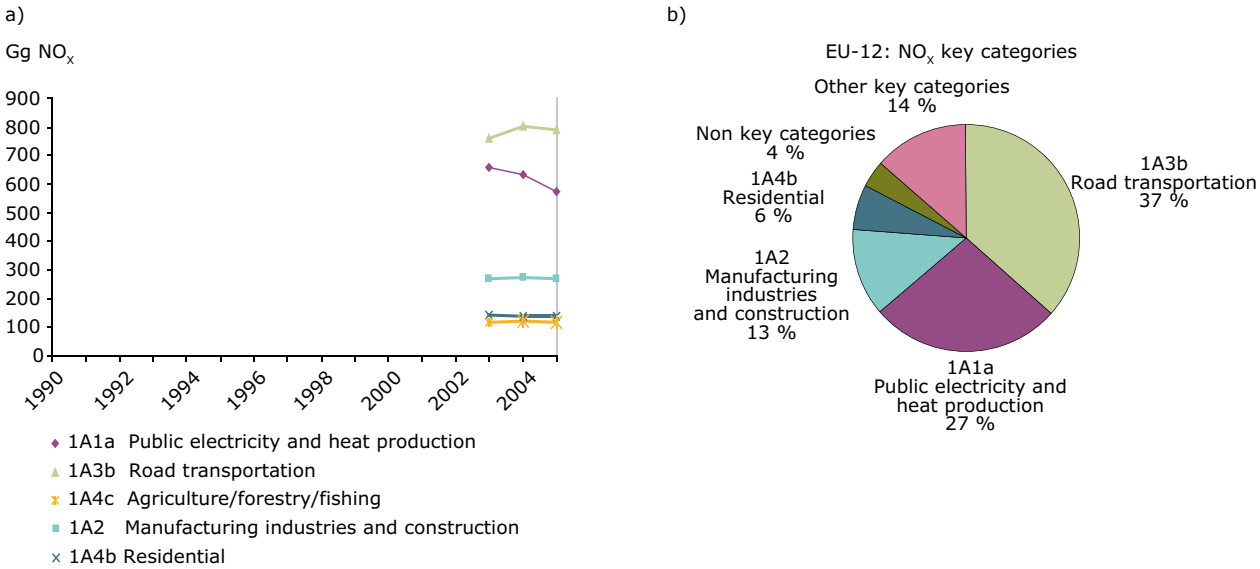


Figure 6 NO_x emissions from key categories in EU-12: (a) Trend in NO_x emissions from the five most important key categories, 2000–2005; (b) Contribution of key categories to EU-12 emissions, 2005



Note: A full EU-12 time-series of data cannot be presented due to non-reporting of sectoral data by Hungary, Malta, Poland and Slovenia.

2.2 CO emission trends

In the EU-27 (excluding Malta), emissions of CO decreased by 50.6 % between 1990 and 2005, totalling 31 878 Gg in 2005. The reduction between 2004 and 2005 was 6.8 % (Table 10).

Between 1990 and 2005 CO emissions in the EU-15 decreased by 53.1 %, reaching 24 194 Gg in 2005. All Member States reported decreases; the largest absolute decreases were reported by Germany, France, United Kingdom and Italy, although these countries were still the largest emitters of CO in absolute terms in 2005 (Table 10).

All EU-12 Member States except Malta reported emissions for the whole time series; the following EU-12 values therefore do not include Malta's CO emissions. In 2005, CO emissions in the EU-12 were 7 685 Gg. Between 1990 and 2005, CO emissions decreased by 40.8 %, mainly due to reductions in Poland and Czech Republic. Between 2004 and 2005 emissions decreased by 6.5 % (Table 10).

Table 10 Member States' contribution to European Community CO emissions (Gg), 1990–2005

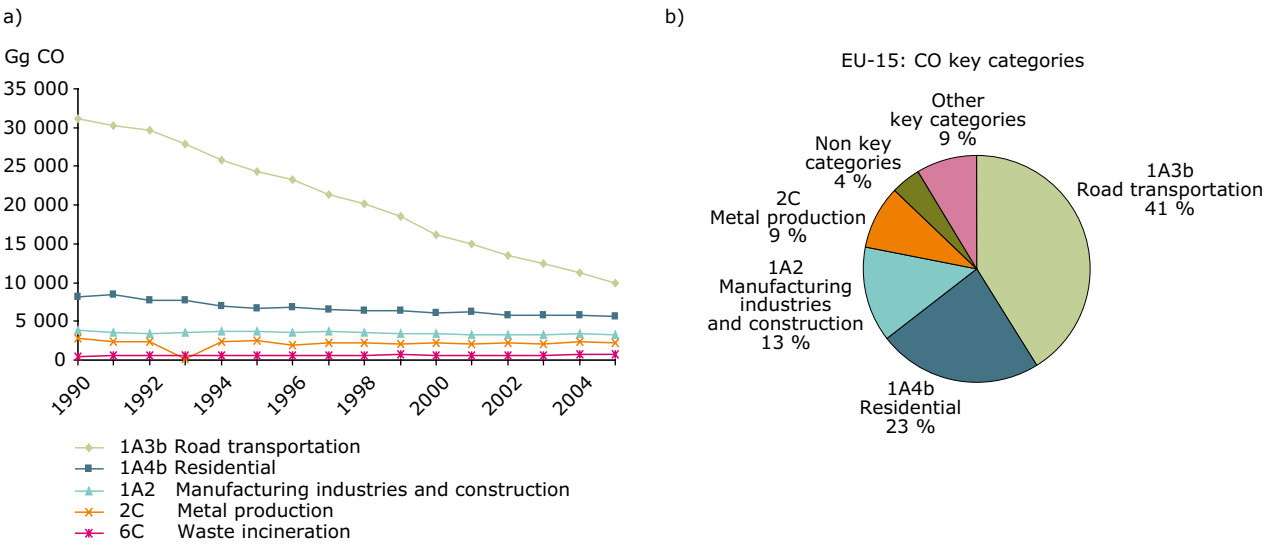
	CO trends								Change in %		Share in EU-27	
CO in Gg	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**1990–2005**	**2004–2005**	**1990**	**2005**
Austria	1 221	1 010	802	789	756	761	737	720	– 41.0 %	– 2.3 %	1.9 %	2.3 %
Belgium	1 379	1 114	1 072	1 009	985	953	898	876	– 36.5 %	– 2.5 %	2.1 %	2.7 %
Denmark	771	712	559	581	571	596	596	611	– 20.7 %	2.6 %	1.2 %	1.9 %
Finland	711	635	588	605	600	564	551	522	– 26.6 %	– 5.2 %	1.1 %	1.6 %
France	11 390	9 568	7 189	6 807	6 522	6 143	6 253	5 677	– 50.2 %	– 9.2 %	17.6 %	17.8 %
Germany	12 145	6 535	5 009	4 785	4 516	4 412	4 307	4 035	– 66.8 %	– 6.3 %	18.8 %	12.7 %
Greece	1 302	1 334	1 364	1 275	1 244	1 200	1 155	1 075	– 17.4 %	– 7.0 %	2.0 %	3.4 %
Ireland	411	316	282	276	255	245	237	226	– 45.0 %	– 4.8 %	0.6 %	0.7 %
Italy	7 183	7 166	5 164	5 086	4 468	4 381	4 207	3 832	– 46.6 %	– 8.9 %	11.1 %	12.0 %
Luxembourg	132	69	17	18	15	15	13	15	– 88.8 %	12.7 %	0.2 %	0.0 %
Netherlands	1 136	860	721	678	646	624	615	599	– 47.3 %	– 2.7 %	1.8 %	1.9 %
Portugal	880	852	749	700	689	674	666	652	– 25.8 %	– 2.1 %	1.4 %	2.0 %
Spain	3 701	3 259	2 735	2 644	2 521	2 452	2 418	2 336	– 36.9 %	– 3.4 %	5.7 %	7.3 %
Sweden	968	901	703	666	653	643	609	602	– 37.8 %	– 1.2 %	1.5 %	1.9 %
United Kingdom	8 229	6 296	4 239	3 891	3 356	2 947	2 711	2 417	– 70.6 %	– 10.8 %	12.7 %	7.6 %
EU-15	**51 557**	**40 629**	**31 192**	**29 809**	**27 797**	**26 610**	**25 974**	**24 194**	**– 53.1 %**	**– 6.9 %**	**79.9 %**	**75.9 %**
Bulgaria	790	644	635	583	700	716	755	740	– 6.3 %	– 1.9 %	1.2 %	2.3 %
Cyprus	88	97	87	87	84	84	45	41	– 53.1 %	– 9.7 %	0.1 %	0.1 %
Czech Republic	1 049	915	665	671	546	578	572	511	– 51.3 %	– 10.6 %	1.6 %	1.6 %
Estonia	313	206	184	190	189	183	175	158	– 49.5 %	– 9.6 %	0.5 %	0.5 %
Hungary	997	645	592	579	574	600	587	587	– 41.1 %	0.0 %	1.5 %	1.8 %
Latvia	382	321	320	327	327	324	338	337	– 11.9 %	– 0.3 %	0.6 %	1.1 %
Lithuania	499	279	1 529	218	224	225	184	190	– 61.9 %	3.2 %	0.8 %	0.6 %
Malta	24	30	30	NE	NE	NE	NE	NE	NE	NE	0.04 %	NE
Poland	7 406	4 547	NE	3 528	3 410	2 626	3 426	3 333	– 55.0 %	– 2.7 %	11.5 %	10.5 %
Romania	846	1 401	1 217	1 256	1 323	1 354	1 743	1 405	66.0 %	– 19.4 %	1.3 %	4.4 %
Slovak Republic	512	420	313	315	292	308	310	299	– 41.5 %	– 3.3 %	0.8 %	0.9 %
Slovenia	81	91	100	90	85	81	82	83	1.9 %	0.5 %	0.1 %	0.3 %
EU-12	**12 987**	**9 595**	**NE**	**7 842**	**7 754**	**7 078**	**8 216**	**7 685**	**– 40.8 %**	**– 6.5 %**	**20.1 %**	**24.1 %**
EU-27	**64 544**	**50 224**	**NE**	**37 651**	**35 551**	**33 689**	**34 190**	**31 878**	**– 50.6 %**	**– 6.8 %**	**100.0 %**	**100.0 %**

Note: EU-12 and EU-27 emission trends for 2001-2005 exclude Malta as data were not reported.

Figure 7 shows that emissions of the five most important key categories of the EU-15 decreased between 1990 and 2005. CO emissions from road transport, which contributes more than 40 % of total CO emissions, decreased by 68 %. All countries reported decreasing emissions between 1990 and 2005. France, Germany, Italy and United Kingdom achieved the highest absolute reduction; the reduction in France was due to the introduction of catalytic converters and the increase of diesel cars [6].

In Chapter 3 the contribution of EU-15 Member States to the first ten key categories of CO is presented by sector.

Figure 7 CO emissions from key categories in the EU-15: (a) Trend in CO emissions from the five most important key categories, 1990–2005; (b) Contribution of key categories to EU-15 CO emissions, 2005



Note: A full EU-12 time-series of data cannot be presented due to non-reporting of sectoral data by Hungary, Malta, Poland and Slovenia.

2.3 NMVOC emission trends

In the EU-15, NMVOC emissions in 2005 accounted for 7 645 Gg. Between 1990 and 2005, emissions decreased by 47.3 %, with a reduction of 3.3 % between 2004 and 2005. Almost all countries reported reductions; the largest emitters in 2005 were France, Germany, Italy, Spain and United Kingdom. All Member States except Greece reported decreasing emissions (Table 11).

In the EU-12, NMVOC emissions in 2005 accounted for 2 034 Gg. Between 1990 and 2005 emissions decreased by 9.8 % overall, although in Czech Republic, Estonia and Slovak Republic the reduction was more than 40 %. Poland had the highest emissions and reported a rise in emissions between 1990 and 2005 of 6 %. Overall, between 2004 and 2005, NMVOC emissions in the EU-12 decreased by 1 % (Table 11).

In the EU-27, NMVOC emissions decreased by 42.2 % between 1990 and 2005 and accounted for 9 678 Gg in 2005. Between 2004 and 2005, emissions decreased by 2.8% (Table 11).

Table 11 Member States' contribution to European Community NMVOC emissions (Gg)

	NMVOC trends								Change in %		Share in EU-27	
NMVOC in Gg	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**1990–2005**	**2004–2005**	**1990**	**2005**
Austria	285	218	170	172	167	163	157	154	– 45.9 %	– 2.0 %	1.7 %	1.6 %
Belgium	354	306	249	243	230	224	205	202	– 43.0 %	– 1.8 %	2.1 %	2.1 %
Denmark	170	158	131	126	122	119	119	118	– 30.3 %	– 0.9 %	1.0 %	1.2 %
Finland	229	192	165	157	151	145	141	131	– 42.7 %	– 7.0 %	1.4 %	1.4 %
France	2 761	2 369	1 935	1 847	1 683	1 589	1 516	1 439	– 47.9 %	– 5.0 %	16.5 %	14.9 %
Germany	3 612	1 972	1 489	1 404	1 334	1 274	1 287	1 253	– 65.3 %	– 2.6 %	21.6 %	12.9 %
Greece	280	305	299	294	289	288	332	289	2.9 %	– 13.0 %	1.7 %	3.0 %
Ireland	107	101	81	78	71	68	64	62	– 41.8 %	– 2.9 %	0.6 %	0.6 %
Italy	1 986	2 004	1 506	1 432	1 335	1 299	1 263	1 233	– 37.9 %	– 2.3 %	11.9 %	12.7 %
Luxembourg	8	8	6	6	6	6	6	6	– 25.9 %	1.1 %	0.1 %	0.1 %
Netherlands	465	332	234	212	202	187	180	176	– 62.1 %	– 1.9 %	2.8 %	1.8 %
Portugal	304	311	297	298	300	301	301	302	– 0.8 %	0.2 %	1.8 %	3.1 %
Spain	1 171	1 109	1 167	1 141	1 125	1 127	1 123	1 102	– 5.9 %	– 1.9 %	7.0 %	11.4 %
Sweden	373	268	220	208	206	205	203	199	– 46.8 %	– 1.9 %	2.2 %	2.1 %
United Kingdom	2 386	1 928	1 338	1 237	1 159	1 064	1 009	977	– 59.0 %	– 3.2 %	14.2 %	10.1 %
EU-15	**14 493**	**11 581**	**9 289**	**8 857**	**8 380**	**8 057**	**7 906**	**7 645**	**– 47.3 %**	**– 3.3 %**	**86.5 %**	**79.0 %**
Bulgaria	117	94	79	82	292	119	130	147	25.1 %	13.2 %	0.7 %	1.5 %
Cyprus	14	15	16	16	16	16	12	11	– 16.9 %	– 6.7 %	0.1 %	0.1 %
Czech Republic	311	215	244	220	203	203	203	182	– 41.6 %	– 10.4 %	1.9 %	1.9 %
Estonia	70	46	41	40	40	40	40	36	– 48.0 %	– 9.9 %	0.4 %	0.4 %
Hungary	205	170	166	162	160	155	157	177	– 13.4 %	12.8 %	1.2 %	1.8 %
Latvia	94	60	58	57	59	60	61	63	– 33.2 %	3.1 %	0.6 %	0.7 %
Lithuania	89	49	47	61	72	74	67	84	– 5.5 %	25.0 %	0.5 %	0.9 %
Malta	5	6	7	NE	NE	8	5	5	19.9 %	9.1 %	0.03 %	0.1 %
Poland	831	769	NE	873	898	892	888	885	6.5 %	– 0.3 %	5.0 %	9.1 %
Romania	339	283	266	267	283	302	361	320	– 5.6 %	– 11.4 %	2.0 %	3.3 %
Slovak Republic	137	105	79	82	77	81	83	79	– 42.4 %	– 4.6 %	0.8 %	0.8 %
Slovenia	44	44	50	48	47	47	46	43	– 1.2 %	– 6.1 %	0.3 %	0.4 %
EU-12	**2 256**	**1 856**	**NE**	**1 909**	**2 148**	**1 997**	**2 054**	**2 034**	**– 9.8 %**	**– 1.0 %**	**13.5 %**	**21.0 %**
EU-27	**16 749**	**13 436**	**NE**	**10 765**	**10 527**	**10 053**	**9 960**	**9 678**	**– 42.2 %**	**– 2.8 %**	**100.0 %**	**100.0 %**

Note: Emission trends for EU-12 and EU-27 for 2001–2002 exclude Malta as data have not been reported.

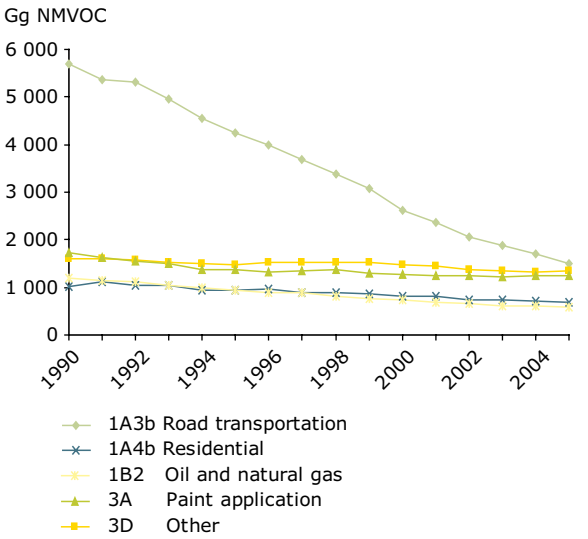
Figure 8 shows that emissions of NMVOC from the five most relevant key categories for the EU-15 decreased between 1990 and 2005. NMVOC emissions from road transport, which contributes almost 20 % of total NMVOC emissions, decreased by 73 %. All countries reported decreases between 1990 and 2005, although Germany achieved the highest absolute reduction.

NMVOC emissions for EU-12 Member States are only available for 2000 and 2003–2005. Figure 9 shows that between 2004 and 2005, emissions increased from the five most important key categories, except Road transportation.

In Chapter 3 the contribution of EU Member States to the first ten key categories of NMVOC is presented for each sector.

Figure 8 NMVOC emissions from key categories in EU-15: (a) Trend in NMVOC emissions from the five most important key categories, 1990–2005; (b) Contribution of key categories to EU-15 NMVOC emissions, 2005

a)



b)

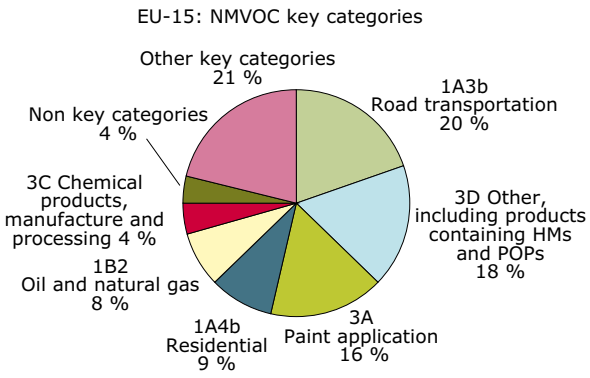
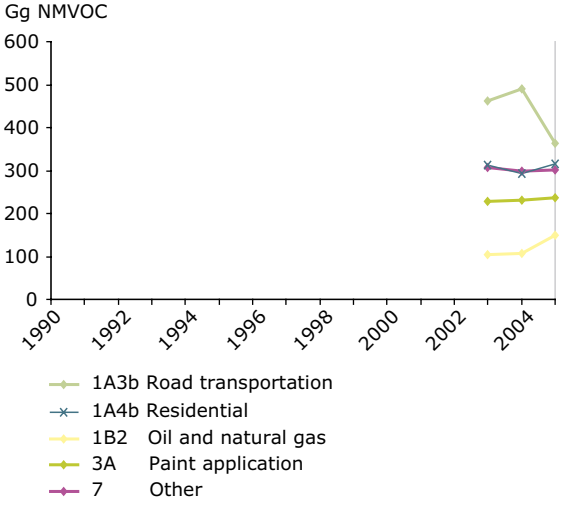
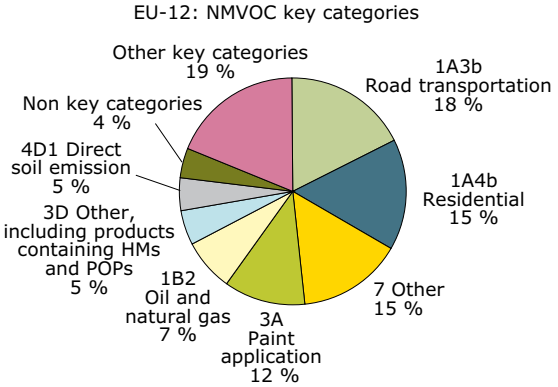


Figure 9 NMVOC emissions from key categories in EU-12: (a) Trend in NMVOC emissions from the five most important key categories, 2000–2005; (b) Contribution of key categories to EU-12 NMVOC emissions, 2005

a)



b)



Note: A full EU-12 time series of data cannot be presented due to non-reporting of sectoral data by Hungary, Malta, Poland and Slovenia.

2.4 SO_x emission trends

In the EU-15, SO_x emissions were 4 635 Gg in 2005. Between 1990 and 2005, emissions decreased by 72 %, mainly due to reductions in Germany (89 %), Spain (42 %) and United Kingdom (80 %). Between 2004 and 2005, SO_x emissions decreased by 5.8 % (Table 12).

In the EU-12, SO_x emissions were 3 513 Gg in 2005. Between 1990 and 2005 emissions decreased by 71 %, mainly due to decreases in Bulgaria (40 %), Czech Republic (88.3 %) and Poland (61.9 %). Between 2004 and 2005, SO_x emissions decreased overall in the EU-12 by 3.6 % (Table 12).

The EU-27 total SO_x emissions in 2005 were 8 147 Gg. Between 1990 and 2005, emissions decreased by 69.4 %, and between 2004 and 2005, the reduction was 3.6 % (Table 12).

Figure 10 shows that emissions of SO_x from the five most important key categories in the EU-15 decreased between 1990 and 2005. SO_x emissions

Table 12 Member States' contribution to European Community SO_x emissions (Gg)

	SO_x trends								Change in %		Share in EU-27	
SO_x in Gg	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**1990–2005**	**2004–2005**	**1990**	**2005**
Austria	74	47	31	33	32	33	27	26	– 64.4 %	– 3.1 %	0.3 %	0.3 %
Belgium	361	262	171	169	158	154	157	147	– 59.4 %	– 6.6 %	1.4 %	1.8 %
Denmark	178	136	29	27	26	32	26	22	– 87.7 %	– 14.6 %	0.7 %	0.3 %
Finland	249	105	81	85	82	99	85	69	– 72.2 %	– 18.5 %	0.9 %	0.8 %
France	1 333	968	612	559	515	506	488	465	– 65.1 %	– 4.5 %	5.0 %	5.7 %
Germany	5 350	1 727	641	643	605	616	592	560	– 89.5 %	– 5.4 %	20.1 %	6.9 %
Greece	487	536	493	502	513	545	529	545	11.9 %	2.9 %	1.8 %	6.7 %
Ireland	183	160	137	130	100	78	72	70	– 61.5 %	– 2.5 %	0.7 %	0.9 %
Italy	1 795	1 320	755	705	625	528	496	450	– 74.9 %	– 9.4 %	6.7 %	5.5 %
Luxembourg	14	7	3	3	2	2	3	3	– 81.2 %	– 1.8 %	0.1 %	0.0 %
Netherlands	190	128	72	73	67	63	64	62	– 67.2 %	– 2.0 %	0.7 %	0.8 %
Portugal	317	332	304	293	294	201	203	215	– 32.2 %	6.0 %	1.2 %	2.6 %
Spain	2 166	1 783	1 445	1 419	1 523	1 256	1 300	1 254	– 42.1 %	– 3.5 %	8.1 %	15.4 %
Sweden	109	71	46	45	45	46	41	40	– 63.4 %	– 3.7 %	0.4 %	0.5 %
United Kingdom	3 687	2 322	1 215	1 119	1 002	991	836	706	– 80.8 %	– 15.5 %	13.9 %	8.7 %
EU-15	**16 492**	**9 904**	**6 034**	**5 805**	**5 586**	**5 150**	**4 918**	**4 635**	**– 71.9 %**	**– 5.8 %**	**62.0 %**	**56.9 %**
Bulgaria	1 517	1 300	1 045	1 096	965	968	929	900	– 40.7 %	– 3.1 %	5.7 %	11.0 %
Cyprus	37	44	52	50	51	45	45	42	16.0 %	– 6.4 %	0.1 %	0.5 %
Czech Republic	1 876	1 095	264	251	237	231	227	219	– 88.3 %	– 3.7 %	7.0 %	2.7 %
Estonia	273	117	96	91	87	101	89	77	– 71.7 %	– 13.3 %	1.0 %	0.9 %
Hungary	1 010	707	489	404	365	347	248	129	– 87.2 %	– 47.8 %	3.8 %	1.6 %
Latvia	100	48	10	8	6	5	4	4	– 96.4 %	– 7.0 %	0.4 %	0.0 %
Lithuania	214	85	42	38	43	43	42	44	– 79.6 %	3.3 %	0.8 %	0.5 %
Malta	19	30	26	NE	NE	33	18	18	– 3.9 %	2.5 %	0.1 %	0.2 %
Poland	3 210	2 376	1 202	1 564	1 455	1 375	1 241	1 222	– 61.9 %	– 1.6 %	12.1 %	15.0 %
Romania	1 152	991	693	727	779	554	542	727	– 36.9 %	34.1 %	4.3 %	8.9 %
Slovak Republic	526	246	127	131	103	106	97	89	– 83.1 %	– 8.1 %	2.0 %	1.1 %
Slovenia	196	125	99	68	71	66	54	42	– 78.7 %	– 22.8 %	0.7 %	0.5 %
EU-12	**10 128**	**7 164**	**4 144**	**4 428**	**4 162**	**3 873**	**3 536**	**3 513**	**– 65.3 %**	**– 0.7 %**	**38.0 %**	**43.1 %**
EU-27	**26 621**	**17 067**	**10 179**	**10 233**	**9 749**	**9 023**	**8 454**	**8 147**	**– 69.4 %**	**– 3.6 %**	**100.0 %**	**100.0 %**

Note: EU-12 and EU-27 SOX emissions for 2001–2002 exclude Malta as data have not been reported.

from 'Public electricity and heat production', which accounts for more than 50 % of total SO_X emissions, decreased by 72 %. All countries except Greece reported decreases between 1990 and 2005. Germany and United Kingdom achieved the highest absolute reduction. The reduction in the United Kingdom was due to the decline in energy-intensive heavy industry. Subsequently there has also been a decrease in SO_X emissions due to a reduction in the use of coal [5].

SO_X emissions data for EU-12 are only available from 2003 to 2005. Figure 11 shows that between 2004 and 2005, of the five most important key categories, emissions from the Petroleum refining, and Manufacturing industries and construction categories increased by 50 % and 5 % respectively; the other key categories showed reductions in emissions.

In Chapter 3 the contribution of EU Member States to emissions from the first ten key categories of SO_X is presented for each category.

Figure 10 SO_x emissions from key categories in EU-15: (a) Trend in SO_x emissions from the five most important key categories, 1990-2005; (b) Contribution of key categories to SO_x emissions, 2005

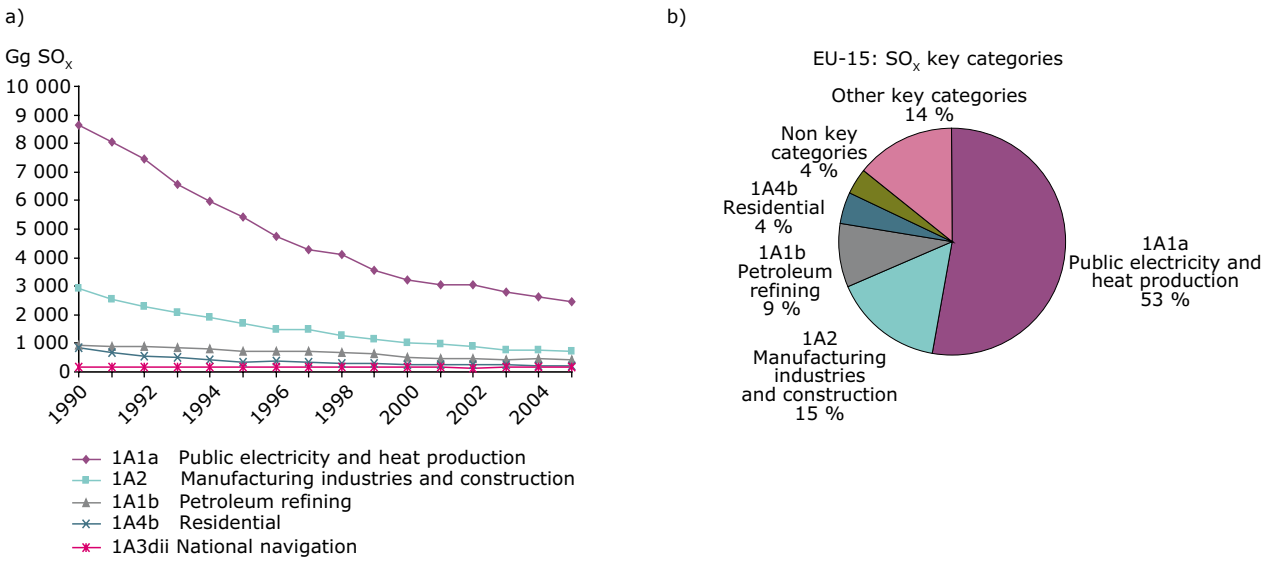
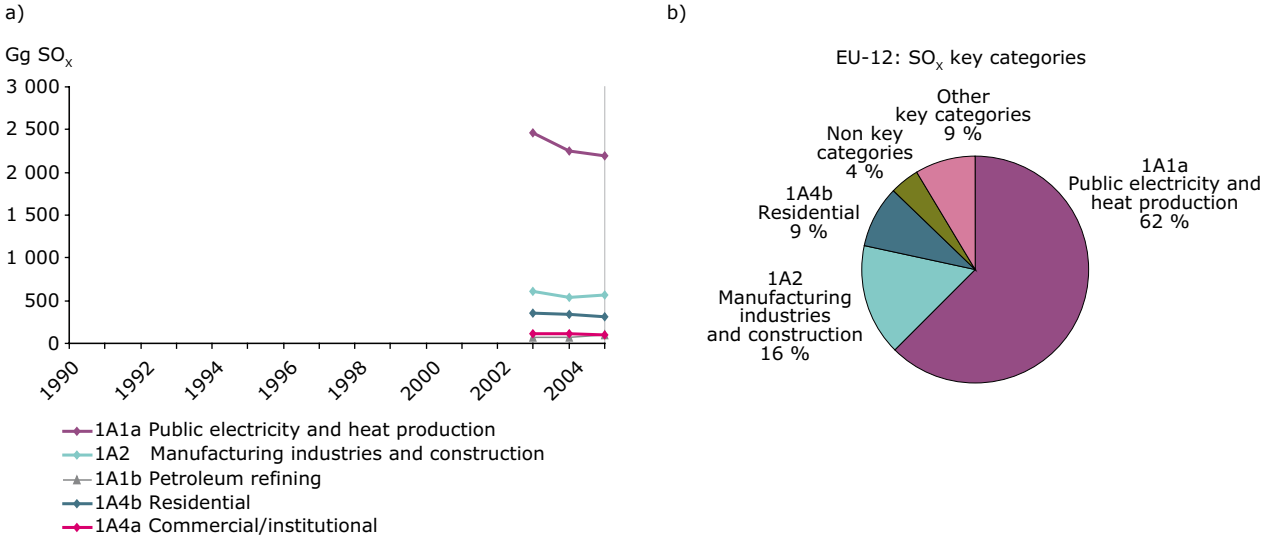


Figure 11 SO_x emissions from key categories in EU-12: (a) Trend in SO_x emissions from the five most important key categories, 2003–2005; (b) Contribution of key categories to SO_x emissions, 2005



Note: A full EU-12 time-series of data cannot be presented due to non-reporting of sectoral data by Hungary, Malta, Poland and Slovenia.

2.5 NH_3 emission trends

NH_3 emissions for 2005 were not reported by Greece and Luxembourg. EU-15 total NH_3 emissions decreased by 6.5 % between 1990 and 2005 (excluding Greece and Luxembourg). The countries that accounted for most NH_3 emissions 2005 were France (735 Gg) and Germany (619 Gg). Between 2004 and 2005, emissions were almost stable (Table 13).

EU-12 total NH_3 emissions were 840 Gg in 2005. Some countries (Romania, Bulgaria, Lithuania and Malta) did not report the whole time series and therefore the changes between 2004 and 2005 and between 1990 and 2005 could be not estimated (Table 13).

EU-27 total NH_3 emissions in 2005 were 4 161 Gg (excluding Greece and Luxembourg). Greece provided information separately that total national NH_3 emissions are considered to have stabilised at 1998 levels.

The NH_3 key category analysis could be not performed as emissions were not reported on a sectoral basis by Greece, Luxembourg, Bulgaria, Lithuania, Malta, Romania and Slovenia.

Table 13 Member States' contribution to European Community NH_3 emissions (Gg)

	NH_3 trends								Change in %		Share in EU-27	
NH_3 in Gg	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**1990–2005**	**2004–2005**	**1990**	**2005**
Austria	69	71	66	66	65	65	64	64	– 7.1 %	– 0.3 %	1.9 %	NE
Belgium	112	103	87	84	82	79	76	74	– 33.8 %	– 1.8 %	3.1 %	NE
Denmark	134	115	106	104	101	102	99	93	– 30.7 %	– 6.1 %	3.7 %	NE
Finland	38	35	33	33	33	33	33	36	– 4.7 %	8.7 %	1.0 %	NE
France	787	772	789	775	777	750	743	735	– 6.6 %	– 1.1 %	21.7 %	NE
Germany	738	631	627	639	627	632	625	619	– 16.0 %	– 0.8 %	20.3 %	NE
Greece	79	85	74	74	73	73	73	73	– 7.6 %	0.0 %	2.2 %	NE
Ireland	110	116	123	117	115	114	113	113	2.4 %	– 0.4 %	3.0 %	NE
Italy	465	447	444	451	437	433	426	415	– 10.7 %	– 2.5 %	12.8 %	NE
Luxembourg	8	7	7	7	5	NE	NE	NE	NE	NE	0.2 %	NE
Netherlands	250	193	152	144	139	135	134	135	– 45.8 %	0.7 %	6.9 %	NE
Portugal	65	73	77	76	76	71	72	73	13.2 %	1.6 %	1.8 %	NE
Spain	339	337	408	409	406	419	416	401	18.3 %	– 3.4 %	9.3 %	NE
Sweden	54	62	56	54	54	53	53	52	– 2.7 %	– 1.4 %	1.5 %	NE
United Kingdom	383	370	343	337	326	313	318	318	– 17.1 %	– 0.2 %	10.6 %	NE
EU-15	**3 629**	**3 417**	**3 391**	**3 369**	**3 317**	**3 271**	**3 245**	**3 202**	**– 11.8 %**	**– 1.3 %**	**100.0 %**	**NE**
Bulgaria	NE	NE	NE	56	56	52	54	57	NE	5.8 %	NE	NE
Cyprus	5	5	5	6	6	6	6	5	17.1 %	– 4.5 %	NE	NE
Czech Republic	156	86	74	77	72	82	70	68	– 56.1 %	– 2.4 %	NE	NE
Estonia	26	12	10	10	9	10	10	9	– 64.0 %	– 3.5 %	NE	NE
Hungary	124	77	71	66	65	67	74	80	– 35.4 %	8.1 %	NE	NE
Latvia	47	15	12	14	13	14	13	14	– 70.3 %	5.7 %	NE	NE
Lithuania	NE	NE	NE	NE	51	34	33	39	NE	18.0 %	NE	NE
Malta	NE	NE	1	NE	NE	1	1	1	NE	– 1.5 %	NE	NE
Poland	512	380	322	309	325	323	317	326	– 36.2 %	3.2 %	NE	NE
Romania	NE	NE	NE	NE	NE	NE	NE	194	NE	NE	NE	NE
Slovak Republic	65	40	30	31	31	29	27	27	– 58.6 %	– 0.9 %	NE	NE
Slovenia	24	22	20	20	20	19	17	18	– 23.9 %	5.9 %	NE	NE
EU-12	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**840**	**NE**	**NE**	**NE**	**NE**
EU-27	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**4 043**	**NE**	**NE**	**NE**	**NE**

Note: EU-15 and EU-27 NH_3 emissions for 1992 and 2003–2005 were aggregated excluding data for Luxembourg (as no data were reported). For Greece, NH_3 emissions for 2003–2005 were assumed to equal the reported emissions for 2002 (following confirmation from Greece that after 1998 these emissions are considered to be constant).

3 Emission trends of key categories by sector

This chapter provides detail on emission trends for EU-15 and EU-12 key categories (level assessment) for 2005. Results are presented by NFR sector (Energy; Industrial processes; Solvent and other product use; Agriculture; Land use and land-use change; Waste; and Other) for EU-15 and EU-12. Results for EU-15 and EU-12 are broadly comparable, but there are some differences; in general, fewer key categories were identified for EU-12.

Detailed tables in the following sections are provided for the 10 key categories with the highest contribution to emissions.

3.1 Energy (NFR Sector 1)

Table 14 shows the key categories for the energy sector (identified by NFR code and sub-sector description) for the respective pollutants.

Table 14 Key categories from the energy sector and the relevant pollutants for which each category was identified as a key category

EU-15		EU-12	
Key category	**Pollutants for which this was identified as a key category**	**Key category**	**Pollutants for which this was identified as a key category**
1A1a Public electricity and heat production	NO_x CO SO_x	1A1a Public electricity and heat production	NMVOC (detail not provided) NO_x SO_x
1A1b Petroleum refining	NO_x SO_x	1A1b Petroleum refining	SO_x
1A1c Manufacture of solid fuels and other energy industries	NO_x SO_x	1A1c Manufacture of solid fuels and other energy industries	SO_x
1A2 Manufacturing industries and construction	NO_x CO NMVOC SO_x	1A2 Manufacturing industries and construction	NMVOC NO_x SO_x
1A3b Road transportation	NO_x CO NMVOC	1A3b Road transportation	NMVOC NO_x
1A3c Railways	NO_x	1A3c Railways	NO_x
		1A3e Other	NO_x
1A3dii National navigation	NO_x CO NMVOC SO_x		
1A4a Commercial/institutional	NO_x SO_x	1A4a Commercial/institutional	SO_x
1A4b Residential	NO_x CO NMVOC SO_x	1A4b Residential	NMVOC NO_x SO_x
1A4c Agriculture/forestry/fishing	NO_x CO NMVOC	1A4c Agriculture/forestry/fishing	NMVOC NO_x SO_x
1B2 Oil and natural gas	NMVOC SO_x	1B2 Oil and natural gas	NMVOC

3.1.1 Public electricity and heat production (Category 1A1a)

Germany, Spain and United Kingdom are responsible for 61 % of the NO_x emissions in the category 1A1a 'Public electricity and heat production' (Table 15). Between 1990 and 2005, almost all countries reduced their emissions and particularly notable reductions were achieved by Germany, Italy and United Kingdom. However, emissions are increasing significantly in Greece, Spain and Luxembourg.

In the EU-12, the highest NO_x emissions from 'Public electricity and heat production' were reported by Poland (43 %) and Romania (15 %) (Table 16). In the EU-12, NO_x emissions from this key category decreased between 2004 and 2005 by 9 %. Between 1990 and 2005 the highest absolute reduction was reported by Czech Republic.

Table 15 Breakdown of NO_x emissions by EU-15 Member State for key category 1A1a 'Public electricity and heat production' in the energy sector

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	12.09	9.81	8.90	1 %	– 0.90	– 9 %	– 3.18	– 26 %
Belgium	60.61	36.20	35.58	2 %	– 0.62	– 2 %	– 25.03	– 41 %
Denmark	90.75	44.21	39.37	3 %	– 4.84	– 11 %	– 51.38	– 57 %
Finland	55.72	49.36	31.58	2 %	– 17.79	– 36 %	– 24.15	– 43 %
France	115.58	103.68	124.11	8 %	20.42	20 %	8.53	7 %
Germany	463.66	247.49	242.14	16 %	– 5.34	– 2 %	– 221.52	– 48 %
Greece	53.96	84.80	86.54	6 %	1.74	2 %	32.58	60 %
Ireland	46.37	32.34	32.40	2 %	0.05	0 %	– 13.98	– 30 %
Italy	408.63	111.11	115.00	8 %	3.89	4 %	– 293.63	– 72 %
Luxembourg	0.30	0.68	0.63	0 %	– 0.05	– 7 %	0.33	110 %
Netherlands	82.03	45.52	43.92	3 %	– 1.60	– 4 %	– 38.11	– 46 %
Portugal	65.22	48.34	57.91	4 %	9.57	20 %	– 7.30	– 11 %
Spain	228.32	323.61	328.32	21 %	4.72	1 %	100.00	44 %
Sweden	14.44	12.22	12.41	1 %	0.19	2 %	– 2.03	– 14 %
United Kingdom	776.19	358.06	372.83	24 %	14.78	4 %	– 403.36	– 52 %
EU-15	**2 473.87**	**1 507.43**	**1 531.64**	**100 %**	**24.21**	**2 %**	**– 942.23**	**– 38 %**

Table 16 Breakdown of NO_x emissions by EU-12 Member State for key category 1A1a 'Public electricity and heat production' in the energy sector

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	59.26	55.35	56.08	10 %	0.73	1 %	– 3.18	– 5 %
Cyprus	3.39	6.54	6.94	1 %	0.40	6 %	3.55	105 %
Czech Republic	334.89	93.31	89.77	16 %	– 3.54	– 4 %	– 245.12	– 73 %
Estonia	25.69	13.93	12.09	2 %	– 1.84	– 13 %	– 13.60	– 53 %
Hungary	NE	27.51	27.94	5 %	0.44	2 %		
Latvia	16.13	6.19	6.14	1 %	– 0.05	– 1 %	– 9.99	– 62 %
Lithuania	47.00	6.01	6.21	1 %	0.20	3 %	– 40.79	– 87 %
Malta	0.00	5.29	5.35	1 %	0.06	1 %	5.35	
Poland	IE	246.49	250.03	43 %	3.54	1 %		
Romania	261.98	140.37	85.05	15 %	– 55.32	– 39 %	– 176.93	– 68 %
Slovak Republic	151.44	15.51	15.20	3 %	– 0.30	– 2 %	– 136.23	– 90 %
Slovenia	NE	16.68	15.00	3 %	– 1.68	– 10 %		
EU-12	**NE**	**633.17**	**575.80**	**100 %**	**– 57.37**	**– 9 %**		

Germany, Greece and United Kingdom were responsible for 63 % of EU-15 CO emissions in the category 1A1a 'Public electricity and heat production' (Table 17) in the energy sector in 2005. Between 1990 and 2005, EU-15 total CO emissions from this key category decreased by 8 %, and by 1 % between 2004 and 2005.

Greece, United Kingdom and Spain were responsible for 64 % of the EU-15 SO_x emissions in the key category 1A1a 'Public electricity and heat production' in 2005 (Table 18). Between 1990 and 2005, EU-15 total emissions decreased by 72 %, all countries except Greece reporting decreasing emissions.

Table 17 Breakdown of CO emissions by EU-15 Member State for key category 1A1a 'Public electricity and heat production' in the energy sector

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	1.36	3.16	2.91	1 %	– 0.25	– 8 %	1.55	114 %
Belgium	2.45	4.47	4.75	1 %	0.29	6 %	2.31	94 %
Denmark	7.95	11.71	10.79	3 %	– 0.92	– 8 %	2.84	36 %
Finland	3.68	13.69	12.47	3 %	– 1.22	– 9 %	8.79	239 %
France	11.88	16.25	16.50	4 %	0.24	2 %	4.61	39 %
Germany	129.33	124.54	123.33	32 %	– 1.21	– 1 %	– 6.00	– 5 %
Greece	35.99	48.17	49.15	13 %	0.98	2 %	13.16	37 %
Ireland	3.12	3.52	3.98	1 %	0.47	13 %	0.86	28 %
Italy	21.62	30.41	30.10	8 %	– 0.31	– 1 %	8.48	39 %
Luxembourg	0.05	0.07	0.06	0 %	– 0.01	– 14 %	0.01	20 %
Netherlands	8.21	8.68	8.27	2 %	– 0.40	– 5 %	0.06	1 %
Portugal	2.10	2.73	3.06	1 %	0.33	12 %	0.95	45 %
Spain	10.79	18.24	20.34	5 %	2.10	12 %	9.55	88 %
Sweden	8.20	29.07	32.08	8 %	3.02	10 %	23.88	291 %
United Kingdom	112.90	68.44	70.18	18 %	1.75	3 %	– 42.72	– 38 %
EU-15	**359.63**	**383.13**	**387.98**	**100 %**	**4.85**	**1 %**	**28.35**	**8 %**

Table 18 Breakdown of SO_x emissions by EU-15 Member State for key category 1A1a 'Public electricity and heat production' in the energy sector

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	11.79	3.80	3.55	0 %	– 0.25	– 7 %	– 8.24	– 70 %
Belgium	95.16	33.30	30.43	1 %	– 2.86	– 9 %	– 64.73	– 68 %
Denmark	126.19	9.77	7.72	0 %	– 2.05	– 21 %	– 118.47	– 94 %
Finland	69.46	40.39	26.07	1 %	– 14.32	– 35 %	– 43.39	– 62 %
France	340.51	112.57	121.00	5 %	8.43	7 %	– 219.51	– 64 %
Germany	2 435.43	233.41	219.54	9 %	– 13.87	– 6 %	– 2 215.89	– 91 %
Greece	276.70	379.45	382.17	16 %	2.72	1 %	105.47	38 %
Ireland	103.04	44.00	42.50	2 %	– 1.50	– 3 %	– 60.54	– 59 %
Italy	769.28	174.20	157.00	6 %	– 17.20	– 10 %	– 612.28	– 80 %
Luxembourg	0.14	0.03	0.03	0 %	0.00	0 %	– 0.11	– 79 %
Netherlands	48.41	10.74	10.61	0 %	– 0.13	– 1 %	– 37.80	– 78 %
Portugal	180.95	101.17	117.29	5 %	16.12	16 %	– 63.66	– 35 %
Spain	1 459.01	947.39	928.86	38 %	– 18.53	– 2 %	– 530.15	– 36 %
Sweden	16.76	8.76	8.14	0 %	– 0.61	– 7 %	– 8.62	– 51 %
United Kingdom	2 728.93	508.94	384.97	16 %	– 123.97	– 24 %	– 2 343.96	– 86 %
EU-15	**8 661.77**	**2 607.91**	**2 439.89**	**100 %**	**– 168.02**	**– 6 %**	**– 6 221.88**	**– 72 %**

Bulgaria, Poland and Romania were responsible for 84 % of EU-12 SO_X emissions in the key category 1A1a 'Public electricity and heat production' in 2005 (Table 19). Emissions have decreased in all EU-12 Member States, which together achieved a 72 % reduction between 1990 and 2005.

3.1.2 Petroleum refining (Category 1A1b)

United Kingdom, Spain, Italy and Germany were responsible for 65 % of EU-15 NO_X emissions in the category 1A1b 'Petroleum Refining' in 2005 (Table 20). Between 1990 and 2005, the EU-15 total NO_X emissions from this category decreased by 20 %.

Table 19 Breakdown of SO_x emissions by EU-12 Member State for key category 1A1a 'Public electricity and heat production' in the energy sector

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	1 104.05	782.16	754.63	34 %	– 27.54	– 4 %	– 349.42	– 32 %
Cyprus	21.62	31.40	34.10	2 %	2.70	9 %	12.48	58 %
Czech Republic	844.47	124.09	128.06	6 %	3.97	3 %	– 716.42	– 85 %
Estonia	220.40	72.52	60.65	3 %	– 11.87	– 16 %	– 159.75	– 72 %
Hungary	NE	125.82	20.70	1 %	– 105.12	– 84 %		
Latvia	36.05	1.36	1.09	0 %	– 0.28	– 20 %	– 34.96	– 97 %
Lithuania	105.00	11.39	10.37	0 %	– 1.03	– 9 %	– 94.63	– 90 %
Malta	NE	11.51	11.92	1 %	0.41	4 %	11.92	
Poland	IE	664.99	651.15	30 %	– 13.84	– 2 %		
Romania	959.40	319.29	436.66	20 %	117.38	37 %	– 522.74	– 54 %
Slovak Republic	459.49	53.15	49.25	2 %	– 3.90	– 7 %	– 410.24	– 89 %
Slovenia	NE	45.50	32.45	1 %	– 13.05	– 29 %		
EU-12	**NE**	**2 243.19**	**2 191.02**	**100 %**	**– 52.16**	**– 2 %**		

Table 20 Breakdown of NO_x emissions by EU-15 Member State for key category 1A1b 'Petroleum refining'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	4.32	3.44	3.05	2 %	– 0.39	– 11 %	– 1.27	– 29 %
Belgium	7.32	6.77	5.59	4 %	– 1.17	NA	– 1.73	– 24 %
Denmark	1.62	1.61	1.51	1 %	– 0.10	– 6 %	– 0.10	– 6 %
Finland	4.00	2.30	2.31	1 %	0.02	1 %	– 1.69	– 42 %
France	16.20	17.14	18.90	12 %	1.76	10 %	2.70	17 %
Germany	34.96	25.62	26.72	17 %	1.10	4 %	– 8.24	– 24 %
Greece	4.79	5.19	5.65	4 %	0.46	9 %	0.86	18 %
Ireland	0.30	0.82	0.94	1 %	0.11	14 %	0.64	216 %
Italy	37.26	24.42	23.00	14 %	– 1.42	– 6 %	– 14.26	– 38 %
Luxembourg	NO	NO	NO					
Netherlands	18.74	9.35	9.13	6 %	– 0.22	– 2 %	– 9.62	– 51 %
Portugal	4.86	6.47	6.57	4 %	0.10	2 %	1.71	35 %
Spain	23.61	25.83	23.87	15 %	– 1.96	– 8 %	0.27	1 %
Sweden	2.16	1.56	1.43	1 %	– 0.13	– 8 %	– 0.72	– 34 %
United Kingdom	38.57	29.52	29.94	19 %	0.42	1 %	– 8.63	– 22 %
EU-15	**198.69**	**160.02**	**158.62**	**100 %**	**– 1.40**	**– 1 %**	**– 40.07**	**– 20 %**

Italy, France, Germany, United Kingdom and Spain were responsible for 73 % of the EU-15 SO_X emissions in the category 1A1b 'Petroleum refining' in 2005 (Table 21). Between 1990 and 2005, EU-15 total SO_X emissions from this category decreased by 54 %, with all countries except Austria, Greece and Ireland reporting decreasing emissions.

Poland and Romania were responsible for 66 % of the EU-12 SO_X emissions in the category 1A1b 'Petroleum Refining' in 2005 (Table 22). The apparent 50 % increase in EU-12 SO_X emissions from this category between 2004 and 2005, is due to the first reported emissions from Romania in 2005, which accounted for 34 % of EU-12 emissions.

Table 21 SO_x EU-15 key category 1A1b 'Petroleum refining'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	2.25	3.84	3.35	1 %	– 0.49	– 13 %	1.10	49 %
Belgium	40.85	25.50	21.22	5 %	– 4.29	NA	– 19.63	– 48 %
Denmark	3.41	0.42	0.33	0 %	– 0.10	– 23 %	– 3.09	– 90 %
Finland	21.80	3.22	4.00	1 %	0.79	24 %	– 17.79	– 82 %
France	135.34	63.97	58.73	14 %	– 5.24	– 8 %	– 76.62	– 57 %
Germany	158.00	49.36	53.31	13 %	3.95	8 %	– 104.70	– 66 %
Greece	21.48	34.80	37.87	9 %	3.07	9 %	16.39	76 %
Ireland	0.75	0.70	0.91	0 %	0.22	31 %	0.16	21 %
Italy	192.21	72.26	60.00	14 %	– 12.26	– 17 %	– 132.21	– 69 %
Luxembourg	NO	NO	NO					
Netherlands	59.56	30.15	29.43	7 %	– 0.72	– 2 %	– 30.13	– 51 %
Portugal	18.65	20.76	17.57	4 %	– 3.19	– 15 %	– 1.08	– 6 %
Spain	134.40	72.55	63.53	15 %	– 9.02	– 12 %	– 70.88	– 53 %
Sweden	1.94	0.75	0.64	0 %	– 0.11	– 14 %	– 1.30	– 67 %
United Kingdom	137.58	70.14	73.05	17 %	2.91	4 %	– 64.53	– 47 %
EU-15	**928.23**	**448.41**	**423.93**	**100 %**	**– 24.48**	**– 5 %**	**– 504.30**	**– 54 %**

Table 22 SO_x EU-12 key category 1A1b 'Petroleum refining'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	NO	19.30	15.52	16 %	– 3.78	– 20 %		
Cyprus	0.59	0.32	NO					
Czech Republic	7.51	3.25	2.64	3 %	– 0.60	– 19 %	– 4.87	– 65 %
Estonia	0.00	NA	NA					
Hungary	NE	IE	IE					
Latvia	NO	NO	NO					
Lithuania	NE	7.21	12.61	13 %	5.40	75 %		
Malta	NE	NO	NO					
Poland	IE	33.39	31.93	32 %	– 1.46	– 4 %		
Romania	IE	IE	33.48	34 %				
Slovak Republic	IE	2.10	2.09	2 %	– 0.01	– 1 %		
Slovenia	NE	NO	NO					
EU-12	**NE**	**65.56**	**98.27**	**100 %**	**32.70**	**50 %**		

3.1.3 *Manufacture of solid fuels and other energy industries (Category 1A1c)*

United Kingdom was responsible for 56 % of the EU-15 NO_x emissions in the category 1A1c 'Manufacture of solid fuels and other energy industries' in 2005 (Table 23). Between 1990 and 2005, the EU-15 total emissions decreased by 40 %. Over this period, Denmark reported an increase in emissions of almost 200 %, although they were only responsible for 6 % of EU-15 emissions in 2005.

Germany and Spain were responsible for 63 % of EU-15 SO_x emissions in the category 1A1c 'Manufacture of solid fuels and other energy industries' in 2005 (Table 24). Between 1990 and 2005, the EU-15 total SO_x emissions from this category decreased by 90 %, as a result of the

Table 23 Breakdown of NO_x emissions by EU-15 Member State for key category 1A1c 'Manufacture of solid fuels and other energy industries'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	0.83	0.70	0.74	1 %	0.04	5 %	– 0.09	– 11 %
Belgium	3.52	1.14	1.14	1 %	0.00	0 %	– 2.39	– 68 %
Denmark	2.38	6.84	7.00	6 %	0.15	2 %	4.62	195 %
Finland	0.29	0.07	0.09	0 %	0.02	28 %	– 0.20	– 68 %
France	8.71	5.41	4.22	4 %	– 1.19	– 22 %	– 4.49	– 52 %
Germany	107.60	16.58	16.63	15 %	0.05	0 %	– 90.97	– 85 %
Greece	0.11	0.22	0.16	0 %	– 0.06	– 27 %	0.05	49 %
Ireland	0.30	0.10	0.09	0 %	NA	NA	– 0.21	– 70 %
Italy	8.59	9.79	9.00	8 %	– 0.79	– 8 %	0.41	5 %
Luxembourg	NO	NO	NO					
Netherlands	8.52	5.09	5.05	5 %	– 0.04	– 1 %	– 3.47	– 41 %
Portugal	0.18	0.00	0.00	0 %	0.00	NA	– 0.18	– 100 %
Spain	5.55	5.72	6.15	6 %	0.44	8 %	0.60	11 %
Sweden	0.43	0.15	0.14	0 %	– 0.01	– 6 %	– 0.29	– 68 %
United Kingdom	36.89	65.99	59.01	54 %	– 6.98	– 11 %	22.13	60 %
EU-15	**183.90**	**117.80**	**109.42**	**100 %**	**– 8.38**	**– 7 %**	**– 74.48**	**– 40 %**

Table 24 Breakdown of SO_x emissions by EU-15 Member State for key category 1A1c 'Manufacture of solid fuels and other energy industries'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	0.00	NA	NA					
Belgium	0.00	2.23	2.23	4 %	0.00	0 %	2.22	601915 %
Denmark	0.00	0.01	0.01	0 %	0.00	10 %	0.01	247 %
Finland	0.80	0.00	0.00	0 %	NA	NA	– 0.79	– 100 %
France	21.37	4.69	4.86	8 %	0.17	4 %	– 16.51	– 77 %
Germany	539.32	17.79	17.10	28 %	– 0.69	– 4 %	– 522.23	– 97 %
Greece	0.00	NO	NO	NA	NA	NA	NA	NA
Ireland	0.75	0.30	0.27	0 %	NA	NA	– 0.48	– 64 %
Italy	39.28	12.00	10.00	17 %	– 2.00	– 17 %	– 29.28	– 75 %
Luxembourg	NO	NO	NO	NA	NA	NA	NA	NA
Netherlands	2.02	0.20	0.20	0 %	0.00	– 1 %	– 1.81	– 90 %
Portugal	1.32	0.00	0.00	0 %	0.00	NA	– 1.32	– 100 %
Spain	10.60	20.71	20.96	35 %	0.25	1 %	10.36	98 %
Sweden	0.44	0.43	0.40	1 %	– 0.03	– 7 %	– 0.04	– 9 %
United Kingdom	6.05	4.38	4.12	7 %	– 0.26	– 6 %	– 1.93	– 32 %
EU-15	**629.04**	**62.74**	**60.14**	**100 %**	**– 2.60**	**– 4 %**	**– 568.90**	**– 90 %**

substantial reduction achieved by Germany. Most Member States showed an overall reduction in SO_X emissions from this category, although emissions from Spain, Denmark and Belgium increased, albeit from a very low starting level for the latter two.

Romania and Czech Republic had the highest share of EU-12 SO_X emissions from this category in 2005, accounting for 72 % (Table 25). Emissions appeared to increase by more than 100 % between 2004 and 2005. However, this was largely due to Romania, which reported its SO_X emissions from this category for the first time in 2005.

3.1.4 Manufacturing industries and construction (Category 1A2)

France, United Kingdom, Spain and Italy were responsible for 80 % of the EU-15 NO_X emissions in 2005 for the category 1A2 'Manufacturing industries and construction' (Table 26). Between 1990 and 2005, EU-15 emissions decreased by 27 %, mainly due to reductions in Germany, Italy and United Kingdom. Spain and Portugal showed an increase in emissions of 54 % and 37 %, respectively.

Table 25 Breakdown of SO_x emissions by EU-12 Member State for key category 1A1c 'Manufacture of solid fuels and other energy industries'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	10.59	0.54	0.48	1 %	– 0.06	– 11 %	– 10.11	– 95 %
Cyprus	NO	NO	NO					
Czech Republic	62.88	9.73	9.94	21 %	0.21	2 %	– 52.94	– 84 %
Estonia	0.48	1.40	1.44	3 %	0.04	3 %	0.96	200 %
Hungary	NE	0.39	IE					
Latvia	0.91	0.12	0.04	0 %	– 0.08	– 65 %	– 0.87	– 95 %
Lithuania	NO	4.99	5.14	11 %	0.15	3 %		
Malta	NE	NO	NO					
Poland	IE	5.53	5.44	11 %	– 0.09	– 2 %		
Romania	IE	IE	24.40	51 %				
Slovak Republic	IE	0.74	0.64	1 %	– 0.10	– 13 %		
Slovenia	NE	NE	NE					
EU-12	**NE**	**23.45**	**47.53**	**100 %**	**24.08**	**103 %**		

Table 26 Breakdown of NO_x emissions by EU-15 Member State for key category 1A2 'Manufacturing industries and construction'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	44.41	34.15	34.73	3 %	0.58	2 %	– 9.68	– 22 %
Belgium	46.14	48.45	48.36	4 %	– 0.09	0 %	2.22	5 %
Denmark	24.03	23.64	23.15	2 %	– 0.49	– 2 %	– 0.89	– 4 %
Finland	47.55	43.14	38.95	3 %	– 4.19	– 10 %	– 8.60	– 18 %
France	188.33	155.15	151.16	11 %	– 3.99	– 3 %	– 37.17	– 20 %
Germany	350.97	66.71	68.10	5 %	1.39	2 %	– 282.87	– 81 %
Greece	40.47	22.65	20.44	2 %	– 2.21	– 10 %	– 20.03	– 49 %
Ireland	9.72	16.84	16.99	1 %	0.15	1 %	7.27	75 %
Italy	289.30	175.34	166.30	13 %	– 9.04	– 5 %	– 123.00	– 43 %
Luxembourg	11.64	5.42	5.03	0 %	– 0.39	– 7 %	– 6.61	– 57 %
Netherlands	88.69	48.24	47.73	4 %	– 0.51	– 1 %	– 40.96	– 46 %
Portugal	37.60	52.63	51.45	4 %	– 1.17	– 2 %	13.85	37 %
Spain	216.07	332.38	343.45	26 %	11.07	3 %	127.38	59 %
Sweden	49.20	44.19	43.96	3 %	– 0.23	– 1 %	– 5.24	– 11 %
United Kingdom	377.14	266.28	267.45	20 %	1.17	0 %	– 109.68	– 29 %
EU-15	**1 821.26**	**1 335.20**	**1 327.25**	**100 %**	**– 7.95**	**– 1 %**	**– 494.01**	**– 27 %**

Over 40 % of EU-12 NO_x emissions in this category were attributed to Poland, followed by Romania (16 %) and Czech Republic (15 %) in 2005 (Table 27). Overall EU-12 NO_x emissions decreased slightly between 2004 and 2005, by 2 %.

Belgium, France, Germany, Italy and United Kingdom were responsible for 83 % of the EU-15 CO emissions in the category 1A2 'Manufacturing industries and construction' in 2005 (Table 28). Between 1990 and 2005, EU-15 total emissions decreased by 15 %. While most countries decreased their emissions, Belgium and Finland reported substantial increases.

Table 27 Breakdown of NO_x emissions by EU-12 Member State for key category 1A2 'Manufacturing industries and construction'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	49.83	16.17	17.65	7 %	1.48	9 %	– 32.18	– 65 %
Cyprus	0.40	0.53	0.48	0 %	– 0.05	– 9 %	0.08	20 %
Czech Republic	80.67	43.54	40.61	15 %	– 2.92	– 7 %	– 40.06	– 50 %
Estonia	6.71	3.44	2.93	1 %	– 0.51	– 15 %	– 3.78	– 56 %
Hungary	NE	10.64	11.59	4 %	0.95	9 %		
Latvia	10.22	3.81	4.19	2 %	0.38	10 %	– 6.02	– 59 %
Lithuania	18.00	2.90	5.50	2 %	2.61	90 %	– 12.50	– 69 %
Malta	0.00	0.14	0.14	0 %	0.00	0 %	0.13	4 321 %
Poland	IE, NE	94.55	114.67	43 %	20.12	21 %		
Romania	83.64	69.36	42.22	16 %	– 27.14	– 39 %	– 41.42	– 50 %
Slovak Republic	IE	25.07	24.13	9 %	– 0.94	– 4 %		
Slovenia	NE	4.05	4.79	2 %	0.74	18 %		
EU-12	**NE**	**274.19**	**268.91**	**100 %**	**– 5.28**	**– 2 %**		

Table 28 Breakdown of CO emissions by EU-15 Member State for key category 1A2 'Manufacturing industries and construction'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	236.60	173.65	158.83	5 %	– 14.82	– 9 %	– 77.77	– 33 %
Belgium	270.86	386.72	381.99	12 %	– 4.72	– 1 %	111.13	41 %
Denmark	25.26	20.81	19.87	1 %	– 0.94	– 5 %	– 5.39	– 21 %
Finland	41.17	64.00	56.77	2 %	– 7.23	– 11 %	15.60	38 %
France	870.09	775.47	736.60	23 %	– 38.86	– 5 %	– 133.49	– 15 %
Germany	795.74	697.94	621.90	19 %	– 76.04	– 11 %	– 173.84	– 22 %
Greece	16.09	9.36	8.95	0 %	– 0.41	– 4 %	– 7.14	– 44 %
Ireland	6.13	14.46	14.84	0 %	0.38	3 %	8.70	142 %
Italy	317.78	298.08	342.77	11 %	44.69	15 %	24.99	8 %
Luxembourg	103.07	2.66	2.59	0 %	– 0.07	– 3 %	– 100.48	– 97 %
Netherlands	152.37	111.86	112.54	3 %	0.69	1 %	– 39.83	– 26 %
Portugal	32.95	27.04	26.94	1 %	– 0.10	0 %	– 6.01	– 18 %
Spain	216.14	222.96	223.89	7 %	0.92	0 %	7.75	4 %
Sweden	31.91	34.02	33.66	1 %	– 0.37	– 1 %	1.74	5 %
United Kingdom	722.51	509.38	516.13	16 %	6.75	1 %	– 206.38	– 29 %
EU-15	**3 838.67**	**3 348.40**	**3 258.27**	**100 %**	**– 90.14**	**– 3 %**	**– 580.41**	**– 15 %**

United Kingdom, France and Spain were responsible for 52 % of EU-15 SO_x emissions in the category 1A2 'Manufacturing industries and construction' in 2005 (Table 29). Between 1990 and 2005, the EU-15 total SO_x emissions from this category decreased by 76 %, with all countries reporting decreasing emissions.

Poland and Romania had the highest share of EU-12 SO_x emissions in this source category in 2005, accounting for 27 % and 31 %, respectively (Table 30). Between 2004 and 2005, Poland's emissions decreased, whereas emissions in Romania increased substantially. This also led to an increase of EU-12 total emissions between 2004 and 2005.

Table 29 Breakdown of SO_x emissions by EU-15 Member State for key category 1A2 'Manufacturing industries and construction'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	18.52	9.12	9.19	1 %	0.08	1 %	– 9.33	– 50 %
Belgium	94.63	38.30	37.17	5 %	– 1.13	– 3 %	– 57.46	– 61 %
Denmark	17.66	7.74	6.07	1 %	– 1.66	– 22 %	– 11.59	– 66 %
Finland	78.11	19.50	17.75	2 %	– 1.75	– 9 %	– 60.36	– 77 %
France	406.47	125.08	118.72	17 %	– 6.36	– 5 %	– 287.76	– 71 %
Germany	928.46	68.49	62.79	9 %	– 5.70	– 8 %	– 865.67	– 93 %
Greece	117.97	62.20	55.03	8 %	– 7.17	– 12 %	– 62.94	– 53 %
Ireland	32.50	7.17	10.16	1 %	2.99	42 %	– 22.33	– 69 %
Italy	302.90	83.13	77.69	11 %	– 5.44	– 7 %	– 225.20	– 74 %
Luxembourg	12.55	1.50	1.50	0 %	0.00	0 %	– 11.05	– 88 %
Netherlands	35.81	15.45	15.23	2 %	– 0.22	– 1 %	– 20.58	– 57 %
Portugal	80.90	44.26	42.84	6 %	– 1.42	– 3 %	– 38.06	– 47 %
Spain	335.94	117.21	108.93	15 %	– 8.29	– 7 %	– 227.02	– 68 %
Sweden	24.55	10.42	9.59	1 %	– 0.83	– 8 %	– 14.96	– 61 %
United Kingdom	426.06	146.22	141.01	20 %	– 5.21	– 4 %	– 285.04	– 67 %
EU-15	**2 913.04**	**755.78**	**713.68**	**100 %**	**– 42.10**	**– 6 %**	**– 2 199.36**	**– 76 %**

Table 30 Breakdown of SO_x emissions by EU-12 Member State for key category 1A2 'Manufacturing industries and construction'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	220.08	48.81	45.76	8 %	– 3.05	– 6 %	– 174.32	– 79 %
Cyprus	4.81	4.32	3.14	1 %	– 1.18	– 27 %	– 1.67	– 35 %
Czech Republic	630.76	44.11	41.02	7 %	– 3.09	– 7 %	– 589.74	– 93 %
Estonia	38.65	12.03	12.27	2 %	0.24	2 %	– 26.38	– 68 %
Hungary	NE	56.44	40.37	7 %	– 16.07	– 28 %		
Latvia	22.90	0.44	0.78	0 %	0.34	77 %	– 22.12	– 97 %
Lithuania	38.00	3.19	2.75	0 %	– 0.44	– 14 %	– 35.25	– 93 %
Malta	NE	0.14	0.14	0 %	0.00	0 %	0.14	
Poland	IE,NE	217.42	204.62	37 %	– 12.80	– 6 %		
Romania	66.69	111.68	175.40	31 %	63.72	57 %	108.71	163 %
Slovak Republic	IE	33.20	30.55	5 %	– 2.65	– 8 %		
Slovenia	NE	3.27	3.68	1 %	0.41	13 %		
EU-12	**NE**	**535.06**	**560.48**	**100 %**	**25.43**	**5 %**		

3.1.5 Road transportation (Category 1A3b)

France, Germany, Italy, Spain and United Kingdom were responsible for 76 % of EU-15 NO_X emissions in the category 1A3b 'Road transportation' in 2005 (Table 31). Between 1990 and 2005, emission decreased by 42 %, due to the heaviest polluting countries reporting substantial reductions. However, NO_X emissions from this category increased in Austria, Greece and Portugal over the same period.

Poland had the highest share (28 %) of EU-12 NO_X emissions in the category 'Road transportation' in 2005, followed by Hungary, Romania, Czech Republic and Bulgaria (Table 32). In these countries, emissions increased between 2004 and 2005, except in Poland and Romania. Not all EU-12 Member States reported emissions in 1990, but most of those that did showed significant changes in emissions over the period 1990–2005, except Cyprus.

Table 31 Breakdown of NO_x emissions by EU-15 Member State for key category 1A3b 'Road transportation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	98.37	129.54	131.02	4 %	1.47	1 %	32.64	33 %
Belgium	183.65	130.72	127.17	3 %	– 3.55	– 3 %	– 56.47	– 31 %
Denmark	105.31	71.16	68.10	2 %	– 3.06	– 4 %	– 37.21	– 35 %
Finland	134.31	61.49	57.42	2 %	– 4.07	– 7 %	– 76.89	– 57 %
France	1 092.54	580.71	545.38	15 %	– 35.33	– 6 %	– 547.16	– 50 %
Germany	1 341.45	732.71	656.40	18 %	– 76.31	– 10 %	– 685.05	– 51 %
Greece	109.17	109.10	122.77	3 %	13.67	13 %	13.60	12 %
Ireland	43.88	43.84	42.86	1 %	– 0.98	– 2 %	– 1.02	– 2 %
Italy	889.30	540.74	505.93	14 %	– 34.81	– 6 %	– 383.37	– 43 %
Luxembourg	NE	NE	NE					
Netherlands	261.41	151.56	144.19	4 %	– 7.37	– 5 %	– 117.22	– 45 %
Portugal	79.83	101.94	101.59	3 %	– 0.35	0 %	21.75	27 %
Spain	513.09	539.69	517.63	14 %	– 22.06	– 4 %	4.55	1 %
Sweden	174.20	87.27	83.52	2 %	– 3.75	– 4 %	– 90.67	– 52 %
United Kingdom	1 323.80	596.94	549.25	15 %	– 47.69	– 8 %	– 774.55	– 59 %
EU-15	**6 350.31**	**3 877.42**	**3 653.24**	**100 %**	**– 224.18**	**– 6 %**	**– 2 697.07**	**– 42 %**

Table 32 Breakdown of NO_x emissions by EU-12 Member State for key category 1A3b 'Road transportation'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	43.71	83.92	90.49	11 %	6.58	8 %	46.79	107 %
Cyprus	6.50	8.34	6.79	1 %	– 1.55	– 19 %	0.29	4 %
Czech Republic	180.11	92.00	97.42	12 %	5.42	6 %	– 82.69	– 46 %
Estonia	30.40	12.15	10.97	1 %	– 1.18	– 10 %	– 19.43	– 64 %
Hungary	NE	105.09	126.65	16 %	21.56	21 %		
Latvia	20.22	17.18	17.79	2 %	0.61	4 %	– 2.43	– 12 %
Lithuania	53.00	31.94	33.23	4 %	1.29	4 %	– 19.77	– 37 %
Malta	0.22	3.05	2.87	0 %	– 0.18	– 6 %	2.64	1181 %
Poland	IE	246.16	224.09	28 %	– 22.07	– 9 %		
Romania	63.96	133.03	107.00	14 %	– 26.03	– 20 %	43.04	67 %
Slovak Republic	46.13	36.44	37.11	5 %	0.66	2 %	– 9.02	– 20 %
Slovenia	NE	32.67	34.01	4 %	1.34	4 %		
EU-12	**NE**	**801.97**	**788.41**	**100 %**	**– 13.56**	**– 2 %**		

Italy, France and Germany were responsible for 52 % of the EU-15 CO emissions in the category 1A3b 'Road transportation' in 2005 (Table 33). Between 1990 and 2005, the EU-15 total CO emissions decreased by 68 %; all countries reported reductions over this period, but the largest reductions were achieved in Germany, Italy, France and United Kingdom.

Italy, France and Spain had the greatest contribution to EU-15 NMVOC emissions in the category 1A3b 'Road transportation' in 2005 (Table 34). Between 1990 and 2005, all countries reported reductions in their NMVOC emissions and the overall EU-15 emissions decreased by 73 %.

Table 33 Breakdown of CO emissions by EU-15 Member State for key category 1A3b 'Road transportation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	419.07	168.82	156.62	2 %	– 12.19	– 7 %	– 262.45	– 63 %
Belgium	671.43	304.71	287.94	3 %	– 16.76	– 6 %	– 383.49	– 57 %
Denmark	457.16	195.68	188.07	2 %	– 7.61	– 4 %	– 269.09	– 59 %
Finland	469.62	266.92	243.48	2 %	– 23.44	– 9 %	– 226.14	– 48 %
France	6 260.15	1 919.16	1 636.68	16 %	– 282.48	– 15 %	– 4 623.48	– 74 %
Germany	6 527.26	1 697.73	1 526.32	15 %	– 171.42	– 10 %	– 5 000.95	– 77 %
Greece	906.14	789.00	703.96	7 %	– 85.04	– 11 %	– 202.18	– 22 %
Ireland	294.35	171.01	154.79	2 %	– 16.22	– 9 %	– 139.57	– 47 %
Italy	5 500.69	2 478.03	2 113.75	21 %	– 364.28	– 15 %	– 3 386.94	– 62 %
Luxembourg	NE	NE	NE					
Netherlands	737.11	330.97	313.56	3 %	– 17.41	– 5 %	– 423.55	– 57 %
Portugal	501.25	290.55	278.02	3 %	– 12.53	– 4 %	– 223.23	– 45 %
Spain	2 337.54	1 115.80	1 021.22	10 %	– 94.58	– 8 %	– 1 316.33	– 56 %
Sweden	635.39	244.28	231.37	2 %	– 12.91	– 5 %	– 404.02	– 64 %
United Kingdom	5 479.87	1 365.76	1 124.25	11 %	– 241.51	– 18 %	– 4 355.62	– 79 %
EU-15	**31 197.05**	**11 338.42**	**9 980.03**	**100 %**	**– 1 358.39**	**– 12 %**	**– 21 217.03**	**– 68 %**

Table 34 Breakdown of NMVOC emissions by EU-15 Member State for key category 1A3b 'Road transportation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	69.36	21.24	19.84	1 %	– 1.40	– 7 %	– 49.53	– 71 %
Belgium	103.68	40.70	39.16	3 %	– 1.54	– 4 %	– 64.52	– 62 %
Denmark	81.02	26.34	24.32	2 %	– 2.02	– 8 %	– 56.69	– 70 %
Finland	63.94	37.08	33.37	2 %	– 3.71	– 10 %	– 30.57	– 48 %
France	1 051.39	299.22	259.27	17 %	– 39.96	– 13 %	– 792.12	– 75 %
Germany	1 408.97	168.28	148.31	10 %	– 19.97	– 12 %	– 1 260.65	– 89 %
Greece	158.52	160.34	129.89	9 %	– 30.45	– 19 %	– 28.63	– 18 %
Ireland	60.81	21.56	19.04	1 %	– 2.52	– 12 %	– 41.78	– 69 %
Italy	962.53	414.42	385.00	26 %	– 29.42	– 7 %	– 577.53	– 60 %
Luxembourg	NE	NE	NE					
Netherlands	170.40	51.45	47.56	3 %	– 3.90	– 8 %	– 122.85	– 72 %
Portugal	114.14	57.35	55.22	4 %	– 2.13	– 4 %	– 58.92	– 52 %
Spain	418.98	207.58	187.48	12 %	– 20.10	– 10 %	– 231.50	– 55 %
Sweden	154.75	42.27	39.59	3 %	– 2.67	– 6 %	– 115.16	– 74 %
United Kingdom	866.87	144.12	118.84	8 %	– 25.28	– 18 %	– 748.03	– 86 %
EU-15	**5 685.37**	**1 691.95**	**1 506.88**	**100 %**	**– 185.06**	**– 11 %**	**– 4 178.49**	**– 73 %**

Poland, Romania and Hungary accounted for 59 % of EU-12 NMVOC emissions from this category in 2005 (Table 35). Between 2004 and 2005, NMVOC emissions in the EU-12 decreased by 26 %, mainly due to Romania, which achieved a 65 % reduction over this period.

Italy was responsible for 47 % of EU-15 SO_X emissions in the category 1A3b 'Road transportation' in 2005 (Table 36). Between 1990 and 2005, the EU-15 total SO_X emissions in this category decreased by 94 %, with all countries reporting decreasing emissions.

Table 35 Breakdown of NMVOC emissions by EU-12 Member State for key category 1A3b 'Road transportation'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	59.74	35.38	36.09	10 %	0.71	2 %	– 23.65	– 40 %
Cyprus	9.26	5.68	4.98	1 %	– 0.70	– 12 %	– 4.28	– 46 %
Czech Republic	45.46	44.94	47.18	13 %	2.24	5 %	1.72	4 %
Estonia	23.02	5.95	4.69	1 %	– 1.26	– 21 %	– 18.33	– 80 %
Hungary	NE	55.90	57.04	16 %	1.14	2 %		
Latvia	10.18	7.63	7.53	2 %	– 0.10	– 1 %	– 2.65	– 26 %
Lithuania	45.00	11.09	17.89	5 %	6.80	61 %	– 27.11	– 60 %
Malta	4.43	0.91	1.35	0 %	0.44	49 %	– 3.07	– 69 %
Poland	IE	120.84	98.99	27 %	– 21.85	– 18 %		
Romania	76.43	165.50	58.62	16 %	– 106.88	– 65 %	58.62	58.62
Slovak Republic	33.07	24.22	18.25	5 %	– 5.98	– 25 %	– 14.82	– 45 %
Slovenia	NE	12.05	11.96	3 %	– 0.09	– 1 %		
EU-12	**NE**	**490.10**	**364.56**	**100 %**	**– 125.54**	**– 26 %**		

Table 36 Breakdown of SO_x emissions by EU-15 Member State for key category 1A3b 'Road transportation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	3.76	0.17	0.15	0 %	– 0.02	– 11 %	– 3.61	– 96 %
Belgium	14.89	0.65	0.65	2 %	0.00	0 %	– 14.24	– 96 %
Denmark	5.77	0.38	0.08	0 %	– 0.30	– 80 %	– 5.69	– 99 %
Finland	5.26	0.09	0.07	0 %	– 0.02	– 23 %	– 5.19	– 99 %
France	139.50	24.16	4.11	13 %	– 20.05	– 83 %	– 135.39	– 97 %
Germany	90.20	0.83	0.80	3 %	– 0.03	– 4 %	– 89.40	– 99 %
Greece	12.92	2.56	0.64	2 %	– 1.92	– 75 %	– 12.28	– 95 %
Ireland	5.40	1.35	0.54	2 %	– 0.82	– 60 %	– 4.86	– 90 %
Italy	131.17	14.51	15.06	47 %	0.55	4 %	– 116.10	– 89 %
Luxembourg	NE	NE	NE					
Netherlands	12.56	0.94	0.95	3 %	0.01	1 %	– 11.61	– 92 %
Portugal	12.16	3.39	3.40	11 %	0.00	0 %	– 8.77	– 72 %
Spain	54.28	13.59	2.35	7 %	– 11.23	– 83 %	– 51.93	– 96 %
Sweden	5.54	0.13	0.14	0 %	0.01	6 %	– 5.41	– 98 %
United Kingdom	63.82	3.51	3.03	9 %	– 0.48	– 14 %	– 60.78	– 95 %
EU-15	**557.22**	**66.25**	**31.96**	**100 %**	**– 34.29**	**– 52 %**	**– 525.25**	**– 94 %**

3.1.6 Railways (Category 1A3c)

NO_X emissions from Railways in the EU-12 Member States are shown in Table 37. All Member States that reported data show decreasing emissions. The largest reduction achieved was almost 90 % by Czech Republic between 1990 and 2005.

3.1.7 National navigation (Category 1A3d)

Italy, United Kingdom and Spain were responsible for 62 % of EU-15 NO_X emissions in the category 1A3dii 'National navigation' in 2005 (Table 38). Between 1990 and 2005, the EU-15 total NO_X emissions in this category increased by 10 % (and by 6 % between 2004 and 2005), mainly due to the increase of emissions in Spain, France and Italy.

Table 37 Breakdown of NO_X emissions by EU-12 Member State for key category 1A3c 'Railways'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	7.66	IE	IE					
Cyprus	NO	NO	NO					
Czech Republic	26.47	7.80	3.02	8 %	– 4.78	– 61 %	– 23.45	– 89 %
Estonia	1.86	1.57	1.65	4 %	0.08	5 %	– 0.21	– 11 %
Hungary	NE	3.00	2.65	7 %	– 0.35	– 12 %		
Latvia	6.68	3.24	3.24	8 %	0.00	0 %	– 3.44	– 51 %
Lithuania	9.00	3.41	3.45	9 %	0.04	1 %	– 5.55	– 62 %
Malta	0.00	NO	NO					
Poland	IE	8.68	8.54	22 %	– 0.14	– 2 %		
Romania	18.66	12.54	13.25	35 %	0.70	6 %	– 5.41	– 29 %
Slovak Republic	7.68	1.96	1.91	5 %	– 0.05	– 3 %	– 5.78	– 75 %
Slovenia	NE	0.49	0.50	1 %	0.01	2 %		
EU-12	**NE**	**42.68**	**38.19**	**100 %**	**– 4.49**	**– 11 %**		

Table 38 Breakdown of NO_X emissions by EU-15 Member State for key category 1A3dii 'National navigation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	0.52	0.67	0.70	0 %	0.03	5 %	0.18	34 %
Belgium	5.25	5.64	5.47	1 %	– 0.17	– 3 %	0.22	4 %
Denmark	10.14	8.90	9.65	3 %	0.74	8 %	– 0.49	– 5 %
Finland	9.13	8.15	8.74	2 %	0.59	7 %	– 0.39	– 4 %
France	21.84	30.67	32.52	9 %	1.86	6 %	10.68	49 %
Germany	38.70	16.38	18.84	5 %	2.46	15 %	– 19.86	– 51 %
Greece	32.66	38.93	37.28	10 %	– 1.65	– 4 %	4.62	14 %
Ireland	1.10	0.73	0.74	0 %	0.01	1 %	– 0.36	– 33 %
Italy	70.28	79.21	80.63	22 %	1.42	2 %	10.35	15 %
Luxembourg	0.08	0.08	0.08	0 %	0.00	0 %	0.00	0 %
Netherlands	7.76	15.53	15.53	4 %	0.00	0 %	7.77	100 %
Portugal	5.52	4.85	4.69	1 %	– 0.16	– 3 %	– 0.83	– 15 %
Spain	33.70	52.68	55.80	15 %	3.12	6 %	22.10	66 %
Sweden	7.89	7.38	7.02	2 %	– 0.36	– 5 %	– 0.87	– 11 %
United Kingdom	91.10	80.27	92.14	25 %	11.88	15 %	1.04	1 %
EU-15	**335.67**	**350.07**	**369.84**	**100 %**	**19.77**	**6 %**	**34.17**	**10 %**

Italy and France were responsible for 80 % of EU-15 CO emissions in the category 1A3dii 'National navigation' in 2005 (Table 39). Between 1990 and 2005, the total EU-15 CO emissions in this category increased by 26 %, mainly due to increasing emissions in Italy and France.

Italy and France were responsible for the majority of NMVOC emissions in the category 1A3dii 'National navigation' in 2005 (60 % and 23 %, respectively) (Table 40). Between 1990 and 2005, the EU-15 total NMVOC emissions in this category increased by 12 %, which is mainly due to increases reported by France and Italy.

Table 39 Breakdown of CO emissions by EU-15 Member State for key category 1A3dii 'National navigation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	3.03	2.86	2.90	1 %	0.04	1 %	– 0.13	– 4 %
Belgium	1.36	1.23	1.18	0 %	– 0.05	– 4 %	– 0.19	– 14 %
Denmark	5.66	7.70	7.80	2 %	0.10	1 %	2.14	38 %
Finland	22.55	25.33	26.01	5 %	0.68	3 %	3.45	15 %
France	78.96	141.25	135.18	27 %	– 6.07	– 4 %	56.22	71 %
Germany	7.95	2.82	3.20	1 %	0.39	14 %	– 4.75	– 60 %
Greece	4.24	5.05	4.84	1 %	– 0.21	– 4 %	0.60	14 %
Ireland	0.28	0.19	0.19	0 %	0.00	1 %	– 0.09	– 33 %
Italy	230.07	265.85	265.99	53 %	0.14	0 %	35.91	16 %
Luxembourg	0.03	0.03	0.03	0 %	0.00	0 %	0.00	0 %
Netherlands	11.76	19.90	19.90	4 %	0.00	0 %	8.14	69 %
Portugal	0.57	0.50	0.48	0 %	– 0.02	– 3 %	– 0.09	– 15 %
Spain	0.95	1.51	1.60	0 %	0.09	6 %	0.65	68 %
Sweden	22.89	23.79	23.76	5 %	– 0.03	0 %	0.87	4 %
United Kingdom	9.32	8.22	9.43	2 %	1.22	15 %	0.11	1 %
EU-15	**399.64**	**506.21**	**502.48**	**100 %**	**– 3.73**	**– 1 %**	**102.85**	**26 %**

Table 40 Breakdown of NMVOC emissions by EU-15 Member State for key category 1A3dii 'National navigation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	0.72	0.65	0.65	0 %	– 0.01	– 1 %	NA	NA
Belgium	0.36	0.38	0.36	0 %	– 0.01	– 3 %	0.01	2 %
Denmark	1.55	1.48	1.39	1 %	– 0.08	– 6 %	– 0.15	– 10 %
Finland	9.65	9.12	9.08	5 %	– 0.04	0 %	– 0.57	– 6 %
France	25.24	45.06	43.15	23 %	– 1.91	– 4 %	17.91	71 %
Germany	3.23	1.15	1.30	1 %	0.16	14 %	– 1.93	– 60 %
Greece	1.38	1.64	1.57	1 %	– 0.07	NA	0.19	NA
Ireland	0.12	0.08	0.08	0 %	NA	NA	NA	NA
Italy	107.55	115.69	113.47	60 %	– 2.21	– 2 %	5.92	6 %
Luxembourg	NE	NE	NE					
Netherlands	2.93	3.37	3.37	2 %	0.00	0 %	0.44	15 %
Portugal	0.18	0.16	0.16	0 %	– 0.01	– 3 %	– 0.03	– 15 %
Spain	1.60	2.40	2.54	1 %	0.15	6 %	0.95	59 %
Sweden	10.06	6.82	6.82	4 %	– 0.01	0 %	– 3.24	– 32 %
United Kingdom	4.41	3.89	4.46	2 %	0.57	15 %	0.05	1 %
EU-15	**168.97**	**191.88**	**188.40**	**100 %**	**– 3.47**	**– 2 %**	**19.43**	**12 %**

Italy, Spain and United Kingdom were responsible for 78 % of EU-15 SO_X emissions in the category 1A3dii 'National navigation' in 2005 (Table 41). Between 1990 and 2005, the EU-15 total SO_X emissions in this category decreased by 2 %, with most Member States reporting decreasing emissions.

3.1.8 Other transport (Category 1A3e)

NO_X emissions from the key category 'Other transport' were reported by five EU-12 Member States in 2005. Bulgaria had the highest share of emissions, almost 70 % (Table 42). This key category is only relevant for the EU-12.

Table 41 Breakdown of SO_x emissions by EU-15 Member State for key category 1A3dii 'National navigation'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	0.04	0.02	0.02	0 %	0.00	7 %	– 0.01	– 36 %
Belgium	0.31	0.38	0.36	0 %	– 0.02	– 5 %	0.05	16 %
Denmark	5.26	2.07	1.97	1 %	– 0.09	– 5 %	– 3.28	– 62 %
Finland	1.38	1.14	1.03	1 %	– 0.11	– 9 %	– 0.35	– 25 %
France	4.72	2.43	2.11	1 %	– 0.33	– 13 %	– 2.61	– 55 %
Germany	2.04	0.00	0.01	0 %	0.00	15 %	– 2.04	– 100 %
Greece	18.61	27.48	26.12	15 %	– 1.36	– 5 %	7.51	40 %
Ireland	1.16	0.34	0.34	0 %	0.00	0 %	– 0.82	– 70 %
Italy	77.94	55.31	54.88	32 %	– 0.43	– 1 %	– 23.06	– 30 %
Luxembourg	0.01	0.01	0.01	0 %	0.00	0 %	0.00	0 %
Netherlands	0.47	0.96	0.96	1 %	0.00	0 %	0.48	102 %
Portugal	0.30	0.23	0.22	0 %	0.00	0 %	– 0.07	– 25 %
Spain	28.51	38.57	41.03	24 %	2.46	6 %	12.53	44 %
Sweden	5.00	4.01	3.92	2 %	– 0.09	– 2 %	– 1.08	– 22 %
United Kingdom	27.71	31.08	37.16	22 %	6.09	20 %	9.45	34 %
EU-15	**173.45**	**164.02**	**170.15**	**100 %**	**6.13**	**4 %**	**– 3.31**	**– 2 %**

Table 42 Breakdown of NO_x emissions by EU-12 Member State for key category 1A3e 'Other transport'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	43.94	28.73	37.76	69 %	9.03	31 %	– 6.18	– 14 %
Cyprus	NE	NE	NE					
Czech Republic	0.89	29.14	6.00	11 %	– 23.15	– 79 %	5.11	577 %
Estonia	0.00	0.00	0.00	0 %	0.00		0.00	
Hungary	NE	IE	IE					
Latvia	NE	NE	NE					
Lithuania	NO	0.03	0.05	0 %	0.03	98 %		
Malta	0.00	0.00	0.00	0 %	0.00		0.00	
Poland	IE	6.73	6.73	12 %	0.00	0 %		
Romania	NE	NE	NE					
Slovak Republic	NO	4.52	3.84	7 %	– 0.68	– 15 %		
Slovenia	NE	NE	NE					
EU-12	**NE**	**69.15**	**54.38**	**100 %**	**– 14.77**	**– 21 %**		

3.1.9 Commercial/institutional (Category 1A4a)

France and Italy were responsible for 42 % of EU-15 NO_X emissions in the category 1A4a 'Commercial/institutional' in 2005 (Table 43). Between 1990 and 2005, the EU-15 total NO_X emissions in this category increased by 10 %. Sweden, Germany, United Kingdom and Finland reported important reductions, while Greece, Italy, Spain and Portugal each reported increases of over 150 %.

EU-12 NO_X emissions in the key category 1A4a 'Commercial/institutional' were highest in Poland and Hungary, together accounting for 69 % of the EU-12 total in 2005 (Table 44). Between 2004 and 2005, overall emissions in the EU-12 decreased slightly.

Table 43 Breakdown of NO_X emissions by EU-15 Member State for key category 1A4a 'Commercial/institutional'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	3.32	3.19	3.41	2 %	0.21	7 %	0.08	2 %
Belgium	3.50	5.40	5.36	3 %	– 0.04	– 1 %	1.85	53 %
Denmark	1.40	1.32	1.08	1 %	– 0.24	– 18 %	– 0.32	– 23 %
Finland	2.49	1.74	1.56	1 %	– 0.18	– 10 %	– 0.93	– 37 %
France	36.61	38.78	38.76	21 %	– 0.02	0 %	2.14	6 %
Germany	47.49	27.43	26.48	14 %	– 0.95	– 3 %	– 21.02	– 44 %
Greece	0.43	0.94	1.22	1 %	0.28	30 %	0.79	184 %
Ireland	2.11	2.51	2.17	1 %	– 0.34	– 14 %	0.06	3 %
Italy	15.90	38.58	40.00	21 %	1.42	4 %	24.10	152 %
Luxembourg	0.47	0.50	0.50	0 %	0.00	0 %	0.03	6 %
Netherlands	12.18	13.49	13.01	7 %	– 0.49	– 4 %	0.83	7 %
Portugal	4.51	23.45	22.56	12 %	– 0.89	– 4 %	18.05	400 %
Spain	2.73	8.61	9.73	5 %	1.12	13 %	7.00	257 %
Sweden	3.32	0.72	0.55	0 %	– 0.17	– 24 %	– 2.77	– 83 %
United Kingdom	35.03	22.06	21.64	12 %	– 0.42	– 2 %	– 13.38	– 38 %
EU-15	**171.50**	**188.73**	**188.01**	**100 %**	**– 0.72**	**0 %**	**16.52**	**10 %**

Table 44 Breakdown of NO_X emissions by EU-12 Member State for key category 1A4a 'Commercial/institutional'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	0.23	0.41	0.36	1 %	– 0.04	– 11 %	0.14	60 %
Cyprus	NE	NE	NE					
Czech Republic	10.79	5.05	5.27	14 %	0.22	4 %	– 5.51	– 51 %
Estonia	0.30	0.44	0.41	1 %	– 0.03	– 7 %	0.11	37 %
Hungary	NE	8.78	8.18	21 %	– 0.61	– 7 %		
Latvia	3.68	1.66	1.49	4 %	– 0.18	– 11 %	– 2.19	– 60 %
Lithuania	IE	0.75	0.79	2 %	0.04	6 %		
Malta	0.00	0.24	0.24	1 %	0.00	0 %	0.24	17158 %
Poland	IE	19.14	18.46	48 %	– 0.68	– 4 %		
Romania	2.33	5.10	2.55	7 %	– 2.56	– 50 %	0.22	9 %
Slovak Republic	IE	0.86	0.83	2 %	– 0.03	– 4 %		
Slovenia	NE	IE	IE					
EU-12	**NE**	**42.43**	**38.57**	**100 %**	**– 3.86**	**– 9 %**		

Germany was responsible for 51 % of EU-15 CO emissions in the category 1A4a 'Commercial/institutional' in 2005 (Table 45). Between 1990 and 2005, the EU-15 total emissions decreased by 88 %, mainly due to reductions reported by Germany. However, emissions in nine Member States increased between 1990 and 2005.

Germany, Spain and France were responsible for 63 % of EU-15 SO_x emissions in the category 1A4a 'Commercial/institutional' in 2005 (Table 46). Between 1990 and 2005, EU-15 total SO_x emissions in this category decreased by 85 %, with all countries except Belgium and Greece reporting reductions.

Table 45 Breakdown of CO emissions by EU-15 Member State for key category 1A4a 'Commercial/institutional'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	11.47	14.88	13.61	9 %	– 1.27	– 9 %	2.14	19 %
Belgium	1.60	2.16	2.12	1 %	– 0.03	– 2 %	0.52	33 %
Denmark	0.89	0.92	0.95	1 %	0.03	3 %	0.06	7 %
Finland	4.61	5.98	6.01	4 %	0.03	1 %	1.40	30 %
France	16.93	16.10	16.36	10 %	0.26	2 %	– 0.57	– 3 %
Germany	1 338.63	68.20	67.52	43 %	– 0.68	– 1 %	– 1 271.11	– 95 %
Greece	1.04	0.66	0.86	1 %	0.20	30 %	– 0.18	– 17 %
Ireland	2.49	2.50	2.58	2 %	0.09	4 %	0.10	4 %
Italy	14.84	17.99	19.08	12 %	1.09	6 %	4.24	29 %
Luxembourg	4.64	1.80	2.67	2 %	0.87	48 %	– 1.97	– 42 %
Netherlands	2.41	2.89	2.79	2 %	– 0.09	– 3 %	0.38	16 %
Portugal	0.26	1.16	1.12	1 %	– 0.04	– 3 %	0.86	335 %
Spain	7.33	11.61	11.84	7 %	0.23	2 %	4.51	61 %
Sweden	4.71	8.69	4.72	3 %	– 3.97	– 46 %	0.00	0 %
United Kingdom	14.77	6.37	6.28	4 %	– 0.10	– 2 %	– 8.49	– 58 %
EU-15	**1 426.63**	**161.90**	**158.51**	**100 %**	**– 3.39**	**– 2 %**	**– 1 268.11**	**– 89 %**

Table 46 Breakdown of SO_x emissions by EU-15 Member State for key category 1A4a 'Commercial/institutional'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	5.10	1.82	1.43	2 %	– 0.39	– 21 %	– 3.67	– 72 %
Belgium	3.10	3.63	3.60	4 %	– 0.03	– 1 %	0.49	16 %
Denmark	1.88	0.35	0.26	0 %	– 0.09	– 27 %	– 1.62	– 86 %
Finland	11.25	2.28	1.90	2 %	– 0.38	– 17 %	– 9.34	– 83 %
France	45.85	24.60	24.31	28 %	– 0.30	– 1 %	– 21.54	– 47 %
Germany	344.49	20.86	18.46	21 %	– 2.40	– 12 %	– 326.03	– 95 %
Greece	2.41	1.79	3.99	5 %	2.20	123 %	1.58	66 %
Ireland	11.03	4.67	2.33	3 %	– 2.33	– 50 %	– 8.69	– 79 %
Italy	28.95	6.69	7.00	8 %	0.31	5 %	– 21.95	– 76 %
Luxembourg	0.59	0.43	0.40	0 %	– 0.03	– 7 %	– 0.19	– 32 %
Netherlands	2.02	0.77	0.54	1 %	– 0.23	– 30 %	– 1.48	– 73 %
Portugal	4.17	3.38	3.18	4 %	– 0.21	– 6 %	– 0.99	– 24 %
Spain	18.12	12.89	13.12	15 %	0.23	2 %	– 5.00	– 28 %
Sweden	4.02	0.24	0.17	0 %	– 0.08	– 32 %	– 3.86	– 96 %
United Kingdom	79.65	6.06	5.96	7 %	– 0.10	– 2 %	– 73.69	– 93 %
EU-15	**562.64**	**90.49**	**86.65**	**100 %**	**– 3.83**	**– 4 %**	**– 475.99**	**– 85 %**

All EU-12 Member States except Cyprus and Slovenia reported SO_x emissions for the category 1A4a 'Commercial/institutional' in 2004 and 2005, although in 1990 only four EU-12 Member States reported SO_x emissions in this category. It is however noted that 83 % of the EU-12 emissions in this key category were reported by Poland. Between 2004 and 2005, there was an overall reduction in EU-12 SO_x emissions in this category by 11 % (Table 47).

3.1.10 Residential (Category 1A4b)

France, Germany, Italy and United Kingdom were responsible for 73 % of EU-15 NO_x emissions in the category 1A4b 'Residential' in 2005 (Table 48). Between 1990 and 2005, the EU-15 total NO_x emissions in this category did not change, whereas between 2004 and 2005 there was a small decrease of 1 %. The largest absolute reduction was reported by Germany.

Table 47 Breakdown of SO_x emissions by EU-12 Member State for key category 1A4a 'Commercial/institutional'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	1.64	1.77	1.80	2 %	0.03	2 %	0.16	10 %
Cyprus	NE	NE	NE					
Czech Republic	78.70	4.62	4.77	5 %	0.15	3 %	– 73.92	– 94 %
Estonia	1.30	0.57	0.56	1 %	– 0.01	– 2 %	– 0.74	– 57 %
Hungary	NE	5.91	0.96	1 %	– 4.94	– 84 %		
Latvia	24.73	0.73	0.72	1 %	– 0.02	– 2 %	– 24.02	– 97 %
Lithuania	IE	2.83	3.17	3 %	0.34	12 %		
Malta	NE	0.28	0.28	0 %	0.00	0 %	0.28	
Poland	IE	90.83	88.17	83 %	– 2.66	– 3 %		
Romania	IE	11.50	5.01	5 %	– 6.49	– 56 %		
Slovak Republic	IE	0.67	0.58	1 %	– 0.09	– 13 %		
Slovenia	NE	IE	IE					
EU-12	**NE**	**119.71**	**106.02**	**100 %**	**– 13.69**	**– 11 %**		

Table 48 Breakdown of NO_x emissions by EU-15 Member State for key category 1A4b 'Residential'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	14.09	13.32	13.89	3 %	0.58	4 %	– 0.20	– 1 %
Belgium	16.19	18.18	17.91	4 %	– 0.27	– 1 %	1.72	11 %
Denmark	5.06	5.81	6.09	1 %	0.28	5 %	1.03	20 %
Finland	6.95	5.42	6.74	2 %	1.32	24 %	– 0.21	– 3 %
France	63.67	68.30	68.03	16 %	– 0.27	0 %	4.37	7 %
Germany	91.87	79.83	77.21	19 %	– 2.62	– 3 %	– 14.66	– 16 %
Greece	6.96	7.68	7.88	2 %	0.20	3 %	0.92	13 %
Ireland	5.68	5.45	5.45	1 %	0.00	0 %	– 0.23	– 4 %
Italy	45.33	48.13	50.01	12 %	1.87	4 %	4.68	10 %
Luxembourg	0.47	0.50	0.50	0 %	0.00	0 %	0.03	6 %
Netherlands	20.18	19.60	18.98	5 %	– 0.62	– 3 %	– 1.20	– 6 %
Portugal	5.42	5.90	5.81	1 %	– 0.09	– 2 %	0.40	7 %
Spain	16.39	20.20	20.30	5 %	0.10	0 %	3.91	24 %
Sweden	11.55	7.43	7.31	2 %	– 0.12	– 2 %	– 4.25	– 37 %
United Kingdom	103.67	114.72	109.42	26 %	– 5.30	– 5 %	5.75	6 %
EU-15	**413.48**	**420.48**	**415.53**	**100 %**	**– 4.95**	**– 1 %**	**2.05**	**0 %**

Of the EU-12 Member States, Poland had the highest share of NO_x emissions (57 %) in this category, and its emissions increased between 2004 and 2005 (Table 49). Nevertheless the overall trend of the EU-12 between 2004 and 2005 was a 3 % reduction in NO_x emissions from this category.

France and Germany were responsible for 49 % of EU-15 CO emissions in the category 1A4b 'Residential' in 2005 (Table 50). Between 1990 and 2005, the EU-15 total emissions decreased by 31 %, with all countries except Denmark, Greece, Finland, Sweden and Italy reporting reductions over this period.

Table 49 Breakdown of NO_x emissions by EU-12 Member State for key category 1A4b 'Residential'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	7.52	3.94	3.63	3 %	– 0.31	– 8 %	– 3.89	– 52 %
Cyprus	0.33	0.44	0.42	0 %	– 0.02	– 5 %	0.09	27 %
Czech Republic	24.04	16.07	11.04	8 %	– 5.02	– 31 %	– 13.00	– 54 %
Estonia	1.51	1.39	1.23	1 %	– 0.16	– 12 %	– 0.28	– 19 %
Hungary	NE	11.46	12.52	9 %	1.06	9 %		
Latvia	3.37	3.43	3.47	3 %	0.03	1 %	0.09	3 %
Lithuania	9.00	1.65	1.69	1 %	0.04	3 %	– 7.31	– 81 %
Malta	0.00	0.00	0.00	0 %	0.00	0 %	0.00	– 91 %
Poland	IE	74.20	78.65	57 %	4.45	6 %		
Romania	8.16	17.72	12.39	9 %	– 5.33	– 30 %	4.23	52 %
Slovak Republic	13.33	7.58	8.87	6 %	1.28	17 %	– 4.47	– 33 %
Slovenia	NE	3.61	3.45	3 %	– 0.16	– 5 %		
EU-12	**NE**	**141.49**	**137.36**	**100 %**	**– 4.13**	**– 3 %**		

Table 50 Breakdown of CO emissions by EU-15 Member State for key category 1A4b 'Residential'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	441.36	293.73	307.63	5 %	13.90	5 %	– 133.73	– 30 %
Belgium	84.44	71.34	70.29	1 %	– 1.05	– 1 %	– 14.15	– 17 %
Denmark	189.14	329.17	356.06	6 %	26.89	8 %	166.92	88 %
Finland	77.23	114.65	114.67	2 %	0.02	0 %	37.43	48 %
France	2 586.21	1 885.47	1 807.84	32 %	– 77.63	– 4 %	– 778.36	– 30 %
Germany	1 933.62	961.88	969.07	17 %	7.19	1 %	– 964.54	– 50 %
Greece	176.53	176.96	181.72	3 %	4.76	3 %	5.19	3 %
Ireland	96.23	38.31	39.68	1 %	1.37	4 %	– 56.55	– 59 %
Italy	258.36	444.69	417.18	7 %	– 27.51	– 6 %	158.82	61 %
Luxembourg	5.76	2.91	3.79	0 %	0.88	30 %	– 1.97	– 34 %
Netherlands	68.12	54.15	53.96	1 %	– 0.19	0 %	– 14.16	– 21 %
Portugal	278.83	252.80	253.82	5 %	1.02	0 %	– 25.02	– 9 %
Spain	516.52	477.32	477.40	8 %	0.08	0 %	– 39.12	– 8 %
Sweden	215.48	211.75	218.95	4 %	7.20	3 %	3.47	2 %
United Kingdom	1 191.18	430.95	361.21	6 %	– 69.74	– 16 %	– 829.97	– 70 %
EU-15	**8 119.02**	**5 746.07**	**5 633.27**	**100 %**	**– 112.79**	**– 2 %**	**– 2 485.75**	**– 31 %**

France and Germany were responsible for 56 % of EU-15 NMVOC emissions in the category 1A4b 'Residential' in 2005 (Table 51). Between 1990 and 2005, EU-15 total NMVOC emissions in this category decreased by 32 %, mainly due to reductions achieved in France.

EU-12 NMVOC emissions from this category are increasing (Table 52). The highest increase between 1990 and 2005 was reported by Romania (37.5 Gg, an increase of 211 %), although between 2004 and 2005 emissions in Romania decreased by 18 %.

Table 51 Breakdown of NMVOC emissions by EU-15 Member State for key category 1A4b 'Residential'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	57.31	33.20	34.15	5 %	0.95	3 %	– 23.16	– 40 %
Belgium	8.83	7.17	7.09	1 %	– 0.08	– 1 %	– 1.75	– 20 %
Denmark	14.15	24.08	25.85	4 %	1.77	7 %	11.70	83 %
Finland	22.18	27.31	26.87	4 %	– 0.44	– 2 %	4.69	21 %
France	545.18	332.82	308.36	45 %	– 24.46	– 7 %	– 236.82	– 43 %
Germany	108.82	76.35	78.44	11 %	2.10	3 %	– 30.37	– 28 %
Greece	14.55	14.36	14.75	2 %	0.39	3 %	0.20	1 %
Ireland	9.82	4.22	4.37	1 %	0.15	3 %	– 5.45	– 56 %
Italy	29.36	40.27	41.90	6 %	1.63	4 %	12.54	43 %
Luxembourg	0.82	0.68	0.75	0 %	0.07	10 %	– 0.07	– 9 %
Netherlands	11.42	8.63	8.60	1 %	– 0.03	0 %	– 2.81	– 25 %
Portugal	21.92	19.76	19.85	3 %	0.09	0 %	– 2.07	– 9 %
Spain	40.77	38.89	38.90	6 %	0.01	0 %	– 1.87	– 5 %
Sweden	32.05	36.29	36.75	5 %	0.46	1 %	4.70	15 %
United Kingdom	90.93	46.02	42.78	6 %	– 3.24	– 7 %	– 48.15	– 53 %
EU-15	**1 008.11**	**710.05**	**689.42**	**100 %**	**– 20.63**	**– 3 %**	**– 318.69**	**– 32 %**

Table 52 Breakdown of NMVOC emissions by EU-12 Member State for key category 1A4b 'Residential'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	2.44	25.87	24.25	8 %	– 1.62	– 6 %	21.82	896 %
Cyprus	0.05	0.07	0.06	0 %	– 0.01	– 14 %	0.01	20 %
Czech Republic	26.28	25.04	17.41	6 %	– 7.63	– 30 %	– 8.87	– 34 %
Estonia	10.45	14.63	12.60	4 %	– 2.03	– 14 %	2.15	21 %
Hungary	NE	25.27	34.45	11 %	9.18	36 %		
Latvia	13.59	18.00	17.98	6 %	– 0.02	0 %	4.40	32 %
Lithuania	1.00	11.11	11.13	4 %	0.02	0 %	10.13	1013 %
Malta	0.00	0.00	0.00	0 %	0.00	0 %	0.00	– 97 %
Poland	IE	88.58	120.82	38 %	32.25	36 %		
Romania	17.82	67.72	55.34	18 %	– 12.38	– 18 %	37.52	211 %
Slovak Republic	12.42	8.90	11.90	4 %	3.00	34 %	– 0.52	– 4 %
Slovenia	NE	8.37	8.41	3 %	0.04	1 %		
EU-12	**NE**	**293.56**	**314.36**	**100 %**	**20.79**	**7 %**		

Germany and France were responsible for 46 % of EU-15 SO_X emissions in the category 1A4b 'Residential' in 2005 (Table 53). Between 1990 and 2005, the EU-15 total SO_X emissions in this category decreased by 76 %, with all countries except Greece reporting decreasing emissions. In Greece, emissions increased by 670 % between 2004 and 2005, although emissions showed only an 18 % increase over the period 1990–2005.

In 1990 only seven EU-12 Member States reported SO_X emissions in this category. The overall trend for EU-12 emissions is decreasing (Table 54), with a reduction of 10 % between 2004 and 2005. All seven Member States that reported emissions for 1990 showed reductions in emissions of more than 70 % over the period 1990 to 2005.

Table 53 Breakdown of SO_x emissions by EU-15 Member State for key category 1A4b 'Residential'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	25.92	6.52	6.80	3 %	0.28	4 %	– 19.13	– 74 %
Belgium	27.27	20.74	20.53	10 %	– 0.21	– 1 %	– 6.74	– 25 %
Denmark	6.42	2.17	2.38	1 %	0.21	10 %	– 4.04	– 63 %
Finland	4.61	1.91	2.13	1 %	0.22	12 %	– 2.48	– 54 %
France	78.91	37.25	36.61	18 %	– 0.64	– 2 %	– 42.31	– 54 %
Germany	449.61	65.85	57.46	28 %	– 8.39	– 13 %	– 392.15	– 87 %
Greece	16.29	2.37	18.26	9 %	15.89	670 %	1.97	12 %
Ireland	27.04	11.30	12.17	6 %	0.87	8 %	– 14.88	– 55 %
Italy	60.02	12.35	12.00	6 %	– 0.35	– 3 %	– 48.02	– 80 %
Luxembourg	0.59	0.43	0.41	0 %	– 0.02	– 5 %	– 0.18	– 31 %
Netherlands	1.13	0.50	0.49	0 %	– 0.01	– 2 %	– 0.64	– 57 %
Portugal	0.18	0.04	0.03	0 %	– 0.01	– 32 %	– 0.16	– 85 %
Spain	22.49	15.01	14.57	7 %	– 0.45	– 3 %	– 7.92	– 35 %
Sweden	7.60	1.23	1.03	0 %	– 0.21	– 17 %	– 6.58	– 87 %
United Kingdom	112.75	27.05	20.84	10 %	– 6.21	– 23 %	– 91.91	– 82 %
EU-15	**840.84**	**204.72**	**205.69**	**100 %**	**0.97**	**0 %**	**– 635.15**	**– 76 %**

Table 54 Breakdown of SO_x emissions by EU-12 Member State for key category 1A4b 'Residential'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	128.95	19.34	14.14	5 %	– 5.20	– 27 %	– 114.81	– 89 %
Cyprus	1.55	2.10	0.40	0 %	– 1.70	– 81 %	– 1.15	– 74 %
Czech Republic	204.61	33.75	27.54	9 %	– 6.21	– 18 %	– 177.06	– 87 %
Estonia	4.24	1.04	0.89	0 %	– 0.15	– 14 %	– 3.35	– 79 %
Hungary	NE	45.60	52.82	17 %	7.22	16 %		
Latvia	8.44	0.38	0.47	0 %	0.10	25 %	– 7.97	– 94 %
Lithuania	64.00	3.85	4.02	1 %	0.17	4 %	– 59.98	– 94 %
Malta	NE	0.00	0.00	0 %	0.00	0 %	0.00	
Poland	IE	179.40	189.95	61 %	10.55	6 %		
Romania	IE	52.12	13.88	4 %	– 38.24	– 73 %		
Slovak Republic	63.20	5.38	5.07	2 %	– 0.31	– 6 %	– 58.12	– 92 %
Slovenia	NE	2.67	2.46	1 %	– 0.21	– 8 %		
EU-12	**NE**	**345.64**	**311.66**	**100 %**	**– 33.99**	**– 10 %**		

3.1.11 Agriculture/forestry/fishing (Category 1A4c)

EU-15 NO_X emissions from the category 1A4c 'Agriculture/forestry/fishing' showed a 17 % decrease between 1990 and 2005 (Table 55). In 2005, Spain had the highest share of emissions (23 %), followed by France (18 %) and Italy (12 %). The largest relative reductions in emissions were reported by Portugal (54 %) and Germany (45 %) between 1990 and 2005.

Poland was responsible for 70 % of EU-12 NO_X emissions in this category in 2005 and reported an increase in emissions between 2004 and 2005 (Table 56). The change in emissions between 1990 and 2005 is only shown for seven countries due to data availability. Romania reported a large reduction in emissions between 1990 and 2004, although this was followed by a substantial increase in 2005.

Table 55 Breakdown of NO_x emissions by EU-15 Member State for key category 1A4c 'Agriculture/forestry/fishing'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	19.42	19.48	18.28	3 %	– 1.20	– 6 %	– 1.14	– 6 %
Belgium	16.07	15.00	15.02	2 %	0.02	0 %	– 1.05	– 7 %
Denmark	25.01	23.63	23.35	4 %	– 0.28	– 1 %	– 1.66	– 7 %
Finland	18.09	15.32	14.14	2 %	– 1.18	– 8 %	– 3.95	– 22 %
France	158.17	125.45	116.35	18 %	– 9.10	– 7 %	– 41.83	– 26 %
Germany	87.06	75.73	47.72	7 %	– 28.01	– 37 %	– 39.34	– 45 %
Greece	40.53	38.83	39.86	6 %	1.03	3 %	– 0.67	– 2 %
Ireland	9.37	11.40	11.76	2 %	0.36	3 %	2.39	25 %
Italy	111.66	86.77	81.62	12 %	– 5.15	– 6 %	– 30.04	– 27 %
Luxembourg	0.51	0.51	0.51	0 %	0.00	0 %	0.00	0 %
Netherlands	44.11	42.46	42.59	6 %	0.13	0 %	– 1.52	– 3 %
Portugal	31.30	17.16	14.37	2 %	– 2.79	– 16 %	– 16.93	– 54 %
Spain	136.14	153.99	154.66	23 %	0.67	0 %	18.51	14 %
Sweden	21.62	24.72	25.32	4 %	0.60	2 %	3.70	17 %
United Kingdom	76.44	58.26	52.80	8 %	– 5.47	– 9 %	– 23.64	– 31 %
EU-15	**795.51**	**708.70**	**658.35**	**100 %**	**– 50.35**	**– 7 %**	**– 137.16**	**– 17 %**

Table 56 Breakdown of NO_x emissions by EU-12 Member State for key category 1A4c 'Agriculture/forestry/fishing'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	0.82	0.06	0.09	0 %	0.03	54 %	– 0.73	– 89 %
Cyprus	0.25	0.44	0.48	0 %	0.04	9 %	0.23	92 %
Czech Republic	2.86	30.69	15.48	13 %	– 15.21	– 50 %	12.61	440 %
Estonia	6.68	2.87	1.95	2 %	– 0.92	– 32 %	– 4.73	– 71 %
Hungary	NE	2.85	2.66	2 %	– 0.19	– 7 %		
Latvia	2.00	0.36	0.33	0 %	– 0.03	– 8 %	– 1.67	– 83 %
Lithuania	IE	1.83	1.88	2 %	0.04	2 %		
Malta	0.02	2.73	2.73	2 %	0.00	0 %	2.70	11369 %
Poland	IE	78.83	83.34	70 %	4.51	6 %		
Romania	5.11	0.63	10.14	9 %	9.51	1510 %	5.03	98 %
Slovak Republic	IE	0.17	0.15	0 %	– 0.02	– 14 %		
Slovenia	NE	NE	NE					
EU-12	**NE**	**121.47**	**119.23**	**100 %**	**– 2.24**	**– 2 %**		

Germany, Greece, France and Italy were responsible for 60 % of EU-15 CO emissions in the category 1A4c 'Agriculture/forestry/fishing' in 2005 (Table 57). Between 1990 and 2005, the EU-15 total CO emissions in this category decreased by 45 %, mainly due to large reductions in emissions reported by Italy and Germany.

Poland was responsible for 72 % of EU-12 SO_x emissions from this category in 2005 (Table 58). Emissions decreased between 1990 and 2005 in all reporting countries.

Table 57 Breakdown of CO emissions by EU-15 Member State for key category 1A4c 'Agriculture/forestry/fishing'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	41.20	43.40	42.11	8 %	– 1.30	– 3 %	0.91	2 %
Belgium	6.30	6.02	6.01	1 %	0.00	0 %	– 0.28	– 5 %
Denmark	82.37	27.09	25.21	5 %	– 1.88	– 7 %	– 57.16	– 69 %
Finland	33.22	26.26	20.85	4 %	– 5.41	– 21 %	– 12.37	– 37 %
France	113.04	88.62	86.43	16 %	– 2.19	– 2 %	– 26.61	– 24 %
Germany	197.66	64.56	59.12	11 %	– 5.45	– 8 %	– 138.55	– 70 %
Greece	87.56	63.30	64.97	12 %	1.67	3 %	– 22.59	– 26 %
Ireland	3.01	3.67	3.78	1 %	0.12	3 %	0.77	25 %
Italy	278.47	115.75	110.09	21 %	– 5.66	– 5 %	– 168.37	– 60 %
Luxembourg	1.05	1.08	1.08	0 %	0.00	0 %	0.03	3 %
Netherlands	14.91	14.89	14.90	3 %	0.01	0 %	– 0.01	0 %
Portugal	8.73	5.09	4.38	1 %	– 0.71	– 14 %	– 4.35	– 50 %
Spain	43.64	42.68	43.06	8 %	0.38	1 %	– 0.58	– 1 %
Sweden	11.78	14.32	14.53	3 %	0.21	1 %	2.75	23 %
United Kingdom	38.74	36.63	35.94	7 %	– 0.69	– 2 %	– 2.80	– 7 %
EU-15	**961.70**	**553.37**	**532.47**	**100 %**	**– 20.90**	**– 4 %**	**– 429.23**	**– 45 %**

Table 58 Breakdown of SO_x emissions by EU-12 Member State for key category 1A4c 'Agriculture/forestry/fishing'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	9.09	0.33	0.50	1 %	0.17	53 %	– 8.59	– 94 %
Cyprus	0.31	0.55	0.12	0 %	– 0.43	– 78 %	– 0.19	– 61 %
Czech Republic	19.14	2.12	1.31	3 %	– 0.81	– 38 %	– 17.82	– 93 %
Estonia	2.55	0.38	0.27	1 %	– 0.11	– 29 %	– 2.28	– 89 %
Hungary	NE	2.55	2.53	5 %	– 0.03	– 1 %		
Latvia	3.62	0.17	0.13	0 %	– 0.03	– 20 %	– 3.49	– 96 %
Lithuania	IE	0.34	0.39	1 %	0.05	14 %		
Malta	NE	5.43	5.43	11 %	0.00	0 %	5.43	
Poland	IE	34.39	36.64	72 %	2.25	7 %		
Romania	43.19	4.79	3.44	7 %	– 1.35	– 28 %	– 39.75	– 92 %
Slovak Republic	IE	0.18	0.14	0 %	– 0.04	– 22 %		
Slovenia	NE	NE	NE					
EU-12	**NE**	**51.23**	**50.90**	**100 %**	**– 0.33**	**– 1 %**		

3.1.12 Oil and natural gas (Category 1B2)

France, Italy and Spain were responsible for 80 % of EU-15 SO_x emissions in the category 1B2 'Oil and Natural Gas' in 2005 (Table 59). Between 1990 and 2005, the EU-15 total SO_x emissions in this category decreased by 45 %, with all countries except Portugal reporting decreasing emissions.

United Kingdom, Italy and France were responsible for 60 % of EU-15 NMVOC emissions in 2005 in this category (Table 60). The overall trend in EU-15 emissions is decreasing, with a 51 % reduction in emissions between 1990 and 2005.

Table 59 Breakdown of SO_x emissions by EU-15 Member State for key category 1B2 'Oil and natural gas'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	2.00	0.14	0.13	0 %	– 0.01	– 8 %	– 1.87	– 93 %
Belgium	0.25	0.00	0.00	0 %	0.00	NA	– 0.25	– 100 %
Denmark	4.28	0.18	0.30	0 %	0.13	72 %	– 3.98	– 93 %
Finland	NO	1.35	0.85	1 %	– 0.50	– 37 %	NA	NA
France	95.18	59.69	63.08	38 %	3.39	6 %	– 32.10	– 34 %
Germany	31.39	17.47	14.65	9 %	– 2.81	– 16 %	– 16.73	– 53 %
Greece	0.00	7.41	7.39	5 %	– 0.02	NA	7.39	NA
Ireland	NE, NO	NE	NE	NA	NA	NA	NA	NA
Italy	79.72	37.21	27.78	17 %	– 9.44	– 25 %	– 51.94	– 65 %
Luxembourg	NE, NO	NE, NO	NE, NO					
Netherlands	7.52	NO	NO					
Portugal	1.30	7.15	7.27	4 %	0.12	2 %	5.98	461 %
Spain	64.43	41.75	40.18	25 %	– 1.57	– 4 %	– 24.24	– 38 %
Sweden	4.24	1.03	1.10	1 %	0.07	7 %	– 3.14	– 74 %
United Kingdom	7.78	1.35	1.26	1 %	– 0.09	– 6 %	– 6.52	– 84 %
EU-15	**298.09**	**174.73**	**164.01**	**100 %**	**– 10.72**	**– 6 %**	**– 134.07**	**– 45 %**

Table 60 Breakdown of NMVOC emissions by EU-15 Member State for key category 1B2 'Oil and natural gas'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	12.22	3.27	3.09	1 %	– 0.18	– 5 %	– 9.12	– 75 %
Belgium	33.00	17.37	15.28	3 %	– 2.09	– 12 %	– 17.72	– 54 %
Denmark	10.88	16.45	15.54	3 %	– 0.90	– 5 %	4.66	43 %
Finland	32.54	8.03	7.91	1 %	– 0.12	– 1 %	– 24.63	– 76 %
France	164.92	70.35	68.85	12 %	– 1.50	– 2 %	– 96.07	– 58 %
Germany	277.78	51.37	45.43	8 %	– 5.94	– 12 %	– 232.35	– 84 %
Greece	0.00	28.96	28.88	5 %	– 0.08	0 %	28.88	NA
Ireland	3.82	6.86	7.31	1 %	0.45	7 %	3.49	91 %
Italy	117.95	77.72	80.67	14 %	2.95	4 %	– 37.28	– 32 %
Luxembourg	1.42	0.69	0.63	0 %	– 0.06	– 9 %	– 0.79	– 56 %
Netherlands	48.25	15.36	15.92	3 %	0.55	4 %	– 32.33	– 67 %
Portugal	19.13	25.73	26.05	4 %	0.32	1 %	6.92	36 %
Spain	63.05	67.14	63.56	11 %	– 3.59	– 5 %	0.51	1 %
Sweden	31.27	14.00	12.67	2 %	– 1.33	– 10 %	– 18.60	– 59 %
United Kingdom	380.94	202.16	200.65	34 %	– 1.51	– 1 %	– 180.29	– 47 %
EU-15	**1 197.17**	**605.47**	**592.44**	**100 %**	**– 13.03**	**– 2 %**	**– 604.73**	**– 51 %**

Only six EU-12 Member States reported NMVOC emissions in 1990 for this category (Table 61). Between 2004 and 2005 EU-12 NMVOC emissions in this category increased, mainly due to a large increase in Romania.

3.2 Industrial processes (NFR Sector 2)

The following pollutant sources from the industrial processes sector were identified as key categories for certain pollutants (Table 62).

As for the preceding section, detailed tables are only provided where the key category is ranked in the top 10 of all key categories identified for that pollutant.

Table 61 Breakdown of NMVOC emissions by EU-12 Member State for key category 1B2 'Oil and natural gas'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	NA, NE	9.18	12.62	8 %	3.45	38 %		
Cyprus	0.71	1.24	1.33	1 %	0.09	7 %	0.62	87 %
Czech Republic	9.67	1.10	0.69	0 %	– 0.42	– 38 %	– 8.99	– 93 %
Estonia	7.79	9.30	8.70	6 %	– 0.60	– 6 %	0.91	12 %
Hungary	NE	4.61	5.07	3 %	0.46	10 %		
Latvia	2.98	0.23	0.06	0 %	– 0.18	– 75 %	– 2.92	– 98 %
Lithuania	NO	10.96	17.62	12 %	6.66	61 %		
Malta	0.00	0.63	0.63	0 %	0.00	0 %	0.63	
Poland	IE, NA, NE	43.24	42.81	29 %	– 0.43	– 1 %		
Romania	14.67	7.67	46.03	31 %	38.36	500 %	31.36	214 %
Slovak Republic	26.01	12.31	11.16	7 %	– 1.15	– 9 %	– 14.85	– 57 %
Slovenia	NE	5.77	2.64	2 %	– 3.13	– 54 %		
EU-12	**NE**	**106.25**	**149.36**	**100 %**	**43.11**	**41 %**		

Table 62 Key categories from the industrial processes sector and the relevant pollutants for which each category was identified as a key category

EU-15		EU-12	
Key category	**Pollutants for which this was identified as a key category**	**Key category**	**Pollutants for which this was identified as a key category**
2A Mineral products	NMVOC	2A Mineral products	NMVOC (detail not provided) NO_x SO_x
2B Chemical industry	CO NMVOC SO_x	2B Chemical industry	NO_x NMVOC (detail not provided)
2C Metal production	CO SO_x	2D Other production	SO_x
2D Other production	NMVOC	1A2 Manufacturing industries and construction	NMVOC

3.2.1 Mineral products (Category 2A)

Spain was responsible for 58 % of EU-15 NMVOC emissions in the category 2A 'Mineral products' in 2005 (Table 63). Between 2004 and 2005 emissions in this category decreased by 6 %, but between 1990 and 2005, the EU-15 total emissions increased by 27 %, mainly due to emissions reported by Spain and Greece.

3.2.2 Chemical industry (Category 2B)

United Kingdom and France were responsible for 54 % of EU-15 NMVOC emissions in the category 2B 'Chemical industry' in 2005 (Table 64). Between 1990 and 2005, the EU-15 total NMVOC emissions in this category decreased by 56 %, with all countries except Portugal and Spain reporting reductions in emissions.

Table 63 Breakdown of NMVOC emissions by EU-15 Member State for key category 2A 'Mineral products'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	IE	IE	IE	NA	NA	NA	NA	NA
Belgium	2.24	1.55	1.26	1 %	– 0.30	– 19 %	– 0.98	– 44 %
Denmark	0.65	0.58	0.58	0 %	0.00	0 %	– 0.08	– 12 %
Finland	7.16	0.95	1.00	0 %	0.05	6 %	– 6.16	– 86 %
France	18.50	24.62	24.19	10 %	– 0.43	– 2 %	5.69	31 %
Germany	17.87	17.27	17.22	7 %	– 0.04	0 %	– 0.65	– 4 %
Greece	0.00	47.69	31.97	13 %	– 15.72	– 33 %	31.97	NA
Ireland	NE, NO	NO	NO	NA	NA	NA	NA	NA
Italy	9.18	11.86	11.86	5 %	0.00	0 %	2.68	29 %
Luxembourg	NE, NO	NE, NO	NE, NO					
Netherlands	1.03	0.26	0.25	0 %	– 0.01	– 4 %	– 0.78	– 76 %
Portugal	0.81	3.72	3.72	2 %	0.01	0 %	2.92	361 %
Spain	116.63	139.66	141.40	58 %	1.73	1 %	24.76	21 %
Sweden	6.41	1.08	1.42	1 %	0.34	32 %	– 5.00	– 78 %
United Kingdom	10.21	8.34	8.02	3 %	– 0.33	– 4 %	– 2.19	– 21 %
EU-15	**190.71**	**257.58**	**242.88**	**100 %**	**– 14.70**	**– 6 %**	**52.18**	**27 %**

Table 64 Breakdown of NMVOC emissions by EU-15 Member State for key category 2B 'Chemical industry'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	8.29	1.32	1.32	1 %	0.00	0 %	– 6.96	– 84 %
Belgium	33.51	15.55	15.28	9 %	– 0.27	– 2 %	– 18.23	– 54 %
Denmark	0.39	0.03	0.03	0 %	– 0.01	– 18 %	– 0.36	– 93 %
Finland	8.32	3.08	2.64	2 %	– 0.44	– 14 %	– 5.68	– 68 %
France	40.49	34.97	34.81	21 %	– 0.16	0 %	– 5.68	– 14 %
Germany	44.38	5.25	5.39	3 %	0.14	3 %	– 38.99	– 88 %
Greece	0.00	1.97	2.03	1 %	0.06	NA	2.03	NA
Ireland	NA, NO	NO	NO	NA	NA	NA	NA	NA
Italy	18.46	4.10	4.10	2 %	0.00	0 %	– 14.36	– 78 %
Luxembourg	NA, NO	NA, NO	NA, NO					
Netherlands	33.34	9.87	9.94	6 %	0.08	1 %	– 23.39	– 70 %
Portugal	11.43	15.57	15.98	10 %	0.41	3 %	4.55	40 %
Spain	11.36	16.48	16.25	10 %	– 0.22	– 1 %	4.89	43 %
Sweden	5.88	3.75	3.40	2 %	– 0.35	– 9 %	– 2.48	– 42 %
United Kingdom	165.77	53.79	54.92	33 %	1.13	2 %	– 110.84	– 67 %
EU-15	**381.62**	**165.73**	**166.11**	**100 %**	**0.38**	**0 %**	**– 215.51**	**– 56 %**

Bulgaria and Poland generally have the highest NO_X emissions of the EU-12 Member States in the category 2B 'Chemical industry' (Table 65). Bulgaria further reported a slight increase in emissions between 2004 and 2005, whilst Poland recorded a decrease over this period.

Portugal and United Kingdom were responsible for 65 % of EU-15 CO emissions in the category 2B 'Chemical industry' in 2005 (Table 66). Between 1990 and 2005, the EU-15 total CO emissions in this category decreased by 29 %, with all reporting countries indicating reductions except Portugal.

Table 65 Breakdown of NO_x emissions by EU-12 Member State for key category 2B 'Chemical industry'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	18.64	16.80	17.06	42 %	0.26	2 %	– 1.58	– 8 %
Cyprus	NO	NO	NO					
Czech Republic	6.32	0.59	0.29	1 %	– 0.30	– 50 %	– 6.02	– 95 %
Estonia	0.19	0.32	0.16	0 %	– 0.16	– 50 %	– 0.03	– 16 %
Hungary	7.34	4.17	4.17	10 %	0.00	0 %	– 3.17	– 43 %
Latvia	NO	NO	NO					
Lithuania	NE, NO	0.42	0.41	1 %	– 0.01	– 3 %		
Malta	0.00	0.00	0.00	0 %	0.00		0.00	
Poland	IE, NE, NO	12.99	10.86	26 %	– 2.13	– 16 %		
Romania	11.90	3.14	7.78	19 %	4.64	148 %	– 4.12	– 35 %
Slovak Republic	4.31	0.23	0.27	1 %	0.04	16 %	– 4.04	– 94 %
Slovenia	NE	NE	NE					
EU-12	**NE**	**38.66**	**41.00**	**100 %**	**2.33**	**6 %**		

Table 66 Breakdown of CO emissions by EU-15 Member State for key category 2B 'Chemical industry'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	12.67	11.11	11.12	9 %	0.01	0 %	– 1.55	– 12 %
Belgium	9.66	1.01	0.95	1 %	– 0.05	– 5 %	– 8.71	– 90 %
Denmark	0.00	0.00	0.00	0 %	0.00	NA	0.00	NA
Finland	NO	NA	NA	NA	NA	NA	NA	NA
France	11.43	5.82	5.83	5 %	0.01	0 %	– 5.60	– 49 %
Germany	1.93	0.87	0.83	1 %	– 0.04	– 4 %	– 1.10	– 57 %
Greece	0.00	1.26	1.26	1 %	0.00	NA	1.26	NA
Ireland	NA, NO	NO	NO	NA	NA	NA	NA	NA
Italy	15.33	13.62	13.68	11 %	0.07	0 %	– 1.65	– 11 %
Luxembourg	NA, NO	NA, NO	NA, NO					
Netherlands	1.42	NO	NO					
Portugal	24.61	50.15	52.17	44 %	2.02	4 %	27.56	112 %
Spain	8.46	7.90	7.94	7 %	0.04	1 %	– 0.52	– 6 %
Sweden	0.00	0.31	0.22	0 %	– 0.09	– 28 %	NA	NA
United Kingdom	81.90	28.91	25.21	21 %	– 3.70	– 13 %	– 56.69	– 69 %
EU-15	**167.41**	**120.95**	**119.23**	**100 %**	**– 1.73**	**– 1 %**	**– 48.19**	**– 29 %**

In 2005, Germany and Portugal were responsible for 52 % of EU-15 SO_x emissions in the category 2B 'Chemical industry' (Table 67). Between 1990 and 2005, the EU-15 total SO_x emissions in this category decreased by 60 %, with all countries except Portugal reporting decreased emissions.

3.2.3 Metal production (Category 2C)

France, Spain and Germany were responsible for 83 % of EU-15 CO emissions in the category 2C 'Metal production' in 2005 (Table 68). Between 1990 and 2005, the total EU-15 CO emissions in this category decreased by 21 %, mainly due to reductions reported by Belgium, France, Germany and Italy. However, emissions increased significantly by 40 % in Spain over this period.

Table 67 Breakdown of SO_x emissions by EU-15 Member State for key category 2B 'Chemical industry'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	1.56	0.77	0.77	1 %	0.00	0 %	– 0.80	– 51 %
Belgium	18.00	3.41	3.61	4 %	0.21	6 %	– 14.38	– 80 %
Denmark	0.64	0.34	0.40	0 %	0.06	NA	– 0.23	– 37 %
Finland	15.08	3.55	6.53	8 %	2.98	84 %	– 8.55	– 57 %
France	23.80	5.14	4.82	6 %	– 0.32	– 6 %	– 18.98	– 80 %
Germany	26.05	25.57	25.78	31 %	0.22	1 %	– 0.26	– 1 %
Greece	0.00	2.34	3.46	4 %	1.12	NA	3.46	NA
Ireland	NA, NO	NO	NO	NA	NA	NA	NA	NA
Italy	60.80	7.85	6.85	8 %	– 1.00	– 13 %	– 53.95	– 89 %
Luxembourg	NA, NO	NA, NO	NA, NO					
Netherlands	3.39	NO	NO					
Portugal	7.56	16.54	17.44	21 %	0.90	5 %	9.88	131 %
Spain	9.76	6.65	7.05	8 %	0.40	6 %	– 2.70	– 28 %
Sweden	5.98	0.69	0.57	1 %	– 0.12	– 17 %	– 5.42	– 90 %
United Kingdom	39.02	8.64	6.91	8 %	– 1.73	– 20 %	– 32.11	– 82 %
EU-15	**211.64**	**81.48**	**84.20**	**100 %**	**2.72**	**3 %**	**– 127.45**	**– 60 %**

Table 68 Breakdown of CO emissions by EU-15 Member State for key category 2C 'Metal production'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	23.52	2.52	2.54	0 %	0.03	1 %	– 20.97	– 89 %
Belgium	269.06	83.72	83.02	4 %	– 0.70	– 1 %	– 186.04	– 69 %
Denmark	NE	NE	NE	NA	NA	NA	NA	NA
Finland	0.72	0.75	0.77	0 %	0.02	3 %	NA	NA
France	1 111.89	1 048.83	897.25	40 %	– 151.58	– 14 %	– 214.63	– 19 %
Germany	700.30	596.47	569.52	25 %	– 26.95	– 5 %	– 130.78	– 19 %
Greece	0.00	22.50	22.83	1 %	0.33	NA	22.83	NA
Ireland	NO	NO	NO	NA	NA	NA	NA	NA
Italy	190.43	102.01	106.84	5 %	4.83	5 %	– 83.59	– 44 %
Luxembourg	17.40	4.42	4.42	0 %	0.00	0 %	– 12.98	– 75 %
Netherlands	118.79	56.00	57.09	3 %	1.10	2 %	– 61.70	– 52 %
Portugal	8.88	15.82	12.25	1 %	– 3.57	– 23 %	3.37	38 %
Spain	289.63	398.94	404.58	18 %	5.65	1 %	114.95	40 %
Sweden	2.30	2.47	2.38	0 %	– 0.09	– 4 %	0.08	4 %
United Kingdom	136.80	104.73	104.20	5 %	– 0.52	– 1 %	– 32.60	– 24 %
EU-15	**2 869.73**	**2 439.18**	**2 267.71**	**100 %**	**– 171.47**	**– 7 %**	**– 602.02**	**– 21 %**

Germany was responsible for 73 % of EU-15 SO_X emissions in the category 2C 'Metal production' in 2005 (Table 69). Between 1990 and 2005, the EU-15 total SO_X emissions in this category increased by 15 %, mainly due to the increasing emissions reported by Germany. Between 2004 and 2005 overall emissions decreased by 1 %.

3.2.4 Other production (Category 2D)

United Kingdom, Spain and Germany were responsible for 60 % of EU-15 NMVOC emissions in 2005 in the category 2D 'Other production' (Table 70). Between 1990 and 2005, when the EU-15 total emissions increased overall by 3 %, only Denmark, Finland France, Italy and the Netherlands reported reductions.

Table 69 Breakdown of SO_x emissions by EU-15 Member State for key category 2C 'Metal production'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	0.66	0.45	0.45	1 %	0.00	0 %	– 0.21	– 31 %
Belgium	10.06	4.23	3.73	5 %	– 0.51	– 12 %	– 6.33	– 63 %
Denmark	NA	NA	NA					
Finland	7.76	4.80	3.83	5 %	NA	NA	– 3.93	– 51 %
France	5.31	7.39	7.61	9 %	0.21	3 %	2.30	43 %
Germany	18.00	43.23	42.93	52 %	– 0.30	– 1 %	24.93	139 %
Greece	0.00	2.62	2.68	3 %	NA	NA	NA	NA
Ireland	NO	NO	NO					
Italy	5.49	4.10	3.91	5 %	– 0.19	– 5 %	– 1.58	– 29 %
Luxembourg	0.16	0.21	0.21	0 %	NA	NA	NA	NA
Netherlands	6.78	NO	NO					
Portugal	0.64	0.00	0.00	0 %	0.00	NA	– 0.64	– 100 %
Spain	4.12	5.69	5.73	7 %	0.04	1 %	1.61	39 %
Sweden	5.64	3.92	4.28	5 %	0.37	9 %	– 1.35	– 24 %
United Kingdom	7.15	6.45	7.26	9 %	0.81	12 %	0.11	2 %
EU-15	**71.75**	**83.09**	**82.62**	**100 %**	**– 0.48**	**– 1 %**	**10.87**	**15 %**

Table 70 Breakdown of NMVOC emissions by EU-15 Member State for key category 2D 'Other production'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	2.29	2.62	2.62	1 %	0.00	0 %	0.33	14 %
Belgium	3.07	3.44	3.49	1 %	0.04	1 %	0.42	14 %
Denmark	0.58	0.53	0.53	0 %	0.00	– 1 %	– 0.05	– 9 %
Finland	5.97	5.47	4.87	2 %	– 0.60	– 11 %	– 1.10	– 18 %
France	33.31	33.25	33.01	12 %	– 0.24	– 1 %	– 0.30	– 1 %
Germany	42.21	42.79	37.09	14 %	– 5.70	– 13 %	– 5.11	– 12 %
Greece	0.00	4.41	5.88	2 %	1.47	33 %	5.88	NA
Ireland	NE	NO	NO					
Italy	33.21	26.36	26.36	10 %	0.00	0 %	– 6.85	– 21 %
Luxembourg	0.12	0.12	0.13	0 %	0.01	8 %	0.01	8 %
Netherlands	7.11	5.00	4.87	2 %	– 0.13	– 3 %	– 2.25	– 32 %
Portugal	15.06	15.69	15.58	6 %	– 0.11	– 1 %	0.52	3 %
Spain	32.30	48.56	46.05	17 %	– 2.51	– 5 %	13.75	43 %
Sweden	9.42	10.41	10.27	4 %	– 0.15	– 1 %	0.85	9 %
United Kingdom	77.74	80.33	78.70	29 %	– 1.63	– 2 %	0.96	1 %
EU-15	**262.39**	**278.99**	**269.45**	**100 %**	**9.54**	**3 %**	**7.05**	**3 %**

Hungary, Poland and Romania were responsible for 64 % of EU-12 NMVOC emissions in 2005 in this category (Table 71). All EU-12 Member States reported reductions in emissions between 1990 and 2005.

3.3 Solvent and other product use (NFR Sector 3)

In the sector 'Solvent and other product use', the following key categories were identified (Table 72).

As for the preceding sections, detailed tables are only provided where the key category is ranked in the top 10 of key categories identified.

Table 71 Breakdown of NMVOC emissions by EU-12 Member State for key category 2D 'Other production'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	16.10	2.03	3.49	6 %	1.45	72 %	– 12.61	– 78 %
Cyprus	NE	NE	NE					
Czech Republic	6.94	0.03	0.00	0 %	– 0.03	– 96 %	– 6.94	– 100 %
Estonia	2.00	0.94	0.98	2 %	0.04	4 %	– 1.02	– 51 %
Hungary	24.66	8.30	14.29	24 %	5.99	72 %	– 10.37	– 42 %
Latvia	8.12	5.60	6.64	11 %	1.05	NA	– 1.48	– 18 %
Lithuania	NE	5.64	8.27	14 %	2.63	47 %		
Malta	0.00	0.53	0.53	1 %	NA	NA	0.53	
Poland	IE	11.34	12.08	21 %	0.74	7 %		
Romania	13.21	13.58	10.90	19 %	– 2.68	– 20 %	– 2.31	– 17 %
Slovak Republic	2.07	0.35	0.34	1 %	– 0.01	– 2 %	– 1.73	– 84 %
Slovenia	NE	0.85	0.83	1 %	– 0.02	– 3 %		
EU-12	**NE**	**49.19**	**58.35**	**100 %**	**9.16**	**19 %**		

Table 72 Key categories from the 'solvent and other product use' sector and the relevant pollutants for which each category was identified as a key category

EU-15		EU-12	
Key category	**Pollutants for which this was identified as a key category**	**Key category**	**Pollutants for which this was identified as a key category**
3A Paint application	NMVOC	3A Paint application	NMVOC
3B Degreasing and Dry Cleaning (detail not provided)	NMVOC	3B Degreasing and dry cleaning	NMVOC
3C Chemical products, manufacture and processing	NMVOC	3C Chemical products, manufacture and processing	NMVOC
3D Other including products containing HMs and POPs	NMVOC	3D Other including products containing HMs and POPs	NMVOC

3.3.1 Paint application (Category 3A)

France, Germany, Spain and Italy were responsible for 77 % of EU-15 NMVOC emissions in the category 3A 'Paint application' in 2005 (Table 73). Between 1990 and 2005, the EU-15 total NMVOC emissions in this category decreased by 28 % with all reporting countries recording reductions except Portugal, Spain and Ireland.

Poland, Czech Republic and Romania were responsible for 66 % of EU-12 NMVOC emissions from this category in 2005 (Table 74). All countries except Bulgaria reported decreasing emissions between 1990 and 2005.

Table 73 Breakdown of NMVOC emissions by EU-15 Member State for key category 3A 'Paint application'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	46.31	21.48	20.81	2 %	– 0.67	– 3 %	– 25.50	– 55 %
Belgium	49.02	21.19	21.39	2 %	0.20	1 %	– 27.63	– 56 %
Denmark	18.80	13.59	13.79	1 %	0.21	2 %	– 5.00	– 27 %
Finland	27.50	14.46	13.97	1 %	– 0.49	– 3 %	– 13.53	– 49 %
France	262.52	205.80	204.65	16 %	– 1.15	– 1 %	– 57.87	– 22 %
Germany	540.00	343.07	345.87	28 %	2.79	1 %	– 194.13	– 36 %
Greece	0.00	11.05	11.10	1 %	0.05	0 %	11.10	NA
Ireland	6.88	8.71	8.79	1 %	0.07	1 %	1.91	28 %
Italy	270.79	221.30	220.00	18 %	– 1.30	– 1 %	– 50.79	– 19 %
Luxembourg	1.35	1.37	1.38	0 %	0.01	1 %	0.03	2 %
Netherlands	80.96	26.08	26.08	2 %	0.00	0 %	– 54.89	– 68 %
Portugal	14.36	30.77	31.83	3 %	1.05	3 %	17.47	122 %
Spain	172.46	201.97	193.19	15 %	– 8.77	– 4 %	20.73	12 %
Sweden	34.61	16.09	16.09	1 %	0.00	0 %	– 18.53	– 54 %
United Kingdom	208.81	119.86	118.49	9 %	– 1.37	– 1 %	– 90.32	– 43 %
EU-15	**1 734.37**	**1 256.78**	**1 247.41**	**100 %**	**– 9.36**	**– 1 %**	**– 486.96**	**– 28 %**

Table 74 Breakdown of NMVOC emissions by EU-12 Member State for key category 3A 'Paint application'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	0.13	1.99	2.43	1 %	0.44	22 %	2.31	1 837 %
Cyprus	NE	NE	NE					
Czech Republic	96.90	38.53	39.40	17 %	0.87	2 %	– 57.50	– 59 %
Estonia	1.60	0.47	0.54	0 %	0.07	15 %	– 1.06	– 66 %
Hungary	32.50	25.14	23.34	10 %	– 1.80	– 7 %	– 9.16	– 28 %
Latvia	7.45	6.70	7.39	3 %	0.69	10 %	– 0.05	– 1 %
Lithuania	NE	16.79	16.68	7 %	– 0.11	– 1 %		
Malta	0.00	0.87	0.87	0 %	0.00	0 %	0.87	
Poland	NE	79.47	87.90	37 %	8.43	11 %		
Romania	35.79	32.01	29.09	12 %	– 2.92	– 9 %	– 6.70	– 19 %
Slovak Republic	32.81	18.46	18.92	8 %	0.46	2 %	– 13.89	– 42 %
Slovenia	NE	10.81	10.25	4 %	– 0.56	– 5 %		
EU-12	**NE**	**231.22**	**236.81**	**100 %**	**5.58**	**2 %**		

3.3.2 *Degreasing and dry cleaning (Category 3B)*

During 1990, emissions in the key category 3B 'Degreasing and dry cleaning' were mainly due to Czech Republic and Slovenia, whilst in 2005, Czech Republic and Poland were the greatest contributors (Table 75). All countries reported decreasing emissions between 1990 and 2005.

3.3.3 *Chemical products, manufacture and processing (Category 3C)*

Spain, France and Italy were responsible for 61 % of EU-15 NMVOC emissions in the category 3C 'Chemical products, manufacture and processing' in 2005 (Table 76). Between 1990 and 2005, the EU-15 total NMVOC emissions in this category decreased by 11 %, although Portugal and Spain reported increasing emissions.

Table 75 Breakdown of NMVOC emissions by EU-12 Member State for key category 3B 'Degreasing and dry cleaning'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	NE	0.56	0.41	1 %	– 0.14	– 26 %		
Cyprus	0.20	0.20	0.19	0 %	– 0.01	– 5 %	– 0.01	– 5 %
Czech Republic	47.70	18.26	17.60	27 %	– 0.66	– 4 %	– 30.10	– 63 %
Estonia	0.03	0.01	0.00	0 %	– 0.01	– 100 %	– 0.03	– 100 %
Hungary	0.20	0.02	0.01	0 %	– 0.01	– 54 %	– 0.19	– 94 %
Latvia	2.27	1.97	1.96	3 %	NA	NA	– 0.31	– 14 %
Lithuania	NE	2.19	2.18	3 %	– 0.01	– 1 %		
Malta	0.00	0.64	0.64	1 %	0.00	0 %	0.64	
Poland	NE	29.96	29.96	47 %	0.00	0 %		
Romania	NE	8.26	5.41	8 %	– 2.85	– 35 %		
Slovak Republic	6.65	5.80	5.69	9 %	– 0.11	– 2 %	– 0.96	– 14 %
Slovenia	28.35	NE	0.20	0 %	NA	NA	– 28.15	– 99 %
EU-12	**NE**	**67.88**	**64.26**	**100 %**	**– 3.62**	**– 5 %**		

Table 76 Breakdown of NMVOC emissions by EU-15 Member State for key category 3C 'Chemical products, manufacture and processing'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	18.76	11.53	11.31	3 %	– 0.22	– 2 %	– 7.44	– 40 %
Belgium	7.60	5.31	4.85	1 %	– 0.46	– 9 %	– 2.75	– 36 %
Denmark	0.95	2.25	2.58	1 %	0.32	14 %	1.62	170 %
Finland	4.26	3.94	3.31	1 %	– 0.63	– 16 %	– 0.95	– 22 %
France	70.78	52.41	51.08	15 %	– 1.33	– 3 %	– 19.70	– 28 %
Germany	70.00	46.25	46.98	14 %	0.73	2 %	– 23.02	– 33 %
Greece	0.00	IE	IE	NA	NA	NA	NA	NA
Ireland	3.53	2.52	2.44	1 %	– 0.08	– 3 %	– 1.09	– 31 %
Italy	59.54	52.47	51.00	15 %	– 1.47	– 3 %	– 8.54	– 14 %
Luxembourg	NO	0.09	0.09	0 %	0.00	0 %	NA	NA
Netherlands	0.85	NO	NO	NA	NA	NA	NA	NA
Portugal	28.98	46.89	48.19	14 %	1.30	3 %	19.21	66 %
Spain	67.71	102.54	104.92	31 %	2.38	2 %	37.21	55 %
Sweden	3.61	0.80	0.80	0 %	0.00	0 %	– 2.81	– 78 %
United Kingdom	47.98	15.18	14.87	4 %	– 0.31	– 2 %	– 33.11	– 69 %
EU-15	**384.56**	**342.17**	**342.40**	**100 %**	**0.24**	**0 %**	**– 42.15**	**– 11 %**

In 1990, Slovenia, Slovak Republic and Czech Republic reported the highest emissions, whilst in 2005 Bulgaria, Poland and Czech Republic were the greatest EU-12 contributors (Table 77). In the EU-12 overall, NMVOC emissions increased by 29 % between 2004 and 2005.

3.3.4 Other including products containing HMs and POPs (Category 3D)

France, Germany, Spain, United Kingdom and Italy were responsible for 81 % of EU-15 NMVOC emissions in the category 3D 'Other' in 2005 (Table 78). Between 1990 and 2005, the EU-15 total NMVOC emissions decreased by 16 % with all reporting countries reporting reductions except Spain, Portugal, Netherlands and Luxembourg. This category includes a variety of sectors linked to the use of solvents and related activities.

Table 77 Breakdown of NMVOC emissions by EU-12 Member State for key category 3C 'Chemical products, manufacture and processing'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	0.83	13.63	24.55	30 %	10.91	80 %	23.72	2 871 %
Cyprus	NE	NE	NE					
Czech Republic	6.45	14.36	13.00	16 %	– 1.36	– 9 %	6.55	102 %
Estonia	0.50	0.15	0.09	0 %	– 0.06	– 40 %	– 0.41	– 82 %
Hungary	NE	NO	NO					
Latvia	NE	0.08	0.06	0 %	– 0.02	– 23 %		
Lithuania	NE	NE	NE					
Malta	0.00	0.77	0.77	1 %	0.00	0 %	0.77	
Poland	NE	18.01	17.47	21 %	– 0.54	– 3 %		
Romania	NE	2.64	11.57	14 %	8.93	338 %		
Slovak Republic	8.23	8.35	8.35	10 %	0.01	0 %	0.12	1 %
Slovenia	17.99	4.94	5.45	7 %	0.51	10 %	– 12.54	– 70 %
EU-12	**NE**	**62.93**	**81.31**	**100 %**	**18.38**	**29 %**		

Table 78 Breakdown of NMVOC emissions by EU-15 Member State for key category 3D 'Other including products containing HMs and POPs'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	37.99	35.31	34.48	3 %	– 0.83	– 2 %	– 3.51	– 9 %
Belgium	38.77	30.27	30.50	2 %	0.23	1 %	– 8.27	– 21 %
Denmark	18.85	15.55	16.03	1 %	0.48	3 %	– 2.82	– 15 %
Finland	18.53	10.17	9.03	1 %	– 1.14	– 11 %	– 9.50	– 51 %
France	226.47	187.11	184.50	14 %	– 2.60	– 1 %	– 41.97	– 19 %
Germany	436.00	307.29	306.68	23 %	– 0.61	0 %	– 129.32	– 30 %
Greece	56.84	38.92	39.17	3 %	0.25	1 %	– 17.67	– 31 %
Ireland	13.23	11.51	11.90	1 %	0.39	3 %	– 1.33	– 10 %
Italy	185.23	180.16	184.00	14 %	3.84	2 %	– 1.23	– 1 %
Luxembourg	1.28	1.32	1.33	0 %	0.01	1 %	0.05	4 %
Netherlands	26.88	27.84	27.93	2 %	0.09	0 %	1.05	4 %
Portugal	26.53	28.60	28.74	2 %	0.13	0 %	2.21	8 %
Spain	114.63	172.02	177.62	13 %	5.61	3 %	63.00	55 %
Sweden	63.04	52.59	52.59	4 %	0.00	0 %	– 10.45	– 17 %
United Kingdom	326.54	231.64	233.75	17 %	2.11	1 %	– 92.79	– 28 %
EU-15	**1 590.81**	**1 330.30**	**1 338.26**	**100 %**	**7.95**	**1 %**	**– 252.55**	**– 16 %**

In 1990 Romania reported the highest emissions, while in 2005 Poland and Czech Republic have the highest outputs amongst the Member States (Table 79). Between 1990 and 2005 all countries reported decreasing emissions, except Czech Republic.

3.4 Agriculture (NFR Sector 4)

The agriculture sector contains the following key categories, although category 4B-NMVOC is not within the first 10 EU-15 key categories (Table 80).

Again, as for the preceding sections, detailed tables are only provided where the key category is ranked in the top 10 of all key categories identified for that pollutant.

Table 79 Breakdown of NMVOC emissions by EU-12 Member State for key category 3D 'Other including products containing HMs and POPs'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	11.30	2.44	3.63	4 %	1.19	49 %	– 7.68	– 68 %
Cyprus	NE	NE	NE					
Czech Republic	24.05	25.82	25.20	24 %	– 0.62	– 2 %	1.15	5 %
Estonia	5.07	3.73	3.81	4 %	0.08	2 %	– 1.26	– 25 %
Hungary	NE	NA	NA					
Latvia	8.14	7.07	7.03	7 %	– 0.04	– 1 %	– 1.10	– 14 %
Lithuania	11.00	4.80	4.76	5 %	– 0.03	– 1 %	– 6.24	– 57 %
Malta	0.00	NO	NO					
Poland	NE	51.35	51.33	50 %	– 0.02	0 %		
Romania	109.30	48.71	7.34	7 %	– 41.37	– 85 %	– 101.96	– 93 %
Slovak Republic	0.33	0.13	0.19	0 %	0.05	41 %	– 0.14	– 43 %
Slovenia	NE	NE	NE					
EU-12	**NE**	**144.05**	**103.29**	**100 %**	**– 40.76**	**– 28 %**		

Table 80 Key categories from the agriculture sector and the relevant pollutants for which each category was identified as a key category

EU-15		EU-12	
Key category	**Pollutants for which this was identified as a key category**	**Key category**	**Pollutants for which this was identified as a key category**
4B Manure management (detail not provided)	NMVOC	4D1 Direct soil emission	NMVOC
4D1 Direct soil emission	NMVOC		

3.4.1 Direct soil emission (Category 4D1)

France and Germany were responsible for 88 % of EU-15 NO_X emissions in category 4D1, 'Direct soil emissions', in 2005 (Table 81). They were also mainly responsible for the decrease of EU-15 total NO_X emissions of 14 % in this category. Between 2004 and 2005, overall EU-15 NO_X emissions in this category decreased by 2 %.

France was responsible for 82 % of EU-15 NMVOC emissions in category 4D1 'Direct soil emissions' in 2005 (Table 82) and was also mainly responsible for the decrease of EU-15 total NMVOC emissions by 5 % in this category. In 2005, only Austria, Denmark, France, Ireland, Luxembourg and Portugal reported NMVOC emissions from this category.

Table 81 Breakdown of NO_x emissions by EU-15 Member State for key category 4D1 'Direct soil emission'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	6.06	5.21	5.19	3 %	– 0.02	0 %	– 0.86	– 14 %
Belgium	NO	NA	NA	NA	NA	NA	NA	NA
Denmark	NA	NA	NA	NA	NA	0 %	NA	0 %
Finland	NE	NA	NA	NA	NA	NA	NA	NA
France	75.32	66.52	66.11	39 %	– 0.40	– 1 %	– 9.21	– 12 %
Germany	100.01	84.43	83.47	49 %	– 0.96	– 1 %	– 16.53	– 17 %
Greece	0.00	0.00	0.00	0 %	0.00	0 %	0.00	0 %
Ireland	NE	NO	NO	NA	NA	NA	NA	NA
Italy	0.00	0.00	0.00	0 %	0.00	NA	0.00	NA
Luxembourg	NE	NE	NE	NA	NA	0 %	NA	0 %
Netherlands	NO	NO	NO	NA	NA	NA	NA	NA
Portugal	0.00	0.00	0.00	0 %	0.00	0 %	0.00	0 %
Spain	15.03	15.98	14.56	9 %	– 1.42	– 9 %	– 0.46	– 3 %
Sweden	NA	NA	NA	NA	NA	NA	NA	NA
United Kingdom	NA	NA	NA	NA	NA	NA	NA	NA
EU-15	**196.41**	**172.14**	**169.34**	**100 %**	**– 2.79**	**– 2 %**	**– 27.06**	**– 14 %**

Table 82 Breakdown of NMVOC emissions by EU-15 Member State for key category 4D1 'Direct soil emission'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	1.72	1.82	1.76	1 %	– 0.06	– 3 %	0.05	3 %
Belgium	NA	NA	NA					
Denmark	1.90	1.60	1.67	1 %	0.07	4 %	– 0.23	– 12 %
Finland	NE, NO	NA	NA					
France	154.07	142.72	142.35	82 %	– 0.37	0 %	– 11.72	– 8 %
Germany	0.00	0.00	0.00	0 %	0.00	1 %	0.00	– 7 %
Greece	0.00	NE	NE					
Ireland	NE, NO	3.36	3.30	2 %	– 0.05	– 2 %		
Italy	NA	NA	NA					
Luxembourg	0.16	0.16	0.16	0 %	0.00	0 %	0.00	0 %
Netherlands	NA	NA	NA					
Portugal	25.84	24.89	24.80	14 %	– 0.09	0 %	– 1.04	– 4 %
Spain	NA	NA	NA					
Sweden	NA	NA	NA					
United Kingdom	NA	NA	NA					
EU-15	**183.68**	**174.55**	**174.04**	**100 %**	**– 0.50**	**0 %**	**– 9.64**	**– 5 %**

For 2005, NMVOC emissions in category 4D1 'Direct Soil Emission' from EU-12 were reported by Bulgaria, Poland and Romania only (Table 83), whilst in 1990 only Slovak Republic reported NMVOC emissions for this category.

3.5 Land use and land-use change (NFR Sector 5)

No key categories were identified for this sector.

3.6 Waste (NFR Sector 6)

The waste sector contains the following key category identified for the EU-15 (Table 84).

Table 83 Breakdown of NMVOC emissions by EU-12 Member State for key category 4D1 'Direct soil emission'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Bulgaria	NA, NO	19.21	18.25	18 %	– 0.96	– 5 %		
Cyprus	NA	NA	NA					
Czech Republic	NA, NE	NA	NA					
Estonia	NA	NA	NA					
Hungary	NE	NA	NA					
Latvia	NA	NA	NA					
Lithuania	NA, NE	NA	NA					
Malta	–	NA	NA					
Poland	NA, NE	31.69	31.70	32 %	0.01	0 %		
Romania	NA, NE	NA, NE	48.74	49 %				
Slovak Republic	0.65	NA	NA					
Slovenia	NE	NA	NA					
EU-12	**NE**	**50.90**	**98.68**	**100 %**	**47.78**	**94 %**		

Table 84 Key categories from the waste sector and the relevant pollutants for which each category was identified as a key category

EU-15	
Key category	**Pollutants for which this was identified as a key category**
6C Waste incineration	CO

3.6.1 Waste incineration (Category 6C)

France and Italy were responsible for 84 % of EU-15 CO emissions in the category 6C 'Waste incineration' in 2005, although only nine EU-15 Member States reported CO emissions in this category in 2005 (Table 85). Between 1990 and 2005, the EU-15 total emissions increased by 37 %, mainly due to increasing emissions reported by key emitters.

3.7 Other

The sector 'Other' contains the following EU-12 key category (Table 86).

Table 85 Breakdown of CO emissions by EU-15 Member State for key category 6C 'Waste incineration'

	Emissions (Gg)			Share of EU-15 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	2004	2005	(%)	(Gg)	(%)	(Gg)	(%)
Austria	0.05	0.01	0.01	0 %	0.00	5 %	– 0.04	– 75 %
Belgium	0.90	0.29	0.29	0 %	0.00	1 %	– 0.61	– 67 %
Denmark	NO	NO	NO	NA	NA	NA	NA	NA
Finland	IE	0.25	0.12	0 %	– 0.13	– 52 %	NA	NA
France	227.78	289.02	273.10	40 %	– 15.93	– 6 %	45.31	20 %
Germany	NE	NE	NE	NA	NA	NA	NA	NA
Greece	0.00	0.00	NE			NA		NA
Ireland	NE	NE	NE	NA	NA	NA	NA	NA
Italy	159.18	337.37	295.70	44 %	– 41.67	– 12 %	136.53	86 %
Luxembourg	NE	NE	NE					
Netherlands	NO	NO	NO	NA	NA	NA	NA	NA
Portugal	0.02	0.03	0.03	0 %	0.00	2 %	0.02	95 %
Spain	81.54	83.11	83.15	12 %	0.04	0 %	1.61	2 %
Sweden	NE	0.02	0.02	0 %	0.00	0 %	NA	NA
United Kingdom	22.53	22.52	22.54	3 %	0.01	0 %	0.00	0 %
EU-15	**492.01**	**732.64**	**674.97**	**100 %**	**– 57.67**	**– 8 %**	**182.96**	**37 %**

Table 86 Key categories from the 'Other' sector and the relevant pollutants for which each category was identified as a key category

EU-12	
Key category	**Pollutants for which this was identified as a key category**
7 Other	NMVOC

Only Poland makes use of this catch-all category (Table 87), and to such an extent that it results in it being a key category for the EU-12 for NMVOC emissions. However, Poland's reported emissions in this category decreased substantially between 1990 and 2005.

Table 87 Breakdown of NMVOC emissions by EU-12 Member State for key category 7 'Other'

	Emissions (Gg)			Share of EU-12 emissions in 2005	Change 2004–2005		Change 1990–2005	
	1990	**2004**	**2005**	**(%)**	**(Gg)**	**(%)**	**(Gg)**	**(%)**
Bulgaria	NA	NE	NE					
Cyprus	NE	NE	NE					
Czech Republic	NA	0.00	0.00					
Estonia	0.00	NO	NO					
Hungary	NE	NO	NO					
Latvia	NE	NE	NE					
Lithuania	NA	NO	NO					
Malta	–	0.00	0.00					
Poland	831.00	298.89	300.85	100 %	1.96	1 %	– 530.15	– 64 %
Romania	NA	NA	NE					
Slovak Republic	NA	NA	NA					
Slovenia	NE	NA	NA					
EU-12	**NE**	**298.89**	**300.85**	**100 %**	**1.96**	**1 %**		

Note: In this category Poland included emissions from non-managed broadleaf forests, non-managed coniferous forests, forests and other vegetation fires [8].

4 Recalculations and improvements

4.1 Recalculations

It is important and necessary to identify inventory recalculations and to understand their origin in order to correctly evaluate officially-reported emissions data. From a country perspective, it is considered good practice to recalculate the whole time series when new information (i.e. activity or emissions factor data) becomes available in order to provide comparable and consistent data. The magnitude of recalculations also provides some indication of the general uncertainty of the emissions data. However, as Member States are not formally required at present to provide any explanatory information as to why recalculations have occurred, it is often not clear why Member States have reported different numbers. However, it is noted that in some instances, under encouragement from EMEP and the European Commission, Member States have submitted Informative Inventory Reports together with their emission inventory data. Details of recalculations performed should be explained within these inventory reports.

The following tables provide an overview of NO_X, NMVOC, SO_X and NH_3 recalculations from Member States, as well as the respective contribution made to the overall EU-15 recalculations. They show the differences between data reported in 2007 and data reported in 2006 in absolute and relative terms. Empty fields indicate that one of the two submissions did not contain data, and '0' indicates that nothing has changed as a result of the recalculations.

Recalculations for Bulgaria and Romania were not performed; because they are new Member States these countries were not included in the Community's LRTAP Inventory last year.

4.1.1 NO_X recalculations

In all but seven Member States (Greece, Italy, Hungary, Malta, Poland and Slovak Republic), recalculations occurred. Spain and United Kingdom contributed most in absolute terms to EU-15 recalculations in 1990 and Germany and United Kingdom contributed most in 2004. These resulted in an EU-15 recalculation of 66 Gg (0.5 %) in 1990 and 83 Gg (0.9 %) in 2004 (Table 88).

Major relative changes due to recalculations occurred in Ireland (1991), Luxembourg (1990–2004), the Netherlands (1991–1994), Cyprus (1990–1998), Estonia (1997–2000), Czech Republic (1990–2000) and Lithuania (1990 and 2001), as shown in Table 89.

Table 88 Member State contributions in absolute terms to NO_x recalculations (Gg)

NO_x recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	– 1	– 1	– 1	– 1	– 1	– 1	0	0	0	1	1	1	0	– 1	– 2
Belgium	0	22	23	22	22	0	– 7	– 7	0	0	0	0	0	0	1
Denmark	1	1	1	1	1	2	3	4	6	8	9	10	12	12	13
Finland	– 4	4	– 1	0	– 1	– 1	– 2	– 4	– 4	– 2	1	0	0	0	0
France	11	11	11	11	11	11	11	12	12	11	15	14	15	13	14
Germany	– 16	– 15	– 16	– 16	– 11	38	6	7	– 3	– 2	– 37	11	9	21	24
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	8	56	7	7	9	11	11	13	15	15	11	0	0	0	0
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	– 8	– 9	– 10	– 10	– 10	– 9	– 9	– 9	– 8	– 7	– 8	– 8	– 8	– 8	– 6
Netherlands	6	87	84	81	79	2	– 2	– 2	– 24	– 19	5	1	7	6	– 5
Portugal	0	0	0	0	0	0	0	1	0	– 1	– 1	– 1	– 1	0	0
Spain	27	27	18	16	18	18	14	11	10	6	4	– 1	– 4	– 1	– 11
Sweden	8	22	14	6	13	10	11	11	11	12	14	12	13	13	12
United Kingdom	34	34	34	32	31	29	31	36	30	33	40	29	28	43	43
EU-15	**66**	**240**	**163**	**148**	**163**	**111**	**66**	**73**	**44**	**54**	**53**	**69**	**72**	**99**	**83**
Bulgaria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyprus	– 5	– 5	– 9	– 7	– 5	– 6	– 6	– 6	– 6	– 2	0	0	0	– 1	0
Czech Republic	198	211	212	236	75	62	80	121	93	78	75	0	0	0	0
Estonia	6	5	3	2	2	– 4	– 3	– 5	– 7	– 5	– 12	0	0	0	0
Hungary	0	– 77	– 59	– 17	– 16	– 5	– 4	– 4	– 5	– 3	0	– 2	– 3	– 7	0
Latvia	– 3	4	4	– 3	0	– 2	– 4	– 2	0	1	2	– 1	1	1	1
Lithuania	– 22								1			– 11	0	0	6
Malta	0	0	0	0	0	0	0	0	0	0	0			0	0
Poland	0	0	0	0	0	0	0	0	0	0				0	0
Romania	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovak Republic	4	3	3	3	4	4	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 89 Relative changes in Member State NO_x emissions as a result of recalculations (%)

NO_x recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	– 1
Belgium	0	6	6	6	6	0	– 2	– 2	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	1	1	2	2	3	4	5	6	6	7
Finland	– 1	1	0	0	0	0	– 1	– 2	– 2	– 1	0	0	0	0	0
France	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Germany	– 1	– 1	– 1	– 1	0	2	0	0	0	0	– 2	1	1	1	2
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	7	44	5	5	7	9	9	10	11	11	8	0	0	0	0
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	– 60	– 65	– 76	– 75	– 78	– 88	– 79	– 72	– 68	– 85	– 84	– 83	– 79	– 80	– 72
Netherlands	1	16	16	16	16	1	0	0	– 6	– 5	1	0	2	2	– 1
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain	2	2	1	1	1	1	1	1	1	0	0	0	0	0	– 1
Sweden	3	7	4	2	4	3	4	4	4	5	6	6	6	6	6
United Kingdom	1	1	1	1	1	1	1	2	1	2	2	2	2	3	3
EU–15	**0**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**
Bulgaria															
Cyprus	– 34	– 32	– 52	– 39	– 29	– 36	– 34	– 30	– 31	– 7	0	0	0	– 5	0
Czech Republic	27	29	30	34	17	14	18	26	22	20	19	0	0	0	0
Estonia	8	8	8	5	4	– 9	– 7	– 11	– 18	– 15	– 34	– 1	– 1	0	0
Hungary	0	– 62	– 48	– 10	– 9	– 3	– 2	– 2	– 2	– 2	0	– 1	– 1	– 4	0
Latvia	– 4	7	8	– 6	– 1	– 5	– 9	– 6	0	3	5	– 2	2	1	2
Lithuania	– 16	0	0	0	0	0	0	0	2	0	0	– 24	0	0	12
Malta	0	0	0	0	0	0	0	0	0	0	0			0	– 2
Poland	0	0	0	0	0	0	0	0	0	0				0	0
Romania															
Slovak Republic	2	2	1	1	2	2	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.1.2 NMVOC recalculations

All Member States except Italy, Greece, Hungary and Poland made recalculations. The largest absolute changes after recalculations for NMVOC occurred in the Netherlands between 1991 and 1994. The EU-15 recalculations resulted in an overall change of 308 Gg (2 %) in 1990 and 59 Gg (1 %) in 2004 (Table 90).

Table 90 Member State contributions in absolute terms to NMVOC recalculations (Gg)

NMVOC recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	1	– 1	– 2	– 4	– 5	– 7	– 8	– 10	– 10	– 9	– 13	– 15
Belgium	0	31	34	31	35	0	– 6	618	– 26	– 6	0	0	0	0	– 8
Denmark	4	4	3	3	3	6	3	2	2	3	4	3	4	3	3
Finland	7	5	5	7	5	7	7	6	7	7	7	0	0	0	0
France	347	420	399	398	339	337	363	301	313	295	277	260	208	177	148
Germany	28	25	24	39	– 161	– 128	– 92	– 66	– 34	– 56	– 80	– 72	– 48	2	19
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	4	4	2	7	4	4	4	2	2	3	5	– 9	– 10	– 10	1
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	– 9	– 9	– 10	– 10	– 10	– 9	– 8	– 8	– 7	– 6	– 6	– 5	– 5	– 5	– 4
Netherlands	– 26	14	14	16	15	– 32	0	0	– 39	– 43	– 33	– 30	– 34	– 36	– 37
Portugal	31	34	31	28	25	23	22	20	19	18	16	14	14	14	15
Spain	1	1	1	1	1	2	2	2	2	2	2	2	3	3	4
Sweden	– 70	– 101	– 104	– 107	– 93	– 93	– 88	– 80	– 66	– 64	– 62	– 62	– 58	– 60	– 53
United Kingdom	– 10	– 9	– 10	– 10	– 10	– 11	– 9	– 7	– 7	– 3	– 9	– 15	– 16	– 10	– 15
EU–15	**308**	**420**	**389**	**402**	**153**	**103**	**192**	**785**	**157**	**142**	**111**	**77**	**49**	**66**	**59**
Bulgaria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyprus	0	0	– 1	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	– 130	– 121	– 109	– 113	– 55	– 77	– 28	– 5	25	13	17	0	0	0	0
Estonia	– 19	– 16	– 4	– 7	– 7	– 2	– 2	– 4	– 12	– 3	7	7	3	0	0
Hungary	0	– 13	– 8	10	20	19	19	19	28	– 4	– 7	4	2	0	0
Latvia	– 5	2	– 13	1	– 5	– 2	– 3	– 1	– 1	0	1	0	1	1	– 2
Lithuania	– 19								– 21			– 9	0	0	26
Malta	0	0	0	0	0	0	0	0	0	0	0			0	– 1
Poland	0	0	0	0	0	0	0	0	0	0		0		0	0
Romania	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovak Republic	– 1			– 1		– 2	– 2	– 2	– 1	– 1	– 1	– 1	– 1	– 1	– 2
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The greatest relative changes as a result of recalculations occurred in Luxembourg over the whole time series (> 70 %), followed by Belgium in 1997 (71 %). Sweden and Czech Republic, whilst Estonia had recalculations higher than 20 %. Beyond these, Cyprus, Hungary, Latvia, Poland and Slovak Republic had recalculations smaller than +/– 10 % (Table 91).

Table 91 Relative changes in Member State NMVOC emissions as a result of recalculations (%)

NMVOC recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	0	0	– 1	– 2	– 3	– 4	– 5	– 6	– 6	– 6	– 8	– 9
Belgium	0	9	10	9	11	0	– 3	71	– 12	– 3	0	0	0	0	– 4
Denmark	2	2	2	2	2	3	2	2	2	2	3	3	4	3	2
Finland	3	2	2	3	3	3	4	4	4	4	4	0	0	0	0
France	13	15	15	15	14	14	16	14	15	15	14	14	12	11	10
Germany	1	1	1	2	– 8	– 6	– 5	– 4	– 2	– 3	– 5	– 5	– 4	0	1
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	4	4	2	7	4	4	4	1	2	3	6	– 12	– 14	– 15	1
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	– 109	– 105	– 120	– 117	– 114	– 115	– 108	– 100	– 101	– 103	– 93	– 84	– 76	– 76	– 59
Netherlands	– 6	3	3	4	4	– 10	0	0	– 15	– 17	– 14	– 14	– 17	– 19	– 20
Portugal	10	11	10	9	8	8	7	6	6	6	5	5	5	5	5
Spain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	– 19	– 31	– 33	– 37	– 33	– 35	– 34	– 32	– 28	– 28	– 28	– 30	– 28	– 29	– 26
United Kingdom	0	0	0	0	0	– 1	– 1	0	0	0	– 1	– 1	– 1	– 1	– 1
EU–15	**2**	**3**	**3**	**3**	**1**	**1**	**2**	**7**	**2**	**1**	**1**	**1**	**1**	**1**	**1**
Bulgaria															
Cyprus	– 3	– 3	– 4	– 3	0	– 3	– 1	2	1	– 3	0	0	0	– 2	0
Czech Republic	– 42	– 44	– 42	– 48	– 21	– 36	– 11	– 2	9	5	7	0	0	0	0
Estonia	– 27	– 24	– 10	– 21	– 19	– 4	– 3	– 9	– 27	– 7	16	17	7	0	0
Hungary	0	– 9	– 6	6	12	11	11	11	17	– 3	– 4	2	1	0	0
Latvia	– 5	3	– 22	2	– 8	– 4	– 4	– 2	– 2	0	1	0	2	1	– 3
Lithuania	– 21	0	0	0	0	0	0	0	– 35	0	0	– 15	0	0	39
Malta	0	0	0	0	0	0	0	0	0	0	0			0	– 28
Poland	0	0	0	0	0	0	0	0	0	0		0		0	0
Romania															
Slovak Republic	– 1			– 1		– 2	– 2	– 2	– 2	– 2	– 2	– 1	– 2	– 1	– 3
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.1.3 SO_X recalculations

Major changes after recalculations for SO_X emissions over the whole time series occurred in Germany, the Netherlands, Spain and United Kingdom. The resulting recalculation for the EU-15 amounted to 1 Gg for 1990 and – 33 Gg for 2004, which is equivalent to – 0.01 % (1990) and – 0.7 % (2004) of the EU-15 total (Table 92). Greece, Italy, Malta, Slovak Republic and Slovenia did not undertake recalculations. Recalculations of more than 100 Gg occurred in Czech Republic, Hungary and Poland.

Table 92 Member State contributions in absolute terms to SO_x recalculations (Gg)

SO_x recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	0	0	0	0	0	0	0	0	0	– 1	– 1	– 2
Belgium	0	4	4	5	6	0	0	– 23	– 24	0	0	0	0	0	– 4
Denmark	0	– 1	1	0	1	0	0	0	0	0	1	1	0	1	1
Finland	– 24	2	6	5	3	4	5	– 1	0	3	1	0	0	0	0
France	0	0	0	0	0	0	0	1	2	2	– 1	9	5	2	4
Germany	61	13	– 10	6	– 2	19	28	19	14	17	11	15	17	21	33
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	– 1	0	– 2	– 1	– 1	– 1	1	– 1	1	0	6	4	3	2	1
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	– 1	– 1	– 1	– 1	0	0	0	– 1	0	0	0	0	0
Netherlands	1	37	32	28	23	1	0	0	– 14	– 14	– 1	0	1	– 1	– 3
Portugal	0	0	0	0	0	0	0	– 1	0	0	– 1	0	0	1	– 1
Spain	– 14	– 6	– 16	– 17	– 21	– 26	– 27	– 30	– 32	– 35	– 34	– 38	– 39	– 31	– 60
Sweden	– 9	– 10	– 12	– 10	– 10	– 8	– 8	– 9	– 8	– 6	– 6	– 6	– 6	– 6	– 6
United Kingdom	– 12	– 22	– 17	– 19	– 15	– 21	– 26	5	29	25	43	9	8	18	3
EU–15	**1**	**19**	**– 15**	**– 3**	**– 18**	**– 32**	**– 26**	**– 39**	**– 34**	**– 6**	**17**	**– 7**	**– 13**	**5**	**– 33**
Bulgaria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyprus	– 8	0	0	– 3	2	1	1	1	3	4	– 1	0	0	0	0
Czech Republic	– 5	– 8	16	45	15	6	– 10	284	4	1	0	0	0	0	0
Estonia	21	5	4	1	2	– 2	0	– 3	– 7	– 7	– 3	– 1	0	0	0
Hungary	0	– 479	– 359	– 8	– 5	2	– 3	– 2	1	8	3	4	0	0	0
Latvia	0	0	2	0	0	0	0	0	0	0	– 1	0	0	0	0
Lithuania	– 8								5			– 10	0	0	5
Malta	0	0	0	0	0	0	0	0	0	0	0			0	0
Poland	0	– 161	0	0	0	0	0	0	0	0	– 309			0	0
Romania	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovak Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Relative changes from recalculations of 10–20 % can be seen for Belgium, Luxembourg, the Netherlands and Sweden. Changes of more than 20 % occurred in Cyprus, Czech Republic, Hungary, Lithuania and Poland (Table 93).

Table 93 Relative changes in Member State SO_x emissions as a result of recalculations (%)

SO_x recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	0	0	0	0	0	0	1	0	0	– 3	– 2	– 6
Belgium	0	1	1	2	2	0	0	– 11	– 13	0	0	0	0	0	– 3
Denmark	0	0	0	0	0	0	0	0	1	1	2	3	2	2	5
Finland	– 10	1	4	4	2	4	5	– 1	0	3	1	0	0	0	0
France	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1
Germany	1	0	0	0	0	1	2	2	1	2	2	2	3	3	6
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	– 1	– 1	– 1	– 1	1	0	1	0	4	3	3	2	2
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	– 3	– 3	– 4	– 4	– 5	– 9	– 7	– 7	– 11	– 18	– 16	– 16	– 9	– 10	– 7
Netherlands	0	21	20	18	16	0	0	0	– 16	– 16	– 1	0	2	– 1	– 4
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Spain	– 1	0	– 1	– 1	– 1	– 1	– 2	– 2	– 2	– 2	– 2	– 3	– 3	– 2	– 5
Sweden	– 8	– 10	– 12	– 12	– 12	– 11	– 12	– 14	– 14	– 12	– 13	– 14	– 15	– 14	– 15
United Kingdom	0	– 1	– 1	– 1	– 1	– 1	– 1	0	2	2	4	1	1	2	0
EU–15	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**– 1**
Bulgaria															
Cyprus	– 23	0	0	– 7	4	3	3	2	6	7	– 1	0	0	0	0
Czech Republic	0	0	1	3	1	1	– 1	29	1	0	0	0	0	0	0
Estonia	8	2	2	1	1	– 1	0	– 3	– 7	– 7	– 3	– 1	– 1	0	0
Hungary	0	– 110	– 77	– 1	– 1	0	0	0	0	1	1	1	0	0	0
Latvia	0	1	3	1	0	1	0	0	0	– 2	– 6	– 4	1	2	– 1
Lithuania	– 4	0	0	0	0	0	0	0	5	0	0	– 27	0	0	12
Malta	0	0	0	0	0	0	0	0	0	0	0			0	3
Poland	0	– 5	0	0	0	0	0	0	0	0	– 26			0	0
Romania															
Slovak Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.1.4 NH_3 recalculations

The largest changes after recalculations for NH_3 occurred in Belgium and the Netherlands (Table 94).

The resulting recalculations for the EU-15 can only be carried out for 1990 and 1995–2002. Most of the new Member States reported little or no change (< 2 Gg) after recalculation.

Table 94 Member State contributions in absolute terms to NH_3 recalculations (Gg)

NH_3 recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
Belgium	0	24	24	22	22	0	0	0	0	0	0	0	0	0	1
Denmark	0	0	0	2	1	1	1	0	0	0	0	0	0	4	1
Finland	0		0			0	0	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Germany	– 20	– 19	– 18	– 18	– 11	– 11	– 13	– 11	– 13	– 16	– 19	– 21	– 22	– 16	– 15
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0		
Ireland	– 2	– 3	– 4	– 2	– 3	– 3	– 1	0	– 1	0	1	– 6	– 4	– 3	– 1
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0			0	0	0	0	0	0	0	0	0	0		
Netherlands	0	10	47	24	38	0	31	– 11	3	1	0	1	3	4	0
Portugal	10	10	10	10	10	10	12	10	10	11	13	10	12	7	8
Spain	– 8	– 6	– 5	– 5	– 6	– 7	– 7	– 9	– 9	– 10	– 13	– 14	– 17	– 15	– 21
Sweden	– 1	– 1	– 2	– 2	– 2	– 2	– 2	– 2	– 2	– 3	– 3	– 3	– 3	– 3	– 3
United Kingdom	1	4	7	8	10	11	11	13	10	8	6	7	6	5	– 18
EU–15	**– 19**					**0**	**33**	**– 10**	**– 2**	**– 7**	**– 14**	**– 24**	**– 26**		
Bulgaria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyprus											– 1	– 2	– 1	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Estonia	2	1	0	1	1	1	1	1	1	1	1	1	0	2	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Latvia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lithuania													0	0	0
Malta														0	0
Poland	0	0	0	0	0	0	0	0	0	0	0			0	0
Romania	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovak Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The relative changes after recalculation in Belgium, the Netherlands, Portugal, Cyprus, Estonia and Malta were greater than 10 % (Table 95). Eleven Member States did not undertake recalculations.

Table 95 Relative changes in Member State NH_3 emissions as a result of recalculations (%)

NH_3 recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
Belgium	0	20	20	18	19	0	0	0	0	0	0	0	0	0	2
Denmark	0	0	0	1	1	1	1	0	0	0	0	0	0	4	1
Finland	0		0			0	0	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Germany	– 3	– 3	– 3	– 3	– 2	– 2	– 2	– 2	– 2	– 3	– 3	– 3	– 4	– 3	– 2
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0		
Ireland	– 2	– 2	– 3	– 1	– 3	– 3	– 1	0	– 1	0	1	– 5	– 3	– 2	– 1
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0			0	0	0	0	0	0	0	0	0	0		
Netherlands	0	4	21	11	19	0	18	– 6	2	1	0	1	2	3	0
Portugal	16	15	14	15	14	14	16	14	13	15	17	14	15	9	11
Spain	– 2	– 2	– 1	– 2	– 2	– 2	– 2	– 3	– 2	– 3	– 3	– 3	– 4	– 4	– 5
Sweden	– 2	– 3	– 3	– 3	– 3	– 3	– 3	– 4	– 4	– 4	– 5	– 5	– 6	– 6	– 6
United Kingdom	0	1	2	2	3	3	3	4	3	2	2	2	2	2	– 6
EU–15	**– 1**					**0**	**1**	**0**	**0**	**0**	**0**	**– 1**	**– 1**		
Bulgaria															
Cyprus	0	0	0	0	0	0	0	0	0	0	– 22	– 28	– 18	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Estonia	7	4	1	10	9	10	13	13	12	11	9	7	3	19	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Latvia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lithuania													0	0	0
Malta														0	14
Poland	0	0	0	0	0	0	0	0	0	0	0			0	0
Romania															
Slovak Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.1.5 CO recalculations

The greatest changes after recalculations occurred in France over the whole time series, followed by United Kingdom (2001–2004), Czech Republic (1990–1998), Sweden (1990), Estonia (1990–1991) and Latvia (1992). The change in Latvia's emissions for 1992 was explained due to new official data from the Central Statistical Bureau regarding gasoline consumption by off-road transport being obtained [7]. For the EU-15 the recalculations resulted in estimates of 429 Gg CO in 1990 and 165 Gg CO in 2004 (both equivalent to a 1 % change) (Table 96).

Table 96 Member State contributions in absolute terms to CO recalculations (Gg)

CO recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	– 1	– 1	– 1	0	– 1	0	0	1	0	3	5	8	18	– 1	– 5
Belgium	0	36	36	36	37	0	0	– 115	– 105	0	0	0	0	0	– 71
Denmark	6	3	– 1	– 5	– 9	– 16	– 22	– 25	– 30	– 32	– 28	– 23	– 17	– 8	– 24
Finland	0	4	3	2	3	– 2	– 3	– 6	– 6	– 7	– 9	0	0	0	0
France	624	752	772	752	734	738	748	666	640	586	519	456	473	290	246
Germany	25	– 3	9	7	– 12	131	63	– 8	– 10	– 11	17	89	82	101	212
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	13	20	4	16	17	15	23	7	17	20	7	3	0	6	– 2
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	– 45	– 44	– 57	– 57	– 55	– 52	– 49	– 46	– 43	– 32	– 38	– 36	– 33	– 33	– 28
Netherlands	– 9	5	8	7	6	– 12	– 2	– 2	18	45	– 19	20	– 12	– 13	3
Portugal	0	0	0	0	0	0	0	0	0	– 1	0	– 1	– 1	0	– 1
Spain	43	39	33	30	36	40	39	40	42	43	43	42	43	46	34
Sweden	– 165	– 124	– 128	– 134	– 112	– 109	– 93	– 79	– 76	– 51	– 27	– 25	– 6	16	21
United Kingdom	– 63	– 61	– 58	– 59	– 52	– 53	– 53	– 59	– 70	– 81	– 54	– 228	– 269	– 164	– 220
EU–15	**429**	**626**	**618**	**595**	**592**	**681**	**650**	**372**	**378**	**482**	**416**	**304**	**279**	**240**	**165**
Bulgaria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyprus	17	17	15	17	21	23	25	28	28	– 1	– 4	– 5	– 4	– 1	0
Czech Republic	– 208	– 37	– 21	72	– 70	– 84	– 65	21	30	– 6	17	22	0	0	0
Estonia	– 121	– 127	– 32	– 54	– 72	– 36	– 34	– 47	– 82	– 25	– 18	12	11	0	0
Hungary	0	– 286	– 250	– 134	– 140	– 117	– 81	– 98	– 105	– 129	– 41	3	11	35	0
Latvia	– 83	3	– 286	10	– 71	– 59	– 53	– 30	– 24	– 11	1	– 3	5	– 1	– 18
Lithuania	– 20								10			– 11	0	2	3
Malta	0	0	0	0	0	0	0	0	0	0	0				
Poland	0		0	0	0	0	0	0	0	0				0	0
Romania	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovak Republic	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The greatest relative changes occurred in Luxembourg's data. Belgium and Sweden show changes between 10 % and 20 % whilst Cyprus, Czech Republic, Estonia, Latvia and Slovenia show relative changes above 20 %, with the greatest change occurring in Latvia (– 93 % in 1992) (Table 97).

Table 97 Relative changes in Member State CO emissions as a result of recalculations (%)

CO recalculations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	0	0	0	0	0	0	0	0	0	0	1	1	2	0	– 1
Belgium	0	3	3	3	3	0	0	– 13	– 12	0	0	0	0	0	– 8
Denmark	1	0	0	– 1	– 1	– 2	– 3	– 4	– 5	– 6	– 5	– 4	– 3	– 1	– 4
Finland	0	1	0	0	0	0	0	– 1	– 1	– 1	– 1	0	0	0	0
France	5	7	7	7	8	8	8	8	8	7	7	7	7	5	4
Germany	0	0	0	0	0	2	1	0	0	0	0	2	2	2	5
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	3	5	1	4	5	5	7	2	5	7	2	1	0	3	– 1
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	– 34	– 31	– 44	– 41	– 48	– 75	– 78	– 116	– 286	– 188	– 220	– 201	– 218	– 221	– 213
Netherlands	– 1	0	1	1	1	– 1	0	0	2	6	– 3	3	– 2	– 2	0
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1
Sweden	– 17	– 13	– 13	– 15	– 12	– 12	– 11	– 10	– 10	– 7	– 4	– 4	– 1	3	3
United Kingdom	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 2	– 1	– 6	– 8	– 6	– 8
EU–15	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Bulgaria															
Cyprus	19	20	17	18	22	24	26	30	30	– 1	– 5	– 5	– 5	– 1	0
Czech Republic	– 20	– 3	– 2	6	– 7	– 9	– 7	2	4	– 1	3	3	0	0	0
Estonia	– 39	– 46	– 18	– 35	– 43	– 18	– 15	– 20	– 41	– 13	– 10	6	6	0	0
Hungary	0	– 46	– 43	– 20	– 22	– 18	– 12	– 15	– 17	– 22	– 7	1	2	6	0
Latvia	– 22	1	– 93	3	– 23	– 18	– 16	– 9	– 7	– 3	0	– 1	2	0	– 5
Lithuania	– 4	0	0	0	0	0	0	0	3	0	0	– 5	0	1	2
Malta	0	0	0	0	0	0	0	0	0	0	0				
Poland	0		0	0	0	0	0	0	0	0				0	0
Romania															
Slovak Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.2 Planned improvements

The EEA-ETC/ACC has noted that the main future challenge for the European Community continues to be improving the data reporting procedures in order to obtain more complete and timely UNECE/CLRTAP emission inventories from Member States. This would then allow a more timely compilation of a European Community LRTAP Inventory. The improvements cannot be implemented at the Community-level alone, but also need to involve the development of reliable and timely inventory reporting systems in the Member States themselves.

As noted earlier in this report, a complete set of emissions inventory data for the main air pollutants is still not available from Member States. This prohibits the compilation of a comprehensive inventory at the European Community level. The European Community Inventory therefore is presently not considered complete. It is essential for the European Community Inventory preparation process that the timeliness of reporting and completeness of Member States' submissions improves.

Methods to fill gaps in reported data could be applied for the following purposes when estimates are not included in Member States' LRTAP Inventory submissions to the European Community:

1. to complete specific years in the inventory time-series for a specific Member State:
    - for the most recent inventory year(s);
    - for some years of the time series from 1990 to the most recent year;
2. to complete individual source categories for individual Member States that did not estimate specific source categories for any year of the inventory time series and reported 'NE'. Gap-filling methods are used for major gaps when it is considered highly probable that emissions from these source categories exist in the Member States concerned;
3. to provide complete NFR data tables for the European Community when some Member States provide only national total emissions. In this case, the gap-filling methods are used to further disaggregate the emission estimates provided by Member States;
4. to enable the presentation of consistent trends for the European Community.

However, before any gap-filling methods are applied, any such procedure will have to be formalised (elaborated and agreed with Member States). As a starting point, the same general principles and methods could be applied as are used in the EU Greenhouse Gas Reporting Mechanism (Decision 280/2004/EC) when compiling the European Community GHG inventory and inventory report.

The EEA-ETC/ACC, together with EMEP, assist Member States in improving the quality of national inventories by performing an annual review of inventory data. However, such tests cannot be performed efficiently if Member States do not report on time, report incomplete inventories and/or report using inconsistent formats.

An uncertainty and sensitivity analysis could identify technical areas within the inventory that would benefit from further improvements, but this type of analysis also requires sufficient information from the Member States to be reported to underpin the analysis.

For the 2008 European Community Inventory report cycle, the chapters of this inventory report will be further elaborated to comply with the EMEP-recommended structure for Informative Inventory Reports. However the improvements will necessarily depend on the information provided by the Member States and the resources available for this work. For example, emission trends of particulate matter and/or heavy metals, together with more explanatory information on emission trends, could be included within the next European Community Inventory report.

Possibilities for further streamlining and harmonisation of emission reporting should be further explored, especially between the current respective reporting required under the LRTAP Convention, the NEC Directive and the EU-MM/UNFCCC.

References

1. Guidelines for estimating and reporting emission data under the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/80, Air Pollution Studies series, No 15), Geneva 2003 http://www.unece.org/env/eb/Air_Pollutionwithcover_15_ENG.pdf.

2. EMEP/CORINAIR Emission Inventory Guidebook — 2006. EEA Technical Report No 11/2006. European Environment Agency, Copenhagen. http://reports.eea.europa.eu/EMEPCORINAIR4/en/page002.html.

3. Vestreng, V.; Mareckova, K.; Kakareka, S.; Malchykhina, A.; Kukharchyk, T. Inventory Review 2007, Emission data reported to LRTAP and NEC Directive, Stage 1 and 2 review, Review of gridded data and Review of PM Inventories in Belarus, Moldova, Russian Federation and Ukraine. EEA & MSC-W Technical Report 1/2007, ISSN 1504-6079. http://emep.int/publ/reports/2007/emep_technical_1_2007.pdf.

4. IPCC, 2000. Good practice guidance and uncertainty management in national GHG inventories, http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm.

5. IIR United Kingdom: Consultation on draft updated UK national programme in accordance with the National Emissions Ceiling Directive 2001/81/EC of the European Parliament and of the Council, Department for Environment, Food and Rural Affairs, October 2006, London.

6. IIR France: Rapport d'Inventaire national, Inventaire des emissions de pollutant atmospheriques en France en titre de al convention sur la pollution atmospheriques transfrontaliere a longue distance et de la directive europeenne relative aux plafonds d'emission nationaux (NEC), Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique, December 2006, Paris.

7. IIR Latvia: Informative Inventory report 1990–2005 submitted under CLRTAP, May 2007. http://cdr.eionet.europa.eu/lv/un/copy_of_colqhgwdg/colrdmuow/envrkhmyw

8. IIR Poland: Emission Inventory of SO_2, NO_2, NH_3, CO, PM, NMVOCs, HMs, and POPs in Poland in 2005, Krzysztof Olendrzyński, Bogusław Dębski, Iwona Kargulewicz, Jacek Skośkiewicz, Joanna Cieślińska, Janina Fudała, Stanisław Hławiczka, Marian Cenowski, February 2007.

Units and abbreviations

kg	1 kilogram = 10^3 g (gram)
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
Cd	cadmium
CH_4	methane
CDR	central data repository of EEA's Eionet Reportnet
CO	carbon monoxide
CO_2	carbon dioxide
LRTAP Convention	Convention on Long-range Transboundary Air Pollution
CRF	common reporting format
EEA	European Environment Agency
Eionet	European environmental information and observation network
EMEP	European monitoring evaluation programme
ETC/ACC	European Topic Centre on Air and Climate Change
EU	European Union
HFCs	hydrofluorocarbons
Hg	mercury
HMs	heavy metals
IIR	informative inventory report
KCA	key category analysis
NECD	National Emission Ceilings Directive (2001/81/EC)
NFR	nomenclature for reporting
NH_3	ammonia
NMVOC	non-methane volatile organic compounds
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
N_2O	nitrous oxide
Pb	lead
PFCs	perfluorocarbons
PM	particulate matter
POPs	persistent organic pollutants
QA/QC	quality assurance/quality control
SF_6	sulphur hexafluoride
SO_2	sulphur dioxide
SO_X	sulphur oxides
TSP	total suspended particles
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VOC	volatile organic compounds

Notation keys [9]

NO	Not occurring
NE	Not estimated
NA	Not applicable
IE	Included elsewhere
C	Confidential
NR	Not reported

[9] A further explanation of these reporting codes may be found in the EMEP 2003 Emission Reporting Guidelines [1].

The LRTAP Convention Emission Reporting Programme for 2007

According to the 2007 workplan for the implementation of the Convention on Long-range Transboundary Air Pollution, Parties to the Convention were requested to report emission data on sulphur oxides (SO_X), nitrogen oxides (NO_X), non-methane volatile organic compounds (NMVOCs), ammonia (NH_3), carbon monoxide (CO), heavy metals (HMs), persistent organic pollutants (POPs), and primary particulate matter (PM) to the Secretariat. The deadline for submission of 2005 data was 15 February 2007. Gridded data for the years 1990, 1995, 2000 and 2005 (if not already reported) should have been received by the Secretariat, by 1 March 2007. All submissions should have been in the NFR format in accordance with the 2002 Reporting Guidelines [1].

Table 98 Summary of the information contained in the UNECE/EMEP Emission Reporting Guidelines

Description of contents	Components	Reporting years (see note 1)
Yearly: minimum (and additional)		
A. National totals:		
1. Main pollutants	SO_X, NO_X, NH_3, NMVOC, CO	1980–2005
2. Particulate matter	$PM_{2.5}$, PM10, TSP	2000–2005
3. Heavy metals	Pb, Cd, Hg/(As, Cr, Cu, Ni, Se, Zn)	1990–2005
4. POPs	(See note 2)	1990–2005
B. Sector emissions:		
1. Main pollutants	SO_X, NO_X, NH_3, NMVOC, CO	1980–2005
2. Particulate matter	$PM_{2.5}$, PM10, TSP	2000–2005
3. Heavy metals	Pb, Cd, Hg/(As, Cr, Cu, Ni, Se, Zn)	1990–2005
4. POPs	(See note 2)	1990–2005
Five-yearly: minimum reporting		
C. Gridded data in the EMEP 50 × 50 km² grid		
1. National totals	Main pollutants, PM, Pb, Cd, Hg, PAHs, HCB, dioxins/furans	1990, 1995, 2000 and 2005 (PM for 2000 and 2005)
2. Sector emissions	Main pollutants, PM, Pb, Cd, Hg, PAHs, HCB, dioxins/furans	1990, 1995, 2000 and 2005 (PM for 2000 and 2005)
D. Emissions from large-point sources	Main pollutants, HM, PCDD/F, PAHs, HCB, PM	1990, 1995, 2000 and 2005 (PM for 2000 and 2005)
E. Historical and projected activity data and projected national total emissions		
1. National total emissions	See table IV 2A in the Emission Reporting Guidelines	2010, 2015 and 2020
2. Energy consumption	See tables IV 2B and 2C in the Emission Reporting Guidelines	1990, 1995, 2000, 2005, 2010, 2015 and 2020
3. Energy consumption for transport sector	See table IV 2D in the Emission Reporting Guidelines	1990, 1995, 2000, 2005, 2010, 2015 and 2020
4. Agricultural activity	See table IV 2E in the Emission Reporting Guidelines	1990, 1995, 2000, 2005, 2010, 2015 and 2020
Five-yearly: additional reporting for review and assessment purposes		
VOC speciation/Height distribution/Temporal distribution		Parties are encouraged to review the information used for modelling at the Meteorological Synthesizing Centres, available at http://webdab.emep.int/ and their country-specific review reports issued in May 2006, available from http://www.emep.int/REVIEW/2006/index.html
Land-use data/Mercury breakdown		
% of toxic congeners of PCDD/F emissions		
Pre-1990 emissions of PAHs, HCB, PCDD/F and PCB		
Information on natural emissions		

Note: 1) As a minimum, data for the base year of the relevant protocol and from the year of entry into force of that protocol and up to the latest year should be reported.

2) Aldrin, chlordane, chlordecone, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene (HCB), Mirex, toxaphene, hexachlorocyclohexane (HCH), hexabromobiphenyl, polychlorinated biphenyls (PCBs), dioxins/furans (PCDD/F), polycyclic aromatic hydrocarbons (PAHs), and as additional information: short-chain chlorinated paraffins (SCCP) and pentachlorophenol (PCP) (see Emission Reporting Guidelines and 2007 reporting instructions: http://www.emep.int/emis2007/reportinginstructions.html).

Annexes

For Annexes A to H see separate files.

European Environment Agency

Annual European Community LRTAP Convention Emission Inventory report 1990–2005
Submission to EMEP through the Executive Secretary of the UNECE

2007 — 88 pp. — 21 x 29.7 cm

ISBN 978-92-9167-970-6
EEA Technical report series: ISSN 1725-2237
Annual report series: ISSN 1830-8139
DOI 10.2800/12142

TH-XB-07-001-EN-N

ISBN 978-92-9167-970-6

European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Tel.: +45 33 36 71 00
Fax: +45 33 36 71 99

Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

European Environment Agency