

Annual European Community LRTAP Convention emission inventory report 1990–2006

Submission to EMEP through the Executive Secretary of the UNECE

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Executive summary

This is the annual European Community Long-range Transboundary Air Pollution (LRTAP) Convention emission inventory report. The report, and its accompanying data, is 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 (including the European Community) are requested to report emissions data for a number of important air pollutants, including sulphur oxides (SO_x), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOCs), ammonia (NH₃), carbon monoxide (CO), primary particulate matter (PM₁₀ and PM_{2.5}), heavy metals (HMs) and persistent organic pollutants (POPs).

The subsequent sections of this report provide general information on the institutional arrangements and data sources that underpin the European Community's LRTAP Convention emission 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 by the EU-27 Member States (Chapter 4) ⁽¹⁾.

New elements have been introduced in this year's European Community emission inventory report compared to the inventory report published in 2007 ⁽²⁾. The report now includes the provision of trend tables and key category analyses (KCAs) for the EU-27 region as a whole. In addition, for the

first time, information is provided concerning the EU-27 trends, key categories and recalculations of particulate matter emissions (PM₁₀ and PM_{2.5}).

EU-27 emission trends

Aggregated EU-27 trends for NO_x, CO, NMVOCs, SO_x, NH₃, PM₁₀ and PM_{2.5} are presented in this report. Total emissions of these air pollutants in the EU-27 still cannot be estimated for all years because of gaps in the underlying data reported by Member States. A description of the specific data used in preparing this year's European Community emission inventory is given later in this report (Chapter 1).

Across the EU-27 the largest reduction in emissions in percentage terms has been achieved for the acidifying pollutant SO_x: emissions in 2006 were almost 70 % less than in 1990. Emissions of other key air pollutants also fell during this period, including emissions of the three air pollutants primarily responsible for the formation of harmful ground-level ozone in the atmosphere: CO (53 % reduction), NMVOCs (44 % reduction) and NO_x (35 % reduction).

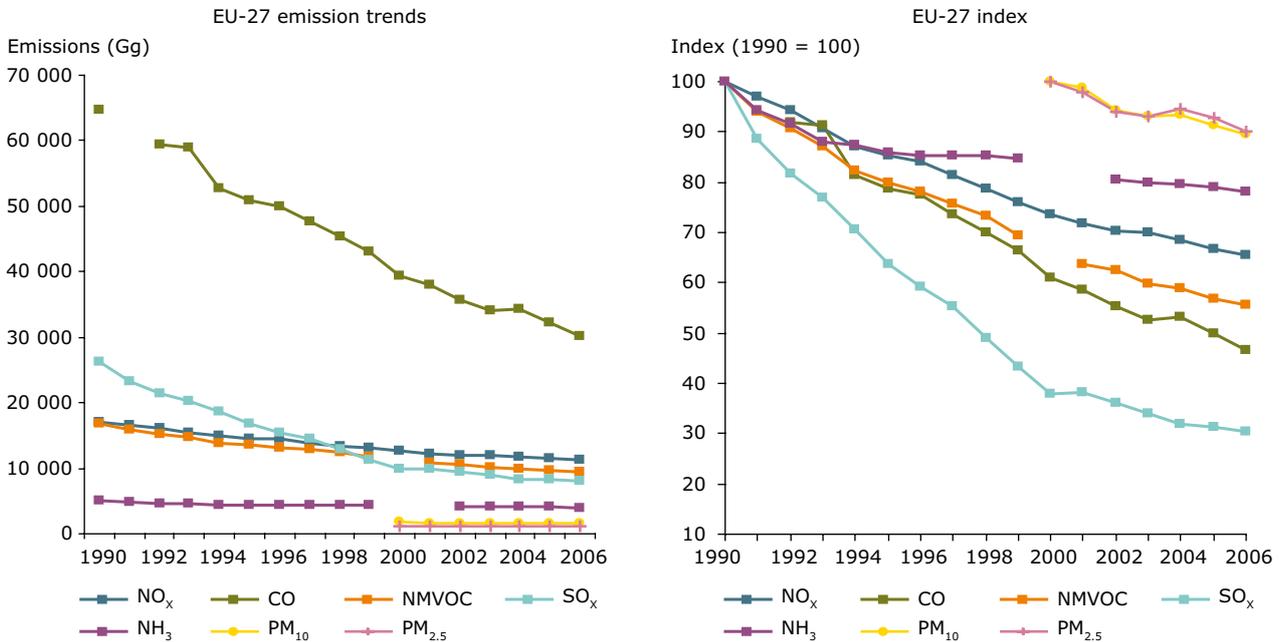
Trends of particulate matter (PM₁₀ and PM_{2.5}) levels have been compiled for the years 2000 to 2006 only. According to the data reported by Member States, emissions of both these pollutants decreased by approximately 10 % in the EU-27 during this period.

The emission trends of the main pollutants within the EU-27 are illustrated in the following charts.

⁽¹⁾ EU-27: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

⁽²⁾ Annual European Community LRTAP Convention emission inventory report 1990–2005, EEA technical report 14/2007. http://reports.eea.europa.eu/technical_report_2007_14/en.

EU-27 emission trends in absolute (Gg) and relative terms for NO_x, CO, NMVOCs, SO_x, NH₃, between 1990 and 2006 (index year 1990 = 100, and for PM₁₀ and PM_{2.5} between 2000 and 2006 (index year 2000 = 100)



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 the EU-27 Member States. Gaps in the trend curves therefore appear for years where a) emissions have not been reported by one or more countries and b) totals from 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 this report. Parties to the LRTAP Convention are formally requested to report emissions of particulate matter (PM) only for years 2000 onward. Hence emission trends for these years only are shown.

Main sources of EU-27 emissions

For each of the main air pollutants and particulate matter (PM₁₀ and PM_{2.5}), a key category analysis (KCA) ⁽³⁾ was performed to identify the most important sectors that contribute to emissions of a given pollutant.

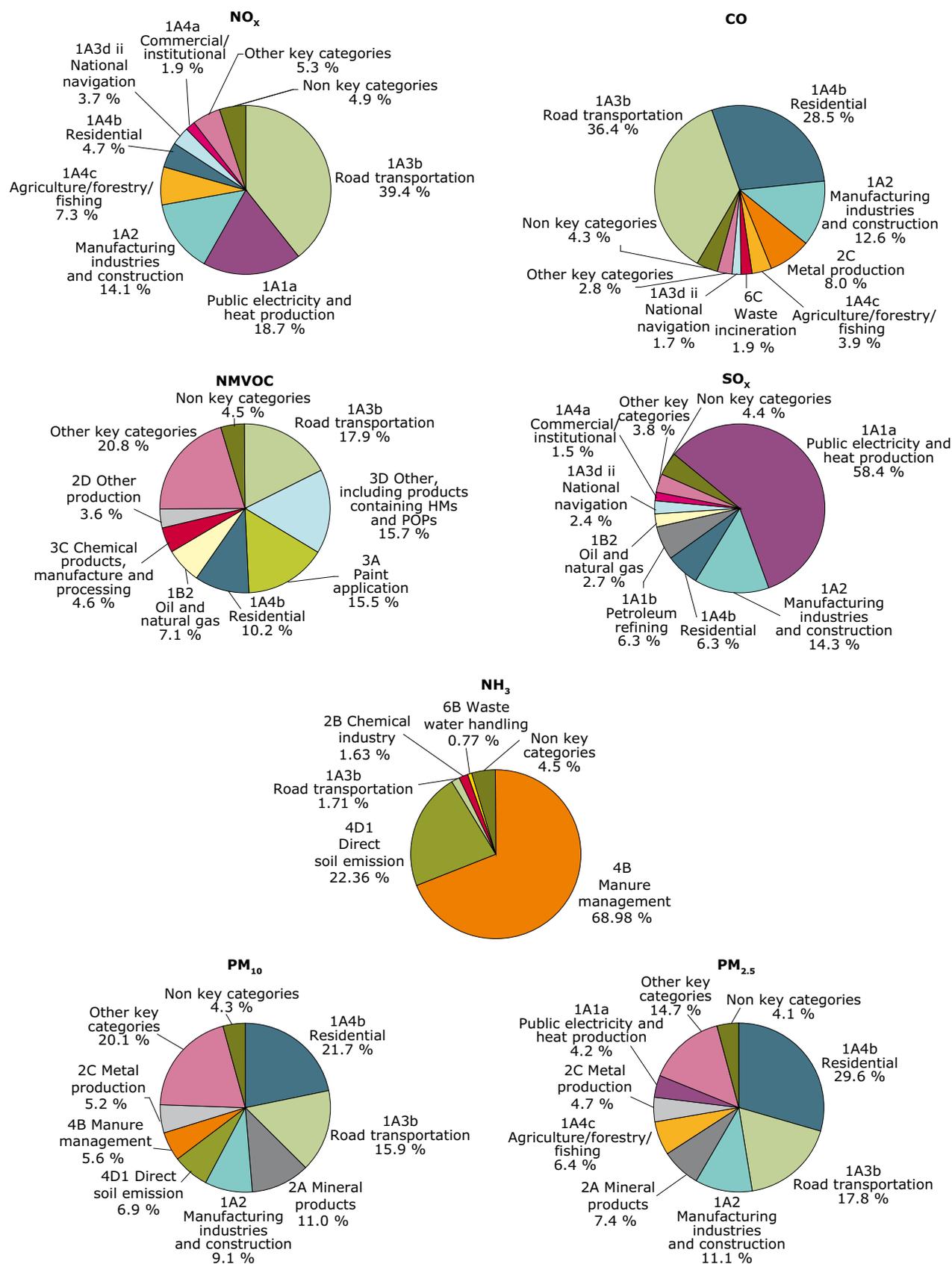
Twenty six individual emission inventory source categories were identified as being a key category for at least one pollutant. A number of emission sources were identified as being key categories for more than one of the seven pollutants assessed. Sources that were identified as being common key categories for six of the seven main pollutants were Road transportation, Manufacturing industries and construction, National navigation (shipping) Agriculture/forestry/fishing and Residential.

The importance of the Road transportation category in terms of the contribution it makes to total EU-27

emissions is clear — it is the most significant source of NO_x, CO, and NMVOCs, and the second most important source for PM₁₀ and PM_{2.5} emissions. Similarly, the Manufacturing industries and construction category is a significant source for emissions of NO_x, CO, PM₁₀, PM_{2.5} and SO_x. A final important key category is Public electricity and heat production, which is responsible for the largest contribution to EU-27 SO_x emissions and is the second most significant emission source for NO_x. In contrast to the other pollutants assessed, the acidifying and eutrophying pollutant NH₃ has very few key categories identified. Agricultural activities (Manure management and Direct soil emission) are responsible for the vast majority of NH₃ emissions, contributing more than 90 % of the total EU-27 emissions in 2006. The figures presented on the following page summarise the KCA results for the EU-27 in 2006.

⁽³⁾ A key category is the one that has significant influence on a country's total inventory in terms of absolute level of emissions, the trend in emission levels or both (IPCC, 2000). This report follows the IPCC definition of a key category — the sectors, in descending order of size, that cumulatively total 95 % of the total EU-27 emissions are identified as being key categories.

Contribution of key categories to EU-27 emissions of NO_x, CO, NMVOCs, SO_x, NH₃, PM₁₀ and PM_{2.5} in 2006



Note: The category codes and descriptions correspond to the emissions reporting nomenclature used by the Member States

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 emission 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 for the EU-27 Member States (Chapter 4). EU-27 totals are estimated for nitrogen oxides (NO_x), carbon monoxide (CO), non-methane volatile organic compounds (NMVOCs), sulphur oxides (SO_x) and ammonia (NH₃). Emission estimates are not always available for these pollutants in each year due to gaps in the data reported by Member States. Similarly, a limited time series of data is provided for particulate matter emissions (PM₁₀ and PM_{2.5}).

A number of annexes accompany this inventory report:

- Annex A provides the Tables IV 1A for the years 1990–2006 for the EU-27;
- Annex B provides the European Community NO_x emissions 1987–1989;
- Annex C provides results of key categories analyses for EU-27;
- Annex D provides emissions of heavy metals (HMs) and persistent organic pollutants (POPs) submitted by the EU-27 Member States.

Compared to last year's *European Community LRTAP Convention emission inventory report* (EEA, 2007), new elements in this 2008 inventory report

include trend tables and KCAs for the EU-27 ⁽⁴⁾, and the compilation of trend tables and provision of recalculation and KCA tables for PM₁₀ and PM_{2.5}. Any emission projection data that Member States may have reported in 2007 under the LRTAP Convention are not included in the scope of this report ⁽⁵⁾.

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

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 come into force. The 1999 Protocol to abate acidification, eutrophication and ground-level ozone came 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.

⁽⁴⁾ In previous reports, trends were provided separately for EU-15 and EU-12 Member States.

⁽⁵⁾ The *European Community NEC Directive status report* (EEA technical report 2008, in preparation) will provide an assessment of the most recent 2010 air emission projections reported by Member States to the European Commission and the EEA.

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

LRTAP Convention and its 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 transmission 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 per cent	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)

The EMEP reporting guidelines (UNECE, 2003) describe the data Parties should report under the LRTAP Convention and its protocols. In particular, in 2008 Parties were requested to report emissions data on SO_x, NO_x, NMVOCs, NH₃, CO, HMs, POPs and PM. The deadline for submission of 2006 data was 15 February 2008. A summary of the reporting requirements is provided in Appendix 2.

Parties to the Convention are requested to report emissions inventory data using the nomenclature for reporting (NFR) templates in accordance with the EMEP reporting guidelines (UNECE, 2003) and as subsequently amended by the Task Force on Emission Inventories and Projections (TFEIP) and endorsed by the EMEP Steering Body.

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

The Member States also report their emissions of SO₂, NO_x, NMVOCs and NH₃ under the NEC Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants (NECD) ⁽⁶⁾, and emissions of NO_x, CO, NMVOCs and SO₂ under the EU Greenhouse Gas Monitoring Mechanism (EU-MM) ⁽⁷⁾ for the United Nations Framework Convention on Climate Change (UNFCCC). This information should also be copied by Member States to the EEA's Eionet Reportnet Central Data Repository (CDR) ⁽⁸⁾. Table 2 provides an overview of the different air emission reporting obligations for the European Community Member States.

⁽⁶⁾ Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants, *Official Journal of the European Communities* L 309, 27.11.2001, p. 22.

⁽⁷⁾ 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, *Official Journal of the European Communities* L 49, 19.02.2004, p. 1.

⁽⁸⁾ <http://cdr.eionet.europa.eu>.

Table 2 Overview of air emission reporting obligations in the European Community, 2007–2008

Legal obligation	Reporting requirements	Annual reporting deadline for EU Member States	Annual reporting deadline for the European Community	
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, HMs, POPs, and 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 ₂ O, HFCs, PFCs, SF ₆ , NO _x , CO, NMVOCs and SO ₂	15 January (to the European Commission) 15 April (to the UNFCCC)	15 April

Note: * Parties are formally required to report only on the substances and for the years set forth in protocols that they have ratified and that have entered into force.

** CH₄ — methane; N₂O — nitrous oxide; HFCs — hydrofluorocarbons; PFCs — polyfluorocarbons; SF₆ — sulphur hexafluoride.

The three reporting obligations differ in the number and type of air pollutants, the geographical coverage of countries (for example, France, Spain, Portugal and 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 emission inventories differ only in the pollutants included and slightly in the sector split. The major differences are summarised in Table 3.

1.2 Institutional arrangements

1.2.1 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 (UNECE, 2003) and are requested to use the joint *EMEP/CORINAIR emission inventory guidebook* (EMEP/EEA, 2007) prepared by the TFEIP.

Table 3 Major differences between the reporting obligations of air pollutants under the LRTAP Convention, NECD and the Council Decision 280/2004/EC

	EU NECD	LRTAP Convention (NFR ^{a)})	EU-MM/UNFCCC (CRF ^{b)})
Air pollutants	NO _x , SO _x , NMVOCs, NH ₃	NO _x , SO _x , CO, NMVOCs, NH ₃ , HMs, POPs, PM	NO _x , SO _x , NMVOCs, CO
Domestic aviation (landing and take-off cycle [LTO])	Included in national total	Included in national total	Included in national total
Domestic aviation (cruise)	<i>Not included in national total</i>	Included in national total	Included in national total
International aviation (LTO)	Included in national total	<i>Not included in national total</i>	<i>Not included in national total</i>
International aviation (cruise)	<i>Not included in national total</i>	<i>Not included in national total</i>	<i>Not included in national total</i>
National navigation (domestic shipping)	Included in national total	Included in national total	Included in national total
International inland shipping	Included in national total	<i>Not included in national total</i>	<i>Not included in national total</i>
International maritime	<i>Not included in national total</i>	<i>Not included in national total</i>	<i>Not included in national total</i>
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 greenhouse gases.

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 and recalculations should be included.

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 inventory report is to improve the quality of the European Community emission inventory. The Member States should check their national data and information used in the inventory report and, if necessary, send updates. In addition, they may comment on general aspects of the inventory report.

1.2.2 *The European Environment Agency and the European Topic Centre on Air and Climate Change*

The European Environment Agency

The European Environment Agency assists the European Commission (DG Environment) in the compilation of the annual European Community LRTAP inventory. The activities of the 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), which undertakes the data checking, compilation and draft report writing tasks;
- communication with the European Commission;
- communication with Member States;
- circulation of the draft European Community emission inventory and inventory report;
- hosting the official inventory database and web dissemination of data and the inventory report.

The European Topic Centre on Air and Climate Change

With regard to the European Community's emission inventory, the main activities of European Topic

Centre on Air and Climate Change ⁽⁹⁾ 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 the EEA) in order to clarify data and other information provided;
- preparation of the draft European Community emission inventory and inventory report by 30 June based on Member States' submissions;
- preparation of the final European Community emission inventory and inventory report by September (subsequently submitted by the Commission to the UNECE).

The work of the EEA and the ETC/ACC is facilitated by the European environmental information and observation network (Eionet) ⁽¹⁰⁾, which consists of the EEA (supported by its European Topic Centres), 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 ⁽¹¹⁾.

1.2.3 *EMEP*

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 LRTAP Convention, which now has 51 Parties, identifies the Executive Secretary of the UNECE as its secretariat.

⁽⁹⁾ The current ETC/ACC was established by a contract between the lead organisation Milieu-en Natuurplanbureau (MNP) in the Netherlands and the EEA in 2006 and involves 11 organisations and institutions in eight European countries.

⁽¹⁰⁾ 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.

⁽¹¹⁾ <http://cdr.eionet.europa.eu>.

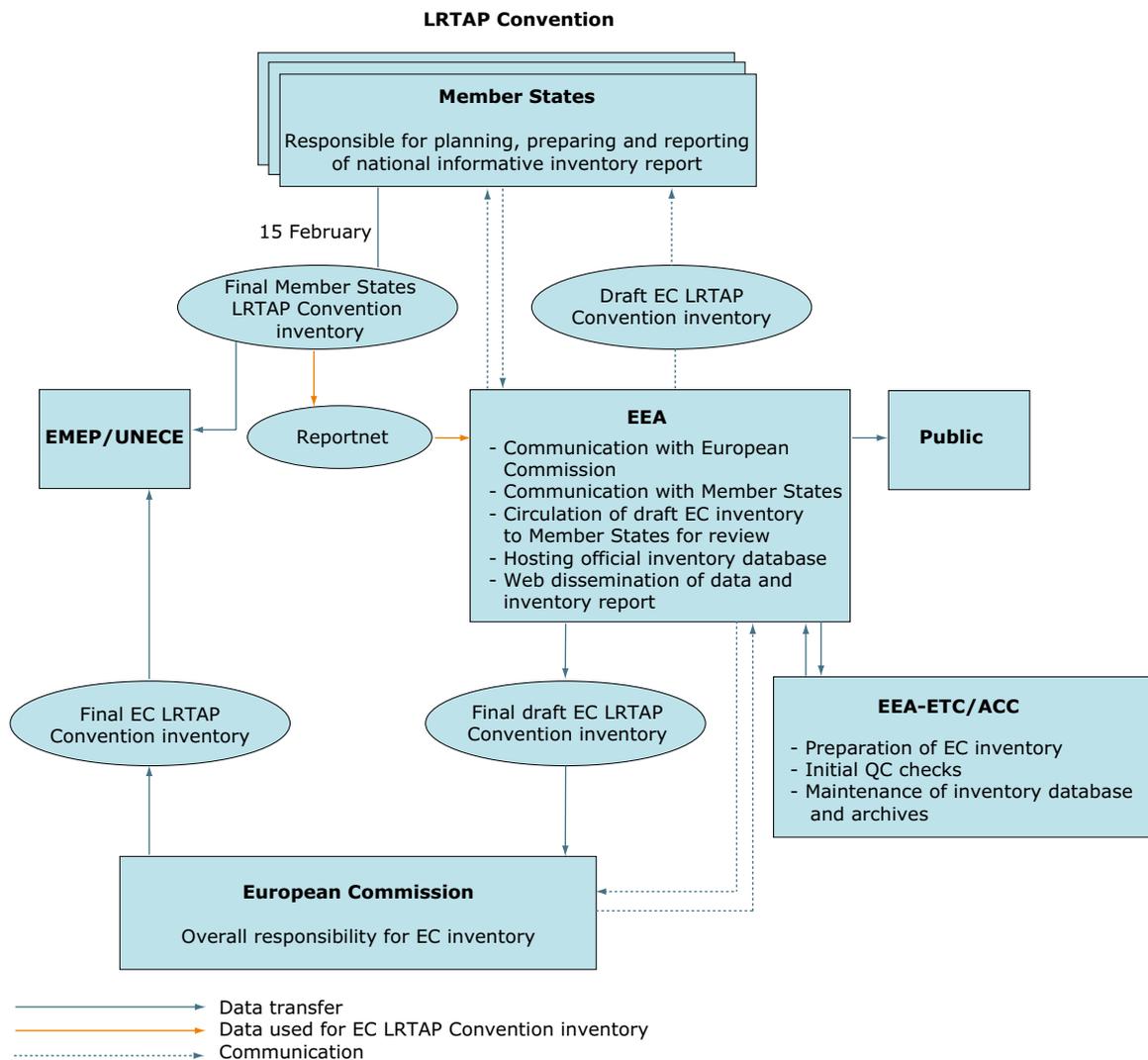
1.3 Inventory preparation process

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 basis of reporting for the individual Member States and for the European Community remains the 1979 LRTAP Convention and its ratified protocols (Table 1). As noted earlier, the EMEP reporting guidelines (UNECE, 2003) describe the data Parties should report under the LRTAP Convention and its protocols. Within the European Community, the Member States are requested each year (under the agreement between Eionet countries and EEA concerning priority data flows) to post a copy of their official submission to the LRTAP Convention in the CDR by 15 February each year. EEA-ETC/ACC subsequently collects

the data from the CDR and compiles the European Community LRTAP Convention emission inventory database, producing a European Community LRTAP Convention emission inventory and inventory report.

Within this legal and procedural framework, preparation of the annual LRTAP Convention emission 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 EEA website. A flowchart diagram illustrating the dataflow that is used to compile the EU LRTAP Convention emission inventory is presented in Figure 1.

Figure 1 Data flow for the compilation of the European Community LRTAP Convention emission inventory



1.4 Methods and data sources

The European Community LRTAP Convention emission inventory is the sum of the Member States' inventories submitted to the UNECE and the EEA. An overview, by pollutant, of emission data received from Member States' LRTAP Convention submissions in 2008 via the CDR is provided in Table 4. Due to data gaps and the lack of an agreed data gap-filling procedure (which might be used to provide emission estimates where data has not been reported by Member States), total European

Community emissions are estimated only for NO_x, CO, NMVOCs, SO_x and NH₃ (1990–2006) and for the years 2000–2006 for PM₁₀ and PM_{2.5}. For HMs and POPs, due to significant gaps in data available from the Member States, neither time-series trends nor an analysis of the main emission sources can be compiled for the EU-27. The HM and POP data that has been reported by Member States is presented in Annex D.

This report includes all data and resubmissions received from EU-27 Member States by 26 May 2008.

Table 4 Overview of air pollutants and years covered in NFR tables received from Member States' LRTAP Convention submissions in 2008

Member State	SO _x , NO _x , CO, NH ₃ , NMVOC	Cd, Hg, Pb	Additional HMs *	PM ₁₀ , PM _{2.5}	TSP **	POPs (PAH, DIOX, HCB) ***
Austria	1980–2006	1985–2006	np	1990–1996, 1998–2006	1990–2006	1985–2006
Belgium	1990–2006	1990–2006	1990–2006	2000–2006	2000–2006	1990–2006
Bulgaria	2006	2006	np	np	np	2006
Cyprus	1990–2006	1990–2006	1990–2006	2000–2006	2000–2006	1990–2006
Czech Republic	2006	2006	2006	2006	2006	2006
Denmark	1980–2006	1990–2006	1990–2006	2000–2006	2000–2006	1990–2006
Estonia	1990–2006	1990–2006	1990–2006	2000–2006	1990–2006	1990–2006
Finland	1980–2006	1990–2006	1990–2006	1990–2006	1990–2006	1990–2006
France	1980–2006	1990–2006	1990–2006	1990–2006	1990–2006	1990–2006
Germany	1990–2006	1990–2006	1990–2006	1995–2006	1995–2006	1990–2006
Greece	2006	np	np	np	np	np
Hungary	2006	2006	2006	2006	2006	2006
Ireland	1987, 1990–2006	1990–2006	1990–2006	1990–2006	1990–2006	np
Italy	1980–2006	1990–2006	1990–2006	1990–2006	np	1990–2006
Latvia	1990–2006	1990–2006	1990–2006	2000–2006	1990–2006	1990–2006
Lithuania	2006	2006	2006	2006	2006	2006
Luxembourg						
Malta	2000–2006	2000–2006	2000–2006	2000–2006	2000–2006	np
Netherlands	1990–2006	1990–2006	1990–2006	1990–2006	1990–2006	1990–2006
Poland	2006	2006	2006	2006	2006	2006
Portugal	1990–2006	1990–2006	1990–2006	1990–2006	1990–2006	1990–2006
Romania	2006	2006	2006	2006	2006	2006
Slovakia	2000–2006	2000–2006	2000–2006	2000–2006	2000–2006	2000–2006
Slovenia	2000–2006	2000–2006	np	2000–2006	2000–2006	2000–2006
Spain	1980–2006	1990–2006	1990–2006	2000–2006	2000–2006	1990–2006
Sweden	1980–2006	1990–2006	1990–2006	1980–2006	1980–2006	1980–2006
United Kingdom	1980–2006	1980–2006	1980–2006	1980–2006	np	1990–2006

Note: np = not provided.

* HM — Heavy metals;

** TSP — Total suspended particles;

*** PAH — polycyclic aromatic hydrocarbons; DIOX — dioxins; HCB — hexachlorobenzene.

Reporting of additional HM is not obligatory for Parties.

Reporting of PM₁₀ and PM_{2.5} is requested from year 2000 onward.

Slovakia, Slovenia and Hungary also submitted national total emissions for the years 1990–2000.

Romania also submitted national total emissions for the years 1990–2004.

1.4.1 Data gaps and gap filling

Member States' submissions contain various data gaps (for the most recent inventory year and/or for some pollutants/years of the time series (Tables 4 and 5). 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 should be elaborated and adopted. One option for the future may be to apply the same general principle and methods as for example are used in the EU greenhouse gas monitoring mechanism (EU-MM) (Decision 280/2004/EC) when compiling the EU greenhouse gas inventory and inventory report.

In this report, emission trends of the main pollutants (SO_x , NO_x , CO, NMVOCs and NH_3) are compiled from 1990 onward. In contrast, reporting of PM_{10} and $\text{PM}_{2.5}$ from countries is formally requested only from year 2000 onward. For Member States that did not provide their LRTAP Convention emission inventory submission (or provided incomplete inventories) to the EEA, the emissions of air pollutants (SO_x , NO_x , CO, NMVOCs, NH_3 , PM_{10} and $\text{PM}_{2.5}$) officially reported under the LRTAP Convention to EMEP (CEIP database) were used. Where there were no reported emissions also in the EMEP database, as the next source of information emissions officially reported by Member States under NECD, and/or EU-MM, have been used to fill gaps where possible (see Table 5 for details). This enables provisional emission trends to be provided and the most significant emission sources of the various pollutants to be determined. This is the same procedure that has been used in previous years to compile the European Community's inventory. As noted earlier (Table 3), 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 (Vestreng *et al.*, 2007).

1.4.2 Gridded data and large point sources

According to the EMEP reporting guidelines (UNECE, 2003), every five years Parties within the geographical scope of EMEP should report gridded data for years 1990, 1995, 2000 and 2005.

In 2008, Estonia, Finland, Lithuania, Portugal, Romania, Slovakia and Spain submitted updated gridded data. Gridded data for the EU-27 for year 2005 were last submitted in 2007 and hence are not updated this year. However, at the request of the UNECE Secretariat, EU-27 gridded data was reported for year 2000 for SO_x . This is available as an accompanying file to this report (Annex E).

In addition to gridded data, 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). France, Lithuania and Portugal reported updated LPS data to the EEA in 2008. EU-27 LPS data were last submitted in 2007 and hence are not updated in 2008.

Further information concerning EU-27 gridded and LPS data is provided in Annexes G and H of last year's inventory report: *Annual European Community LRTAP Convention emission inventory report 1990–1995* (EEA, 2007).

1.5 Key category analyses

It is good practice to identify inventory key categories⁽¹²⁾ in a systematic and objective manner by performing a quantitative analysis of the relationships between the magnitude of emission in any one year (a so-called 'level' assessment) and the change in emission year to year (trend) of each category's emissions compared to the total national emissions. A key category is one that has significant influence on a country's total inventory in terms of absolute level of emissions, the trend in emissions, or both. In this report, the categories that are together responsible for 95 % of the national total emission of a given pollutant are classified as key categories (IPCC, 2000).

The method used to identify the EU-27 key categories is consistent with the quantitative Tier 1 approach as provided in the IPCC good practice guidance (IPCC, 2000).

EU-27 key categories were determined using a level analysis of 2006 emissions. The EU-27 values are the sum of those of all Member States that reported a value or a notation key (Appendix 1) for the respective category and pollutant. 'IE' (included elsewhere) reported by Member States might therefore lead to an underestimate of the

⁽¹²⁾ A key category is the one that has significant influence on a country's total inventory in terms of absolute level of emissions, the trend in emission levels or both (IPCC, 2000). This report follows the IPCC definition of a key category — the sectors, in descending order of size, that cumulatively total 95 % of the total EU-27 emissions are identified as being key categories.

Table 5 Overview – data sources for SO_x, NO_x, CO, NMVOC, NH₃, PM₁₀ and PM_{2.5} emissions used for EU inventory compilation

Member State	NFR as provided as LRTAP Convention submission under Eionet		NFR as provided under NEC Directive (SO _x , NO _x , NMVOC, NH ₃)	CRF as provided under Council Decision 280/2004/EC under Eionet (SO _x , NO _x , CO, NMVOC)	Data submitted under LRTAP Convention to EMEP (CEIP database)
	SO _x , NO _x , CO, NMVOC, NH ₃	PM ₁₀ and PM _{2.5}			
Austria	1990–2006	1990, 1995, 1999–2006			
Belgium	1990–2006	2000–2006			1997 PM ₁₀ , PM _{2.5}
Bulgaria	2002–2006	–		1990–2001	NH ₃ 1990–1999, 2001; CO 2000
Cyprus	1990–2006	2000–2006			NH ₃ 1990, 1993–2004
Czech Republic*	2002–2006	PM ₁₀ 2000–2006, PM _{2.5} 2003–2006		1990–2001	
Denmark	1990–2006	2000–2006			NH ₃ 1990–1999
Estonia	1990–2006	2000–2006			
Finland	1990–2006	2000–2006			
France	1990–2006	1990–2006			
Germany	1990–2006	1995–2006			
Greece	1990–2006	–			
Hungary**	2003–2006	1995–2006	1990 (totals)	1991–2002	CO 2000, NO _x 2000–2001
Ireland	1990–2006	1990–2006			
Italy	1990–2006	1990–2006			
Latvia***	1990–2006	1990–2006			
Lithuania****	2002, 2005–2006	2005–2006		1990–2001	All 2003–2004; NH ₃ 1990–2000
Luxembourg*****		–		1990–2006	NH ₃ 1990; 1993–2004
Malta#	2000–2006	2000–2006		1990–1999	
Netherlands	1990–2006	1990–2006			
Poland##	2002–2006	2003–2006		1990–1999	NO _x , CO, SO _x 2000; all 2001
Portugal	1990–2006	1990–2006			
Romania	2005–2006	PM ₁₀ 2005–2006, PM _{2.5} –		1990–2004	
Slovakia	2000–2006	2000–2006		1990–1999	
Slovenia	1990–1999 (nat.total); 2000–2006	2000–2006			
Spain	1990–2006	2000–2006			
Sweden	1990–2006	1990–2006			
United Kingdom	1990–2006	1990–2006			

Note:

'All' in the table refers to all main pollutants SO_x, NO_x, CO, NMVOCs, and NH₃.

- * The Czech Republic: Emissions from 1990 to 2001 were reported under CLRTAP. However only national totals are provided and as these seem not to be consistent with data reported for 2002–2005, the 1990–2001 emissions submitted under the EU-MM in March 2008 are used in this report.
- ** Hungary: 1990 emissions submitted to EU-MM were not consistent with those of other years. Therefore, the emissions presented in Hungary's NECD Programme report 2006 are used.
- *** Latvia: 1990–1999 PM₁₀ and PM_{2.5} national total emissions are provided in the IIR (IIR Latvia, 2008).
- **** Lithuania: 2003 and 2004 emissions are taken from data reported directly to UNECE, as they were not submitted to the CDR.
- ***** Luxembourg did not submit LRTAP Convention inventories in 2008.
- # Malta: 1990–1999 emissions were submitted under the EU-MM in 2004, but only national totals were provided.
- ## Poland: 1990–1999 data submitted under CLRTAP are available only in SNAP format and therefore emissions reported in the EU-MM CRF tables were used in the report. National totals in NFR and CRF for this period are consistent. However, consistent CO emissions for 1991 and NMVOC emissions for 2000 are not available from either the submitted NFR or CRF tables.

respective category (and an overestimate of another one). The analysis does not include emission data from Bulgaria (PM₁₀ and PM_{2.5}), Greece (NH₃, PM₁₀ and PM_{2.5}), Italy (PM₁₀ and PM_{2.5}), Luxembourg (NH₃, PM₁₀ and PM_{2.5}) and Romania (PM_{2.5}) due to incomplete reporting of sectoral emissions from these countries.

Chapter 2 provides a summary of the top five EU-27 key categories in 2006 for each pollutant. A complete list of all EU-27 key categories for NO_x, CO, NMVOCs, SO_x, NH₃, PM₁₀ and PM_{2.5} emissions is given in Chapter 3, together with tables showing emissions by Member State for the top three key categories. Detailed KCA calculations are provided in Annex C.

1.6 Quality assurance/quality control and verification methods

Member States are encouraged to use appropriate quality assurance and quality control 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 emission inventory guidebook (EMEP/EEA, 2007).

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 Member State's submission. In addition, the internal consistencies of the data tables submitted by Member States are checked before the EU-27 tables are compiled. External checks are also provided by Member States through an Eionet review before the EC-27 inventory is submitted to the LRTAP Convention.

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 the EMEP Centre on Emission Inventories and Projections (CEIP) in an annual review process. The review of Member State LRTAP Convention emission inventories is performed jointly with the review of those reported under the national emissions ceilings Directive (2001/81/EC). The review process includes checks on timeliness, formats, consistency, accuracy, completeness and comparability of actual Member State inventory submissions⁽¹³⁾. Results of testing are submitted to the Member States and used to improve the quality of the national emission inventories. Results of the review are separately published each year in a joint EMEP/EEA review report⁽¹⁴⁾.

1.7 General uncertainty evaluation

A quantification of uncertainty in the European Community LRTAP emission inventory first requires the provision of detailed underpinning information on emission uncertainties from Member States. However, an evaluation of uncertainty at the European Community level (including all EU-27 Member States) has not been performed, because insufficient information has been reported by Member States.

1.8 General assessment of completeness

Member States should have reported inventory data to UNECE (and are requested also to provide a copy of this data to EEA via the CDR no later than 15 February 2008).

For the inventory prepared in 2008, 26 of 27 EU Member States provided data. This is similar to 2007, when 25 Member States reported LRTAP Convention emission inventory data. The Czech Republic, Poland, Portugal, Malta, Spain, Greece and Italy did not submit on time. Luxembourg did not submit a LRTAP Convention inventory for the year 2006 (Figure 2). Nine Member States posted more

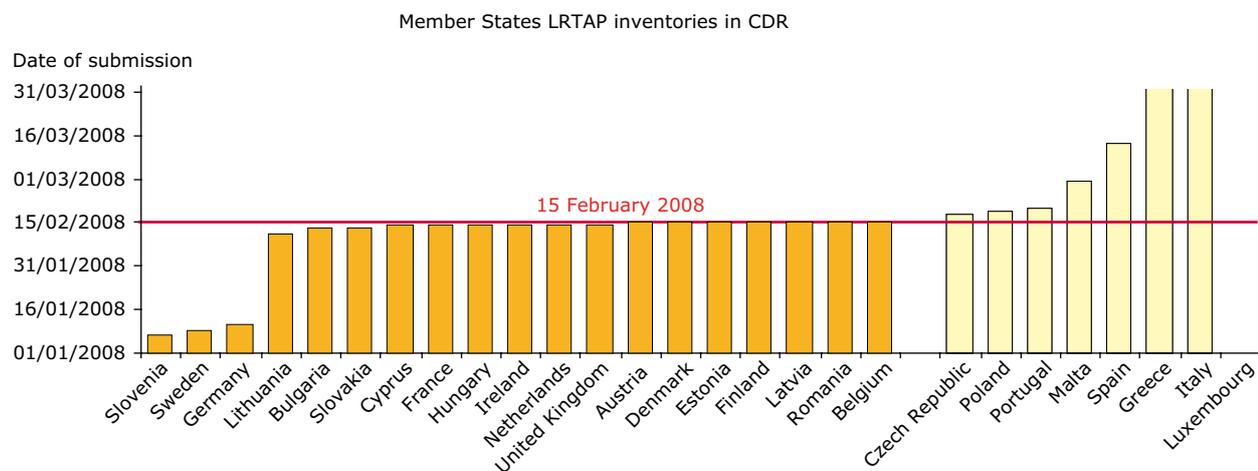
⁽¹³⁾ The technical review of inventories is carried out in three stages:

Stage 1: An initial check of submissions for timeliness, format and completeness;

Stage 2: A synthesis and assessment of all national submissions with respect to consistency and comparability of data, with recommendations for data quality improvement;

Stage 3: In-depth reviews of selected inventories, by pollutant, country and sector, as in the workplan agreed by the EMEP Executive Body.

⁽¹⁴⁾ A summary of the results of the review performed in 2007 are available in Vestreng *et al.*, 2007.

Figure 2 Dates of the first data submissions received from Member States

than one submission on the CDR, providing either additional information and/or revised inventories following their original data submission. Table 6 summarises the data received by Member States in 2008 (information concerning data submitted in previous years is not provided).

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 are not estimated for all years or all pollutants. Therefore this report presents trends and KCAs only for the main pollutants (NO_x , CO, NMVOCs, SO_x , NH_3 , PM_{10} and $\text{PM}_{2.5}$). Data reported for POPs and HMs are presented in Annex D.

Table 6 Date of receipt of inventory submission by the EEA, years covered and information provided by Member States by 20 March 2008

Member State	Annual reporting				Minimum 5 year reporting				
	Submission date *	Re-submission Date	NFR template	Other format	IIR 2007	Projections	Activity data	Gridded data	LPS emissions
Austria	15/02/2008		1980–2006		x	np	1990, 1995, 2000, 2005	np	np
Belgium	15/02/2008	29/02/2008	1990–2006		x	2010	np	np	np
Bulgaria	13/02/2008		2006		x	np	np	np	np
Cyprus	14/02/2008		1990–2006		x	np	np	np	np
Czech Republic	18/02/2008	18/04/2008	2006		np	np	np	np	np
Denmark	15/02/2008		1980–2006		np	2010, 2015, 2020	1990, 1995, 2000, 2005, 2010, 2015, 2020	np	np
Estonia	15/02/2008		1990–2006		np	2010, 2015	np	1990, 1995, 2000, 2005	np
Finland	15/02/2008	29/02/2008, 10/03/2008	1980–2006		x	2010, 2020	2006	2006	2006
France	14/02/2008	26.05.2008	1980–2006		x	2010, 2020	1990, 1995, 2000, 2005, 2010, 2020	np	np
Germany	11/01/2008		1990–2006		np	2010, 2015, 2020	1990, 1995, 2000, 2005, 2010, 2015, 2020	np	np
Greece	21/04/2008		2006		np	np	np	np	np
Hungary	14/02/2008	06/03/2008	2006	1990–2000	x	np	np	np	np
Ireland	14/02/2008		1987, 1990–2006		np	np	np	np	np
Italy	25/04/2008		1980–2006			np	np	np	np
Latvia	15/02/2008	14/03/2008	1990–2006		x	np	1990, 1995, 2000, 2005	np	np
Lithuania	11/02/2008		2006		x	2010	2006	2006	2006
Luxembourg	np		np		np	np	np	np	np
Malta	29/02/2008		2000–2006		np	2010	np	np	np
Netherlands	14/02/2008		1990–2006		np	2010, 2015, 2020	np	np	np
Poland	19/02/2008		2006		np	np	np	np	np
Portugal	20/02/2008	29/02/2008	1990–2006		np	2010	1990–2006	2005	2005
Romania	15/02/2008	14/03/2008	2006	1980–2004 (nat.totals)	x	2010, 2020	2006	2005	np
Slovakia	13/02/2008		2000–2006	1990–2006 (nat. totals)	x	2010, 2015, 2020	np	1990, 1995, 2000, 2005	np
Slovenia	07/01/2008	20/03/2008, 25/04/2008	2000–2006	1980–2006 (level 1)	x	2010, 2015, 2020	np	np	np
Spain	20/03/2008	04/04/2008	1990–2006	1980–1989 (level 1)	x	2010, 2015, 2020	1990, 1995, 2000, 2005, 2010, 2015, 2020	1990, 1995, 2000, 2005	np
Sweden	09/01/2008		1980–2006		x	2010, 2015, 2020	np	np	np
United Kingdom	14/02/2008		1980–2006		np	np	np	np	np

Note: * refers to the first submission of inventory data to the CDR; submission of other data is possible at later dates.
 IIR — submission of an informative inventory report (IIR) is not mandatory for Parties.
 np — not provided.
 x — provided.

2 Trends of pollutant emissions

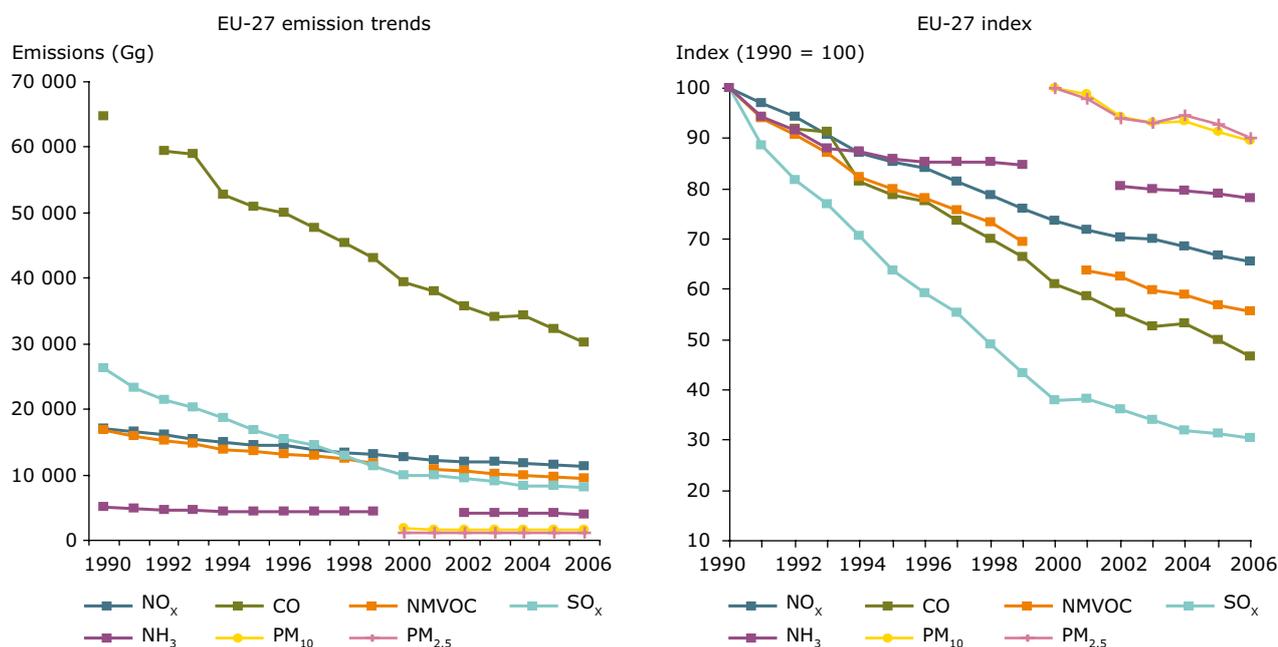
Total emissions of air pollutants for the EU-27 are not estimated in all years because of gaps in the data reported by Member States. Section 1.4.1 provides details of the available data used in this report.

Across the EU-27 the largest reductions (in percentage terms) have been achieved for SO_x emissions (which have decreased by almost 70 % since 1990), followed by CO (- 53 %), NMVOC (- 44 %) and NO_x (- 35 %) (Figure 3). NH_3 emissions decreased by 22 %. Particulate matter emission

trends, which have been compiled only for years 2000 to 2006, indicate that emissions have reduced by approximately 10 % (Table 7).

The 1990–2006 changes of emissions in each country are expressed as $100 \cdot (E_{2006} - E_{1990}) / E_{1990}$ (%), where E_{2006} and E_{1990} are 2006 and 1990 total emissions, respectively. The 2005–2006 changes of emissions in each country are expressed as $100 \cdot (E_{2006} - E_{2005}) / E_{2005}$ (%), where E_{2006} and E_{2005} are the 2006 and 2005 total emissions, respectively.

Figure 3 EU-27 emission trends for NO_x , CO , NMVOCs, SO_x , and NH_3 in Gg between 1990 and 2006 (index year 1990 = 100) and for PM_{10} and $\text{PM}_{2.5}$ between 2000 and 2006 (index year 2000 = 100)



Note: To enable presentation of provisional emission trends, in some instances (due to non-reporting of data via the CDR) emissions have been aggregated without including data for all of the EU-27 Member States. Gaps in the trend curves appear for years where a) emissions have not been reported by one or more countries and b) totals from available data (in the expert judgement of ETC/ACC) would have changed significantly the overall trend shown. The following data were not reported by Member States:

- CO emissions were not provided by Poland for 2000;
- NH_3 emissions were not provided by: Malta (1990–1999), Luxembourg (1991–1992 and 2005–2006), Lithuania (2001) and Bulgaria for 2000. For Greece NH_3 emissions for 2003–2006 were assumed to be the same as their reported emissions for 2002 (following confirmation from Greece that after 1998 these emissions are considered to be constant);
- PM_{10} emissions were not provided by: Greece, Luxembourg, Bulgaria 2000–2006, the Czech Republic (2000–2001) and Poland (2000–2002), Lithuania and Romania (2000–2004);
- $\text{PM}_{2.5}$ emissions were not provided by: Greece, Luxembourg, Bulgaria, Romania (2000–2006), Lithuania (2000–2004), the Czech Republic and Poland (2000–2002).

Table 7 Total EU-27 emissions of NO_x, CO, NMVOCs, SO_x, NH₃, PM₁₀ and PM_{2.5} (Gg)

EU-27	1990	1995	2000	2001	2002	2003	2004	2005	2006	Change 1990- 2006	Change 2005- 2006
NO _x	17 101	14 576	12 581	12 286	12 019	11 955	11 728	11 406	11 199	- 35 %	- 1.8 %
CO	64 660	50 791	39 434	37 891	35 694	34 005	34 391	32 240	30 200	- 53 %	- 6.3 %
NMVOC	16 868	13 501	NE	10 760	10 520	10 082	9 948	9 596	9 391	- 44 %	- 2.1 %
SO _x	26 217	16 719	9 928	9 992	9 460	8 935	8 382	8 227	7 946	- 70 %	- 3.4 %
NH ₃	5 118	4 395	NE	NE	4 118	4 090	4 068	4 049	4 001	- 22 %	- 1.2 %
										Change 2000- 2006	Change 2005- 2006
PM ₁₀ *			1 936	1 914	1 824	1 798	1 807	1 760	1 726	- 11 %	- 1.9 %
PM _{2.5} *			1 324	1 299	1 242	1 227	1 245	1 212	1 181	- 10.8 %	- 2.6 %

Note: * Reporting of PM emissions is requested only for years 2000–2006.

NE — EU-27 total emission could not be estimated as:

a) emissions have been not reported by one or more countries

b) the totals based on the available data (in the expert judgment of ETC/ACC) would significantly have changed the overall trend shown.

Minus values indicate that a reduction of emissions has occurred.

The following sections of this chapter show the contribution of the Member States to the EU-27 total emissions for NO_x, CO, NMVOCs, SO_x, NH₃, PM₁₀ and PM_{2.5}. A summary of the top five EU-27 key categories in 2006 for each pollutant is also presented. Due to historical data not being provided in NFR by a number of countries, the summary of emission trends for key categories is presented only for years following year 2000. A complete list of the EU-27 key categories for main pollutants is given in Chapter 3.

2.1 NO_x emission trends

Between 1990 and 2006, NO_x emissions decreased in the EU-27 by 35 % (Table 8). The change of total NO_x emissions between 2005 and 2006 was rather small — a decrease of 1.8 %, mainly caused by reductions achieved in Germany, Italy and the United Kingdom (Table 8).

Six Member States (Austria, Bulgaria, Cyprus, Greece, Malta, Portugal and Spain) reported increases between 1990 and 2006, with the highest increase occurring in Cyprus (21 %). Emissions from 2005–2006 increased in 11 Member States, and in five of these (Bulgaria, Finland, Latvia, Lithuania, and Poland) by more than 5 % (Table 8).

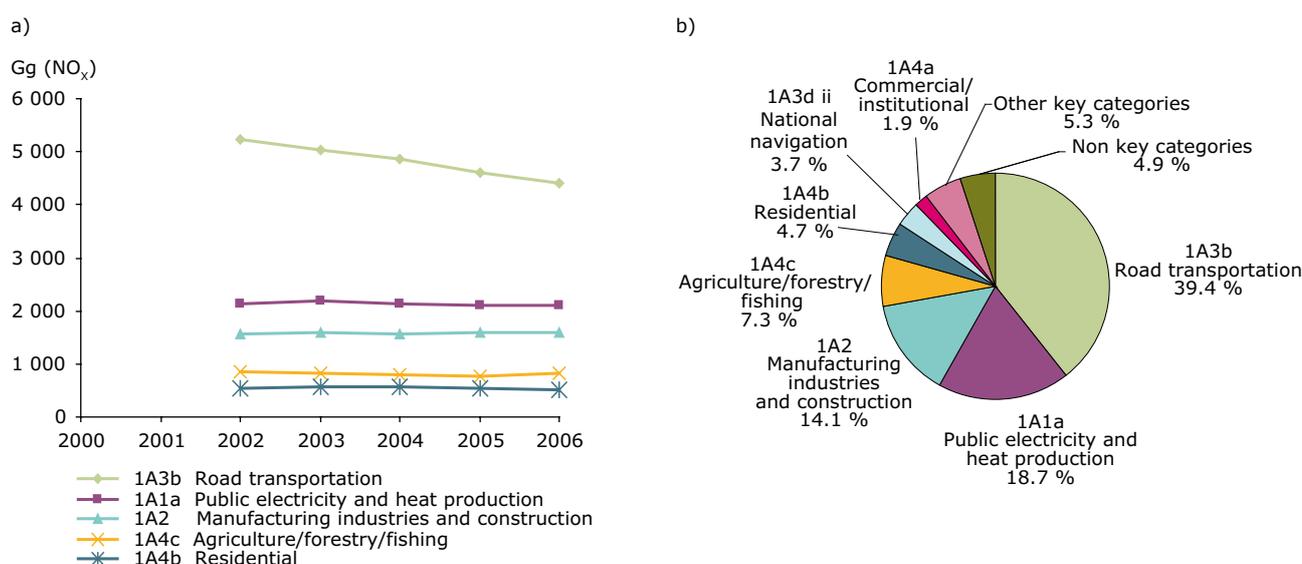
NO_x emissions of the EU-27 from road transport, i.e. the most important key category which contributes about 40 % to total NO_x emissions, decreased between 2002–2006 by 16 % (Figure 4). The reduction in emissions from the road transport sector has mainly been achieved as a result of the introduction of three-way catalytic converters on cars and stricter regulation of emissions from heavy goods vehicles across Europe. In contrast to the decrease in emissions the road transport sector, the trend of following four NO_x key categories stayed almost constant since 2002.

2.2 CO emission trends

In the EU-27, emissions of CO decreased by just over 53 % between 1990 and 2006, being in total 30 200 Gg in 2006. Decreased emissions were reported in all Member States except Romania. The largest absolute decreases were reported by France, Germany, Italy, Poland, Spain and the United Kingdom. However, these countries remained the largest emitters of CO in absolute terms in 2006 (Table 9). The largest relative decrease was observed in Luxembourg and Malta. For Malta emission trends are a combination of data submitted to the UNFCCC and to the LRTAP Convention and these two data sets appear inconsistent for CO.

Table 8 Member States' contributions to European Community emissions of NO_x (Gg)

Member State	NO _x (Gg)										Change		Share in EU-27	
	1990	1995	2000	2001	2002	2003	2004	2005	2006	1990–2006	2005–2006	1990	2006	
Austria	192	181	205	215	225	236	233	237	225	17 %	- 5.0 %	1.1 %	2.0 %	
Belgium	368	372	330	316	300	297	299	285	278	- 24 %	- 2.5 %	2.2 %	2.5 %	
Bulgaria	242	151	128	138	197	209	216	233	246	2 %	5.4 %	1.4 %	2.2 %	
Cyprus	15	17	22	21	22	21	18	17	18	21 %	1.5 %	0.1 %	0.2 %	
Czech Republic	742	430	396	332	318	323	328	278	282	- 62 %	1.6 %	4.3 %	2.5 %	
Denmark	274	266	205	203	199	208	193	184	185	- 32 %	0.6 %	1.6 %	1.7 %	
Estonia	74	38	35	37	40	39	37	32	30	- 59 %	- 5.0 %	0.4 %	0.3 %	
Finland	300	259	210	220	208	219	205	177	193	- 36 %	8.7 %	1.8 %	1.7 %	
France	1 856	1 696	1 559	1 516	1 483	1 450	1 431	1 413	1 351	- 27 %	- 4.3 %	10.9 %	12.1 %	
Germany	2 862	2 132	1 815	1 735	1 640	1 580	1 532	1 447	1 394	- 51 %	- 3.6 %	16.7 %	12.5 %	
Greece	300	321	330	344	341	343	317	332	316	11 %	- 4.8 %	1.8 %	2.8 %	
Hungary	238	185	185	183	183	180	185	203	208	- 13 %	2.3 %	1.4 %	1.9 %	
Ireland	124	125	136	138	128	123	123	124	119	- 4 %	- 4.0 %	0.7 %	1.1 %	
Italy	1 941	1 808	1 373	1 352	1 258	1 249	1 180	1 112	1 061	- 45 %	- 4.5 %	11.4 %	9.5 %	
Latvia	67	40	37	38	38	39	40	40	44	- 35 %	8.8 %	0.4 %	0.4 %	
Lithuania	136	51	46	44	51	53	55	58	61	- 55 %	6.5 %	0.8 %	0.5 %	
Luxembourg	14	6	4	4	3	3	3	3	0.4	- 97 %	- 84.6 %	0.1 %	0.0 %	
Malta	10	10	9	9	9	10	9	9	9	- 10 %	- 4.3 %	0.1 %	0.1 %	
Netherlands	536	440	377	367	360	358	338	325	311	- 42 %	- 4.3 %	3.1 %	2.8 %	
Poland	1 280	1 120	838	805	796	808	804	811	890	- 30 %	9.7 %	7.5 %	7.9 %	
Portugal	254	287	298	300	309	285	288	289	267	5 %	- 7.7 %	1.5 %	2.4 %	
Romania	462	387	305	328	345	356	372	323	326	- 29 %	1.0 %	2.7 %	2.9 %	
Slovakia	222	178	109	109	101	98	98	98	87	- 61 %	- 11.7 %	1.3 %	0.8 %	
Slovenia	65	59	49	50	49	48	48	47	47	- 28 %	0.4 %	0.4 %	0.4 %	
Spain	1 246	1 347	1 462	1 446	1 496	1 500	1 529	1 529	1 481	19 %	- 3.1 %	7.3 %	13.2 %	
Sweden	314	280	220	209	204	198	188	181	175	- 44 %	- 3.3 %	1.8 %	1.6 %	
United Kingdom	2 968	2 390	1 899	1 828	1 715	1 721	1 659	1 620	1 595	- 46 %	- 1.5 %	17.4 %	14.2 %	
EU-27	17 101	14 576	12 581	12 286	12 019	11 955	11 728	11 406	11 199	- 35 %	- 1.8 %	100 %	100 %	

Figure 4 NO_x emissions from key categories in EU-27: (a) Trend in NO_x emissions from the five most important key categories, 2000–2006; (b) Contribution of key categories to EU-27 emissions, 2006

Note: A complete EU-27 time series 1990–2006 of key category data cannot be presented due to non-reporting of sectoral data by Hungary, Luxembourg, Malta, Poland and Slovenia.

Due to missing sectoral data, the trend of NO_x emissions for the years 2002 to 2006 from 1A3b Road transportation, 1A1a Public electricity and heat production, 1A4b Residential and 1A4c Agriculture/forestry/fishing is without emissions from Luxembourg; the trend for 1A4c Agriculture /forestry/fishing excludes data from Malta.

Trends of pollutant emissions

The EU-27 emission reduction between 2005 and 2006 was 6.3 % (Table 9).

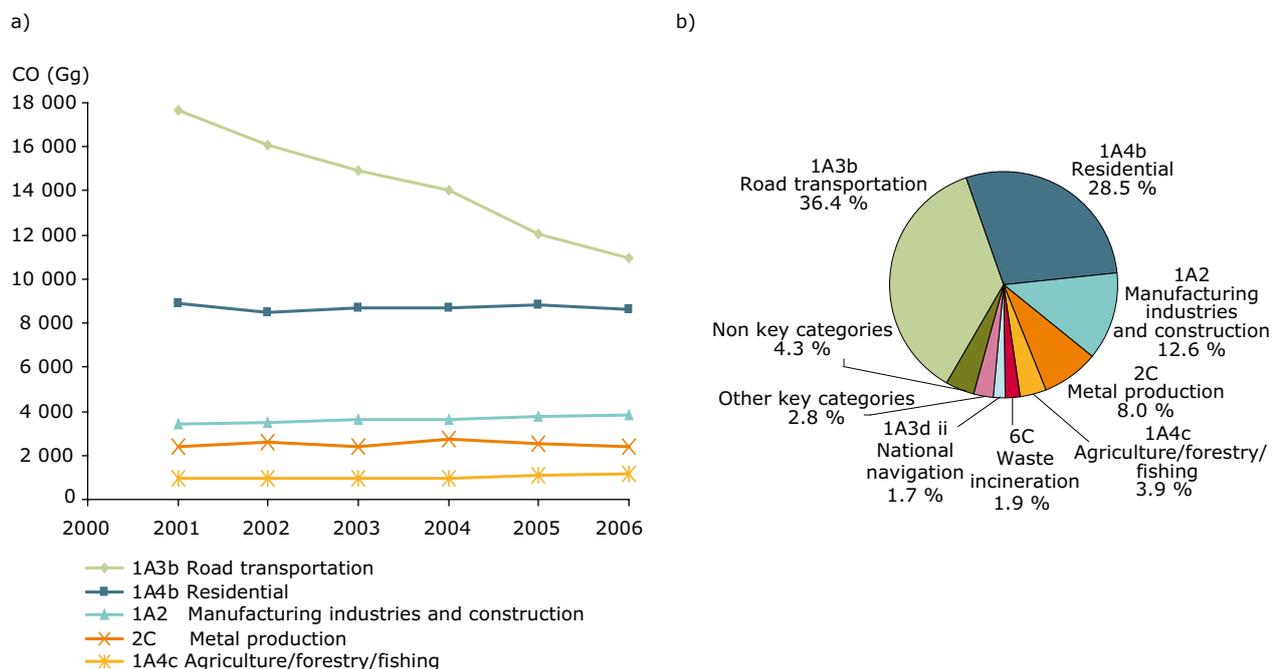
CO emissions from the most significant key category – road transport, which in 2006 contributed

about 36 % to total CO emissions, decreased by 32 % between 2002 and 2006. Figure 5 shows that emissions of the other four highest EU-27 key categories have remained almost constant since 2001.

Table 9 Member States' contributions to European Community CO emissions (Gg), 1990–2006

Member State	CO (Gg)										Change		Share in EU-27	
	1990	1995	2000	2001	2002	2003	2004	2005	2006	1990–2006	2005–2006	1990	2006	
Austria	1 444	1 267	959	930	899	900	857	823	785	- 46 %	- 4.6 %	2.2 %	2.6 %	
Belgium	1 529	1 114	1 072	1 009	985	953	898	839	838	- 45 %	- 0.1 %	2.4 %	2.8 %	
Bulgaria	790	644	635	583	700	716	755	740	785	- 1 %	6.0 %	1.2 %	2.6 %	
Cyprus	88	97	87	87	84	84	45	41	34	- 53 %	- 18.2 %	0.1 %	0.1 %	
Czech Republic	1 063	926	676	683	546	578	572	511	484	- 54 %	- 5.3 %	1.6 %	1.6 %	
Denmark	761	702	543	559	543	563	559	592	591	- 22 %	- 0.2 %	1.2 %	2.0 %	
Estonia	313	206	184	190	189	183	175	158	148	- 53 %	- 6.3 %	0.5 %	0.5 %	
Finland	561	436	610	604	600	564	551	522	511	- 9 %	- 2.1 %	0.9 %	1.7 %	
France	11 054	9 668	7 131	6 575	6 320	6 026	6 183	5 668	5 179	- 53 %	- 8.6 %	17.1 %	17.1 %	
Germany	12 145	6 671	5 134	4 907	4 634	4 484	4 317	4 201	4 006	- 67 %	- 4.6 %	18.8 %	13.3 %	
Greece	1 302	1 334	1 364	1 275	1 244	1 200	1 155	1 075	956	- 27 %	- 11.0 %	2.0 %	3.2 %	
Hungary	997	645	592	579	574	600	587	587	569	- 43 %	- 3.1 %	1.5 %	1.9 %	
Ireland	404	306	243	233	215	203	193	183	175	- 57 %	- 4.9 %	0.6 %	0.6 %	
Italy	7 123	7 155	5 123	5 058	4 446	4 346	4 182	3 808	3 576	- 50 %	- 6.1 %	11.0 %	11.8 %	
Latvia	382	314	302	308	305	316	322	328	330	- 14 %	0.7 %	0.6 %	1.1 %	
Lithuania	499	279	281	218	224	225	184	190	200	- 60 %	5.0 %	0.8 %	0.7 %	
Luxembourg	132	63	15	16	13	13	10	12	0.2	- 100 %	- 98.6 %	0.2 %	0.0 %	
Malta	23.7	30.1	0.4	0.4	0.4	0.4	0.4	0.8	0.4	- 98 %	- 46.2 %	0.0 %	0.0 %	
Netherlands	1 066	802	652	620	597	576	575	543	519	- 51 %	- 4.4 %	1.6 %	1.7 %	
Poland	7 406	4 547	3 463	3 528	3 410	2 626	3 426	3 333	2 800	- 62 %	- 16.0 %	11.5 %	9.3 %	
Portugal	894	864	758	708	697	682	673	645	619	- 31 %	- 3.9 %	1.4 %	2.1 %	
Romania	824	1 370	1 196	1 238	1 298	1 321	1 718	1 496	1 417	72 %	- 5.3 %	1.3 %	4.7 %	
Slovakia	512	420	313	315	292	308	310	299	290	- 43 %	- 3.2 %	0.8 %	1.0 %	
Slovenia	257	247	162	154	141	135	121	117	109	- 57 %	- 6.5 %	0.4 %	0.4 %	
Spain	3 883	3 475	2 998	2 964	2 739	2 821	2 717	2 530	2 433	- 37 %	- 3.9 %	6.0 %	8.1 %	
Sweden	974	908	710	673	660	651	616	608	578	- 41 %	- 5.0 %	1.5 %	1.9 %	
United Kingdom	8 235	6 300	4 230	3 880	3 338	2 932	2 689	2 388	2 268	- 72 %	- 5.0 %	12.7 %	7.5 %	
EU-27	64 660	50 791	39 434	37 891	35 694	34 005	34 391	32 240	30 200	- 53 %	- 6.3 %	100 %	100 %	

Figure 5 CO emissions from key categories in the EU-27: (a) Trend in CO emissions from the five most important key categories, 1990–2006; (b) Contribution of key categories to EU-27 CO emissions, 2006



Note: A complete EU-27 time series 1990–2006 of key category data cannot be presented due to non-reporting of sectoral data by Hungary, Malta, Poland and Slovenia.

Due to missing sectoral data, the trend of CO emissions for the years 2001 to 2006 from 1A3b Road transportation is without emissions from Luxembourg and Malta; from 1A4b Residential is without emissions from Malta; from 2C Metal production is without emissions from Slovenia and Denmark.

2.3 NMVOC emission trends

In the EU-27, NMVOC emissions declined by just under 45 % between 1990 and 2006 and comprised 9 391 Gg in 2006. Twenty-three countries reported reductions (Belgium, Germany, Luxembourg the Netherlands and the United Kingdom have reduced emissions by more than 60 % during this period). The four countries that reported increased NMVOC emissions are Bulgaria, Greece, Poland and Romania. The largest emitters in 2006 were France, Germany, Italy, Spain, Poland and the United Kingdom.

Between 2005 and 2006, EU-27 emissions decreased by around 2 %, but in seven Member States (Austria, Bulgaria, Finland, Greece, Latvia, Poland and Romania) emissions increased (Table 10).

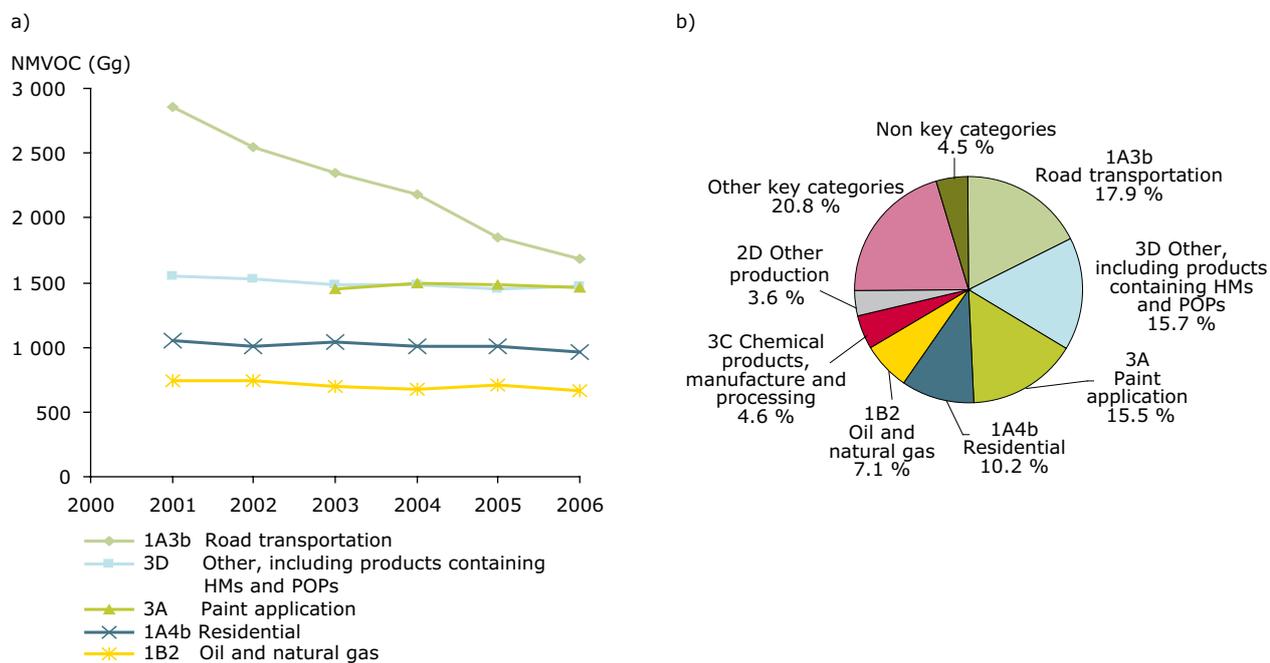
Figure 6 shows that emissions from road transportation contributed just under 18 % to total NMVOC emissions in 2006. NMVOC emissions from this sector (the most significant key category) have decreased by 34 % since 2002. In contrast, NMVOC emissions from the other 4 largest key categories for the EU-27 show an almost steady trend since 2001.

Table 10 Member States' contributions to European Community NMVOC emissions (Gg)

NMVOC in Gg	NMVOC (Gg)									Change		Share in EU-27	
	1990	1995	2000	2001	2002	2004	2005	2006	1990–2006	2005–2006	1990	2006	
Austria	283	229	177	188	189	183	176	164	172	- 39 %	4.9 %	1.7 %	1.8 %
Belgium	399	306	249	243	230	224	205	153	150	- 62 %	- 2.2 %	2.4 %	1.6 %
Bulgaria	117	94	79	82	292	119	130	147	159	36 %	8.3 %	0.7 %	1.7 %
Cyprus	14	16	16	16	16	16	12	11	11	- 24 %	- 7.0 %	0.1 %	0.1 %
Czech Republic	311	215	244	220	203	203	203	182	179	- 43 %	- 1.8 %	1.8 %	1.9 %
Denmark	172	161	129	122	120	115	116	116	110	- 36 %	- 4.9 %	1.0 %	1.2 %
Estonia	70	46	41	40	40	40	40	36	34	- 51 %	- 6.3 %	0.4 %	0.4 %
Finland	226	185	160	155	154	145	140	131	133	- 41 %	0.8 %	1.3 %	1.4 %
France	2 744	2 373	1 935	1 810	1 662	1 606	1 505	1 425	1 336	- 51 %	- 6.2 %	16.3 %	14.2 %
Germany	3 768	2 094	1 613	1 524	1 451	1 390	1 402	1 385	1 349	- 64 %	- 2.6 %	22.3 %	14.4 %
Greece	280	305	299	294	289	288	332	289	291	3 %	1.0 %	1.7 %	3.1 %
Hungary	205	170	166	162	160	155	157	177	177	- 14 %	- 0.5 %	1.2 %	1.9 %
Ireland	108	104	81	78	71	67	63	62	60	- 44 %	- 1.9 %	0.6 %	0.6 %
Italy	1 979	2 005	1 496	1 425	1 330	1 289	1 259	1 212	1 174	- 41 %	- 3.2 %	11.7 %	12.5 %
Latvia	94	59	56	55	57	59	60	63	65	- 31 %	3.6 %	0.6 %	0.7 %
Lithuania	110	72	70	66	72	74	67	84	78	- 29 %	- 7.3 %	0.7 %	0.8 %
Luxembourg	8	8	6	6	6	6	6	6	3	- 62 %	- 44.6 %	0.0 %	0.0 %
Malta	6.0	7.3	3	8	6	6	4	4	4	- 36 %	- 1.5 %	0.0 %	0.0 %
Netherlands	450	315	220	199	190	175	168	169	164	- 64 %	- 3.0 %	2.7 %	1.7 %
Poland	831	769	NE	873	898	892	888	885	916	10 %	3.5 %	4.9 %	9.8 %
Portugal	294	297	284	285	287	287	289	287	284	- 3 %	- 0.7 %	1.7 %	3.0 %
Romania	335	281	265	266	282	301	359	332	353	5 %	6.3 %	2.0 %	3.8 %
Slovakia	141	101	78	84	82	87	88	83	78	- 45 %	- 5.0 %	0.8 %	0.8 %
Slovenia	65	64	51	50	48	47	46	42	41	- 36 %	- 2.7 %	0.4 %	0.4 %
Spain	1 094	1 030	1 088	1 061	1 022	1 039	1 027	990	965	- 12 %	- 2.6 %	6.5 %	10.3 %
Sweden	373	268	220	208	206	207	203	200	195	- 48 %	- 2.4 %	2.2 %	2.1 %
United Kingdom	2 388	1 929	1 338	1 237	1 157	1 063	1 002	961	910	- 62 %	- 5.3 %	14.2 %	9.7 %
EU-27	16 868	13 501	NE	10 760	10 520	10 082	9 948	9 596	9 391	- 44 %	- 2.1 %	100 %	100 %

Note: NE — not estimated — see Appendix I for a description of this notation key. NMVOC emissions were not provided by Poland for 2000.

Figure 6 NMVOC emissions from key categories in EU-27: (a) Trend in NMVOC emissions from the five most important key categories, 1990–2006; (b) Contribution of key categories to EU-27 NMVOC emissions, 2006



Note: A complete EU-27 time series 1990–2006 of key category data cannot be presented due to non-reporting of sectoral data by Hungary, Malta, Poland and Slovenia.

Due to missing sectoral data, the trend of NMVOC emissions for the years 2001 to 2006 from 1A3b Road transportation is without emissions from Luxembourg; from 3D Other including products containing HMs and POPs is without emissions from Slovenia.

2.4 SO_x emission trends

The EU-27 total SO_x emissions in 2006 were 7 946 Gg. This is almost a 70 % reduction compared to the level of emissions reported in 1990. Since 1990, SO_x emissions have increased in only two Member States: Romania (21.9 %) and Greece (11.9 %). Inspection of the time-series trends for some Member States shows some step changes in emission reductions have occurred since 1990. For example, emissions of SO₂ in Slovenia fell considerably in 2001 and again in 2005 due to the introduction of flue gas desulphurisation abatement equipment in thermal power plants.

Between 2005 and 2006, the SO_x emission reduction in the EU was just over 3 %, but five Member States

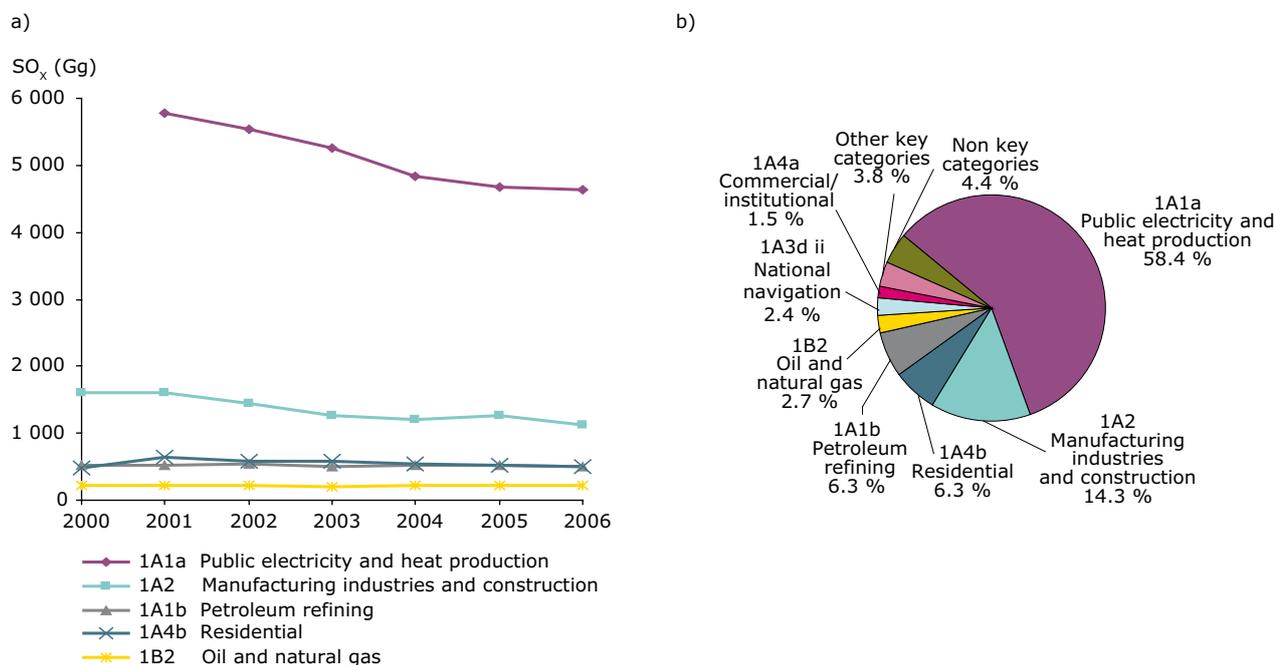
reported increased emission. The highest increases in this last year were reported by Finland (more than 23 %) and Denmark (almost 15 %) (Table 11).

Figure 7 shows that emissions of SO_x from the two most important key categories in the EU-27 decreased between 2001 and 2006. SO_x emissions from Public electricity and heat production, which accounts for more than 58 % of total SO_x emissions, decreased by 20 %. In the Manufacturing industries and Construction category (which accounts for 14% of total emissions) SO_x emissions decreased by 29 % between 2000 and 2006. Emissions from the other key categories remained broadly constant between 2000 and 2006.

Table 11 Member States' contributions to European Community SO_x emissions (Gg)

	SO _x (Gg)										Change		Share in EU-27	
	1990	1995	2000	2001	2002	2003	2004	2005	2006	1990–2006	2005–2006	1990	2006	
Austria	74	47	32	33	32	32	27	27	28	- 62 %	6.8 %	0.3 %	0.4 %	
Belgium	354	262	171	169	158	154	157	144	139	- 61 %	- 3.4 %	1.4 %	1.7 %	
Bulgaria	1 517	1 300	1 045	1 096	965	968	929	900	877	- 42 %	- 2.6 %	5.8 %	11.0 %	
Cyprus	37	44	52	50	51	45	45	42	36	- 3 %	- 16.3 %	0.1 %	0.4 %	
Czech Republic	1 876	1 095	264	251	237	231	227	219	211	- 89 %	- 3.4 %	7.2 %	2.7 %	
Denmark	178	137	29	27	25	32	25	22	25	- 86 %	14.9 %	0.7 %	0.3 %	
Estonia	273	117	96	91	87	101	89	77	71	- 74 %	- 8.1 %	1.0 %	0.9 %	
Finland	259	95	89	85	79	99	84	69	85	- 67 %	23.1 %	1.0 %	1.1 %	
France	1 332	970	615	561	516	509	504	486	452	- 66 %	- 7.0 %	5.1 %	5.7 %	
Germany	5 353	1 724	637	641	601	605	582	574	558	- 90 %	- 2.6 %	20.4 %	7.0 %	
Greece	487	536	493	502	513	545	529	545	536	12 %	- 1.7 %	1.9 %	6.7 %	
Hungary	1 010	707	489	404	365	347	248	129	118	- 88 %	- 8.5 %	3.9 %	1.5 %	
Ireland	183	160	137	129	99	78	72	71	60	- 67 %	- 15.6 %	0.7 %	0.8 %	
Italy	1 794	1 320	755	704	622	525	488	408	389	- 78 %	- 4.7 %	6.8 %	4.9 %	
Latvia	101	48	10	8	6	5	4	4	3	- 97 %	- 9.9 %	0.4 %	0.0 %	
Lithuania	214	85	42	38	43	43	42	44	43	- 80 %	- 2.0 %	0.8 %	0.5 %	
Luxembourg	14	6	1.3	1.4	1.3	1.2	1.2	1.1	0.04	- 100 %	- 96.5 %	0.1 %	0.0 %	
Malta	16	29	24	26	25	27	12	12	12	- 21 %	0.9 %	0.1 %	0.2 %	
Netherlands	190	128	72	73	66	63	65	65	64	- 66 %	- 2.4 %	0.7 %	0.8 %	
Poland	3 210	2 376	1 202	1 564	1 455	1 375	1 241	1 222	1 195	- 63 %	- 2.2 %	12.2 %	15.0 %	
Portugal	320	334	307	296	296	202	214	214	191	- 40 %	- 10.8 %	1.2 %	2.4 %	
Romania	707	619	439	469	484	493	479	831	863	22 %	3.8 %	2.7 %	10.9 %	
Slovakia	526	246	127	131	103	106	97	89	88	- 83 %	- 1.4 %	2.0 %	1.1 %	
Slovenia	198	126	99	69	71	66	54	41	18	- 91 %	- 56.5 %	0.8 %	0.2 %	
Spain	2 169	1 786	1 458	1 433	1 536	1 270	1 312	1 264	1 170	- 46 %	- 7.5 %	8.3 %	14.7 %	
Sweden	108	71	46	44	45	45	41	40	39	- 64 %	- 0.7 %	0.4 %	0.5 %	
United Kingdom	3 717	2 352	1 198	1 095	978	967	812	688	676	- 82 %	- 1.8 %	14.2 %	8.5 %	
EU-27	26 217	16 719	9 928	9 992	9 460	8 935	8 382	8 227	7 946	- 70 %	- 3.4 %	100 %	100 %	

Figure 7 SO_x emissions from key categories in EU-27: (a) Trend in SO_x emissions from the five most important key categories, 1990–2006; (b) Contribution of key categories to SO_x emissions, 2006



Note: A complete EU-27 time series 1990–2006 of key category data cannot be presented due to non-reporting of sectoral data by Hungary, Malta, Poland and Slovenia.

Due to missing sectoral data, the trend of SO_x emissions from 1A1a Public electricity and heat production and 1A4b Residential is without emissions from Luxembourg in 2002 and 2006, respectively; from 1B2 Oil and natural gas is without emissions from Slovenia and Ireland.

2.5 NH₃ emission trends

EU-27 total NH₃ emissions in 2006 were 4 001 Gg (excluding data from Luxembourg). Emissions of NH₃ have decreased by almost 22 % since 1990 and by just over 1 % between 2005 and 2006 (Table 12). Since 1990, emissions have increased in only three Member States: Cyprus, Ireland, and Spain (16.6 %, 0.2 % and 24.2 % increase respectively). The countries that accounted for the greatest share of EU-27 NH₃ emissions in 2006 were France (740 Gg) and Germany (621 Gg).

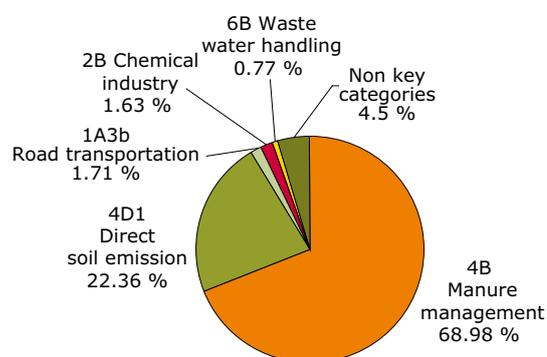
Reporting of emissions at the sectoral level is rather incomplete and therefore EU-27 trends for the top five NH₃ key categories are not presented. Figure 8 shows that the two most important key categories of NH₃ are Manure management and Direct Soil Emission, which contributed approximately 70 % and 23 % respectively of total EU-27 emissions in 2006. Agriculture thus contributed more than 90 % of total EU-27 NH₃ emissions in 2006.

Table 12 Member States' contributions to European Community NH₃ emissions (Gg)

	NH ₃ (Gg)									Change		Share in EU-27	
	1990	1995	2000	2001	2002	2003	2004	2005	2006	1990–2006	2005–2006	1990	2006
Austria	71	75	69	69	68	67	66	66	66	- 7 %	- 0.2 %	1.4 %	1.6 %
Belgium	109	103	87	84	82	79	76	74	73	- 33 %	- 0.8 %	2.1 %	1.8 %
Bulgaria	144	99	NE	56	56	52	54	57	55	- 62 %	- 3.7 %	2.8 %	1.4 %
Cyprus	5	5	5	6	6	6	6	5	5	17 %	- 0.2 %	0.1 %	0.1 %
Czech Republic	156	86	74	77	72	82	70	68	63	- 60 %	- 7.8 %	3.0 %	1.6 %
Denmark	134	115	106	104	101	97	98	93	90	- 33 %	- 3.8 %	2.6 %	2.2 %
Estonia	26	12	10	10	9	10	10	9	9	- 64 %	- 0.2 %	0.5 %	0.2 %
Finland	42	35	33	33	33	33	33	36	36	- 14 %	0.4 %	0.8 %	0.9 %
France	791	773	797	783	785	758	751	745	740	- 6 %	- 0.7 %	15.4 %	18.5 %
Germany	738	631	627	639	627	632	625	620	621	- 16 %	0.2 %	14.4 %	15.5 %
Greece	79	85	74	74	73	73	73	73	73	- 8 %	0.0 %	1.5 %	1.8 %
Hungary	124	77	71	66	65	67	74	80	81	- 35 %	1.1 %	2.4 %	2.0 %
Ireland	110	115	121	115	113	112	111	110	110	0 %	- 0.4 %	2.1 %	2.7 %
Italy	464	447	441	444	434	429	423	411	408	- 12 %	- 0.7 %	9.1 %	10.2 %
Latvia	47	15	12	14	13	14	14	14	15	- 69 %	1.1 %	0.9 %	0.4 %
Lithuania	84	38	25	NE	51	34	33	39	35	- 58 %	- 11.3 %	1.6 %	0.9 %
Luxembourg	8	7	7	7	5	5	5	NE	NE	NE	NE	0.1 %	NE
Malta	NE	NE	0.7	0.9	0.9	0.8	0.8	0.8	0.8	NE	- 8.2 %	NE	0.0 %
Netherlands	250	193	152	144	139	135	134	133	133	- 47 %	0.0 %	4.9 %	3.3 %
Poland	512	380	322	309	325	323	317	326	287	- 44 %	- 12.2 %	10.0 %	7.2 %
Portugal	66	68	71	70	70	65	66	63	65	- 2 %	2.5 %	1.3 %	1.6 %
Romania	300	217	206	164	156	182	191	204	199	- 34 %	- 2.4 %	5.9 %	5.0 %
Slovakia	65	40	30	31	31	29	27	27	27	- 59 %	- 1.0 %	1.3 %	0.7 %
Slovenia	24	22	20	20	20	19	17	18	19	- 23 %	2.6 %	0.5 %	0.5 %
Spain	342	340	411	413	409	424	425	406	424	24 %	4.4 %	6.7 %	10.6 %
Sweden	54	62	56	53	52	53	53	53	52	- 3 %	- 1.1 %	1.1 %	1.3 %
United Kingdom	383	362	335	331	326	316	322	315	315	- 18 %	0.0 %	7.5 %	7.9 %
EU-27	5 118	4 395	NE	NE	4 118	4 090	4 068	4 049	4 001	- 22 %	- 1.2 %	100 %	100 %

Note: NH₃ emissions are not available for: Malta for 1990–1999, Luxembourg for 1991–1992 and 2005–2006, Lithuania for 2001 and Bulgaria for 2000. EU-27 NH₃ emissions are summed excluding data for Luxembourg and Malta. For Greece, NH₃ emissions for 2003–2006 were assumed to equal the reported emissions for 2002 (following confirmation from Greece that after 1998 these emissions are considered to be constant). NE — not estimated — see Appendix I for a description of this notation key.

Figure 8 **NH₃ emissions from key categories in EU-27: Contribution of key categories to NH₃ emissions, 2006**



Note: An EU-27 time series of key category data cannot be presented due to non-reporting of sectoral data by the following Member States: Bulgaria, the Czech Republic, Greece, Hungary, Italy, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia and Slovenia.

2.6 PM₁₀ emission trends

The EU-27 total PM₁₀ emissions in 2006 exclude data for Bulgaria, Greece and Luxembourg (which were not reported). In order to determine at least an indicative emission trend, EU-27 2000–2006⁽¹⁵⁾ aggregated emissions were also estimated without consideration of data from the Czech Republic, Lithuania, Poland and Romania (which were not complete). Excluding the partial data from these countries, emissions of PM₁₀ decreased by over 10 % in 2006 compared to 2000; between 2005 and 2006

the reduction was 2 % (Table 13). France and Poland are the biggest contributors to emissions in absolute terms.

Emission trends of PM₁₀ from the five most relevant key categories cannot be estimated due to insufficient data being provided by Member States. Figure 9 illustrates the diversity of PM₁₀ emission sources and key categories. Of the top key categories for PM₁₀, almost 60 % of emissions occur in energy-related sectors, with a further 13 % of emissions occurring in the agriculture sector.

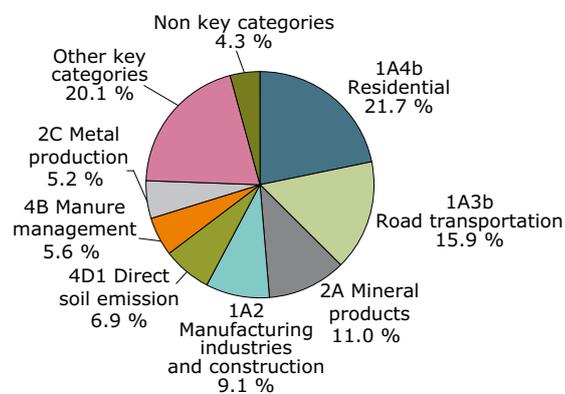
Table 13 Member States' contributions to European Community PM₁₀ emissions (Gg)

	PM ₁₀ (Gg)									Change		Share in EU-27	
	1990	1995	2000	2001	2002	2003	2004	2005	2006	2000–2006	2005–2006	2000	2006
Austria	43	43	44	44	44	44	44	43	43	– 1 %	1.0 %	2.3 %	2.5 %
Belgium	NE	NE	66	64	63	61	45	40	40	– 40 %	– 0.4 %	3.4 %	2.3 %
Bulgaria	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Cyprus	NE	NE	0.8	0.9	0.9	0.9	0.9	1.0	1.0	31 %	– 1.9 %	0.0 %	0.1 %
Czech Republic	NE	NE	NE	NE	51	51	47	34	35	NE	1.5 %	NE	2.0 %
Denmark	NE	NE	36	36	35	36	36	39	38	8 %	– 1.4 %	1.8 %	2.2 %
Estonia	NE	NE	37	37	33	30	30	26	20	– 46 %	– 24.8 %	1.9 %	1.1 %
Finland	NE	NE	47	54	55	55	57	51	55	17 %	6.6 %	2.4 %	3.2 %
France	690	655	588	562	532	533	527	502	488	– 17 %	– 2.8 %	30.4 %	28.2 %
Germany	NE	240	215	211	205	200	201	197	194	– 10 %	– 1.6 %	11.1 %	11.3 %
Greece	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Hungary	NE	60	47	48	44	33	47	52	48	2 %	– 6.9 %	2.4 %	2.8 %
Ireland	13	13	13	13	12	11	11	12	11	– 12 %	– 5.7 %	0.7 %	0.6 %
Italy	245	241	200	199	187	184	185	174	171	– 6.0 %	– 1.5 %	12.5 %	11.6 %
Latvia	12	13	13	14	14	14	15	15	15	19 %	2.7 %	0.7 %	0.9 %
Lithuania	NE	NE	NE	NE	NE	NE	NE	11	11	NE	3.4 %	NE	0.6 %
Luxembourg	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Malta	NE	NE	1.6	1.2	1.0	2.0	2.0	2.2	1.3	– 20 %	– 42.5 %	0.1 %	0.1 %
Netherlands	74	54	44	42	42	39	39	38	37	– 16 %	– 1.6 %	2.3 %	2.2 %
Poland	NE	NE	NE	NE	NE	303	280	289	285	NE	– 1.5 %	NE	16.5 %
Portugal	99	114	131	139	130	131	142	137	140	7 %	1.8 %	6.7 %	8.1 %
Romania	NE	NE	NE	NE	NE	NE	NE	47	46	NE	– 1.5 %	NE	2.7 %
Slovakia	NE	NE	40	41	36	33	36	45	40	– 1 %	– 11.5 %	2.1 %	2.3 %
Slovenia	NE	NE	8.3	7.6	8.3	7.8	8.0	7.9	7.8	– 7 %	– 1.8 %	0.4 %	0.5 %
Spain	NE	NE	173	174	179	178	180	178	176	2 %	– 1.4 %	8.9 %	10.2 %
Sweden	59	56	48	49	49	49	49	50	48	– 1 %	– 3.0 %	2.5 %	2.8 %
United Kingdom	304	238	184	177	155	154	153	150	152	– 18 %	1.2 %	9.5 %	8.8 %
EU-27	NE	NE	1 936	1 914	1 824	1 798	1 807	1 760	1 726	– 10.8 %	– 1.9 %	100 %	100 %

Note: NE — not estimated — see Appendix 1 for a description of this notation key. PM₁₀ emissions were not provided by Greece, Luxembourg or Bulgaria for the years 2000–2006, and in the Czech Republic for years 2000–2001, Poland 2000–2002, and Lithuania and Romania 2000–2004. PM₁₀ emission trends (2000–2006) for EU-27 are therefore presented without consideration of data from these countries.

⁽¹⁵⁾ Reporting of PM emissions is formally requested under the LRTAP Convention only for years 2000–2006 (Appendix 2) — other years are reported by Member States on a voluntary basis.

Figure 9 **PM₁₀ emissions from key categories in EU-27: Contribution of key categories to PM₁₀ emissions, 2006**



Note: An EU-27 time series of key category data cannot be presented due to non-reporting of full time series sectoral data by Bulgaria, the Czech Republic, Estonia, Finland, Greece, Hungary, Lithuania, Luxembourg, Poland, and Romania.

2.7 PM_{2.5} emission trends

The EU-27 total PM_{2.5} emissions in 2006 exclude data for Bulgaria, Greece, Luxembourg and Romania (which was not reported). In order to determine at least an indicative emission trend since 2000 ⁽¹⁶⁾, EU-27 emissions were also estimated without consideration of data from the Czech Republic, Lithuania and Poland (which were not complete). Excluding the partial data from these countries,

since the year 2000 aggregated emissions of PM_{2.5} have decreased by about 10 % (Table 14).

Emission trends of PM_{2.5} from the five most relevant key categories cannot be estimated due to insufficient data being provided by Member States. In 2006, PM_{2.5} emissions from the Residential category contributed approximately 30 % to total emissions, Road transportation 18 % and Manufacturing industries 11 % (Figure 10).

Table 14 Member States' contributions to European Community PM_{2.5} emissions (Gg)

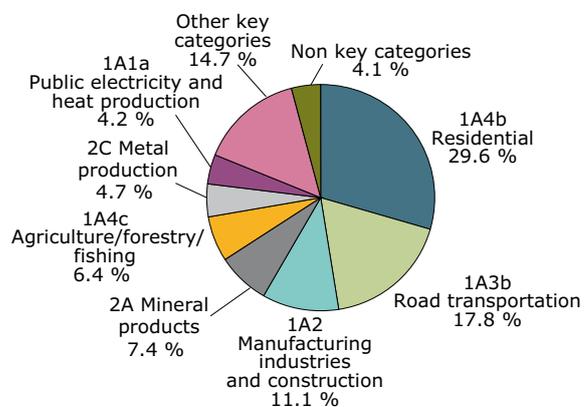
	PM _{2.5} (Gg)									Change		Share in EU-27	
	1990	1995	2000	2001	2002	2003	2004	2005	2006	2000–2006	2005–2006	2000	2006
Austria	25	24	24	24	24	24	23	23	23	– 4 %	– 2.4 %	1.8 %	1.9 %
Belgium	NE	NE	35	32	32	30	31	28	28	– 22 %	– 0.2 %	2.7 %	2.3 %
Bulgaria	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Cyprus	NE	NE	0.5	0.5	0.5	0.5	0.5	0.6	0.6	36 %	1.7 %	0.0 %	0.1 %
Czech Republic	NE	NE	NE	NE	NE	38	35	21	22	NE	3.1 %	NE	1.8 %
Denmark	NE	NE	24	25	24	26	26	29	28	14 %	– 2.9 %	1.8 %	2.3 %
Estonia	NE	NE	21	23	23	21	22	20	15	– 28 %	– 23.4 %	1.6 %	1.3 %
Finland	NE	NE	37	38	39	38	38	34	35	– 5 %	2.1 %	2.8 %	2.9 %
France	482	465	400	378	352	353	347	328	316	– 21 %	– 3.7 %	30.2 %	26.7 %
Germany	NE	163	126	125	120	117	117	115	112	– 11 %	– 2.8 %	9.5 %	9.5 %
Greece	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Hungary	NE	28	26	26	26	18	27	31	29	14 %	– 5.5 %	1.9 %	2.5 %
Ireland	10	10	10	10	10	9	9	10	9	– 12 %	– 5.4 %	0.8 %	0.8 %
Italy	210	205	166	164	152	149	149	139	137	– 18 %	– 1.6 %	12.5 %	11.6 %
Latvia	10	11	11	12	12	13	13	13	13	18 %	2.4 %	0.9 %	1.1 %
Lithuania	NE	NE	NE	NE	NE	NE	NE	9	9	NE	2.1 %	NE	0.8 %
Luxembourg	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Malta	NE	NE	1.0	0.5	0.3	1.3	1.3	1.5	0.5	– 48 %	– 64.6 %	0.1 %	0.0 %
Netherlands	45	33	26	24	23	23	21	21	20	– 21 %	– 3.2 %	1.9 %	1.7 %
Poland	NE	NE	NE	NE	NE	142	134	138	136	NE	– 1.4 %	NE	11.5 %
Portugal	82	89	106	109	102	104	114	109	111	5 %	1.6 %	8.0 %	9.4 %
Romania	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Slovakia	NE	NE	26	26	27	25	28	36	33	26 %	– 9.3 %	2.0 %	2.8 %
Slovenia	NE	NE	6.4	5.8	6.3	6.1	6.1	6.0	5.7	– 12 %	– 5.2 %	0.5 %	0.5 %
Spain	NE	NE	131	132	135	136	137	138	136	4 %	– 1.5 %	9.9 %	11.5 %
Sweden	45	43	36	37	37	36	37	37	36	– 2 %	– 4.1 %	2.7 %	3.0 %
United Kingdom	178	147	112	108	97	97	97	94	95	– 14 %	1.1 %	8.4 %	8.1 %
EU-27	NE	NE	1 324	1 299	1 242	1 227	1 245	1 212	1 181	– 10.8 %	– 2.6 %	100 %	100 %

Note: PM_{2.5} emissions were not provided by Greece, Luxembourg, Bulgaria, and Romania 2000–2006, Lithuania 2000–2004, the Czech Republic and Poland 2000–2002. PM_{2.5} emission trends (2000–2006) for EU-27 are therefore presented without consideration of data from these countries.

NE — not estimated — see Appendix 1 for a description of this notation key.

⁽¹⁶⁾ Reporting of PM emissions is formally requested under the LRTAP Convention only for years 2000–2006 (Appendix 2) — other years are reported by Member States on a voluntary basis.

Figure 10 $PM_{2.5}$ emissions from key categories in EU-27: Contribution of key categories to $PM_{2.5}$ emissions, 2006



Note: An EU-27 time series of key category data cannot be presented due to non-reporting of sectoral data by Bulgaria, Cyprus, the Czech Republic, Estonia, Finland, Greece, Hungary, Italy, Lithuania, Luxembourg, Malta, Poland, Romania and Spain.

3 Emission trends of key categories

This chapter provides detail on emission trends for EU-27 key categories (determined by a level assessment) for the year 2006. Results are presented for NO_x, CO, NMVOCs, SO_x, NH₃ and for particulate matter (PM₁₀ and PM_{2.5}). More detailed KCA results are provided in the Annex C file that accompanies this report.

The analysis does not include emission data from Bulgaria (PM₁₀ and PM_{2.5}), Greece (NH₃, PM₁₀ and PM_{2.5}), Luxembourg (NH₃, PM₁₀ and PM_{2.5}) or Romania (PM_{2.5}) due to incomplete reporting of sectoral emissions.

Twenty six emission inventory source categories were identified as being a key category for at least one pollutant. A number of emission categories were identified as being key for more than one of the seven pollutants assessed. Categories that were identified as being common key categories for six pollutants were 1A2 Manufacturing industries and construction, 1A3b Road transportation, 1A3dii National navigation and 1A4b Residential.

For NO_x eleven key categories were identified, ten of which were energy related. Nine key sources were identified for CO, 16 for NMVOC and 10 for SO_x. Only five key categories were identified for NH₃. PM₁₀ and PM_{2.5} emission sources seem to be more diverse — sixteen key categories were identified for each of these pollutants.

The results of the KCA show that 1A3b Road transportation is the most important key category for NO_x, CO and NMVOC and the second most

significant source for PM₁₀ and PM_{2.5} emissions. 1A1a Public electricity and heat production is responsible for a significant fraction of NO_x and SO_x emissions, while 1A2 Manufacturing industries and construction contributes significantly to NO_x, CO, SO_x and PM_{2.5} emissions. 1A4b Residential is the most significant key source for PM₁₀ and PM_{2.5} emissions and the second most significant source for CO emissions. 4B Manure management is the dominant source of NH₃ emissions.

It is important to note that several factors affect which emission categories are determined as being key categories at the EU-27 level. Specifically, Member States sometimes report using different levels of aggregation within the NFR reporting nomenclature — this of course influences the amount of emissions assigned to specific NFR categories. Similarly, Member States' use of the emission inventory notation key IE (included elsewhere — see Appendix 1) means emission estimates for one NFR sector can be included in emission estimates of a different sector. Due to such issues, the EU-27 KCA may not always accurately reflect the share of all main emission sources. It is also important to note that the results of KCA in individual Member States may differ from key sources determined for the overall EU-27.

The following sections of this chapter provide detailed tables showing the emissions in the top three key categories for each pollutant in 1990, 2005 and 2006. The absolute and relative change between 1990 and 2006, and 2005 and 2006, in each Member State and in the EU-27 is also shown.

Table 15 Results of key category analysis for EU-27 in 2006; cumulative contribution of emission sources to total emissions of NO_x, CO, NMVOCs, SO_x, NH₃, PM₁₀ and PM_{2.5} (in descending order)

NO _x key categories	(%)	(%) cumul.
1A3b Road transportation	39.4	39.4
1A1a Public electricity and heat production	18.7	58.1
1A2 Manufacturing industries and construction	14.1	72.3
1A4c Agriculture/forestry/fishing	7.3	79.6
1A b Residential	4.7	84.2
1A3d ii National navigation	3.7	87.9
1A4a Commercial/institutional	1.9	89.8
1A1b Petroleum refining	1.5	91.3
4D1 Direct soil emission	1.5	92.8
1A3c Railways	1.2	94.0
1A1c Manufacture of solid fuels and other energy industries	1.1	95.1

NMVOC key categories	(%)	(%) cumul.
1A3b Road transportation	17.9	17.9
3D Other including products containing HMs and POPs	15.7	33.5
3A Paint application	15.5	49.1
1A b Residential	10.2	59.3
1B2 Oil and natural gas	7.1	66.4
3C Chemical products, manufacture and processing	4.6	71.0
2D Other production	3.6	74.6
7 Other	3.3	78.0
4D1 Direct soil emission	3.0	81.0
4B Manure management	2.8	83.7
3B Degreasing and dry cleaning	2.5	86.2
1A4c Agriculture/forestry/fishing	2.1	88.3
1A3d ii National navigation	2.0	90.3
2 B Chemical Industry	1.9	92.3
1A2 Manufacturing industries and construction	1.8	94.1
2A Mineral products	1.4	95.5

PM ₁₀ key categories	(%)	(%) cumul.
1A b Residential	21.7	21.7
1A3b Road transportation	15.9	37.6
2A Mineral products	11.0	48.7
1A2 Manufacturing industries and construction	9.1	57.8
4D1 Direct soil emission	6.9	64.7
4B Manure management	5.6	70.3
2C Metal production	5.2	75.6
1A4c Agriculture/forestry/fishing	5.1	80.7
1A1a Public electricity and heat production	4.6	85.3
2G Other	3.5	88.8
2D Other production	1.5	90.3
1A3d ii National navigation	1.4	91.7
6C Waste incineration	1.3	92.9
3D Other	1.0	93.9
1A4a Commercial/institutional	0.9	94.8
1A1b Petroleum refining	0.9	95.7

CO key categories	(%)	(%) cumul.
1A3b Road transportation	36.4	36.4
1A b Residential	28.5	64.9
1A2 Manufacturing industries and construction	12.6	77.5
2C Metal production	8.0	85.4
1A4c Agriculture/forestry/fishing	3.9	89.3
6C Waste incineration	1.9	91.3
1A3d ii National navigation	1.7	92.9
1A1a Public electricity and heat production	1.6	94.5
4F Field burning of agricultural waste	1.2	95.7

SO _x key categories	(%)	(%) cumul.
1A1a Public electricity and heat production	58.4	58.4
1A2 Manufacturing industries and construction	14.3	72.6
1A b Residential	6.3	78.9
1A1b Petroleum refining	6.3	85.3
1B2 Oil and natural gas	2.7	87.9
1A3d ii National navigation	2.4	90.4
1A4a Commercial/institutional	1.5	91.8
2B Chemical industry	1.3	93.2
2C Metal production	1.2	94.4
1A1c Manufacture of solid fuels and other energy industries	1.2	95.6

NH ₃ key categories	(%)	(%) cumul.
4B Manure management	69.0	69.0
4D1 Direct soil emission	22.4	91.3
1A3b Road transportation	1.7	93.1
2B Chemical industry	1.6	94.7
6B Wastewater handling	0.8	95.5

PM _{2.5} key categories	(%)	(%) cumul.
1A b Residential	29.6	29.6
1A3b Road transportation	17.8	47.3
1A2 Manufacturing industries and construction	11.1	58.4
2A Mineral products	7.4	65.9
1A4c Agriculture/forestry/fishing	6.4	72.3
2C Metal production	4.7	76.9
1A1a Public electricity and heat production	4.2	81.1
4D1 Direct soil emission	2.3	83.4
2G Other	2.3	85.7
1A3d ii National navigation	2.0	87.7
4B Manure management	1.7	89.4
6C Waste incineration	1.6	91.0
3D Other	1.4	92.4
2D Other production	1.3	93.7
1A4a Commercial/institutional	1.2	94.9
1A1b Petroleum refining	1.0	95.9

Note: The sector labels and descriptions are those used in the NFR emission reporting nomenclature.

3.1 NO_x key categories

For NO_x, 11 key categories were identified. The top three key categories, together contributing a total of

more than 70 % to NO_x emissions, are 1A3b Road transportation (Table 16), 1A1a Public electricity and heat production (Table 17) and 1A2 Manufacturing industries and construction (Table 18).

Table 16 NO_x emissions for key category 1A3b Road transportation in the energy sector

1A3b	NO _x emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	79.1	141.8	129.9	3 %	- 11.9	- 8 %	50.8	64 %
Belgium	174.3	123.9	123.9	3 %	0.0	0 %	- 50.3	- 29 %
Bulgaria	43.7	90.5	97.5	2 %	7.0	8 %	53.8	123 %
Cyprus	6.5	6.8	6.8	0 %	0.0	0 %	0.3	5 %
Czech Republic	180.1	97.4	89.6	2 %	- 7.8	- 8 %	- 90.5	- 50 %
Denmark	105.9	68.5	67.0	2 %	- 1.5	- 2 %	- 38.9	- 37 %
Estonia	30.4	11.0	11.0	0 %	0.0	0 %	- 19.4	- 64 %
Finland	158.2	57.4	53.3	1 %	- 4.2	- 7 %	- 104.9	- 66 %
France	1 120.7	747.4	725.7	16 %	- 21.7	- 3 %	- 395.0	- 35 %
Germany	1 341.4	655.6	613.3	14 %	- 42.3	- 6 %	- 728.1	- 54 %
Greece	109.2	122.8	103.1	2 %	- 19.7	- 16 %	- 6.1	- 6 %
Hungary	NE	126.7	130.7	3 %	4.1	3 %		
Ireland	46.2	49.7	49.4	1 %	- 0.2	0 %	3.2	7 %
Italy	889.3	499.0	472.5	11 %	- 26.4	- 5 %	- 416.8	- 47 %
Latvia	20.2	17.8	20.4	0 %	2.6	15 %	0.2	1 %
Lithuania	53.0	33.2	36.4	1 %	3.2	10 %	- 16.6	- 31 %
Luxembourg	NE	NE	NE					
Malta	3.2	3.1	2.7	0 %	- 0.3	- 11 %	- 0.5	- 15 %
Netherlands	239.9	132.7	123.0	3 %	- 9.8	- 7 %	- 116.9	- 49 %
Poland	NE	224.1	233.5	5 %	9.4	4 %		
Portugal	79.8	97.5	96.6	2 %	- 0.8	- 1 %	16.8	21 %
Romania	64.0	102.7	99.2	2 %	- 3.5	- 3 %	35.2	55 %
Slovakia	46.1	37.1	29.3	1 %	- 7.8	- 21 %	- 16.8	- 36 %
Slovenia	NE	17.9	18.5	0 %	0.6	3 %		
Spain	513.1	517.6	487.8	11 %	- 29.8	- 6 %	- 25.3	- 5 %
Sweden	174.2	83.6	79.1	2 %	- 4.5	- 5 %	- 95.1	- 55 %
United Kingdom	1 323.8	548.8	515.0	12 %	- 33.8	- 6 %	- 808.8	- 61 %
EU-27	NE	4 614.5	4 415.5	100 %	- 199.1	- 4 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 17 NO_x emissions for key category 1A1a Public electricity and heat production in the energy sector

1A1a	NO _x emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	12.1	10.1	10.5	1 %	0.4	4 %	- 1.6	- 13 %
Belgium	59.3	34.8	30.5	1 %	- 4.3	- 12 %	- 28.8	- 49 %
Bulgaria	59.3	56.1	58.6	3 %	2.5	5 %	- 0.6	- 1 %
Cyprus	3.4	6.9	7.1	0 %	0.2	3 %	3.8	111 %
Czech Republic	334.9	89.8	91.4	4 %	1.6	2 %	- 243.5	- 73 %
Denmark	90.7	39.0	43.3	2 %	4.3	11 %	- 47.4	- 52 %
Estonia	25.7	12.1	10.6	1 %	- 1.5	- 13 %	- 15.1	- 59 %
Finland	41.8	31.6	50.1	2 %	18.5	59 %	8.3	20 %
France	115.6	124.2	100.1	5 %	- 24.2	- 19 %	- 15.5	- 13 %
Germany	463.7	242.1	243.5	12 %	1.3	1 %	- 220.2	- 47 %
Greece	54.0	86.5	82.5	4 %	- 4.1	- 5 %	28.5	53 %
Hungary	NE	27.9	26.7	1 %	- 1.3	- 5 %		
Ireland	46.4	32.4	29.9	1 %	- 2.5	- 8 %	- 16.5	- 36 %
Italy	408.6	83.7	78.4	4 %	- 5.4	- 6 %	- 330.3	- 81 %
Latvia	16.1	5.8	5.9	0 %	0.1	2 %	- 10.2	- 63 %
Lithuania	47.0	6.2	5.7	0 %	- 0.5	- 7 %	- 41.3	- 88 %
Luxembourg	0.3	NE	NE					
Malta	5.9	5.3	5.4	0 %	0.0	0 %	- 0.5	- 8 %
Netherlands	82.0	43.1	41.0	2 %	- 2.1	- 5 %	- 41.0	- 50 %
Poland	IE	250.0	289.8	14 %	39.8	16 %		
Portugal	61.2	57.0	46.4	2 %	- 10.6	- 19 %	- 14.9	- 24 %
Romania	262.0	103.0	110.7	5 %	7.6	7 %	- 151.3	- 58 %
Slovakia *	147.1	15.2	12.7	1 %	- 2.5	- 17 %	- 134.5	- 91 %
Slovenia	NE	15.0	13.2	1 %	- 1.8	- 12 %		
Spain	228.3	329.1	300.5	14 %	- 28.6	- 9 %	72.2	32 %
Sweden	14.4	12.4	12.8	1 %	0.4	3 %	- 1.6	- 11 %
United Kingdom	776.2	372.6	389.2	19 %	16.6	4 %	- 387.0	- 50 %
EU-27	NE	2 092.1	2 096.3	100 %	4.2	0 %	NE	NE

Note: * Slovakia's emissions from category 1A2 are included in category 1A1a.
An explanation of the notation keys used in this table is given in Appendix 1.

Table 18 NO_x emissions for key category 1A2 Manufacturing industries and construction in the energy sector

1A2	NO _x emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	44.3	34.5	35.4	2 %	0.9	2 %	- 8.9	- 20 %
Belgium	51.0	45.1	43.2	3 %	- 1.9	- 4 %	- 7.8	- 15 %
Bulgaria	49.8	17.6	18.6	1 %	1.0	6 %	- 31.2	- 63 %
Cyprus	0.4	0.5	0.5	0 %	0.0	- 2 %	0.1	18 %
Czech Republic	80.7	40.6	36.7	2 %	- 3.9	- 10 %	- 44.0	- 55 %
Denmark	24.2	23.2	23.3	1 %	0.1	0 %	- 0.9	- 4 %
Estonia	6.7	2.9	2.7	0 %	- 0.2	- 6 %	- 4.0	- 59 %
Finland	21.1	38.9	39.3	2 %	0.3	1 %	18.2	86 %
France	174.7	149.9	145.4	9 %	- 4.5	- 3 %	- 29.3	- 17 %
Germany	351.0	77.3	77.7	5 %	0.5	1 %	- 273.2	- 78 %
Greece	40.5	20.4	23.5	1 %	3.1	15 %	- 17.0	- 42 %
Hungary	NE	11.6	10.9	1 %	- 0.7	- 6 %		
Ireland	9.8	18.3	17.5	1 %	- 0.8	- 4 %	7.7	79 %
Italy	289.5	173.3	166.6	11 %	- 6.7	- 4 %	- 122.9	- 42 %
Latvia	10.2	3.6	3.9	0 %	0.3	8 %	- 6.3	- 62 %
Lithuania	18.0	5.5	7.0	0 %	1.5	27 %	- 11.0	- 61 %
Luxembourg	11.6	0.4	NE, NO					
Malta	0.1	0.1	0.1	0 %	0.0	- 27 %	- 0.1	- 36 %
Netherlands	88.7	47.2	47.3	3 %	0.1	0 %	- 41.4	- 47 %
Poland	IE, NE	114.7	124.4	8 %	9.7	8 %		
Portugal	47.2	66.3	64.5	4 %	- 1.8	- 3 %	17.2	37 %
Romania	83.6	42.7	42.1	3 %	- 0.6	- 1 %	- 41.5	- 50 %
Slovakia *	IE	24.1	24.9	2 %	0.8	3 %		
Slovenia	NE	6.3	8.0	1 %	1.7	26 %		
Spain	216.1	347.6	349.2	22 %	1.6	0 %	133.1	62 %
Sweden	48.9	30.7	31.3	2 %	0.6	2 %	- 17.7	- 36 %
United Kingdom	373.6	252.2	239.4	15 %	- 12.8	- 5 %	- 134.3	- 36 %
EU-27	NE	1 595.7	1 583.4	100 %	- 12.4	- 1 %	NE	NE

Note: * Slovakia's emissions from category 1A2 are included in category 1A1a.
An explanation of the notation keys used in this table is given in Appendix 1.

3.2 CO key categories

Around 95 % of CO emissions occur as a result of fuel combustion. Nine CO categories were identified

as key categories: The top three are 1A3b Road transportation (Table 19), 1A4b Residential (Table 20) and 1A2 Manufacturing industries and construction (Table 21).

Table 19 CO emissions for key category 1A3b Road transportation in the energy sector

1A3b	CO emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	643.2	268.4	235.8	2 %	- 32.6	- 12 %	- 407.4	- 63 %
Belgium	777.2	273.7	273.7	2 %	0.0	0 %	- 503.5	- 65 %
Bulgaria	413.4	212.8	233.3	2 %	20.6	10 %	- 180.1	- 44 %
Cyprus	85.9	38.7	31.4	0 %	- 7.3	- 19 %	- 54.5	- 63 %
Czech Republic	195.1	234.2	210.5	2 %	- 23.7	- 10 %	15.4	8 %
Denmark	459.5	192.0	171.5	2 %	- 20.5	- 11 %	- 288.0	- 63 %
Estonia	165.5	41.3	43.5	0 %	2.2	5 %	- 122.0	- 74 %
Finland	405.9	243.5	218.5	2 %	- 25.0	- 10 %	- 187.4	- 46 %
France	6 204.5	1 446.3	1 229.7	11 %	- 216.6	- 15 %	- 4 974.8	- 80 %
Germany	6 527.3	1 523.2	1 385.7	13 %	- 137.5	- 9 %	- 5 141.6	- 79 %
Greece	906.1	704.0	608.1	6 %	- 95.9	- 14 %	- 298.0	- 33 %
Hungary	NE	416.4	418.4	4 %	2.0	0 %		
Ireland	290.5	118.2	110.3	1 %	- 7.9	- 7 %	- 180.2	- 62 %
Italy	5 500.7	2 113.8	1 869.1	17 %	- 244.7	- 12 %	- 3 631.6	- 66 %
Latvia	101.3	70.4	71.6	1 %	1.2	2 %	- 29.7	- 29 %
Lithuania	450.0	65.2	68.4	1 %	3.1	5 %	- 381.6	- 85 %
Luxembourg	NE	NE	NE					
Malta	23.4	NE	NE					
Netherlands	666.9	277.5	255.6	2 %	- 21.8	- 8 %	- 411.3	- 62 %
Poland	NE	609.0	687.1	6 %	78.0	13 %		
Portugal	501.2	264.3	237.8	2 %	- 26.5	- 10 %	- 263.4	- 53 %
Romania	404.6	374.1	334.0	3 %	- 40.1	- 11 %	- 70.6	- 17 %
Slovakia	150.8	107.1	86.9	1 %	- 20.2	- 19 %	- 63.9	- 42 %
Slovenia	NE	81.9	73.2	1 %	- 8.7	- 11 %		
Spain	2 337.5	1 021.2	932.2	8 %	- 89.0	- 9 %	- 1 405.3	- 60 %
Sweden	635.4	230.6	208.0	2 %	- 22.6	- 10 %	- 427.4	- 67 %
United Kingdom	5 479.9	1 123.7	984.1	9 %	- 139.6	- 12 %	- 4 495.8	- 82 %
EU-27	NE	12 051.6	10 978.5	100 %	- 1 073.1	- 9 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 20 CO emissions for key category 1A4b Residential in the energy sector

1A4b	CO emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	441.4	302.0	285.1	3 %	- 16.9	- 6 %	- 156.2	- 35 %
Belgium	84.4	70.4	69.7	1 %	- 0.7	- 1 %	- 14.7	- 17 %
Bulgaria	152.4	402.1	426.5	5 %	24.3	6 %	274.1	180 %
Cyprus	0.1	0.1	0.1	0 %	0.0	- 13 %	0.0	17 %
Czech Republic	341.8	85.3	83.6	1 %	- 1.7	- 2 %	- 258.2	- 76 %
Denmark	176.3	333.0	353.6	4 %	20.6	6 %	177.3	101 %
Estonia	72.9	80.1	77.2	1 %	- 3.0	- 4 %	4.3	6 %
Finland	IE	114.7	115.4	1 %	0.7	1 %		
France	2 586.2	1 838.4	1 734.6	20 %	- 103.8	- 6 %	- 851.6	- 33 %
Germany	1 933.6	998.2	966.4	11 %	- 31.8	- 3 %	- 967.2	- 50 %
Greece	176.5	181.7	154.2	2 %	- 27.5	- 15 %	- 22.4	- 13 %
Hungary	NE	33.3	32.3	0 %	- 0.9	- 3 %		
Ireland	96.2	37.4	36.9	0 %	- 0.5	- 1 %	- 59.4	- 62 %
Italy	258.4	418.1	456.3	5 %	38.1	9 %	197.9	77 %
Latvia	115.3	180.7	178.7	2 %	- 2.0	- 1 %	63.4	55 %
Lithuania	4.0	98.5	100.6	1 %	2.1	2 %	96.6	2 415 %
Luxembourg	5.8	3.8	NE					
Malta	NE	NE	IE					
Netherlands	68.1	53.9	53.8	1 %	- 0.1	0 %	- 14.4	- 21 %
Poland	IE	1 537.0	1 527.4	18 %	- 9.6	- 1 %		
Portugal	278.8	253.8	252.5	3 %	- 1.3	- 1 %	- 26.3	- 9 %
Romania	155.6	678.9	639.5	7 %	- 39.4	- 6 %	483.9	311 %
Slovakia	161.9	41.8	40.9	0 %	- 0.9	- 2 %	- 121.0	- 75 %
Slovenia	NE	29.7	29.0	0 %	- 0.7	- 2 %		
Spain	516.5	477.4	476.6	6 %	- 0.8	0 %	- 39.9	- 8 %
Sweden	215.5	218.9	207.1	2 %	- 11.9	- 5 %	- 8.4	- 4 %
United Kingdom	1 191.2	333.2	317.5	4 %	- 15.7	- 5 %	- 873.7	- 73 %
EU-27	NE	8 802.4	8 615.3	100 %	- 187.1	- 2 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 21 CO emissions for key category 1A2 Manufacturing industry and construction in the energy sector

1A2	CO emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	235.6	156.9	168.7	4 %	11.8	8 %	- 66.9	- 28 %
Belgium	301.6	352.3	351.4	9 %	- 0.9	0 %	49.7	16 %
Bulgaria	8.7	68.4	61.9	2 %	- 6.5	- 10 %	53.1	609 %
Cyprus	0.9	0.9	0.8	0 %	- 0.2	- 16 %	- 0.1	- 10 %
Czech Republic	16.9	129.2	107.6	3 %	- 21.6	- 17 %	90.7	535 %
Denmark	25.3	19.8	19.5	1 %	- 0.3	- 1 %	- 5.7	- 23 %
Estonia	14.1	11.0	6.3	0 %	- 4.7	- 43 %	- 7.8	- 55 %
Finland	40.8	56.8	59.9	2 %	3.1	5 %	19.1	47 %
France	829.0	728.1	752.8	20 %	24.7	3 %	- 76.2	- 9 %
Germany	795.7	653.8	621.9	16 %	- 31.9	- 5 %	- 173.8	- 22 %
Greece	16.1	9.0	9.7	0 %	0.7	8 %	- 6.4	- 40 %
Hungary	NE	5.7	5.4	0 %	- 0.3	- 6 %		
Ireland	6.1	14.9	15.1	0 %	0.2	1 %	8.9	145 %
Italy	318.1	342.8	336.8	9 %	- 6.0	- 2 %	18.7	6 %
Latvia	26.3	14.0	15.8	0 %	1.7	12 %	- 10.5	- 40 %
Lithuania	36.0	6.2	7.2	0 %	0.9	15 %	- 28.8	- 80 %
Luxembourg	103.1	0.1	NE, NO					
Malta	0.0	0.0	0.0	0 %	0.0	- 19 %	0.0	13 %
Netherlands	152.4	107.8	108.0	3 %	0.2	0 %	- 44.3	- 29 %
Poland	IE, NE	18.2	89.5	2 %	71.3	391 %		
Portugal	32.9	27.2	27.6	1 %	0.5	2 %	- 5.3	- 16 %
Romania	10.1	131.7	133.4	4 %	1.6	1 %	123.3	1223 %
Slovakia *	IE	119.0	132.3	3 %	13.3	11 %		
Slovenia	NE	2.4	3.2	0 %	0.8	32 %		
Spain	216.1	224.4	221.3	6 %	- 3.0	- 1 %	5.2	2 %
Sweden	31.9	33.7	36.5	1 %	2.8	8 %	4.6	15 %
United Kingdom	675.3	508.3	510.3	13 %	2.0	0 %	- 165.0	- 24 %
EU-27	NE	3 742.6	3 802.7	100 %	60.1	2 %	NE	NE

Note: * Slovakia's emissions from category 1A2 are included in category 1A1a.
An explanation of the notation keys used in this table is given in Appendix 1.

3.3 NMVOC key categories

For NMVOC, 16 key categories were identified. Of these, 43 % of emissions come from energy-related sectors, with a further 38 % from the Solvent

and other Product Use sector. Detailed tables (Tables 22–24) are provided for the three key categories with the highest contribution to EU-27 emissions (i.e. 1A3b Road transportation, 3D Other and 3A Paint application).

Table 22 NMVOC emissions for key category 1A3b Road transportation in the energy sector

1A3b	NMVOC emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	68.2	24.0	21.3	1 %	- 2.7	- 11 %	- 46.9	- 69 %
Belgium	126.2	37.0	37.0	2 %	0.0	0 %	- 89.2	- 71 %
Bulgaria	59.7	36.1	39.3	2 %	3.3	9 %	- 20.4	- 34 %
Cyprus	9.3	5.0	4.3	0 %	- 0.7	- 14 %	- 5.0	- 54 %
Czech Republic	45.5	47.2	42.1	3 %	- 5.1	- 11 %	- 3.4	- 7 %
Denmark	81.8	25.9	23.2	1 %	- 2.8	- 11 %	- 58.6	- 72 %
Estonia	23.0	4.7	4.9	0 %	0.2	5 %	- 18.1	- 79 %
Finland	82.1	33.4	29.5	2 %	- 3.9	- 12 %	- 52.6	- 64 %
France	1 052.6	259.2	218.8	13 %	- 40.4	- 16 %	- 833.7	- 79 %
Germany	1 409.0	147.9	133.5	8 %	- 14.4	- 10 %	- 1 275.5	- 91 %
Greece	158.5	129.9	124.2	7 %	- 5.7	- 4 %	- 34.3	- 22 %
Hungary	NE	57.0	57.7	3 %	0.7	1 %		
Ireland	62.5	17.9	16.1	1 %	- 1.8	- 10 %	- 46.5	- 74 %
Italy	962.5	366.8	321.2	19 %	- 45.6	- 12 %	- 641.3	- 67 %
Latvia	10.2	7.5	8.1	0 %	0.5	7 %	- 2.1	- 21 %
Lithuania	45.0	17.9	18.7	1 %	0.8	5 %	- 26.3	- 58 %
Luxembourg	NE	NE	NE					
Malta	4.4	0.9	0.8	0 %	- 0.1	- 11 %	- 3.6	- 82 %
Netherlands	156.9	38.2	34.1	2 %	- 4.1	- 11 %	- 122.9	- 78 %
Poland	NE	99.0	102.4	6 %	3.4	3 %		
Portugal	114.1	52.6	48.3	3 %	- 4.4	- 8 %	- 65.9	- 58 %
Romania	76.4	65.1	61.4	4 %	- 3.7	- 6 %	- 15.1	- 20 %
Slovakia	32.6	18.2	15.0	1 %	- 3.3	- 18 %	- 17.6	- 54 %
Slovenia	NE	10.2	9.2	1 %	- 1.0	- 10 %		
Spain	419.0	187.5	169.1	10 %	- 18.4	- 10 %	- 249.9	- 60 %
Sweden	154.8	39.7	35.7	2 %	- 4.0	- 10 %	- 119.0	- 77 %
United Kingdom	866.9	118.7	102.1	6 %	- 16.6	- 14 %	- 764.8	- 88 %
EU-27	NE	1 847.4	1 677.8	100 %	- 169.6	- 9 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 23 NMVOC emissions for key category 3D Other in the solvent and other product use sector

3D	NMVOC emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	38.0	37.9	44.5	3 %	6.6	17 %	6.5	17 %
Belgium	37.0	31.1	31.9	2 %	0.7	2 %	- 5.1	- 14 %
Bulgaria	11.3	3.6	4.4	0 %	0.8	21 %	- 6.9	- 61 %
Cyprus	0.2	0.2	0.3	0 %	0.0	4 %	0.1	25 %
Czech Republic	24.0	25.2	25.8	2 %	0.6	2 %	1.8	7 %
Denmark	16.6	11.3	11.2	1 %	0.0	0 %	- 5.4	- 32 %
Estonia	5.1	3.8	3.9	0 %	0.1	3 %	- 1.1	- 22 %
Finland	IE	9.0	8.8	1 %	- 0.2	- 2 %		
France	226.5	184.8	186.5	13 %	1.7	1 %	- 40.0	- 18 %
Germany	436.0	306.7	324.6	22 %	17.9	6 %	- 111.4	- 26 %
Greece	56.8	39.2	39.6	3 %	0.4	1 %	- 17.2	- 30 %
Hungary	NE	NA	NA					
Ireland	13.3	12.1	12.7	1 %	0.7	6 %	- 0.5	- 4 %
Italy	185.2	184.9	188.9	13 %	4.0	2 %	3.7	2 %
Latvia	8.1	7.0	7.0	0 %	- 0.1	- 1 %	- 1.2	- 14 %
Lithuania	11.3	4.8	4.7	0 %	0.0	- 1 %	- 6.6	- 58 %
Luxembourg	1.3	1.3	1.3	0 %	0.0	1 %	0.1	5 %
Malta	1.5	0.0	0.0	0 %	0.0	0 %	- 1.5	- 100 %
Netherlands	26.9	28.9	28.6	2 %	- 0.2	- 1 %	1.8	7 %
Poland	NE	51.3	51.3	3 %	0.0	0 %		
Portugal	25.3	27.4	27.5	2 %	0.1	0 %	2.2	9 %
Romania	109.3	7.3	9.4	1 %	2.0	28 %	- 99.9	- 91 %
Slovakia	0.3	0.2	0.2	0 %	0.0	- 20 %	- 0.2	- 54 %
Slovenia	NE	NE	NE					
Spain	113.5	176.4	167.6	11 %	- 8.7	- 5 %	54.1	48 %
Sweden	63.0	52.5	52.5	4 %	0.0	0 %	- 10.5	- 17 %
United Kingdom	336.3	242.3	239.6	16 %	- 2.7	- 1 %	- 96.7	- 29 %
EU-27	NE	1 449.2	1 473.0	100 %	23.8	2 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 24 NMVOC emissions for key category 3A Paint application in the solvent and other product use sector

3A	NMVOC emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	46.3	23.2	27.2	2 %	4.0	17 %	- 19.1	- 41 %
Belgium	38.4	22.5	21.8	1 %	- 0.7	- 3 %	- 16.7	- 43 %
Bulgaria	0.1	2.4	2.2	0 %	- 0.3	- 11 %	2.0	1 620 %
Cyprus	2.0	2.2	2.5	0 %	0.3	14 %	0.5	27 %
Czech Republic	96.9	39.4	37.5	3 %	- 1.9	- 5 %	- 59.4	- 61 %
Denmark	19.5	13.1	12.7	1 %	- 0.4	- 3 %	- 6.8	- 35 %
Estonia	1.6	0.5	0.7	0 %	0.1	24 %	- 0.9	- 58 %
Finland	52.6	14.0	14.5	1 %	0.5	4 %	- 38.1	- 72 %
France	262.5	205.7	188.6	13 %	- 17.1	- 8 %	- 73.9	- 28 %
Germany	540.0	345.9	304.9	21 %	- 41.0	- 12 %	- 235.1	- 44 %
Greece	NE	11.1	11.3	1 %	0.2	2 %		
Hungary	NE	23.3	20.4	1 %	- 2.9	- 13 %		
Ireland	6.9	9.3	9.5	1 %	0.2	2 %	2.6	38 %
Italy	270.8	219.2	223.5	15 %	4.2	2 %	- 47.3	- 17 %
Latvia	7.4	7.4	7.8	1 %	0.4	6 %	0.4	5 %
Lithuania	16.7	16.7	16.6	1 %	- 0.1	- 1 %	- 0.1	0 %
Luxembourg	1.4	1.4	1.4	0 %	0.0	0 %	0.0	2 %
Malta	NE	0.9	0.9	0 %	0.0	0 %		
Netherlands	80.7	25.5	25.5	2 %	0.0	0 %	- 55.3	- 68 %
Poland	NE	87.9	87.9	6 %	0.0	0 %		
Portugal	13.7	30.3	31.3	2 %	1.0	3 %	17.6	129 %
Romania	35.8	29.1	52.1	4 %	23.0	79 %	16.3	46 %
Slovakia	32.8	18.9	19.5	1 %	0.6	3 %	- 13.3	- 41 %
Slovenia	NE	10.2	11.9	1 %	1.7	16 %		
Spain	172.5	193.2	192.3	13 %	- 0.9	0 %	19.9	12 %
Sweden	34.6	16.7	16.7	1 %	0.0	0 %	- 17.9	- 52 %
United Kingdom	208.8	117.3	117.7	8 %	0.4	0 %	- 91.1	- 44 %
EU-27	NE	1 487.2	1 458.7	100 %	- 28.5	- 2 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

3.4 SO_x key categories

For SO_x, 10 key categories were identified. Of these key categories, more than 90 % of the emissions occur in the energy sector and about 3 % come from the industry sector. Detailed tables

are provided for three key categories making the largest contribution to EU-27 emissions: 1A1a Public electricity and heat production (Table 25), 1A2 Manufacturing industries and construction (Table 26) and 1A4b Residential (Table 27).

Table 25 SO_x emissions for key category 1A1a Public electricity and heat production in the energy sector

1A1a	SO _x emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	11.8	3.4	4.2	0 %	0.7	21 %	- 7.6	- 65 %
Belgium	94.5	29.4	26.0	1 %	- 3.4	- 12 %	- 68.5	- 72 %
Bulgaria	1 104.1	754.6	725.2	16 %	- 29.5	- 4 %	- 378.9	- 34 %
Cyprus	21.6	34.1	27.5	1 %	- 6.6	- 19 %	5.9	27 %
Czech Republic	844.5	128.1	126.7	3 %	- 1.3	- 1 %	- 717.7	- 85 %
Denmark	126.2	7.7	9.8	0 %	2.1	27 %	- 116.4	- 92 %
Estonia	220.4	60.7	61.2	1 %	0.5	1 %	- 159.2	- 72 %
Finland	67.5	26.1	39.7	1 %	13.6	52 %	- 27.8	- 41 %
France	340.5	120.7	99.7	2 %	- 21.0	- 17 %	- 240.9	- 71 %
Germany	2 435.4	219.8	213.9	5 %	- 6.0	- 3 %	- 2 221.6	- 91 %
Greece	276.7	382.2	358.1	8 %	- 24.1	- 6 %	81.3	29 %
Hungary	NE	20.7	9.9	0 %	- 10.8	- 52 %		
Ireland	103.0	42.5	36.8	1 %	- 5.7	- 13 %	- 66.2	- 64 %
Italy	769.3	112.2	115.7	2 %	3.5	3 %	- 653.6	- 85 %
Latvia	36.0	1.1	0.6	0 %	- 0.4	- 41 %	- 35.4	- 98 %
Lithuania	105.0	10.4	9.1	0 %	- 1.2	- 12 %	- 95.9	- 91 %
Luxembourg	0.1	NE	NE					
Malta	14.8	11.9	12.1	0 %	0.1	1 %	- 2.7	- 18 %
Netherlands	48.4	9.8	10.2	0 %	0.4	4 %	- 38.2	- 79 %
Poland	IE	651.2	817.9	18 %	166.7	26 %		
Portugal	156.2	105.2	84.5	2 %	- 20.8	- 20 %	- 71.7	- 46 %
Romania	529.6	541.9	594.8	13 %	52.9	10 %	65.2	12 %
Slovakia *	459.5	49.2	46.1	1 %	- 3.1	- 6 %	- 413.4	- 90 %
Slovenia	NE	32.5	9.7	0 %	- 22.8	- 70 %		
Spain	1 459.0	928.7	829.4	18 %	- 99.3	- 11 %	- 629.6	- 43 %
Sweden	16.8	8.1	8.2	0 %	0.0	0 %	- 8.6	- 51 %
United Kingdom	2 728.9	384.4	360.0	8 %	- 24.4	- 6 %	- 2368.8	- 87 %
EU-27	NE	4 676.6	4 636.8	100 %	- 39.8	- 1 %	NE	NE

Note: * Slovakia's emissions from category 1A2 are included in category 1A1a. An explanation of the notation keys used in this table is given in Appendix 1.

Table 26 SO_x emissions for key category 1A2 Manufacturing industries and construction in the energy sector

1A2	SO _x emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	18.5	9.5	10.3	1 %	0.8	9 %	- 8.2	- 44 %
Belgium	102.6	35.4	33.6	3 %	- 1.9	- 5 %	- 69.1	- 67 %
Bulgaria	220.1	45.8	50.7	4 %	5.0	11 %	- 169.4	- 77 %
Cyprus	4.8	3.1	2.7	0 %	- 0.5	- 15 %	- 2.2	- 45 %
Czech Republic	630.8	41.0	37.1	3 %	- 3.9	- 10 %	- 593.6	- 94 %
Denmark	17.7	6.7	7.9	1 %	1.2	18 %	- 9.7	- 55 %
Estonia	38.7	12.3	6.1	1 %	- 6.2	- 50 %	- 32.6	- 84 %
Finland	89.7	17.8	18.4	2 %	0.7	4 %	- 71.3	- 79 %
France	405.1	142.2	138.1	12 %	- 4.1	- 3 %	- 267.0	- 66 %
Germany	928.5	67.6	64.3	6 %	- 3.3	- 5 %	- 864.2	- 93 %
Greece	118.0	55.0	61.9	5 %	6.9	13 %	- 56.1	- 48 %
Hungary	NE	40.4	39.3	3 %	- 1.0	- 3 %		
Ireland	32.5	10.6	6.8	1 %	- 3.7	- 35 %	- 25.7	- 79 %
Italy	302.9	72.6	65.1	6 %	- 7.5	- 10 %	- 237.8	- 79 %
Latvia	23.1	0.8	1.0	0 %	0.2	22 %	- 22.1	- 96 %
Lithuania	38.0	2.7	3.2	0 %	0.4	16 %	- 34.8	- 92 %
Luxembourg	12.6	0.0	NE, NO					
Malta	0.2	0.1	0.1	0 %	0.0	- 12 %	- 0.1	- 47 %
Netherlands	35.8	15.2	15.3	1 %	0.1	1 %	- 20.6	- 57 %
Poland	IE, NE	204.6	88.5	8 %	- 116.1	- 57 %		
Portugal	80.7	37.4	35.6	3 %	- 1.8	- 5 %	- 45.0	- 56 %
Romania	66.5	181.3	179.7	16 %	- 1.7	- 1 %	113.1	170 %
Slovakia *	IE	30.6	32.0	3 %	1.4	5 %		
Slovenia	NE	3.7	4.0	0 %	0.2	7 %		
Spain	335.9	109.2	118.1	10 %	8.9	8 %	- 217.8	- 65 %
Sweden	24.2	9.6	10.2	1 %	0.6	6 %	- 14.0	- 58 %
United Kingdom	419.8	106.2	102.7	9 %	- 3.4	- 3 %	- 317.1	- 76 %
EU-27	NE	1 261.4	1 132.7	100 %	- 128.7	- 10 %	NE	NE

Note: * Slovakia's emissions from category 1A2 are included in category 1A1a.
An explanation of the notation keys used in this table is given in Appendix 1.

Table 27 SO_x emissions for key category 1A4b Residential in the energy sector

1A4b	SO _x emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	25.9	6.8	6.5	1 %	- 0.4	- 5 %	- 19.4	- 75 %
Belgium	25.7	20.4	19.3	4 %	- 1.1	- 5 %	- 6.4	- 25 %
Bulgaria	129.0	14.1	15.7	3 %	1.5	11 %	- 113.3	- 88 %
Cyprus	1.6	0.4	0.4	0 %	0.0	- 8 %	- 1.2	- 76 %
Czech Republic	204.6	27.5	25.0	5 %	- 2.6	- 9 %	- 179.6	- 88 %
Denmark	6.4	2.4	2.4	0 %	0.0	0 %	- 4.0	- 62 %
Estonia	4.2	0.9	0.8	0 %	- 0.1	- 16 %	- 3.5	- 82 %
Finland	IE	2.1	2.2	0 %	0.1	5 %		
France	78.9	38.7	36.3	7 %	- 2.4	- 6 %	- 42.6	- 54 %
Germany	449.6	58.7	56.0	11 %	- 2.7	- 5 %	- 393.6	- 88 %
Greece	16.3	18.3	17.4	3 %	- 0.9	- 5 %	1.1	7 %
Hungary	NE	52.8	54.3	11 %	1.5	3 %		
Ireland	27.0	12.2	11.0	2 %	- 1.2	- 10 %	- 16.1	- 59 %
Italy	60.0	12.1	10.7	2 %	- 1.4	- 12 %	- 49.3	- 82 %
Latvia	8.4	0.5	0.4	0 %	- 0.1	- 18 %	- 8.1	- 96 %
Lithuania	64.0	4.0	4.6	1 %	0.6	14 %	- 59.4	- 93 %
Luxembourg	0.6	0.4	NE					
Malta	0.0	IE	IE					
Netherlands	1.1	0.5	0.5	0 %	0.0	- 2 %	- 0.6	- 57 %
Poland	IE	190.0	183.8	37 %	- 6.1	- 3 %		
Portugal	0.2	0.0	0.0	0 %	0.0	- 3 %	- 0.2	- 86 %
Romania	24.6	13.9	12.3	2 %	- 1.6	- 12 %	- 12.3	- 50 %
Slovakia	63.2	5.1	5.5	1 %	0.5	9 %	- 57.7	- 91 %
Slovenia	NE	2.5	2.0	0 %	- 0.5	- 18 %		
Spain	22.5	14.6	13.1	3 %	- 1.5	- 10 %	- 9.4	- 42 %
Sweden	7.6	1.0	0.8	0 %	- 0.2	- 21 %	- 6.8	- 89 %
United Kingdom	143.0	20.3	21.5	4 %	1.3	6 %	- 121.4	- 85 %
EU-27	NE	520.3	502.4	100 %	- 17.8	- 3 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

3.5 NH₃ key categories

For NH₃, only five key categories were identified. Of these more than 90 % of the emissions occur from the agriculture sector. Detailed tables are

provided for the top three key categories 4B Manure management (Table 28), 4D1 Direct Soil Emission (Table 29) and 1A3b Road transportation (Table 30).

Table 28 NH₃ emissions for key category 4B Manure management in the agriculture sector

4B	NH ₃ emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	58.0	53.2	53.1	2 %	- 0.1	0 %	- 4.9	- 8 %
Belgium	88.5	59.0	58.3	2 %	- 0.7	- 1 %	- 30.3	- 34 %
Bulgaria	NE	32.0	34.1	1 %	2.2	7 %		
Cyprus	4.0	4.9	4.7	0 %	- 0.2	- 4 %	0.8	20 %
Czech Republic	NE	63.8	60.0	2 %	- 3.8	- 6 %		
Denmark	88.2	61.8	58.8	2 %	- 3.0	- 5 %	- 29.4	- 33 %
Estonia	20.2	7.2	7.1	0 %	- 0.2	- 2 %	- 13.2	- 65 %
Finland	38.9	30.5	31.1	1 %	0.7	2 %	- 7.8	- 20 %
France	614.9	572.4	569.1	21 %	- 3.3	- 1 %	- 45.8	- 7 %
Germany	615.5	494.4	494.4	18 %	0.0	0 %	- 121.1	- 20 %
Greece	NE	NE	NE					
Hungary	NE	66.2	66.7	2 %	0.5	1 %		
Ireland	102.8	100.9	100.4	4 %	- 0.5	0 %	- 2.3	- 2 %
Italy	268.4	224.2	219.4	8 %	- 4.8	- 2 %	- 49.0	- 18 %
Latvia	33.7	10.0	9.9	0 %	- 0.1	- 1 %	- 23.8	- 71 %
Lithuania	NE	31.3	30.4	1 %	- 0.9	- 3 %		
Luxembourg	NE	NE	NE					
Malta	NE	0.8	0.7	0 %	- 0.1	- 10 %		
Netherlands	224.8	109.5	109.4	4 %	- 0.1	0 %	- 115.4	- 51 %
Poland	NE	226.9	206.4	7 %	- 20.5	- 9 %		
Portugal	25.9	27.4	27.4	1 %	0.1	0 %	1.5	6 %
Romania	NE	151.1	156.5	6 %	5.4	4 %		
Slovakia	NE	22.4	22.4	1 %	0.0	0 %		
Slovenia	NE	15.6	15.6	1 %	- 0.03	0 %		
Spain	97.0	128.2	133.1	5 %	4.9	4 %	36.1	37 %
Sweden	39.4	40.4	39.9	1 %	- 0.6	- 1 %	0.5	1 %
United Kingdom	296.5	248.4	251.1	9 %	2.7	1 %	- 45.4	- 15 %
EU-27	NE	2 782.3	2 759.9	100 %	- 22.4	- 1 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 29 NH₃ emissions for key category 4D1 Direct soil emission in the agriculture sector

4D1	NH ₃ emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	8.1	7.4	7.8	1 %	0.4	5 %	- 0.3	- 3 %
Belgium	17.1	9.2	9.2	1 %	0.0	0 %	- 7.9	- 46 %
Bulgaria	NE	4.5	4.5	1 %	0.05	1 %		
Cyprus	0.6	0.3	0.5	0 %	0.2	52 %	- 0.1	- 9 %
Czech Republic	NE	NE	NE					
Denmark	39.5	22.8	22.4	3 %	- 0.4	- 2 %	- 17.1	- 43 %
Estonia	5.2	1.5	1.7	0 %	0.2	13 %	- 3.6	- 68 %
Finland	2.2	1.4	1.4	0 %	- 0.01	- 1 %	- 0.8	- 37 %
France	157.1	148.3	148.5	17 %	0.2	0 %	- 8.6	- 5 %
Germany	90.5	95.7	95.7	11 %	0.0	0 %	5.2	6 %
Greece	NE	NE	NE					
Hungary	NE	11.9	12.3	1 %	0.4	3 %		
Ireland	6.8	6.7	6.8	1 %	0.1	2 %	0.0	0 %
Italy	187.3	163.0	165.4	18 %	2.4	1 %	- 21.9	- 12 %
Latvia	13.1	4.1	4.3	0 %	0.2	4 %	- 8.9	- 68 %
Lithuania	NE	7.6	4.1	0 %	- 3.6	- 47 %		
Luxembourg	NE	NE	NE					
Malta	NE	0.0	0.0	0 %	- 0.01	- 46 %		
Netherlands	NO	NO	NO					
Poland	NE	87.7	73.3	8 %	- 14.4	- 16 %		
Portugal	26.7	22.6	24.6	3 %	2.0	9 %	- 2.1	- 8 %
Romania	NE	12.0	9.1	1 %	- 2.8	- 24 %		
Slovakia	NE	3.3	3.2	0 %	- 0.1	- 3 %		
Slovenia	NE	1.7	2.2	0 %	0.5	29 %		
Spain	220.7	244.7	257.0	29 %	12.3	5 %	36.4	16 %
Sweden	9.6	6.0	5.9	1 %	- 0.01	0 %	- 3.6	- 38 %
United Kingdom	58.0	35.6	34.8	4 %	- 0.8	- 2 %	- 23.2	- 40 %
EU-27	NE	898.0	894.8	100 %	- 3.3	0 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 30 NH₃ emissions for key category 1A3b Road transportation in the energy sector

1A3b	NH ₃ emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	3.2	2.8	2.4	3 %	- 0.5	- 16 %	- 0.8	- 26 %
Belgium	0.1	2.1	2.1	3 %	0.0	0 %	1.9	1 417 %
Bulgaria	NE	0.0	0.0	0 %	0.003	10 %		
Cyprus	0.0	0.0	0.0	0 %	0.0	0 %	0.0	100 %
Czech Republic	NE	2.4	2.5	4 %	0.1	3 %		
Denmark	0.1	2.1	2.0	3 %	- 0.2	- 8 %	1.9	2 681 %
Estonia	0.0	0.4	0.4	1 %	0.0	0 %	0.4	1 750 %
Finland	NA	2.6	2.7	4 %	0.1	4 %		
France	0.4	4.9	4.7	7 %	- 0.2	- 5 %	4.3	1 156 %
Germany	4.0	10.1	9.6	14 %	- 0.5	- 5 %	5.6	139 %
Greece	NE	NE	NE					
Hungary	NE	0.0	0.0	0 %	0.001	6 %		
Ireland	0.0	2.7	2.6	4 %	- 0.1	- 4 %	2.5	5 522 %
Italy	0.7	15.4	15.2	22 %	- 0.2	- 1 %	14.6	2 145 %
Latvia	0.0	0.2	0.3	0 %	0.1	27 %	0.3	2 933 %
Lithuania	NE	0.2	0.2	0 %	0.01	9 %		
Luxembourg	NE	NE	NE					
Malta	NE	0.0	0.0	0 %	0.001	5 %		
Netherlands	1.0	2.5	2.5	4 %	0.03	1 %	1.5	153 %
Poland	NE	NE	NE					
Portugal	0.1	1.7	1.6	2 %	- 0.1	- 3 %	1.5	2 291 %
Romania	NE	0.6	0.6	1 %	0.04	7 %		
Slovakia	NE	0.8	0.7	1 %	- 0.1	- 8 %		
Slovenia	NE	0.8	0.8	1 %	0.01	1 %		
Spain	0.4	7.8	7.9	11 %	0.1	1 %	7.5	1 858 %
Sweden	0.6	1.4	1.4	2 %	- 0.03	- 2 %	0.8	148 %
United Kingdom	0.9	9.5	8.5	12 %	- 1.0	- 11 %	7.6	896 %
EU-27	NE	71.0	68.6	100 %	- 2.4	- 3 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

3.6 PM₁₀ key categories

For PM₁₀, 16 key categories were identified, indicating the diversity of emission sources for this pollutant. Of these, 60 % of emissions were

energy related, 21 % from industry and 13 % from the agriculture sector. The top three key categories are 1A4 Residential (Table 31), 1A3b Road transportation (Table 32) and 2A Mineral products (Table 33).

Table 31 PM₁₀ emissions for key category 1A4b Residential in the energy sector

1A4b	PM ₁₀ emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	9.6	7.8	7.6	2 %	- 0.2	- 3 %	- 2.0	- 21 %
Belgium	NE	2.1	2.0	0 %	- 0.1	- 3 %		
Bulgaria	NE	NE	NE					
Cyprus	NE	0.0	0.0	0 %	0.0	0 %		
Czech Republic	NE	12.9	12.4	3 %	- 0.5	- 4 %		
Denmark	NE	19.7	18.8	4 %	- 0.9	- 4 %		
Estonia	NE	9.0	8.7	2 %	- 0.3	- 3 %		
Finland	NE	16.0	16.2	3 %	0.2	1 %		
France	221.9	136.5	126.0	25 %	- 10.5	- 8 %	- 95.9	- 43 %
Germany	NE	26.4	25.9	5 %	- 0.5	- 2 %		
Greece	NE	NE	NE					
Hungary	NE	25.5	21.9	4 %	- 3.6	- 14 %		
Ireland	5.9	2.5	2.5	0 %	- 0.03	- 1 %	- 3.4	- 58 %
Italy	12.1	17.1	18.7	4 %	1.6	9 %	6.6	55 %
Latvia	NR/NO	9.3	8.9	2 %	- 0.3	- 3 %		
Lithuania	NE	4.2	4.3	1 %	0.1	3 %		
Luxembourg	NE	NE	NE					
Malta	NE	IE	IE					
Netherlands	2.5	1.8	1.8	0 %	- 0.003	0 %	- 0.7	- 27 %
Poland	NE	111.8	113.6	23 %	1.8	2 %		
Portugal	22.1	20.0	20.0	4 %	- 0.1	0 %	- 2.2	- 10 %
Romania	NE	8.0	8.0	2 %	0.0	0 %		
Slovakia	NE	26.7	25.0	5 %	- 1.7	- 6 %		
Slovenia	NE	3.0	2.9	1 %	- 0.1	- 4 %		
Spain	NE	23.6	23.5	5 %	- 0.1	0 %		
Sweden	6.7	5.9	5.4	1 %	- 0.4	- 7 %	- 1.2	- 18 %
United Kingdom	49.9	20.0	20.5	4 %	0.5	2 %	- 29.4	- 59 %
EU-27	NE	509.8	494.9	100 %	- 15.0	- 3 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 32 PM₁₀ emissions for key category 1A3b Road transportation in the energy sector

1A3b	PM ₁₀ emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	4.6	8.1	7.7	2 %	- 0.4	- 5 %	3.1	67 %
Belgium	NE	9.0	9.0	3 %	0.0	0 %		
Bulgaria	NE	NE	NE					
Cyprus	NE	0.2	0.2	0 %	- 0.01	- 6 %		
Czech Republic	NE	4.1	7.7	2 %	3.5	86 %		
Denmark	NE	4.8	4.8	1 %	0.0	0 %		
Estonia	NE	0.8	0.8	0 %	0.0	2 %		
Finland	NE	11.7	11.6	4 %	- 0.1	- 1 %		
France	66.0	54.4	52.3	16 %	- 2.1	- 4 %	- 13.7	- 21 %
Germany	NE	40.4	38.7	12 %	- 1.7	- 4 %		
Greece	NE	NE	NE					
Hungary	NE	15.6	15.0	5 %	- 0.5	- 4 %		
Ireland	2.1	2.5	2.4	1 %	- 0.1	- 3 %	0.3	15 %
Italy	69.0	48.2	46.8	14 %	- 1.3	- 3 %	- 22.2	- 32 %
Latvia	NR	0.8	1.0	0 %	0.2	29 %		
Lithuania	NE	1.7	1.9	1 %	0.2	10 %		
Luxembourg	NE	NE	NE					
Malta	NE	1.1	0.2	0 %	- 0.9	- 84 %		
Netherlands	15.5	8.8	8.4	3 %	- 0.5	- 5 %	- 7.2	- 46 %
Poland	NE	15.0	18.5	6 %	3.5	23 %		
Portugal	5.9	7.0	7.0	2 %	0.0	0 %	1.1	18 %
Romania	NE	2.1	1.4	0 %	- 0.7	- 34 %		
Slovakia	NE	3.3	2.5	1 %	- 0.8	- 24 %		
Slovenia	NE	1.5	1.6	1 %	0.1	6 %		
Spain	NE	39.5	38.2	12 %	- 1.3	- 3 %		
Sweden	14.4	14.9	13.7	4 %	- 1.2	- 8 %	- 0.7	- 5 %
United Kingdom	60.2	33.7	32.3	10 %	- 1.3	- 4 %	- 27.8	- 46 %
EU-27	NE	329.1	323.7	100 %	- 5.5	- 2 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

Table 33 PM₁₀ emissions for key category 2A Mineral products in the industrial processes sector

2A	PM ₁₀ emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	7.4	11.1	12.5	7 %	1.4	13 %	5.1	69 %
Belgium	NE	3.3	3.3	2 %	0.02	1 %		
Bulgaria	NE	NE	NE					
Cyprus	NE	0.2	0.2	0 %	- 0.01	- 4 %		
Czech Republic	NE	3.6	2.1	1 %	- 1.6	- 43 %		
Denmark	NE	NE	NE					
Estonia	NE	0.4	0.5	0 %	0.1	19 %		
Finland	NE	1.1	2.0	1 %	0.9	78 %		
France	90.0	90.7	92.9	49 %	2.2	2 %	3.0	3 %
Germany	NE	12.7	12.9	7 %	0.2	2 %		
Greece	NE	NE	NE					
Hungary	NE	1.7	1.7	1 %	- 0.1	- 3 %		
Ireland	0.05	0.05	0.05	0 %	0.004	7 %	0.003	6 %
Italy	9.7	11.2	11.4	6 %	0.2	1 %	1.7	17 %
Latvia	NR/NA	0.1	0.2	0 %	0.03	20 %		
Lithuania	NE	NE	NE					
Luxembourg	NE	NE	NE					
Malta	NE	NE	NE					
Netherlands	3.0	1.2	1.2	1 %	0.04	4 %	- 1.7	- 58 %
Poland	NE	NE	NE					
Portugal	10.6	25.0	25.7	14 %	0.7	3 %	15.1	142 %
Romania	NE	4.2	4.2	2 %	0.0	0 %		
Slovakia	NE	0.2	0.2	0 %	0.02	9 %		
Slovenia	NE	NE	NE					
Spain	NE	NE	NE					
Sweden	6.8	4.2	4.2	2 %	0.1	1 %	- 2.5	- 37 %
United Kingdom	18.1	14.1	13.9	7 %	- 0.2	- 2 %	- 4.2	- 23 %
EU-27	NE	185.3	189.2	100 %	4.0	2 %	NE	NE

Note: An explanation of the notation keys used in this table is given in Appendix 1.

3.7 PM_{2.5} key categories

For PM_{2.5}, 16 key categories were identified, the same number of key categories as was determined for PM₁₀. Of these, 73 % of the emissions were from energy-related sectors. The top three key categories

are 1A4b Residential (Table 34), 1A3b Road transportation (Table 35) and 1A2a Manufacturing industries and construction (Table 36). Between 2005 and 2006 EU-27 emissions from all top three categories decreased by between 3 and 5 %.

Table 34 PM_{2.5} emissions for key category 1A4b Residential in the energy sector

1A4b	PM _{2.5} emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	8.6	7.0	6.8	2 %	- 0.2	- 3 %	- 1.8	- 21 %
Belgium	NE	1.9	1.8	1 %	- 0.1	- 3 %		
Bulgaria	NE	NE	NE					
Cyprus	NE	0.03	0.030	0 %	0.0	0 %		
Czech Republic	NE	6.8	6.4	2 %	- 0.4	- 6 %		
Denmark	NE	18.6	17.8	6 %	- 0.8	- 4 %		
Estonia	NE	9.0	8.7	3 %	- 0.3	- 3 %		
Finland	NE	15.4	15.7	5 %	0.3	2 %		
France	217.4	133.8	123.5	40 %	- 10.3	- 8 %	- 93.9	- 43 %
Germany	NE	24.6	24.2	8 %	- 0.4	- 2 %		
Greece	NE	NE	NE					
Hungary	NE	15.3	13.2	4 %	- 2.1	- 14 %		
Ireland	3.2	1.4	1.4	0 %	- 0.01	- 1 %	- 1.8	- 55 %
Italy	10.7	16.2	17.7	6 %	1.5	9 %	7.0	65 %
Latvia	NR/NO	8.7	8.5	3 %	- 0.3	- 3 %		
Lithuania	NE	3.9	3.9	1 %	0.05	1 %		
Luxembourg	NE	NE	NE					
Malta	NE	IE	NE					
Netherlands	2.2	1.7	1.7	1 %	- 0.003	0 %	- 0.6	- 26 %
Poland	NE	50.6	50.1	16 %	- 0.4	- 1 %		
Portugal	22.1	20.0	20.0	6 %	- 0.1	0 %	- 2.2	- 10 %
Romania	NE	NE	NE					
Slovakia	NE	24.2	22.5	7 %	- 1.7	- 7 %		
Slovenia	NE	2.8	2.7	1 %	- 0.1	- 3 %		
Spain	NE	22.3	22.2	7 %	- 0.1	0 %		
Sweden	6.6	5.9	5.4	2 %	- 0.4	- 7 %	- 1.2	- 18 %
United Kingdom	22.3	12.4	12.7	4 %	0.3	2 %	- 9.6	- 43 %
EU-27	NE	325.1	308.7	100 %	- 16.4	- 5 %	NE	NE

Table 35 PM_{2.5} emissions for key category 1A3b Road transportation in the energy sector

1A3b	PM _{2.5} emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	3.0	5.8	5.3	2 %	- 0.5	- 8 %	2.3	78 %
Belgium	NE	7.6	7.6	3 %	0.0	0 %		
Bulgaria	NE	NE	NE					
Cyprus	NE	0.1	0.1	0 %	0.0	0 %		
Czech Republic	NE	3.3	6.7	3 %	3.5	106 %		
Denmark	NE	4.1	4.0	2 %	- 0.02	0 %		
Estonia	NE	0.6	0.7	0 %	0.02	3 %		
Finland	NE	4.3	4.1	2 %	- 0.2	- 4 %		
France	52.4	39.6	37.5	15 %	- 2.1	- 5 %	- 14.9	- 28 %
Germany	NE	31.3	29.6	12 %	- 1.8	- 6 %		
Greece	NE	NE	NE					
Hungary	NE	10.0	9.6	4 %	- 0.4	- 4 %		
Ireland	2.1	2.5	2.4	1 %	- 0.1	- 3 %	0.3	15 %
Italy	63.0	40.8	39.4	16 %	- 1.5	- 4 %	- 23.6	- 37 %
Latvia	NR	0.6	0.8	0 %	0.2	33 %		
Lithuania	NE	1.3	1.5	1 %	0.1	10 %		
Luxembourg	NE	NE	NE					
Malta	NE	1.1	0.2	0 %	- 0.9	- 84 %		
Netherlands	13.9	6.6	6.1	2 %	- 0.5	- 7 %	- 7.7	- 56 %
Poland	NE	15.0	16.6	7 %	1.7	11 %		
Portugal	5.9	7.0	7.0	3 %	- 0.02	0 %	1.1	18 %
Romania	NE	NE	NE					
Slovakia	NE	2.9	2.1	1 %	- 0.7	- 26 %		
Slovenia	NE	1.2	1.3	1 %	0.1	7 %		
Spain	NE	34.7	33.4	13 %	- 1.3	- 4 %		
Sweden	9.6	9.4	8.2	3 %	- 1.2	- 12 %	- 1.3	- 14 %
United Kingdom	49.6	26.9	25.7	10 %	- 1.2	- 5 %	- 24.0	- 48 %
EU-27	NE	256.7	249.9	100 %	- 6.8	- 3 %	NE	NE

Table 36 PM_{2.5} emissions for key category 1A2 Manufacturing industries and construction in the energy sector

1A2	PM _{2.5} emissions (Gg)			Share of EU-27 emissions in 2006 (%)	Change 2005–2006		Change 1990–2006	
	1990	2005	2006		(Gg)	(%)	(Gg)	(%)
Austria	3.3	2.0	2.1	1 %	0.1	5 %	- 1.2	- 36 %
Belgium	NE	2.5	2.6	2 %	0.02	1 %		
Bulgaria	NE	NE	NE					
Cyprus	NE	0.0	0.0	0 %	0.0	0 %		
Czech Republic	NE	2.4	0.0	0 %	- 2.4	- 100 %		
Denmark	NE	1.4	1.4	1 %	0.02	1 %		
Estonia	NE	4.4	1.6	1 %	- 2.7	- 63 %		
Finland	NE	3.7	3.1	2 %	- 0.6	- 16 %		
France	25.4	13.7	13.7	9 %	- 0.03	0 %	- 11.7	- 46 %
Germany	NE	2.0	1.9	1 %	- 0.2	- 9 %		
Greece	NE	NE	NE					
Hungary	NE	3.7	3.5	2 %	- 0.3	- 7 %		
Ireland	1.7	2.9	2.7	2 %	- 0.2	- 6 %	1.0	61 %
Italy	39.4	23.6	23.4	15 %	- 0.3	- 1 %	- 16.1	- 41 %
Latvia	NR/NO	0.4	0.4	0 %	0.1	16 %		
Lithuania	NE	1.2	1.1	1 %	- 0.1	- 11 %		
Luxembourg	NE	NE	NE					
Malta	NE	0.007	0.005	0 %	- 0.002	- 26 %		
Netherlands	3.0	1.3	1.4	1 %	0.1	6 %	- 1.6	- 53 %
Poland	NE	14.8	15.1	10 %	0.3	2 %		
Portugal	21.3	35.7	37.0	24 %	1.3	4 %	15.7	74 %
Romania	NE	NE	NE					
Slovakia	NE	2.4	2.5	2 %	0.1	4 %		
Slovenia	NE	0.5	0.6	0 %	0.1	19 %		
Spain	NE	23.0	23.6	15 %	0.6	3 %		
Sweden	6.1	4.7	5.0	3 %	0.3	6 %	- 1.0	- 17 %
United Kingdom	19.8	12.7	12.7	8 %	- 0.1	0 %	- 7.1	- 36 %
EU-27	NE	159.3	155.4	100 %	- 3.8	- 2 %	NE	NE

4 Recalculations and improvements

4.1 Recalculations

It is important and necessary to identify inventory recalculations and to understand their origin in order to properly 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, methodologies or emission 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 in one year compared to an earlier year. However, it is noted that in some instances, under encouragement from EMEP, the European Commission and the EEA, Member States have submitted Informative Inventory Reports (IIRs) 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 , CO, NMVOC, SO_x , NH_3 , PM_{10} and $\text{PM}_{2.5}$ recalculations from Member States, as well as the

respective contribution made to the overall EU-27 recalculations. They show the differences in absolute and relative terms between data used for the EU-27 inventory compilation this year (i.e. 2008) with that used in the preparation of the Community's inventory last year (2007). Where available ⁽¹⁷⁾ explanatory information concerning significant changes is provided.

In general terms, recalculated data reported by Member States in 2008 led to little change in the EU-27 emissions, with EU-27 NO_x , NMVOC and CO emissions changing insignificantly (by 1 % or less). However, in more than half of the Member States (Austria, Belgium, Cyprus, Germany, Spain, Finland, France, Ireland, Lithuania, Luxembourg, Malta, Portugal, Romania, Sweden and Slovenia) revisions of emissions data of greater than 10 % were reported for at least one pollutant and one year. Particularly for SO_x , Romania reported substantial recalculations (35–47 %) of previously reported emissions for the years 1990–2002. This significant recalculation influenced the overall EU-27 figure, resulting in an overall EU-27 recalculation of between 2 % and 3 %. A complete analysis of the NH_3 , PM_{10} and $\text{PM}_{2.5}$ recalculations for the EU-27 cannot be performed because data were not reported by all Member States.

⁽¹⁷⁾ Explanatory information is provided in cases where Member States submitted an IIR and explained their recalculations in a transparent manner within this report.

4.1.1 NO_x recalculations

In all but nine Member States (Bulgaria, the Czech Republic, Estonia, Greece, Hungary, Lithuania, Poland, Spain and the United Kingdom) recalculations of reported NO_x emissions of more than 0.5 % occurred. At an EU-27 level, these recalculations resulted in an overall change of -45 Gg (-0.3 %) in 1990 and 171 Gg (1.5 %) in 2005. The highest absolute recalculations for the period 1990-2005 occurred in France, followed by Germany, the Netherlands, Finland and Romania (Table 37). For France and Germany no explanatory information on the recalculations was obtained. In percentage terms (Table 38), the highest relative change occurred in Luxembourg (1995-2005);

however, no explanation for these recalculations was available. Explanations for the recalculated emissions in other countries included:

- Austria: new household census data, and revision of fuel consumption;
- the Netherlands: updated information from the oil and gas sector;
- Finland: revision of historical data and transferral of emissions from SNAP to NFR categories;
- Romania: change of estimation methods.

Table 37 Member States' contributions in absolute terms to EU-27 NO_x recalculations (Gg)

NO _x (Gg)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	-19	-20	-18	-16	-14	-11	-8	-6	-4	-1	1	1	5	6	9	12
Belgium	-14	0	0	0	0	0	29	29	23	23	0	0	0	0	0	-8
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	-2	-1	2	4	2	1	0	-1	-2	-2	-2	-3	-2	-2	-2
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	6	14	18	16	15	14	21	19	28	8	1	-2	0	0	2	0
France	15	13	24	23	27	41	55	79	109	135	153	166	185	193	197	206
Germany	1	2	0	0	1	-38	-8	-16	-18	-26	-3	-39	-43	-46	-46	4
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	-1	-2	-1	0	0	0	0	1	0	1	2	3	2	3	4	5
Italy	-2	-1	-1	-2	-1	0	0	0	0	0	0	-1	0	4	7	-16
Latvia	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	-1	-1
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	-5	-6	-7	-8	-5	-6	-5	-6	-6	-6	-5
Malta	0	0	0	0	0	0	0	0	0	0	-2			-2	-3	-3
Netherlands	-22	-27	-27	-24	-28	-28	-21	-15	-22	-21	-17	-16	-15	-15	-17	-19
Poland	0	0	0	0	0	0	0	0	0	0			0	0	0	0
Portugal	11	12	12	11	12	12	13	14	14	14	14	14	16	14	17	14
Romania	-22	-25	-29	-23	-23	-24	-25	-33	-30	-18	-14	-9	-15	-16	-17	20
Slovakia	-4	-3	-3	-2	-4	-4	0	0	0	0	0	0	0	0	0	0
Slovenia	2	-5	-4	-7	-8	-8	-9	-10	-9	-8	-10	-9	-9	-7	-10	-11
Spain	3	3	4	4	4	4	4	5	3	3	5	6	4	7	6	7
Sweden	0	0	0	0	0	0	0	0	0	0	-11	-14	-15	-18	-21	-24
United Kingdom	2	1	4	5	4	6	6	6	6	6	2	1	-6	-7	-5	-7
EU-27*/**	-45	-39	-20	-14	-8	-40	52	63	89	108	NE	NE	99	108	115	171

Note: * The EU-27 total for year 2002 is presented without data for Malta.

** No EU-27 total is given for the years 2000 and 2001 due to missing data in the 2007 Member States' data submissions. Empty cells indicate instances where one of the two submissions did not contain data. 0 indicates that the change in reported emissions was less than 0.5 Gg.

Table 38 Member States' contributions in relative terms to EU-27 NO_x recalculations (%)

NO _x (%)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	-9	-9	-8	-8	-7	-6	-4	-3	-2	0	0	1	2	3	4	5
Belgium	-4	0	0	0	0	0	9	9	7	8	0	0	0	0	0	-3
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	-2	-1	-2	-1	-2	-2	-2	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	0	-1	1	1	1	0	0	-1	-1	-1	-1	-1	-1	-1	-1
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	2	5	7	6	6	6	9	8	13	3	0	-1	0	0	1	0
France	1	1	1	1	2	2	3	5	7	9	11	12	14	15	16	17
Germany	0	0	0	0	0	-2	0	-1	-1	-1	0	-2	-3	-3	-3	0
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	-1	-1	0	0	0	0	0	0	1	2	2	2	3	3	4
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-1
Latvia	1	0	0	0	0	0	0	-1	-1	-1	-2	-2	-2	-1	-2	-3
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	-48	-50	-62	-70	-61	-63	-58	-65	-65	-68	-66
Malta	-3	-1	-1	-1	0	-1	1	0	-1	1	-16			-20	-24	-24
Netherlands	-4	-5	-5	-5	-6	-6	-5	-4	-5	-5	-4	-4	-4	-4	-5	-6
Poland	0	0	0	0	0	0	0	0	0	0			0	0	0	0
Portugal	5	5	4	4	5	4	5	5	5	5	5	5	5	5	6	5
Romania	-5	-6	-7	-6	-6	-6	-5	-8	-8	-6	-4	-3	-4	-4	-4	7
Slovakia	-2	-2	-2	-1	-2	-2	0	0	0	0	0	0	0	0	0	0
Slovenia	3	-9	-6	-11	-11	-12	-12	-15	-14	-14	-17	-16	-15	-13	-17	-19
Spain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0	0	0	-5	-6	-7	-8	-10	-12
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EU-27*/**	0	1	1	NE	NE	1	1	1	2							

Note: * The EU-27 total for year 2002 is presented without data for Malta.

** No EU-27 total is given for the years 2000 and 2001 due to missing data in the 2007 Member States' data submissions. Empty cells indicate instances where one of the two submissions did not contain data. 0 indicates that the change in reported emissions was less than 0.5 %.

4.1.2 NMVOC recalculations

In all but five Member States (the Czech Republic, Estonia, Greece, Hungary and Poland) recalculations of more than 0.5 % occurred. At the EU-27 level, the recalculations performed by Member States resulted in an overall change of 120 Gg (-0.7 %) in 1990 and 83 Gg (0.9 %) in 2005.

Generally, the recalculations of NMVOC emissions were small (1 % or less, except for 1997 where the difference was 4 %). The greatest single year change occurred for 1997 in Belgium (-635 Gg) explained by the revision of the combustion emissions of NMVOCs for the Flemish emission inventory.

Apart from Belgium, Germany has the highest recalculations in absolute terms (up to 156 Gg) but explanatory information was not provided in an IIR. Reasons for recalculations in other countries were, for example, the use of lower emission factors derived from the COPERT (computer programme to calculate emissions from road transport) model in the Netherlands or updates of emission factors and activity data in Slovakia and Slovenia.

The greatest relative changes (apart from the -73% recalculation in Belgium 1997) occurred in Malta and Slovenia with recalculations of up to -57 and 53% respectively. Data for all countries are shown in Tables 39 and 40.

Table 39 Member States' contributions in absolute terms to EU-27 NMVOC recalculations (Gg)

NMVOC (Gg)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	-2	3	7	10	11	11	10	9	9	8	8	16	22	20	19	10
Belgium	44	0	0	0	0	0	-8	-635	9	-11	0	0	0	0	0	-49
Bulgaria	0	0	0	0	0	0	0	0	-5	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	2	2	2	4	5	3	2	0	0	-1	-2	-4	-2	-4	-3	-3
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	-4	-5	-4	-7	-4	-7	-7	-6	-6	-6	-5	-2	3	0	-1	0
France	-17	-20	-6	-8	0	4	-18	1	-2	13	-1	-37	-21	17	-11	-14
Germany	156	136	131	130	125	122	123	122	124	120	124	120	117	116	115	132
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	2	2	2	3	3	3	3	4	3	1	0	0	0	-1	-1	-1
Italy	-7	-1	-3	-8	-3	0	0	-3	-4	-4	-9	-7	-5	-10	-4	-21
Latvia	0	0	0	0	0	-1	-1	-1	-1	-2	-2	-2	-2	0	-1	0
Lithuania	21	21	25	26	26	23	23	24	25	24	23	5	0	0	0	0
Luxembourg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
Malta	1	1	1	1	1	1	1	1	1	0	-4			-2	-1	-2
Netherlands	-15	-18	-17	-14	-17	-18	-17	-14	-14	-15	-15	-13	-12	-12	-12	-7
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	-10	-10	-12	-12	-14	-14	-14	-14	-15	-14	-13	-13	-13	-14	-13	-15
Romania	-3	-3	-3	-2	-2	-2	-3	-4	-4	-2	-1	-1	-1	-2	-2	13
Slovakia	4			-4		-4	-6	-1	0	0	-1	2	5	6	6	4
Slovenia	21	21	21	21	20	20	19	17	15	13	1	1	1	1	0	-1
Spain	-77	-90	-83	-93	-89	-79	-69	-71	-94	-93	-79	-80	-103	-88	-96	-112
Sweden	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	2	0	1
United Kingdom	2	2	1	1	1	1	1	-1	1	0	0	0	-1	0	-8	-16
EU-27*/**	120	-93	-70	48	-50	65	42	-572	41	30	NE	-14	-13	29	-13	-83

Note: * The EU-27 total is presented without data for Malta in years 2001 and 2002.

** No EU-27 total is given for the year 2000 due to missing data in the 2007 Member States' data submissions. Empty cells indicate instances where one of the two submissions did not contain data. 0 indicates that the change in reported emissions was less than 0.5 Gg.

Table 40 Member States' contributions in relative terms to EU-27 NMVOC recalculations (%)

NMVOC (%)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	- 1	1	3	4	5	5	5	5	5	5	4	9	13	12	12	6
Belgium	12	0	0	0	0	0	- 3	- 73	4	- 5	0	0	0	0	0	- 24
Bulgaria	0	0	0	0	0	0	0	0	- 6	0	0	0	0	0	0	0
Cyprus	2	2	1	1	1	2	1	1	1	1	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	1	1	1	2	3	2	1	0	0	- 1	- 2	- 3	- 2	- 4	- 3	- 2
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	- 2	- 2	- 2	- 3	- 2	- 4	- 4	- 4	- 3	- 4	- 3	- 1	2	0	- 1	0
France	- 1	- 1	0	0	0	0	- 1	0	0	1	0	- 2	- 1	1	- 1	- 1
Germany	4	4	5	5	6	6	7	7	7	7	8	9	9	9	9	11
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	1	2	2	3	3	3	3	3	3	1	0	0	0	- 1	- 2	- 1
Italy	0	0	0	0	0	0	0	0	0	0	- 1	0	0	- 1	0	- 2
Latvia	0	0	0	0	0	- 1	- 1	- 1	- 2	- 3	- 3	- 3	- 3	0	- 2	0
Lithuania	24	23	48	62	62	48	43	41	42	45	50	8	0	0	0	0
Luxembourg	- 2	- 2	- 2	- 2	- 2	- 3	- 3	- 3	- 3	- 4	- 4	- 4	- 7	- 7	- 9	- 8
Malta	32	30	28	27	26	23	13	17	9	- 1	- 57			- 20	- 23	- 28
Netherlands	- 3	- 4	- 4	- 4	- 5	- 5	- 6	- 5	- 5	- 6	- 6	- 6	- 6	- 6	- 6	- 4
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	- 3	- 3	- 4	- 4	- 4	- 5	- 4	- 5	- 5	- 5	- 4	- 4	- 4	- 5	- 4	- 5
Romania	- 1	- 1	- 1	- 1	- 1	- 1	- 1	- 1	- 1	- 1	- 1	0	0	- 1	0	4
Slovakia	3			- 3		- 4	- 6	- 1	0	0	- 1	2	6	7	7	5
Slovenia	48	52	53	50	45	45	40	35	36	32	2	3	2	2	0	- 2
Spain	- 7	- 7	- 7	- 8	- 8	- 7	- 6	- 6	- 8	- 8	- 7	- 7	- 9	- 8	- 9	- 10
Sweden	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	- 1	- 2
EU-27*/**	1	- 1	0	0	0	0	0	- 4	0	0	NE	0	0	0	0	- 1

Note: * The EU-27 total is presented without data for Malta in years 2001 and 2002.
 ** No EU-27 total is given for the years 2000 due to missing data in the 2007 Member States' data submissions.
 Empty cells indicate instances where one of the two submissions did not contain data.
 0 indicates that the change in reported emissions was less than 0.5 %.

4.1.3 SO_x recalculations

In 11 Member States (Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Ireland, Lithuania, Poland, Slovakia and Sweden) either none or only small recalculations of less than 0.5 % occurred. Significant recalculations were however performed for 1990–2002 SO_x emission

data from Romania (corresponding to changes of 35–47 % of reported emissions), but explanations for these recalculations were not provided in an IIR. Romania's recalculations are reflected in the overall EU-27 recalculation statistics where values changed by up to 3 %. Data for all countries are shown in Tables 41 and 42.

Table 41 Member States' contributions in absolute terms to EU-27 SO_x recalculations (Gg)

SO _x (Gg)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Belgium	-7	0	0	0	0	0	5	29	31	7	0	0	0	0	0	-3
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	-1	0	0	0	1	1	0	0	0	-1	-1	-1	-1	-1	0
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	10	-8	-18	-16	-9	-10	-5	-1	-4	-4	9	0	-3	0	-1	0
France	-1	-1	2	2	2	2	1	1	0	0	3	3	1	3	16	21
Germany	3	0	0	0	0	-3	-6	-9	-1	3	-3	-1	-4	-11	-10	13
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Italy	-1	-1	-1	-1	0	0	0	0	0	0	0	0	-2	-3	-8	-42
Latvia	2	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	-1	-2	-2	-2	-2	-1	-1	-1	-1	-2	-2
Malta	-3	-2	-2	1	-1	-1	-1	-1	-1	0	-2			-5	-6	-6
Netherlands	0	0	0	0	0	0	-5	-2	0	-1	0	0	0	0	2	3
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	3	3	3	0	2	3	3	3	3	3	3	3	2	1	11	-1
Romania	-444	-506	-395	-424	-370	-372	-427	-406	-332	-268	-254	-257	-295	-61	-63	104
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	2	4	4	3	4	1	0	1	0	1	0	0	0	0	0	-1
Spain	2	2	3	3	3	3	3	11	11	11	13	13	13	14	13	10
Sweden	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
United Kingdom	30	30	30	30	30	30	30	21	13	-18	-17	-24	-23	-24	-23	-18
EU-27*	-404	-478	-373	-400	-339	-348	-401	-355	-282	-270	-250	-267	-313	-89	-72	79

Note: * The EU-27 total is presented without data for Malta in years 2001 and 2002. Empty cells indicate instances where one of the two submissions did not contain data. 0 indicates that the change in reported emissions was less than 0.5 Gg.

Table 42 Member States' contributions in relative terms to EU-27 SO_x recalculations (%)

SO _x (%)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	0	0	0	0	0	0	0	0	0	0	1	-1	-1	-1	-1	1
Belgium	-2	0	0	0	0	0	2	15	17	4	0	0	0	0	0	-2
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	1	0	0	0	-1	-2	-2	-3	-2	-3	0
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	4	-4	-11	-12	-7	-9	-4	-1	-4	-5	11	0	-4	0	-2	0
France	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	4
Germany	0	0	0	0	0	0	0	-1	0	0	0	0	-1	-2	-2	2
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-2	-9
Latvia	2	1	2	1	1	1	1	1	1	1	-1	1	0	0	1	1
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	-20	-26	-31	-53	-57	-52	-49	-43	-46	-56	-57
Malta	-16	-8	-8	6	-3	-3	-2	-2	-2	-1	-8			-16	-32	-32
Netherlands	0	0	0	0	0	0	-4	-2	0	-2	0	0	0	0	3	5
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	1	1	1	0	1	1	1	1	1	1	1	1	1	1	5	0
Romania	-39	-47	-41	-42	-39	-38	-38	-41	-41	-38	-37	-35	-38	-11	-12	14
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	1	2	2	2	2	1	0	1	0	0	0	0	0	0	0	-1
Spain	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Sweden	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
United Kingdom	1	1	1	1	1	1	2	1	1	-1	-1	-2	-2	-2	-3	-3
EU-27*	-2	-2	-2	-2	-2	-2	-3	-2	-2	-2	-2	-3	-3	-3	-1	1

Note: * The EU-27 total is presented without data for Malta in years 2001 and 2002.
Empty cells indicate instances where one of the two submissions did not contain data.
0 indicates that the change in reported emissions was less than 0.5 %.

4.1.4 NH₃ recalculations

In 12 Member States (Bulgaria, Cyprus, the Czech Republic, Estonia, Germany, Greece, Hungary, Lithuania, Luxembourg, Malta, Poland and Slovakia) no recalculations or recalculations of less than 0.5 % occurred for NH₃ emission data. The

largest absolute and relative recalculations occurred in Belgium between 1996 and 1999 (between 17 and 21 Gg and 17 and 21%). The relative recalculations in most other Member States were negligible (in the range of a few percent). Data for all countries are shown in Tables 43 and 44.

Table 43 Member States' contributions in absolute terms to EU-27 NH₃ recalculations (Gg)

NH ₃ (Gg)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	2	3	4	5	5	5	4	4	4	3	3	3	3	2	2	2
Belgium	-3	0	0	0	0	0	21	21	17	19	0	0	0	0	0	-1
Bulgaria												0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	0
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	4		-3			0	4	-1	-2	0	0	0	0	0	0	0
France	4	4	4	4	3	1	0	0	-1	8	8	8	7	8	8	10
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-3	-2
Italy	-1	0	0	-1	0	0	0	0	-1	-2	-2	-7	-3	-4	-3	-4
Latvia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lithuania													0	0	0	0
Luxembourg	0			0	0	0	0	0	0	0	0	0	0			
Malta											0			0	0	0
Netherlands	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	-2
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	2	-4	-5	-5	-5	-5	-6	-6	-6	-6	-6	-6	-6	-6	-6	-10
Romania																10
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	0	1	-1	0	0	0	0	1	0	0	0	0	0	0	0	0
Spain	3	3	3	3	3	3	3	4	3	2	3	4	3	5	10	5
Sweden	0	0	0	0	0	0	0	0	0	0	0	-1	-2	0	0	0
United Kingdom	0	-1	-3	-6	-7	-8	-7	-6	-5	-1	-7	-6	1	3	4	-3
EU-27	NE															

Note: Empty cells indicate instances where one of the two submissions did not contain data. 0 indicates that the change in reported emissions was less than 0.5 Gg.

Table 44 Member States' contributions in relative terms to EU-27 NH₃ recalculations (%)

NH ₃ (%)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	3	5	6	7	7	7	6	5	5	5	4	4	4	4	4	3
Belgium	-3	0	0	0	0	0	21	21	17	19	0	0	0	0	0	-1
Bulgaria												0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	1
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	11		-7			1	10	-4	-4	0	0	0	0	0	0	0
France	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0			
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2
Italy	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
Latvia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3
Lithuania													0	0	0	0
Luxembourg	0			0	0	0	0	0	0	0	0	0	0			
Malta											0			0	0	0
Netherlands	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	-2
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	3	-5	-6	-7	-7	-7	-7	-7	-8	-8	-7	-8	-8	-9	-9	-13
Romania																5
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	1	2	-2	1	1	0	0	4	0	1	1	0	0	0	-1	-1
Spain	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Sweden	0	0	0	0	0	0	0	0	0	0	0	-1	-3	0	0	0
United Kingdom	0	0	-1	-2	-2	-2	-2	-2	-1	0	-2	-2	0	1	1	-1
EU-27	NE															

Note: Empty cells indicate instances where one of the two submissions did not contain data.
0 indicates that the change in reported emissions was less than 0.5 %.

4.1.5 CO recalculations

In eight Member States (Bulgaria, Cyprus, Estonia, Greece, Hungary, Lithuania, Poland and Slovakia) no recalculations or recalculations of less than 0.5 % occurred. The highest relative recalculations occurred in Slovenia (224 % in 1991). In absolute terms the highest recalculations were performed in Austria, Finland, France, Germany Slovenia and

Spain. Reasons for recalculations of CO emissions in Austria were an update of heating type split (new household census) data and a revision of fuel consumption of new biomass-, gas- and oil-heating (new boiler sales statistics). In Slovenia, a different methodology was used to estimate emissions for all air pollutants for the road transport sector for the entire 1980–2006 period. Data for all countries are shown in Tables 45 and 46.

Table 45 Member States' contributions in absolute terms to EU-27 CO recalculations (Gg)

CO (Gg)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	223	273	284	294	278	257	225	200	194	168	157	141	143	139	120	103
Belgium	149	0	0	0	0	0	30	149	137	57	0	0	0	0	0	- 37
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	14	10	8	11	12	11	12	10	11	12	11	12	0	0	0	0
Denmark	- 10	- 12	- 12	0	9	- 10	- 15	- 15	- 16	- 16	- 16	- 23	- 28	- 33	- 37	- 19
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	- 150	- 157	- 194	- 196	- 198	- 199	- 162	- 148	- 164	- 36	22	- 1	0	0	0	0
France	- 336	30	76	195	144	100	33	- 14	- 53	- 33	- 58	- 232	- 201	- 117	- 70	- 8
Germany	0	7	0	0	0	136	135	130	129	130	126	123	118	72	10	166
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	- 7	- 5	- 9	- 7	- 10	- 11	- 15	- 20	- 26	- 30	- 39	- 43	- 40	- 42	- 44	- 42
Italy	- 59	- 15	- 25	- 63	- 25	- 11	- 9	- 31	- 36	- 23	- 41	- 29	- 22	- 36	- 25	- 25
Latvia	0	0	0	0	0	- 7	- 10	- 10	- 17	- 20	- 19	- 18	- 22	- 8	- 16	- 9
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	- 6	- 6	- 3	- 3	- 2	- 3	- 2	- 2	- 2	- 3	- 3
Malta	0	0	0	0	0	0	0	0	0	0	- 30					
Netherlands	- 70	- 69	- 63	- 47	- 53	- 58	- 67	- 37	- 58	- 69	- 69	- 58	- 48	- 48	- 40	- 55
Poland	0		0	0	0	0	0	0	0	0		0	0	0	0	0
Portugal	14	15	10	7	12	12	14	14	12	11	9	9	8	8	6	- 8
Romania	- 22	- 22	- 27	- 25	- 26	- 31	- 30	- 37	- 36	- 23	- 22	- 18	- 25	- 33	- 25	91
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	176	175	151	160	151	156	168	144	118	105	62	64	56	54	39	34
Spain	182	220	224	226	217	216	204	265	192	169	263	320	218	370	298	194
Sweden	7	7	5	6	6	7	7	7	7	7	7	7	7	7	6	6
United Kingdom	6	5	5	6	3	4	4	4	5	- 14	- 9	- 11	- 19	- 14	- 22	- 28
EU-27*/**	116	NE	434	569	520	567	518	607	397	394	NE	240	143	316	200	361

Note: * The EU-27 recalculation is without consideration of data from Malta in years 2001–2005.
 ** No EU-27 total is given for the year 2000 due to missing data in the 2007 Member States' data submissions.
 Empty cells indicate instances where one of the two submissions did not contain data.
 0 indicates that the change in reported emissions was less than 0.5 Gg.

Table 46 Member States' contributions in relative terms to EU-27 CO recalculations (%)

CO (%)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	18	22	24	26	25	25	22	21	21	19	20	18	19	18	16	14
Belgium	11	0	0	0	0	0	3	17	16	6	0	0	0	0	0	-4
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	1	1	1	1	1	1	1	1	1	2	2	2	0	0	0	0
Denmark	-1	-1	-2	0	1	-1	-2	-2	-3	-3	-3	-4	-5	-5	-6	-3
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finland	-21	-23	-29	-30	-31	-31	-26	-24	-27	-6	4	0	0	0	0	0
France	-3	0	1	2	1	1	0	0	-1	0	-1	-3	-3	-2	-1	0
Germany	0	0	0	0	0	2	2	2	2	2	3	3	3	2	0	4
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	-2	-1	-2	-2	-3	-3	-5	-6	-8	-10	-14	-16	-16	-17	-18	-19
Italy	-1	0	0	-1	0	0	0	0	-1	0	-1	-1	-1	-1	-1	-1
Latvia	0	0	0	0	0	-2	-3	-3	-5	-6	-6	-6	-7	-3	-5	-3
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	-8	-9	-8	-22	-11	-14	-12	-14	-14	-20	-17
Malta	0	0	0	0	0	0	0	0	-1	-1	-99					
Netherlands	-6	-7	-6	-5	-6	-7	-8	-5	-8	-9	-10	-9	-7	-8	-6	-9
Poland	0		0	0	0	0	0	0	0	0		0	0	0	0	0
Portugal	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	-1
Romania	-3	-3	-4	-3	-3	-2	-2	-2	-3	-2	-2	-1	-2	-2	-1	6
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slovenia	217	224	194	184	163	172	177	154	153	150	63	71	66	66	48	42
Spain	5	6	6	6	6	7	6	8	6	6	10	12	9	15	12	8
Sweden	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	-1	-1
EU-27*/**	0	NE	1	NE	1	0	1	1	1							

Note: * The EU-27 recalculation is without consideration of data from Malta in years 2001–2005.

** No EU-27 total is given for the year 2000 due to missing data in the 2007 Member States' data submissions.

Empty cells indicate instances where one of the two submissions did not contain data.

0 indicates that the change in reported emissions was less than 0.5 %.

4.1.6 PM₁₀ recalculations

For the years before 2000, few Member States have submitted consistent time series of PM₁₀ emissions. Therefore, the submitted data is presented below only for year 2000 onwards. For these years,

Bulgaria, Greece, Italy, Malta and Luxembourg have not submitted PM₁₀ emission data. In the Czech Republic, Estonia, Hungary, Lithuania and the United Kingdom no recalculations or recalculations of less than 0.5 % occurred. Data for all countries is shown in Tables 47 and 48.

Table 47 Member States' contributions in absolute terms to EU-27 PM₁₀ recalculations (Gg)

PM ₁₀ (Gg)	2000	2001	2002	2003	2004	2005
Austria	- 2	- 3	- 3	- 2	- 3	- 2
Belgium	0	0	0	0	0	- 3
Bulgaria						
Cyprus	0	0	0	0	0	0
Czech Republic			0	0	0	0
Denmark	- 1	- 1	- 1	- 1	- 1	0
Estonia	0	0	0	0	0	0
Finland		0	0	0	1	0
France	- 1	- 12	- 10	- 4	- 2	- 7
Germany	5	4	4	3	4	4
Greece						
Hungary	0	0	0	0	0	0
Ireland	0	- 1	0	0	- 1	- 1
Italy						
Latvia	- 1	- 1	- 1	0	- 1	- 1
Lithuania						0
Luxembourg						
Malta						
Netherlands	- 2	- 2	- 2	- 1	- 1	- 2
Poland				7	6	0
Portugal	11	12	13	12	13	14
Romania						42
Slovakia	0	0	0	0	0	0
Slovenia	0	- 1	- 1	- 1	- 1	- 1
Spain	- 4	- 4	- 4	- 5	- 5	- 5
Sweden	- 3	- 3	- 3	- 3	- 3	- 3
United Kingdom	0	- 1	- 1	- 1	- 1	0
EU-27	NE	NE	NE	NE	NE	NE

Note: Empty cells indicate instances where one of the two submissions did not contain data. 0 indicates that the change in reported emissions was less than 0.5 Gg.

Table 48 Member States' contributions in relative terms to EU-27 PM₁₀ recalculations (%)

PM ₁₀ (%)	2000	2001	2002	2003	2004	2005
Austria	- 4	- 6	- 5	- 5	- 6	- 5
Belgium	0	0	0	0	0	- 7
Bulgaria						
Cyprus	7	5	7	- 13	9	0
Czech Republic			0	0	0	0
Denmark	- 2	- 2	- 2	- 2	- 3	0
Estonia	0	0	0	0	0	0
Finland		1	0	0	1	0
France	0	- 2	- 2	- 1	0	- 1
Germany	2	2	2	2	2	2
Greece						
Hungary	0	0	0	0	0	0
Ireland	- 3	- 4	- 3	- 4	- 5	- 5
Italy						
Latvia	- 7	- 6	- 8	- 2	- 5	- 4
Lithuania						0
Luxembourg						
Malta						
Netherlands	- 4	- 4	- 4	- 3	- 3	- 5
Poland				3	2	0
Portugal	9	9	11	10	10	11
Romania						889
Slovakia	1	0	1	1	0	0
Slovenia	- 5	- 12	- 8	- 9	- 13	- 15
Spain	- 2	- 2	- 2	- 3	- 2	- 3
Sweden	- 6	- 6	- 6	- 6	- 6	- 7
United Kingdom	0	0	0	0	0	0
EU-27	NE	NE	NE	NE	NE	NE

Note: Empty cells indicate instances where one of the two submissions did not contain data.
0 indicates that the change in reported emissions was less than 0.5 Gg.

4.1.7 $PM_{2.5}$ recalculations

For the years before 2000, few Member States have submitted consistent time series of $PM_{2.5}$ emissions. Therefore, the submitted data is presented from 2000 onwards. Bulgaria, Greece, Italy, Luxembourg and Romania have not submitted $PM_{2.5}$ emission

data for these years. In the Czech Republic, Estonia, Finland, Hungary and Lithuania no recalculations or recalculations of less than 0.5 % occurred. Portugal has the largest recalculation in absolute terms (- 13 Gg in 2004 and 2005) and Malta in relative terms (170 % to 219 % in the years 2004 to 2005). Data for all countries is shown in Tables 49 and 50.

Table 49 Member States' contributions in absolute terms to EU-27 $PM_{2.5}$ recalculations (Gg)

$PM_{2.5}$ (Gg)	2000	2001	2002	2003	2004	2005
Austria	- 3	- 3	- 3	- 3	- 3	- 3
Belgium	0	0	0	0	0	- 2
Bulgaria						
Cyprus	0	0	0	0	0	0
Czech Republic				0	0	0
Denmark	0	0	0	0	0	1
Estonia	0	0	0	0	0	0
Finland		0	0	0	0	0
France	0	- 11	- 8	- 2	1	- 2
Germany	5	4	4	3	4	4
Greece						
Hungary	0	0	0	0	0	0
Ireland	0	- 1	0	0	- 1	- 1
Italy						
Latvia	- 1	- 1	- 1	0	- 1	- 1
Lithuania						0
Luxembourg						
Malta					0.8	1.0
Netherlands	- 2	- 2	- 2	- 1	- 2	- 2
Poland				1	3	0
Portugal	11	11	12	12	13	13
Romania						
Slovakia	0	0	0	0	0	0
Slovenia	0	- 1	0	- 1	- 1	- 1
Spain	- 4	- 4	- 4	- 5	- 5	- 5
Sweden	4	4	4	4	4	4
United Kingdom	0	- 1	- 1	- 1	- 1	- 1
EU-27	NE	NE	NE	NE	NE	NE

Note: Empty cells indicate instances where one of the two submissions did not contain data. 0 indicates that the change in reported emissions was less than 0.5 Gg.

Table 50 Member States' contributions in relative terms to EU-27 PM_{2.5} recalculations (%)

PM _{2.5} (%)	2000	2001	2002	2003	2004	2005
Austria	- 10	- 12	- 12	- 11	- 12	- 11
Belgium	0	0	0	0	0	- 5
Bulgaria						
Cyprus	- 2	- 4	0	- 22	11	0
Czech Republic				0	0	0
Denmark	- 1	- 1	- 1	- 1	- 1	3
Estonia	0	0	0	0	0	0
Finland		0	0	0	0	0
France	0	- 3	- 2	- 1	0	0
Germany	4	4	3	3	4	4
Greece						
Hungary	0	0	0	0	0	0
Ireland	- 4	- 5	- 4	- 5	- 6	- 7
Italy						
Latvia	- 7	- 6	- 8	- 2	- 5	- 4
Lithuania						0
Luxembourg						
Malta					170	219
Netherlands	- 6	- 6	- 8	- 6	- 8	- 9
Poland				1	3	0
Portugal	11	12	13	13	12	13
Romania						
Slovakia	0	0	2	- 1	- 1	0
Slovenia	- 1	- 11	- 6	- 8	- 11	- 16
Spain	- 3	- 3	- 3	- 3	- 3	- 3
Sweden	13	13	13	13	13	13
United Kingdom	0	- 1	- 1	- 1	- 1	- 1
EU-27	NE	NE	NE	NE	NE	NE

Note: Empty cells indicate instances where one of the two submissions did not contain data.
0 indicates that the change in reported emissions was less than 0.5 Gg.

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 LRTAP Convention emission inventories from the EU Member States. This would then allow a more timely compilation of a European Community LRTAP emission 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 also.

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

In early 2008 the ETC/ACC drafted a paper proposing technical methods that potentially could be used in the future to fill gaps in reported data (ETC/ACC, 2008). Such methods could, for example, be applied for the following purposes when estimates are not included in Member States' LRTAP inventory submissions to the European Community:

1. 1 to complete specific years in the inventory time series for a specific Member State: a) for the most recent inventory year(s); b) for some years of the time series from 1990 to the most recent year;
2. 1 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' ⁽¹⁸⁾;
3. 1 to provide complete NFR data tables for the European Community when some Member States provide only national total emissions ⁽¹⁹⁾;
4. to enable the presentation of consistent trends for the European Community.

However, before any such gap-filling methods are applied to the compilation of the European Community emission inventory, any such procedure will have to be formalised, discussed and agreed in close cooperation with emission experts from the Member States.

The EEA-ETC/ACC, together with EMEP CEIP, assists Member States in improving the quality of national inventories by performing an annual review of inventory data. The review of data reported under the LRTAP Convention is performed jointly with the review of data reported by Member States under the National Emissions Ceilings Directive (2001/81/EC). The technical review process is performed in three stages. The Stage 1 review provides information to Parties based on initial automated data checks (concerning timeliness, formats and completeness). A subsequent Stage 2 review checks the consistency, comparability and trends of national inventories. Results of these two review stages are presented to countries in 'synthesis and assessment' reports by the end of May each year, and are summarised in an annual EMEP/EEA technical review report ⁽²⁰⁾. In 2008, a voluntary Stage 3 review will take place. Inventories from up to five countries will be peer reviewed by a team of emission experts; key review findings will be submitted to the Implementation Committee of the LRTAP Convention and to the Party's representative to the Executive Body.

An uncertainty and sensitivity analysis of the European Community's LRTAP Convention emission inventory could be used in the future to identify technical areas within the inventory that would benefit from further improvements. However, this type of analysis also requires sufficient information to be reported from the Member States to underpin the analysis.

For the 2009 European Community inventory report cycle, the chapters of this inventory report will be further elaborated to comply with the EMEP-recommended structure for IIRs. The improvements in 2009 will necessarily depend on the information provided by the Member States. For example, more complete emission trends of particulate matter and/or heavy metals, together with more explanatory information on emission trends and recalculations could be included within the next European Community emission inventory report if such data is received from countries.

⁽¹⁸⁾ Gap-filling methods could be used for major gaps when it is considered highly probable that emissions from these source categories exist in the Member States concerned.

⁽¹⁹⁾ In such cases, the gap-filling methods would be used to further disaggregate the emission estimates provided by Member States.

⁽²⁰⁾ A summary of the results of the review performed in 2007 are available in Vestreng *et al.*, 2007.

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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
As	arsenic
Cd	cadmium
CDR	central data repository of EEA's Eionet Reportnet
CEIP	EMEP Centre on Emission Inventories and Projections
CH ₄	methane
CLRTAP	LRTAP Convention
CO	carbon monoxide
CO ₂	carbon dioxide
Cr	chromium
CRF	UNFCCC common reporting format for greenhouse gases
Cu	copper
EEA	European Environment Agency
Eionet	European environmental information and observation network
EMEP	Co-operative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe
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

LRTAP Convention	UNECE Convention on Long-range Transboundary Air Pollution
N ₂ O	nitrous oxide
NECD	National Emission Ceilings Directive (2001/81/EC)
NFR	UNECE nomenclature for reporting of air pollutants
NH ₃	ammonia
Ni	nickel
NMVOCs	non-methane volatile organic compounds
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
Pb	lead
PFCs	perfluorocarbons
PM	particulate matter
PM ₁₀	particles measuring 10 µm or less
PM _{2.5}	particles measuring 2.5 µm or less
POPs	persistent organic pollutants
QA/QC	quality assurance/quality control
Se	selenium
SF ₆	sulphur hexafluoride
SNAP	selected nomenclature for air pollution
SO ₂	sulphur dioxide
SO _x	sulphur oxides
TFEIP	UNECE Task Force on Emission Inventories and Projections
TSP	total suspended particles
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VOCs	volatile organic compounds
Zn	zinc

Appendix 1 Notation keys

Where methodological or data gaps in inventories exist, information on these gaps should be presented in a transparent manner. Parties should clearly indicate the sources not considered in their inventories but included in the *EMEP/CORINAIR emission inventory guidebook* (EMEP/EEA 2007), and explain the reason for the exclusion. Similarly, each Party should indicate if a part of its territory has been excluded and explain the reason for this. In addition, each Party should use the notation keys presented below to fill the blanks in all the tables of the (NFR) inventory. This approach facilitates assessment of the completeness of emission data reports. The notation keys ⁽²¹⁾ are as follows:

- NO** (not occurring) for emissions by sources of compounds that do not occur for a particular compound or source category within a country;
- NE** (not estimated) for existing emissions by sources of compounds that have not been estimated. Where 'NE' is used in an inventory, the Party should indicate why emissions could not be estimated;
- NA** (not applicable) is used for activities in a given source category which are believed not to result in significant emissions of a specific compound;

IE (included elsewhere) for emissions by sources of compounds that are estimated but included elsewhere in the inventory instead of in the expected source category. Where 'IE' is used in an inventory, the Party should indicate where in the inventory the emissions from the displaced source category have been included and the Party should give the reasons for this inclusion deviating from the expected category;

C (confidential) for emissions by sources of compounds which could lead to the disclosure of confidential information. Where 'C' is used in an inventory, reference should be made to the Protocol provision that authorizes such practice.

NR (not relevant) is introduced to ease the reporting where emissions for a specific Party are not strictly required by the different Protocols.

If a Party estimates emissions from country-specific sources, or of compounds, that are not part of the *EMEP/CORINAIR emission inventory guidebook*, it should explicitly describe which source categories or compounds these are, as well as which methodologies, emission factors and activity data have been used for their estimation.

⁽²¹⁾ Further explanation and guidance concerning the use of these notation codes may be found in the EMEP emission reporting guidelines (UNECE, 2003).

Appendix 2 LRTAP Convention emission reporting

This appendix contains a summary of the information provided in the EMEP emission reporting guidelines (UNECE, 2003).

Summary of the information contained in the 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 , NMVOCs, CO	1980–2006
2. Particulate matter	PM _{2.5} , PM ₁₀ , TSP	2000–2006
3. Heavy metals	Pb, Cd, Hg/(As, Cr, Cu, Ni, Se, Zn)	1990–2006
4. POPs	(See note 2)	1990–2006
B. Sector emissions		
1. Main pollutants	SO _x , NO _x , NH ₃ , NMVOCs, CO	1980–2006
2. Particulate matter	PM _{2.5} , PM ₁₀ , TSP	2000–2006
3. Heavy metals	Pb, Cd, Hg/(As, Cr, Cu, Ni, Se, Zn)	1990–2006
4. POPs	(See note 2)	1990–2006
5-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
5-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://emep-emissions.at and their country-specific review reports issued in March and June 2008.
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:

- 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 (current year – 2) should be reported.
- 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 EU-27 and 2008 reporting instructions: <http://www.emep-emissions.at/reporting-instructions/reporting-programme-2008/>).

Reporting format

Each Party should use the reporting format set out in annex IV of the reporting guidelines (UNECE, 2003) for its annual submissions. The information should be formally submitted to the UNECE secretariat, preferably in electronic form. The reporting format, including NFR, is a standardised format for reporting estimates of emissions, including activity data, projected activity data, projected emissions and other relevant information. The reporting format aims at facilitating electronic submissions to simplify the processing of emissions information and the preparation of useful technical analysis and synthesis documentation. The reporting format covers:

- national annual emissions and national annual sector emissions using NFR (annex IV, table IV 1A and table IV 1B);
- total and aggregated sector emissions for reporting emissions of sulphur, nitrogen oxides, ammonia, non-methane volatile organic compounds, carbon monoxide, particulate matter, lead, cadmium, mercury, PAHs, HCB and dioxins/furans, for the EMEP grid squares of 50 km x 50 km and emissions from large point sources (annex IV, tables IV 3A, IV 3B and IV 3C);
- for the years 2010, 2015 and 2020, projected activity data and projected national total emissions of sulphur, nitrogen oxides, ammonia and non-methane volatile organic compounds to be reported for the source categories listed in annex IV (annex IV, tables IV 2B, IV 2C, IV 2D, IV 2E and IV 2A).

Annexes

For Annexes A to E, see separate files.

European Environment Agency

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