

European Environment Agency



# European Union emission inventory report 1990-2024

Under the UNECE Convention on Long-range  
Transboundary Air Pollution (Air Convention)

EEA report

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# Executive summary

## About this report

This annual EU emission inventory report and its accompanying data comprise the EU's official submission to the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (Air Convention) (UNECE, 1979). The European Environment Agency (EEA) compiled the report, working with EU Member States and the European Commission, which submitted the report on behalf of the EU as a Party to the Air Convention.

The Air Convention requires Parties to report emission data for numerous air pollutants, including:

- regulated pollutants with a reduction obligation, or the so-called main pollutants: nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOCs), sulphur oxides (SO<sub>x</sub>), ammonia (NH<sub>3</sub>) and particulate matter (PM) with a diameter of 2.5µm or less (PM<sub>2.5</sub>, also known as fine PM);
- other pollutants: carbon monoxide (CO);
- PM emitted directly to the air (primary PM): PM with a diameter of 10µm or less (PM<sub>10</sub>), total suspended particulates (TSPs) and black carbon (BC, as a component of PM);
- priority heavy metals (HMs): lead (Pb), cadmium (Cd) and mercury (Hg);
- additional HMs: arsenic (As), chromium (Cr), copper (Cu), nickel (Ni), selenium (Se) and zinc (Zn);
- persistent organic pollutants (POPs): polychlorinated dibenzodioxins/dibenzofurans (PCDD/Fs), polycyclic aromatic hydrocarbons (PAHs), hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs);
- four individual PAHs and their sum: benzo(a)pyrene (B(a)P), benzo(b)fluoranthene (B(b)F), benzo(k)fluoranthene (B(k)F) and indeno(1,2,3-cd)pyrene (IP).

These pollutants harm human health and the environment. Certain pollutants also contribute to the formation of ground-level ozone (O<sub>3</sub>) and secondary PM in the atmosphere.

## Status of emission reporting by EU Member States

In 2026, EU Member States reported air pollutant emission inventory data under the Air Convention for each year between 1990 and 2024, and for PM from 2000 to 2024. All 27 EU Member States provided air emission inventories and activity data. A gap-filling procedure was applied to those missing emission data for certain years to obtain as complete a European inventory as possible.

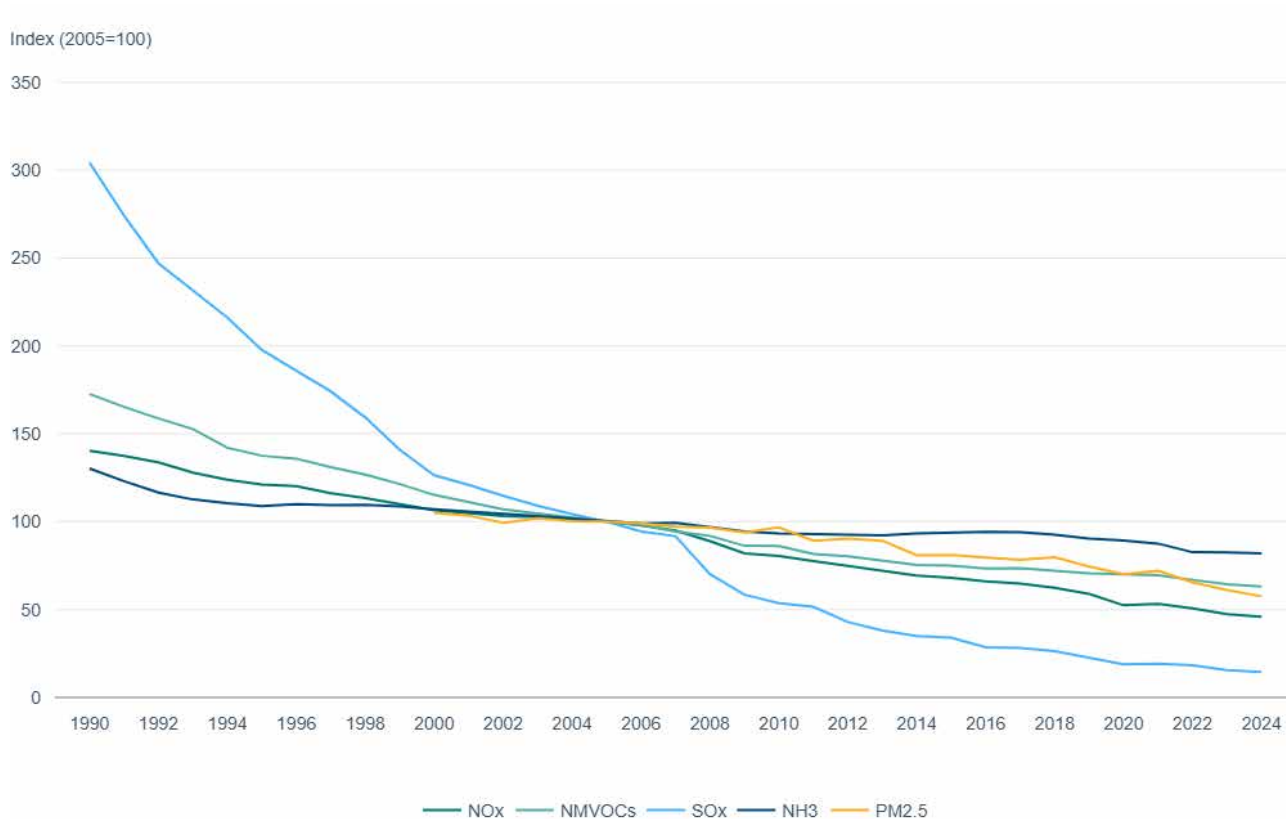
Member States also reported their informative inventory reports (IIR). Detailed information on EU Member States' submissions is provided in Appendix 3.

## EU emission trends

Emission trends are presented in Figure ES.1 for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub> and NH<sub>3</sub> from 1990 to 2024, and for PM<sub>2.5</sub> from 2000 to 2024. The reported emissions of all pollutants were lower in 2024 than in 2005. For the main pollutants, SO<sub>x</sub> emissions have been reduced the most (in percentage terms) both since 2005 (by 86%) and since 2023 (by 6%). This is followed by NO<sub>x</sub>, which has fallen by 54% since 2005 and 3% since 2023. NMVOC emissions have fallen by 37% since 2005 and by 2% since 2023. NH<sub>3</sub> emissions have fallen by 18% since 2005, and by 1% since 2023. PM<sub>2.5</sub> emissions have fallen by 42% since 2005 and by 6% since 2023.

The following summaries highlight the trends in emissions over time in the key sectors responsible for pollution in the EU (see Chapters 3 and 4 for more detailed analysis):

**Figure ES.1 Indexed EU-27 emission trends up to 2024 for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub> and PM<sub>2.5</sub>**



- **Energy production and distribution:** this sector is a major source of many air pollutants in the EU. In 2024, it was the main source of SO<sub>x</sub> and Hg emissions. Additionally, the sector is a significant source of HCB, Cd, NO<sub>x</sub> and PCBs. Of the five main pollutants, the highest absolute and relative reductions within this aggregated sector since 2005 have been in SO<sub>x</sub>.
- **Energy use in the industry sector:** this sector is a significant source of SO<sub>x</sub>, Hg, Pb, Cd, NO<sub>x</sub> and HCB emissions. Of the main pollutants, the highest absolute and relative reductions within this sector since 1990 and 2005, respectively, have been in SO<sub>x</sub>. Of the three main heavy metals, Cd has seen the greatest reduction from

this sector in relative terms since 1990, while Pb has shown the largest absolute reduction since 2005.

- Industrial processes and product use:** this sector comprises industrial sources of emissions other than those arising from fuel combustion within the industry sector. This sector is the main source of NMVOC, Cd, Pb, HCB and PCB emissions and a significant source of SO<sub>x</sub>, Hg, PM<sub>10</sub>, PCDD/F and CO emissions. Despite considerable reductions since 1990, the industrial processes and product use sector continues to contribute significantly to total EU emissions of HMs. Of the main pollutants, the highest absolute reductions within this sector since 1990 and 2005 have been in NMVOCs, while SO<sub>x</sub> emissions have fallen the most in relative terms.
- Commercial, institutional and households:** fuel combustion by commercial and institutional facilities and households contributes significantly to the EU's total emissions of many pollutants. This sector is the main source of B(a)P, PAHs, PM<sub>2.5</sub>, CO, PM<sub>10</sub> and BC emissions and a significant source of PCDD/Fs, Cd, HCB, SO<sub>x</sub> and NMVOC emissions in the EU. It is also an important sector for emissions of Pb and NO<sub>x</sub>. Of the main pollutants from this sector, the highest relative and absolute reductions since both 1990 and 2005 have been in SO<sub>x</sub>. Within this sector, Cd emissions have increased since 1990 but have levelled off since 2005.
- Road transport:** this is the main sector for emissions of NO<sub>x</sub> and a significant source of Pb, BC and CO emissions. Of the main pollutants from the sector, NO<sub>x</sub> has seen the greatest absolute reduction since both 1990 and 2005. The main HM emitted by the road transport sector is Pb, which has seen the highest relative reduction in emissions since 1990.
- Non-road transport:** this sector is not a main source of any pollutant, but it is a significant source of NO<sub>x</sub> and CO emissions. In 2024, it contributed about 15% of total NO<sub>x</sub> emissions and about 10% of CO emissions in the EU. In this sector, NO<sub>x</sub> emissions have decreased more than CO emissions, both relatively and absolutely.
- Agriculture:** this sector is the main source of EU emissions of NH<sub>3</sub>, with a share of 94% in 2024. In addition, the agriculture sector produces considerable emissions of NMVOCs, PM<sub>10</sub> and NO<sub>x</sub>. Of the most important pollutants from this sector, the highest relative and absolute reduction since both 1990 and 2005 was in NH<sub>3</sub>. In 1990, the agriculture sector was also a major source of HCB emissions; however, they have reduced markedly and agriculture is no longer an important source of HCB.
- Waste:** this sector is a major source of PCDD/Fs, BC and HCB. Of these pollutants, HCB emissions have fallen the most since 1990. PCDD/F emissions have also fallen markedly, while BC emissions from this sector have fluctuated, with no clear trend since 2000.

# 1 Introduction

The European Commission provides this report and its accompanying data, on behalf of the EU-27 countries, as an official submission to the Convention on Long-range Transboundary Air Pollution (Air Convention) via the Convention secretariat at the United Nations Economic Commission for Europe (UNECE).

This report covers the following subjects: the formal institutional arrangements that underpin the EU's emission inventory, the inventory preparation process, methods and data sources, key category analyses (KCAs), information on quality assurance and quality control (QA/QC), general uncertainty evaluation, general assessment of completeness and information on underestimations (Chapter 1); adjustments under the Gothenburg Protocol (Chapter 2); emission trends and the contribution of key categories to total emissions (Chapter 3); sectoral analysis and emission trends for key pollutants (Chapter 4); and information on recalculations and planned improvements (Chapter 5).

Several annexes accompany this inventory report:

- Annex A provides a copy of the EU's formal Air Convention data submission in the required UNECE format for the reporting of air pollutants (nomenclature for reporting 19 (NFR19)).
- Annex B provides the updated EU NO<sub>x</sub> emission data for the period 1987-1989, as required by the 1988 NO<sub>x</sub> protocol of the Air Convention (see Sofia Protocol in Table 1.1).
- Annex C provides results of the key category analyses (KCAs) for the EU, showing the main emitting sectors for each pollutant.
- Annex D presents the EU's gap-filled inventory, colour-coded for the different data sources used and the various additional gap-filling methods applied.
- Annex E provides EU Member States' projections for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub> and BC emissions.
- Annex F presents the EU's data submission under the Oslo protocol (Table A2.2 in Appendix 2).
- Annex G gives an overview of the emission data sources of the individual pollutants used when compiling the EU inventory.
- Annex H provides an overview of the completeness of the gap-filled inventory concerning the notation keys 'NE', 'NR', 'NO' and 'NA'.

## 1.1 Background

The EU ratified the UNECE Air Convention (UNECE, 1979) in 1982. Since 1984, eight protocols have come into force. Table 1.1 presents the ratification status of each protocol for the EU as a whole. The status differs across individual EU Member States.

**Table 1.1 EU ratification status of the Air Convention and related protocols**

Year	Air Convention and its protocols	Ratification status
1979	'Air Convention': Convention on Long-range Transboundary Air Pollution (UNECE, 1979)	Signed and ratified (approval)
1984	'EMEP Protocol': Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (UNECE, 1984)	Signed and ratified (approval)
1985	'Helsinki Protocol': Protocol on the Reduction of Sulphur Emissions or Their Transboundary Fluxes by at Least 30 Per Cent (UNECE, 1985)	Not signed
1988	'Sofia Protocol': Protocol Concerning the Control of Emissions of Nitrogen Oxides or Their Transboundary Fluxes (UNECE, 1988)	Ratified (accession)
1991	'Geneva Protocol': Protocol Concerning the Control of Emissions of Volatile Organic Compounds or Their Transboundary Fluxes (UNECE, 1991)	Signed
1994	'Oslo Protocol': Protocol on Further Reduction of Sulphur Emissions (UNECE, 1994)	Signed and ratified (approval)
1998	'Aarhus Protocol': Protocol on Persistent Organic Pollutants (UNECE, 1998a)	Signed and ratified (approval)
1998	'Aarhus Protocol': Protocol on Heavy Metals (UNECE, 1998b)	Signed and ratified (approval)
1999	'Gothenburg Protocol': Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (UNECE, 1999)	Ratified (accession)
2009	Amendments to the Aarhus POPs Protocol	Ratified (acceptance)
2012	Amendments to the Gothenburg Protocol (UNECE, 2012b)	Ratified (acceptance)
2012	Amendments to the Aarhus Heavy Metals Protocol	Ratified (acceptance)

**Note:** Ratification is the final step in the process of approving an agreement by which the parties indicate their intention to be bound by that agreement. Once ratification has been completed, an agreement can be concluded and formally enters into force <sup>(1)</sup>

### 1.1.1 Reporting obligations

#### Reporting obligations under the Air Convention

The basis for reporting by individual EU Member States and by the EU is the Air Convention (UNECE, 1979), its protocols and the subsequent decisions taken by the Executive Body of the convention. The reporting guidelines describe the data that Parties should report under the Air Convention and its protocols.

Under the Air Convention, Parties are obliged to report their emission totals, the emission inventory, every year for the following pollutants (see Appendix 2):

(1) See: <https://eur-lex.europa.eu/EN/legal-content/glossary/ratification-process.html>

- regulated pollutants with a reduction obligation:
  - o nitrogen oxides (NO<sub>x</sub>)
  - o non-methane volatile organic compounds (NMVOCs)
  - o sulphur oxides (SO<sub>x</sub>)
  - o ammonia (NH<sub>3</sub>)
  - o fine PM with a diameter of 2.5µm or less (PM<sub>2.5</sub>)
- other
  - o carbon monoxide (CO)
- particulate matter (PM)
  - o PM with a diameter of 10µm or less (PM<sub>10</sub>)
  - o total suspended particulates (TSPs)
  - o black carbon (BC)
- priority heavy metals (HMs)
  - o lead (Pb)
  - o cadmium (Cd)
  - o mercury (Hg)
- additional HMs:
  - o arsenic (As)
  - o chromium (Cr)
  - o copper (Cu)
  - o nickel (Ni)
  - o selenium (Se)
  - o zinc (Zn)
- persistent organic pollutants (POPs)
  - o polychlorinated dibenzodioxins/polychlorinated dibenzofurans (PCDD/Fs)
  - o polycyclic aromatic hydrocarbons (PAHs)
  - o hexachlorobenzene (HCB)
  - o polychlorinated biphenyls (PCBs)

- additional reporting of PAHs
  - o benzo(a)pyrene (B(a)P)
  - o benzo(b)fluoranthene (B(b)F)
  - o benzo(k)fluoranthene (B(k)F)
  - o indeno(1,2,3-cd)pyrene (IP)

The reporting guidelines (Guidelines for reporting emissions and projections data under the Convention on Long-range Transboundary Air Pollution) are adopted by the Executive Body of the Air Convention. The latest guidelines were updated in December 2022 at the 42nd session of the Executive Body (UNECE, 2022a; UNECE, 2022c). A summary of the reporting requirements is presented in Appendix 2.

The reporting guidelines specify separate reporting dates for the EU to allow time to compile an aggregated inventory based on the individual submissions from EU Member States. The reporting guidelines also request that Parties report emission inventory data using the European Monitoring and Evaluation Programme (EMEP) NFR19 format.

The EU should submit the following reporting obligations to the Executive Secretary of UNECE by the dates given below:

- Inventory data by 30th of April, annually;
- Projections data by 30th of April, every 4 years, starting in 2015;
- Informative inventory report by 30th of May, annually;
- Gridded data at a resolution of 0.1°×0.1° longitude-latitude by 15th of June, every 4 years, starting in 2017;
- Large Point Source data (LPS) by 15th of June every 4 years, starting in 2017.

### Gothenburg Protocol

The Gothenburg Protocol to the Air Convention (UNECE, 1999) and its amendment (UNECE, 2012a) specifies emission reduction commitments for the pollutants NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub> and PM<sub>2.5</sub> (and BC as a component of PM). The reduction commitments are defined in relation to the 2005 emission levels and they are to be met by 2020 and every year thereafter.

The emission reduction commitment for the EU as a whole is the sum of the reduction commitments for the EU Member States <sup>(2)</sup>. For the EU, the emission reduction commitments for 2020 and beyond are the following (UNECE, 2012b):

(2) The reduction commitment levels specified in Gothenburg Protocol annex II for the EU as a whole are based on the EU membership in 2012 (before Croatia's accession and the UK departure); the EU reduction commitment is therefore subject to technical correction, cf EB decision 2021/3.

- 59% for SO<sub>2</sub>;
- 40% for NO<sub>x</sub> <sup>(3)</sup>;
- 6% for NH<sub>3</sub>;
- 28% for NMVOCs;
- 22% for PM<sub>2.5</sub>.

### Adjustments under the Air Convention

Adjustments to emission reduction commitments may be applied in certain circumstances if such a circumstance keeps a Party from meeting one of its reduction commitments (UNECE, 2012a; see also Chapter 2). An adjustment may also be applied to emission inventories for the purpose of comparing them with total national emissions.

These circumstances are as follows:

- New emission source categories are identified that were not accounted for at the time the emission reduction commitments were made;
- Emission factors used to determine emission levels for particular source categories have changed since the emission reduction commitments were made;
- The ways of determining emissions from specific source categories have changed significantly between the time when emission reduction commitments were made and the year that they are to be attained.

If a Party is planning to adjust its inventory for the purpose of comparing total national emissions with emission reduction commitments, it indicates in its notification to the Air Convention which categories and pollutants are affected. It uses Annex IIa to the reporting guidelines as a basis.

Parties must report details of their approved adjusted aggregated emissions using the appropriate row in the main emissions reporting template (Annex I to the reporting guidelines). They must also provide detailed information by pollutant and sector for each adjustment, using the template provided in Annex IIa to the reporting guidelines. Reporting of information on adjusted emissions in no way suspends the mandatory requirement for Parties to report unadjusted emissions, as laid down in Section V, Sub-sections A-D, of the guidelines.

More information and the adjusted emission data can be found in Chapter 2.

#### 1.1.2 Harmonisation of reporting obligations

The National Emissions reduction Commitments (NEC) Directive (2016/2284/EU) entered into force on 31 December 2016, replacing earlier legislation (Directive 2001/81/EC). The 2016 NEC Directive sets emission reduction commitments for five main air pollutants: NO<sub>x</sub>, NMVOCs, SO<sub>2</sub>, NH<sub>3</sub> and PM<sub>2.5</sub> separately for the years 2020-2029 and for the years 2030 and after.

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(3) This figure is in accordance with a technical correction to the original Gothenburg Protocol Annex II table in 2022.

The directive transposes the reduction commitments for 2020 agreed by the EU and its Member States under the Gothenburg Protocol of the Air Convention into EU law. The more ambitious reduction commitments agreed for 2030 are designed to reduce the health impacts of air pollution by half compared to 2005.

Further, the Directive requires that the Member States draw up National Air Pollution Control Programmes with a view to complying with its emission reduction commitments, and to contributing effectively to the achievement of the air quality objectives as stipulated in Article 1 of the Directive.

Reporting obligations under the Air Convention and NEC Directive are largely harmonised. Member States fulfil reporting obligations under either framework using methodologies set out in [EMEP Reporting Guidelines](#), the [EMEP/EEA air pollutants emission inventory guidebook](#) and further guidance material adopted under the Air Convention. Minor differences still occur between reporting under the Air Convention and the NEC Directive:

- Reporting of emission data for the PAHs (B(a)P, B(b)F, B(k)F and IP) is voluntary under the Air Convention but is obligatory under the NEC Directive;
- Under the Air Convention, the territories may differ from the scope of the NEC Directive. For Portugal, emissions from the Azores and Madeira are included under the Air Convention. This differs from reporting under the NEC Directive, for which the Azores and Madeira are excluded. For Spain, the territorial scope of the amended Gothenburg Protocol covers Canary islands, but excludes Ceuta and Melilla, which is the Spanish territory applied in the context of this report. In the scope of the NEC Directive, the Canary islands are excluded and Ceuta and Melilla are included;
- Emissions of NO<sub>x</sub> and NMVOCs from activities falling under the 2014 Nomenclature for Reporting (NFR) as provided by the Air Convention categories 3B (manure management) and 3D (agricultural soils) are not included in NECD compliance total, but are included in the Air Convention compliance total (Directive 2016/2284/EU, Article 4(3));
- While reporting of projections is required biennially under the NEC Directive, under the Air Convention it is only obligatory every 4 years.
- For NO<sub>x</sub>, SO<sub>2</sub>, NMVOCs and CO, EU Member States are required to report their emissions also under the Governance Regulation (EU 2018/1999) (EU, 2018). This regulation transposes the requirement under the United Nations Framework Convention on Climate Change (UNFCCC) to the EU.

Table 1.2 provides an overview of the various air emission reporting obligations for EU Member States including the NEC Directive, Air Convention and the EU Governance Regulation/UNFCCC. These reporting obligations differ regarding the inclusion of domestic and international aviation and navigation in the reported national totals. Table 1.3 summarises the main differences between these reporting instruments, which are small overall.

**Table 1.2 Overview of air emission reporting obligations under the NEC Directive, Air Convention and EU Governance Regulation/UNFCCC in the EU**

Legal obligation	Emissions to report	Annual reporting deadline for EU Member States	Annual reporting deadline for the EU (a)
NEC Directive	NO <sub>x</sub> (as NO <sub>2</sub> ), NMVOCs, SO <sub>x</sub> (as SO <sub>2</sub> ), NH <sub>3</sub> , CO, HMs, POPs and PM	15 February	Not applicable
Air Convention	NO <sub>x</sub> (as NO <sub>2</sub> ), NMVOCs, SO <sub>x</sub> (as SO <sub>2</sub> ), NH <sub>3</sub> , CO, HMs, POPs and PM	15 February	30 April
EU Governance Regulation/ United Nations Framework Convention on Climate Change (UNFCCC)	Carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride, NO <sub>x</sub> , CO, NMVOCs and SO <sub>2</sub>	15 January	15 April

**Notes:** (a) Over the years, the European Union has acceded to a number of protocols. The protocols have also been signed by the vast majority of EU Member States, while others are in the process to ratify them. 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.

**Table 1.3 Comparison of how reported emissions are included in national totals under the Air Convention, NEC Directive (NECD) and EU Governance Regulation/UNFCCC**

Reporting item	NECD	Air Convention	Governance Regulation/ UNFCCC
<b>Domestic aviation (LTO)</b>	Included	Included	Included
<b>Domestic aviation (cruise)</b>	Not included	Not included	Included
<b>International aviation (LTO)</b>	Included	Included	Not included
<b>International aviation (cruise)</b>	Not included	Not included	Not included
<b>National navigation (domestic shipping)</b>	Included	Included	Included
<b>International inland shipping</b>	Included	Included	Not included
<b>International maritime navigation</b>	Not included	Not included	Not included
<b>Road transport (fuel sold)(a)</b>	Included	Included	Included

**Notes:** Included: included in national totals; LTO: landing/take-off; Not included: Not included in national total ( i.e. memo item). International inland shipping refers to shipping activity in continental waters and international maritime navigation to shipping activity in marine waters. Air emissions resulting from inland shipping are included, as they are more relevant to air quality for the surrounding environment. (a) Parties may also report emission estimates based on fuel used as an additional 'memo item'. Austria, Belgium, Ireland, Lithuania, Luxembourg and the Netherlands may choose to use the national emission total calculated on the basis of fuel used in the relevant geographical area as a basis for compliance (UNECE, 2022b; UNECE, 2022c). However, the Netherlands report these emissions based on fuel sold.

### 1.1.3 Institutional arrangements for the EU

#### European Commission

The European Commission formally submits the EU emission inventory and the EU IIR to EMEP via the Executive Secretary of UNECE.

#### European Environment Agency (EEA)

The EEA supports the European Commission's Directorate-General (DG) for Environment to compile the annual EU emission inventory under the Air Convention.

EEA activities include:

- overall coordination and management of the inventory compilation process;
- coordinating the activities of the EEA's European Topic Centre on Human health and the environment (ETC HE);
- communication with the European Commission;
- communication with EU Member States;
- circulation of the draft EU IIR;
- hosting the official inventory database and disseminating the data and inventory report online;
- preparing the gap-filled EU emission inventory, based on Member States submissions and submitting this to the European Commission;
- compiling the EU IIR, based on the gap-filled EU emission inventory and the Member States IIRs;
- supporting a separate annual quality review of emission data submitted by the EU Member States;
- EEA is one of the co-chairs of the Task Force on Emission Inventories and Projections (TFEIP) under the Air Convention.

#### EU Member States

EU Member States are responsible for compiling their national emission inventories and informative inventory reports. They are responsible for selecting the activity data, emission factors and other parameters for their national inventories. EU Member States are requested to follow the reporting guidelines (UNECE, 2022b; UNECE, 2022c) and apply the methodologies in the latest version of the EMEP/EEA inventory guidebook (EMEP/EEA, 2023). EU Member States are also responsible for establishing QA/QC programmes for their inventories. Each emission inventory report should include a description of the QA/QC activities and recalculations.

EU Member States submit their national emission inventories and informative inventory reports to the European Environment Agency (EEA) via the reporting system maintained by the EEA. In addition, they take part in the annual review and commenting phase of the draft European Union emission inventory report (EU IIR). EU Member States check their national data and information used in the EU IIR and, if necessary, submit updates. They also provide general comments on the EU IIR.

### European Topic Centre on Human Health and the Environment (ETC HE)

The main activities of the ETC HE <sup>(4)</sup> regarding the EU's Air Convention emission inventory include:

- supporting the EEA in the development of the EU emission inventory, including QA/QC of the inventory data as well as compiling the EU emission inventory report;
- supporting a centralised review of Member State submissions in cooperation with the EMEP Centre on Emission Inventories and Projections (CEIP) and compiling results from those checks (status reports, country synthesis and assessment reports, country review reports).

### European Environment Information and Observation Network (Eionet)

Eionet facilitates the work of the EEA and the respective European topic centres (ETCs) (EU, 1999) <sup>(5)</sup>. It comprises the EEA (supported by its ETCs) and a supporting network of experts from national environment agencies and other bodies that deal with environmental information (Eionet, 2026a). Eionet's Central Data Repository is used as the reporting tool where the EU Member States Reportnet make their Air Convention submissions available to the EEA (Eionet, 2026b).

## 1.2 EU Inventory compilation

The Air Convention emission inventory of the EU is based on an aggregation of data reported by EU Member States. The methods that the Member States use must follow those described in the inventory guidebook (EMEP/EEA, 2023).

The recommended structure for an Informative Inventory Report (IIR) involves a general description of the methodologies and data sources used. This includes an overview of the emission factors used in the national inventory – country specific or default given in the inventory guidebook (EMEP/EEA, 2023) – and the specification of the sources of emission factors and methods. It also provides a detailed description of activity data sources where data differ from national statistics.

The following sub-sections summarise the information that EU Member States provide in their IIRs. This should help readers to understand the basis of the EU inventory. For detailed descriptions of methodologies and data sources, see EU Member States' IIRs (see Appendix 5 for IIR references).

### 1.2.1 Reporting data flow

Under the agreement between Eionet countries and the EEA concerning priority data flows, EU Member States are requested to post a copy of their official submission to the Air Convention in the reporting system provided by EEA by the 15th of February each year. The EEA subsequently collects the data in a database, performs a QA/QC procedure, compiles the gap-filled EU Air Convention emission inventory database and produces an EU27 emission inventory. The EEA also compiles the EU IIR. The European Commission formally submits the EU's emission inventory data and the EU IIR to EMEP through the Executive Secretary of UNECE. The inventory and accompanying documentation are then made publicly available through the EEA's website.

(5) <https://www.eionet.europa.eu>

All inventory documents (submissions, inventory master files, inventory reports, status reports and related correspondence) are archived electronically on the EEA system. Revisions of data sets are recorded.

### 1.2.2 Data sources

The main data sources for the national emission inventories are official national statistics.

Table 1.4 summarises data sources commonly used by the Member States for the various sectors. The main source for emission factors is the inventory guidebook (EMEP/EEA, 2023). However, the emission factors can also be country specific or even plant specific. The emission factors also vary according to which tier method is used by the Member State. Detailed information on the data sources and emission factors used by each Member State is documented in their respective IIR (see Appendix 5).

The data sources used to compile the EU emission inventory and the EU informative inventory report is the EU Member States' emission inventories and the informative inventory reports, respectively.

**Table 1.4 Data sources commonly used for inventory sectors**

Sector	Sources
<b>Energy</b>	Energy balances, EU Emissions Trading Scheme (ETS) data, large combustion plant data and LPS surveys
<b>Transport</b>	Energy balances, vehicle fleet statistics
<b>Industrial processes and product use</b>	National production statistics, trade statistics, data from plant operators (facility reports), reporting under the European Pollutant Release and Transfer Register (E-PRTR) and its predecessor, the European Pollutant Emission Register (EPER)
<b>Agriculture</b>	National agricultural statistics, specific studies
<b>Waste</b>	Landfill databases, national studies, national statistics, information from municipalities

### Comparison of EU Member States' emissions calculated on the basis of fuel sold versus fuel used in road transport

Parties to the Air Convention can estimate transport emissions using the amount of fuel sold within the country or the amount of fuel consumed. When fuel purchased within a country is used outside that country (and vice versa), these estimates can differ significantly. The EU inventory estimates emissions from road transport based on the fuel sold for all EU Member States.

Article V/A, paragraph 22, of the EMEP reporting guidelines (UNECE, 2022b; UNECE, 2022c) specifies how to report emissions from transport:

For emissions from transport, all Parties should calculate emissions consistent with national energy balances reported to Eurostat or the International Energy Agency. Emissions from road vehicle transport should therefore be calculated on the basis of the fuel sold in the Party concerned. In addition, Parties may voluntarily calculate emissions from road vehicles based on fuel used or kilometres driven in the geographical area of the Party. The method for the estimate(s) should be clearly specified in the IIR.

Paragraph 23 of the guidelines provides detailed information on the basis of compliance checking:

For Parties for which emission ceilings are derived from national energy projections based on the amount of fuel sold, compliance checking will be based on fuels sold in the geographical area of the Party. Other Parties within the EMEP region (i.e. Austria, Belgium, Ireland, Lithuania, Luxembourg, the Netherlands<sup>(6)</sup>, Switzerland and the United Kingdom of Great Britain and Northern Ireland) may choose to use the national emission total calculated on the basis of fuels used in the geographic area of the Party as a basis for compliance with their respective emission ceilings (UNECE, 2022b).

### 1.2.3 Data gaps and gap filling

The EMEP reporting guidelines (UNECE, 2022b) require that submitted emission inventories are complete. However, emission estimates are not always available for all pollutants every year, because there are gaps in the data reported by the EU Member States. A gap-filling process was developed in 2010 for compiling the EU inventory and was refined in 2011 and 2017.

The gap-filling procedure, performed for the EU inventory by the EEA, follows a methodology paper by the EEA and the European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM, 2015) and some changes agreed by TFEIP in 2016<sup>(7)</sup>. This procedure is also consistent with the techniques used to fill emission data gaps proposed by the inventory guidebook (EMEP/EEA, 2023). It applies a stepwise approach using emission data from other reporting obligations to fill gaps in the national data sets, followed by further gap-filling procedures such as interpolation or extrapolation and manual changes (Box 1.1).

Gap filling can only be applied if national total or sectoral data is available. When the national total is available, sectors are first gap filled and then summed to determine the total. When sectoral data is available, the sectoral split of the previous or following year is used to fill the gaps. If a national total was available, but the sectoral data were incomplete, no gap filling is carried out. In such instances, the EU emission totals for these pollutants are considered incomplete (i.e. they are underestimated). Furthermore, inventories cannot be considered complete if the notation keys 'NE' and in some cases 'NR', or the value 0, are reported or are used for gap filling. For further information on the effect of gap filling on the EU inventory, see Section 1.3.7.

(6) The Netherlands have chosen to report these emissions based on fuel sold.

(7) TFEIP/Eionet meeting and workshop, 16-18 May 2016, in Zagreb.

**Box 1.1: Unified Air Convention gap filling for EU and EMEP inventories (ETC/ACM, 2015)**

A stepwise approach is used to fill gaps in the national data sets:

1. An EU wide emission inventory (comprising of trends for all pollutants from 1990 onwards) is compiled by the EEA, using the Air Convention emission inventories provided by the EU Member States
2. Air Convention inventories submitted to the EEA in the previous year are the next source used to fill remaining gaps. All reported data (i.e. values and notation keys) are used.
3. Next, emission data reported officially by EU Member States under the NEC Directive in the current year are used to fill gaps. Notation keys are not used in this step.
4. For those EU Member States not reporting complete data, emission data reported officially by them under the EU Greenhouse Gas Monitoring Mechanism Regulation (MMR) in the current year are used to fill gaps. Notation keys are not used in this step.
5. Subsequently, notation keys reported by EU Member States under the NEC Directive in the current year are used to fill any remaining gaps.
6. In a further step, notation keys reported by EU Member States under the MMR in the current year are used to fill any remaining gaps.
7. Next, Member State Air Convention emission inventories provided to the EEA in previous years are used to fill any gaps still remaining (values and notation keys).
8. Next, NEC Directive data provided to the EEA in previous years are used to fill any remaining gaps (values and notation keys).
9. The gap filling continues with emission data reported in previous years under the MMR (values and notation keys).
10. For all remaining cases of missing data, further gap-filling procedures are applied:
  - (a) Linear interpolation is performed if one or several years are missing in the middle of a time series.
  - (b) Linear extrapolation is performed if one or several years are missing, either at the beginning or at the end of a time series, and if at least 5 consecutive years showing a clear trend ( $r^2 \geq 0.6$ ) are available. Extrapolation 'backwards' is never allowed to result in negative values.
  - (c) If fewer than 5 consecutive years are available as a basis for extrapolation, or if years do not show a clear trend (as is the case when  $r^2 < 0.6$ ), the value of the previous or next year is used to fill the gaps.
  - (d) If the notation key 'NA' (not applicable) or 'NO' (not occurring) is used as a basis for gap filling, it is treated as '0' and is not gap filled.
  - (e) When both national total and sectoral data are unavailable, sectors are first gap filled and then summed to determine the total.
  - (f) When the national total is available but there are no sectoral data, the sectoral split of the previous or following year is used to fill the gaps.
11. The final step of the gap-filling procedure is the correction of the gap-filled particulate matter data in all cases in which total suspended particulate (TSP) emissions are lower than  $PM_{10}$  emissions,  $PM_{10}$  emissions are lower than  $PM_{2.5}$  emissions, or  $PM_{2.5}$  emissions are lower than BC emissions. In these cases,  $PM_{10}$  data are equated with TSP data,  $PM_{2.5}$  data with  $PM_{10}$  data, and BC data with  $PM_{2.5}$  data.

### 1.3 Overview of the reporting in the current cycle

#### 1.3.1 Data submissions

Appendix 3 presents detailed information on EU Member States' submissions in the current reporting cycle. In the current reporting cycle, only inventory data and IIRs were mandatory.

#### 1.3.2 Activity Data

Activity Data is provided for all categories for liquid fuels, solid fuels, gaseous fuels, biomass and other fuels. Aggregation of the reported activity data for the EU is possible, when all Member States report in the same unit.

Activity Data for 'Other Activity' is reported in following categories:

- 1A1a Public electricity and heat production
- 1A1b Petroleum refining
- 1A1c Manufacture of solid fuels and other energy industries
- 1A2a Stationary combustion in manufacturing industries and construction: Iron and steel
- 1A2b Stationary combustion in manufacturing industries and construction: Non-ferrous metals
- 1A2c - Stationary combustion in manufacturing industries and construction: Chemicals
- 1A2d - Stationary combustion in manufacturing industries and construction: Pulp, Paper and Print
- 1A2e - Stationary combustion in manufacturing industries and construction: Food processing, beverages and tobacco
- 1A2f - Stationary combustion in manufacturing industries and construction: Non-metallic minerals
- 1A2gvii - Mobile combustion in manufacturing industries and construction (please specify in the IIR)
- 1A2gviii - Stationary combustion in manufacturing industries and construction: Other (please specify in the IIR)
- 1A3ai(i) - International aviation LTO (civil)
- 1A3aai(i) - Domestic aviation LTO (civil)
- 1A3bi - Road transport: Passenger cars
- 1A3bii - Road transport: Light duty vehicles
- 1A3biii - Road transport: Heavy duty vehicles and buses
- 1A3biv - Road transport: Mopeds & motorcycles

- 1A3bvi - Road transport: Automobile tyre and brake wear
- 1A3bvii - Road transport: Automobile road abrasion
- 1A3c - Railways
- 1A3di(ii) - International inland waterways
- 1A3ei - Pipeline transport
- 1A3eii - Other (please specify in the IIR)
- 1A4ai - Commercial/Institutional: Stationary
- 1A4aii - Commercial/Institutional: Mobile
- 1A4bi - Residential: Stationary
- 1A4bii - Residential: Household and gardening (mobile)
- 1A4ci - Agriculture/Forestry/Fishing: Stationary
- 1A4cii - Agriculture/Forestry/Fishing: Off-road vehicles and other machinery
- 1A4ciii - Agriculture/Forestry/Fishing: National fishing
- 1A5a - Other stationary (including military)
- 1A5b - Other, Mobile (including military, land based and recreational boats)
- 2A2 - Lime production
- 2B1 - Ammonia production
- 2B3 - Adipic acid production
- 2B5 - Carbide production
- 2B6 - Titanium dioxide production
- 2B7 - Soda ash production
- 2C3 - Aluminium production
- 1A3bi(fu) - Road transport: Passenger cars (fuel used)
- 1A3bii(fu) - Road transport: Light duty vehicles (fuel used)
- 1A3biii(fu) - Road transport: Heavy duty vehicles and buses (fuel used)
- 1A3biv(fu) - Road transport: Mopeds & motorcycles (fuel used)
- 1A3bv(fu) - Road transport: Gasoline evaporation (fuel used)
- 1A3bvi(fu) - Road transport: Automobile tyre and brake wear (fuel used)
- 1A3bvii(fu) - Road transport: Automobile road abrasion (fuel used)

### 1.3.3 Condensable components from $PM_{2.5}$ and $PM_{10}$

Particulate matter (PM) consists of a filterable fraction and a condensable fraction. The condensable fraction reacts shortly after release on cooling and dilution and forms solid or liquid PM. Although the reporting of condensable components is not mandatory, including information on condensable components is recommended in Annex II of the reporting guidelines (EMEP CEIP, 2023a).

In the current reporting cycle, 22 EU Member States provided information in their IIR that confirms they include the condensable components at least for some sectors. The level of information provided by the Member States is rather heterogeneous and for many categories no information is available.

### 1.3.4 Key category analyses

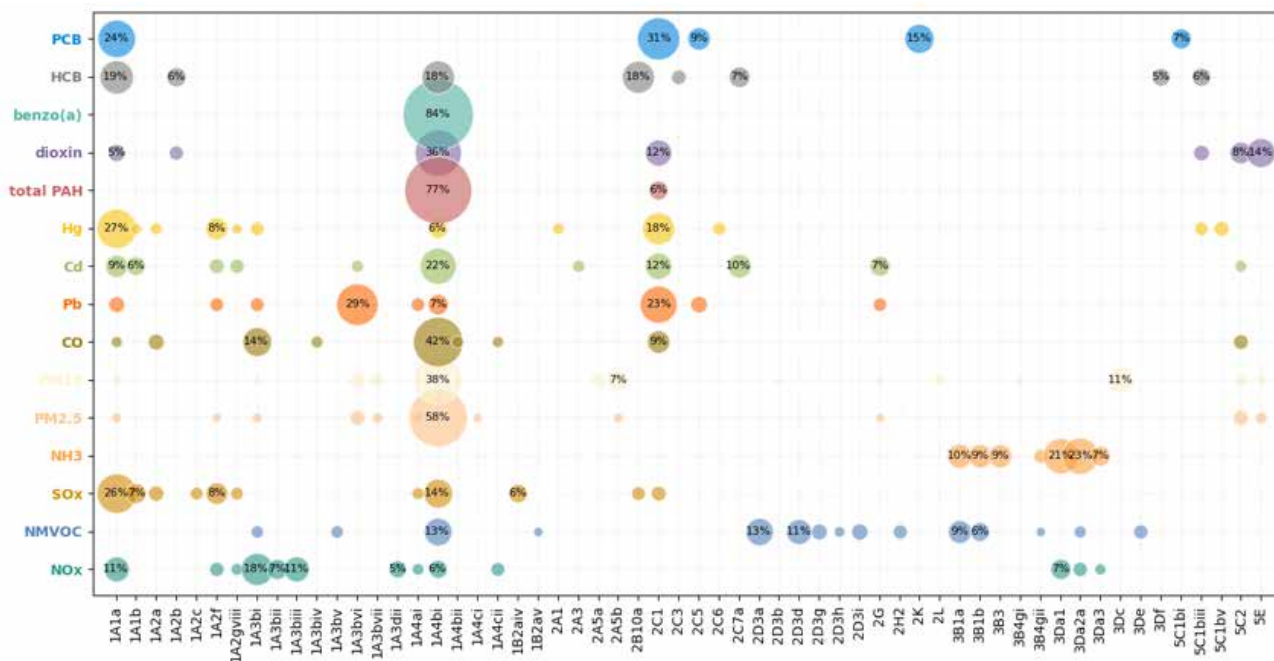
A key category is an emission source category that has a significant influence on an inventory. It may affect the absolute level of emissions, the trend in emissions or both. This report classifies categories jointly responsible for 80% of the national total emissions of a given pollutant as key categories (see EMEP/EEA, 2023).

EU key categories are determined by an analysis of the total EU emission levels of each pollutant following any necessary gap filling. Several factors may influence the determination of key categories at the EU level. When a Member State uses the notation 'IE' (included elsewhere) for a particular source-pollutant combination, the category concerned is likely to be underestimated, while the category in which emissions were reported instead is likely to be overestimated. In addition, EU Member States have different ways of allocating emissions to the sub-sector 'other', which might lead to inconsistencies. Given such issues, the EU KCA may not always accurately reflect the share of all main emission sources. It is also crucial to note that the results of a similar analysis of individual EU Member States will differ from the key sources determined for the EU.

A complete list of all EU key categories for the emissions of  $NO_x$ , NMVOCs,  $SO_x$ ,  $NH_3$ ,  $PM_{2.5}$ ,  $PM_{10}$ , CO, HMs (Pb, Cd and Hg) and POPs (PCDD/Fs, total PAHs, HCB and PCBs) is given in Figure 1.1. Chapter 3 provides a summary of the top five EU key categories for these pollutants. Additional HMs, TSPs, BC and the remaining POPs are not considered here.

More information on the Key category analysis can be found in Annex C.

Figure 1.1 EU KCA results for the current year



Note: Bubble size indicates the share of the respective category from the EU total of the particular air pollutant. All values >5% are indicated. For NFR codes, see the list of source sector abbreviations in Appendix 4.

### 1.3.5 Methodologies used

As the EU inventory is a compilation of each of the Member State’s inventories, the methodologies used by the Member States to compile their national inventories constitute the basis for the EU inventory. To reflect the level of combined methodological advancement in the EU inventory, information on the methodologies used by each of the Member States is collated, with a summary shown in Table 1.5. The information shown here is based on the Member States’ IIRs.

Table 1.5 shows the share of higher tiers for each pollutant and key category for the current reporting cycle. The share is calculated based on how many Member States used higher tier methods in compiling their inventory for the listed pollutants and key categories. Higher tiers are taken into account if member states reported Tier 2 or Tier 3. Also a mix of Tier 1, Tier 2 and/or Tier 3 are considered as a higher Tier method. It should be further noted that a key category in the EU inventory is not always a key category in all of the Member States.

**Table 1.5 Data sources commonly used for inventory sectors**

Pollutant	Key Categories	Share of higher tier methods
<b>NO<sub>x</sub></b>		
	1A3bi Road transport: Passenger cars	100%
	1A3biii Road transport: Heavy duty vehicles and buses	100%
	1A1a Public electricity and heat production	100%
	3Da1 Inorganic N-fertilizers (includes also urea application)	3%
	1A3bii Road transport: Light duty vehicles	100%
	1A4bi Residential: Stationary	99%
	1A3dii National navigation (shipping)	82%
	3Da2a Animal manure applied to soils	100%
	1A2f Stationary combustion in manufacturing industries and construction: Non-metallic minerals	84%
	1A4cii Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	95%
	1A2gviii Stationary combustion in manufacturing industries and construction: Other (please specify in the IIR)	93%
	1A4ai Commercial/Institutional: Stationary	94%
	3Da3 Urine and dung deposited by grazing animals	66%
<b>NMVO<sub>C</sub></b>		
	1A4bi Residential: Stationary	99%
	2D3a Domestic solvent use including fungicides	100%
	2D3d Coating applications	89%
	3B1a Manure management - Dairy cattle	99%
	3B1b Manure management - Non-dairy cattle	99%
	2D3i Other solvent use (please specify in the IIR)	100%
	2D3g Chemical products	100%
	2H2 Food and beverages industry	92%
	3De Cultivated crops	95%
	1A3bv Road transport: Gasoline evaporation	100%
	1A3bi Road transport: Passenger cars	100%
	3Da2a Animal manure applied to soils	99%
	2D3h Printing	98%
	1B2av Distribution of oil products	68%
	3B4gii Manure management - Broilers	100%
<b>SO<sub>x</sub></b>		
	1A1a Public electricity and heat production	100%
	1A4bi Residential: Stationary	99%
	1A2f Stationary combustion in manufacturing industries and construction: Non-metallic minerals	84%
	1A1b Petroleum refining	100%
	1B2aiv Fugitive emissions oil: Refining and storage	79%
	1A2a Stationary combustion in manufacturing industries and construction: Iron and steel	83%

2C1 Iron and steel production	100%
2B10a Chemical industry: Other (please specify in the IIR)	98%
1A2c Stationary combustion in manufacturing industries and construction: Chemicals	99%
1A2gviii Stationary combustion in manufacturing industries and construction: Other (please specify in the IIR)	96%
1A4ai Commercial/Institutional: Stationary	98%
<b>NH<sub>3</sub></b>	
3Da2a Animal manure applied to soils	100%
3Da1 Inorganic N-fertilizers (includes also urea application)	98%
3B1a Manure management - Dairy cattle	99%
3B1b Manure management - Non-dairy cattle	99%
3B3 Manure management - Swine	100%
3Da3 Urine and dung deposited by grazing animals	69%
3B4gii Manure management - Broilers	100%
<b>PM<sub>2.5</sub></b>	
1A4bi Residential: Stationary	98%
5C2 Open burning of waste	97%
1A3bvi Road transport: Automobile tyre and brake wear	100%
5E Other waste (please specify in the IIR)	85%
1A3bvii Road transport: Automobile road abrasion	94%
1A1a Public electricity and heat production	96%
1A3bi Road transport: Passenger cars	100%
2A5b Construction and demolition	44%
1A4ci Agriculture/Forestry/Fishing: Stationary	97%
2G Other product use (please specify in the IIR)	53%
1A2f Stationary combustion in manufacturing industries and construction: Non-metallic minerals	79%
1A4ai Commercial/Institutional: Stationary	95%
<b>PM<sub>10</sub></b>	
1A4bi Residential: Stationary	98%
3Dc Farm-level agricultural operations including storage, handling and transport of agricultural products	60%
2A5b Construction and demolition	26%
1A3bvi Road transport: Automobile tyre and brake wear	100%
2A5a Quarrying and mining of minerals other than coal	75%
1A3bvii Road transport: Automobile road abrasion	100%
5C2 Open burning of waste	97%
2L Other production, consumption, storage, transportation or handling of bulk products (please specify in the IIR)	2%
5E Other waste (please specify in the IIR)	85%
1A1a Public electricity and heat production	97%
3B4gi Manure management - Laying hens	95%
1A3bi Road transport: Passenger cars	100%

2D3b Road paving with asphalt	28%
2G Other product use (please specify in the IIR)	56%
<b>CO</b>	
1A4bi Residential: Stationary	99%
1A3bi Road transport: Passenger cars	100%
2C1 Iron and steel production	100%
1A2a Stationary combustion in manufacturing industries and construction: Iron and steel	98%
5C2 Open burning of waste	41%
1A3biv Road transport: Mopeds & motorcycles	100%
1A4bii Residential: Household and gardening (mobile)	99%
1A4cii Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	96%
1A1a Public electricity and heat production	98%
<b>Pb</b>	
1A3bvi Road transport: Automobile tyre and brake wear	100%
2C1 Iron and steel production	97%
1A4bi Residential: Stationary	99%
2C5 Lead production	10%
1A1a Public electricity and heat production	100%
1A3bi Road transport: Passenger cars	100%
1A2f Stationary combustion in manufacturing industries and construction: Non-metallic minerals	89%
1A4ai Commercial/Institutional: Stationary	99%
2G Other product use (please specify in the IIR)	52%
<b>Cd</b>	
1A4bi Residential: Stationary	98%
2C1 Iron and steel production	96%
2C7a Copper production	99%
1A1a Public electricity and heat production	99%
2G Other product use (please specify in the IIR)	50%
1A1b Petroleum refining	100%
1A2f Stationary combustion in manufacturing industries and construction: Non-metallic minerals	89%
1A2gviii Stationary combustion in manufacturing industries and construction: Other (please specify in the IIR)	90%
2A3 Glass production	53%
1A3bvi Road transport: Automobile tyre and brake wear	100%
5C2 Open burning of waste	97%
<b>Hg</b>	
1A1a Public electricity and heat production	98%
2C1 Iron and steel production	99%
1A2f Stationary combustion in manufacturing industries and construction: Non-metallic minerals	78%
1A4bi Residential: Stationary	99%

5C1bv Cremation	30%
1A3bi Road transport: Passenger cars	100%
5C1biii Clinical waste incineration	87%
2C6 Zinc production	100%
1A2a Stationary combustion in manufacturing industries and construction: Iron and steel	90%
2A1 Cement production	17%
1A1b Petroleum refining	100%
1A2gviii Stationary combustion in manufacturing industries and construction: Other (please specify in the IIR)	94%
<b>Dioxin</b>	
1A4bi Residential: Stationary	98%
5E Other waste (please specify in the IIR)	79%
2C1 Iron and steel production	96%
5C2 Open burning of waste	96%
1A1a Public electricity and heat production	95%
5C1biii Clinical waste incineration	100%
1A2b Stationary combustion in manufacturing industries and construction: Non-ferrous metals	96%
<b>HCB</b>	
1A1a Public electricity and heat production	95%
1A4bi Residential: Stationary	99%
2B10a Chemical industry: Other (please specify in the IIR)	0%
2C7a Copper production	100%
1A2b Stationary combustion in manufacturing industries and construction: Non-ferrous metals	100%
5C1biii Clinical waste incineration	58%
3Df Use of pesticides	12%
2C3 Aluminium production	100%
<b>Total PAH</b>	
1A4bi Residential: Stationary	99%
2C1 Iron and steel production	95%
<b>PCB</b>	
2C1 Iron and steel production	95%
1A1a Public electricity and heat production	100%
2K Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)	87%
2C5 Lead production	100%
5C1bi Industrial waste incineration	0%

### 1.3.6 Quality assurance and Quality control

EU Member States are encouraged to use appropriate quality assurance (QA) and quality control (QC) procedures to ensure data quality and to verify and validate their emission data. These procedures should be consistent with those described in the inventory guidebook (EMEP/EEA, 2023).

Once the Member States submit their quality-assured data to the EEA, an automatic QA procedure is performed. If the submission passes this stage, the data submission is technically accepted by the EEA. After the technical acceptance, the reported data are harvested into the EEA's internal SQL database. Thereafter, initial QA/QC are performed at the EEA. When relevant, this may result in questions that are sent to the Member States and a possible resubmission. An overview of the findings during the current reporting is given in Table 1.6.

**Table 1.6 Findings of the quality checks carried out during the preparation of the EU Air Convention emission inventory in the current reporting cycle**

Test	Number of EU Member States concerned
TSP to PM <sub>10</sub> ratio	4
PM10 to PM <sub>2.5</sub> ratio	2
PM <sub>2.5</sub> to BC ratio	7
'NE' analysis	27

**Notes:** In the PM ratio tests, the average of each ratio across the timeseries is calculated for each Member State and values 30% above or below the average are highlighted as outliers. The number of countries having one or more outliers is listed in the table. The NE-analysis lists how many Member States have reported the notation key NE at least once in the NFR-table for the most recent year of their inventory submission, i.e. for the year 2024.

In addition to the QA/QC procedures mentioned above, EU Member States also provide external checks through an Eionet review before the EU submits the final version of the EU inventory to the UNECE secretariat.

Additionally, an annual review, consisting of more detailed QA activities for the Member State Air Convention emission inventories, is performed by the EMEP Centre on Emission Inventories and Projections (CEIP) (EMEP CEIP, 2023b). At the same time, the European Commission, assisted by the EEA, reviews the inventories reported under the NEC Directive (EU, 2016). The results from these reviews are used to improve the quality of the national emission inventories, and where applicable, the quality of the EU inventory or the IIR.

### 1.3.7 Uncertainty evaluation

For quantification of uncertainties in emission inventories, the EMEP/EEA guidebook 2023 refers to the 2019 Refinement of the 2006 IPCC Guidelines for National GHG Inventories' guidance. In this approach, an uncertainty analysis is carried out by assessing the uncertainty of underlying activity data and emission factors used. As the EU air emission inventory presents an aggregation of Member States' emissions, a simplified methodology is applied.

First, information on the uncertainties reported for the pollutants NO<sub>x</sub>, SO<sub>x</sub>, NMVOC, NH<sub>3</sub> and PM<sub>2.5</sub> is collected from each of the MS IIRs (see and Appendix 6), displaying

the source of information, coverage, gases covered and the method used. The Netherlands and Germany are the only countries using approach 2 (Monte Carlo Simulation) to estimate uncertainties. Four Member States (BG, CZ, HU and LT) did not report any uncertainties. Italy reported only for NO<sub>x</sub> and SO<sub>x</sub> and the Netherlands reported only the level uncertainty. To gap-fill the missing uncertainty estimates, the average value of reporting MS has been used, for these countries. In order to derive an EU uncertainty estimate, a weighted level and trend uncertainty was determined by using the share of MS emissions in the EU total of the current reporting year. The results for EU level and trend uncertainty represent the sum of the weighted averages, as presented in Table 1.7.

This approach is also in line with the '2023 Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution', which states in paragraph 31 "Parties shall quantify uncertainties in their emission estimates using the most appropriate methodologies available, taking into account guidance provided in the EMEP/EEA Guidebook. Uncertainties should be described in the IIR."

The underlying data of the EU uncertainty assessment are presented in Appendix 6.

**Table 1.7**      **Weighted level and trend uncertainty for the EU inventory, based on the uncertainties reported by Member States**

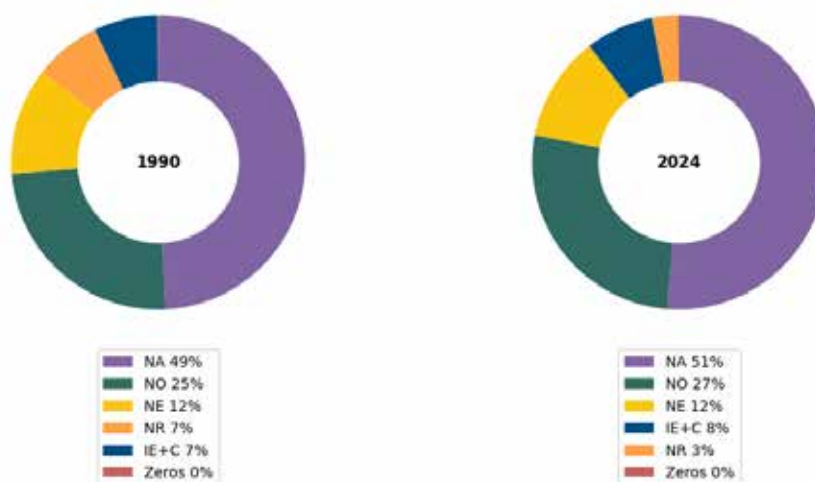
Pollutant	Weighted level uncertainty	Weighted trend uncertainty
NO <sub>x</sub>	28.07%	7.11%
SO <sub>x</sub>	11.88%	0.90%
NMVOC	39.10%	12.10%
NH <sub>3</sub>	41.39%	15.68%
PM <sub>2.5</sub>	47.63%	12.72%

### 1.3.8 Completeness of reporting

In this context, completeness means that reports include estimates for all pollutants, all relevant source categories, all years and all territorial areas. The reporting guidelines (UNECE, 2022b) require Parties to report data at least for the base year of the relevant protocol, and from the year it entered into force and up to the latest inventory year (i.e. minus 2 years from the submission year) (see Appendix 2, Table A2.1). Therefore, ideally, there should be no difference between the availability of data submissions for 1990 and for the latest inventory year.

Figure 1.2 shows a simple compilation indicating the completeness of Member State reporting for the first and the latest inventory year. In this compilation, the original data submissions, i.e. before gap filling, are used. It gives the percentages of each notation key or values that the reports present for source categories. The data are for all EU Member States and all pollutants, excluding national totals.

**Figure 1.2** Completeness of reporting of NFR templates submitted by EU Member States (all data entries for all pollutants, excluding national totals)



**Notes** C, confidential; NO, not occurring; NE, not estimated; NA, not applicable; IE, included elsewhere; NR, not relevant. Appendix 1 provides further explanations of notation keys

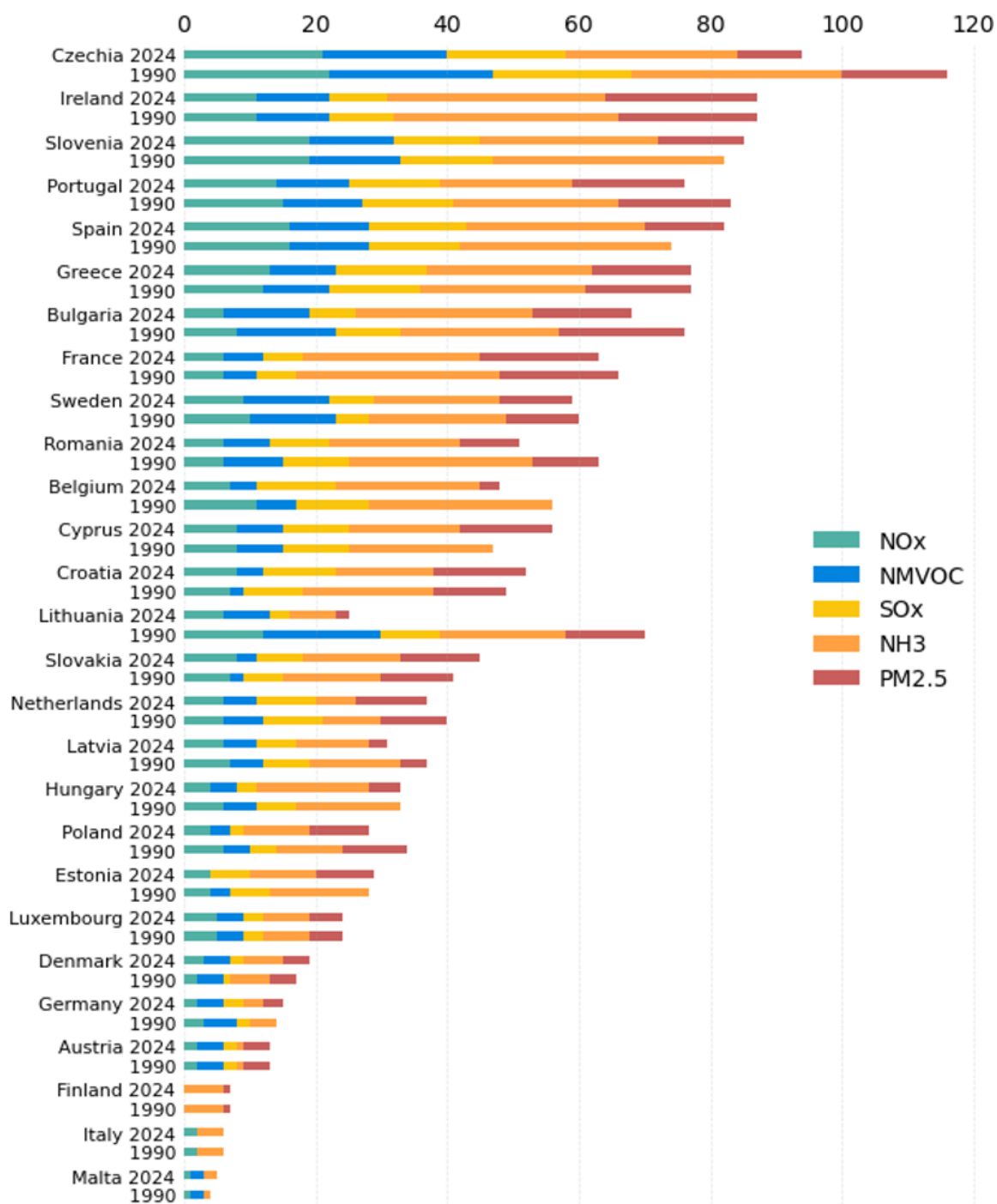
The notation key 'NA' (not applicable) appears often in the Member State's submissions, because an air pollutant is relevant only to specific emission sources (e.g. NH<sub>3</sub> for agriculture). There are many instances, however, in which some countries report emissions for a particular NFR category and pollutant while others use the notation keys 'NA' or 'NO'. More information on these instances can be found in Annex H.

The use of the notation keys 'NE', 'NR' <sup>(8)</sup> and the reporting of empty cells or '0' count as incomplete reporting. The official reporting guidelines of the Air Convention (UNECE, 2022b) allow countries to report emissions as 'NE' for some sectors. This is carried out when they know that emissions occur but have not estimated or reported them. In some cases, this approach aligns with the methodology of emission inventories as presented in the EMEP/EEA Air Pollutant Emission Inventory Guidebook. Countries should report in their IIR why they have not estimated emissions. A summary of the use of the notation key 'NE' for the main pollutants in the Member States is given in Figure 1.3. Information for all pollutants can be found in Annex H.

In the current reporting cycle, EU Member States reported 15% of the data entries incompletely, while for 1990 they reported 19% of the data incompletely.

(8) According to the reporting guidelines (UNECE, 2022b; UNECE, 2022c), emission inventory reporting should cover all years from 1990 onwards if data are available. However, 'NR' has been added to ease reporting where the different protocols do not strictly require details of emissions. 'NR' is correct and appropriate only in these circumstances.

**Figure 1.3** Number of 'NE' source categories reported for the main pollutants for 1990 and for the latest year



**Notes:** The Air Convention formally requests Parties to report emissions of PM for 2000 and thereafter. Therefore, 'NE' reporting for PM<sub>2.5</sub> in 1990 might be high for several countries.

## 2 Adjustments under the Gothenburg Protocol

A list of new inventory adjustment applications accepted by the EMEP Steering Body is given in Table 2.1. An overview of the reported adjustments within the current year's inventory is given in Table 2.2. Figure 2.1 and 2.2 show the effect of the adjustments on the EU emissions on NMVOCs and NH<sub>3</sub>, respectively (sum of EU Member States' adjustments). No figure is shown for NH<sub>3</sub>, due to the low values represented by the adjustment. All approved and reported adjustments also appear in the emission trend table in Section 3.3 (Table 3.4 for NMVOCs and Table 3.6 for NH<sub>3</sub>).

**Table 2.1** Inventory adjustment applications submitted in 2026, and accepted by the EMEP Steering Body during 2025

New or previously accepted	Member State	Pollutant	NFR19 code	Years	Years included in Annex I
Previously accepted	Denmark	NMVOCs	3B1b	2005, 2020-2024	2005, 2020-2024
Previously accepted	France	NMVOCs	3B, 3D	2005, 2020-2024	2005, 2020-2024
Previously accepted	Netherlands	NMVOCs	3B1a	2005, 2020	2005, 2020
Previously accepted	Czechia	NH <sub>3</sub>	3Da1	2005, 2020-2022	2005, 2020-2022
Accepted in 2025	Finland	NH <sub>3</sub>	3B, 3Da1, 3Da2a, 3Da2c, 3Da3, 3Da4, 5B2, 6A	2005, 2020-2021	2005, 2020-2021

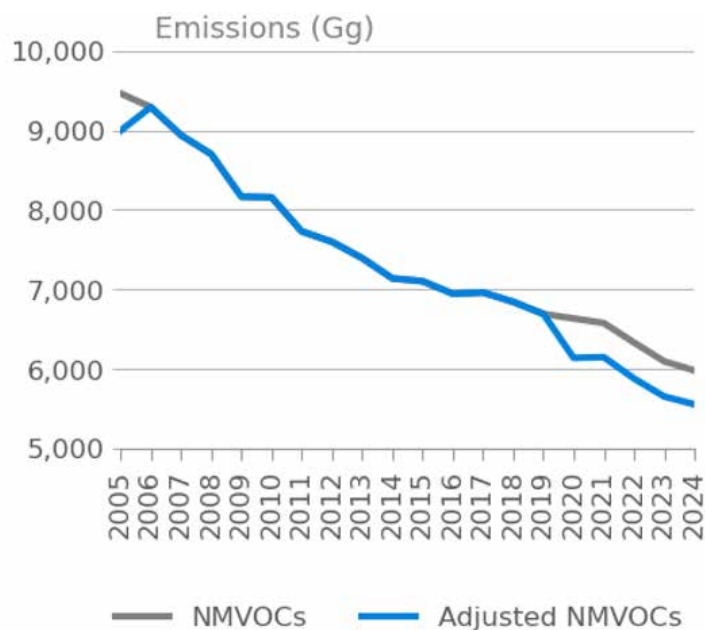
**Note:** For nomenclature for reporting (NFR) codes, see the list of source sector abbreviations in Appendix 4.

**Sources:** UNECE, 2025.

**Table 2.2** Submitted, but not yet accepted, adjustments in the Air Convention submission for the current year

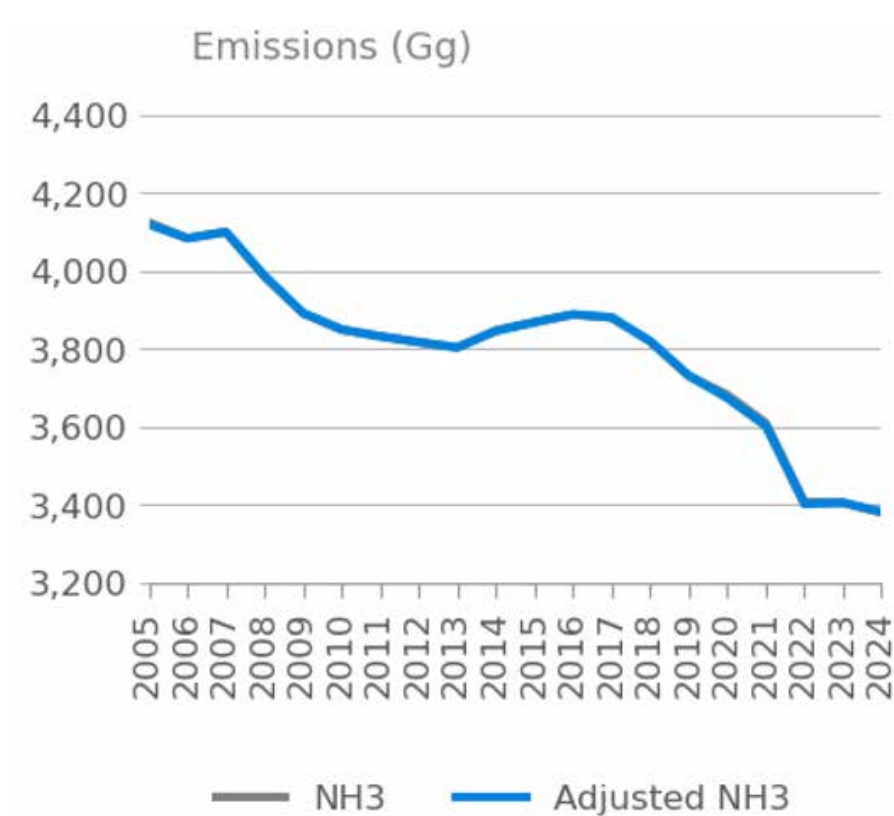
Year of submitting	Member State	Pollutant	NFR19 code	Years	Annex I ('adjustment row')	Annex IIa
2026	Ireland	NMVOCs	2H2, 3B1a, 3B1b	2005, 2020-2024	Yes	Yes

**Figure 2.1 Adjusted and unadjusted emissions of NMVOCs for the EU, 2005-2024**



**Note:** This figure takes into account all accepted adjustments for NMVOCs (see table 2.1) the adjustment from IE is new and not previously approved and therefore, not taken into account.

**Figure 2.2 Adjusted and unadjusted emissions of NH<sub>3</sub> for the EU, 2005-2024**



**Note:** This figure takes into account all accepted adjustments for NH<sub>3</sub> (see table 2.1). The difference is relatively small and therefore not visible in the figure.

## 3 Trends and key categories of EU pollutant emissions

In this chapter, the individual sections summarise the contributions each Member State has made to total EU emissions <sup>(9)</sup> of: NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub>, CO, PM<sub>2.5</sub>, PM<sub>10</sub>, TSPs, BC, Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn, PCDD/Fs, total PAHs, B(a)P, B(b)F, B(k)F, IP, HCB and PCBs.

Additionally, the EU emission trends for the five most important key categories are presented for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, HMs and POPs, as well as B(a)P and BC. In the pollutant-specific sections below, the countries listed are ranked according to certain criteria, specified in brackets where it applies.

### 3.1 Trends in emissions and projections and progress towards Gothenburg Protocol reduction commitments

#### 3.1.1 Total trends in EU emissions

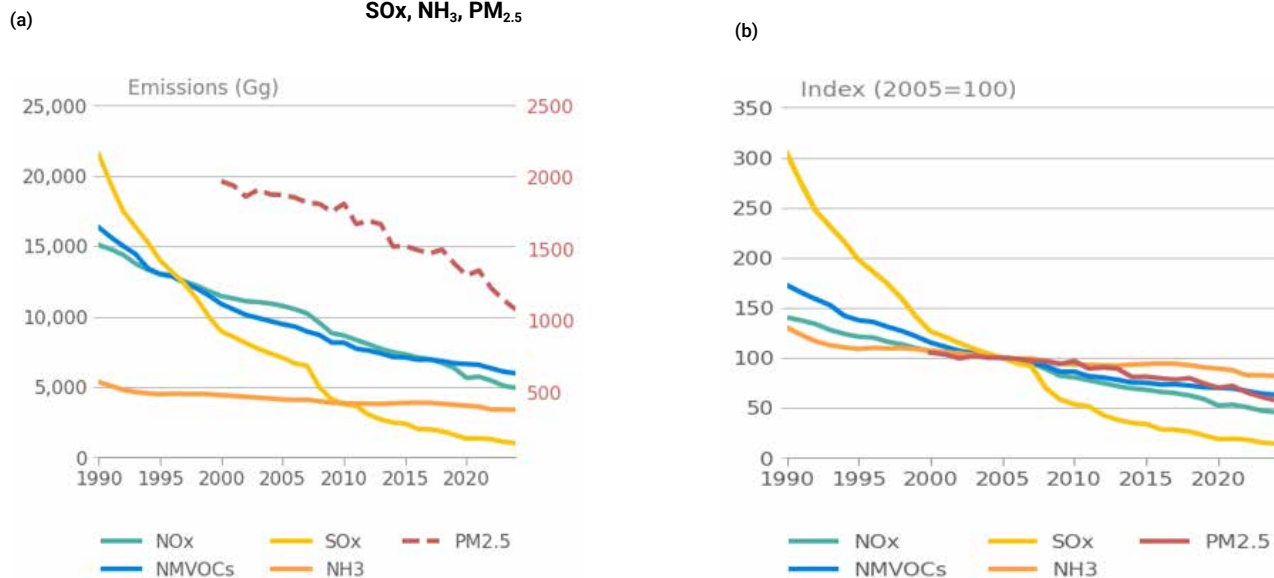
In 2024, emissions of all pollutants were lower than in 2005 (or in 2000 for PM) (Table 3.1). Emission trends for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub> and PM<sub>2.5</sub> are presented in Figure 3.1. For the main pollutants, the largest reductions, in percent, across the EU were for SO<sub>x</sub> emissions. SO<sub>x</sub> reduced by 95% since 1990 and by 6% since the previous reporting cycle. This was followed by NO<sub>x</sub>, which reduced by 67% since 1990 and by 3% since the previous reporting cycle. NMVOCs reduced by 63% since 1990 and by 2% since the previous reporting cycle. NH<sub>3</sub> reduced by 37% since 1990, and by 1% since the previous reporting cycle. PM<sub>2.5</sub> reduced by 45% since 2000 and by 6% since the previous reporting cycle.

Emission trends for CO, TSPs, PM<sub>10</sub> and BC are presented in Figure 3.2 and Figure 3.3. CO emissions decreased by 75% since 1990, while TSP and PM<sub>10</sub> emissions fell by 37% and 41%, respectively since 2000. BC emissions dropped by 57% during the same period.

Emission trends for HMs and POPs are presented in Figure 3.4. Emissions of these pollutants have reduced significantly since 1990, with the only exception of Cu, which increased by 15%.

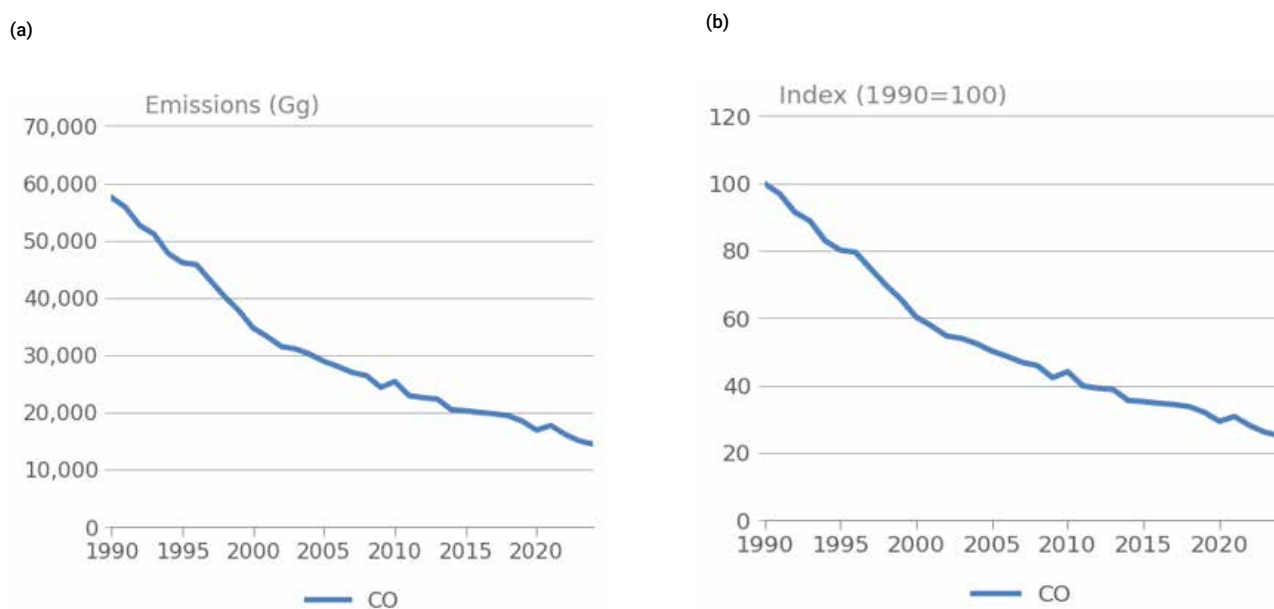
(9) For BC and additional HMs, data for several countries (at least for some years) were missing and could not be gap filled. Therefore, the EU total is not complete for these pollutants (see also Section 1.3.7).

**Figure 3.1 (a) EU-27 emission trends and (b) indexed emissions for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>**

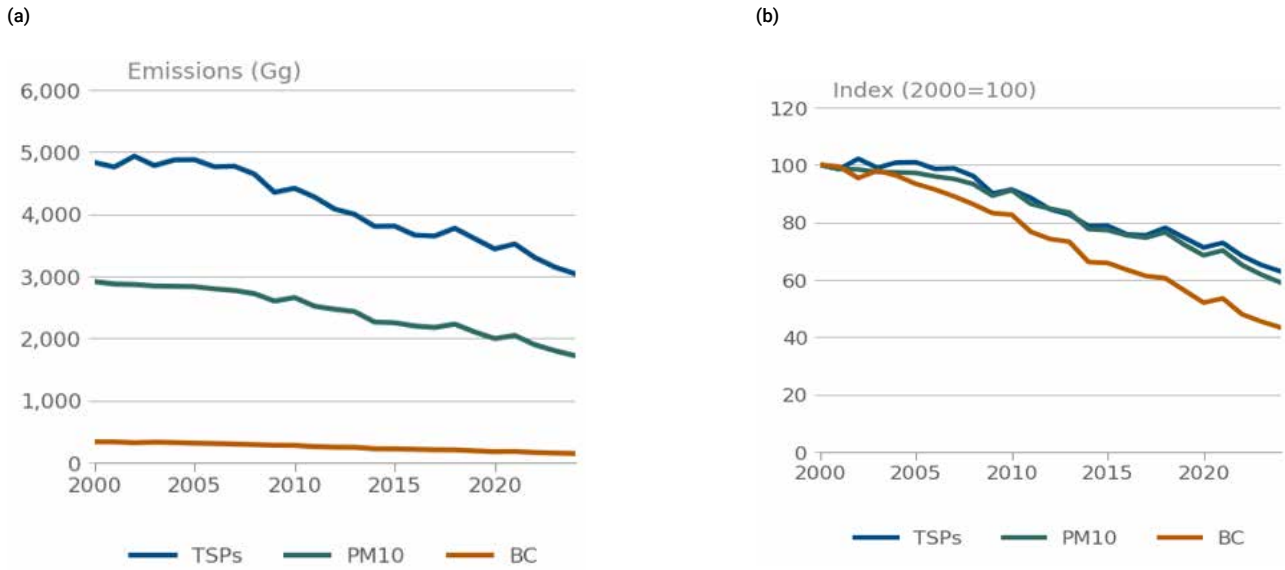


**Notes:** The right-hand axis gives values for PM<sub>2.5</sub> emissions. The indexed emissions are based on emissions in 2005 (=100%).  
This figure does not take into account adjustments.

**Figure 3.2 (a) EU-27 emission trends and (b) indexed emissions for CO emissions**

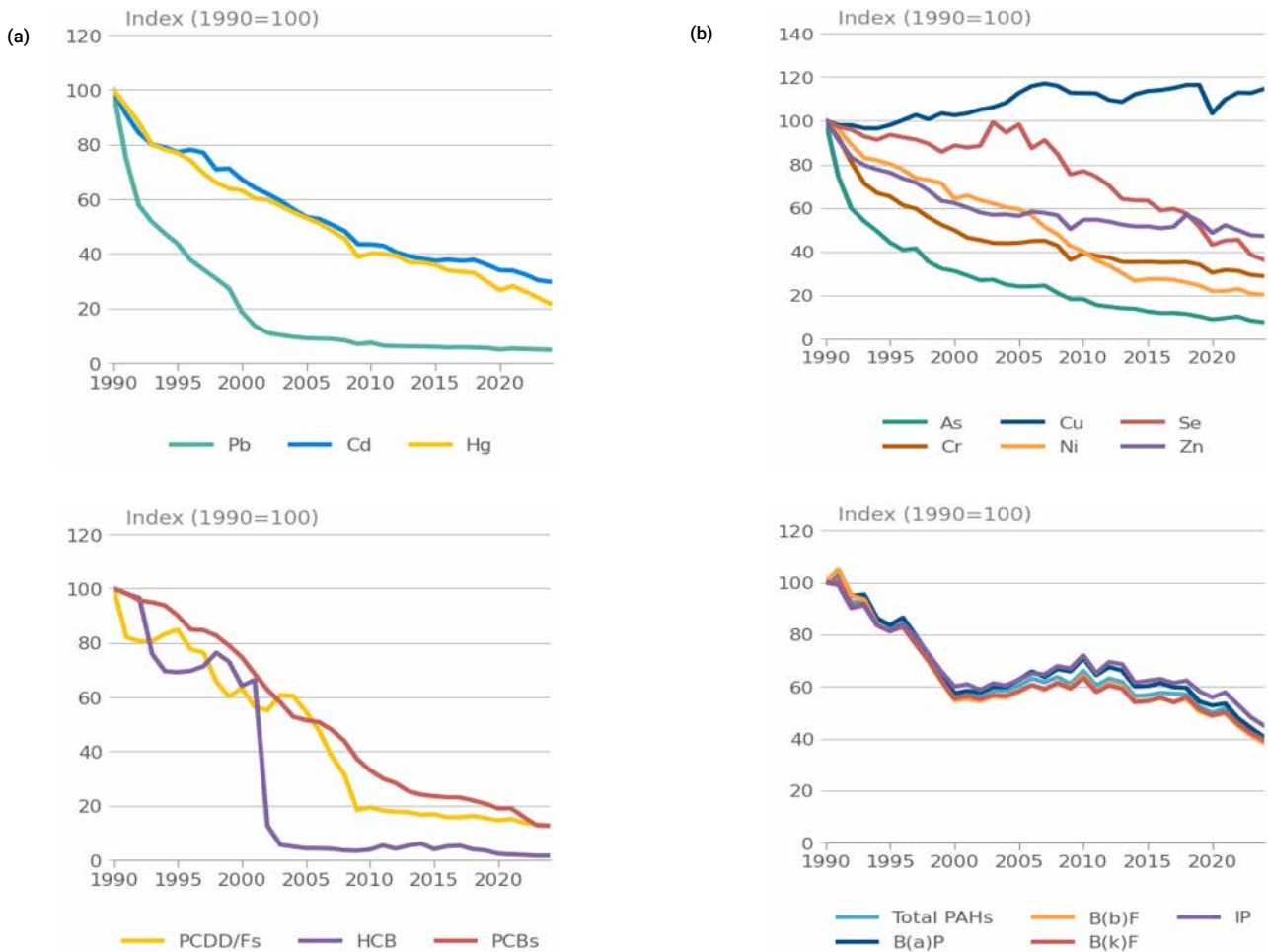


**Figure 3.3 (a) EU-27 emission trends (b) and indexed emissions for TSP, PM<sub>10</sub> and BC**



**Notes:** Not all countries reported data for BC. The Air Convention formally requests Parties to report emissions of PM for 2000 and thereafter. Thus, emission trends can be shown for these years only. The indexed emissions are based on emissions in 2000 (=100%).

**Figure 3.4 Indexed EU-27 emission trends for HMs and POPs**



**Notes:** The drop in HCB emissions between 2001 and 2002 is caused by data reported by Germany (see section 3.26).

**Table 3.1 Total EU emissions of NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>, HMs, POPs and PM**

Pollutant	Unit												Change		
		1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024
NO <sub>x</sub>	Gg	15,102	13,036	11,465	10,764	8,664	7,326	5,643	5,736	5,460	5,093	4,940	-67%	-54%	-3%
NMVOCs	Gg	16,343	13,015	10,904	9,467	8,158	7,102	6,633	6,575	6,330	6,093	5,978	-63%	-37%	-2%
NMVOCs*	Gg				8,954			6,080	6,087	5,815	5,590	5,493			
SO <sub>x</sub>	Gg	21,536	13,996	8,951	7,080	3,792	2,405	1,334	1,359	1,294	1,095	1,026	-95%	-86%	-6%
NH <sub>3</sub>	Gg	5,373	4,490	4,414	4,124	3,849	3,868	3,682	3,610	3,407	3,405	3,381	-37%	-18%	-1%
NH <sub>3</sub> *	Gg				4,119			3,673	3,601	3,401					
CO	Gg	57,535	46,143	34,731	28,927	25,408	20,300	16,927	17,751	16,202	15,067	14,482	-75%	-50%	-4%
Pb	Mg	20,599	8,982	3,822	1,861	1,524	1,206	1,006	1,085	1,049	1,013	990	-95%	-47%	-2%
Cd	Mg	165	127	111	88	72	62	56	56	53	50	49	-70%	-44%	-2%
Hg	Mg	145	112	92	77	58	52	39	41	38	35	31	-79%	-60%	-10%
As	Mg	571	253	178	138	104	72	52	55	59	48	44	-92%	-68%	-9%
Cr	Mg	1,029	672	513	453	404	363	312	325	321	302	296	-71%	-35%	-2%
Cu	Mg	2,580	2,528	2,644	2,909	2,907	2,931	2,666	2,830	2,912	2,908	2,955	15%	2%	2%
Ni	Mg	1,946	1,561	1,251	1,157	782	534	427	427	446	404	397	-80%	-66%	-2%
Se	Mg	174	163	154	171	134	110	75	78	79	67	63	-64%	-63%	-6%
Zn	Mg	6,898	5,258	4,295	3,885	3,765	3,559	3,353	3,595	3,440	3,279	3,254	-53%	-16%	-1%
PCDD/Fs	g I-TEQ	11,826	10,022	7,475	6,457	2,283	1,981	1,717	1,772	1,615	1,538	1,500	-87%	-77%	-2%
Total PAHs	Mg	1,518	1,251	863	918	1,004	861	759	785	706	648	603	-60%	-34%	-7%
B(a)P	Mg	444	371	255	278	315	268	234	238	213	196	180	-59%	-35%	-8%
B(b)F	Mg	497	404	272	288	320	272	242	247	223	205	191	-62%	-34%	-7%
B(k)F	Mg	239	194	133	139	151	130	117	120	109	101	95	-60%	-32%	-6%
IP	Mg	219	178	132	137	158	136	122	127	116	106	99	-55%	-28%	-7%
PCB	kg	6,052	4,184	3,878	256	228	239	136	117	107	90	90	-99%	-65%	1%
PCBs	kg	6,425	5,776	4,792	3,304	2,117	1,503	1,215	1,219	1,010	818	805	-87%	-76%	-1%
													2000-2024	2005-2024	2023-2024
PM <sub>2.5</sub>	Gg			1,973	1,877	1,816	1,522	1,317	1,351	1,229	1,146	1,080	-45%	-42%	-6%
PM <sub>10</sub>	Gg			2,912	2,830	2,655	2,250	1,994	2,044	1,896	1,799	1,719	-41%	-39%	-4%
TSPs	Gg			4,830	4,875	4,414	3,806	3,438	3,517	3,299	3,145	3,039	-37%	-38%	-3%
BC	Gg			333	311	275	219	173	178	160	151	144	-57%	-54%	-5%

Notes: \* These NMVOC or NH<sub>3</sub> emission data represent the adjusted EU totals. Adjusted data: under the Gothenburg Protocol, the EMEP Steering Body accepted inventory adjustment applications<sup>(10)</sup> for emissions from several EU Member States. This table takes the accepted adjustments (listed in table 2.1) into account, whereas emission data are based on fuel sold. See Chapter 2 for further details.

Negative percentage values indicate that emissions have decreased.

Table 3.1 and Table 3.3-Table 3.28 express changes in emissions between 1990 and 2024 as  $100 \times (E_{2024} - E_{1990}) / E_{1990}$  (%), where E<sub>2024</sub> and E<sub>1990</sub> are 2024 and 1990 total emissions, respectively. The tables express changes in emissions from 2023 to 2024 as  $100 \times (E_{2024} - E_{2023}) / E_{2023}$  (%), where E<sub>2023</sub> and E<sub>2024</sub> are the 2023 and 2024 total emissions, respectively.

The bases for the EU inventory shown in Table 3.1 and Table 3.3-Table 3.28 provide total national data for the entire territory based on fuel sold for all EU Member States. See Section 1.2.2 for further details.

### 3.1.2 Progress towards the Gothenburg Protocol reduction commitments

Table 3.2 presents a comparison of the total EU-27 emissions for the current year for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>, and the Gothenburg Protocol reduction commitments<sup>(11)</sup>. The total EU-27 emissions for each of the pollutants have reduced by more than the current emission reduction commitments require. Thus, the current reduction commitments are overachieved for the EU. Figure 3.5 shows further whether or not each of the EU Member States met the Gothenburg Protocol reduction commitments during the current year.

(10) In 2012, the Executive Body for the Air Convention decided that adjustments to emission reduction commitments, or to inventories for the purposes of comparing them with total national emissions, may be made in some circumstances (UNECE, 2012a).

(11) In this report, the comparison with the EU-27 reduction commitments in the Gothenburg Protocol is based on fuel sold.

**Table 3.2 Total EU emissions of NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>, for 2005 and the current year and compared with the Gothenburg Protocol reduction commitments for 2020 and beyond**

Pollutant	EU-27 emission levels in 2024 (Gg)	EU-27 emission levels in 2005 (Gg)	Gothenburg Protocol Reduction commitment from 2005 level (%)	EU-27 reduction achieved from 2005 (%)
NO <sub>x</sub>	10,764	4,940	-40	-54
NMVOCs	9,467	5,978	-28	-37
SO <sub>x</sub>	7,080	1,026	-59	-86
NH <sub>3</sub>	4,124	3,381	-6	-18
PM <sub>2.5</sub>	1,877	1,080	-22	-42

**Notes:** For Spain, data for emission comparisons include emissions from the Canary Islands, while Ceuta and Melilla are excluded.

For Portugal's reduction commitments, emissions from the Azores and Madeira are excluded.

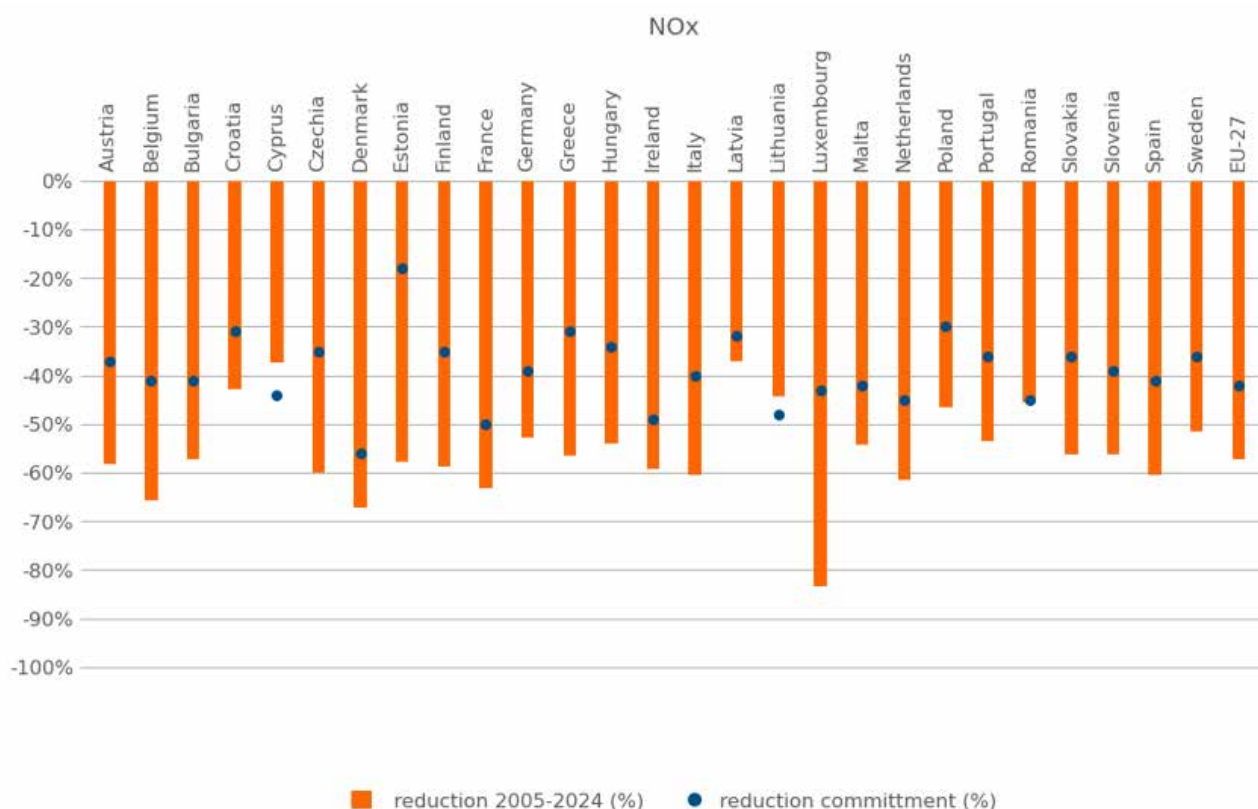
This table takes into account the adjustments, accepted by the EMEP steering body (Table 2.1).

Emission reduction commitments are also specified for individual EU Member States.

For NO<sub>x</sub>, the emissions under category 3D are subtracted.

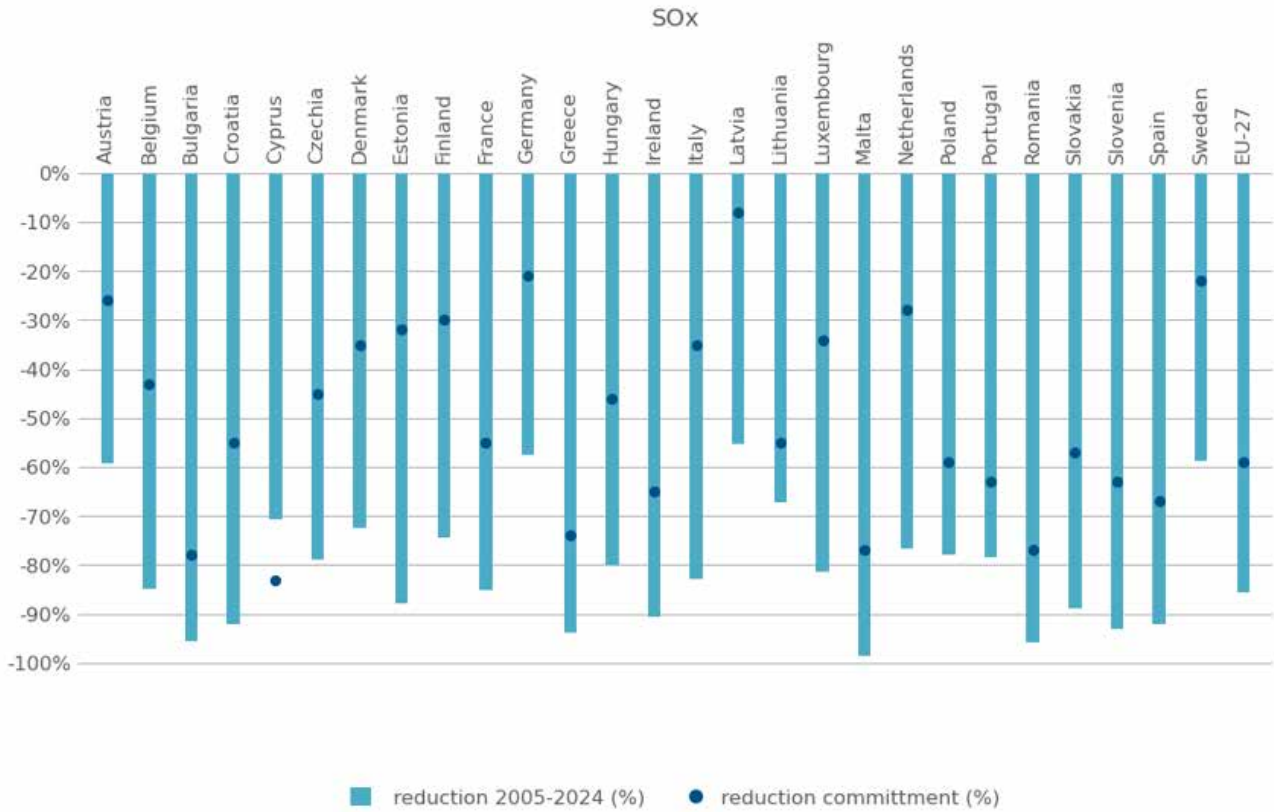
Adjustments are not taken into account in this table.

**Figure 3.5a Distance to Gothenburg Protocol reduction commitments for EU Member States based on reported emissions for NO<sub>x</sub> in the current year**

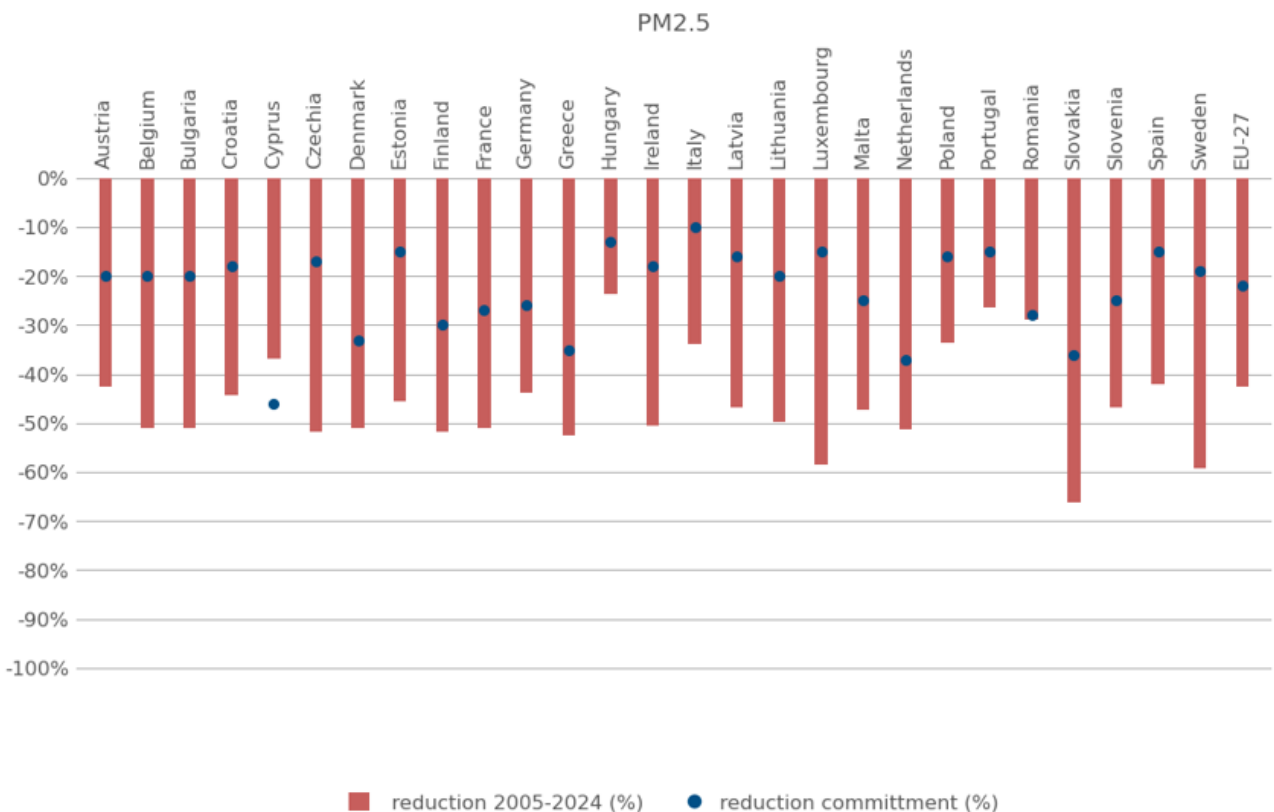


**Note:** NO<sub>x</sub> emissions from soils are not included in the estimates from the member states. Thus, for NO<sub>x</sub>, the emissions under category 3D are subtracted.

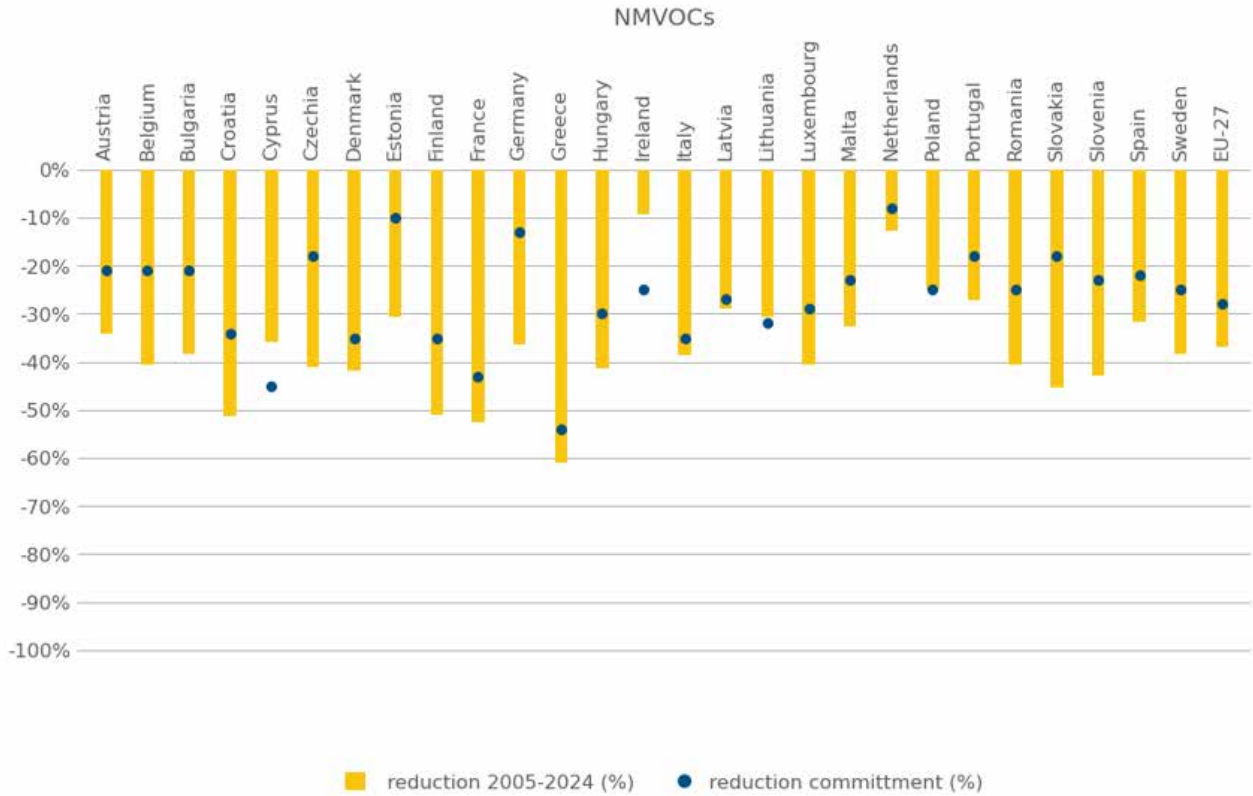
**Figure 3.5b** Distance to Gothenburg Protocol reduction commitments for EU Member States based on reported emissions for SO<sub>x</sub> in the current year



**Figure 3.5c** Distance to Gothenburg Protocol reduction commitments for EU Member States based on reported emissions for PM<sub>2.5</sub> in the current year

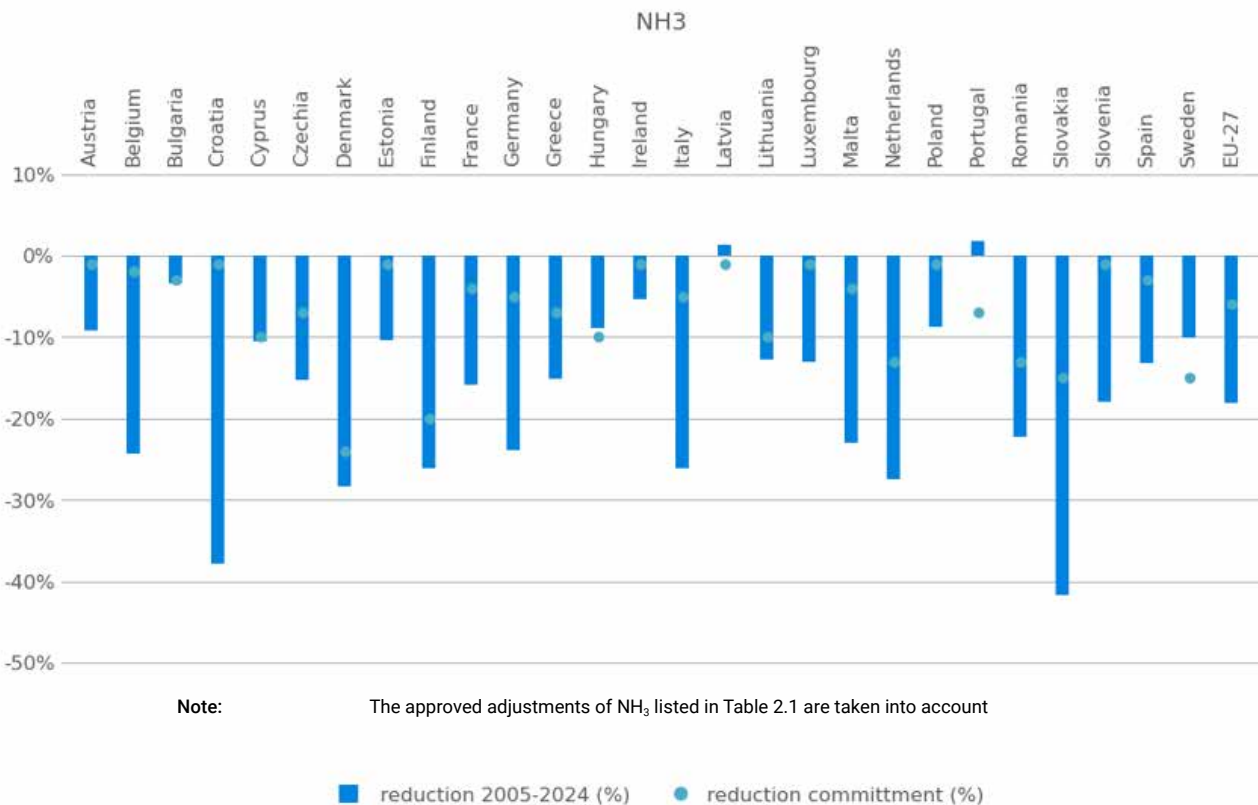


**Figure 3.5d** Distance to Gothenburg Protocol reduction commitments for EU Member States based on reported emissions for NMVOCs in the current year



**Note:** The approved adjustments of NMVOC listed in Table 2.1 are taken into account. Agricultural emissions are included, as they are included under the Gothenburg protocol.

**Figure 3.5e** Distance to Gothenburg Protocol reduction commitments for EU Member States based on reported emissions for NH<sub>3</sub> in the current year



**Note:** The approved adjustments of NH<sub>3</sub> listed in Table 2.1 are taken into account

### 3.2 Nitrogen oxide emission trends and key categories

Since 2005 NO<sub>x</sub> emissions have dropped by 54% in the EU (Table 3.3). This trend has been largely determined by emissions from Germany, France, Spain and Italy due to their relatively large share of the total emissions (see Figure 3.6). Between the latest two years, the EU total emissions of NO<sub>x</sub> decreased by about 3%.

Figure 3.7(b) shows the contribution made by each aggregated sector group to total EU emissions. The main sources for NO<sub>x</sub> emissions were the road transport sector, non-road transport, the energy production and distribution and the agriculture sector.

The main key categories for NO<sub>x</sub> emissions are shown in figure 3.7a. The highest relative reduction in NO<sub>x</sub> emissions since 1990 occurred in 'Public electricity and heat production' (82%) (Figure 3.7a). These reductions are thanks to measures such as introducing combustion modification technologies (e.g. low-NO<sub>x</sub> burners), implementing flue gas abatement techniques (e.g. NO<sub>x</sub> scrubbers and selective catalytic reduction and selective non-catalytic reduction techniques) and switching from coal to gas.

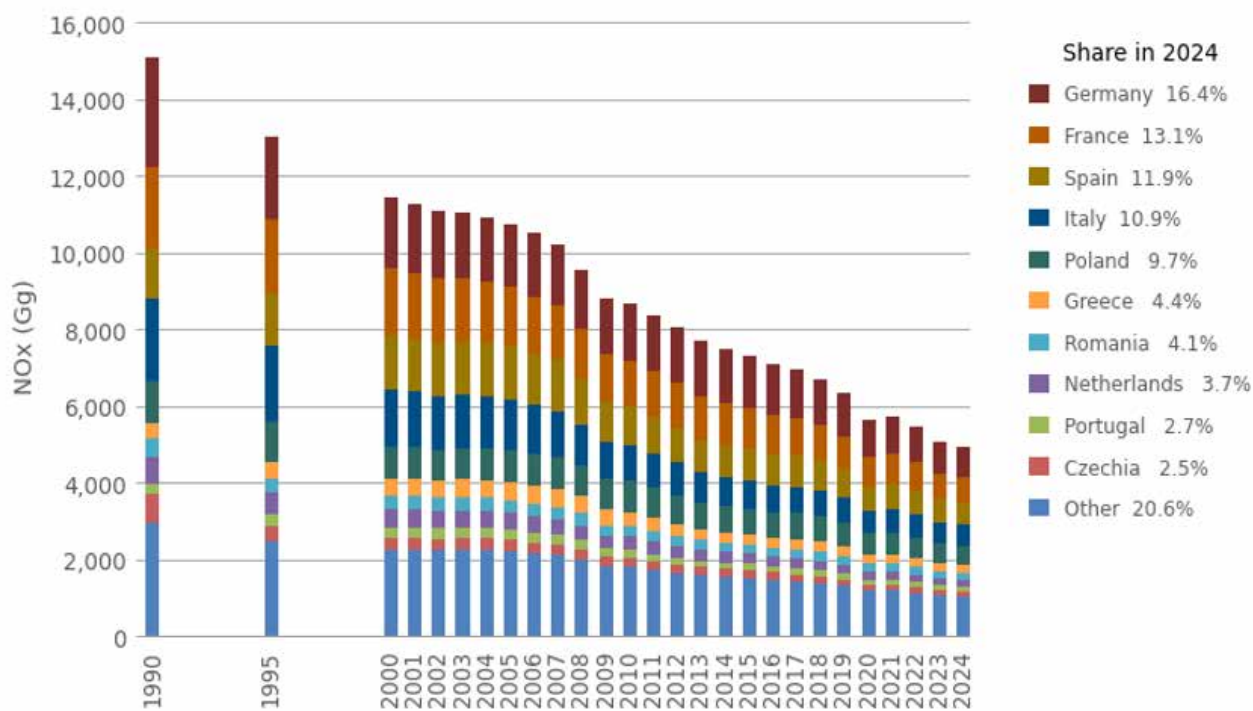
Significant reductions were also reported for NO<sub>x</sub> emissions from heavy duty vehicles and buses (76%) and from passenger cars (74%). Emissions from light duty vehicles decreased by only 20%. The road transport sector represents the largest source of NO<sub>x</sub> emissions, accounting for about 36% of total EU emissions in the current year. Emission reductions made in the road transport sector are mostly due to the harmonised application of Euro emission standards (EEA, 2024a).

**Table 3.3 Member State contributions to EU emissions of NO<sub>x</sub>**

Member State	NO <sub>x</sub> (Gg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	214	198	212	249	216	199	133	132	122	115	110	-49%	-56%	-4.2%	1.4%	2.2%
Belgium	429	415	363	334	259	209	146	148	136	127	122	-72%	-64%	-4.5%	2.8%	2.5%
Bulgaria	301	194	163	178	120	108	90	98	100	88	87	-71%	-51%	-0.9%	2.0%	1.8%
Croatia	104	79	88	85	69	56	46	48	47	48	50	-52%	-41%	4.4%	0.7%	1.0%
Cyprus	18	22	23	22	20	16	15	15	13	13	14	-20%	-36%	9.0%	0.1%	0.3%
Czechia	764	387	279	286	248	202	149	153	146	131	125	-84%	-56%	-4.8%	5.1%	2.5%
Denmark	295	284	223	206	151	114	94	94	89	83	80	-73%	-61%	-4.4%	2.0%	1.6%
Estonia	72	40	38	38	38	28	21	21	22	19	18	-75%	-53%	-7.1%	0.5%	0.4%
Finland	307	273	244	211	193	145	112	111	104	97	92	-70%	-56%	-4.7%	2.0%	1.9%
France	2,114	1,900	1,751	1,571	1,221	1,050	755	791	744	680	648	-69%	-59%	-4.7%	14.0%	13.1%
Germany	2,850	2,173	1,871	1,634	1,468	1,381	983	969	928	841	809	-72%	-51%	-3.8%	18.9%	16.4%
Greece	411	403	431	484	366	262	225	223	233	218	218	-47%	-55%	0.1%	2.7%	4.4%
Hungary	246	191	189	181	155	136	114	116	107	93	94	-62%	-48%	1.9%	1.6%	1.9%
Ireland	170	173	184	178	124	117	100	103	98	91	89	-47%	-50%	-2.5%	1.1%	1.8%
Italy	2,125	1,988	1,516	1,302	961	723	584	595	587	552	537	-75%	-59%	-2.7%	14.1%	10.9%
Latvia	99	53	43	45	42	38	33	34	33	32	31	-69%	-31%	-3.7%	0.7%	0.6%
Lithuania	156	75	63	67	62	63	55	55	47	45	40	-74%	-40%	-11.6%	1.0%	0.8%
Luxembourg	41	35	43	59	46	35	18	17	14	12	11	-74%	-82%	-10.9%	0.3%	0.2%
Malta	7.3	8.1	8.3	9.6	9.1	5.6	4.1	4.3	4.6	4.4	4.4	-39%	-54%	-0.1%	0.0%	0.1%
Netherlands	675	573	484	427	345	271	212	207	195	186	181	-73%	-58%	-2.8%	4.5%	3.7%
Poland	1,106	1,062	840	836	817	665	565	580	532	503	477	-57%	-43%	-5.3%	7.3%	9.7%
Portugal	258	292	294	278	200	166	133	135	136	135	134	-48%	-52%	-0.6%	1.7%	2.7%
Romania	499	389	327	344	257	231	215	222	211	202	205	-59%	-40%	1.3%	3.3%	4.1%
Slovakia	141	113	111	107	90	71	59	61	57	54	51	-64%	-53%	-5.3%	0.9%	1.0%
Slovenia	76	75	59	55	49	36	27	27	27	25	25	-66%	-54%	1.9%	0.5%	0.5%
Spain	1,342	1,384	1,401	1,386	971	854	639	663	620	592	588	-56%	-58%	-0.7%	8.9%	11.9%
Sweden	285	254	219	191	167	145	115	113	109	104	99	-65%	-48%	-4.6%	1.9%	2.0%
<b>EU27(a)</b>	<b>15,102</b>	<b>13,036</b>	<b>11,465</b>	<b>10,764</b>	<b>8,664</b>	<b>7,326</b>	<b>5,643</b>	<b>5,736</b>	<b>5,460</b>	<b>5,093</b>	<b>4,940</b>	<b>-67%</b>	<b>-54%</b>	<b>-3.0%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	15,102	13,036	11,465	10,764	8,664	7,326	5,643	5,736	5,460	5,093	4,940					

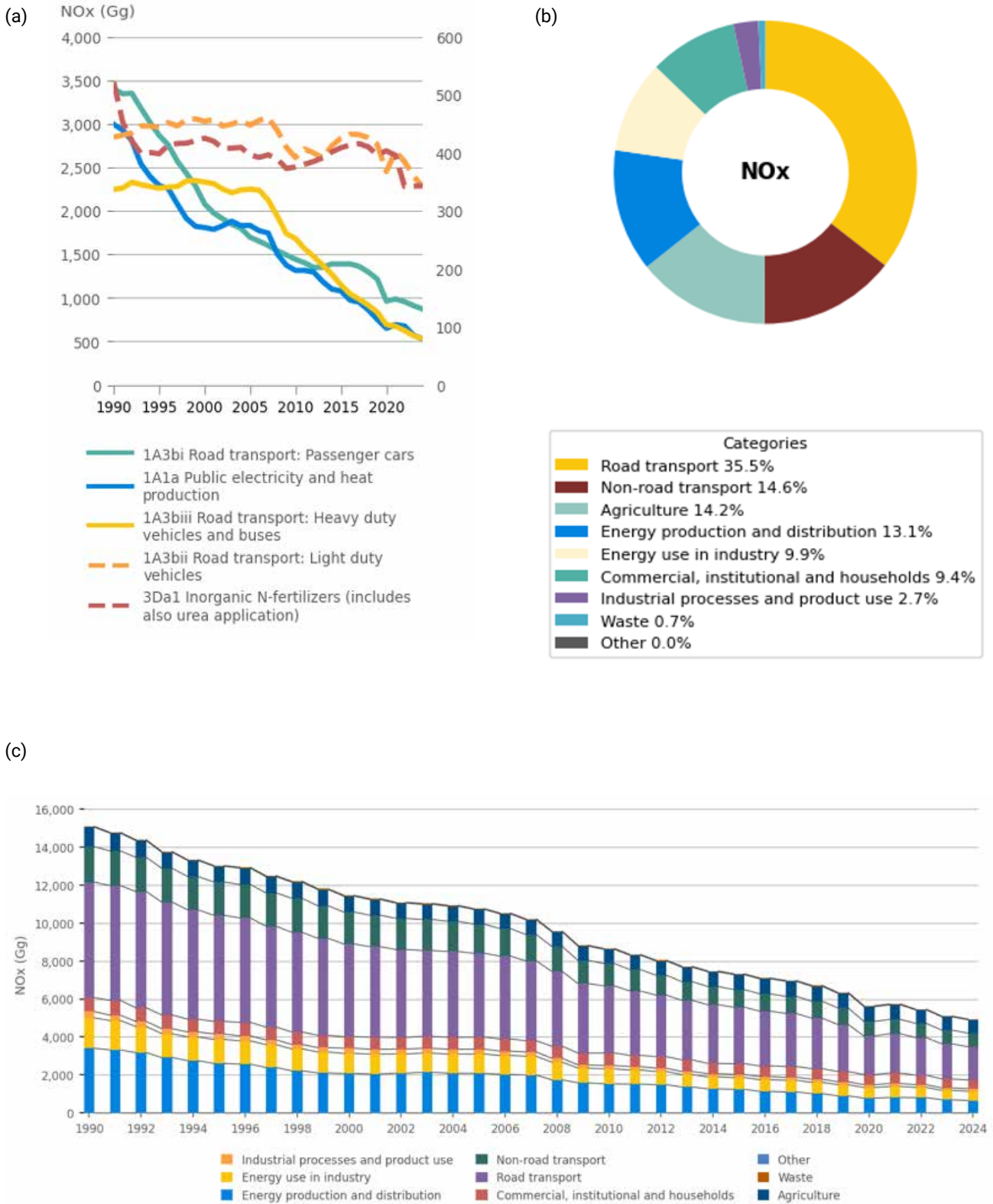
**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

**Figure 3.6 NOx emission trends in the EU and shares of Member States**



**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.7 NOx emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**



**Note:** In (a), the right-hand axis shows values for '1A3bii – Road transport: Light duty vehicles' and '3Da1 – Inorganic N fertilisers (also includes urea application)'.

### 3.3 Non-methane volatile organic compound emission trends and key categories

Since 2005, NMVOC emissions have dropped by 37% in the EU (Table 3.4). This trend has been largely determined by emissions from France, Germany, Italy and Poland, due to their relatively large share of the EU total (Figure 3.8).

For the current year, the most important key categories for NMVOC emissions were residential heating (1A4bi), domestic solvent use including fungicides (2D3a) and coating applications (2D3d) (Figure 3.9a). Among the top five key categories, the highest relative reduction is reported for coating applications, which reduced by about 65% since 1990 and by 50% since 2005.

Figure 3.9b shows the contribution made by each aggregated sector group to total EU emissions. The main emission source of NMVOCs for the current reporting is industrial processes and product use, followed by agriculture and commercial, institutional and households.

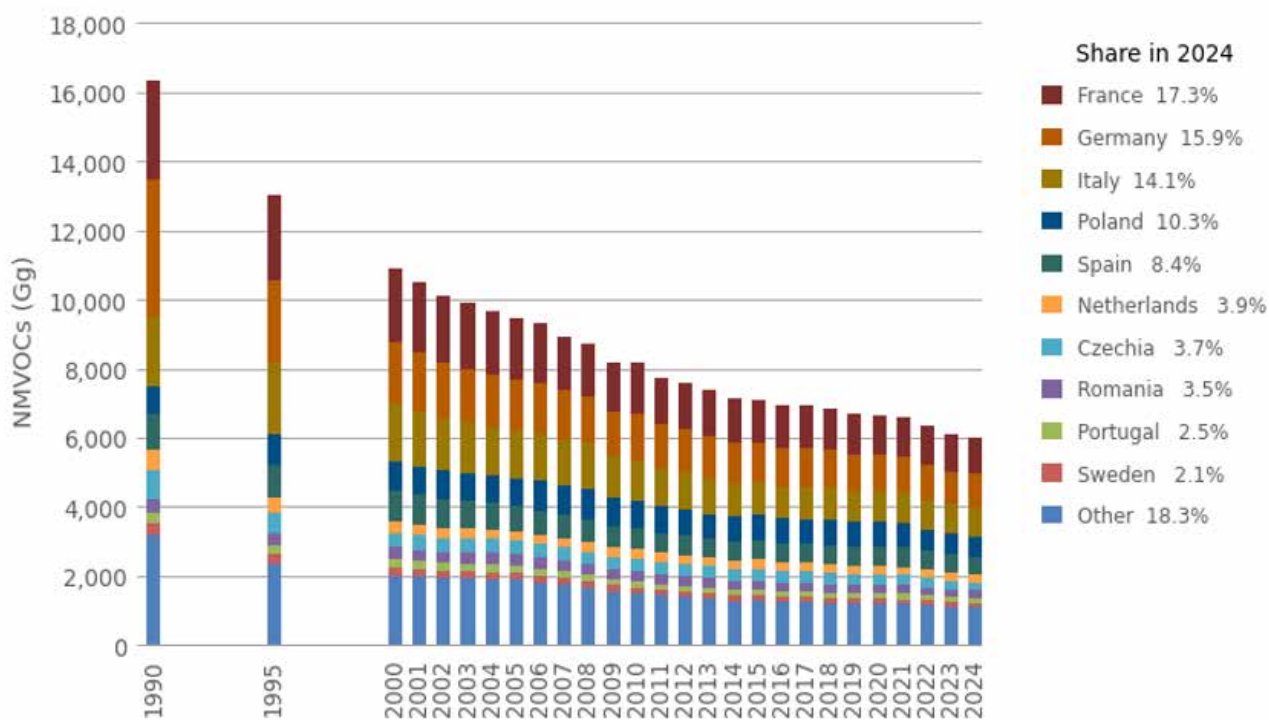
In general, NMVOC emissions in 1990 were caused by emission sources different from those in recent years (Figure 3.9c). In 1990, NMVOC emissions from road transport were most important; however, on account of the introduction of Euro emission standards and renewal of the vehicle fleets, these emissions decreased significantly. Nowadays, the emissions are dominated by NMVOC emissions from solvent use, agriculture and residential heating.

**Table 3.4 Member State contributions to EU emissions of NMVOCs**

Member State	NMVOCs(Gg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	344	257	196	168	147	126	117	118	113	113	111	-68%	-34%	-2.2%	2.1%	1.9%
Belgium	368	327	249	200	163	136	131	130	122	121	119	-68%	-40%	-2.0%	2.2%	2.0%
Bulgaria	459	148	106	102	81	82	72	73	74	67	63	-86%	-38%	-6.1%	2.8%	1.1%
Croatia	160	115	99	107	89	64	60	62	52	53	52	-67%	-51%	-0.8%	1.0%	0.9%
Cyprus	16	16	14	15	13	11	10	10	9.3	9.5	9.6	-40%	-36%	1.4%	0.1%	0.2%
Czechia	837	601	435	373	370	355	303	302	286	245	220	-74%	-41%	-10.2%	5.1%	3.7%
Denmark	214	214	186	159	134	113	106	106	100	99	105	-51%	-34%	6.6%	1.3%	1.8%
Adjusted data*				139			82	82	76	75	81					
Estonia	66	38	34	32	23	23	23	25	25	23	22	-66%	-31%	-4.2%	0.4%	0.4%
Finland	233	203	178	151	114	93	88	87	79	75	74	-68%	-51%	-1.0%	1.4%	1.2%
France	2,884	2,460	2,113	1,766	1,466	1,255	1,134	1,115	1,109	1,067	1,037	-64%	-41%	-2.8%	17.6%	17.3%
Adjusted data*				1,340			706	709	680	649	635					
Germany	3,942	2,361	1,813	1,497	1,367	1,140	1,032	1,052	1,044	968	953	-76%	-36%	-1.6%	24.1%	15.9%
Greece	287	277	291	318	203	151	130	129	127	128	124	-57%	-61%	-2.9%	1.8%	2.1%
Hungary	314	227	202	184	144	137	124	123	119	114	108	-66%	-41%	-5.8%	1.9%	1.8%
Ireland	159	145	128	121	113	111	113	112	114	111	110	-31%	-9%	-1.1%	1.0%	1.8%
Italy	2,008	2,080	1,663	1,375	1,154	944	885	889	825	838	843	-58%	-39%	0.6%	12.3%	14.1%
Latvia	85	62	53	49	39	35	34	36	32	34	35	-59%	-29%	0.9%	0.5%	0.6%
Lithuania	135	85	61	66	55	53	51	53	51	50	46	-66%	-31%	-8.6%	0.8%	0.8%
Luxembourg	30	20	18	16	13	11	9.4	9.7	9.3	8.8	9.2	-69%	-41%	4.7%	0.2%	0.2%
Malta	5.1	6.2	5.3	4.2	3.4	2.8	2.7	2.8	3.0	2.9	2.8	-45%	-33%	-4.1%	0.0%	0.0%
Netherlands	600	432	334	268	273	257	253	240	241	238	234	-61%	-13%	-1.6%	3.7%	3.9%
Adjusted data*				244			210									
Poland	791	928	833	819	798	732	730	703	631	606	614	-22%	-25%	1.4%	4.8%	10.3%
Portugal	269	255	258	207	170	162	160	158	160	160	151	-44%	-27%	-5.2%	1.6%	2.5%
Romania	419	325	318	348	292	255	242	239	224	214	207	-51%	-41%	-3.2%	2.6%	3.5%
Slovakia	247	164	138	137	113	100	85	83	80	76	75	-70%	-45%	-1.2%	1.5%	1.3%
Slovenia	65	62	55	48	40	33	32	31	29	28	27	-58%	-43%	-2.2%	0.4%	0.5%
Spain	1,042	929	901	732	603	564	564	552	532	513	501	-52%	-32%	-2.4%	6.4%	8.4%
Sweden	366	279	223	205	178	159	139	136	139	131	126	-66%	-38%	-3.6%	2.2%	2.1%
EU27(a)	16,343	13,015	10,904	9,467	8,158	7,102	6,633	6,575	6,330	6,093	5,978	-63%	-37%	-1.9%	100.0%	100.0%
EU27(b)	16,343	13,015	10,904	9,467	8,158	7,102	6,633	6,575	6,330	6,093	5,978					
EU27(c)	16,343	13,015	10,904	8,996	8,158	7,102	6,137	6,146	5,877	5,651	5,552					

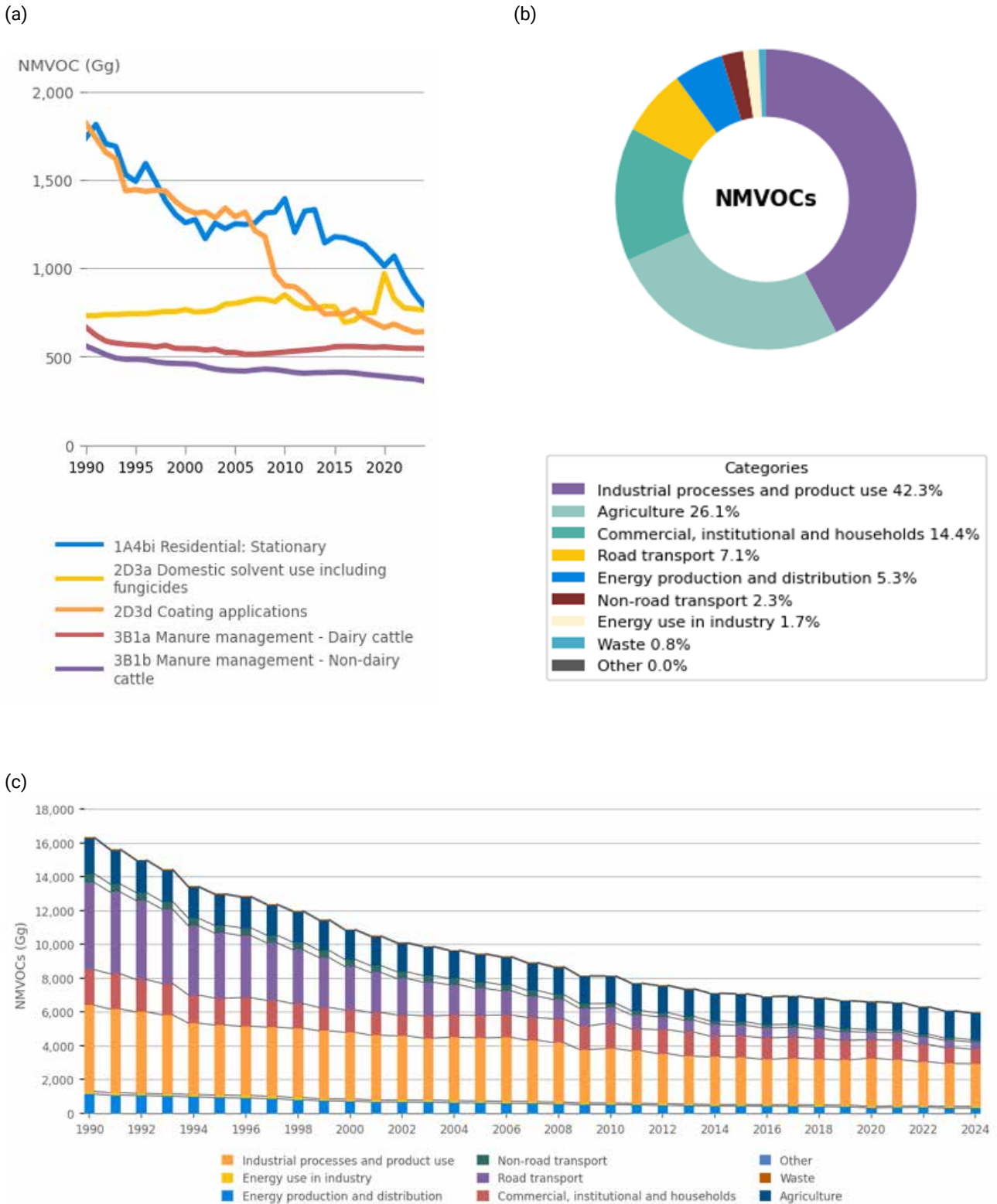
- Notes: (a) Sum of national totals, as reported by EU Member States.  
 (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.  
 (c) Sum of national totals, as reported by EU Member States, allowing for approved adjustments.  
 \* Adjusted data: accepted adjustments listed in table 2.1 are taken into account.

**Figure 3.8 NMVOC emission trends in the EU and shares of Member States**



**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.  
Adjustments are not considered in this figure.

**Figure 3.9 NMVOC emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**



### 3.4 Sulphur oxide emission trends and key categories

Since 2005, SO<sub>x</sub> emissions have dropped by 86% in the EU (see Table 3.5). During the past two years, they decreased by 6%. The recent SO<sub>x</sub> emission trend has largely been determined by emissions from Poland and Germany due to their relatively large share of the total EU emissions (Figure 3.10). The major sources for SO<sub>x</sub> emissions are fuel combustion in thermal power plants and industrial installations.

Figure 3.11b shows the contribution made by each aggregated sector group to total EU emissions. For SO<sub>x</sub>, the common main emission sources are the energy sectors.

Public electricity and heat production (1A1a) is the most significant key category for SO<sub>x</sub> emissions (Figure 3.11a). The same sector is also responsible for the highest relative reductions in emissions since 2005 among the top five key categories. The remaining four of these categories saw significant decreases as well.

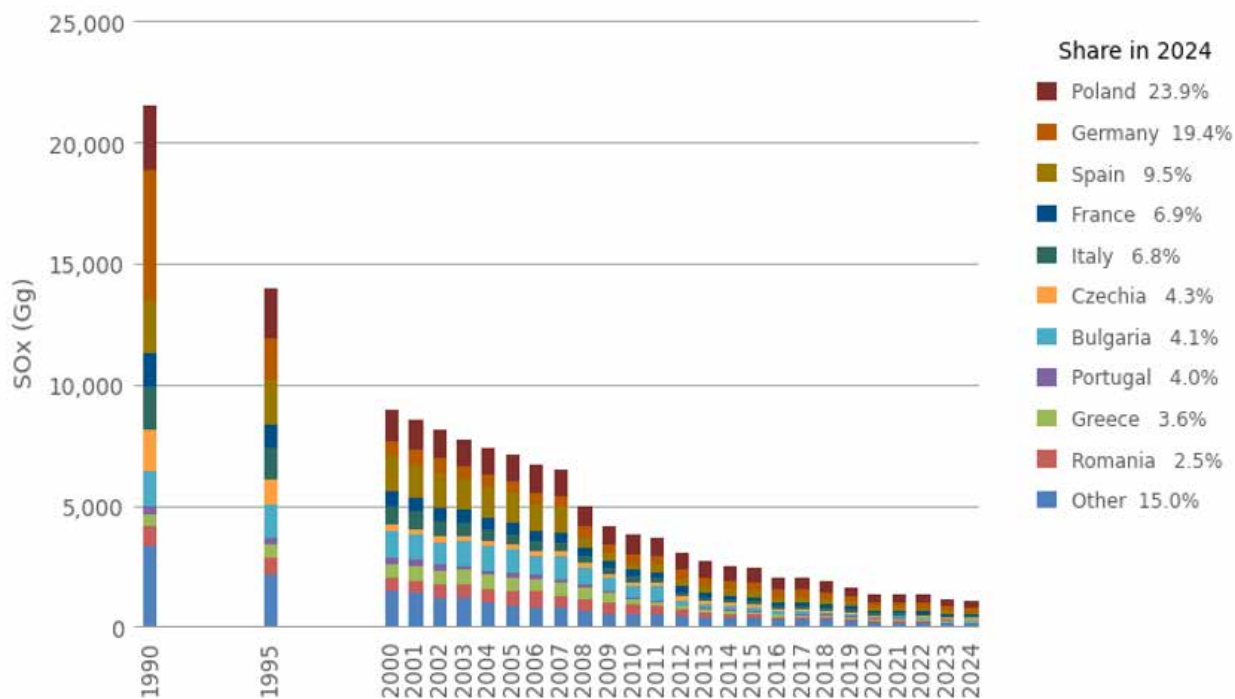
The historical reductions (Figure 3.11c) are mainly due to a shift to fuels with lower sulphur content and retrofitting with desulphurisation installations. After 2010, reductions are also a result of technical improvements to meet the more stringent standards of the EU Industrial Emissions Directive. The shift from the use of fossil fuels to renewable energy sources has also contributed to lower SO<sub>x</sub> emissions.

**Table 3.5 Member State contributions to EU emissions of SO<sub>x</sub>**

Member State	SO <sub>x</sub> (Gg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	74	47	32	26	16	14	10	11	11	11	11	-86%	-59%	-1.6%	0.3%	1.0%
Belgium	365	258	171	140	60	41	24	23	24	21	21	-94%	-85%	0.8%	1.7%	2.1%
Bulgaria	1,438	1,314	1,120	972	489	121	48	60	69	44	42	-97%	-96%	-3.8%	6.7%	4.1%
Croatia	169	77	59	58	34	15	5.9	5.4	5.3	5.2	4.6	-97%	-92%	-11.3%	0.8%	0.5%
Cyprus	31	40	47	38	23	13	12	11	12	11	11	-64%	-71%	5.6%	0.1%	1.1%
Czechia	1,754	1,059	234	208	164	130	67	60	64	48	44	-98%	-79%	-9.5%	8.1%	4.3%
Denmark	178	145	32	26	15	9.2	8.7	7.9	8.0	8.1	7.3	-96%	-72%	-10.0%	0.8%	0.7%
Estonia	279	117	97	77	83	36	11	12	15	11	9.3	-97%	-88%	-15.0%	1.3%	0.9%
Finland	249	105	82	70	66	41	23	23	22	21	18	-93%	-74%	-13.5%	1.2%	1.7%
France	1,328	966	641	473	279	156	87	94	86	78	71	-95%	-85%	-9.7%	6.2%	6.9%
Germany	5,461	1,743	643	468	397	341	239	249	247	210	199	-96%	-57%	-5.3%	25.4%	19.4%
Greece	512	522	558	585	233	102	49	47	44	38	37	-93%	-94%	-4.2%	2.4%	3.6%
Hungary	810	601	428	42	30	24	17	14	14	11	8.5	-99%	-80%	-21.0%	3.8%	0.8%
Ireland	183	164	145	74	27	16	11	13	9.3	7.4	7.1	-96%	-90%	-4.5%	0.8%	0.7%
Italy	1,784	1,322	756	411	222	127	85	79	86	71	70	-96%	-83%	-1.6%	8.3%	6.8%
Latvia	100	49	18	8.8	4.3	3.6	3.5	3.7	3.8	3.8	3.9	-96%	-55%	1.8%	0.5%	0.4%
Lithuania	200	76	40	28	18	15	11	11	12	9.2	9.2	-95%	-67%	-0.1%	0.9%	0.9%
Luxembourg	16	9.3	3.6	2.6	1.7	1.3	0.8	0.7	0.4	0.3	0.5	-97%	-81%	40.3%	0.1%	0.0%
Malta	13	11	9.3	12	8.1	2.2	0.2	0.2	0.2	0.2	0.2	-99%	-99%	8.4%	0.1%	0.0%
Netherlands	198	136	78	68	36	31	20	21	20	17	16	-92%	-77%	-9.4%	0.9%	1.5%
Poland	2,688	2,079	1,298	1,108	800	610	348	356	309	269	246	-91%	-78%	-8.8%	12.5%	23.9%
Portugal	318	322	294	189	62	45	38	39	41	41	41	-87%	-78%	-1.5%	1.5%	4.0%
Romania	821	696	492	603	355	149	60	65	45	26	26	-97%	-96%	-2.1%	3.8%	2.5%
Slovakia	141	122	119	88	69	68	15	16	13	14	9.7	-93%	-89%	-29.3%	0.7%	0.9%
Slovenia	203	125	93	40	10	5.4	3.9	3.8	3.2	2.6	2.7	-99%	-93%	6.4%	0.9%	0.3%
Spain	2,123	1,820	1,419	1,230	260	270	120	118	114	101	98	-95%	-92%	-3.1%	9.9%	9.5%
Sweden	102	71	44	34	28	17	15	16	15	14	14	-86%	-59%	-1.6%	0.5%	1.4%
<b>EU27(a)</b>	<b>21,536</b>	<b>13,996</b>	<b>8,951</b>	<b>7,080</b>	<b>3,792</b>	<b>2,405</b>	<b>1,334</b>	<b>1,359</b>	<b>1,294</b>	<b>1,095</b>	<b>1,026</b>	<b>-95%</b>	<b>-86%</b>	<b>-6.3%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	21,536	13,996	8,951	7,080	3,792	2,405	1,334	1,359	1,294	1,095	1,026					

**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

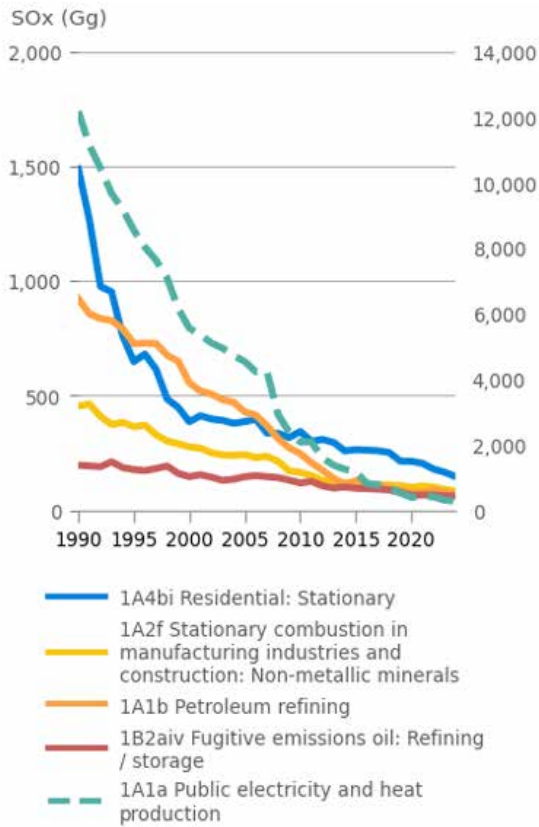
**Figure 3.10 SOx emission trends in the EU and shares of Member States**



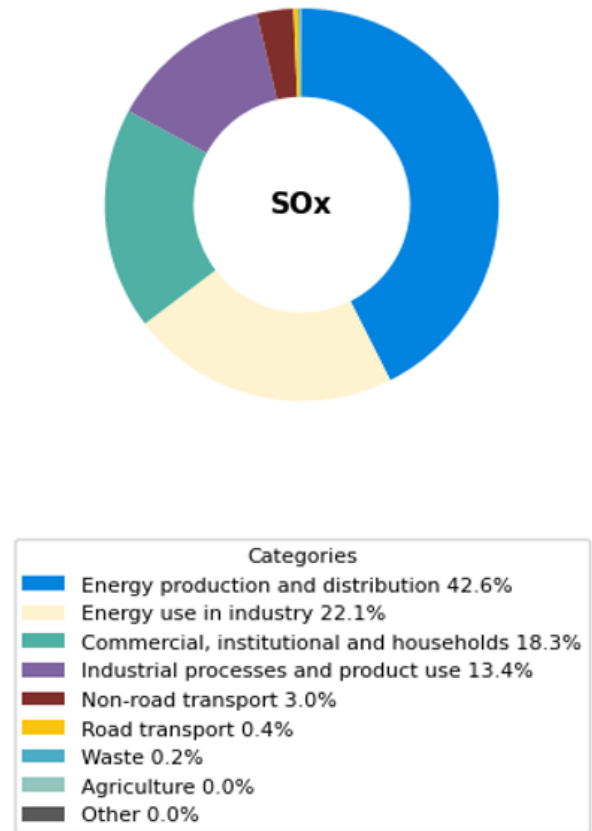
**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.11a SOx emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

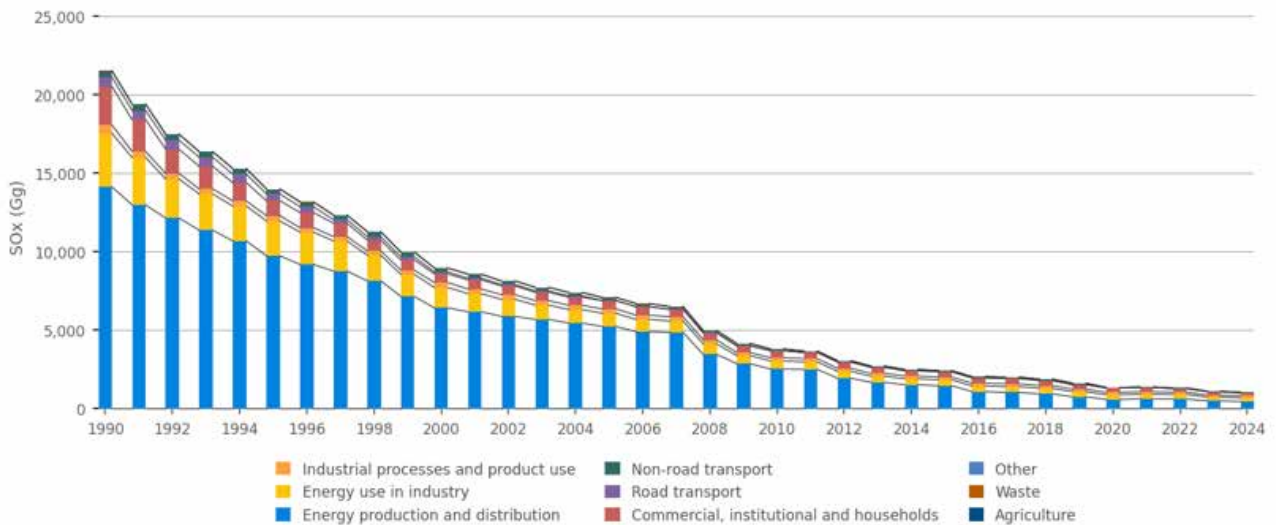
(a)



(b)



(c)



**Note:** In (a), the right-hand axis shows values for '1A1a – Public electricity and heat production'.

### 3.5 Ammonia emission trends and key categories

Since 2005, NH<sub>3</sub> emissions have dropped by 18% in the EU (Table 3.6). During the past two years, NH<sub>3</sub> emissions decreased by less than 1%. Currently, the EU Member States with the highest share of NH<sub>3</sub> emissions are France, Germany, Spain and Italy (Figure 3.12).

NH<sub>3</sub> emissions are mainly the result of agricultural activities during manure management (3B) and application of fertiliser to soils (3D). For the EU-27, both categories show a decrease since 1990 (Figure 3.13a). Factors driving the emission trend are mainly the number of livestock and changes in manure management practices, feeding practices and abatement technologies in fertiliser application.

The principal key categories for NH<sub>3</sub> emissions are presented in Figure 3.13a, while Figure 3.13b shows the contribution made by each aggregated sector group to total EU emissions. A single sector group – agriculture – is responsible for over 90% of the NH<sub>3</sub> emissions in the EU (Figure 3.13c).

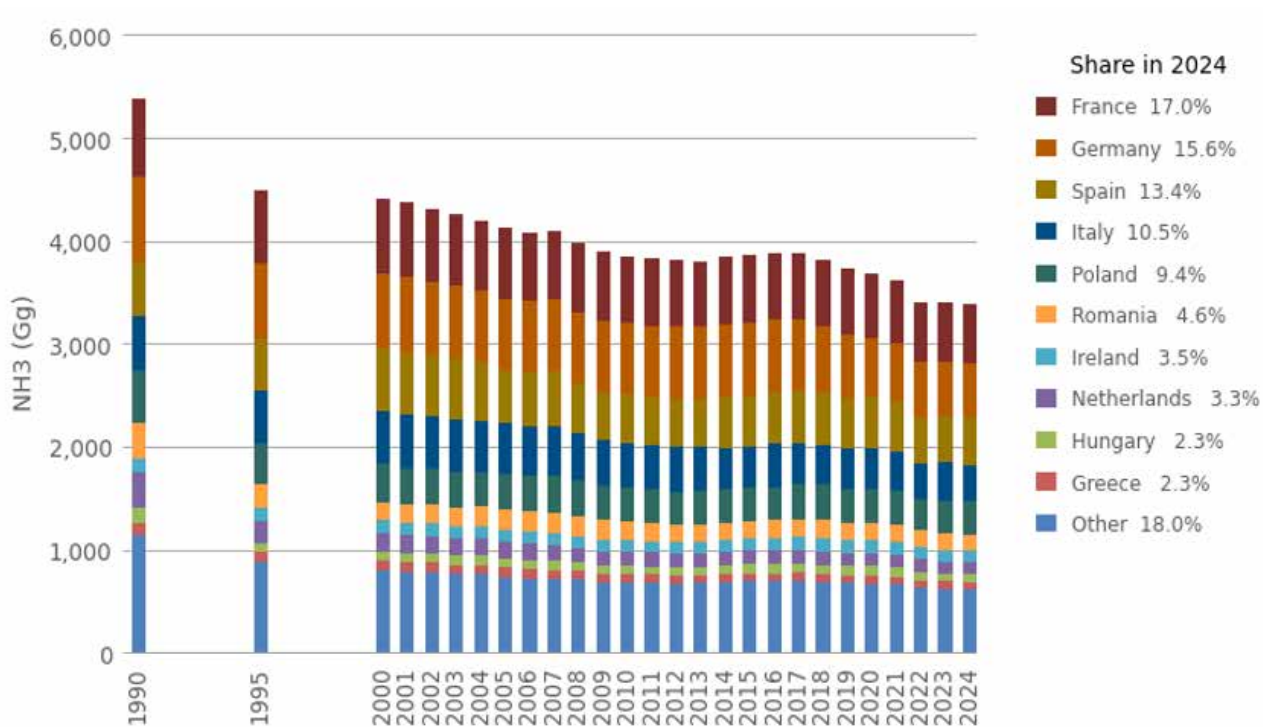
**Table 3.6 Member State contributions to EU emissions of NH<sub>3</sub>**

Member State	NH <sub>3</sub> (Gg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	91	88	83	80	81	81	77	77	76	74	72	-21%	-9%	-2.5%	1.7%	2.1%
Belgium	125	130	96	80	75	72	68	68	65	64	61	-52%	-24%	-5.3%	2.3%	1.8%
Bulgaria	143	70	55	54	52	57	57	56	55	53	52	-63%	-3%	-1.1%	2.7%	1.6%
Croatia	55	41	43	42	36	31	29	28	25	24	26	-52%	-38%	6.7%	1.0%	0.8%
Cyprus	6.9	7.9	8.4	8.3	8.0	7.0	7.9	7.9	7.4	7.3	7.4	8%	-11%	1.8%	0.1%	0.2%
Czechia	152	95	88	81	71	86	75	75	75	72	69	-55%	-15%	-4.5%	2.8%	2.0%
<i>Adjusted data*</i>				78			69	69	69							
Denmark	155	128	113	98	90	85	82	76	73	66	71	-55%	-28%	6.2%	2.9%	2.1%
Estonia	24	11	9.0	11	11	11	10	11	10	10.0	9.6	-60%	-10%	-3.7%	0.4%	0.3%
Finland	41	39	39	41	39	38	34	33	30	30	30	-27%	-26%	-0.6%	0.8%	0.9%
<i>Adjusted data*</i>				39			31	30								
France	744	714	731	683	647	657	618	605	588	579	574	-23%	-16%	-0.8%	13.9%	17.0%
Germany	827	714	720	693	693	708	574	554	541	532	528	-36%	-24%	-0.7%	15.4%	15.6%
Greece	116	101	96	91	86	76	79	79	74	77	77	-33%	-15%	0.4%	2.2%	2.3%
Hungary	149	86	93	87	77	86	91	91	82	73	79	-47%	-9%	9.4%	2.8%	2.3%
Ireland	129	131	130	124	120	121	125	123	122	117	117	-9%	-5%	0.5%	2.4%	3.5%
Italy	529	514	517	482	428	406	396	383	343	377	356	-33%	-26%	-5.5%	9.8%	10.5%
Latvia	32	14	12	13	13	14	14	14	13	13	13	-60%	1%	-2.3%	0.6%	0.4%
Lithuania	70	33	30	36	36	38	39	38	32	31	31	-56%	-13%	-0.2%	1.3%	0.9%
Luxembourg	6.5	6.9	7.1	6.5	6.6	6.3	6.4	6.4	5.8	5.8	5.7	-13%	-13%	-2.7%	0.1%	0.2%
Malta	2.2	2.2	2.1	1.9	1.8	1.5	1.5	1.5	1.4	1.4	1.4	-33%	-23%	3.0%	0.0%	0.0%
Netherlands	347	220	175	155	135	130	125	124	121	117	113	-68%	-27%	-3.9%	6.5%	3.3%
Poland	511	387	368	348	328	319	339	323	296	314	318	-38%	-9%	1.2%	9.5%	9.4%
Portugal	74	70	75	61	57	60	63	63	59	61	62	-16%	2%	2.3%	1.4%	1.8%
Romania	340	226	176	200	173	172	166	171	161	157	156	-54%	-22%	-0.8%	6.3%	4.6%
Slovakia	80	52	49	44	30	31	30	30	28	29	26	-68%	-42%	-11.8%	1.5%	0.8%
Slovenia	23	21	21	19	18	17	17	17	16	16	16	-32%	-18%	0.7%	0.4%	0.5%
Spain	535	520	615	522	479	497	499	500	450	447	453	-15%	-13%	1.4%	9.9%	13.4%
Sweden	67	66	65	62	60	60	58	57	57	57	56	-16%	-10%	-1.1%	1.2%	1.7%
<b>EU27(a)</b>	<b>5,373</b>	<b>4,490</b>	<b>4,414</b>	<b>4,124</b>	<b>3,849</b>	<b>3,868</b>	<b>3,682</b>	<b>3,610</b>	<b>3,407</b>	<b>3,405</b>	<b>3,381</b>	<b>-37%</b>	<b>-18%</b>	<b>-0.7%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	5,373	4,490	4,414	4,124	3,849	3,868	3,682	3,610	3,407	3,405	3,381					
EU27(c)	5,373	4,490	4,414	4,119	3,849	3,868	3,673	3,601	3,401	3,405	3,381					

**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

\*Adjusted data: accepted adjustments listed in table 2.1 are taken into account.

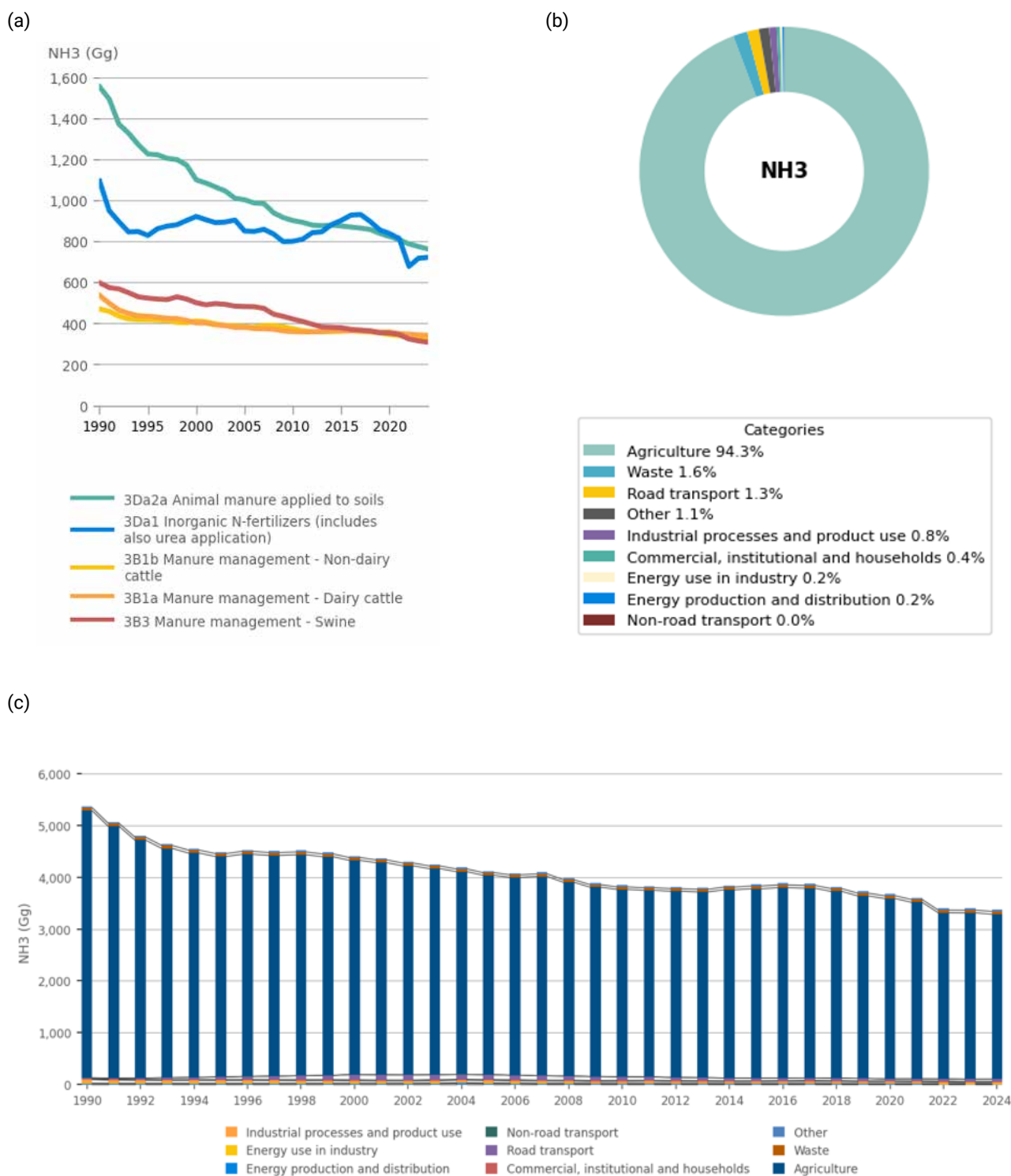
**Figure 3.1 NH<sub>3</sub> emission trends in the EU and shares of Member States**



**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

Adjustments are not considered in this figure.

**Figure 3.13 NH<sub>3</sub> emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**



**Note:** Adjustments are not considered in this figure.

### 3.6 PM<sub>2.5</sub> emission trends and key categories

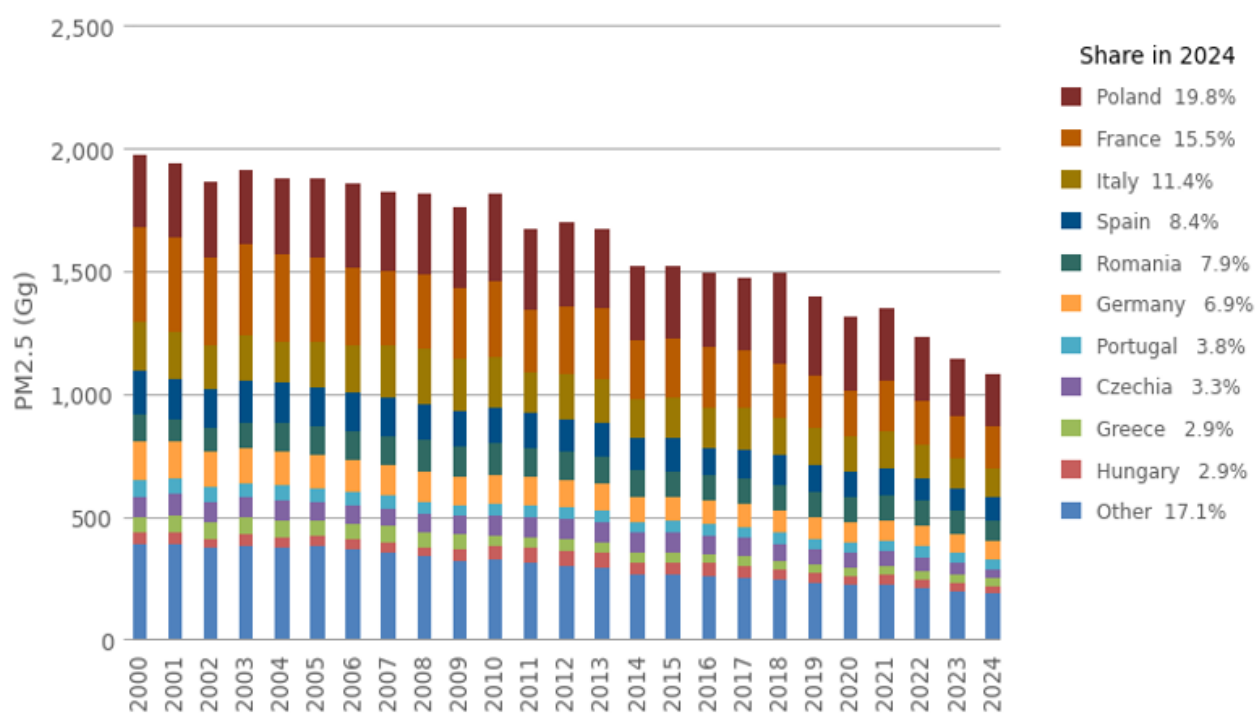
Since 2005, PM<sub>2.5</sub> emissions have dropped by 42% in the EU (Table 3.7). Between the past two years, emissions decreased by about 6%. During the current year, the EU Member States contributing most to PM<sub>2.5</sub> emissions were Poland, France and Italy (Figure 3.13).

Domestic fuel use (1A4bi) is the principal key category for PM<sub>2.5</sub> emissions. Among the top five key categories (Figure 3.15a), the highest relative reduction in emissions since 2000 has been in domestic fuel use (1A4bi), which has reduced by 31%. The reductions achieved in stationary fuel combustion in public electricity and heat production is a result of EU directives introduced for installations. Emissions from road transport (1A3) have decreased as well (3.15c), which is largely due to the Euro emission standards for the transport sector and the introduction of stricter testing procedures with vehicles tested on the road which were introduced in the EU following the Dieselgate scandal. In contrast, emissions from tyre and brake wear (1A3bvi) have increased by about 28% since 2000 mostly due to an increase in vehicle weight.

**Table 3.7 Member State contributions to EU emissions of PM<sub>2.5</sub>**

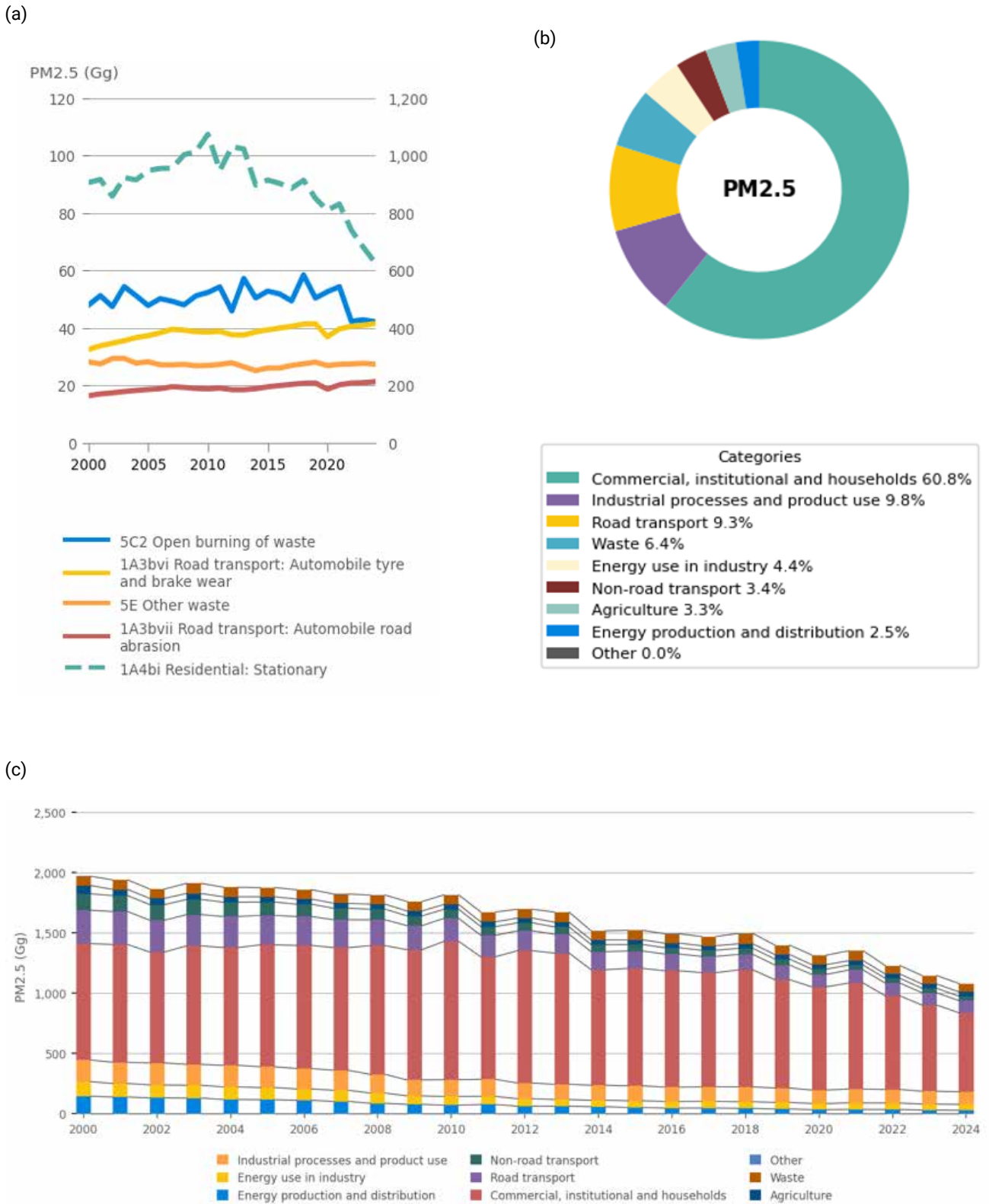
Member State	PM2.5(Gg)												Change			Share in EU-27	
	2000	2005	2010	2015	2020	2021	2022	2023	2024	2000-2024	2005-2024	2023-2024	2000	2024			
Austria	25	24	21	17	14	14	14	14	14	-45%	-43%	-3.0%	1.2%	1.3%			
Belgium	40	35	32	23	17	19	18	17	17	-58%	-51%	-2.4%	2.0%	1.6%			
Bulgaria	33	38	33	31	31	30	26	23	19	-43%	-51%	-18.0%	1.7%	1.7%			
Croatia	36	43	38	32	28	29	26	25	24	-32%	-44%	-4.2%	1.8%	2.2%			
Cyprus	2.8	2.6	2.1	1.2	1.6	1.7	1.7	1.6	1.7	-41%	-37%	1.3%	0.1%	0.2%			
Czechia	84	74	82	81	59	59	55	43	35	-58%	-52%	-17.1%	4.3%	3.3%			
Denmark	21	21	21	17	12	12	11	11	10	-50%	-51%	-7.4%	1.0%	1.0%			
Estonia	10	8.2	11	7.0	5.1	4.7	5.0	4.7	4.5	-56%	-46%	-4.3%	0.5%	0.4%			
Finland	26	26	24	18	15	15	14	13	13	-52%	-52%	-5.4%	1.3%	1.2%			
France	383	343	305	239	186	209	182	173	168	-56%	-51%	-3.4%	19.4%	15.5%			
Germany	161	132	118	100	80	82	84	78	74	-54%	-44%	-4.4%	8.2%	6.9%			
Greece	65	66	46	41	34	35	36	37	32	-52%	-53%	-14.7%	3.3%	2.9%			
Hungary	49	41	51	51	37	38	36	33	31	-36%	-24%	-4.6%	2.5%	2.9%			
Ireland	20	19	16	15	13	12	11	9.8	9.5	-51%	-51%	-2.4%	1.0%	0.9%			
Italy	204	185	210	169	143	153	136	126	123	-40%	-34%	-2.8%	10.4%	11.4%			
Latvia	27	27	20	16	15	16	15	14	14	-47%	-47%	-0.5%	1.4%	1.3%			
Lithuania	15	19	17	14	11	11	11	9.7	9.5	-38%	-50%	-2.1%	0.8%	0.9%			
Luxembourg	2.9	3.2	2.2	1.6	1.1	1.2	1.1	1.4	1.3	-54%	-58%	-3.1%	0.1%	0.1%			
Malta	0.7	0.8	0.5	0.4	0.3	0.3	0.3	0.3	0.4	-46%	-47%	26.4%	0.0%	0.0%			
Netherlands	35	29	22	18	15	15	15	14	14	-60%	-51%	-3.0%	1.8%	1.3%			
Poland	294	323	360	297	304	296	255	234	214	-27%	-34%	-8.4%	14.9%	19.8%			
Portugal	64	56	48	45	43	45	45	43	41	-35%	-26%	-3.4%	3.2%	3.8%			
Romania	108	121	129	105	101	106	99	92	86	-20%	-29%	-6.7%	5.4%	7.9%			
Slovakia	44	36	26	21	17	16	16	13	12	-72%	-66%	-7.4%	2.2%	1.1%			
Slovenia	14	16	15	13	10	11	9.7	9.4	8.7	-40%	-47%	-6.8%	0.7%	0.8%			
Spain	177	157	143	132	108	105	94	91	91	-49%	-42%	-0.7%	9.0%	8.4%			
Sweden	32	31	26	17	15	14	14	13	13	-60%	-59%	-4.7%	1.6%	1.2%			
<b>EU27(a)</b>	<b>1,973</b>	<b>1,877</b>	<b>1,816</b>	<b>1,522</b>	<b>1,317</b>	<b>1,351</b>	<b>1,229</b>	<b>1,146</b>	<b>1,080</b>	<b>-45%</b>	<b>-42%</b>	<b>-5.7%</b>	<b>100.0%</b>	<b>100.0%</b>			
EU27(b)	1,973	1,877	1,816	1,522	1,317	1,351	1,229	1,146	1,080								

**Notes:** The Air Convention formally requests Parties to report emissions of PM for 2000 and thereafter.  
(a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

**Figure 3.14** PM<sub>2.5</sub> emission trends in the EU and shares of Member States

**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.15** PM<sub>2.5</sub> emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions



**Notes:** In (a), the right-hand axis shows values for '1A4bi – Residential: Stationary'. The Air Convention formally requests Parties to report emissions of PM for 2000 and thereafter.

### 3.7 PM<sub>10</sub> emission trends and key categories

Since 2000, PM<sub>10</sub> emissions have decreased by 41% in the EU (Table 3.8). During the current year, the EU Member States contributing most to PM<sub>10</sub> emissions were Poland, France and Italy (Figure 3.15). During the past two years, the PM<sub>10</sub> emissions decreased by about 4%.

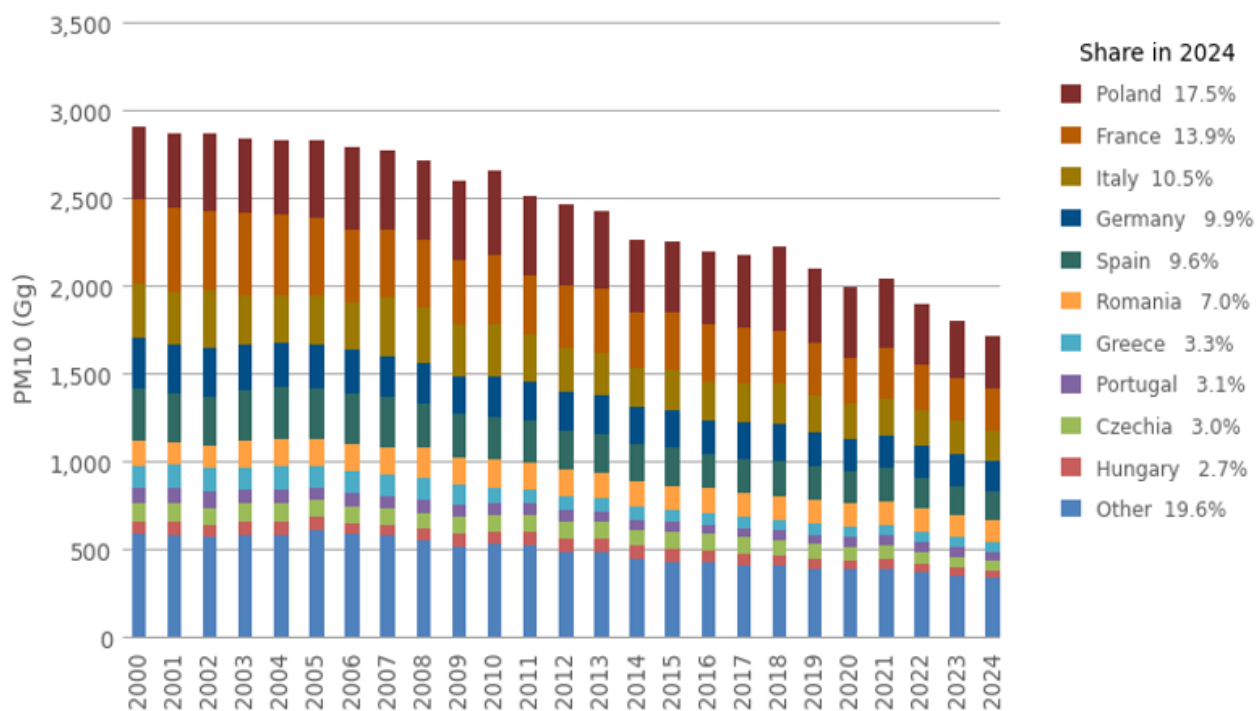
Figure 3.17b shows the contribution of each aggregated sector group to total EU emissions. The commercial, institutional and households sector group is the biggest source of PM<sub>10</sub> in the EU. The most significant key category for PM<sub>10</sub> is residential stationary combustion (1A4bi) (Figure 3.17a). Emissions from this category have decreased since 2000, which is due to for example the stricter emission standards of the Eco-design Directive (2009/125/EC). Among the top five key categories, construction and demolition (2A5b) has had the highest relative reduction in emissions since 2000 (34%). The reductions in this sector are for example due to better techniques in dust suppression and advances in construction practices. Emissions from quarrying and mining of minerals (2A5a) have also reduced since 2000. From the agricultural sector, emissions have remained relatively constant (Figure 3.17a and 3.17c).

**Table 3.8 Member State contributions to EU emissions of PM<sub>10</sub>**

Member State	PM10(Gg)									Change			Share in EU-27	
	2000	2005	2010	2015	2020	2021	2022	2023	2024	2000-2024	2005-2024	2023-2024	2000	2024
Austria	41	40	36	32	28	30	29	29	28	-33%	-30%	-2.0%	1.4%	1.6%
Belgium	60	51	50	35	30	33	31	30	29	-51%	-43%	-2.9%	2.1%	1.7%
Bulgaria	69	75	60	53	49	47	41	38	34	-51%	-55%	-10.6%	2.4%	2.0%
Croatia	47	57	52	42	44	43	36	37	37	-22%	-35%	1.4%	1.6%	2.2%
Cyprus	4.8	4.2	3.5	1.9	2.4	2.6	2.5	2.5	2.5	-48%	-41%	1.4%	0.2%	0.1%
Czechia	105	93	98	96	73	74	69	56	52	-51%	-44%	-8.0%	3.6%	3.0%
Denmark	32	32	32	27	23	23	22	21	20	-37%	-37%	-4.8%	1.1%	1.2%
Estonia	27	17	21	14	11	10	9.4	8.8	8.6	-68%	-48%	-2.8%	0.9%	0.5%
Finland	43	43	39	32	27	28	27	26	25	-42%	-42%	-4.4%	1.5%	1.4%
France	485	436	388	321	260	290	261	247	239	-51%	-45%	-3.2%	16.6%	13.9%
Germany	294	244	228	215	183	184	186	184	170	-42%	-30%	-7.3%	10.1%	9.9%
Greece	127	123	88	68	57	57	60	63	57	-55%	-54%	-9.8%	4.4%	3.3%
Hungary	73	72	72	72	54	53	51	47	46	-37%	-37%	-3.0%	2.5%	2.7%
Ireland	32	35	29	24	23	21	20	18	18	-43%	-49%	-1.7%	1.1%	1.0%
Italy	300	284	304	234	202	214	194	184	180	-40%	-37%	-2.3%	10.3%	10.5%
Latvia	32	34	27	24	23	25	24	22	22	-32%	-36%	-2.8%	1.1%	1.3%
Lithuania	17	39	27	23	19	19	18	17	18	6%	-55%	2.1%	0.6%	1.0%
Luxembourg	3.7	4.2	3.2	2.7	2.0	2.1	2.0	2.2	2.1	-43%	-51%	-6.2%	0.1%	0.1%
Malta	1.1	1.5	1.1	1.0	1.0	1.2	1.4	1.0	1.7	55%	18%	76.6%	0.0%	0.1%
Netherlands	50	43	36	32	27	28	27	27	26	-48%	-38%	-2.4%	1.7%	1.5%
Poland	419	446	481	402	401	395	346	321	300	-28%	-33%	-6.5%	14.4%	17.5%
Portugal	83	74	65	56	56	58	57	56	53	-35%	-28%	-4.5%	2.8%	3.1%
Romania	141	159	165	140	137	142	133	125	120	-15%	-25%	-4.6%	4.8%	7.0%
Slovakia	54	45	33	29	24	23	22	19	18	-67%	-60%	-5.9%	1.8%	1.0%
Slovenia	18	21	18	15	13	16	14	14	12	-35%	-43%	-16.4%	0.6%	0.7%
Spain	298	287	236	217	186	184	172	165	165	-45%	-43%	-0.1%	10.2%	9.6%
Sweden	58	72	63	43	39	39	40	38	36	-38%	-50%	-4.4%	2.0%	2.1%
EU27(a)	2,912	2,830	2,655	2,250	1,994	2,044	1,896	1,799	1,719	-41%	-39%	-4.5%	100.0%	100.0%
EU27(b)	2,912	2,830	2,655	2,250	1,994	2,044	1,896	1,799	1,719					

**Notes:** The Air Convention formally requests Parties to report emissions of PM for 2000 and thereafter.  
(a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

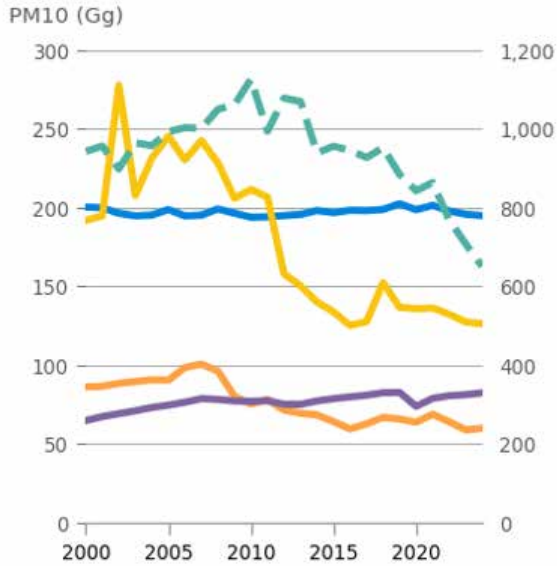
**Figure 3.16** PM<sub>10</sub> emission trends in the EU and shares of Member States



**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

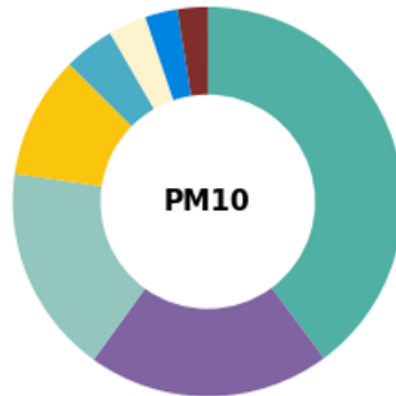
**Figure 3.17** **PM<sub>10</sub> emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

(a)



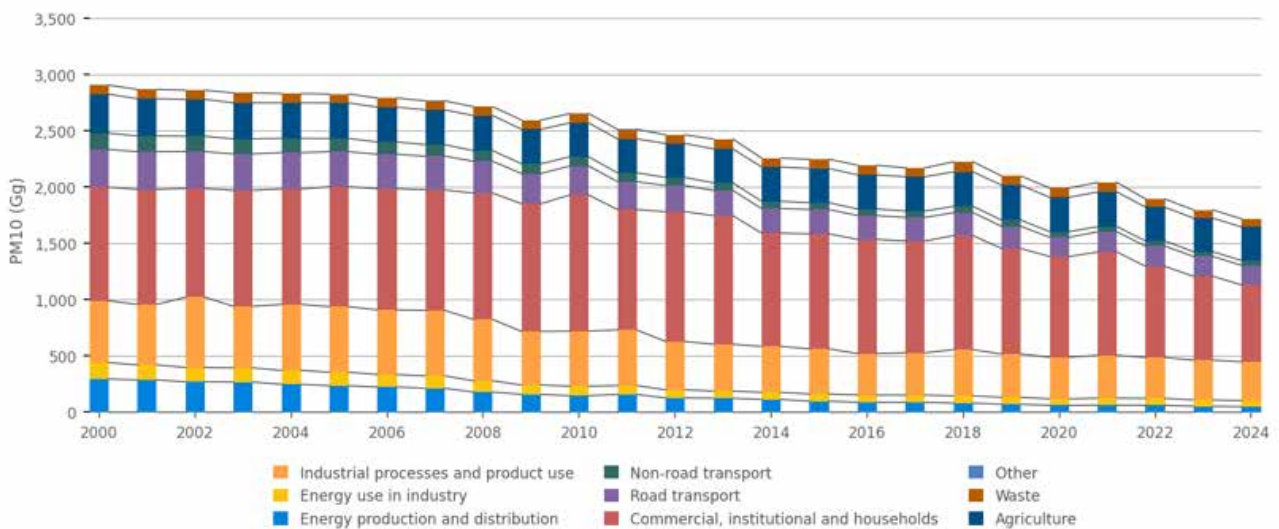
- 3Dc Farm-level agricultural operations including storage, handling and transport of agricultural products
- 2A5b Construction and demolition
- 2A5a Quarrying and mining of minerals other than coal
- 1A3bvi Road transport: Automobile tyre and brake wear
- 1A4bi Residential: Stationary

(b)



Categories	
Commercial, institutional and households	39.8%
Industrial processes and product use	20.1%
Agriculture	17.4%
Road transport	10.1%
Waste	4.2%
Energy use in industry	3.2%
Energy production and distribution	2.7%
Non-road transport	2.5%
Other	0.0%

(c)



**Notes:** In (b), the right-hand axis shows values for '1A4bi – Residential: Stationary'. The Air Convention formally requests Parties to report emissions of PM for 2000 and thereafter.

### 3.8 Total suspended particulate emission trends

Since 2000, TSP emissions have dropped by 37% in the EU (Table 3.9). Between the two latest years, emissions decreased by about 3%. During the current year, the EU Member States contributing most to TSP emissions were France, Poland and Germany.

The reductions in TSP emissions is linked to improvements in wood-burning equipment in the residential sector, reduced emissions from demolition and construction, switching from solid to gaseous and liquid fuel, as well as advancements in filter technologies of combustion plants and industrial processes (from the EU-Member State's IIRs).

**Table 3.9 Member State contributions to EU emissions of TSPs**

Member State	TSPs(Gg)									Change			Share in EU-27	
	2000	2005	2010	2015	2020	2021	2022	2023	2024	2000-2024	2005-2024	2023-2024	2000	2024
Austria	61	59	53	48	46	49	46	45	45	-27%	-25%	-2.1%	1.3%	1.5%
Belgium	97	87	89	59	58	62	58	57	55	-44%	-37%	-3.2%	2.0%	1.8%
Bulgaria	132	150	96	125	84	78	56	55	54	-59%	-64%	-2.2%	2.7%	1.8%
Croatia	73	87	80	61	78	72	53	57	62	-15%	-29%	7.9%	1.5%	2.0%
Cyprus	10	7.3	6.5	3.3	4.2	4.5	4.2	4.2	4.2	-59%	-42%	0.5%	0.2%	0.1%
Czechia	135	116	114	113	88	90	84	69	71	-47%	-38%	4.2%	2.8%	2.4%
Denmark	98	92	93	87	86	86	84	82	80	-19%	-13%	-2.4%	2.0%	2.6%
Estonia	63	29	31	23	20	19	16	15	15	-77%	-49%	-2.0%	1.3%	0.5%
Finland	57	57	54	45	40	42	41	40	37	-34%	-35%	-6.2%	1.2%	1.2%
France	992	932	856	806	703	772	738	686	663	-33%	-29%	-3.4%	20.5%	21.8%
Germany	497	412	382	375	331	330	333	335	308	-38%	-25%	-8.1%	10.3%	10.1%
Greece	245	229	168	118	108	107	114	132	119	-51%	-48%	-10.0%	5.1%	3.9%
Hungary	105	132	107	105	78	73	70	63	63	-40%	-52%	-0.8%	2.2%	2.1%
Ireland	82	99	75	57	58	54	53	50	50	-39%	-49%	-0.4%	1.7%	1.6%
Italy	442	444	487	347	309	316	292	279	275	-38%	-38%	-1.6%	9.2%	9.0%
Latvia	40	49	40	45	40	48	43	37	34	-16%	-31%	-7.4%	0.8%	1.1%
Lithuania	21	82	42	33	25	27	26	25	27	34%	-67%	9.8%	0.4%	0.9%
Luxembourg	4.3	4.9	3.8	3.6	2.4	2.5	2.8	2.9	2.6	-40%	-47%	-11.1%	0.1%	0.1%
Malta	1.8	4.1	3.0	3.3	3.4	5.1	5.1	3.1	6.1	247%	51%	98.5%	0.0%	0.2%
Netherlands	57	51	44	38	32	32	32	31	31	-46%	-40%	-1.3%	1.2%	1.0%
Poland	588	605	629	529	522	526	466	435	410	-30%	-32%	-5.8%	12.2%	13.5%
Portugal	141	131	115	90	93	97	96	94	90	-36%	-32%	-3.9%	2.9%	3.0%
Romania	236	300	289	234	227	215	189	174	175	-26%	-42%	0.1%	4.9%	5.7%
Slovakia	73	60	42	41	31	30	28	23	22	-70%	-64%	-4.4%	1.5%	0.7%
Slovenia	26	30	26	17	20	22	24	25	18	-31%	-41%	-27.5%	0.5%	0.6%
Spain	456	476	355	318	277	281	267	253	254	-44%	-47%	0.4%	9.5%	8.3%
Sweden	97	149	135	80	75	77	78	73	70	-27%	-53%	-3.9%	2.0%	2.3%
<b>EU27(a)</b>	<b>4,830</b>	<b>4,875</b>	<b>4,414</b>	<b>3,806</b>	<b>3,438</b>	<b>3,517</b>	<b>3,299</b>	<b>3,145</b>	<b>3,039</b>	<b>-37%</b>	<b>-38%</b>	<b>-3.4%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	4,830	4,875	4,414	3,806	3,438	3,517	3,299	3,145	3,039					

Notes: (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.9 Black carbon emission trends

Since 2000, BC emissions have dropped by 57% in the EU (Table 3.10). Between the latest two years, emissions decreased by about 5%. One of the drivers for the reduced BC emissions are the Euro standards in the road transport sector (EU Member State's IIRs).

During the latest year, the EU Member States contributing most to BC emissions were France, Spain and Italy. Austria and Luxembourg did not provide data for BC. As these gaps could not be gap-filled, the EU total is an underestimate.

**Table 3.10 Member State contributions to EU emissions of BC**

Member State	Black Carbon(Gg)									Change			Share in EU-27	
	2000	2005	2010	2015	2020	2021	2022	2023	2024	2000-2024	2005-2024	2023-2024	2000	2024
Austria	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Belgium	8.2	7.4	6.5	4.0	2.4	2.7	2.4	2.4	2.3	-72%	-69%	-3.4%	2.5%	1.6%
Bulgaria	3.0	4.8	3.7	3.7	3.7	3.5	3.1	2.8	2.4	-19%	-49%	-13.4%	0.9%	1.7%
Croatia	5.1	6.1	5.2	4.4	3.6	3.8	3.5	3.5	3.4	-34%	-44%	-3.3%	1.5%	2.3%
Cyprus	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.3	0.3	-57%	-53%	0.5%	0.2%	0.2%
Czechia	8.6	8.2	8.3	7.7	5.9	5.9	5.4	4.5	3.8	-55%	-53%	-15.1%	2.6%	2.7%
Denmark	4.1	3.8	3.3	2.5	1.8	1.8	1.6	1.6	1.5	-64%	-62%	-8.9%	1.2%	1.0%
Estonia	1.5	1.4	1.5	1.1	1.1	1.1	1.2	1.1	1.1	-29%	-23%	-1.8%	0.5%	0.8%
Finland	6.6	6.1	5.7	4.4	3.5	3.7	3.4	3.2	3.1	-54%	-50%	-5.7%	2.0%	2.1%
France	77	67	58	44	29	32	28	27	26	-66%	-62%	-3.5%	23.1%	17.9%
Germany	39	32	23	16	11	10	10	9.3	8.7	-78%	-73%	-6.5%	11.7%	6.0%
Greece	11	12	9.7	9.3	7.6	7.7	8.0	7.6	6.8	-37%	-42%	-10.6%	3.2%	4.7%
Hungary	8.3	7.5	8.5	8.2	5.7	5.9	5.7	5.2	5.0	-39%	-33%	-3.2%	2.5%	3.5%
Ireland	4.2	3.9	2.9	2.4	1.8	1.7	1.6	1.5	1.4	-66%	-64%	-6.0%	1.3%	1.0%
Italy	42	38	32	23	18	18	17	15	15	-64%	-60%	-0.9%	12.5%	10.5%
Latvia	3.4	3.4	2.7	2.1	2.0	2.0	1.9	1.8	1.8	-46%	-46%	-1.3%	1.0%	1.3%
Lithuania	2.2	2.6	2.7	2.3	1.8	1.9	1.7	1.6	1.6	-30%	-41%	-4.2%	0.7%	1.1%
Luxembourg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Malta	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-51%	-39%	-0.1%	0.1%	0.1%
Netherlands	10	8.4	5.1	3.5	2.6	2.5	2.4	2.3	2.2	-79%	-74%	-4.2%	3.1%	1.5%
Poland	20	21	23	18	18	18	16	15	14	-32%	-37%	-8.3%	6.0%	9.4%
Portugal	8.6	7.3	6.3	5.3	4.4	4.5	4.5	4.4	4.3	-49%	-41%	-2.5%	2.6%	3.0%
Romania	13	14	15	13	13	13	13	12	11	-9%	-19%	-5.3%	3.8%	7.9%
Slovakia	4.1	4.5	4.1	3.0	2.4	2.3	2.2	2.0	1.8	-55%	-59%	-5.6%	1.2%	1.3%
Slovenia	2.6	3.0	2.7	2.3	1.7	1.8	1.6	1.5	1.4	-45%	-52%	-5.4%	0.8%	1.0%
Spain	45	43	41	35	31	31	24	24	24	-47%	-44%	-0.8%	13.5%	16.6%
Sweden	5.3	4.6	3.8	2.6	1.9	1.8	1.7	1.6	1.5	-71%	-67%	-4.9%	1.6%	1.1%
<b>EU27(a)</b>	<b>333</b>	<b>311</b>	<b>275</b>	<b>219</b>	<b>173</b>	<b>178</b>	<b>160</b>	<b>151</b>	<b>144</b>	<b>-57%</b>	<b>-54%</b>	<b>-4.6%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>EU27(b)</b>	<b>333</b>	<b>311</b>	<b>275</b>	<b>219</b>	<b>173</b>	<b>178</b>	<b>160</b>	<b>151</b>	<b>144</b>					

**Notes:** Values presented in this table are based on the national total reported by each Member State. Dark blue-shaded cells indicate that no emission values are available. See Appendix 1 for an explanation of the notation keys reported by EU Member States. (a) Sum of national totals, as reported by EU Member States. Due to missing values for Austria and Luxembourg, this is an underestimate. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.10 Carbon monoxide emission trends and key categories

Since 2005, CO emissions have fallen by 50% in the EU (Table 3.11). Between the two latest years, CO emissions decreased by about 4%. During the current year, the EU Member States contributing most to CO emissions were Germany, France, Poland and Italy (Figure 3.18).

Figure 3.19b shows the contribution to total EU emissions made by each aggregated sector group. The largest emissions source for CO in the EU is fuel, combustion in the residential sector (Figure 3.19a), mainly consisting of biomass combustion followed by road transport. Among the most important key categories, the highest relative emission reductions (92%) since 1990 have been in the road transport sector for passenger cars (1A3bi) (Figure 3.19a).

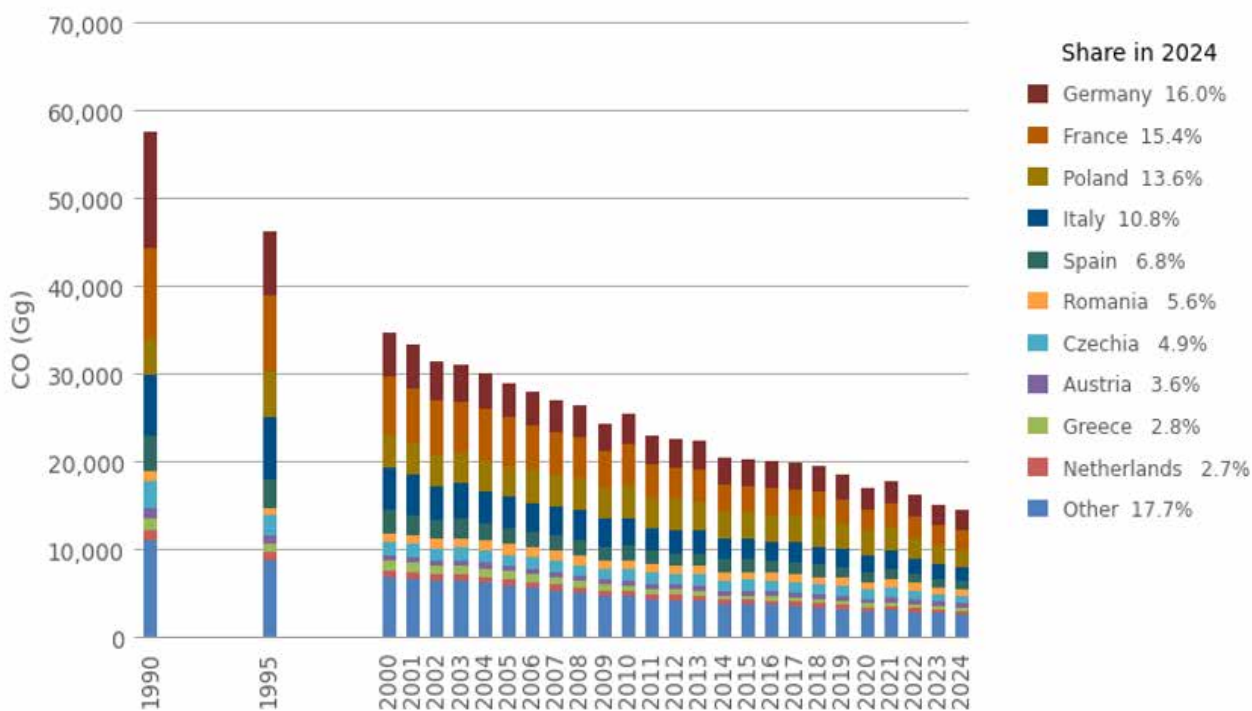
The reduced CO emissions are mainly due to advanced vehicle standards in the transport sector, but also due to reduced burning of agricultural residues (from the EU-Member State's IIRs).

**Table 3.11 Member State contributions to EU emissions of CO**

Member State	CO(Gg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	1,257	981	736	642	603	567	492	552	523	528	515	-59%	-20%	-2.5%	2.2%	3.6%	
Belgium	1,463	1,248	985	805	508	381	272	283	272	251	266	-82%	-67%	6.2%	2.5%	1.8%	
Bulgaria	851	663	428	376	310	261	236	239	201	176	156	-82%	-59%	-11.6%	1.5%	1.1%	
Croatia	564	446	466	423	334	271	215	228	201	203	201	-64%	-53%	-1.0%	1.0%	1.4%	
Cyprus	45	39	30	24	15	12	11	12	11	12	11	-76%	-55%	-10.4%	0.1%	0.1%	
Czechia	2,912	2,288	1,460	1,222	1,234	1,185	1,075	1,115	1,038	847	715	-75%	-41%	-15.6%	5.1%	4.9%	
Denmark	717	641	469	426	358	272	197	197	182	180	166	-77%	-61%	-7.5%	1.2%	1.1%	
Estonia	225	154	136	115	119	94	102	93	91	91	85	-62%	-26%	-6.7%	0.4%	0.6%	
Finland	765	662	599	536	459	374	336	351	324	312	294	-62%	-45%	-5.7%	1.3%	2.0%	
France	10,316	8,631	6,461	5,562	4,613	3,050	2,401	2,678	2,422	2,237	2,229	-78%	-60%	-0.4%	17.9%	15.4%	
Germany	13,319	7,187	5,096	3,825	3,461	3,033	2,428	2,551	2,507	2,340	2,322	-83%	-39%	-0.8%	23.1%	16.0%	
Greece	1,236	1,059	1,004	862	610	522	427	425	442	430	402	-67%	-53%	-6.4%	2.1%	2.8%	
Hungary	1,416	981	857	700	558	477	349	352	343	308	287	-80%	-59%	-6.5%	2.5%	2.0%	
Ireland	574	433	344	303	235	192	125	124	107	93	89	-85%	-71%	-5.1%	1.0%	0.6%	
Italy	6,824	7,118	4,814	3,526	3,106	2,301	1,881	2,019	1,785	1,641	1,571	-77%	-55%	-4.3%	11.9%	10.8%	
Latvia	399	288	249	210	155	110	104	107	105	99	98	-75%	-54%	-0.7%	0.7%	0.7%	
Lithuania	371	212	180	174	150	115	99	100	91	83	82	-78%	-53%	-1.6%	0.6%	0.6%	
Luxembourg	471	215	49	44	35	27	18	20	19	19	18	-96%	-60%	-4.8%	0.8%	0.1%	
Malta	20	27	20	16	10	7.0	4.2	4.8	5.0	4.8	4.5	-78%	-71%	-7.0%	0.0%	0.0%	
Netherlands	1,188	949	761	728	659	526	439	434	418	401	397	-67%	-46%	-1.0%	2.1%	2.7%	
Poland	4,031	5,320	3,940	3,574	3,859	3,044	2,761	2,725	2,351	2,183	1,972	-51%	-45%	-9.7%	7.0%	13.6%	
Portugal	778	801	659	503	371	303	249	278	245	245	242	-69%	-52%	-1.3%	1.4%	1.7%	
Romania	1,212	753	1,056	1,225	1,046	908	903	954	897	843	813	-33%	-34%	-3.5%	2.1%	5.6%	
Slovakia	1,041	663	552	573	463	371	279	317	280	258	237	-77%	-59%	-8.2%	1.8%	1.6%	
Slovenia	284	273	200	180	143	123	90	97	80	76	72	-75%	-60%	-5.5%	0.5%	0.5%	
Spain	4,166	3,177	2,540	1,864	1,588	1,443	1,150	1,207	987	943	978	-77%	-48%	3.7%	7.2%	6.8%	
Sweden	1,091	934	640	490	405	330	286	286	274	264	259	-76%	-47%	-2.0%	1.9%	1.8%	
<b>EU27(a)</b>	<b>57,535</b>	<b>46,143</b>	<b>34,731</b>	<b>28,927</b>	<b>25,408</b>	<b>20,300</b>	<b>16,927</b>	<b>17,751</b>	<b>16,202</b>	<b>15,067</b>	<b>14,482</b>	<b>-75%</b>	<b>-50%</b>	<b>-3.9%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	57,535	46,143	34,731	28,927	25,408	20,300	16,927	17,751	16,202	15,067	14,482						

Notes: (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

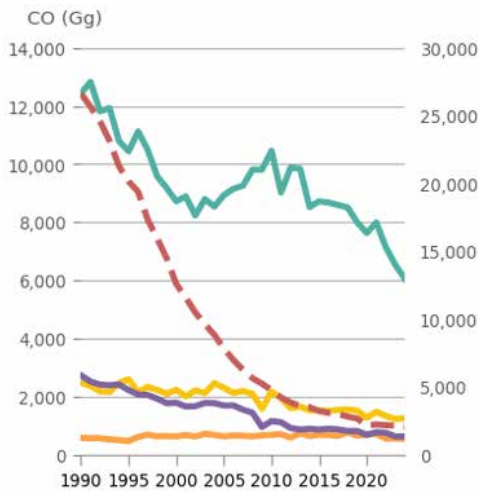
**Figure 3.18 CO emission trends in the EU and shares of Member States**



**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

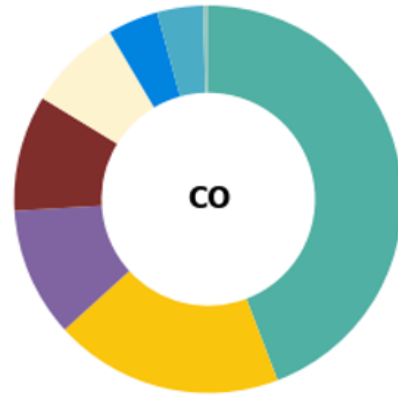
**Figure 3.19a** CO emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions

(a)



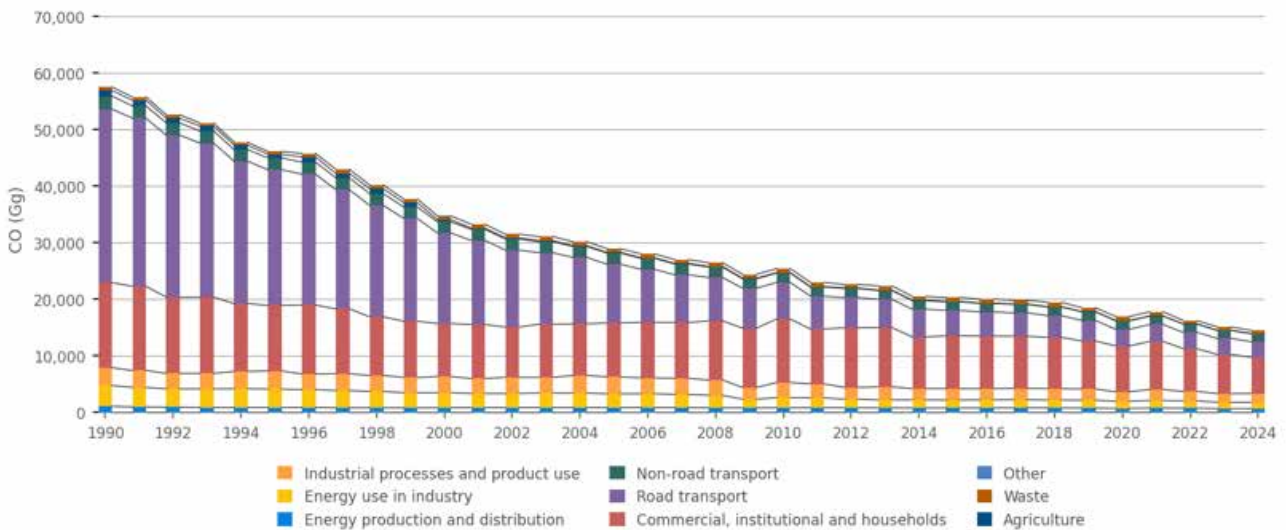
- 1A4bi Residential: Stationary
- 2C1 Iron and steel production
- 5C2 Open burning of waste
- 1A2a Stationary combustion in manufacturing industries and construction: Iron and steel
- 1A3bi Road transport: Passenger cars

(b)



Categories	
Commercial, institutional and households	44.2%
Road transport	19.1%
Industrial processes and product use	10.8%
Non-road transport	9.7%
Energy use in industry	7.8%
Energy production and distribution	4.2%
Waste	3.8%
Agriculture	0.4%
Other	0.0%

(c)



**Note:** In (a) the right-hand axis gives values for '1A3bi – Road transport: Passenger cars'.

### 3.11 Lead emission trends and key categories

Since 1990, Pb emissions have dropped by 95% in the EU (Table 3.12). During the current year, the EU Member States contributing most to Pb emissions were Poland, Germany and Italy (Figure 3.19).

The main key categories for Pb emissions are iron and steel production (2C1), tyre and brake wear from the road transport sector (1A3bvi) and residential combustion (1A4bi) (Figure 3.21a). The aggregated sector group industrial processes and product use, road transport, energy use in industry and commercial, institutional and households are significant sources of Pb emissions (Figure 3.21b). Emissions from tyre and brake wear from the road transport sector (1A3bvi) have increased by 61% since 1990 and by about 2% during the past two years.

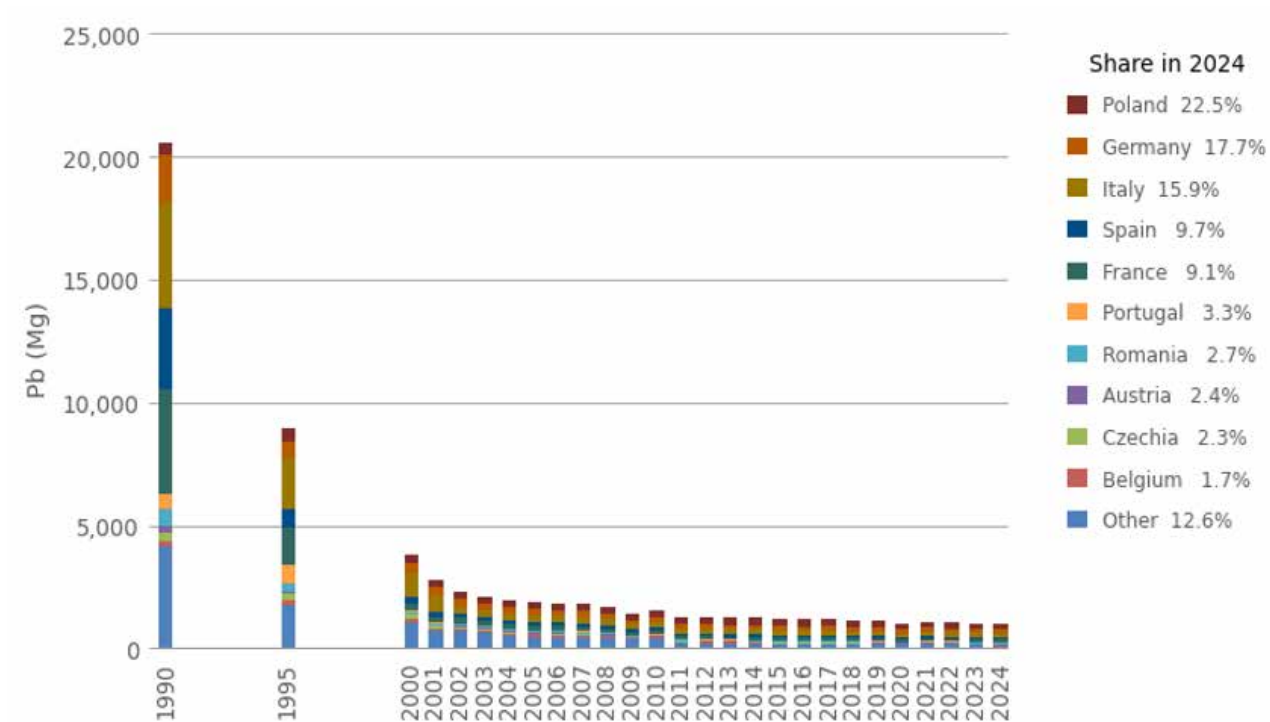
The historical decline in Pb emissions in the EU is primarily achieved through reduced emissions from the road transport sector due to unleaded petrol. Since 2005, Pb emissions have decreased by 47%, mainly driven by reduced lead emissions from iron and steel production. Between the past two years, emissions decreased by about 2%.

**Table 3.12 Member State contributions to EU emissions of Pb**

Member State	Pb(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	238	32	30	38	25	26	22	24	23	23	24	-90%	-36%	3.2%	1.2%	2.4%	
Belgium	258	203	106	82	48	38	19	18	18	18	17	-94%	-80%	-7.9%	1.3%	1.7%	
Bulgaria	394	269	183	44	24	20	17	17	18	16	15	-96%	-66%	-6.5%	1.9%	1.5%	
Croatia	530	264	147	15	10	10	7.7	8.7	8.4	9.0	9.1	-98%	-41%	1.1%	2.6%	0.9%	
Cyprus	0.9	1.1	1.3	1.4	1.5	1.2	1.3	1.3	1.3	1.4	1.4	63%	0%	2.0%	0.0%	0.1%	
Czechia	321	260	226	45	32	28	23	22	27	23	23	-93%	-48%	0.1%	1.6%	2.3%	
Denmark	133	30	23	21	17	16	15	15	15	14	13	-90%	-38%	-2.1%	0.6%	1.4%	
Estonia	202	83	30	9.5	8.7	5.3	4.2	4.2	4.5	3.9	3.8	-98%	-60%	-2.6%	1.0%	0.4%	
Finland	321	73	31	21	20	15	12	13	12	12	11	-96%	-47%	-5.6%	1.6%	1.2%	
France	4,302	1,469	280	178	138	109	93	100	96	89	90	-98%	-49%	1.9%	20.9%	9.1%	
Germany	1,921	704	382	257	193	194	170	184	179	173	175	-91%	-32%	1.2%	9.3%	17.7%	
Greece	505	405	340	73	37	15	10	11	11	11	12	-98%	-83%	9.6%	2.5%	1.2%	
Hungary	818	145	21	14	13	13	14	16	16	13	12	-99%	-17%	-9.7%	4.0%	1.2%	
Ireland	158	100	17	12	9.7	9.6	8.2	8.6	8.5	8.3	8.2	-95%	-29%	-1.7%	0.8%	0.8%	
Italy	4,302	2,021	959	270	206	187	143	167	162	164	158	-96%	-41%	-3.7%	20.9%	15.9%	
Latvia	233	128	154	171	166	5.3	5.1	5.1	5.0	5.0	5.0	-98%	-97%	0.5%	1.1%	0.5%	
Lithuania	11	3.7	2.3	3.4	3.4	3.5	3.6	3.8	4.0	3.5	3.8	-66%	15%	8.7%	0.1%	0.4%	
Luxembourg	19	11	2.9	3.2	2.3	2.5	2.0	2.2	2.0	1.8	1.8	-91%	-43%	0.0%	0.1%	0.2%	
Malta	0.4	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.5	28%	-5%	12.5%	0.0%	0.1%	
Netherlands	336	155	29	30	38	8.8	6.0	5.1	4.7	4.1	4.6	-99%	-85%	11.0%	1.6%	0.5%	
Poland	542	576	394	268	293	288	253	262	244	221	222	-59%	-17%	0.3%	2.6%	22.5%	
Portugal	571	786	39	37	34	30	27	28	30	31	33	-94%	-11%	4.8%	2.8%	3.3%	
Romania	734	356	48	74	42	43	40	43	38	29	27	-96%	-64%	-7.0%	3.6%	2.7%	
Slovakia	55	47	48	20	10	13	11	14	12	11	10	-82%	-49%	-9.7%	0.3%	1.0%	
Slovenia	43	24	8.3	7.2	7.2	6.5	5.4	6.1	6.0	5.8	6.2	-86%	-14%	6.6%	0.2%	0.6%	
Spain	3,285	812	305	154	134	110	84	98	96	114	96	-97%	-38%	-15.8%	15.9%	9.7%	
Sweden	364	24	15	11	10	8.0	7.6	6.6	6.5	6.7	6.2	-98%	-45%	-6.4%	1.8%	0.6%	
<b>EU27(a)</b>	<b>20,599</b>	<b>8,982</b>	<b>3,822</b>	<b>1,861</b>	<b>1,524</b>	<b>1,206</b>	<b>1,006</b>	<b>1,085</b>	<b>1,049</b>	<b>1,013</b>	<b>990</b>	<b>-95%</b>	<b>-47%</b>	<b>-2.3%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	20,599	8,982	3,822	1,861	1,524	1,206	1,006	1,085	1,049	1,013	990						

**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

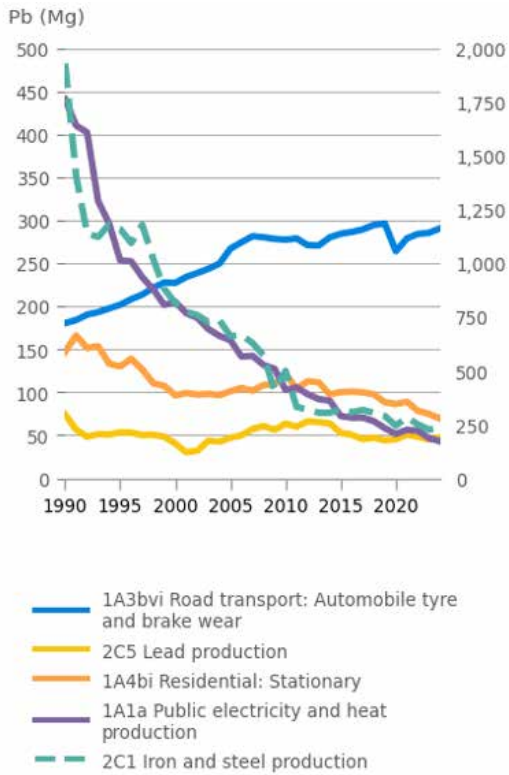
**Figure 3.20 Pb emission trends in the EU and shares of Member States**



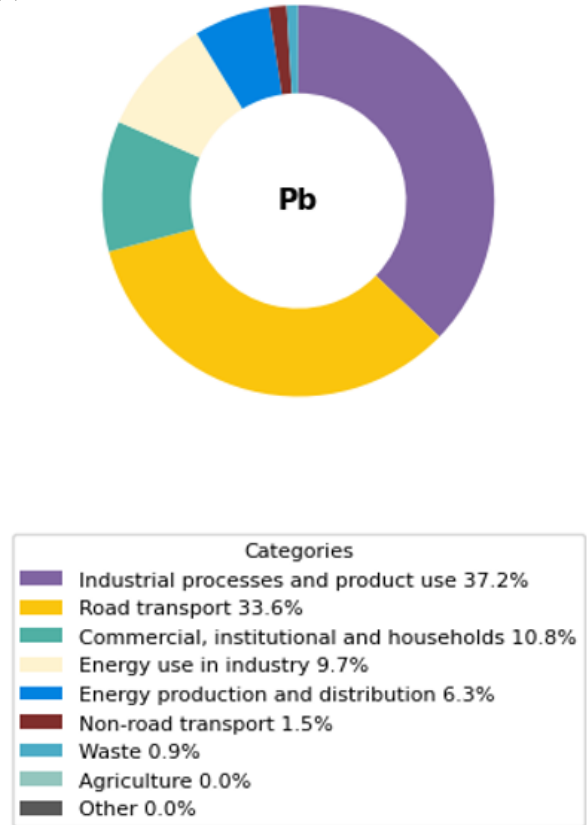
**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.21 Pb emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

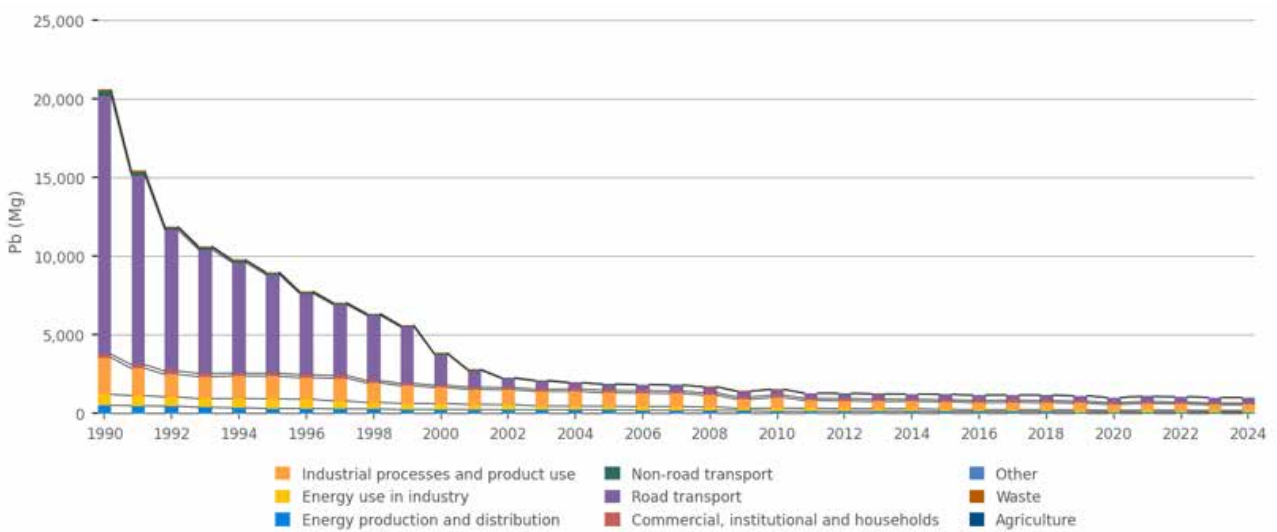
(a)



(b)



(c)



**Note:** In (a), the right-hand axis gives values for '1A3bi – Road transport: Passenger cars' and '2C1 – Iron and steel production'.

### 3.12 Cadmium emission trends and key categories

Since 1990, Cd emissions in the EU have fallen by 70% (Table 3.13). Since 2005 they have decreased by 44%. During the past two years, Cd emissions decreased by about 2%. During the latest year, the EU Member States contributing most to Cd emissions were Poland, Germany and Spain (Figure 3.21).

Figure 3.23(b) shows the contribution made by each aggregated sector group to total EU emissions. The common leading sources of Cd emissions are the industrial processes and product use sector and the commercial, institutional and households and energy sector.

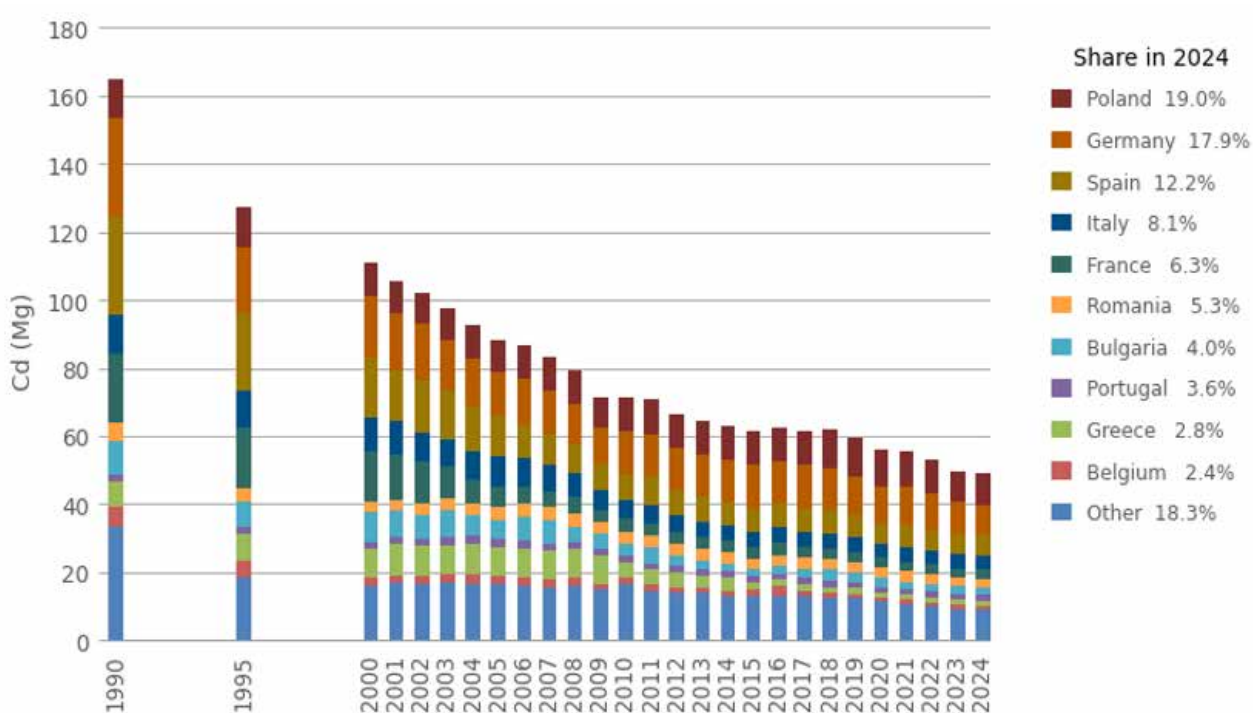
Industrial sources of Cd emissions have fallen since the early 1990s in all EU Member States. This is largely because the abatement technologies for waste water treatment and incinerators have improved, as have those for metal refining and smelting facilities (EEA, 2024b). The reduction since 2005 has mainly been achieved in public electricity and heat production (1A1a) and in iron and steel production (2C1).

**Table 3.13 Member State contributions to EU emissions of Cd**

Member State	Cd(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	1.8	1.1	1.0	1.1	1.0	1.0	0.9	1.0	1.0	1.0	1.0	-46%	-14%	-1.0%	1.1%	2.0%	
Belgium	6.0	4.9	2.6	2.4	2.0	1.7	1.1	1.2	1.1	1.1	1.2	-80%	-50%	5.2%	3.7%	2.4%	
Bulgaria	10	7.5	8.5	5.7	3.6	2.2	2.9	2.1	2.2	2.2	2.0	-81%	-66%	-11.5%	6.1%	4.0%	
Croatia	1.2	0.9	0.9	1.2	1.0	0.9	0.8	0.8	0.8	0.8	0.8	-36%	-34%	-4.8%	0.7%	1.6%	
Cyprus	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	-21%	-23%	10.7%	0.1%	0.1%	
Czechia	5.2	2.2	1.7	1.7	1.5	1.4	1.3	1.4	1.3	1.2	1.1	-78%	-35%	-5.7%	3.1%	2.3%	
Denmark	1.2	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.6	-54%	-20%	-6.5%	0.7%	1.1%	
Estonia	4.5	2.2	0.8	0.5	0.6	0.5	0.5	0.4	0.5	0.4	0.4	-91%	-20%	-2.3%	2.7%	0.8%	
Finland	6.7	2.2	1.5	1.5	1.3	0.9	0.7	0.9	0.8	0.8	0.7	-89%	-51%	-7.5%	4.1%	1.5%	
France	21	18	14	6.2	3.7	3.2	2.8	2.7	2.7	2.4	3.1	-85%	-51%	25.0%	12.5%	6.3%	
Germany	29	19	18	13	13	12	11	11	11	9.4	8.8	-70%	-30%	-6.9%	17.7%	17.9%	
Greece	7.5	7.8	8.4	8.9	4.6	2.1	1.5	1.5	1.5	1.5	1.4	-81%	-84%	-5.2%	4.6%	2.8%	
Hungary	1.9	1.6	1.8	1.4	1.5	1.7	1.4	1.4	1.3	1.2	1.2	-39%	-15%	-5.2%	1.2%	2.4%	
Ireland	0.6	0.6	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	-61%	-44%	-0.9%	0.3%	0.4%	
Italy	11	11	10	8.7	5.4	4.6	4.0	4.5	4.2	4.1	4.0	-64%	-55%	-3.7%	6.7%	8.1%	
Latvia	0.9	0.8	0.9	1.1	1.0	0.6	0.7	0.8	0.8	0.8	0.8	-16%	-30%	0.4%	0.6%	1.6%	
Lithuania	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-45%	-8%	0.6%	0.1%	0.3%	
Luxembourg	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-74%	-72%	0.0%	0.1%	0.1%	
Malta	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	-91%	-90%	1.6%	0.0%	0.0%	
Netherlands	4.1	3.1	3.1	3.8	4.8	2.9	2.1	1.0	0.9	0.5	0.6	-86%	-85%	6.6%	2.5%	1.2%	
Poland	12	12	9.7	9.5	10.0	10	11	11	10	9.3	9.3	-21%	-2%	0.2%	7.1%	19.0%	
Portugal	2.0	2.0	2.1	2.2	2.0	1.9	1.8	1.8	1.8	1.8	1.8	-10%	-20%	-2.7%	1.2%	3.6%	
Romania	5.0	3.9	3.4	3.8	3.6	3.1	2.9	3.2	3.0	2.7	2.6	-49%	-31%	-5.8%	3.1%	5.3%	
Slovakia	1.7	1.5	1.5	1.3	0.9	0.7	0.7	0.7	0.6	0.5	0.5	-70%	-60%	-3.4%	1.0%	1.0%	
Slovenia	0.6	0.6	0.6	0.7	0.7	0.6	0.5	0.6	0.5	0.5	0.5	-23%	-29%	0.3%	0.4%	1.0%	
Spain	29	23	18	12	7.7	7.1	5.8	6.2	6.1	6.0	6.0	-79%	-50%	0.3%	17.4%	12.2%	
Sweden	2.3	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-79%	-13%	-2.7%	1.4%	1.0%	
<b>EU27(a)</b>	<b>165</b>	<b>127</b>	<b>111</b>	<b>88</b>	<b>72</b>	<b>62</b>	<b>56</b>	<b>56</b>	<b>53</b>	<b>50</b>	<b>49</b>	<b>-70%</b>	<b>-44%</b>	<b>-1.8%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	165	127	111	88	72	62	56	56	53	50	49						

**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available

**Figure 3.22 Cd emission trends in the EU and share of Member States**



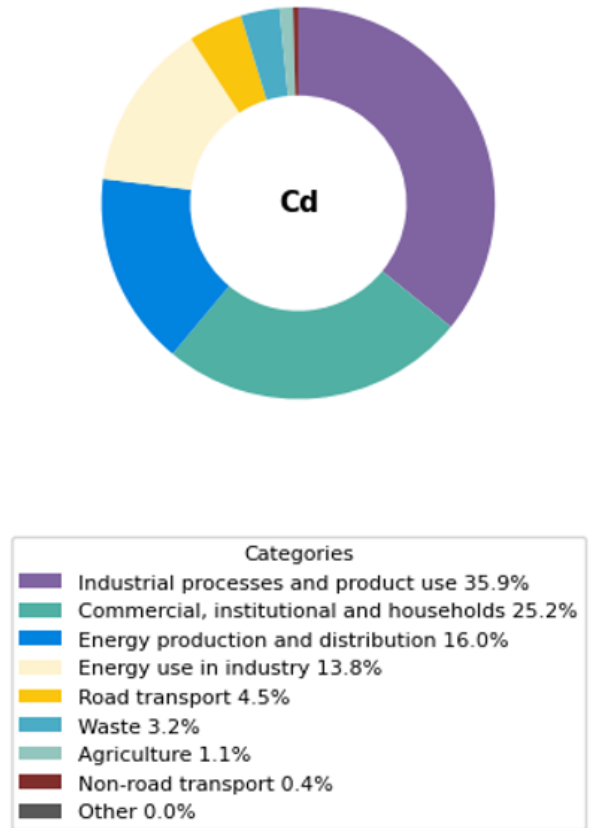
**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.23 Cd emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

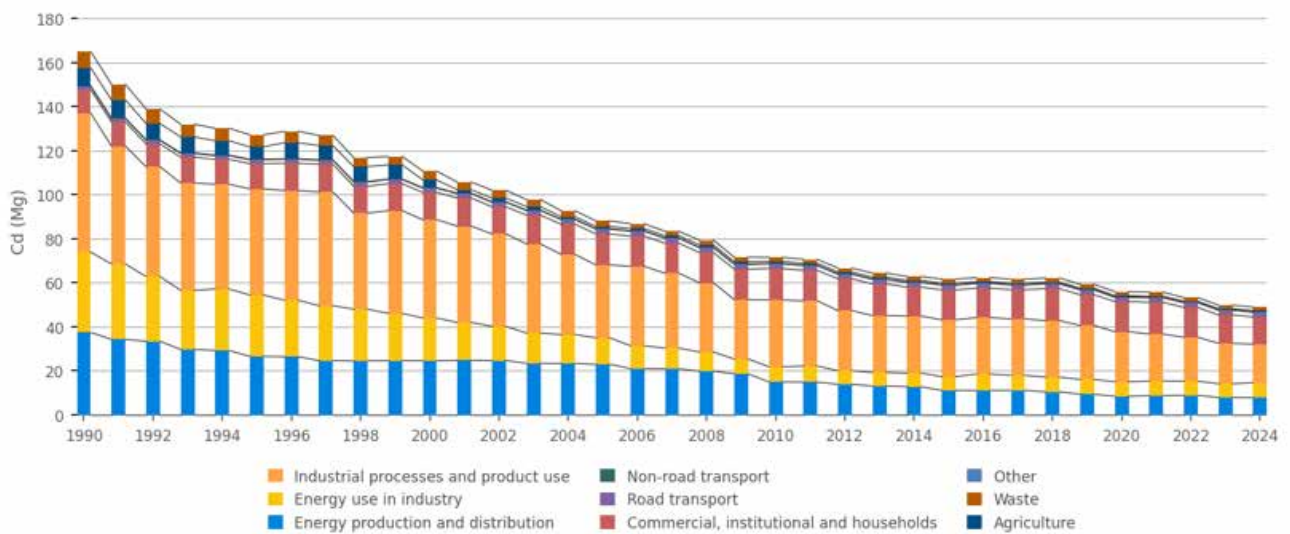
(a)



(b)



(c)



### 3.13 Mercury emission trends and key categories

Since 1990, Hg emissions in the EU have dropped by 79%, and since 2005 by 60%. Between the past two years they decreased by 10% (Table 3.14).

During the latest year, the EU Member States contributing most to Hg emissions were Germany, Italy and Poland (see Figure 3.24).

Figure 3.25b shows the contribution made by each aggregated sector group to total EU emissions. For Hg, the principal emission sources are the energy and the industrial processes and product use sectors. Since 1990, the fall in Hg emissions in the industrial sector is mainly due to better emission controls on Hg cells and replacing them with diaphragm or membrane cells and switching from coal to gas and other energy sources in the power and heat-generating sectors (EEA, 2024b).

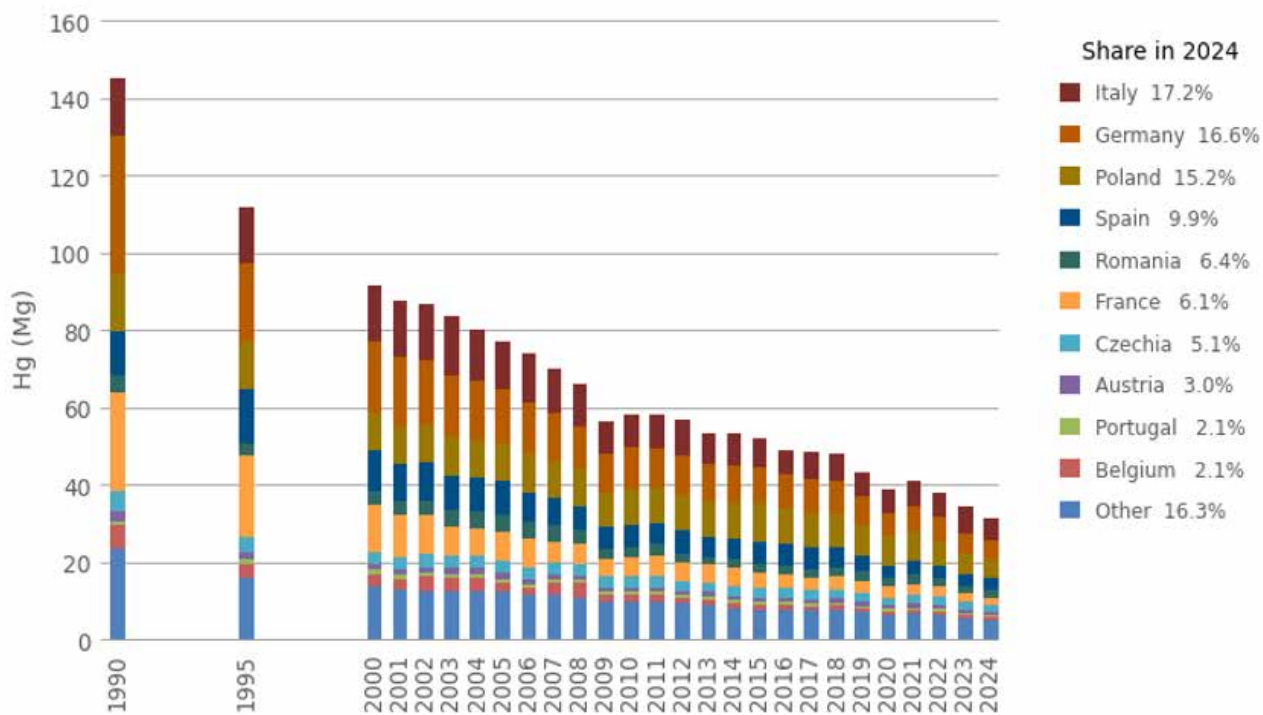
The reductions achieved since 2005 are mainly occurring in the public electricity and heat production and the iron and steel industry. The strong decrease in 2009 is partly explained by lower emissions in the iron and steel production sector (2C1) reported by Belgium (Figure 3.25c).

**Table 3.14 Member State contributions to EU emissions of Hg**

Member State	Hg(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	2.5	1.6	1.4	1.6	1.1	1.1	1.1	1.0	1.0	0.9	0.9	-63%	-42%	-1.3%	1.7%	3.0%	
Belgium	6.1	3.3	3.2	2.2	1.7	1.1	0.9	0.9	1.0	0.8	0.7	-89%	-71%	-14.4%	4.2%	2.1%	
Bulgaria	2.1	2.1	1.8	1.8	1.3	1.0	0.8	0.9	0.9	0.7	0.6	-71%	-66%	-8.5%	1.4%	1.9%	
Croatia	1.2	0.3	0.4	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	-76%	-49%	-14.8%	0.8%	0.9%	
Cyprus	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-69%	-68%	-6.1%	0.1%	0.1%	
Czechia	5.1	4.3	3.2	3.3	3.1	2.4	2.0	2.2	2.3	1.9	1.6	-69%	-52%	-14.8%	3.5%	5.1%	
Denmark	3.2	2.3	1.0	0.7	0.4	0.3	0.2	0.2	0.3	0.2	0.2	-94%	-71%	-5.4%	2.2%	0.6%	
Estonia	1.2	0.6	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-85%	2%	-4.6%	0.8%	0.6%	
Finland	1.1	0.8	0.6	0.9	0.9	0.6	0.5	0.5	0.5	0.5	0.4	-64%	-56%	-20.2%	0.7%	1.3%	
France	26	21	12	7.5	4.9	4.2	2.7	2.9	2.5	2.2	1.9	-93%	-75%	-12.3%	17.6%	6.1%	
Germany	36	20	18	14	11	9.5	6.1	6.7	6.6	5.4	5.2	-85%	-63%	-4.6%	24.4%	16.6%	
Greece	2.3	2.3	2.6	2.7	2.5	1.4	0.8	0.8	0.7	0.6	0.6	-74%	-78%	-4.5%	1.6%	1.9%	
Hungary	2.8	2.0	1.7	1.3	0.9	0.9	0.8	0.8	0.7	0.6	0.6	-78%	-55%	-1.6%	1.9%	2.0%	
Ireland	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	-71%	-56%	-3.2%	0.5%	0.7%	
Italy	15	14	15	13	8.5	7.3	5.8	6.4	6.0	7.0	5.4	-65%	-57%	-23.8%	10.5%	17.2%	
Latvia	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-74%	-9%	-4.4%	0.2%	0.2%	
Lithuania	0.5	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	-45%	51%	4.6%	0.4%	0.9%	
Luxembourg	0.5	0.3	0.4	0.5	0.3	0.3	0.3	0.3	0.2	0.2	0.2	-53%	-53%	0.0%	0.3%	0.7%	
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-88%	-80%	-1.9%	0.0%	0.0%	
Netherlands	3.7	1.6	1.2	1.0	0.8	0.7	0.5	0.5	0.5	0.4	0.4	-90%	-63%	-9.1%	2.5%	1.2%	
Poland	15	12	10	9.8	9.1	10	7.6	7.6	6.0	5.1	4.8	-68%	-52%	-7.4%	10.1%	15.2%	
Portugal	1.2	1.4	1.2	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.7	-46%	-28%	2.9%	0.8%	2.1%	
Romania	4.4	2.9	3.3	4.2	2.6	2.2	2.3	2.6	2.3	2.0	2.0	-54%	-53%	-2.7%	3.0%	6.4%	
Slovakia	1.9	1.4	1.6	0.9	0.6	0.6	0.6	0.6	0.6	0.5	0.5	-75%	-50%	-4.1%	1.3%	1.5%	
Slovenia	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-55%	-28%	-2.7%	0.3%	0.5%	
Spain	12	14	10	8.7	5.5	5.5	3.4	3.4	3.2	3.2	3.1	-74%	-65%	-2.5%	8.0%	9.9%	
Sweden	1.6	1.0	0.8	0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.4	-77%	-46%	-2.3%	1.1%	1.2%	
<b>EU27(a)</b>	<b>145</b>	<b>112</b>	<b>92</b>	<b>77</b>	<b>58</b>	<b>52</b>	<b>39</b>	<b>41</b>	<b>38</b>	<b>35</b>	<b>31</b>	<b>-79%</b>	<b>-60%</b>	<b>-9.9%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	145	112	92	77	58	52	39	41	38	35	31						

**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

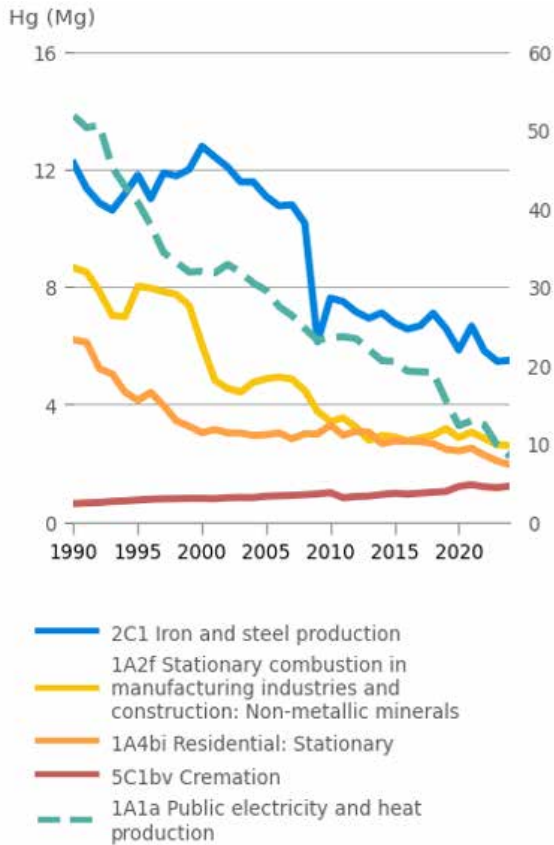
**Figure 3.24 Hg emission trends in the EU and shares of Member States**



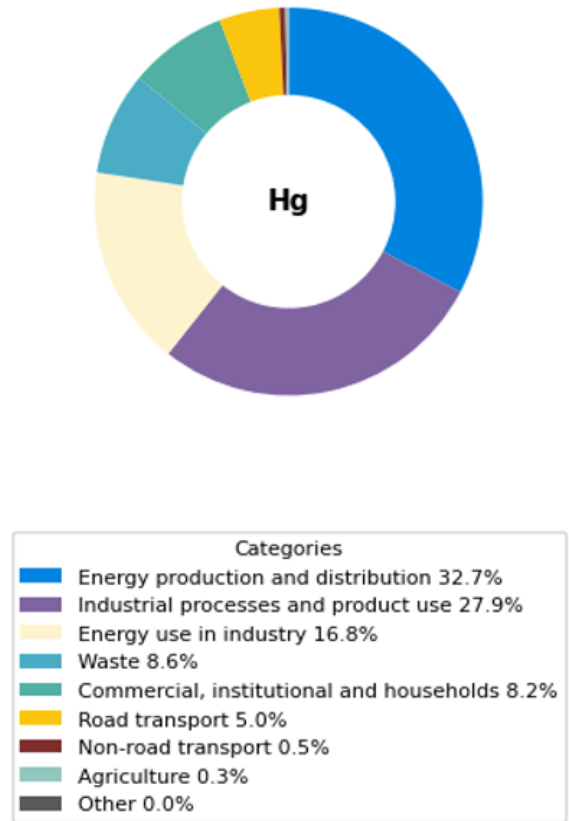
**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed up 'Other'.

**Figure 3.25 Hg emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

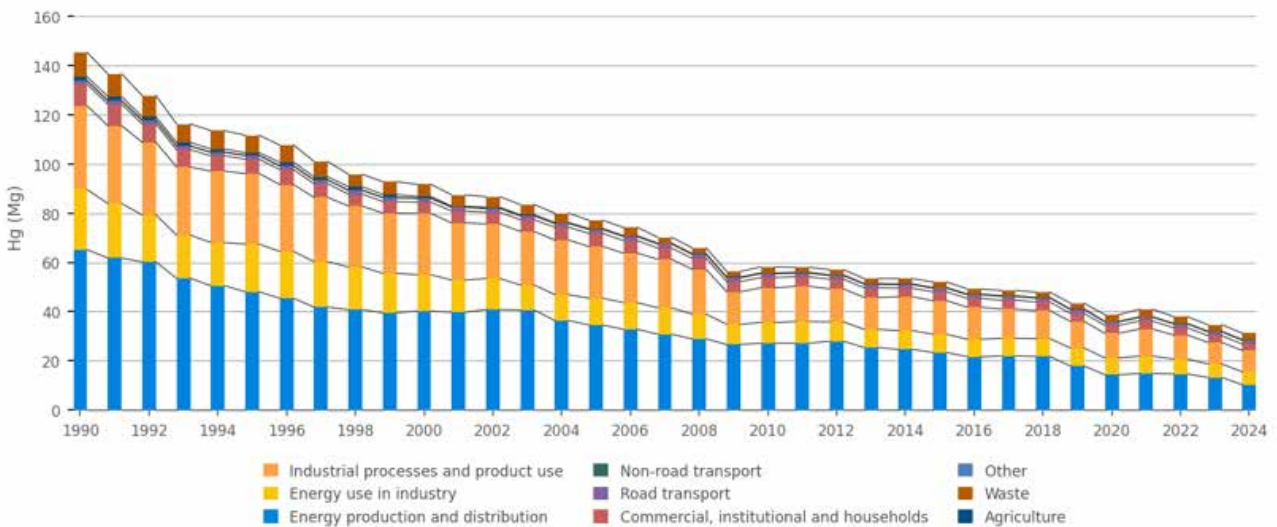
(a)



(b)



(c)



Note: In (a), the right-hand axis shows values for '1A1a – Public electricity and heat production'.

### 3.14 Arsenic emission trends

Since 1990, As emissions have dropped by 92% in the EU, and by 68% since 2005 (Table 3.15). Between the latest two years, emissions decreased by about 9%. The EU Member States that contributed most to As emissions during the latest year were Poland, Germany, France and Italy. Austria and Luxembourg did not provide emission data for As, and therefore, the EU total is an underestimate.

**Table 3.15 Member State contributions to EU emissions of As**

Member State	As(Mg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Belgium	6.7	6.4	4.0	3.2	2.0	1.2	0.9	0.9	0.8	0.8	0.7	-89%	-77%	-12.4%	1.2%	1.7%
Bulgaria	23	15	15	11	4.7	3.3	2.4	2.6	3.2	2.0	1.7	-93%	-85%	-16.0%	4.0%	3.9%
Croatia	8.7	1.3	1.1	1.2	0.8	0.5	0.3	0.4	0.4	0.4	0.4	-96%	-69%	-7.5%	1.5%	0.8%
Cyprus	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	-28%	-59%	0.1%	0.0%	0.2%
Czechia	69	17	3.9	2.2	1.8	1.6	1.3	2.4	6.9	3.0	1.1	-98%	-49%	-63.2%	12.2%	2.5%
Denmark	1.4	0.8	0.9	0.5	0.3	0.4	0.2	0.3	0.2	0.2	0.2	-86%	-65%	-4.8%	0.2%	0.4%
Estonia	20	9.7	6.7	1.7	2.0	0.9	0.5	0.5	0.7	0.5	0.4	-98%	-75%	-9.6%	3.5%	1.0%
Finland	35	5.2	4.4	3.0	3.4	2.5	2.0	2.1	1.9	1.6	1.7	-95%	-45%	1.4%	6.1%	3.8%
France	18	18	16	13	9.1	6.8	5.6	6.2	6.1	5.8	5.9	-67%	-55%	1.8%	3.1%	13.5%
Germany	86	9.4	8.3	8.0	7.6	7.3	5.5	5.9	6.1	5.3	4.9	-94%	-38%	-6.3%	15.1%	11.3%
Greece	2.4	2.6	3.0	3.2	2.4	3.2	1.2	1.2	1.2	1.1	1.0	-59%	-69%	-7.6%	0.4%	2.2%
Hungary	4.0	3.3	3.2	2.6	2.3	2.2	1.8	1.6	1.4	1.1	0.9	-77%	-64%	-16.9%	0.7%	2.1%
Ireland	1.8	1.9	1.9	1.8	1.4	1.6	1.1	1.3	1.2	1.1	1.0	-43%	-42%	-3.7%	0.3%	2.4%
Italy	37	28	39	28	17	9.4	5.3	5.8	6.3	4.9	4.3	-89%	-85%	-13.0%	6.5%	9.7%
Latvia	17	8.5	15	17	16	0.1	0.1	0.1	0.1	0.1	0.1	-99%	-99%	0.0%	2.9%	0.2%
Lithuania	0.8	0.3	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	-40%	54%	0.6%	0.1%	1.1%
Luxembourg	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Malta	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-92%	-89%	20.5%	0.0%	0.0%
Netherlands	1.5	1.1	1.7	1.6	0.8	0.8	0.3	0.3	0.3	0.2	0.3	-83%	-83%	11.7%	0.3%	0.6%
Poland	144	71	30	16	16	14	12	12	12	10	10	-93%	-37%	-1.9%	25.2%	23.0%
Portugal	2.1	2.6	3.0	3.1	1.9	2.2	1.3	1.2	1.2	1.2	1.2	-42%	-61%	1.1%	0.4%	2.7%
Romania	73	37	5.8	6.6	5.1	4.7	3.3	3.6	3.2	2.3	2.1	-97%	-69%	-11.1%	12.7%	4.7%
Slovakia	2.4	1.7	1.6	1.3	1.0	1.0	0.8	1.0	0.9	0.9	0.8	-67%	-37%	-6.0%	0.4%	1.8%
Slovenia	0.9	0.8	0.8	0.9	0.9	0.7	0.7	0.6	0.5	0.5	0.6	-40%	-38%	8.7%	0.2%	1.3%
Spain	11	10	11	10	6.2	6.0	3.6	3.7	3.7	3.5	3.4	-69%	-67%	-4.0%	1.9%	7.7%
Sweden	5.7	1.6	0.9	1.0	1.0	0.7	0.7	0.6	0.6	0.6	0.6	-90%	-41%	-2.3%	1.0%	1.4%
<b>EU27(a)</b>	<b>571</b>	<b>253</b>	<b>178</b>	<b>138</b>	<b>104</b>	<b>72</b>	<b>52</b>	<b>55</b>	<b>59</b>	<b>48</b>	<b>44</b>	<b>-92%</b>	<b>-68%</b>	<b>-8.6%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	571	253	178	138	104	72	52	55	59	48	44					

**Notes:** Values presented in this table are based on the national total reported by each Member State. Dark blue-shaded cells indicate that no emission values are available. See Appendix 1 for an explanation of the notation keys reported by EU Member States. (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.15 Chromium emission trends

Since 1990, Cr emissions dropped by 71% in the EU, and by 35% since 2005 (Table 3.16). Between the latest two years, emissions decreased by 2%. During the latest year, the EU Member States contributing most to Cr emissions were Germany, Italy, France and Poland. Austria and Luxembourg did not provide emission data for Cr, and therefore, the EU total is an underestimate.

**Table 3.16 Member State contributions to EU emissions of Cr**

Member State	Cr(Mg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Belgium	38	34	24	21	17	9.4	7.3	7.6	7.9	7.6	8.3	-78%	-60%	8.9%	3.7%	2.8%
Bulgaria	19	15	15	12	8.2	6.2	6.8	6.0	6.5	5.8	5.5	-71%	-54%	-6.1%	1.9%	1.9%
Croatia	5.3	4.1	3.8	4.4	3.3	2.9	2.7	2.9	2.8	3.0	3.1	-41%	-30%	2.6%	0.5%	1.0%
Cyprus	0.3	0.4	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.6	68%	-1%	1.9%	0.0%	0.2%
Czechia	23	16	13	14	13	12	11	12	13	11	10	-57%	-26%	-3.9%	2.3%	3.4%
Denmark	7.1	4.3	2.8	2.9	3.0	3.0	2.7	2.7	2.7	2.7	2.6	-63%	-10%	-2.5%	0.7%	0.9%
Estonia	17	9.0	6.9	3.6	4.5	2.9	1.7	1.9	2.3	1.7	1.5	-91%	-57%	-6.7%	1.7%	0.5%
Finland	48	36	29	20	26	17	14	14	15	14	13	-73%	-36%	-5.7%	4.6%	4.3%
France	403	201	117	63	48	40	35	35	35	33	33	-92%	-47%	1.4%	39.1%	11.3%
Germany	174	104	93	87	85	88	75	76	77	74	75	-57%	-14%	0.9%	16.9%	25.3%
Greece	6.0	6.5	6.9	9.8	9.8	17	6.0	6.0	5.9	5.4	5.7	-5%	-42%	5.8%	0.6%	1.9%
Hungary	18	12	13	13	13	13	12	11	9.6	7.4	5.1	-72%	-61%	-30.0%	1.8%	1.7%
Ireland	5.1	5.3	6.1	4.9	4.0	4.1	3.6	3.8	3.9	3.8	3.8	-24%	-21%	-0.3%	0.5%	1.3%
Italy	95	79	55	62	51	47	37	44	43	41	39	-59%	-37%	-4.2%	9.3%	13.2%
Latvia	2.8	2.1	2.4	2.9	2.9	1.7	1.9	2.0	2.0	2.0	2.0	-29%	-33%	-1.1%	0.3%	0.7%
Lithuania	3.2	1.5	1.2	1.5	1.4	1.4	1.4	1.5	1.5	1.5	1.5	-52%	4%	5.0%	0.3%	0.5%
Luxembourg	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Malta	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	13%	-1%	11.8%	0.0%	0.1%
Netherlands	12	8.6	5.3	4.4	3.9	3.5	3.2	3.5	3.5	3.5	4.1	-66%	-6%	17.8%	1.2%	1.4%
Poland	56	53	41	41	44	31	34	35	33	32	31	-44%	-25%	-2.6%	5.4%	10.5%
Portugal	9.3	11	12	12	10	9.4	8.1	8.5	8.5	8.5	8.7	-6%	-25%	2.8%	0.9%	3.0%
Romania	25	19	15	20	14	14	13	15	13	10	9.3	-63%	-54%	-8.0%	2.4%	3.2%
Slovakia	6.4	4.2	3.3	3.6	3.8	4.6	4.5	4.8	4.1	3.8	4.4	-32%	21%	15.2%	0.6%	1.5%
Slovenia	1.8	1.9	1.9	2.2	2.2	2.0	1.8	2.0	1.9	1.9	1.9	9%	-10%	3.7%	0.2%	0.7%
Spain	30	32	37	37	29	28	23	23	22	23	22	-25%	-40%	-1.4%	2.9%	7.6%
Sweden	23	12	7.0	10	5.1	5.4	5.1	6.3	6.5	5.8	3.8	-83%	-62%	-34.1%	2.2%	1.3%
<b>EU27(a)</b>	<b>1,029</b>	<b>672</b>	<b>513</b>	<b>453</b>	<b>404</b>	<b>363</b>	<b>312</b>	<b>325</b>	<b>321</b>	<b>302</b>	<b>296</b>	<b>-71%</b>	<b>-35%</b>	<b>-1.9%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	1,029	672	513	453	404	363	312	325	321	302	296					

**Notes:** Values presented in this table are based on the national total reported by each Member State. Dark blue-shaded cells indicate that no emission values are available. See Appendix 1 for an explanation of the notation keys reported by EU Member States. (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.16 Copper emission trends

Since 1990, Cu emissions in the EU have increased by 15% and by 2% since 2005 (Table 3.17). Between the latest two years, the emissions grew by 2%. During the latest year, the EU Member States contributing most to Cu emissions were Germany, Italy, France and Poland. Austria and Luxembourg did not provide emission data for Cu. As these gaps could not be gap-filled, the EU total is an underestimate.

**Table 3.17 Member State contributions to EU emissions of Cu**

Member State	Cu(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR						
Belgium	101	108	110	113	118	115	95	103	105	106	105	4%	-7%	-0.4%	3.9%	3.6%	
Bulgaria	75	55	64	58	43	47	53	54	54	56	58	-22%	0%	5.2%	2.9%	2.0%	
Croatia	17	15	20	24	24	25	26	28	29	32	36	112%	52%	10.8%	0.7%	1.2%	
Cyprus	4.8	6.2	7.6	8.8	11	8.8	8.9	9.6	9.5	9.9	10	110%	15%	2.5%	0.2%	0.3%	
Czechia	58	52	55	74	75	78	83	87	92	92	96	66%	30%	3.8%	2.2%	3.2%	
Denmark	53	62	69	73	75	74	69	70	72	70	68	29%	-6%	-2.6%	2.1%	2.3%	
Estonia	16	9.0	8.3	10	12	13	13	14	14	14	14	-17%	31%	-1.5%	0.6%	0.5%	
Finland	163	122	71	64	48	47	44	44	44	43	43	-74%	-33%	-0.7%	6.3%	1.4%	
France	306	310	323	347	344	350	304	312	320	310	311	2%	-10%	0.4%	11.9%	10.5%	
Germany	805	728	764	769	782	830	752	771	785	783	788	-2%	2%	0.6%	31.2%	26.7%	
Greece	22	26	29	89	87	69	59	64	69	68	83	273%	-6%	23.2%	0.9%	2.8%	
Hungary	36	30	37	51	55	59	65	72	78	73	73	101%	41%	0.1%	1.4%	2.5%	
Ireland	22	26	45	55	52	56	51	54	58	59	59	168%	8%	0.8%	0.9%	2.0%	
Italy	389	440	466	496	449	444	305	368	383	384	392	1%	-21%	2.0%	15.1%	13.3%	
Latvia	10.0	6.9	7.7	11	12	13	14	14	14	14	13	34%	22%	-4.2%	0.4%	0.5%	
Lithuania	7.6	3.6	3.1	11	12	13	16	16	17	17	18	136%	64%	4.8%	0.3%	0.6%	
Luxembourg	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR						
Malta	1.3	1.9	2.3	2.6	2.8	3.2	2.5	2.9	3.1	3.1	3.7	190%	41%	18.6%	0.0%	0.1%	
Netherlands	93	102	110	109	116	110	104	101	107	111	114	23%	5%	2.8%	3.6%	3.9%	
Poland	201	215	194	216	267	253	299	316	316	315	314	56%	45%	-0.3%	7.8%	10.6%	
Portugal	48	63	86	88	81	67	60	64	67	71	74	53%	-16%	3.7%	1.9%	2.5%	
Romania	10	8.8	7.0	51	57	60	72	74	81	84	84	725%	66%	-0.1%	0.4%	2.8%	
Slovakia	13	9.5	7.4	9.1	9.6	33	33	34	36	35	35	170%	283%	-1.1%	0.5%	1.2%	
Slovenia	10	15	15	17	20	20	18	21	23	22	23	123%	36%	5.3%	0.4%	0.8%	
Spain	82	95	126	144	137	125	106	119	120	119	122	49%	-15%	2.6%	3.2%	4.1%	
Sweden	35	20	17	18	18	18	17	18	17	17	17	-51%	-8%	0.3%	1.3%	0.6%	
<b>EU27(a)</b>	<b>2,580</b>	<b>2,528</b>	<b>2,644</b>	<b>2,909</b>	<b>2,907</b>	<b>2,931</b>	<b>2,666</b>	<b>2,830</b>	<b>2,912</b>	<b>2,908</b>	<b>2,955</b>	<b>15%</b>	<b>2%</b>	<b>1.6%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	2,580	2,528	2,644	2,909	2,907	2,931	2,666	2,830	2,912	2,908	2,955						

**Notes:** Values presented in this table are based on the national total reported by each Member State. Dark blue-shaded cells indicate that no emission values are available. See Appendix 1 for an explanation of the notation keys reported by EU Member States. (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.17 Nickel emission trends

Since 1990, Ni emissions have dropped by 80% in the EU, and by 66% since 2005 (Table 3.18). Between the latest two years, they decreased by about 2%. During the latest year, the EU Member States contributing most to Ni emissions were Germany, Spain and Poland. A major contributor is the combustion of fuels in sector 1A1. Austria and Luxembourg did not provide emission data for Ni. As these gaps could not be gap-filled, the EU total is an underestimate.

**Table 3.18 Member State contributions to EU emissions of Ni**

Member State	Ni(Mg)													Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024		
Austria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR						
Belgium	77	72	36	29	11	5.5	3.9	4.1	4.5	4.2	4.0	-95%	-86%	-3.6%	3.9%	1.0%		
Bulgaria	94	48	33	24	11	7.9	7.3	7.4	7.9	6.1	6.2	-93%	-74%	1.5%	4.8%	1.6%		
Croatia	17	14	13	14	7.7	4.5	2.3	2.5	2.9	2.5	2.2	-87%	-84%	-11.2%	0.9%	0.6%		
Cyprus	5.9	7.4	10	12	7.2	5.3	5.1	4.7	4.7	4.7	4.8	-20%	-61%	1.7%	0.3%	1.2%		
Czechia	55	28	14	13	8.3	5.6	4.8	5.1	5.7	4.7	4.1	-93%	-67%	-12.8%	2.8%	1.0%		
Denmark	21	16	9.8	9.6	6.9	5.4	5.0	5.2	5.4	4.6	4.3	-79%	-55%	-7.4%	1.1%	1.1%		
Estonia	26	10	6.1	3.4	3.3	2.6	1.7	1.7	2.1	1.8	1.5	-94%	-55%	-13.8%	1.4%	0.4%		
Finland	79	47	35	26	23	16	9.9	10	9.9	9.0	9.8	-88%	-63%	8.5%	4.0%	2.5%		
France	307	228	190	156	97	46	23	24	26	23	20	-94%	-87%	-14.4%	15.8%	5.0%		
Germany	334	205	163	195	159	150	136	128	138	128	129	-61%	-34%	0.8%	17.2%	32.4%		
Greece	42	47	50	56	61	40	22	23	23	22	22	-48%	-61%	1.0%	2.2%	5.5%		
Hungary	12	20	15	3.9	3.2	3.0	2.7	2.6	2.5	2.0	2.0	-84%	-49%	-3.2%	0.6%	0.5%		
Ireland	22	27	32	21	8.9	5.3	4.9	7.4	6.4	4.2	5.0	-77%	-76%	20.6%	1.1%	1.3%		
Italy	116	112	109	114	43	33	28	30	32	29	28	-76%	-75%	-4.6%	5.9%	7.1%		
Latvia	15	8.5	6.8	6.4	5.8	0.3	0.3	0.4	0.4	0.3	0.3	-98%	-95%	-3.0%	0.8%	0.1%		
Lithuania	34	15	8.4	8.1	4.6	2.0	1.5	1.4	2.3	1.9	1.5	-96%	-81%	-21.5%	1.7%	0.4%		
Luxembourg	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR							
Malta	3.9	5.6	5.4	5.2	4.9	1.8	0.4	0.4	0.5	0.3	0.3	-92%	-94%	-12.9%	0.2%	0.1%		
Netherlands	76	86	21	11	2.5	2.1	1.8	1.7	1.7	1.9	2.7	-96%	-75%	41.9%	3.9%	0.7%		
Poland	200	166	120	106	102	74	64	68	68	60	58	-71%	-45%	-3.1%	10.3%	14.7%		
Portugal	57	65	64	67	33	18	15	14	15	15	15	-73%	-77%	0.5%	2.9%	3.8%		
Romania	113	64	34	25	14	11	9.6	10	9.8	9.1	9.6	-91%	-61%	6.3%	5.8%	2.4%		
Slovakia	9.5	4.4	2.6	1.7	1.7	1.7	1.4	1.5	1.5	1.4	1.3	-86%	-22%	-5.7%	0.5%	0.3%		
Slovenia	2.9	2.1	2.5	2.4	2.2	1.6	1.5	1.4	1.3	1.3	1.6	-47%	-36%	16.7%	0.2%	0.4%		
Spain	201	235	254	234	147	85	68	66	70	61	59	-70%	-75%	-3.1%	10.3%	15.0%		
Sweden	28	30	17	15	14	6.6	5.4	5.9	5.6	5.2	4.4	-84%	-72%	-15.2%	1.4%	1.1%		
<b>EU27(a)</b>	<b>1,946</b>	<b>1,561</b>	<b>1,251</b>	<b>1,157</b>	<b>782</b>	<b>534</b>	<b>427</b>	<b>427</b>	<b>446</b>	<b>404</b>	<b>397</b>	<b>-80%</b>	<b>-66%</b>	<b>-1.7%</b>	<b>100.0%</b>	<b>100.0%</b>		
EU27(b)	1,946	1,561	1,251	1,157	782	534	427	427	446	404	397							

**Notes:** Values presented in this table are based on the national total reported by each Member State. Dark blue-shaded cells indicate that no emission values are available. See Appendix 1 for an explanation of the notation keys reported by EU Member States. (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.18 Selenium emission trends

Since 1990 and 2005, Se emissions have dropped by 64% and 63% in the EU, respectively (Table 3.19). Between the latest two years, Se emissions decreased by 6%. During the latest year, the EU Member States contributing most to Se emissions were Czechia, France and Spain. Finland reported emission data only at the sectoral level and used the notation key 'NE' (not estimated) for the national total, while noting in their IIR that there is not yet a comprehensive emission inventory covering all sources of selenium. Therefore, the national total for Finland was calculated using the sum of sector totals in accordance with the gap-filling procedure. Austria, Luxembourg and Poland did not provide emission data for Se. As these gaps could not be gap-filled, the EU total is an underestimate.

**Table 3.19 Member State contributions to EU emissions of Se**

Member State	Se(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Belgium	5.1	6.4	6.5	27	12	3.7	1.6	2.0	1.6	1.5	1.5	-72%	-95%	-6.3%	2.9%	2.3%	
Bulgaria	22	22	20	18	13	9.4	6.3	7.3	9.3	5.6	4.6	-79%	-74%	-17.8%	12.7%	7.3%	
Croatia	0.6	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	-7%	-1%	-9.7%	0.3%	0.9%	
Cyprus	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-38%	-62%	-1.3%	0.1%	0.1%	
Czechia	32	29	28	30	26	22	17	17	18	15	14	-56%	-52%	-4.3%	18.7%	22.8%	
Denmark	4.2	3.9	2.3	1.5	1.4	0.7	0.4	0.5	0.5	0.5	0.4	-91%	-73%	-13.3%	2.4%	0.6%	
Estonia	9.2	4.9	3.6	1.4	1.8	1.0	0.6	0.6	0.7	0.5	0.5	-95%	-68%	-9.5%	5.3%	0.7%	
Finland	1.9	0.5	0.5	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.3	-81%	-39%	-26.1%	1.1%	0.6%	
France	13	13	13	13	11	10	8.7	9.7	9.4	8.7	8.6	-34%	-32%	-1.2%	7.5%	13.6%	
Germany	5.8	11	8.6	5.0	4.4	3.4	2.8	2.9	3.0	2.8	2.7	-54%	-46%	-2.1%	3.3%	4.3%	
Greece	14	14	16	17	15	11	3.8	3.6	3.6	2.8	2.1	-85%	-88%	-24.8%	7.9%	3.3%	
Hungary	6.5	5.8	5.8	4.1	3.6	3.4	2.4	2.1	2.0	1.8	1.7	-74%	-59%	-3.9%	3.7%	2.7%	
Ireland	9.3	7.0	5.6	5.2	4.5	4.6	2.7	2.9	2.3	1.8	1.5	-84%	-71%	-13.7%	5.4%	2.4%	
Italy	7.7	7.8	8.5	8.9	8.1	8.4	6.0	6.6	6.8	6.0	5.5	-29%	-39%	-9.0%	4.4%	8.7%	
Latvia	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.0	141%	1151%	1479.8%	0.2%	1.5%	
Lithuania	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	-59%	11%	-0.3%	0.2%	0.2%	
Luxembourg	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR						
Malta	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-97%	-87%	10.2%	0.1%	0.0%	
Netherlands	0.4	0.4	0.8	2.8	1.6	1.0	0.2	0.2	0.2	0.1	0.1	-73%	-96%	-12.7%	0.2%	0.2%	
Poland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
Portugal	3.9	5.2	5.8	6.2	4.8	6.4	3.6	3.5	3.4	3.3	3.4	-12%	-45%	2.3%	2.2%	5.4%	
Romania	20	16	12	13	12	11	6.2	6.8	6.4	5.1	4.7	-76%	-63%	-8.8%	11.3%	7.4%	
Slovakia	5.8	3.2	3.2	3.4	2.7	2.3	1.7	1.7	1.6	1.4	0.9	-84%	-72%	-31.3%	3.3%	1.5%	
Slovenia	2.9	2.5	2.4	2.6	2.5	1.9	1.8	1.7	1.4	1.4	1.5	-49%	-42%	9.0%	1.7%	2.4%	
Spain	7.6	8.0	9.5	9.6	7.3	7.5	6.7	7.0	6.7	6.4	6.1	-20%	-37%	-5.1%	4.4%	9.6%	
Sweden	1.0	1.1	1.0	1.1	1.2	1.0	1.1	1.1	1.1	1.1	1.0	-2%	-7%	-6.3%	0.6%	1.6%	
<b>EU27(a)</b>	<b>174</b>	<b>163</b>	<b>154</b>	<b>171</b>	<b>134</b>	<b>110</b>	<b>75</b>	<b>78</b>	<b>79</b>	<b>67</b>	<b>63</b>	<b>-64%</b>	<b>-63%</b>	<b>-5.9%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	174	163	154	171	134	110	75	78	79	67	63						

**Notes:** Values presented in this table are based on the national total reported by each Member State. Dark blue-shaded cells indicate that no emission values are available. See Appendix 1 for an explanation of the notation keys reported by EU Member States. Light blue-shaded cells denote gap-filled data. For more detailed information, see Annex D. (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.19 Zinc emission trends

Since 1990, Zn emissions have dropped by 53% in the EU, and by 16% since 2005 (Table 3.20). Between the latest two years, the emissions decreased by 1%. During the current reporting cycle, the EU Member States contributing most to Zn emissions were Poland, Italy and France. The category “Other sectors” within the energy sector is one of the main contributors to Zn emissions. Austria and Luxembourg did not provide emission data for Zn. As these gaps could not be gap-filled, the EU total is an underestimate.

**Table 3.20 Member State contributions to EU emissions of Zn**

Member State	Zn(Mg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Belgium	243	195	194	145	125	97	73	82	82	101	86	-65%	-41%	-14.6%	3.5%	2.6%
Bulgaria	55	42	40	49	44	42	47	49	47	43	41	-26%	-16%	-5.1%	0.8%	1.3%
Croatia	41	34	32	39	39	37	35	38	37	38	38	-7%	-4%	-0.6%	0.6%	1.2%
Cyprus	4.4	5.4	6.6	8.0	6.6	4.8	6.0	6.2	6.0	6.1	6.2	38%	-23%	1.5%	0.1%	0.2%
Czechia	111	84	72	72	68	58	53	56	57	53	50	-55%	-30%	-5.8%	1.6%	1.5%
Denmark	76	72	61	65	68	68	62	62	61	58	56	-27%	-13%	-3.8%	1.1%	1.7%
Estonia	106	61	44	27	33	27	26	26	28	28	27	-74%	1%	-1.4%	1.5%	0.8%
Finland	686	406	131	123	132	122	119	137	130	123	114	-83%	-7%	-7.4%	9.9%	3.5%
France	2,106	1,310	924	525	472	441	388	416	402	408	417	-80%	-21%	2.2%	30.5%	12.8%
Germany	512	309	324	308	338	345	314	332	343	320	326	-36%	6%	2.1%	7.4%	10.0%
Greece	67	71	74	90	86	80	67	70	72	69	65	-3%	-27%	-5.1%	1.0%	2.0%
Hungary	84	65	69	67	74	77	67	71	72	67	67	-20%	-1%	-0.4%	1.2%	2.0%
Ireland	55	51	61	34	28	30	27	30	30	28	29	-48%	-15%	1.7%	0.8%	0.9%
Italy	971	962	925	999	895	838	720	860	788	781	780	-20%	-22%	-0.1%	14.1%	24.0%
Latvia	31	29	27	34	32	29	33	35	35	35	35	12%	2%	0.0%	0.4%	1.1%
Lithuania	22	15	16	20	21	20	19	19	19	18	20	-10%	0%	7.5%	0.3%	0.6%
Luxembourg	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR					
Malta	1.7	2.3	2.3	2.9	2.7	1.9	0.8	0.9	1.0	1.0	1.1	-36%	-63%	10.5%	0.0%	0.0%
Netherlands	226	147	100	89	103	103	178	150	156	70	87	-62%	-3%	23.7%	3.3%	2.7%
Poland	787	798	569	517	536	510	539	546	511	475	463	-41%	-10%	-2.5%	11.4%	14.2%
Portugal	73	76	82	81	73	64	61	62	65	68	68	-6%	-16%	0.5%	1.1%	2.1%
Romania	125	98	103	135	131	119	119	128	121	111	106	-15%	-21%	-4.6%	1.8%	3.3%
Slovakia	34	26	27	31	31	38	32	36	34	31	30	-12%	-3%	-3.7%	0.5%	0.9%
Slovenia	21	20	20	24	24	23	20	22	21	20	20	-3%	-16%	0.3%	0.3%	0.6%
Spain	273	247	303	307	308	304	278	291	251	258	257	-6%	-16%	-0.3%	4.0%	7.9%
Sweden	186	131	89	96	95	82	67	69	69	69	65	-65%	-33%	-5.9%	2.7%	2.0%
<b>EU27(a)</b>	<b>6,898</b>	<b>5,258</b>	<b>4,295</b>	<b>3,885</b>	<b>3,765</b>	<b>3,559</b>	<b>3,353</b>	<b>3,595</b>	<b>3,440</b>	<b>3,279</b>	<b>3,254</b>	<b>-53%</b>	<b>-16%</b>	<b>-0.8%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	6,898	5,258	4,295	3,885	3,765	3,559	3,353	3,595	3,440	3,279	3,254					

**Notes:** Values presented in this table are based on the national total reported by each Member State. Dark blue-shaded cells indicate that no emission values are available. See Appendix 1 for an explanation of the notation keys reported by EU Member States. (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.20 Dioxin and furan emission trends and key categories

Since 1990, PCDD/F emissions dropped by 87% in the EU, and by 77% since 2005 (Table 3.21). Between the past two years, the decrease was about 3%. During the latest year, the Member States contributing most to PCDD/F emissions were Spain, Italy, Poland and Romania (Figure 3.25).

The drop in emissions between 2008 and 2009 can be attributed to data reported by Bulgaria in the category 'Fugitive emission from solid fuels: Solid fuel transformation' (1B1b). Until 2008 the country reported emission values for this sector, but since 2009 they have reported the notation key 'NO' (not occurring). In Bulgaria, there was one installation for the production of coke in coke ovens until 2008, after which it was closed due to the impossibility of complying with the norms of environmental legislation (Bulgaria's IIR).

Figure 3.27(b) shows the contribution made by each aggregated sector group to total EU emissions. The sector groups waste, as well as commercial, institutional and households and industrial processes and product use are significant sources of PCDD/F emissions.

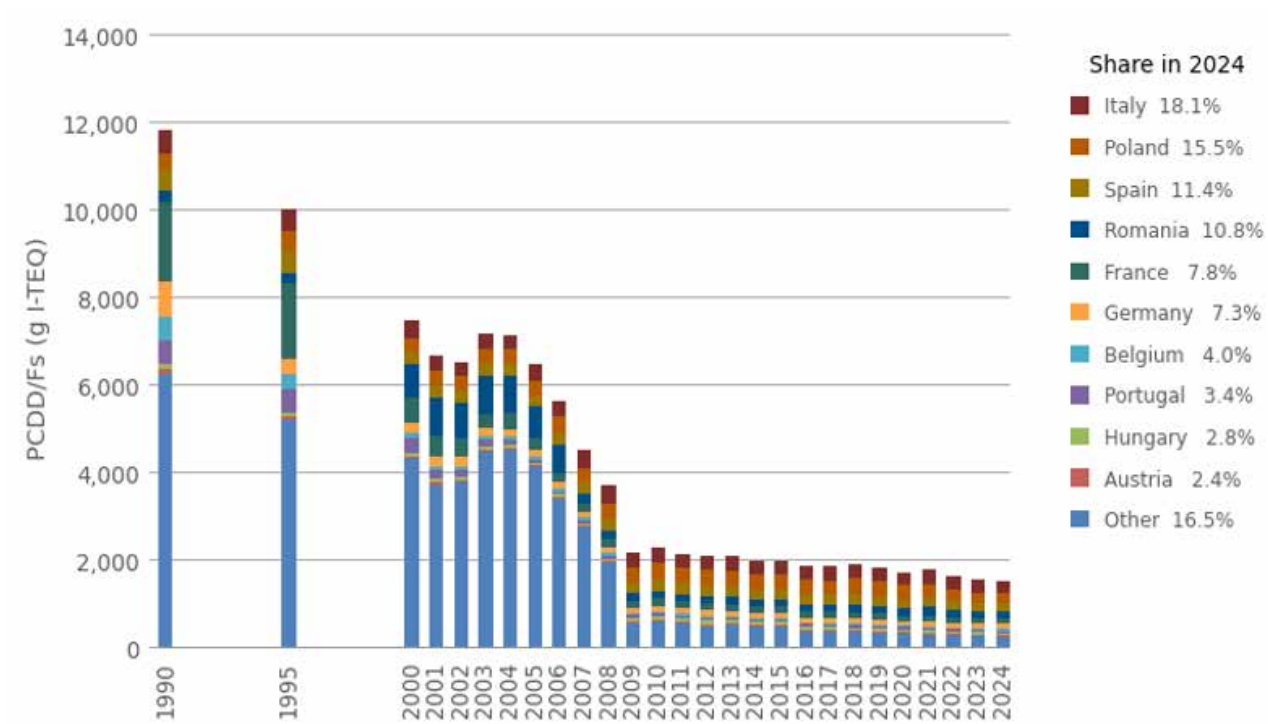
The primary key categories for PCDD/F emissions were residential heating (1A4bi), iron and steel production (2C1) and other waste (5E) (Figure 3.27a). Among the top five key categories, the highest relative reductions in emissions since 1990 have been in category public electricity and heat production (1A1a) (97%) and iron and steel production (2C1) (78%). During the same time period, emissions from residential heating (1A4bi), open burning of waste (5C2) and Other Waste (5E) decreased by 33%, 15% and 3%, respectively.

**Table 3.21 Member State contributions to EU emissions of PCDD/Fs**

Member State	PCDD/Fs(g I-TEQ)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	121	57	50	36	42	40	35	39	35	35	36	-71%	0%	1.2%	1.0%	2.4%
Belgium	519	339	91	66	50	30	27	26	25	28	59	-89%	-9%	108.9%	4.4%	4.0%
Bulgaria	3,964	3,822	2,799	3,098	62	39	39	39	36	31	27	-99%	-99%	-13.1%	33.5%	1.8%
Croatia	84	74	71	110	80	38	25	27	25	24	22	-74%	-80%	-6.1%	0.7%	1.5%
Cyprus	17	20	21	0.7	0.7	0.5	0.8	0.8	0.7	0.7	0.7	-96%	-1%	1.5%	0.1%	0.0%
Czechia	117	77	64	64	49	38	27	22	21	17	16	-86%	-75%	-7.7%	1.0%	1.1%
Denmark	67	49	33	32	36	34	27	28	25	25	24	-64%	-23%	-3.8%	0.6%	1.6%
Estonia	11	5.9	6.3	5.9	5.3	4.8	4.4	4.2	4.2	4.5	4.5	-60%	-24%	-1.5%	0.1%	0.3%
Finland	17	16	15	11	14	12	9.7	11	9.5	8.8	8.7	-48%	-23%	-0.8%	0.1%	0.6%
France	1,802	1,743	581	266	175	150	119	124	123	120	116	-94%	-56%	-2.8%	15.2%	7.8%
Germany	805	334	257	145	130	118	107	109	112	111	109	-86%	-25%	-1.4%	6.8%	7.3%
Greece	42	42	42	43	28	27	23	26	25	26	22	-48%	-50%	-15.1%	0.4%	1.4%
Hungary	113	79	82	63	77	78	60	57	52	44	43	-62%	-32%	-2.8%	1.0%	2.8%
Ireland	44	34	27	25	24	22	18	17	14	12	11	-74%	-53%	-1.3%	0.4%	0.8%
Italy	529	508	430	361	343	312	282	325	295	281	272	-49%	-25%	-3.2%	4.5%	18.1%
Latvia	32	36	33	37	25	20	19	19	19	18	18	-44%	-51%	-0.7%	0.3%	1.2%
Lithuania	23	17	18	23	21	20	16	17	15	14	14	-41%	-41%	-2.1%	0.2%	0.9%
Luxembourg	41	32	9.0	5.4	5.1	4.2	3.5	3.6	3.9	3.8	3.8	-91%	-30%	0.0%	0.4%	0.3%
Malta	0.3	0.2	0.3	0.2	8.0	1.3	0.2	0.2	0.2	0.2	0.2	-29%	-21%	1.3%	0.0%	0.0%
Netherlands	745	70	38	35	40	32	30	30	30	32	30	-96%	-15%	-7.4%	6.3%	2.0%
Poland	374	459	306	348	393	333	333	318	280	261	232	-38%	-33%	-11.2%	3.2%	15.5%
Portugal	556	554	358	74	53	52	56	54	52	52	52	-91%	-30%	-0.7%	4.7%	3.4%
Romania	278	226	745	725	180	166	188	214	188	173	162	-42%	-78%	-6.5%	2.4%	10.8%
Slovakia	962	876	1,086	589	159	138	53	30	29	26	26	-97%	-96%	-0.2%	8.1%	1.7%
Slovenia	21	19	19	21	20	18	14	16	13	12	12	-45%	-43%	-3.7%	0.2%	0.8%
Spain	489	505	269	253	247	244	191	205	174	169	171	-65%	-32%	0.9%	4.1%	11.4%
Sweden	51	29	23	21	15	11	9.3	8.9	8.4	8.2	8.1	-84%	-62%	-1.5%	0.4%	0.5%
<b>EU27(a)</b>	<b>11,826</b>	<b>10,022</b>	<b>7,475</b>	<b>6,457</b>	<b>2,283</b>	<b>1,981</b>	<b>1,717</b>	<b>1,772</b>	<b>1,615</b>	<b>1,538</b>	<b>1,500</b>	<b>-87%</b>	<b>-77%</b>	<b>-2.5%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	11,826	10,022	7,475	6,457	2,283	1,981	1,717	1,772	1,615	1,538	1,500					

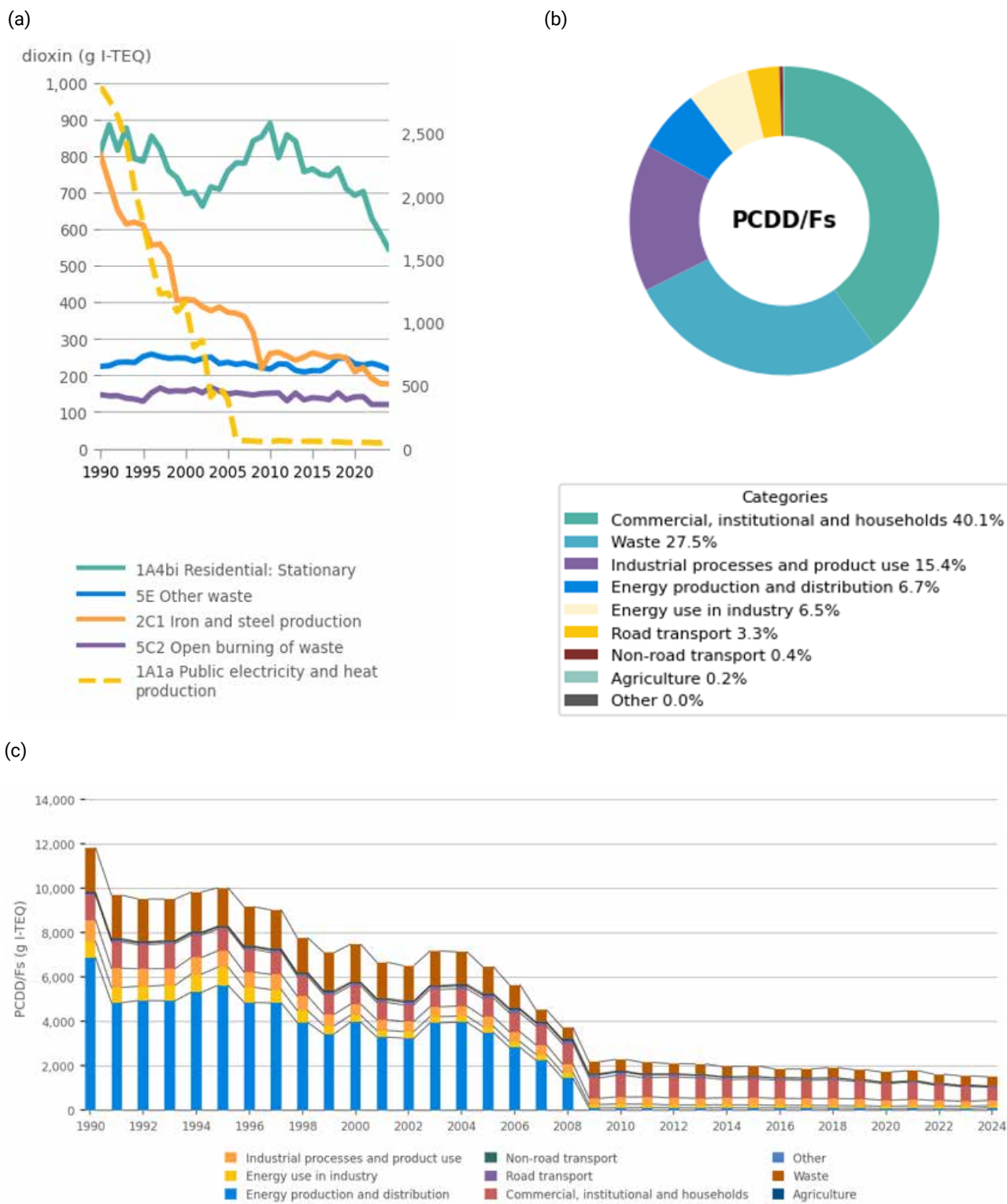
Notes: (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available. I-TEQ, international toxic equivalent.

**Figure 3.26** Dioxin emission trends in the EU and shares of Member States



**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.27 PCDD/F emissions in the EU (a) emission trends since 1990 from the five most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**



**Notes:** I-TEQ, international toxic equivalent. In (a), the right-hand axis gives values for '1A1a – Public electricity and heat production'.

### 3.21 Total PAH emission trends and key categories

Since 1990, PAH emissions have dropped by 60% in the EU, and by 34% since 2005 (Table 3.22). Between the latest two years, PAH emissions fell by 7%. During the latest year, the EU Member States contributing most to the PAH emissions in the EU were Poland and Germany (Figure 3.28).

Figure 3.29b shows the contribution made by each aggregated sector group to total EU emissions. The commercial, institutional and households sector group is the most significant source of total PAH emissions.

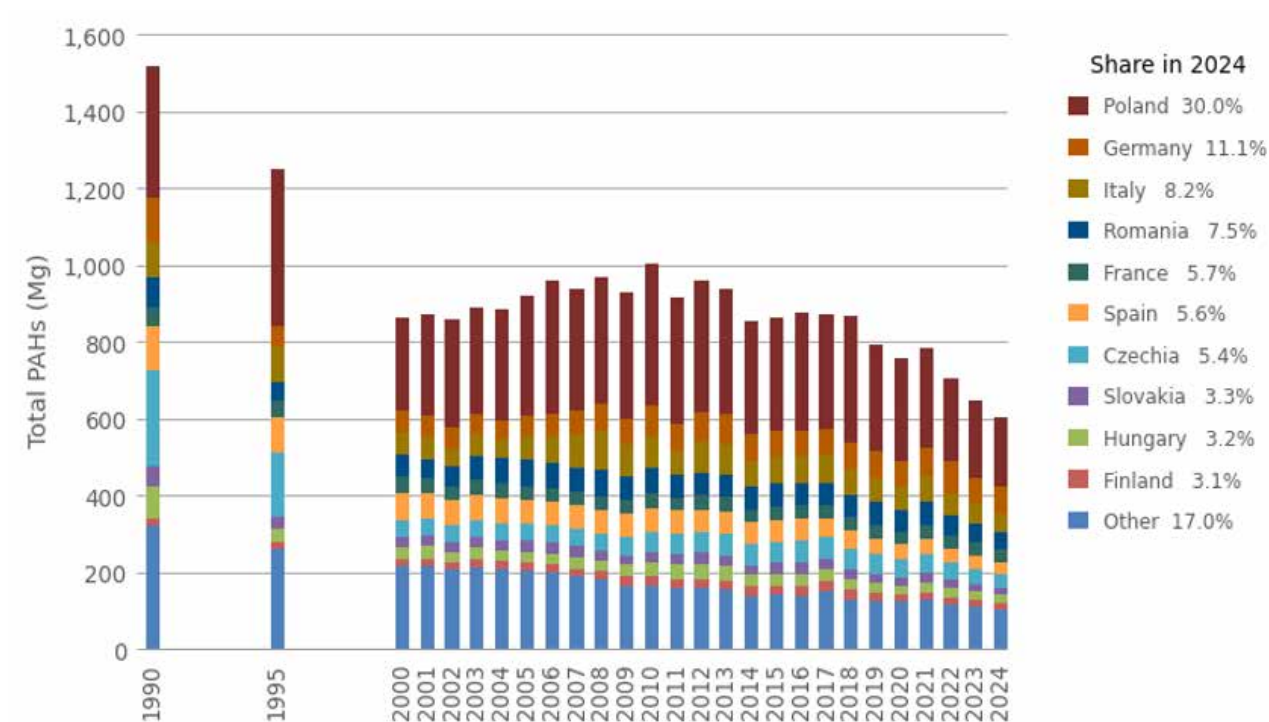
For the current reporting cycle, the residential heating category (1A4bi) and iron and steel production (2C1) were the principal key categories for these emissions (Figure 3.29a). Both categories show decreases in total PAH emissions since 1990, by 47% and 74%, respectively.

According to the Member States IIRs, the reduction in PAH emissions is mainly caused by a decrease in emissions from the household sector, which is due to a reduced consumption of coal and biomass.

**Table 3.22 Member State contributions to EU emissions of total PAHs**

Member State	Total PAHs(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	18	11	8.8	7.3	8.1	7.3	6.8	7.7	7.1	7.4	7.1	-61%	-2%	-4.5%	1.2%	1.2%	
Belgium	51	40	31	25	15	8.4	5.9	6.7	6.0	5.8	5.7	-89%	-77%	-2.3%	3.3%	0.9%	
Bulgaria	27	29	23	23	19	15	15	16	11	9.3	7.3	-73%	-68%	-21.8%	1.8%	1.2%	
Croatia	23	18	16	19	18	16	14	15	13	13	12	-49%	-38%	-6.0%	1.5%	2.0%	
Cyprus	14	11	6.5	4.2	1.2	1.0	1.0	1.0	1.0	1.0	1.0	-93%	-76%	4.0%	0.9%	0.2%	
Czechia	253	166	43	42	51	56	48	50	47	38	33	-87%	-21%	-14.5%	16.7%	5.4%	
Denmark	13	13	10	11	7.6	6.8	4.6	4.5	4.2	4.5	4.2	-67%	-60%	-6.6%	0.8%	0.7%	
Estonia	9.9	10	7.7	5.8	6.0	4.3	4.1	3.6	3.8	3.6	3.6	-64%	-38%	-1.9%	0.7%	0.6%	
Finland	18	17	18	22	26	22	19	22	20	19	18	1%	-16%	-4.7%	1.2%	3.1%	
France	48	44	41	38	39	35	32	37	33	34	34	-29%	-11%	-0.7%	3.2%	5.7%	
Germany	118	54	55	51	78	69	66	75	81	67	67	-43%	29%	0.0%	7.7%	11.1%	
Greece	25	24	24	22	16	19	17	18	18	18	16	-34%	-26%	-11.3%	1.6%	2.7%	
Hungary	84	35	31	28	34	33	23	23	23	21	19	-77%	-32%	-5.5%	5.5%	3.2%	
Ireland	30	20	16	15	15	14	12	12	9.2	7.8	7.6	-74%	-49%	-1.9%	1.9%	1.3%	
Italy	90	92	59	64	87	71	61	68	58	53	49	-45%	-23%	-6.4%	5.9%	8.2%	
Latvia	18	17	16	13	10.0	7.0	6.9	7.1	6.9	5.9	5.9	-66%	-55%	0.0%	1.2%	1.0%	
Lithuania	18	8.0	8.2	9.3	9.7	8.0	6.8	7.2	6.6	5.6	5.4	-70%	-42%	-3.9%	1.2%	0.9%	
Luxembourg	4.2	2.5	1.8	1.3	1.3	1.4	0.6	0.5	0.6	0.6	0.6	-85%	-49%	0.0%	0.3%	0.1%	
Malta	0.8	0.5	0.4	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-95%	-3%	-26.8%	0.1%	0.0%	
Netherlands	21	12	6.3	6.4	7.2	5.9	4.7	5.2	5.2	4.9	4.7	-78%	-26%	-4.2%	1.4%	0.8%	
Poland	341	410	242	310	369	291	271	260	217	204	181	-47%	-42%	-11.2%	22.5%	30.0%	
Portugal	22	20	18	15	12	12	11	11	11	12	11	-49%	-26%	-3.7%	1.4%	1.9%	
Romania	79	47	57	67	64	58	57	60	55	49	45	-43%	-33%	-7.4%	5.2%	7.5%	
Slovakia	51	30	27	31	30	28	22	26	22	22	20	-61%	-36%	-7.0%	3.4%	3.3%	
Slovenia	9.9	8.3	7.9	8.9	8.3	7.6	5.8	6.3	5.1	4.8	4.5	-55%	-50%	-6.5%	0.7%	0.7%	
Spain	114	93	74	62	61	58	37	37	34	33	34	-70%	-46%	1.8%	7.5%	5.6%	
Sweden	19	19	14	16	9.9	7.7	6.1	6.3	5.7	5.3	5.2	-72%	-67%	-1.1%	1.3%	0.9%	
<b>EU27(a)</b>	<b>1,518</b>	<b>1,251</b>	<b>863</b>	<b>918</b>	<b>1,004</b>	<b>861</b>	<b>759</b>	<b>785</b>	<b>706</b>	<b>648</b>	<b>603</b>	<b>-60%</b>	<b>-34%</b>	<b>-7.0%</b>	<b>100.0%</b>	<b>100.0%</b>	
<b>EU27(b)</b>	<b>1,518</b>	<b>1,251</b>	<b>863</b>	<b>918</b>	<b>1,004</b>	<b>861</b>	<b>759</b>	<b>785</b>	<b>706</b>	<b>648</b>	<b>603</b>						

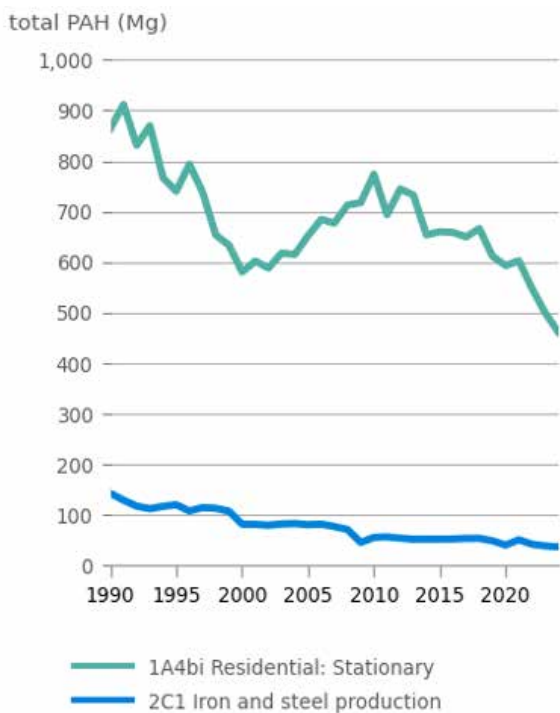
**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

**Figure 3.28 Total PAH emission trends in the EU and shares of Member States**

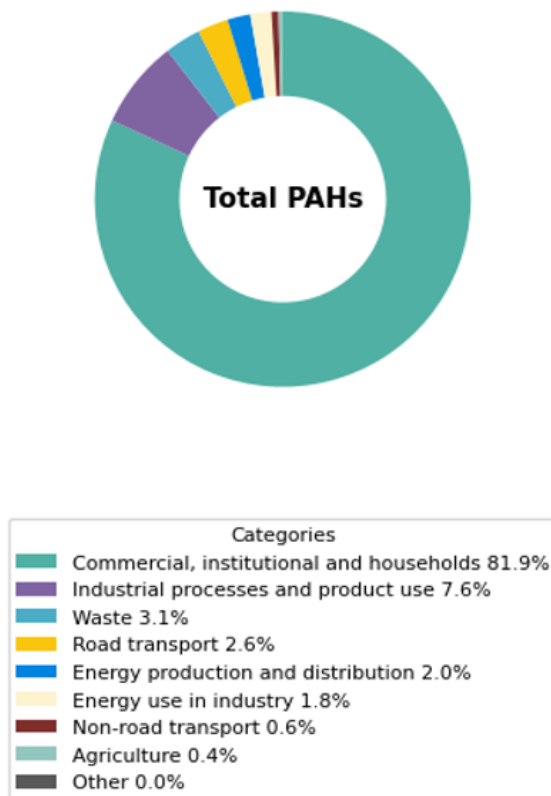
**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.29 Total PAH emissions in the EU (a) emission trends since 1990 from the most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

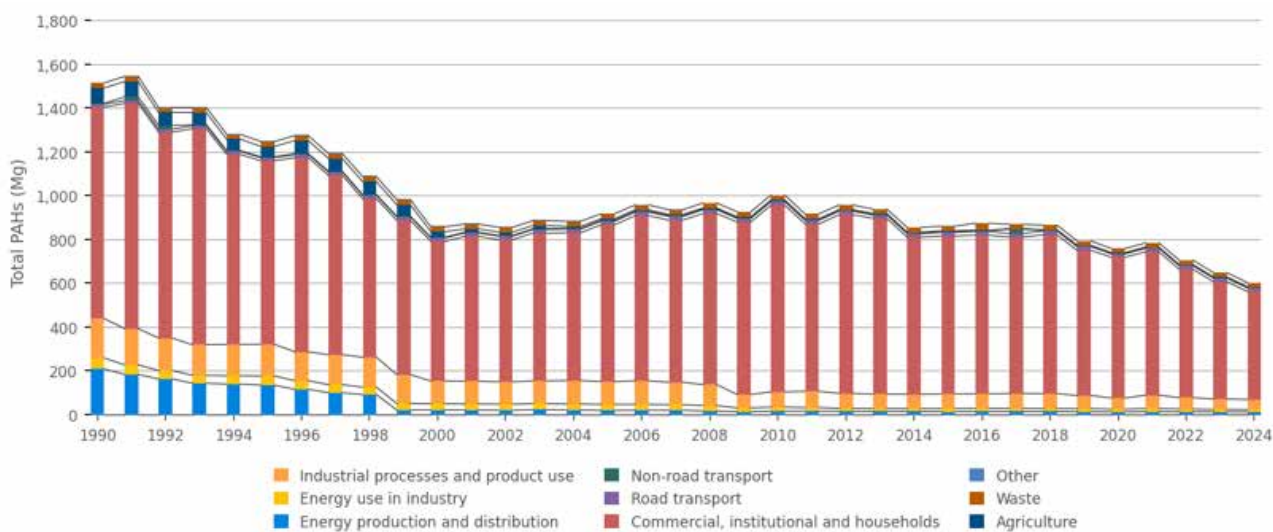
(a)



(b)



(c)



### 3.22 Benzo(a)pyrene emission trends and key categories

Since 1990, B(a)P emissions have fallen by 59% in the EU, and since 2005 by 35% (Table 3.23). Between the latest two years, they decreased by 8%. During the latest year, the Member State contributing most to B(a)P emissions was Poland, with a share of 34% (Figure 3.30).

Figure 3.31b shows the contribution made by each aggregated sector group to total EU emissions. The commercial, institutional and households sector group is the main source of B(a)P emissions.

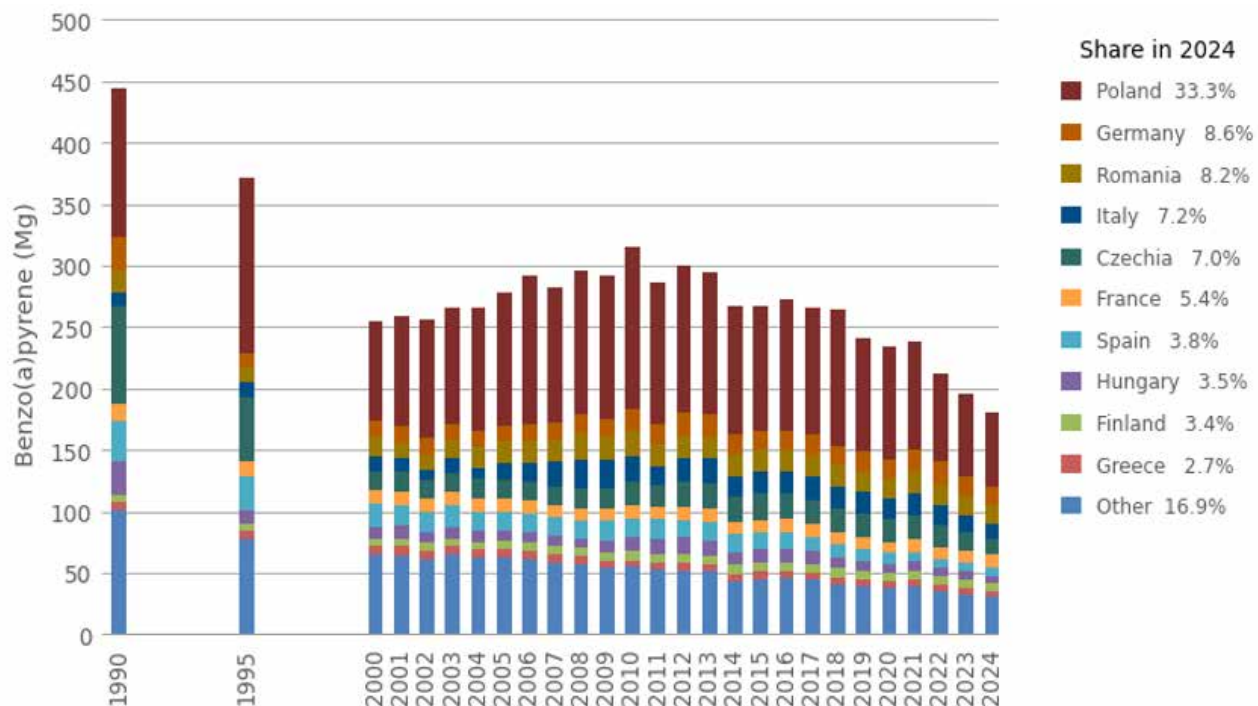
Residential combustion (1A4bi) was the principal key category for B(a)P emissions. This sector also corresponds to the greatest decrease in emissions (46%) since 1990 (Figure 3.31a).

**Table 3.23 Member State contributions to EU emissions of B(a)P**

Member State	Benzo(a)pyrene(Mg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	6.0	3.6	2.9	2.3	2.6	2.3	2.2	2.5	2.3	2.4	2.3	-62%	-1%	-4.7%	1.4%	1.3%
Belgium	15	12	9.7	7.8	5.4	2.7	1.9	2.1	1.9	1.9	1.8	-88%	-77%	-2.3%	3.5%	1.0%
Bulgaria	5.8	7.2	6.0	6.3	6.3	5.1	5.1	5.1	3.7	3.0	2.3	-60%	-63%	-23.0%	1.3%	1.3%
Croatia	7.4	5.9	5.3	6.6	6.2	5.6	4.7	5.1	4.5	4.4	4.1	-44%	-37%	-5.5%	1.7%	2.3%
Cyprus	2.4	1.9	1.1	0.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-93%	-76%	4.4%	0.5%	0.1%
Czechia	80	53	15	15	19	21	19	19	18	15	13	-84%	-15%	-15.2%	18.0%	7.0%
Denmark	3.5	3.6	2.9	3.1	2.4	2.1	1.3	1.3	1.2	1.3	1.2	-65%	-59%	-6.7%	0.8%	0.7%
Estonia	2.8	2.9	2.1	1.6	1.7	1.2	1.2	1.0	1.1	1.0	1.0	-64%	-37%	-1.8%	0.6%	0.6%
Finland	5.7	5.5	5.6	7.0	8.2	7.2	6.3	7.1	6.5	6.3	6.1	6%	-13%	-4.3%	1.3%	3.4%
France	14	13	12	11	11	10	9.2	11	9.6	9.9	9.8	-29%	-10%	-0.8%	3.1%	5.4%
Germany	27	11	12	12	18	16	15	17	19	16	16	-42%	33%	0.0%	6.1%	8.6%
Greece	7.4	7.1	7.2	6.3	4.5	5.8	5.1	5.4	5.4	5.7	4.9	-34%	-22%	-14.1%	1.7%	2.7%
Hungary	27	11	9.5	8.7	11	11	7.6	7.7	7.4	6.7	6.4	-77%	-27%	-5.7%	6.1%	3.5%
Ireland	6.8	4.7	3.6	3.6	3.6	3.5	3.2	2.9	2.3	2.0	1.9	-71%	-46%	-1.8%	1.5%	1.1%
Italy	11	12	12	13	21	18	16	18	15	14	13	14%	-2%	-4.6%	2.6%	7.2%
Latvia	6.3	6.0	6.1	4.7	3.5	2.5	2.4	2.5	2.4	2.0	2.0	-68%	-57%	0.0%	1.4%	1.1%
Lithuania	5.9	2.8	2.9	3.3	3.4	2.8	2.4	2.5	2.3	2.0	1.9	-68%	-42%	-3.3%	1.3%	1.1%
Luxembourg	1.8	1.2	1.4	0.9	0.9	1.0	0.1	0.1	0.2	0.2	0.2	-91%	-80%	0.0%	0.4%	0.1%
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-58%	2%	-21.4%	0.0%	0.0%
Netherlands	5.5	3.4	2.0	2.1	2.2	1.9	1.5	1.6	1.6	1.6	1.5	-73%	-28%	-4.8%	1.2%	0.8%
Poland	120	143	82	109	131	102	92	87	72	68	60	-50%	-45%	-11.7%	27.1%	33.3%
Portugal	6.8	6.0	5.4	4.4	3.4	3.5	3.4	3.4	3.3	3.4	3.3	-52%	-26%	-4.4%	1.5%	1.8%
Romania	18	11	16	18	20	18	17	18	17	16	15	-18%	-18%	-7.2%	4.1%	8.2%
Slovakia	15	7.4	6.0	7.1	6.9	5.6	4.6	4.5	4.3	3.6	3.4	-77%	-52%	-5.0%	3.3%	1.9%
Slovenia	3.1	2.6	2.6	2.9	2.7	2.5	1.9	2.1	1.6	1.5	1.4	-54%	-51%	-7.6%	0.7%	0.8%
Spain	33	27	19	15	16	14	8.6	7.2	7.1	7.0	6.8	-79%	-56%	-2.4%	7.4%	3.8%
Sweden	6.4	6.4	4.9	5.4	3.4	2.6	2.1	2.1	1.9	1.8	1.8	-72%	-67%	-1.0%	1.4%	1.0%
<b>EU27(a)</b>	<b>444</b>	<b>371</b>	<b>255</b>	<b>278</b>	<b>315</b>	<b>268</b>	<b>234</b>	<b>238</b>	<b>213</b>	<b>196</b>	<b>180</b>	<b>-59%</b>	<b>-35%</b>	<b>-7.9%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	444	371	255	278	315	268	234	238	213	196	180					

Notes: (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

**Figure 3.30 B(a)P emission trends in the EU and shares of Member States**



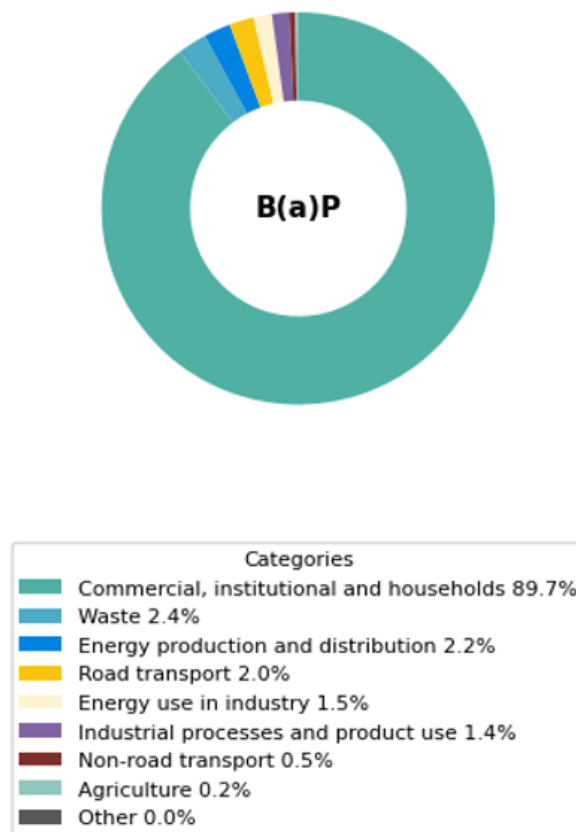
**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.31 B(a)P emissions in the EU (a) emission trends since 1990 from the most important key category, (b) share by sector group in the current year and (c) sectoral trends in emissions**

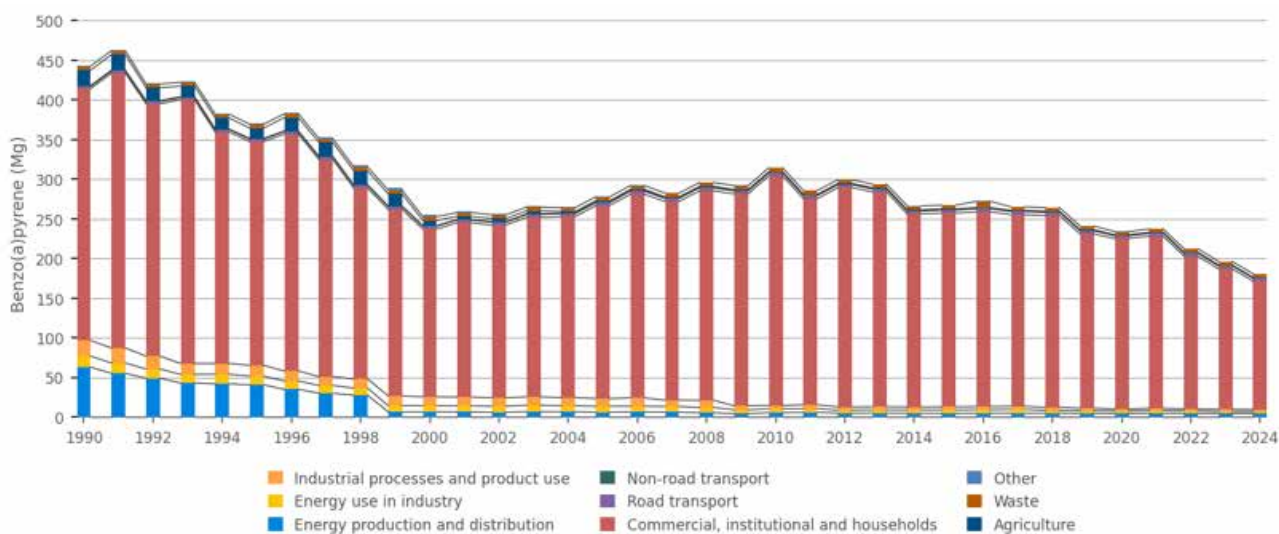
(a)



(b)



(c)



### 3.23 Benzo(b)fluoranthene emission trends

Since 1990, B(b)F emissions have fallen by 62% in the EU, and by 34% since 2005. Between the two latest years, they decreased by 7% (Table 3.24).

**Table 3.24 Member State contributions to EU emissions of B(b)F**

Member State	Benzo(b)fluoranthene(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	6.2	3.8	3.0	2.5	2.8	2.6	2.4	2.6	2.4	2.5	2.4	-61%	-4%	-4.3%	1.2%	1.3%	
Belgium	18	14	11	8.6	4.7	2.9	2.1	2.3	2.1	2.1	2.0	-89%	-77%	-1.9%	3.6%	1.1%	
Bulgaria	5.3	8.7	6.5	6.8	6.4	5.0	5.0	5.1	3.6	2.9	2.3	-57%	-66%	-21.7%	1.1%	1.2%	
Croatia	8.0	5.8	5.1	6.3	5.9	5.2	4.4	4.7	4.2	4.1	3.8	-52%	-39%	-6.0%	1.6%	2.0%	
Cyprus	6.8	5.5	3.2	2.1	0.6	0.5	0.5	0.5	0.6	0.5	0.5	-92%	-75%	4.3%	1.4%	0.3%	
Czechia	89	57	13	12	14	15	13	13	12	9.8	8.3	-91%	-30%	-15.2%	17.8%	4.3%	
Denmark	3.2	3.2	2.6	2.7	2.1	2.0	1.5	1.4	1.4	1.5	1.4	-56%	-49%	-6.0%	0.6%	0.7%	
Estonia	3.6	2.9	2.1	1.6	1.6	1.2	1.1	1.0	1.0	1.0	1.0	-71%	-37%	-1.7%	0.7%	0.5%	
Finland	4.8	4.5	4.6	5.6	6.5	5.6	4.9	5.5	5.1	4.9	4.7	-2%	-16%	-5.3%	1.0%	2.4%	
France	16	15	14	13	13	12	11	12	11	11	11	-31%	-13%	-0.9%	3.3%	5.9%	
Germany	37	16	17	17	26	23	22	25	27	22	22	-39%	34%	0.1%	7.4%	11.8%	
Greece	9.1	8.9	8.7	7.7	5.6	6.4	5.6	5.9	5.9	6.1	5.4	-41%	-30%	-11.5%	1.8%	2.8%	
Hungary	31	13	10	9.7	11	11	7.8	7.9	7.7	6.9	6.5	-79%	-33%	-5.9%	6.3%	3.4%	
Ireland	12	8.3	6.6	6.2	6.1	5.7	5.2	4.8	3.8	3.2	3.2	-73%	-49%	-1.9%	2.3%	1.7%	
Italy	15	16	15	16	25	21	19	20	18	16	15	1%	-8%	-5.2%	3.0%	7.9%	
Latvia	6.1	5.4	5.0	4.3	3.3	2.3	2.3	2.4	2.3	2.0	2.0	-67%	-52%	0.0%	1.2%	1.1%	
Lithuania	7.0	3.0	2.9	3.4	3.6	3.1	2.7	2.9	2.7	2.3	2.2	-68%	-34%	-3.3%	1.4%	1.2%	
Luxembourg	1.1	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-78%	31%	0.0%	0.2%	0.1%	
Malta	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-97%	-3%	-29.5%	0.1%	0.0%	
Netherlands	8.1	3.7	2.0	1.9	2.2	1.8	1.4	1.5	1.6	1.5	1.5	-82%	-24%	-3.5%	1.6%	0.8%	
Poland	122	147	85	108	128	101	94	90	75	70	63	-49%	-42%	-10.9%	24.6%	32.9%	
Portugal	6.6	5.8	5.3	4.4	3.4	3.5	3.4	3.4	3.4	3.4	3.3	-50%	-25%	-4.2%	1.3%	1.7%	
Romania	23	12	16	18	19	17	17	18	17	15	14	-37%	-22%	-6.3%	4.6%	7.5%	
Slovakia	11	5.9	5.0	5.9	5.8	5.1	4.2	4.2	4.0	3.4	3.4	-70%	-43%	-1.2%	2.2%	1.8%	
Slovenia	3.6	2.9	2.6	2.9	2.6	2.4	1.8	2.0	1.6	1.5	1.4	-61%	-52%	-7.6%	0.7%	0.7%	
Spain	37	29	20	15	15	14	9.0	7.8	7.7	7.7	7.5	-80%	-50%	-1.5%	7.5%	4.0%	
Sweden	6.2	6.1	4.7	5.3	3.4	2.7	2.2	2.2	2.1	1.9	1.9	-69%	-64%	-0.7%	1.2%	1.0%	
<b>EU27(a)</b>	<b>497</b>	<b>404</b>	<b>272</b>	<b>288</b>	<b>320</b>	<b>272</b>	<b>242</b>	<b>247</b>	<b>223</b>	<b>205</b>	<b>191</b>	<b>-62%</b>	<b>-34%</b>	<b>-6.9%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	497	404	272	288	320	272	242	247	223	205	191						

**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.24 Benzo(k)fluoranthene emission trends

Since 1990, B(k)F emissions in the EU decreased by 60%, and since 2005 by 32% (Table 3.25). During the two latest years, they fell by 6%. During the latest year, the EU Member States contributing most to the B(k)F emissions in the EU were Poland and Germany.

**Table 3.25 Member State contributions to EU emissions of B(k)F**

Member State	Benzo(k)fluoranthene(Mg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	3.6	1.5	1.2	1.0	1.1	1.0	1.0	1.1	1.0	1.0	1.0	-73%	-5%	-4.1%	1.5%	1.0%
Belgium	10.0	7.8	6.0	4.7	2.4	1.3	0.9	1.0	0.9	0.9	0.9	-91%	-81%	-2.0%	4.2%	0.9%
Bulgaria	5.6	3.8	2.9	2.9	2.7	2.1	2.0	2.1	1.5	1.3	1.0	-82%	-66%	-21.1%	2.3%	1.1%
Croatia	3.4	2.4	2.2	2.6	2.5	2.2	1.9	2.0	1.8	1.7	1.6	-52%	-37%	-4.8%	1.4%	1.7%
Cyprus	2.8	2.3	1.3	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-94%	-79%	3.1%	1.2%	0.2%
Czechia	45	30	7.0	6.9	8.3	9.0	7.9	8.3	7.7	6.5	5.7	-87%	-18%	-12.4%	18.8%	6.0%
Denmark	2.4	2.5	2.1	2.2	1.7	1.4	0.9	0.9	0.8	0.8	0.8	-68%	-65%	-7.8%	1.0%	0.8%
Estonia	1.7	1.9	1.4	1.0	1.1	0.8	0.7	0.6	0.7	0.6	0.6	-63%	-39%	-0.7%	0.7%	0.7%
Finland	3.6	3.4	3.5	4.3	5.1	4.4	3.7	4.2	3.9	3.7	3.6	0%	-17%	-4.8%	1.5%	3.8%
France	9.6	8.9	8.1	7.6	7.8	7.0	6.4	7.3	6.7	6.8	6.8	-30%	-11%	-0.9%	4.0%	7.2%
Germany	17	7.5	8.1	7.8	12	11	10	12	13	10	10	-39%	33%	0.0%	7.2%	11.0%
Greece	4.2	4.0	4.1	3.7	2.8	3.3	3.1	3.2	3.2	3.3	3.1	-27%	-16%	-7.4%	1.7%	3.2%
Hungary	15	7.5	6.4	6.0	6.2	5.1	3.5	3.6	3.6	3.3	3.2	-79%	-47%	-2.9%	6.2%	3.4%
Ireland	6.2	4.1	3.0	2.8	2.7	2.5	2.2	2.1	1.7	1.4	1.4	-78%	-51%	-2.1%	2.6%	1.5%
Italy	6.9	7.6	7.2	8.0	12	9.8	8.5	9.4	8.1	7.3	7.0	1%	-13%	-4.6%	2.9%	7.4%
Latvia	2.4	2.1	2.0	1.6	1.3	0.9	0.9	0.9	0.9	0.8	0.8	-68%	-54%	-0.3%	1.0%	0.8%
Lithuania	3.0	1.3	1.3	1.5	1.6	1.4	1.2	1.3	1.2	1.1	1.1	-64%	-28%	-2.1%	1.2%	1.1%
Luxembourg	0.7	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-80%	12%	0.0%	0.3%	0.1%
Malta	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-97%	-10%	-32.9%	0.1%	0.0%
Netherlands	4.2	2.6	1.1	1.1	1.2	1.0	0.7	0.8	0.8	0.8	0.8	-82%	-26%	-3.5%	1.8%	0.8%
Poland	52	64	39	48	57	45	45	43	37	34	31	-41%	-37%	-10.3%	21.8%	32.4%
Portugal	2.5	2.3	2.1	1.8	1.4	1.4	1.3	1.3	1.3	1.4	1.3	-48%	-27%	-4.0%	1.1%	1.4%
Romania	9.4	5.4	6.7	7.6	7.9	7.2	7.0	7.4	6.9	6.4	6.0	-36%	-21%	-5.8%	4.0%	6.4%
Slovakia	7.1	3.8	3.2	4.0	4.0	3.6	2.9	2.9	2.8	2.5	2.6	-64%	-37%	3.1%	3.0%	2.7%
Slovenia	1.3	1.1	1.0	1.1	1.0	0.9	0.7	0.8	0.6	0.6	0.5	-60%	-50%	-7.2%	0.6%	0.6%
Spain	16	13	9.4	7.2	6.9	6.3	3.6	3.2	3.1	3.1	3.0	-81%	-58%	-1.3%	6.7%	3.2%
Sweden	3.0	2.9	2.3	2.9	1.2	1.0	0.8	0.8	0.7	0.7	0.7	-78%	-78%	-0.9%	1.2%	0.7%
<b>EU27(a)</b>	<b>239</b>	<b>194</b>	<b>133</b>	<b>139</b>	<b>151</b>	<b>130</b>	<b>117</b>	<b>120</b>	<b>109</b>	<b>101</b>	<b>95</b>	<b>-60%</b>	<b>-32%</b>	<b>-6.2%</b>	<b>100.0%</b>	<b>100.0%</b>
EU27(b)	239	194	133	139	151	130	117	120	109	101	95					

**Notes:** (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.25 Indeno(1,2,3-cd)pyrene emission trends

Since 1990, IP emissions fell by 55% and since 2005 by 28% in the EU (Table 3.26). During the latest two years, they decreased by about 7%. During the latest year, the EU Member States contributing most to IP emissions were Poland and Germany.

**Table 3.26 Member State contributions to EU emissions of IP**

Member State	Indeno(123-cd)pyrene(Mg)												Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024	
Austria	2.5	2.0	1.6	1.4	1.5	1.3	1.3	1.5	1.4	1.4	1.4	-45%	1%	-4.7%	1.1%	1.4%	
Belgium	7.4	5.9	4.7	3.9	2.5	1.5	1.0	1.2	1.1	1.0	1.0	-86%	-74%	-3.2%	3.4%	1.0%	
Bulgaria	6.2	3.4	3.3	3.2	3.3	2.7	2.9	2.8	2.1	1.8	1.4	-78%	-57%	-22.8%	2.8%	1.4%	
Croatia	3.8	3.3	3.0	3.7	3.5	3.1	2.6	2.8	2.5	2.4	2.2	-42%	-40%	-6.5%	1.8%	2.3%	
Cyprus	2.0	1.6	0.9	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-94%	-78%	3.6%	0.9%	0.1%	
Czechia	40	26	8.1	7.8	9.7	11	9.1	9.5	8.8	7.2	6.2	-85%	-21%	-14.1%	18.2%	6.3%	
Denmark	3.6	3.5	2.7	2.6	1.4	1.3	0.9	0.9	0.8	0.9	0.8	-78%	-69%	-6.2%	1.6%	0.8%	
Estonia	1.8	2.7	2.1	1.5	1.7	1.2	1.1	1.0	1.0	0.9	0.9	-49%	-40%	-1.5%	0.8%	0.9%	
Finland	4.1	3.9	4.0	4.9	5.8	5.0	4.3	4.8	4.5	4.3	4.1	0%	-17%	-4.8%	1.9%	4.2%	
France	8.5	7.9	7.2	6.9	7.1	6.4	5.8	6.7	6.1	6.3	6.3	-26%	-9%	-0.1%	3.9%	6.4%	
Germany	23	9.9	11	11	17	15	15	17	18	15	15	-36%	35%	0.1%	10.6%	15.1%	
Greece	3.4	3.4	3.3	2.9	2.0	2.7	2.2	2.4	2.4	2.5	2.1	-39%	-29%	-17.9%	1.6%	2.1%	
Hungary	10	4.3	4.3	4.0	5.4	5.7	4.1	4.1	3.9	3.6	3.4	-68%	-15%	-5.4%	4.8%	3.4%	
Ireland	5.0	3.3	2.4	2.2	2.2	2.0	1.8	1.7	1.3	1.1	1.1	-77%	-50%	-1.9%	2.3%	1.1%	
Italy	8.0	8.7	8.3	8.9	14	12	10	11	9.8	8.8	8.4	5%	-6%	-4.8%	3.6%	8.5%	
Latvia	2.9	3.1	3.1	2.6	1.9	1.3	1.3	1.3	1.3	1.1	1.1	-60%	-56%	0.0%	1.3%	1.1%	
Lithuania	2.5	1.4	1.6	1.8	1.7	1.4	1.2	1.2	1.1	1.0	0.9	-63%	-47%	-4.1%	1.1%	0.9%	
Luxembourg	0.6	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-84%	11%	0.0%	0.3%	0.1%	
Malta	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-95%	1%	-18.7%	0.1%	0.0%	
Netherlands	2.9	1.6	0.9	1.0	1.1	0.9	0.7	0.8	0.8	0.8	0.7	-75%	-24%	-4.1%	1.3%	0.7%	
Poland	41	52	31	39	47	37	36	35	29	27	24	-41%	-39%	-10.5%	18.7%	24.5%	
Portugal	4.0	3.5	3.2	2.5	2.0	2.1	2.0	2.0	2.0	2.0	1.9	-52%	-24%	-4.4%	1.8%	1.9%	
Romania	7.9	5.1	8.5	9.6	11	9.6	9.6	10	9.6	8.9	8.3	5%	-14%	-7.0%	3.6%	8.4%	
Slovakia	7.3	3.6	2.9	3.3	3.2	2.6	2.2	2.2	2.1	1.7	1.6	-79%	-54%	-9.2%	3.3%	1.6%	
Slovenia	1.7	1.5	1.5	1.7	1.6	1.4	1.1	1.2	0.9	0.9	0.8	-50%	-51%	-7.4%	0.8%	0.8%	
Spain	15	12	9.2	7.6	7.9	7.3	4.8	4.1	4.0	3.9	3.8	-75%	-50%	-2.1%	6.9%	3.9%	
Sweden	3.1	3.3	2.5	2.4	1.9	1.5	1.1	1.2	1.0	1.0	1.0	-69%	-60%	-1.2%	1.4%	1.0%	
<b>EU27(a)</b>	<b>219</b>	<b>178</b>	<b>132</b>	<b>137</b>	<b>158</b>	<b>136</b>	<b>122</b>	<b>127</b>	<b>116</b>	<b>106</b>	<b>99</b>	<b>-55%</b>	<b>-28%</b>	<b>-6.6%</b>	<b>100.0%</b>	<b>100.0%</b>	
EU27(b)	219	178	132	137	158	136	122	127	116	106	99						

Notes: (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

### 3.26 Hexachlorobenzene emission trends and key categories

Since 1990, HCB emissions have fallen by 99% in the EU, and since 2005 by 65% (Table 3.27). During the latest two years, they increased by about 1%. During the latest year, the EU Member States contributing most to HCB emissions were Finland, Austria and Italy (Figure 3.30).

The drop in HCB emissions between 2001 and 2002 was mainly attributed to data reported by Germany. Emission estimates were reported up to 2001, after which the notation key 'NA' (not applicable) was used (Figure 3.33). The drop from 1990 to 1995 is mainly due to the reduced emissions from France.

For HCB, the primary emission sources are the sectors commercial, institutional and households and public electricity and heat production. Figure 3.33(b) shows the contribution made by each aggregated sector group to total EU emissions. The fluctuations in the emission trend for the chemical industry (2B10a) is dominated by the emissions reported by Finland (Finland's IIR).

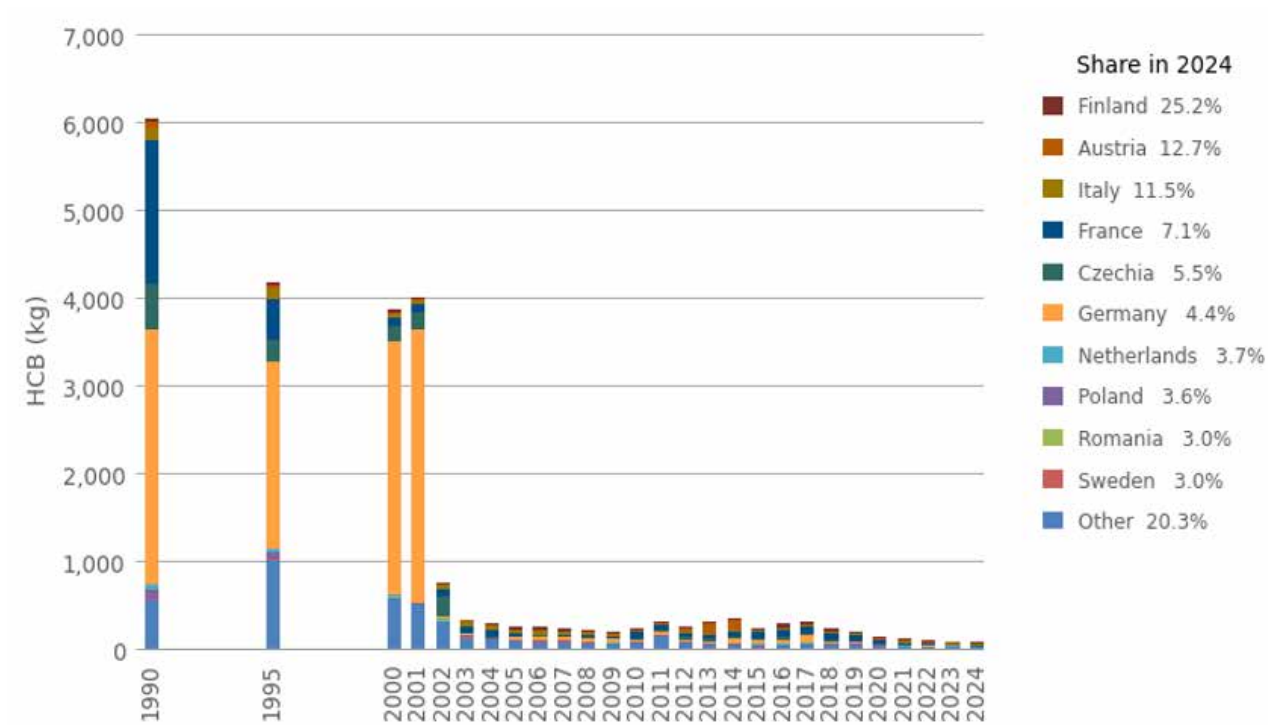
The main key categories for HCB emissions in the current year were the Chemical industry (2B10a), residential combustion (1A4bi) and public electricity and heat production (1A1a) (Figure 3.33a). Among the top five key categories, the highest relative reductions in emissions since 1990 have been in stationary combustion in manufacturing industries and construction (1A2b) (99.9%) and in residential combustion (1A4bi) (88%).

**Table 3.27 Member State contributions to EU emissions of HCB**

Member State	HCB(kg)													Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024		
Austria	80	42	20	14	16	14	11	12	11	11	11	-86%	-17%	2.7%	1.3%	12.7%		
Belgium	40	115	21	19	11	3.4	2.6	3.1	2.9	6.5	2.7	-93%	-86%	-58.7%	0.7%	3.0%		
Bulgaria	5.8	6.1	5.5	5.4	3.9	2.2	1.3	1.6	2.0	1.5	1.3	-77%	-76%	-8.9%	0.1%	1.5%		
Croatia	7.1	6.4	2.0	0.5	0.9	0.4	0.4	0.3	0.3	0.3	0.3	-96%	-31%	-1.7%	0.1%	0.3%		
Cyprus	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-63%	144%	-7.6%	0.0%	0.0%		
Czechia	516	254	172	14	22	26	13	11	10	6.0	5.0	-99%	-64%	-17.9%	8.5%	5.5%		
Denmark	13	11	5.5	3.7	2.7	2.2	2.1	2.4	2.3	2.1	2.0	-85%	-46%	-5.9%	0.2%	2.2%		
Estonia	0.6	0.8	0.8	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	-13%	-4%	-1.9%	0.0%	0.6%		
Finland	35	35	38	32	8.4	16	21	23	29	16	23	-36%	-29%	41.9%	0.6%	25.2%		
France	1,639	472	100	24	58	70	34	17	6.9	6.4	6.4	-100%	-74%	0.7%	27.1%	7.1%		
Germany	2,901	2,118	2,884	38	29	40	5.2	4.5	4.7	3.8	3.9	-100%	-90%	2.3%	47.9%	4.4%		
Greece	21	22	25	27	12	3.1	0.9	0.9	0.9	0.9	0.8	-96%	-97%	-10.8%	0.4%	0.9%		
Hungary	257	630	367	3.3	2.2	3.2	2.1	1.6	1.6	1.5	1.5	-99%	-54%	-0.1%	4.2%	1.6%		
Ireland	48	48	7.9	2.6	2.6	2.7	2.4	2.5	2.6	2.5	2.4	-95%	-10%	-3.7%	0.8%	2.6%		
Italy	144	114	39	36	15	15	11	13	12	11	10	-93%	-71%	-4.7%	2.4%	11.5%		
Latvia	5.7	0.3	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	-91%	86%	0.3%	0.1%	0.6%		
Lithuania	11	4.7	1.9	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	-97%	65%	6.2%	0.2%	0.4%		
Luxembourg	1.4	1.7	1.1	0.7	0.7	0.6	0.8	0.8	0.8	0.7	0.7	-50%	-2%	0.0%	0.0%	0.8%		
Malta	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	-38%	2602%	-7.9%	0.0%	0.0%		
Netherlands	67	41	17	3.7	3.7	4.4	3.7	3.6	3.6	3.4	3.3	-95%	-11%	-1.2%	1.1%	3.7%		
Poland	83	83	12	12	11	11	3.4	3.8	3.8	3.5	3.3	-96%	-72%	-8.2%	1.4%	3.6%		
Portugal	61	76	101	1.7	1.4	1.8	1.4	1.3	1.2	0.8	1.3	-98%	-22%	71.6%	1.0%	1.4%		
Romania	2.9	2.9	3.9	4.2	3.2	3.0	3.0	3.6	3.1	2.9	2.7	-7%	-36%	-6.6%	0.0%	3.0%		
Slovakia	16	5.8	5.4	3.7	3.4	3.5	3.3	3.3	2.5	1.7	1.5	-90%	-59%	-13.4%	0.3%	1.7%		
Slovenia	21	18	20	0.9	1.3	0.6	0.5	0.5	0.4	0.4	0.4	-98%	-58%	3.1%	0.4%	0.4%		
Spain	58	60	16	4.5	12	10	9.0	2.0	1.9	1.8	2.0	-97%	-57%	11.3%	1.0%	2.2%		
Sweden	17	17	11	4.5	6.6	3.9	2.6	3.1	2.7	3.4	2.7	-84%	-40%	-21.8%	0.3%	3.0%		
<b>EU27(a)</b>	<b>6,052</b>	<b>4,184</b>	<b>3,878</b>	<b>256</b>	<b>228</b>	<b>239</b>	<b>136</b>	<b>117</b>	<b>107</b>	<b>90</b>	<b>90</b>	<b>-99%</b>	<b>-65%</b>	<b>0.6%</b>	<b>100.0%</b>	<b>100.0%</b>		
EU27(b)	6,052	4,184	3,878	256	228	239	136	117	107	90	90							

Notes: (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

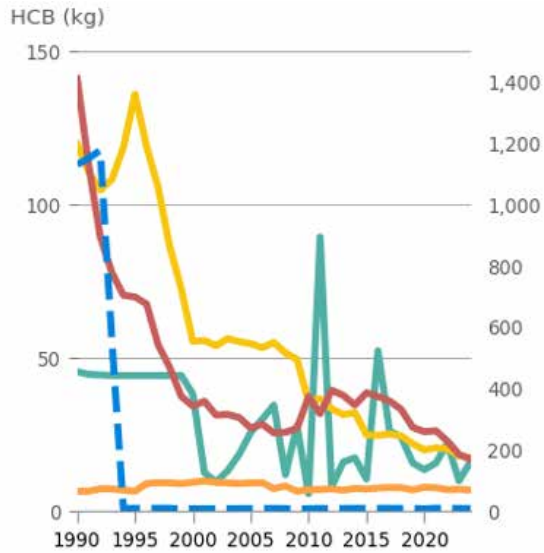
**Figure 3.32 HCB emission trends in the EU and shares of Member States**



**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

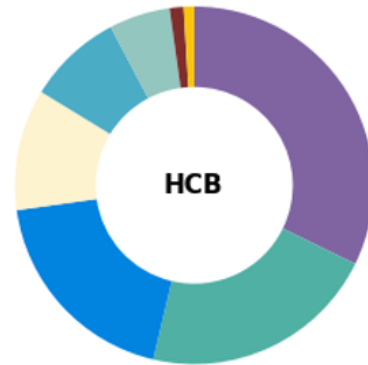
**Figure 3.33 HCB emissions in the EU (a) emission trends since 1990 from the most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

(a)



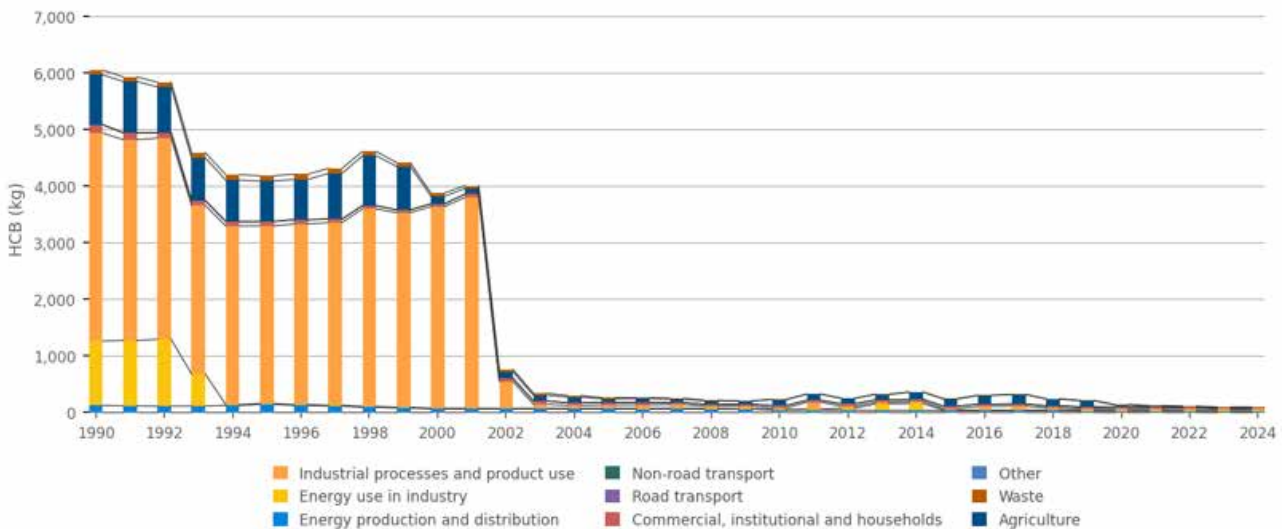
- 2B10a Chemical industry: Other
- 1A1a Public electricity and heat production
- 2C7a Copper production
- 1A4bi Residential: Stationary
- 1A2b Stationary combustion in manufacturing industries and construction: Non-ferrous metals

(b)



- Categories**
- Industrial processes and product use 32.2%
  - Commercial, institutional and households 21.4%
  - Energy production and distribution 19.1%
  - Energy use in industry 11.0%
  - Waste 8.5%
  - Agriculture 5.5%
  - Non-road transport 1.3%
  - Road transport 0.9%
  - Other 0.0%

(c)



**Note:** In (a), the right-hand axis shows values for 1A4bi – Residential: Stationary.

### 3.27 Polychlorinated biphenyl emission trends and key categories

Since 1990, PCB emissions have dropped by 87% in the EU, and since 2005 by 76% (Table 3.28). Between the latest two years they fell by about 2%. During the latest year, the EU Member States contributing most to PCB emissions were Spain, Germany, Poland and Italy (Figure 3.32).

For PCBs, the most significant emission source is the industrial processes and product use sector group. Figure 3.35b shows the contribution made by each aggregated sector group to total EU emissions.

Consumption of POPs and heavy metals (2K) was the main key category for PCB emissions. The highest relative emission reductions since 1990 among the top four key categories, have been in the sectors consumption of POPs and heavy metals (2K) (97%) and lead production (2C5) (89%) (Figure 3.35a). However, PCB emissions from lead production have increased about five-fold since 2005, which is mainly due to substantial increases reported by Greece.

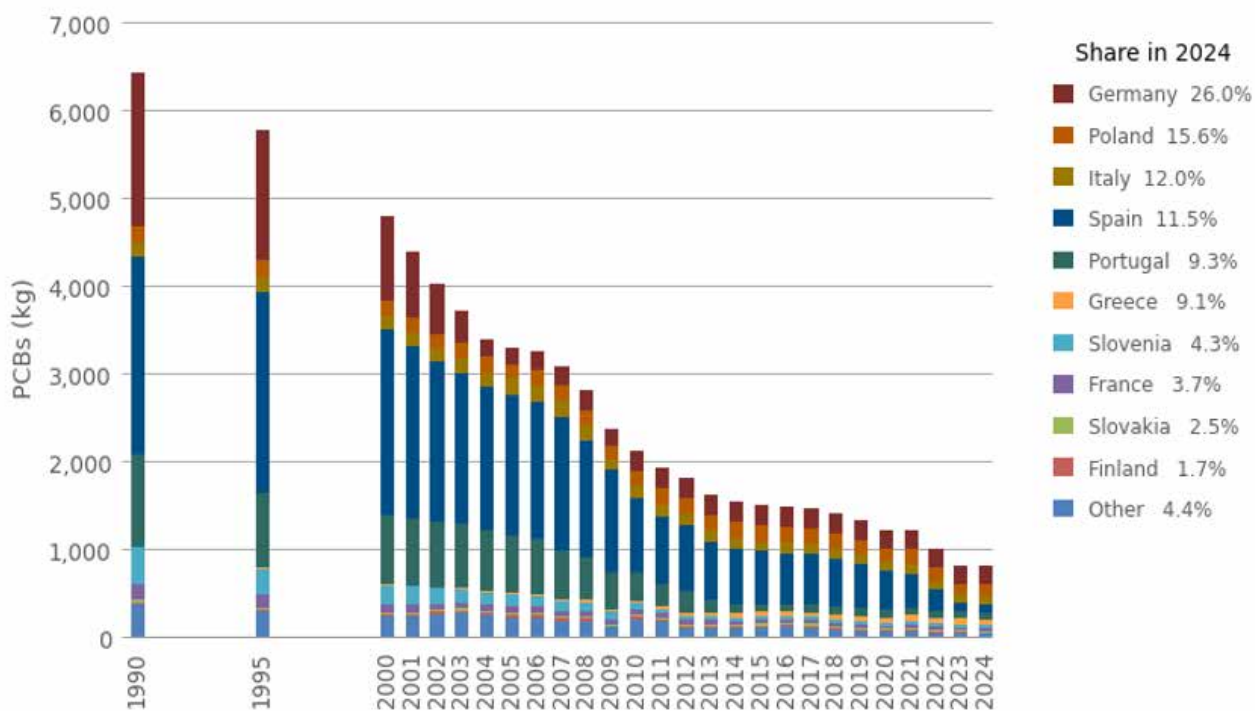
The reduction of PCB emissions from the consumption of POPS and heavy metals in the industry sector is reported to be due to the implementation of the Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) and Regulation (EC) 850/2004 on Persistent Organic Pollutants (Member State's IIRs).

**Table 3.28 Member State contributions to EU emissions of PCBs**

Member State	PCBs(kg)											Change			Share in EU-27	
	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023	2024	1990-2024	2005-2024	2023-2024	1990	2024
Austria	18	11	9.3	6.0	4.5	4.1	3.2	3.1	2.8	2.4	2.3	-88%	-62%	-6.9%	0.3%	0.3%
Belgium	119	103	108	89	116	41	8.7	8.9	3.6	3.1	2.6	-98%	-97%	-17.9%	1.9%	0.3%
Bulgaria	11	16	11	10	3.9	2.8	2.4	2.8	2.0	1.8	1.7	-84%	-83%	-2.3%	0.2%	0.2%
Croatia	5.1	1.3	3.3	4.5	4.7	4.5	2.4	3.1	3.2	3.0	2.0	-60%	-55%	-32.4%	0.1%	0.3%
Cyprus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	10%	15%	-24.0%	0.0%	0.0%
Czechia	3.6	2.7	2.1	2.0	1.7	1.8	1.5	1.2	1.1	0.9	0.9	-76%	-56%	-8.4%	0.1%	0.1%
Denmark	2.9	2.9	2.3	1.2	0.5	0.4	0.4	0.4	0.4	0.4	0.3	-88%	-71%	-7.8%	0.0%	0.0%
Estonia	4.9	2.8	2.4	1.6	1.3	0.8	0.6	0.5	0.6	0.4	0.4	-92%	-74%	-5.8%	0.1%	0.1%
Finland	26	26	27	28	23	20	17	20	16	14	14	-46%	-50%	-2.8%	0.4%	1.7%
France	178	152	98	68	54	41	30	36	34	29	30	-83%	-56%	1.7%	2.8%	3.7%
Germany	1,736	1,483	948	192	232	230	209	218	209	206	209	-88%	9%	1.3%	27.0%	26.0%
Greece	9.2	8.9	7.9	19	32	55	58	72	67	72	73	694%	293%	1.8%	0.1%	9.1%
Hungary	26	12	9.9	11	8.9	11	5.0	4.8	3.4	4.8	2.9	-89%	-75%	-39.6%	0.4%	0.4%
Ireland	40	33	30	32	12	8.9	7.0	6.6	5.7	4.9	4.8	-88%	-85%	-1.5%	0.6%	0.6%
Italy	154	166	157	179	133	114	104	122	107	103	97	-37%	-46%	-5.6%	2.4%	12.0%
Latvia	4.3	1.1	0.4	0.6	0.5	0.2	0.1	0.1	0.1	0.1	0.1	-98%	-83%	-0.2%	0.1%	0.0%
Lithuania	6.2	1.8	0.8	4.5	2.0	0.9	0.8	0.9	0.9	0.6	0.6	-91%	-87%	-5.5%	0.1%	0.1%
Luxembourg	23	35	11	11	18	2.4	1.7	1.2	1.4	1.7	1.7	-93%	-85%	0.0%	0.4%	0.2%
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-91%	26%	63.0%	0.0%	0.0%
Netherlands	38	22	0.3	0.3	0.3	0.3	0.1	0.2	0.2	0.1	0.1	-100%	-49%	7.3%	0.6%	0.0%
Poland	207	190	180	171	164	181	143	158	158	125	125	-39%	-27%	0.0%	3.2%	15.6%
Portugal	1,061	858	794	670	323	86	87	78	73	77	75	-93%	-89%	-2.7%	16.5%	9.3%
Romania	62	39	28	39	21	20	17	20	15	8.6	7.5	-88%	-81%	-12.7%	1.0%	0.9%
Slovakia	24	21	22	24	24	24	18	25	21	23	20	-16%	-15%	-11.3%	0.4%	2.5%
Slovenia	416	291	214	136	77	39	35	35	35	34	34	-92%	-75%	0.3%	6.5%	4.3%
Spain	2,241	2,286	2,116	1,594	851	606	455	391	241	93	92	-96%	-94%	-0.3%	34.9%	11.5%
Sweden	9.2	9.6	9.8	9.4	9.2	9.0	8.8	9.0	8.6	8.4	7.7	-16%	-18%	-8.3%	0.1%	1.0%
<b>EU27(a)</b>	<b>6,425</b>	<b>5,776</b>	<b>4,792</b>	<b>3,304</b>	<b>2,117</b>	<b>1,503</b>	<b>1,215</b>	<b>1,219</b>	<b>1,010</b>	<b>818</b>	<b>805</b>	<b>-87%</b>	<b>-76%</b>	<b>-1.5%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>EU27(b)</b>	<b>6,425</b>	<b>5,776</b>	<b>4,792</b>	<b>3,304</b>	<b>2,117</b>	<b>1,503</b>	<b>1,215</b>	<b>1,219</b>	<b>1,010</b>	<b>818</b>	<b>805</b>					

Notes: (a) Sum of national totals, as reported by EU Member States. (b) Sum of sectors: differences arise when only national totals and no sectoral data are available.

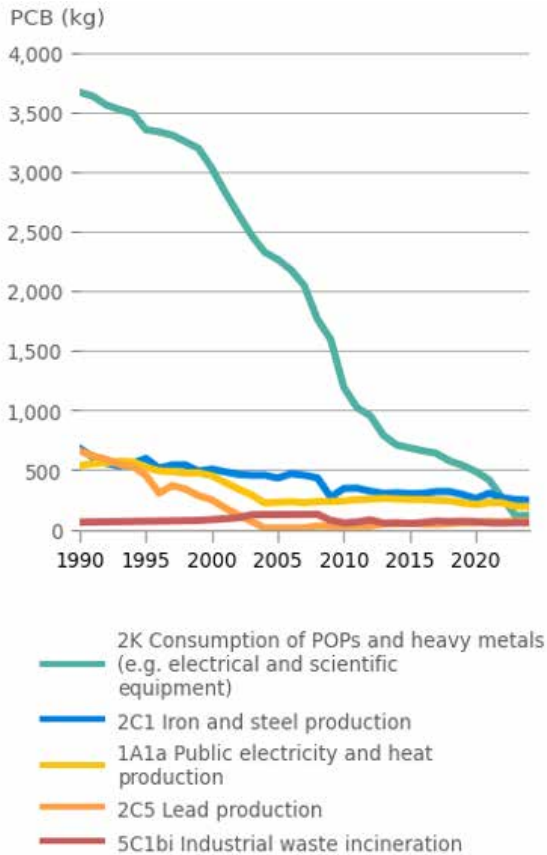
**Figure 3.34 PCB emission trends in the EU and shares of Member States**



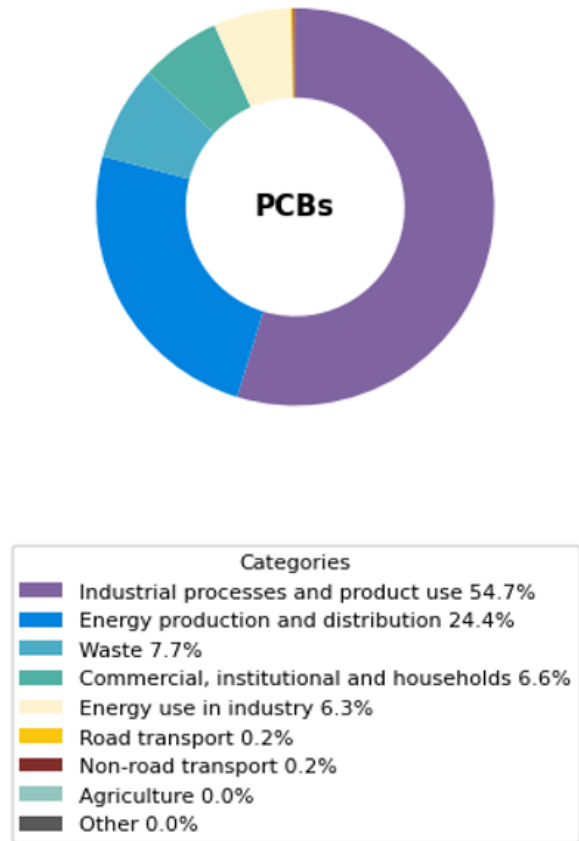
**Notes:** Countries are sorted by their contribution to the EU total for the last year. The top 10 countries are displayed. Data for the other 17 reporting countries are summed under 'Other'.

**Figure 3.35 PCB emissions from key categories in the EU (a) emission trends since 1990 from the most important key categories, (b) share by sector group in the current year and (c) sectoral trends in emissions**

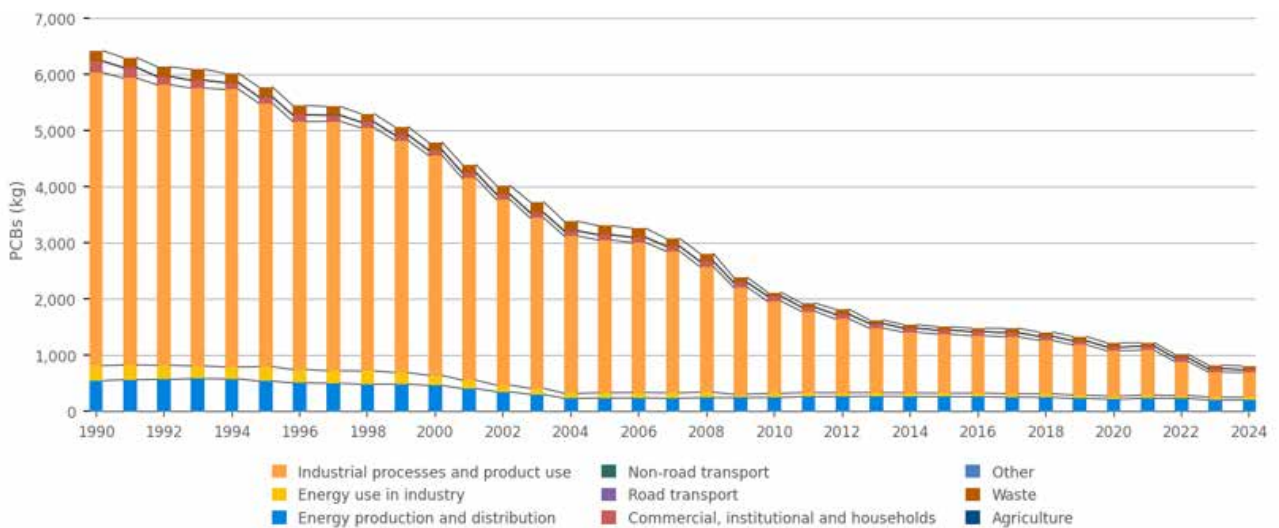
(a)



(b)



(c)



## 4 Sectoral analysis of EU pollutant emissions

This chapter sets out emission trends for the air pollutants, aggregated into the following main sector groups:

- energy production and distribution;
- energy use in industry;
- industrial processes and product use;
- commercial, institutional and households;
- road transport;
- non-road transport;
- agriculture;
- waste.

Appendix 4 of this report provides a conversion chart showing how the aggregated sector groups include the individual nomenclature for reporting (NFR) source categories (Table A4.1). Box 4.1 gives some general explanations relevant to the figures in this chapter.

Table 4.2, Table 4.4, Table 4.6, Table 4.8, Table 4.9, Table 4.10, Table 4.12 and Table 4.14 provide information on the relative and absolute differences between emissions reported during the current year and the previous year. The changes shown in these tables is a reflection of the performed recalculations by the EU Member States. Certain Member States have carried out major recalculations, which results in major changes in absolute terms. Detailed information can be found in Section 5.1.

Adjustments are not considered in the emission totals covered in this chapter.

### **Box 4.1 Explanations of the figures in this chapter**

The Convention on Long-range Transboundary Air Pollution (Air Convention) formally requests Parties to report emissions of particulate matter (PM) for the year 2000 and thereafter. Therefore, the figures in this chapter show data for PM only from year 2000 onwards.

The figures showing indexed values (in percentages) use either 1990, 2000 or 2005 as the index year, which is detailed for each figure.

#### 4.1 Energy production and distribution

The energy production and distribution sector grouping comprises emissions from a number of activities that employ fuel combustion to produce energy products and electricity, for instance. It is a major source of many pollutants, especially SO<sub>x</sub> and Hg. Despite considerable previous reductions, this sector group contributes 43% of the total EU emissions of SO<sub>x</sub> and 36% of Hg emissions.

Additionally, the sector is a significant source of HCB, Cd, NO<sub>x</sub> and PCBs. For emissions of the main pollutants within this aggregated sector, the highest absolute and relative reductions were seen for SO<sub>x</sub> both since 1990 and 2005 (Figure 4.1, Table 4.2).

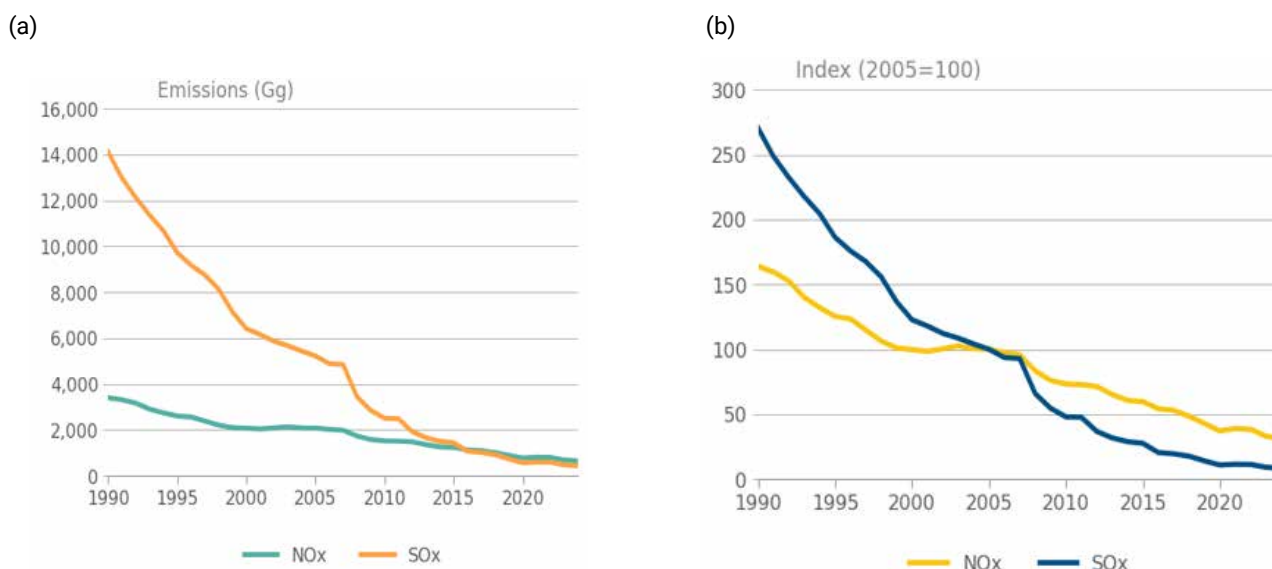
Since 1990, SO<sub>x</sub> emissions have reduced by about 97%. Several measures have been combined to reduce SO<sub>x</sub> emissions from these main emitting sources: switching fuel in energy-related sectors away from high-sulphur solid and liquid fuels to low-sulphur fuels such as natural gas, fitting flue gas desulphurisation (FGD) abatement technology in industrial facilities and introducing EU directives relating to the sulphur content of certain liquid fuels (EEA, 2023a).

Since 1990 as well as since 2005, Cd, Pb and Hg emissions have reduced significantly (Figure 4.2a). HCB and PCB emissions have also reduced strongly since 1990 (Figure 4.2b). Since 2005 the trend has continued for HCB, but stagnated for PCB.

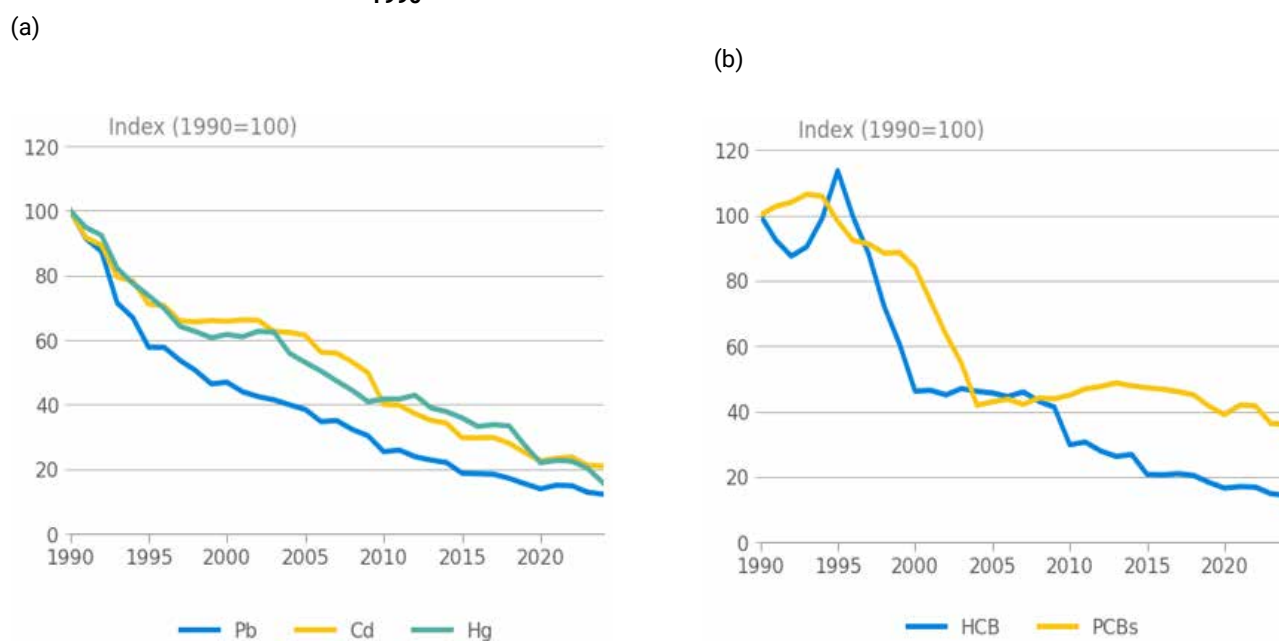
The peak in HCB emissions in 1995 reflects high emission values reported by Belgium in public electricity and heat production category (1A1a). The increases in PCB emissions observed after 2004 originate mainly from Germany. The dip in 2020 is a result of Poland's PCB emission trend.

Table 4.1 indicates the number of EU Member States reporting the notation keys 'NA' (not applicable), 'NO' (not occurring), 'NR' (not relevant) and 'NE' (not estimated) within the key categories. Table 4.2 shows the recalculations within the energy production and distribution sector group. For explanations of EU recalculations, see Section 5.1.

**Figure 4.1** (a) EU emission trends and (b) indexed EU emission trends in the energy production and distribution sector for NO<sub>x</sub> and SO<sub>x</sub> since 1990



**Figure 4.2** (a) EU emission trends and (b) indexed EU emission trends in the energy production and distribution sector group for HMs (Cd and Hg) since 1990



**Table 4.1** Number of EU Member States reporting notation keys within the key categories of the energy production and distribution sector group in the latest year

Key categories		NA	NO	NR	NE
HCB	1A1a	1	0	0	0
PCB	1A1a	1	0	0	0
SOx	1A1b	0	6	0	0
Cd	1A1b	0	6	0	0
Hg	1A1b	0	6	0	0
SOx	1B2aiv	0	5	0	0

**Note:** Only the key categories where notation keys were reported are considered.

**Table 4.2a Relative difference (relative data, percentage of EU national totals) when comparing the EU's 2024 and 2025 submissions for the energy production and distribution sector group**

Relative difference Energy production and distribution																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	0.3%	0.0%	1.5%	0.0%	2.2%	0.0%	2.5%	0.0%	2.8%	0.1%	3.5%	0.0%	3.6%	-0.2%	4.0%	0.2%	4.3%	0.3%
NMVOCs	Gg	-0.4%	-0.9%	-0.1%	-0.4%	0.5%	0.1%	0.5%	0.0%	0.3%	3.0%	2.9%	0.1%	0.3%	2.5%	2.1%	-0.1%	0.3%	1.4%
SOx	Gg	0.4%	0.0%	0.3%	0.0%	0.5%	0.0%	0.6%	0.0%	0.6%	0.0%	0.8%	0.0%	0.9%	0.0%	0.8%	0.0%	1.0%	-0.7%
NH3	Gg	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%	0.1%	0.1%	0.3%	0.2%	0.2%	0.3%	0.4%	0.3%	0.3%	0.2%	-1.0%
CO	Gg	-0.4%	-0.5%	-0.4%	-0.5%	-0.3%	-0.4%	-0.2%	-0.3%	-0.2%	-0.3%	-0.2%	-0.3%	-0.1%	-0.2%	0.0%	-0.1%	0.2%	-0.3%
Pb	Mg	0.6%	0.6%	1.7%	1.0%	2.2%	1.1%	2.3%	1.3%	2.1%	1.0%	2.7%	1.0%	2.4%	0.8%	1.7%	0.6%	2.0%	1.4%
Cd	Mg	3.0%	0.8%	6.7%	0.9%	9.6%	0.6%	9.7%	1.7%	9.0%	0.4%	11.9%	0.5%	11.8%	0.3%	9.1%	0.0%	8.2%	-0.6%
Hg	Mg	1.5%	0.1%	3.6%	0.2%	5.0%	0.2%	4.6%	0.3%	4.6%	0.2%	5.8%	0.3%	5.5%	0.2%	5.4%	0.2%	8.9%	10.5%
As	Mg	0.3%	0.1%	1.5%	0.3%	2.2%	0.4%	2.1%	0.7%	2.2%	0.8%	2.8%	1.0%	3.0%	1.3%	3.4%	1.5%	2.3%	-7.6%
Cr	Mg	1.7%	0.8%	5.5%	0.9%	5.3%	0.6%	5.1%	0.6%	4.2%	0.1%	4.9%	0.0%	4.7%	-0.1%	3.8%	-0.5%	3.3%	-2.2%
Cu	Mg	0.6%	0.6%	2.3%	0.7%	2.0%	0.5%	2.3%	0.9%	1.9%	0.4%	2.1%	0.5%	1.9%	0.2%	1.5%	0.1%	1.4%	-1.6%
Ni	Mg	3.6%	-0.1%	8.0%	0.1%	12.8%	0.1%	14.7%	0.2%	17.6%	0.2%	18.5%	0.2%	20.3%	0.2%	15.3%	0.1%	13.0%	1.8%
Se	Mg	0.8%	0.0%	1.4%	0.1%	1.6%	0.1%	1.5%	0.1%	1.5%	0.1%	1.9%	0.1%	1.9%	0.1%	2.0%	0.2%	1.8%	48.9%
Zn	Mg	0.0%	-0.1%	0.5%	-0.3%	-0.8%	-1.1%	-1.1%	-1.7%	-2.1%	-3.4%	-3.0%	-3.8%	-3.9%	-4.6%	-4.8%	-5.6%	-4.8%	-7.4%
Total PAHs	Mg	0.3%	0.7%	5.8%	6.4%	3.5%	2.7%	3.4%	2.9%	4.3%	5.5%	5.7%	5.6%	5.6%	4.6%	2.6%	4.7%	5.9%	6.0%
PCDD/Fs	g I-TEQ	0.9%	1.1%	1.5%	1.6%	8.1%	7.1%	5.5%	9.2%	8.4%	7.9%	8.5%	5.7%	4.9%	2.9%	-0.8%	1.4%	2.5%	-12.7%
B(a)P	Mg	0.6%	1.1%	8.7%	10.6%	0.9%	1.1%	4.2%	9.7%	12.6%	15.1%	15.1%	14.6%	14.2%	14.0%	12.7%	13.1%	14.0%	13.2%
B(b)F	Mg	0.8%	1.5%	11.6%	11.3%	9.7%	9.4%	8.9%	7.6%	7.0%	7.3%	7.5%	7.4%	7.1%	6.1%	3.9%	6.0%	7.5%	7.5%
B(k)F	Mg	1.0%	1.9%	11.2%	10.0%	8.9%	9.0%	8.8%	8.5%	8.6%	9.2%	9.4%	9.4%	9.0%	7.9%	5.8%	7.8%	9.3%	9.1%
IP	Mg	1.6%	2.9%	16.0%	12.3%	9.0%	8.7%	8.2%	7.5%	7.3%	7.8%	7.8%	7.7%	7.2%	6.2%	4.2%	6.3%	7.9%	7.6%
HCB	kg	0.0%	0.0%	0.1%	0.1%	2.3%	2.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.9%
PCBs	kg	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.4%
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-0.2%	-0.4%	0.4%	-0.3%	0.5%	0.0%	0.4%	0.0%	0.6%	0.0%	-0.9%	0.3%	0.8%	0.2%	0.7%	-1.2%
PM10	Gg			0.0%	-0.2%	0.2%	-0.2%	0.3%	-0.1%	0.2%	-0.2%	0.3%	-0.2%	-0.6%	0.1%	0.5%	0.0%	0.3%	-0.9%
TSPs	Gg			0.0%	-0.1%	0.2%	-0.2%	0.3%	-0.1%	0.2%	-0.1%	0.2%	-0.1%	-0.4%	0.0%	0.5%	0.0%	0.3%	-0.7%
BC	Gg			-5.2%	-2.8%	-1.4%	-2.5%	-2.0%	-2.5%	-3.2%	-5.8%	-5.2%	-5.9%	-8.6%	-0.2%	0.5%	-1.5%	-0.7%	-2.9%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.2b Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions for the energy production and distribution sector group**

Relative difference Energy production and distribution																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	10	0	31	0	32	0	36	1	34	1	38	1	35	-1	30	2	33	2
NMVOCs	Gg	-5	-9	-1	-3	3	0	2	0	1	13	12	1	1	9	7	0	1	4
SOx	Gg	61	0	19	-1	13	-1	12	0	9	0	9	0	8	0	5	0	6	-4
NH3	Gg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO	Gg	-4	-4	-3	-4	-2	-3	-1	-2	-2	-2	-1	-2	-1	-2	0	-1	1	-2
Pb	Mg	3	2	4	2	3	1	3	2	2	1	2	1	2	1	1	0	1	1
Cd	Mg	1	0	2	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Hg	Mg	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1
As	Mg	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	-2
Cr	Mg	3	1	4	1	4	0	3	0	3	0	3	0	3	0	2	0	2	-1
Cu	Mg	2	1	2	1	1	0	2	1	1	0	1	0	1	0	1	0	1	-1
Ni	Mg	32	-1	50	0	48	0	44	0	36	0	41	0	38	0	25	0	24	3
Se	Mg	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	11
Zn	Mg	0	0	2	-1	-2	-3	-3	-5	-6	-10	-9	-11	-11	-12	-11	-14	-12	-17
Total PAHs	Mg	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	1	1	1
PCDD/Fs	g I-TEQ	59	59	60	55	7	7	5	8	7	7	7	5	4	2	-1	1	2	-10
B(a)P	Mg	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	0
B(b)F	Mg	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(k)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IP	Mg	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCB	kg	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
PCBs	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10	Gg			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TSPs	Gg			0	0	0	0	1	0	0	0	0	0	-1	0	0	0	0	-1
BC	Gg			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## 4.2 Energy use in industry sector

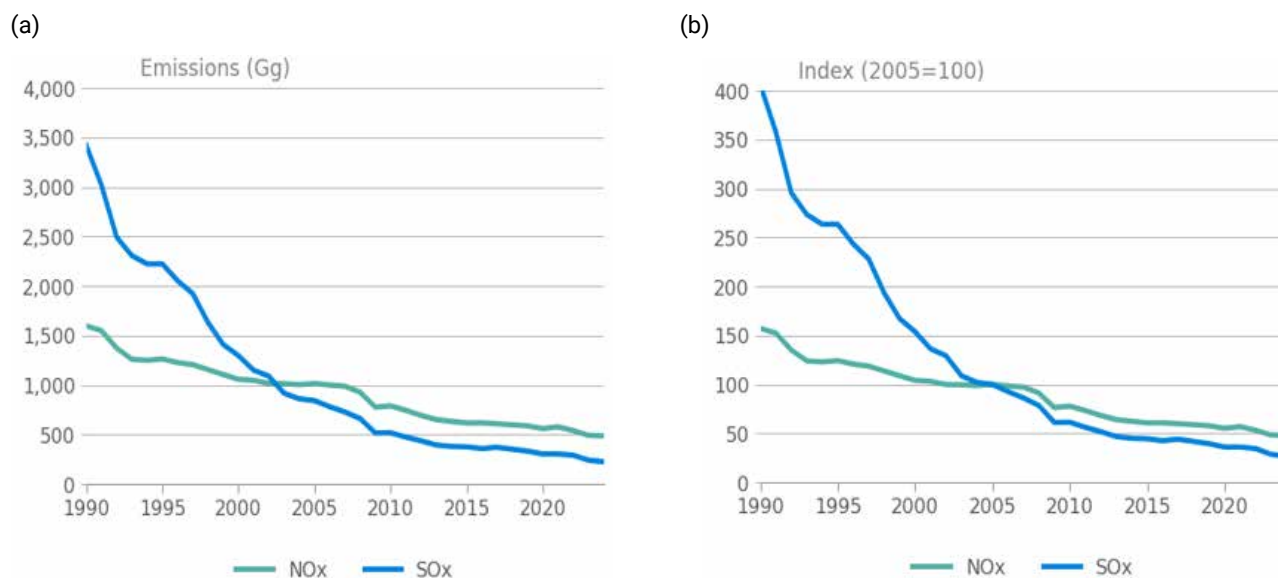
Energy use in the industry sector is a significant source of SO<sub>x</sub>, Hg, Pb, Cd, NO<sub>x</sub> and HCB. Of these main pollutants from this sector, the highest absolute and relative reduction since 1990 and 2005 was for SO<sub>x</sub> (Figure 4.3).

Of the three main heavy metals, Cd shows the biggest reduction in relative terms since 1990, while Pb shows the largest reduction since 2005 (Figure 4.4). The development of Cd and Hg emissions over the past 30 years mainly reflects data reported by Spain in the category stationary combustion in manufacturing industries and construction: non-metallic minerals (1A2f), including the rise in emissions from 1994 to 1995.

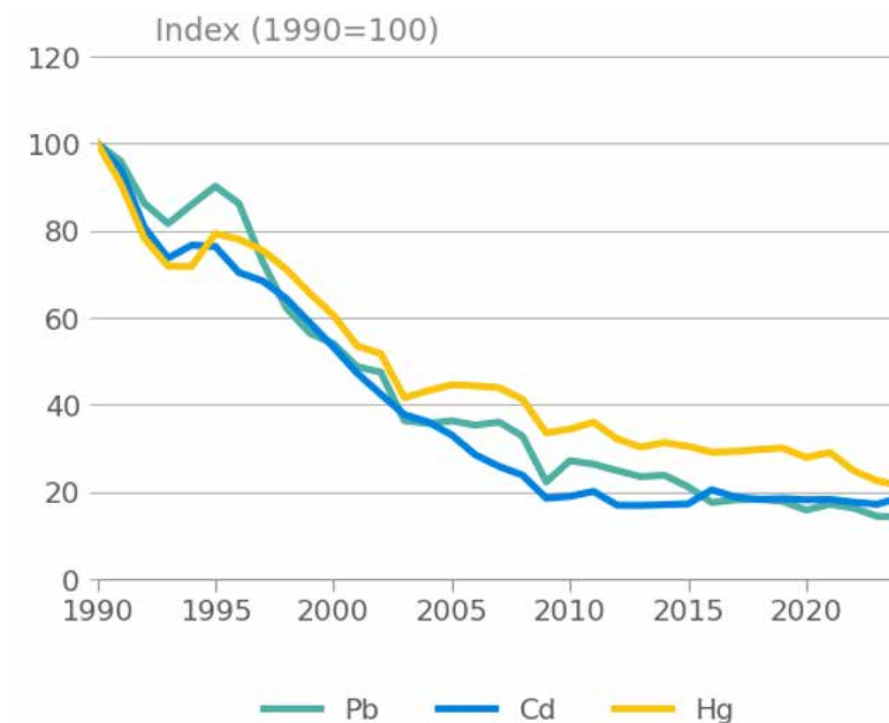
Pb emissions from this sector fell between 1996 and 1997 after a minor peak in 1995, decreased considerably between 2008 and 2009, and increased again afterwards (Figure 4.4). This pattern was mainly the result of data reported by Italy and France for the energy sector in iron and steel (1A2a), non-ferrous metals (1A2b) and non-metallic minerals (1A2f).

Table 4.3 presents the number of EU Member States reporting the notation keys 'NA', 'NO', 'NR' and 'NE' within the key categories. Table 4.4 shows the recalculations within the energy use in industry sector group. For explanations of EU recalculations, see Section 5.1.

**Figure 4.3 (a) EU emission trends and (b) indexed EU emission trends in the energy use in industry -sector for NO<sub>x</sub> and SO<sub>x</sub> since 1990**



**Figure 4.4** EU emission trends in the energy use in industry sector group for HMs (Pb, Cd and Hg) since 1990



**Table 4.3** Number of EU Member States reporting notation keys within the key categories of the energy use in industry sector group in the latest year.

Key categories		NA	NO	NR	NE
dioxin	1A2b	0	1	0	0
HCB	1A2b	3	3	0	7
Pb	1A2f	0	0	0	0

**Note:** Only the key categories where notation keys were reported are considered.

**Table 4.4a** Relative difference (relative data, percentage of EU national totals) between reported emissions when comparing the EU's 2024 and 2025 submissions for the energy use in industry sector group

Relative difference Energy use in industry																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	-0.1%	-0.2%	0.1%	0.2%	0.7%	0.4%	0.4%	0.1%	0.0%	-0.2%	-0.1%	0.0%	0.0%	0.3%	0.6%	0.3%	-0.3%	-1.8%
NMVOcs	Gg	0.4%	-2.6%	-3.2%	-3.8%	-4.6%	-4.9%	-5.2%	-7.7%	-7.9%	-7.8%	-8.1%	-8.8%	-8.6%	-9.1%	-9.5%	-3.2%	-3.1%	-3.7%
SOx	Gg	-0.5%	-0.5%	0.5%	0.6%	0.6%	0.0%	0.2%	0.0%	0.0%	-0.3%	0.3%	0.4%	0.1%	0.1%	0.2%	0.0%	0.3%	-1.6%
NH3	Gg	0.4%	-0.1%	0.4%	0.0%	5.7%	2.7%	0.8%	-0.1%	0.1%	0.0%	0.5%	0.0%	0.6%	0.1%	0.6%	7.5%	8.9%	5.5%
CO	Gg	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.5%	-0.2%	0.0%	0.3%	0.1%
Pb	Mg	0.2%	0.1%	-7.8%	-18.8%	-17.6%	-18.3%	-17.7%	-18.6%	-19.1%	-21.8%	-26.0%	-25.7%	-24.8%	-24.9%	-24.1%	-26.8%	-28.5%	-28.6%
Cd	Mg	0.6%	0.5%	0.8%	1.1%	1.9%	1.7%	2.2%	2.0%	1.9%	1.7%	1.9%	2.0%	3.0%	2.3%	2.8%	4.2%	4.4%	2.4%
Hg	Mg	1.0%	0.4%	0.5%	0.5%	0.6%	0.7%	1.0%	1.1%	1.2%	1.0%	1.2%	1.3%	1.7%	1.8%	1.9%	2.4%	1.6%	0.9%
As	Mg	0.2%	0.1%	0.2%	0.3%	0.5%	0.5%	0.5%	0.5%	0.5%	0.7%	1.0%	1.0%	1.2%	1.1%	1.5%	1.5%	1.0%	0.5%
Cr	Mg	0.3%	0.2%	1.0%	0.9%	1.5%	1.5%	1.0%	0.5%	0.1%	-0.1%	0.0%	0.0%	0.2%	0.2%	0.6%	0.7%	0.4%	0.5%
Cu	Mg	0.4%	0.3%	0.5%	0.6%	0.5%	0.6%	0.3%	0.2%	0.1%	0.1%	3.1%	2.6%	2.0%	0.4%	0.4%	0.5%	0.2%	0.3%
Ni	Mg	0.0%	0.0%	2.1%	2.4%	4.9%	0.4%	0.0%	-1.9%	0.3%	-4.2%	-1.1%	-0.5%	0.8%	3.1%	4.3%	1.5%	-1.8%	-1.7%
Se	Mg	-1.7%	-1.4%	-1.5%	-0.5%	-0.4%	-0.4%	-0.6%	-0.5%	-0.5%	-0.5%	-0.3%	-0.3%	-0.2%	-0.3%	-0.4%	0.0%	-0.2%	5.7%
Zn	Mg	0.2%	0.1%	0.1%	-0.2%	0.0%	0.1%	-0.2%	-0.3%	-0.4%	-0.4%	-0.4%	-0.2%	-0.4%	-0.2%	-0.6%	0.5%	1.4%	1.1%
Total PAHs	Mg	-0.2%	0.4%	1.4%	1.1%	0.8%	-0.1%	-0.3%	-1.1%	-1.5%	-1.4%	-1.2%	-1.1%	-0.4%	0.3%	0.9%	2.3%	3.7%	3.6%
PCDD/Fs	g I-TEQ	4.5%	3.7%	9.0%	10.7%	0.3%	-0.2%	-2.2%	-2.9%	-2.5%	-1.0%	-2.3%	-2.4%	-4.5%	-5.1%	-4.8%	-6.7%	-1.5%	1.5%
B(a)P	Mg	10.6%	14.8%	10.5%	11.2%	3.1%	4.4%	5.2%	5.6%	5.9%	5.1%	5.1%	4.7%	6.9%	7.4%	8.3%	9.8%	12.3%	13.2%
B(b)F	Mg	11.3%	14.3%	12.2%	12.8%	6.0%	5.7%	5.1%	3.6%	3.0%	2.9%	3.3%	3.5%	4.1%	4.6%	5.2%	7.0%	9.4%	9.8%
B(k)F	Mg	11.5%	13.7%	11.7%	11.6%	3.9%	4.2%	4.1%	3.6%	3.4%	2.6%	2.8%	2.7%	3.2%	3.7%	4.2%	5.6%	7.4%	7.9%
IP	Mg	11.1%	13.4%	11.4%	11.5%	3.8%	4.3%	3.8%	2.7%	2.2%	1.7%	1.9%	1.8%	2.4%	2.9%	3.3%	4.6%	6.1%	6.2%
HCB	kg	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.3%	0.3%	0.3%	0.7%	0.6%	0.6%	1.1%	0.9%	1.8%
PCBs	kg	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.2%	0.3%	0.2%	0.3%	0.4%	0.5%	0.6%	0.6%	0.7%	0.5%	4.5%
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			0.8%	1.1%	2.2%	1.7%	1.4%	0.7%	0.4%	0.1%	0.7%	0.7%	1.3%	1.3%	1.7%	3.7%	5.1%	3.0%
PM10	Gg			0.7%	0.9%	1.9%	1.4%	1.0%	0.3%	0.1%	-0.4%	0.3%	0.2%	0.8%	1.0%	1.4%	3.0%	3.9%	2.1%
TSPs	Gg			0.6%	0.8%	1.5%	1.2%	0.8%	0.2%	0.0%	-0.4%	0.1%	0.1%	0.5%	0.7%	1.0%	4.4%	7.3%	3.6%
BC	Gg			0.6%	0.9%	2.8%	1.8%	1.3%	0.6%	0.8%	0.0%	1.2%	0.7%	1.3%	0.3%	0.7%	3.4%	5.1%	1.6%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.4b** Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions for the energy use in industry sector group

Relative difference Energy use in industry																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	-1	-2	2	2	5	3	3	1	0	-1	-1	0	0	2	3	2	-1	-9
NMVOcs	Gg	1	-4	-4	-5	-5	-5	-5	-8	-8	-8	-9	-10	-10	-11	-10	-3	-3	-4
SOx	Gg	-16	-10	7	5	3	0	1	0	0	-1	1	2	0	0	1	0	1	-4
NH3	Gg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
CO	Gg	-1	0	2	0	2	1	0	-1	-1	0	0	-3	0	-8	-2	0	4	1
Pb	Mg	1	1	-31	-57	-39	-40	-36	-36	-38	-40	-42	-43	-41	-40	-34	-43	-44	-39
Cd	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr	Mg	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Cu	Mg	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
Ni	Mg	0	0	4	4	6	0	0	-2	0	-3	-1	0	0	2	2	1	-1	-1
Se	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Zn	Mg	2	1	1	-1	0	0	-1	-1	-1	-2	-1	-1	-1	-2	-1	2	5	3
Total PAHs	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCDD/Fs	g I-TEQ	32	29	26	27	1	0	-3	-4	-4	-1	-3	-3	-5	-6	-5	-8	-2	2
B(a)P	Mg	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(b)F	Mg	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(k)F	Mg	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IP	Mg	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCB	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCBs	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			1	1	2	1	1	0	0	0	0	0	1	1	1	2	3	1
PM10	Gg			1	1	2	1	1	0	0	0	0	0	1	1	1	2	2	1
TSPs	Gg			1	1	2	1	1	0	0	0	0	0	1	1	1	4	6	3
BC	Gg			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

### 4.3 Industrial processes and product use sector

The industrial processes and product use sector grouping refers to emissions from industrial sources other than those arising from fuel combustion within the industrial sector. This is the primary sector group for PCB, NMVOC, Cd, Pb, HCB, Hg, PM<sub>10</sub>, PCDD/F and CO emissions, as well as a significant source of SOX emissions. Figure 4.5 and 4.6 show the emission trends for this sector.

Spain contributed most to PCB emissions in this sector during the current reporting cycle, caused by electrical equipment manufactured or contaminated with PCBs that has been destroyed, reported in category 2K. Of all the countries, Germany, Italy and France contributed most to NMVOC emissions. The Cd emissions are mainly driven by data reported by Germany, Poland and Spain. For Pb, the greatest contributions came from Poland, Italy and Germany.

Data from France and Germany for the category '2C1 – Iron and steel production' have a great influence on the trend in CO emissions. In France, CO emissions from the 2C1 category have fluctuated over the years, depending on the amount of blast furnace gas that has been produced in the iron and steel production, resulting in peaks (1995, 2004 and 2010) or troughs (2001 and 2009) (EU IIR 2024). The negative peak in 2009 was also influenced by the data reported by several countries, mainly Germany, Belgium and France, in the category '2C1 – Iron and steel production'.

Despite considerable reductions since 1990, the industrial processes and product use sector continues to contribute significantly to total EU emissions of HMs. Figure 4.6a presents emission trends for these pollutants. For the HMs, Pb shows the highest relative reduction in emissions since 1990 (84%).

The trend in Cd emissions reflects mainly data reported by Germany in the categories '2C1 – Iron and steel' and '2C7a – Copper production'.

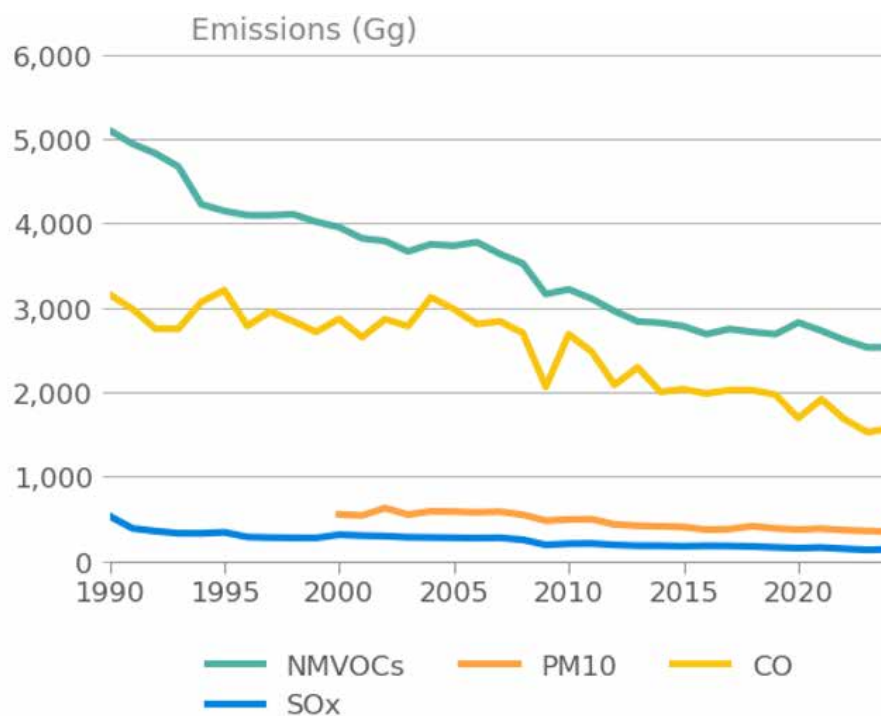
The dip in Pb emissions between 2008 and 2009 was mainly caused by reductions in the category '2C5 – Lead production' reported by Bulgaria. The reduction in Pb emissions between 2010 and 2011 reflected the drastic drop in emissions reported by Latvia in category '2C1 – Iron and steel production', resulting from a change in the type of furnace used in metal production. Overall, between 2010 and 2011, Latvia's total Pb emissions (national total) fell by 96% (Latvia's IIR 2024).

Among the persistent organic pollutants (POPs), HCB recorded the highest relative reduction since 1990 (99%) in this sector, while PCBs shows highest relative reductions since 2005 (75%) (Figure 4.6b).

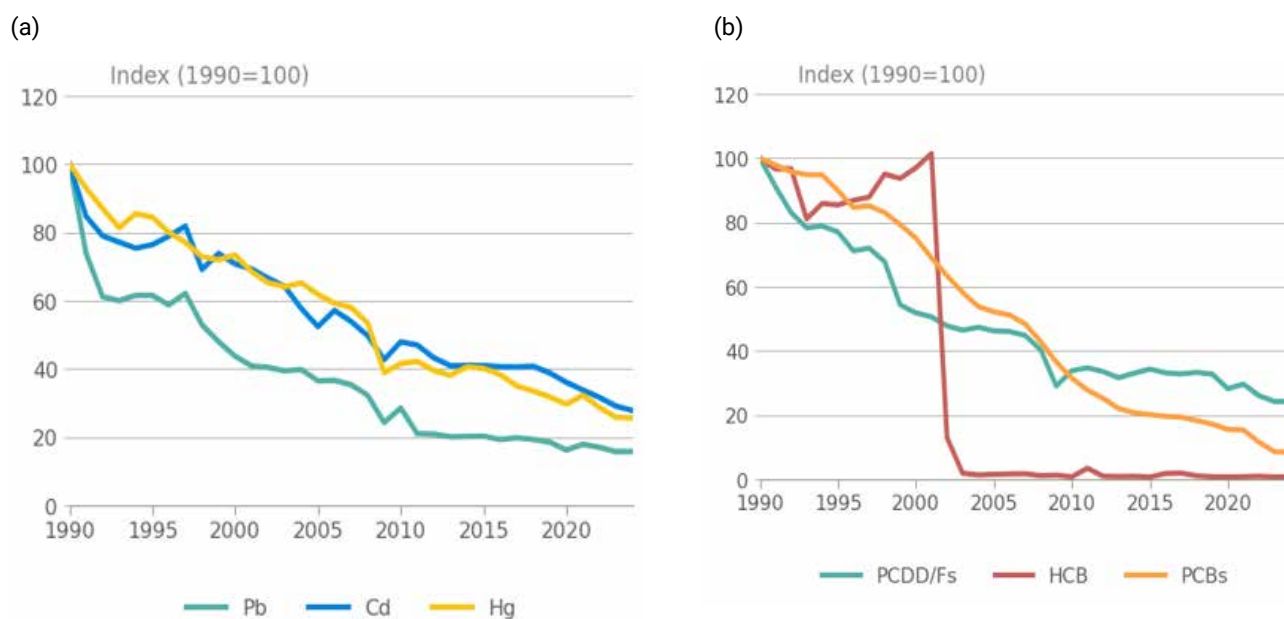
The major decrease in HCB from 2001 to 2002 (87%) is a result of Germany's reporting the notation key 'NA' in category '2C3 – Aluminium production', due to the prohibition of secondary aluminium production in Germany since 2002, which has resulted in the omission of the source of HCB (Germany's IIR 2024).

Table 4.5 presents the number of EU Member States reporting the notation keys 'NA', 'NO', 'NR' and 'NE' within the key categories. Table 4.6 shows the recalculations within the industrial processes and product use sector group. For explanations of EU recalculations, see Section 5.1.

**Figure 4.5** EU emission trends in the industrial processes and product use sector group for NMVOCs, SO<sub>x</sub>, PM<sub>10</sub> and CO since 1990 (or 2000 for PM<sub>10</sub>)



**Figure 4.6** (a) EU emission trends and (b) indexed EU emission trends in the industrial processes and product use sector group for HMs (Pb, Cd, Hg) since 1990



**Table 4.5** Number of EU Member States reporting notation keys within the key categories of the industrial processes and product use sector group

Key categories		NA	NO	NR	NE
Hg	2A1	5	2	0	4
Cd	2A3	2	3	0	0
PM10	2A5a	0	2	0	0
SOx	2B10a	1	6	0	1
HCB	2B10a	13	6	0	6
SOx	2C1	1	4	0	2
CO	2C1	1	4	0	2
Pb	2C1	1	4	0	0
Cd	2C1	1	4	0	0
Hg	2C1	1	4	0	0
total PAH	2C1	1	4	0	2
dioxin	2C1	1	4	0	1
PCB	2C1	1	4	0	0
HCB	2C3	3	11	0	6
Pb	2C5	0	8	0	0
PCB	2C5	1	7	0	1
Hg	2C6	2	12	0	0
Cd	2C7a	0	11	0	1
HCB	2C7a	3	12	0	6
NMVOC	2D3g	0	0	0	1
NMVOC	2D3i	0	0	0	1
PM2.5	2G	1	0	0	1
PM10	2G	1	0	0	1
Pb	2G	1	0	0	0
Cd	2G	1	0	0	0
PCB	2K	7	7	0	5
PM10	2L	5	14	0	1

**Note:** Only the key categories where notation keys were reported are considered.

**Table 4.6** Relative difference (relative data, percentage of EU national totals) between reported emissions when comparing the EU's 2024 and 2025 submissions for the industrial processes and product use sector group

Relative difference Industrial processes and product use																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	0.3%	0.3%	0.4%	0.3%	0.3%	0.4%	0.3%	0.4%	0.4%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%	-0.1%	-0.1%
NMVOcs	Gg	-0.3%	-0.4%	-0.1%	0.0%	0.7%	0.5%	0.9%	0.2%	0.6%	0.3%	0.6%	0.4%	0.8%	0.4%	0.9%	0.5%	0.4%	0.2%
SOx	Gg	0.4%	1.1%	0.5%	0.6%	0.0%	-0.1%	-0.2%	-0.5%	-0.3%	-0.3%	-0.3%	-0.8%	-0.9%	-1.0%	-1.1%	-1.1%	-1.3%	-1.5%
NH3	Gg	0.1%	0.1%	0.0%	-0.2%	-0.1%	-0.2%	-0.2%	-0.4%	-0.3%	-0.5%	-0.4%	-0.5%	-0.4%	-0.6%	-0.6%	-0.7%	-0.8%	-1.4%
CO	Gg	0.1%	0.0%	0.0%	-0.1%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%	-0.3%	-0.4%	-0.4%	-0.4%	-0.4%	-0.5%	-0.4%	-0.6%	-0.7%
Pb	Mg	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	-0.2%	0.3%
Cd	Mg	-0.2%	0.2%	0.1%	0.1%	0.2%	0.1%	0.2%	0.1%	0.2%	0.2%	0.3%	0.2%	0.3%	0.2%	0.3%	0.3%	0.1%	-0.4%
Hg	Mg	0.0%	0.0%	0.0%	-0.1%	0.0%	0.2%	0.5%	0.3%	0.4%	0.4%	0.4%	0.0%	-0.1%	0.1%	-0.2%	-0.1%	0.8%	-0.2%
As	Mg	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.4%	0.3%	0.4%	0.2%	0.4%	0.3%	0.2%	0.1%
Cr	Mg	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
Cu	Mg	0.8%	0.8%	1.1%	1.5%	1.6%	1.8%	2.0%	2.5%	2.7%	2.5%	2.8%	2.6%	2.6%	2.6%	3.0%	3.6%	2.1%	2.0%
Ni	Mg	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.4%	0.4%	0.5%	0.5%	0.5%	0.4%	0.5%	0.6%	0.3%	0.2%
Se	Mg	1.3%	0.9%	0.9%	0.5%	1.0%	0.9%	1.5%	1.3%	1.5%	1.3%	2.0%	1.5%	2.1%	1.5%	1.8%	1.5%	2.0%	4.8%
Zn	Mg	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.4%	0.4%	0.3%	0.3%	0.4%	0.4%	0.3%	0.3%
Total PAHs	Mg	1.7%	1.3%	1.7%	1.3%	1.4%	1.2%	0.8%	0.4%	0.1%	-0.2%	-0.6%	-0.3%	-0.4%	-0.1%	-0.6%	-0.7%	-1.1%	-0.9%
PCDD/Fs	g I-TEQ	0.1%	0.4%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.2%	-0.3%
B(a)P	Mg	3.6%	3.9%	7.1%	8.8%	31.3%	27.9%	23.8%	16.4%	12.6%	8.5%	6.9%	8.8%	8.5%	13.6%	9.9%	11.0%	8.4%	8.8%
B(b)F	Mg	8.9%	11.4%	14.1%	12.8%	26.4%	21.2%	19.2%	18.8%	17.8%	16.0%	13.9%	17.2%	16.6%	27.1%	20.8%	21.7%	17.7%	18.8%
B(k)F	Mg	7.6%	6.7%	6.4%	3.3%	4.6%	3.5%	3.0%	2.1%	2.5%	1.3%	0.1%	0.6%	0.1%	2.8%	1.1%	1.3%	-0.6%	-0.6%
IP	Mg	7.9%	10.8%	16.3%	18.6%	42.6%	33.4%	28.9%	22.9%	26.7%	16.9%	8.9%	13.6%	10.1%	29.1%	16.3%	17.0%	5.9%	7.0%
HCB	kg	0.0%	0.0%	0.0%	0.5%	0.8%	0.2%	0.6%	0.7%	0.7%	1.0%	0.4%	0.4%	0.6%	0.9%	-1.4%	0.7%	0.6%	4.9%
PCBs	kg	0.7%	0.0%	1.6%	0.0%	1.6%	0.0%	1.7%	-0.1%	1.8%	-0.1%	1.7%	-0.1%	1.6%	-0.1%	1.7%	-0.2%	-10.2%	-33.8%
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			0.4%	0.4%	0.8%	0.7%	0.6%	0.9%	0.5%	0.5%	0.0%	0.0%	0.2%	-0.2%	-0.2%	-0.3%	-0.5%	-1.1%
PM10	Gg			0.8%	1.1%	1.5%	1.5%	1.6%	2.2%	1.5%	0.6%	0.3%	0.2%	0.4%	0.1%	0.2%	0.2%	0.0%	-0.4%
TSPs	Gg			0.9%	1.6%	1.5%	1.4%	1.5%	2.8%	1.4%	1.9%	0.5%	0.4%	0.8%	0.7%	0.9%	0.7%	0.9%	1.4%
BC	Gg			8.4%	2.4%	1.6%	0.5%	1.5%	0.8%	2.3%	0.8%	2.1%	1.0%	2.7%	1.5%	2.3%	0.9%	1.5%	-7.7%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.6b** Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions for the industrial processes and product use sector group

Relative difference Industrial processes and product use																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0
NMVOcs	Gg	-18	-17	-4	1	21	14	25	6	17	8	17	12	22	11	25	13	11	6
SOx	Gg	2	4	2	2	0	0	0	-1	0	0	0	-1	-2	-2	-2	-2	-2	-2
NH3	Gg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO	Gg	2	1	-1	-3	-5	-6	-5	-6	-6	-7	-8	-8	-9	-8	-9	-8	-10	-11
Pb	Mg	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
Cd	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cu	Mg	3	3	4	4	4	4	5	6	7	6	7	7	7	7	6	8	5	5
Ni	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Se	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Zn	Mg	0	0	1	2	2	2	2	3	3	3	4	4	4	4	4	5	3	3
Total PAHs	Mg	3	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	-1	0
PCDD/Fs	g I-TEQ	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
B(a)P	Mg	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
B(b)F	Mg	2	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0
B(k)F	Mg	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IP	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCB	kg	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
PCBs	kg	37	0	62	-1	26	-1	22	-1	19	-1	17	-1	15	-1	13	-2	-69	-228
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			1	1	1	1	1	1	1	1	0	0	0	0	0	0	-1	-1
PM10	Gg			4	7	7	7	7	9	6	2	1	1	2	1	1	1	0	-1
TSPs	Gg			13	27	21	20	20	33	17	22	5	5	10	8	10	8	9	14
BC	Gg			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

#### 4.4 Commercial, institutional and households sector

As indicated in Chapter 2, fuel combustion in commercial and institutional facilities and households makes a significant contribution to the total emissions of many pollutants. The commercial, institutional and households sector is the primary source for B(a)P, PAHs, PM<sub>2.5</sub>, CO, PM<sub>10</sub>, BC, PCDD/Fs, Cd, HCB, SO<sub>x</sub>, NMVOC emissions. It is also an important sector group for Pb and NO<sub>x</sub> emissions.

For B(a)P and PAHs, the greatest contributions were reported by Poland (37%). The trend in total emissions of PAHs largely reflects data from Poland, Germany and Italy in category '1A4bi – Residential: Stationary'. The peaks in 2010 and 2012 reflect data reported by Germany and Poland in category '1A4bi – Residential: Stationary'. Emissions from Poland reported in the same category reflects the peak in total PAHs and B(a)P emissions in 1993.

For PM<sub>2.5</sub> and PM<sub>10</sub>, Poland, France, Italy and Romania reported the highest emissions. Poland, Italy and France contributed most to CO emissions. Poland, Italy and Romania emitted the largest proportion of PCDD/Fs in during the current reporting cycle.

Of the main pollutants for the sector grouping, the highest relative reduction since both 1990 and 2005 was for SO<sub>x</sub>, which reduced by 91% and 59%, respectively (Figure 4.7).

The trend for CO within the commercial, institutional and households sector is mainly influenced by emissions reported by France, Poland and Italy in category '1A4bi – Residential: Stationary'.

Lower SO<sub>x</sub> emissions from 1990 onwards were the result of reductions in emissions of this air pollutant in Germany. The Member State explained that lower SO<sub>x</sub> emissions resulted from the fuel switch from coal, especially lignite, with a high emission factor, to natural gas with a lower emission factor). From 2008 onwards, a further reduction in sulphur dioxide (SO<sub>2</sub>) emissions can be explained by the increasing use of fuel oil with a low sulphur content (Germany's IIR 2022).

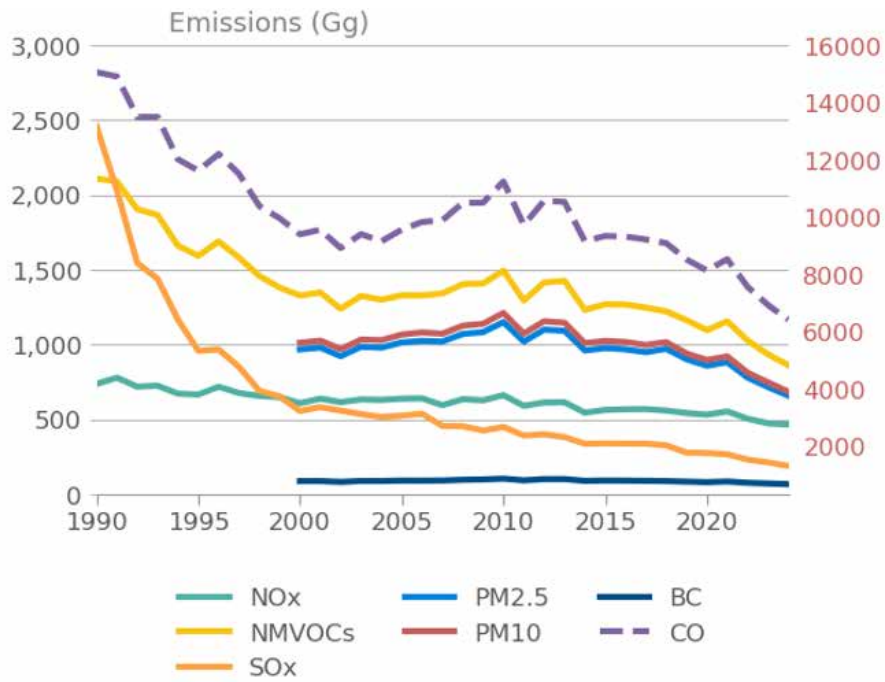
The trend for NMVOC emissions mainly follows the development of emissions from the main contributors Czechia, France and Italy for category '1A4bi – Residential: Stationary'.

Of the HMs in the commercial, institutional and households sector, Pb shows the largest reduction since 1990 (Figure 4.8a). Poland, Germany, France and Italy contribute most to the trend in Pb emissions. The fall in Pb emissions from 1990 to 1992 is the result of emission reductions reported by several countries, especially Germany and Italy, which reduced their emissions considerably in categories '1A5b – Other, mobile (including military, land based and recreational boats)' and '1A4cii – Agriculture/forestry/fishing: Off-road vehicles and other machinery'.

Cd emissions show an increasing trend since 1990 in category '1A4bi – Residential: Stationary', with some fluctuations, mainly related to emissions reported by Poland and Romania.

Among the POPs relevant to the commercial, institutional and households sector, the highest relative reduction occurred for HCB both since 1990 (86%) and since 2005 (39%) (Figure 4.8b).

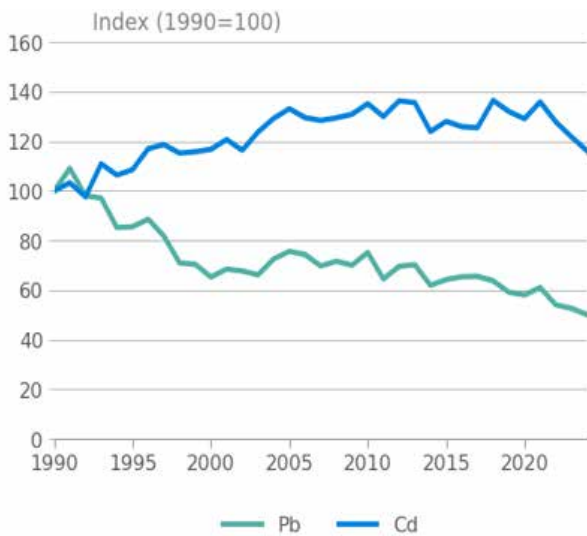
**Figure 4.7** EU emission trends in the commercial, institutional and households sector group for NO<sub>x</sub>, NMVOCs, SO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, BC and CO since 1990 (or 2000 for PM)



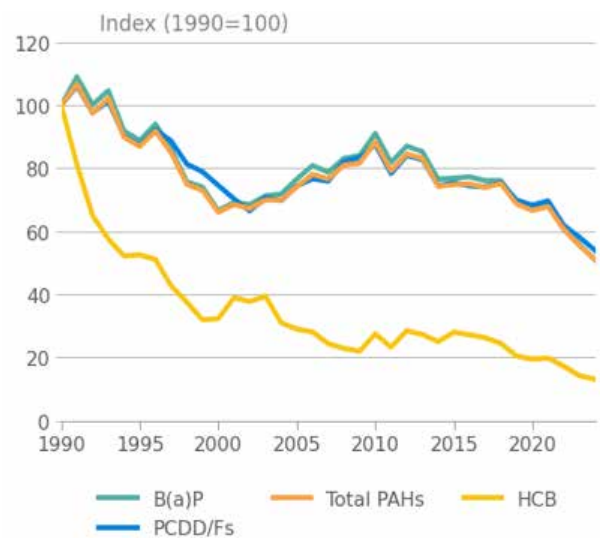
Notes: The right-hand axis shows values for CO.

**Figure 4.8a** EU emission trends in the commercial, institutional and households sector group for (a) HMs (Pb and Cd) and (b) for POPs (PCDD/Fs, total PAHs, B(a)P and HCB) since 1990

(a)



(b)



**Table 4.8a** Relative difference (relative data, percentage of EU national totals) between reported emissions when comparing the EU's 2024 and 2025 submissions for the commercial, institutional and households sector group

Relative difference Commercial, institutional and households																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	-0.2%	-0.6%	-0.5%	-1.4%	-0.5%	-1.4%	-1.3%	-1.2%	-1.6%	-1.6%	-0.8%	-1.3%	-1.3%	-1.6%	-1.5%	-1.8%	-2.3%	-2.4%
NMVOcs	Gg	0.0%	0.0%	0.1%	0.0%	-0.6%	-1.3%	-0.7%	-0.6%	-1.1%	-0.6%	0.1%	0.5%	0.5%	0.2%	0.9%	1.4%	0.2%	-0.1%
SOx	Gg	0.0%	-0.2%	-0.4%	-0.9%	0.0%	-0.4%	-0.4%	-0.4%	-0.4%	-0.4%	-0.3%	-0.4%	-0.4%	-0.5%	-0.5%	-0.9%	-1.1%	-1.8%
NH3	Gg	0.0%	-0.1%	0.0%	-1.2%	0.4%	-0.1%	0.0%	0.3%	-0.4%	-0.5%	0.4%	0.2%	0.4%	0.1%	0.1%	0.2%	-0.2%	-0.7%
CO	Gg	0.0%	-0.1%	0.0%	0.0%	-0.2%	-0.6%	-0.2%	-0.1%	-0.5%	-0.3%	0.1%	0.3%	0.4%	0.3%	0.7%	0.6%	-0.6%	-1.3%
Pb	Mg	-0.2%	-0.2%	-0.1%	-0.2%	-0.4%	-0.8%	-0.4%	-0.3%	-0.7%	-0.5%	-0.2%	0.0%	0.1%	0.0%	0.4%	0.6%	0.1%	-1.5%
Cd	Mg	0.0%	-0.2%	0.0%	-0.2%	0.1%	-0.2%	0.1%	-0.1%	0.1%	-0.1%	0.2%	0.1%	0.3%	0.2%	0.4%	-0.1%	-0.6%	-0.2%
Hg	Mg	-0.2%	-0.2%	0.1%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.2%	0.2%	0.3%	0.3%	0.3%	0.1%	0.5%	0.9%
As	Mg	-0.5%	-0.5%	0.1%	-0.3%	-0.7%	-1.3%	-0.5%	-0.2%	-1.3%	-0.9%	-0.1%	0.3%	0.5%	0.3%	1.1%	2.3%	2.1%	1.2%
Cr	Mg	-0.1%	-0.3%	-0.2%	-0.4%	-0.6%	-1.3%	-0.6%	-0.5%	-1.1%	-0.9%	-0.4%	-0.2%	-0.1%	-0.3%	0.4%	0.6%	0.1%	-0.2%
Cu	Mg	-0.5%	-0.4%	-0.1%	-0.1%	-0.2%	-0.5%	-0.2%	-0.1%	-0.4%	-0.3%	0.0%	0.2%	0.2%	0.1%	0.4%	0.7%	0.5%	-0.2%
Ni	Mg	0.0%	-0.6%	-0.2%	-0.6%	-0.9%	-1.8%	-1.7%	-1.3%	-1.6%	-1.8%	-1.4%	-2.0%	-2.1%	-2.3%	-2.1%	-3.4%	-4.3%	-5.0%
Se	Mg	-0.2%	-0.3%	0.0%	0.1%	-0.3%	-0.9%	-0.1%	0.1%	-0.7%	-0.3%	0.3%	0.7%	0.9%	0.7%	1.4%	2.6%	2.3%	2.4%
Zn	Mg	-0.1%	-0.2%	0.0%	-0.1%	-0.1%	-0.5%	-0.1%	-0.2%	-0.3%	-0.3%	0.0%	0.0%	0.1%	0.0%	0.3%	0.0%	-0.5%	-1.0%
Total PAHs	Mg	-0.1%	-0.1%	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	0.0%	-0.6%	-1.3%	-1.7%
PCDD/Fs	g I-TEQ	-0.2%	-0.2%	0.0%	0.0%	0.2%	-0.2%	0.0%	-0.2%	-0.3%	-0.5%	-0.4%	-0.6%	-0.6%	-0.9%	-0.8%	-1.7%	-3.0%	-3.6%
B(a)P	Mg	-0.1%	-0.1%	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	0.0%	-0.6%	-1.2%	-1.5%
B(b)F	Mg	-0.2%	-0.1%	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	0.0%	-0.7%	-1.4%	-1.7%
B(k)F	Mg	-0.1%	-0.1%	0.0%	0.0%	0.0%	-0.2%	-0.1%	-0.1%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	0.0%	-0.5%	-1.4%	-1.6%
IP	Mg	-0.1%	-0.1%	0.1%	0.0%	0.0%	-0.2%	0.0%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	0.0%	-0.7%	-1.3%	-1.8%
HCb	kg	0.5%	3.1%	14.4%	25.2%	-1.8%	-1.1%	-0.7%	-0.2%	-0.3%	-0.5%	-0.6%	-0.7%	-1.0%	-1.4%	-1.6%	-2.5%	-1.0%	1.2%
PCBs	kg	0.0%	0.0%	0.0%	-0.1%	0.2%	-0.6%	-0.3%	-0.2%	-1.1%	-0.9%	-0.1%	-0.2%	-0.3%	-0.6%	-0.6%	-1.4%	-2.8%	-5.9%
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			0.0%	0.0%	-0.2%	-0.8%	-0.3%	-0.4%	-0.8%	-0.7%	-0.4%	-0.3%	-0.3%	-0.6%	-0.2%	-0.4%	-1.9%	-2.1%
PM10	Gg			0.0%	0.0%	-0.2%	-0.8%	-0.3%	-0.4%	-0.8%	-0.7%	-0.4%	-0.3%	-0.3%	-0.6%	-0.2%	-0.4%	-1.9%	-2.0%
TSPs	Gg			0.1%	0.0%	-0.2%	-0.7%	-0.3%	-0.4%	-0.8%	-0.7%	-0.4%	-0.3%	-0.3%	-0.6%	-0.2%	-0.4%	-2.0%	-2.2%
BC	Gg			0.1%	-0.1%	-0.1%	-0.8%	-0.2%	-0.3%	-0.9%	-0.9%	-0.5%	-0.6%	-0.3%	-0.7%	-0.1%	-0.2%	-1.3%	-2.0%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.8b** Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions for the commercial, institutional and households sector group

Relative difference Commercial, institutional and households																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	-2	-4	-3	-9	-3	-8	-8	-8	-9	-9	-4	-7	-7	-9	-8	-10	-12	-12
NMVOcs	Gg	0	-1	1	1	-9	-17	-10	-8	-13	-8	1	6	6	3	9	16	2	-1
SOx	Gg	-1	-2	-2	-5	0	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-4
NH3	Gg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO	Gg	-6	-8	3	1	-26	-63	-21	-15	-46	-27	11	28	35	21	59	51	-45	-91
Pb	Mg	0	0	0	0	-1	-1	-1	0	-1	-1	0	0	0	0	1	1	0	-2
Cd	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr	Mg	0	0	0	0	0	-1	0	0	-1	0	0	0	0	0	0	0	0	0
Cu	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ni	Mg	0	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2
Se	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zn	Mg	-1	-1	0	-1	-1	-3	-1	-1	-2	-2	0	0	1	0	2	0	-3	-7
Total PAHs	Mg	-1	-1	0	0	0	-1	0	-1	-1	-1	-1	-1	-1	-1	0	-4	-8	-9
PCDD/Fs	g I-TEQ	-2	-2	0	0	2	-1	0	-2	-3	-5	-4	-5	-5	-7	-6	-14	-21	-24
B(a)P	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-2	-3
B(b)F	Mg	-1	0	0	0	0	-1	0	0	0	0	0	0	0	0	-1	0	-2	-3
B(k)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1
IP	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-2
HCb	kg	1	2	6	9	-1	0	0	0	0	0	0	0	0	0	0	0	-1	0
PCBs	kg	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	-1	-2	-3
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			0	0	-2	-8	-4	-4	-8	-7	-4	-3	-3	-6	-2	-4	-15	-15
PM10	Gg			0	0	-3	-8	-4	-5	-8	-8	-4	-3	-3	-6	-2	-4	-16	-16
TSPs	Gg			1	0	-2	-9	-4	-5	-9	-8	-4	-4	-3	-6	-2	-4	-17	-18
BC	Gg			0	0	-1	0	0	-1	-1	0	-1	0	-1	0	0	0	-1	-1

#### 4.5 Road transport sector

The road transport sector group is the primary sector group for NO<sub>x</sub>, Pb, BC and CO emissions (Figure 4.9 and Figure 4.10).

In absolute terms, France, Germany, Italy and Spain reported the highest emissions for NO<sub>x</sub>, Pb and BC in the road transport sector during the current reporting cycle. Germany, Poland and Italy contributed most to CO emissions in the road transport sector.

In this sector, NO<sub>x</sub> emissions have decreased since 1990 by 71% and since 2005 by 59%. The main source of NO<sub>x</sub> emissions in this sector group is category 1A3bi 'Road transport: Passenger cars'. CO emissions have decreased by 91% since 1990 and by 73% since 2005 in the road transport sector. Category 1A3bi 'Road transport: Passenger cars' is also the main source of CO emissions, with a share of 75% of CO emissions during the current reporting cycle.

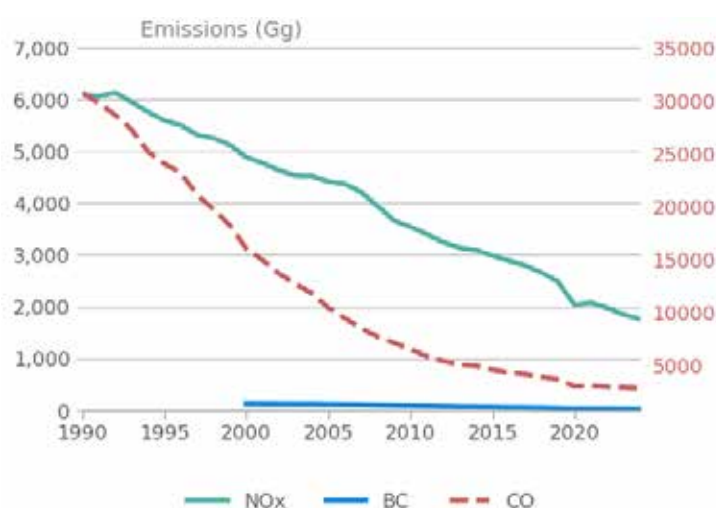
Since 1990, BC emissions from this sector have decreased by 76% and since 2005 by 72%. The main reasons for the decline of these pollutants in this sector are the introduction of Euro standards (EU, 2007) as well as the regulation of the catalytic-converter (EU, 1991).

The main HM for the road transport sector is Pb, which shows a high relative reduction in emissions (98%) since 1990 and since 2005 (4%) (Figure 4.10). However, between the two latest reporting cycles, the Pb emissions increased by 11%. A major increase is seen for Spain in the road traffic sector for passenger cars, which may explain a part of this increase.

The promotion of unleaded petrol in the EU and other EEA member countries, by means of a combination of fiscal and regulatory measures, has been a success story. For example, EU Member States have completely phased out the use of leaded petrol. Directive 98/70/EC on the quality of petrol and diesel fuels (EU, 2009) achieved that objective. Nevertheless, the road transport sector remains a key source of Pb, contributing around 30% of total Pb emissions in the EU.

Table 4.9 shows the recalculations within the road transport sector group. For explanations of EU recalculations, see Section 5.1.

**Figure 4.9 EU emission trends in the road transport sector group for NO<sub>x</sub>, BC and CO since 1990 (or 2000 for BC)**



**Note:** In the left-hand panel the right-hand axis shows values for CO.

Figure 4.10 EU emission trend in the road transport sector group for Pb since 1990

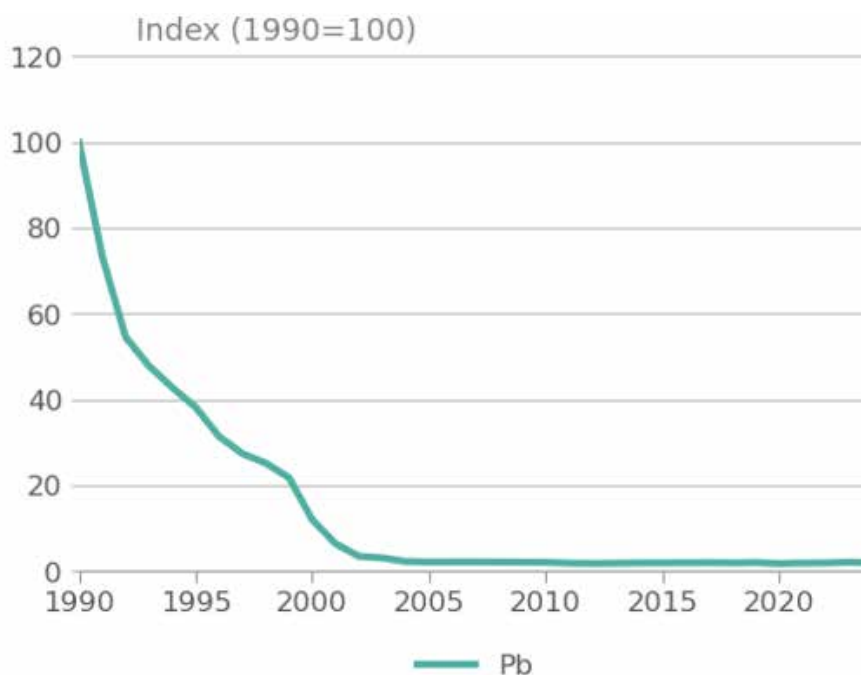


Table 4.9a Relative difference (relative data, percentage of EU national totals) between reported emissions when comparing the EU's 2024 and 2025 submissions for the road transport sector group

Relative difference Road transport																				
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
NOx	Gg	-0.4%	-1.2%	-0.7%	0.4%	1.1%	0.8%	1.5%	1.8%	3.4%	2.3%	3.0%	3.1%	3.1%	2.8%	3.1%	4.2%	3.8%	3.1%	
NMVOcs	Gg	0.1%	-0.8%	-0.2%	1.3%	0.8%	0.5%	0.7%	0.4%	5.3%	2.9%	2.6%	3.2%	4.3%	2.1%	3.4%	3.4%	3.7%	3.4%	
SOx	Gg	0.1%	0.0%	0.9%	0.1%	0.7%	0.4%	0.9%	0.3%	1.0%	0.2%	0.6%	0.3%	0.1%	0.0%	0.2%	0.2%	0.3%	0.1%	
NH3	Gg	0.4%	0.6%	1.4%	1.1%	3.3%	2.9%	4.0%	3.4%	6.0%	3.0%	3.8%	3.9%	4.6%	4.1%	4.8%	4.1%	3.7%	2.4%	
CO	Gg	0.1%	-1.0%	-0.8%	1.1%	1.2%	1.0%	1.7%	1.4%	7.2%	3.0%	2.9%	3.2%	3.7%	0.1%	1.9%	3.3%	4.4%	3.7%	
Pb	Mg	0.7%	0.1%	2.3%	14.9%	18.5%	18.6%	20.3%	19.3%	20.1%	19.2%	20.8%	19.5%	20.9%	19.7%	20.7%	19.7%	18.7%	15.0%	
Cd	Mg	11.8%	11.0%	11.9%	10.7%	12.2%	11.5%	13.0%	12.4%	13.1%	12.2%	13.5%	12.7%	13.5%	12.7%	13.9%	12.6%	12.3%	10.6%	
Hg	Mg	0.2%	0.0%	0.9%	0.6%	0.9%	0.2%	0.9%	0.2%	1.3%	-0.2%	0.5%	0.2%	0.3%	-0.1%	0.5%	0.3%	0.5%	-0.1%	
As	Mg	13.4%	12.8%	13.3%	12.5%	12.9%	13.0%	13.7%	14.6%	14.6%	14.2%	15.2%	14.6%	14.9%	14.5%	15.5%	15.3%	13.1%	11.8%	
Cr	Mg	17.6%	17.1%	17.1%	15.1%	16.0%	16.1%	17.1%	17.6%	17.4%	17.4%	18.2%	17.8%	18.0%	17.8%	17.8%	17.8%	17.8%	16.2%	14.5%
Cu	Mg	17.8%	17.1%	17.3%	15.7%	16.9%	16.9%	18.0%	18.4%	18.2%	18.1%	18.9%	18.5%	18.8%	18.6%	18.6%	18.3%	16.8%	15.2%	
Ni	Mg	9.0%	12.1%	12.7%	11.2%	12.6%	12.1%	13.4%	13.4%	13.8%	13.3%	14.3%	13.6%	14.3%	13.7%	14.6%	13.7%	13.1%	11.2%	
Se	Mg	9.8%	8.8%	9.7%	8.2%	9.8%	9.3%	10.6%	10.2%	10.9%	10.2%	11.4%	10.7%	11.6%	10.5%	12.1%	10.9%	10.7%	8.4%	
Zn	Mg	9.4%	8.8%	9.3%	8.2%	9.1%	8.9%	9.7%	9.9%	10.1%	9.7%	10.5%	10.0%	10.4%	10.0%	10.7%	10.4%	9.1%	7.6%	
Total PAHs	Mg	3.3%	2.8%	2.1%	-1.5%	-2.4%	-2.4%	-1.5%	-1.6%	-0.9%	-1.8%	-1.2%	-1.8%	-1.5%	-1.8%	-1.7%	-1.4%	-1.8%	-2.0%	
PCDD/Fs	g I-TEQ	1.0%	1.1%	3.0%	2.4%	3.3%	2.7%	3.3%	3.0%	4.0%	2.9%	3.1%	2.5%	2.9%	1.7%	1.6%	3.1%	2.7%	2.0%	
B(a)P	Mg	4.1%	4.7%	4.6%	-0.7%	-0.7%	-0.8%	0.6%	0.3%	1.2%	-0.4%	0.1%	-0.3%	0.4%	0.0%	1.0%	1.1%	0.8%	0.5%	
B(b)F	Mg	2.5%	1.4%	0.5%	-2.3%	-3.4%	-3.4%	-2.7%	-2.8%	-2.2%	-2.9%	-2.2%	-2.8%	-2.6%	-2.9%	-3.0%	-2.6%	-3.1%	-3.3%	
B(k)F	Mg	2.4%	3.7%	3.2%	0.2%	-1.8%	-1.6%	-1.2%	-1.0%	-0.7%	-0.7%	0.1%	-0.8%	-0.9%	-0.8%	-1.2%	-0.9%	-1.4%	-1.4%	
IP	Mg	4.7%	2.0%	0.7%	-3.4%	-3.3%	-3.4%	-2.2%	-2.5%	-1.5%	-3.1%	-2.5%	-3.1%	-2.5%	-3.2%	-2.9%	-2.8%	-3.2%	-3.5%	
HCb	kg	-14.5%	-17.8%	-22.1%	-21.0%	-19.2%	-19.2%	-19.0%	-18.9%	-18.4%	-17.8%	-18.0%	-18.0%	-17.9%	-17.9%	-18.3%	-18.5%	-18.3%	-18.1%	
PCBs	kg	2.9%	0.0%	6.0%	0.0%	3.7%	0.0%	3.8%	0.0%	4.0%	0.0%	3.5%	0.0%	3.5%	0.0%	3.5%	0.0%	3.7%	-1.6%	
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
PM2.5	Gg			1.2%	2.1%	2.5%	2.3%	3.1%	3.3%	5.2%	4.1%	4.8%	4.8%	5.2%	4.0%	4.7%	5.5%	5.2%	4.3%	
PM10	Gg			2.4%	3.4%	4.3%	4.0%	4.9%	5.1%	6.6%	5.3%	6.0%	6.2%	6.8%	5.6%	6.2%	6.8%	6.2%	5.5%	
TSPs	Gg			2.1%	2.6%	3.5%	3.0%	4.0%	4.0%	5.1%	3.7%	4.4%	4.6%	5.2%	4.0%	4.6%	5.1%	4.4%	3.7%	
BC	Gg			0.2%	0.7%	1.0%	0.7%	1.4%	1.4%	3.3%	2.0%	2.7%	2.7%	3.0%	2.0%	2.5%	4.2%	3.9%	3.1%	

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.9b Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions for the road transport sector group**

Relative difference Road transport																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	-27	-70	-35	16	39	27	47	55	103	67	83	83	79	68	61	84	72	55
NMVOCs	Gg	5	-30	-6	20	7	4	5	3	34	18	15	18	22	11	15	14	16	14
SOx	Gg	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH3	Gg	0	0	1	1	2	2	2	2	3	1	2	2	2	2	2	2	2	1
CO	Gg	33	-234	-126	114	79	59	87	67	329	133	122	127	135	4	54	95	122	101
Pb	Mg	107	8	44	47	54	49	51	51	54	52	57	54	56	55	51	52	51	45
Cd	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	Mg	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
Cr	Mg	10	11	12	13	14	14	15	15	16	16	16	16	17	17	15	16	15	14
Cu	Mg	217	235	268	286	315	316	323	329	338	343	358	355	366	364	323	341	324	299
Ni	Mg	2	2	2	2	2	2	2	2	3	3	3	3	3	3	2	3	3	2
Se	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zn	Mg	52	55	65	67	75	74	78	80	83	81	89	86	90	87	82	87	79	67
Total PAHs	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCDD/Fs	g I-TEQ	1	1	3	3	4	3	4	3	4	3	3	2	2	1	1	2	1	1
B(a)P	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(b)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(k)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IP	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCB	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCBs	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			3	5	5	4	5	5	7	6	6	6	6	5	5	6	5	4
PM10	Gg			8	10	11	9	11	11	13	11	12	12	13	10	10	11	10	9
TSPs	Gg			8	10	11	9	11	11	14	10	12	12	14	11	11	12	11	9
BC	Gg			0	1	1	1	1	1	2	1	2	2	2	1	1	2	1	1

#### 4.6 Non-road transport sector

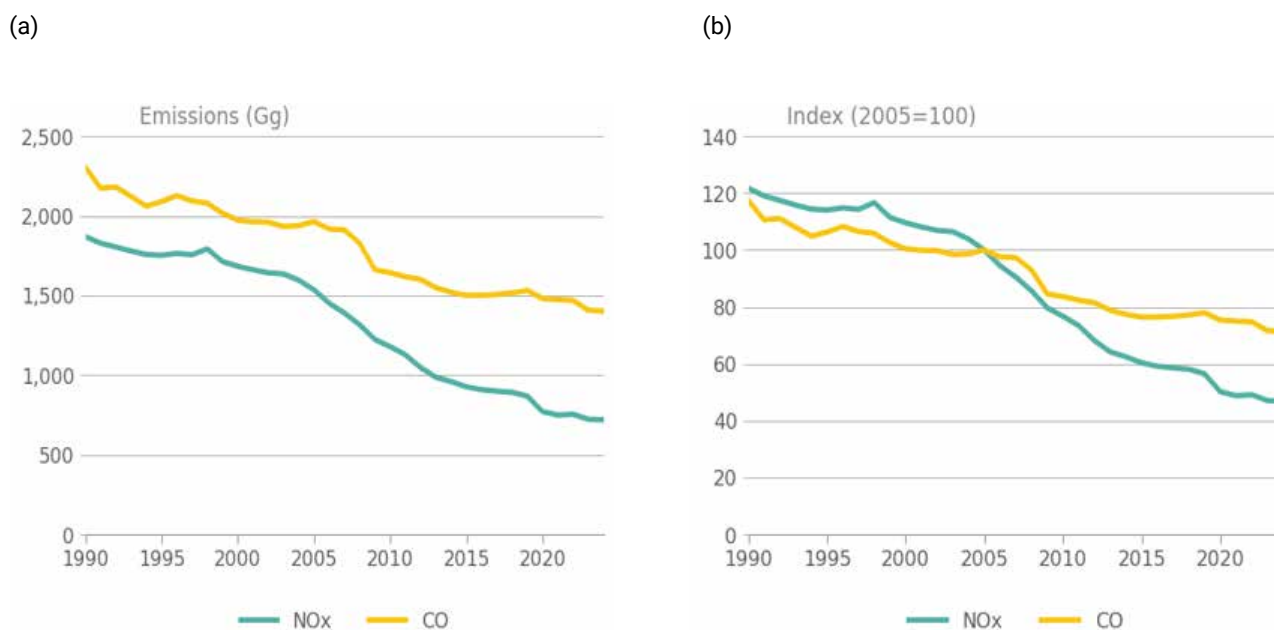
In this report, emissions from international/domestic aviation and shipping are reported as a simple sum of the emissions from each of the EU Member States. Accordingly, emissions from international/domestic aviation and shipping are not divided into those occurring within the EU and those that cross its geographical boundaries. However, as the guidelines (UNECE, 2022b) define international emissions as those that start in one country and finish in another, the reporting matches the guidelines.

The non-road transport sector is not a key sector for any pollutant but is a source of NO<sub>x</sub> and CO emissions (Figure 4.11). Within the non-road transport sector group, NO<sub>x</sub> is the most relevant pollutant.

As the non-road transport sector group does not contribute very much to HM and POP emissions, trends in pollutants from these two pollutant groups are not shown.

Table 4.10 shows the recalculations within the non-road transport sector group. For explanations of EU recalculations, see Section 5.1.

**Figure 4.11 (a) EU emission trend and (b) indexed EU-emission trend in the non-road transport sector group for NO<sub>x</sub> since 1990**



**Table 4.10a** Relative difference (relative data, percentage of EU national totals) between reported emissions when comparing the EU's 2024 and 2025 submissions for the non-road transport sector group

Relative difference Non-road transport																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	1.4%	-0.6%	1.2%	-0.4%	1.3%	-0.2%	1.6%	0.3%	1.5%	0.5%	2.2%	1.1%	3.5%	1.2%	3.2%	1.2%	4.3%	0.6%
NMVOcs	Gg	-0.6%	-0.8%	-0.4%	-0.3%	-4.1%	-3.8%	-2.1%	-2.0%	-1.4%	-1.8%	-1.1%	-0.8%	-0.4%	-0.9%	-0.4%	-1.0%	-0.1%	-1.5%
SOx	Gg	5.9%	3.5%	8.7%	4.3%	5.3%	4.0%	11.8%	9.2%	10.5%	7.5%	11.2%	6.2%	15.4%	5.5%	11.5%	3.8%	12.3%	3.3%
NH3	Gg	-0.5%	-0.5%	-0.5%	-0.7%	-1.1%	-0.9%	-1.0%	-0.7%	-0.6%	-0.7%	-0.7%	-0.5%	-1.1%	-1.4%	-2.4%	-2.0%	-2.5%	-3.7%
CO	Gg	0.0%	-0.2%	-0.4%	-0.5%	-8.4%	-8.3%	-7.6%	-7.8%	-7.1%	-7.2%	-6.6%	-5.4%	-4.7%	-4.3%	-3.4%	-3.2%	-2.7%	-3.5%
Pb	Mg	0.0%	0.3%	0.4%	-1.1%	0.1%	-0.6%	0.1%	-0.3%	-0.1%	-0.7%	-0.6%	-1.0%	-0.4%	-1.0%	-0.1%	-1.2%	-0.2%	-0.8%
Cd	Mg	0.7%	-2.0%	1.0%	-2.1%	-4.0%	-6.6%	-5.1%	-7.3%	-6.9%	-7.8%	-5.1%	-5.9%	-3.0%	-6.1%	-4.9%	-5.9%	-3.2%	-6.6%
Hg	Mg	11.9%	4.6%	15.0%	4.9%	13.8%	5.3%	13.0%	5.9%	9.4%	5.6%	10.7%	5.6%	13.0%	6.0%	13.8%	6.1%	15.2%	6.3%
As	Mg	18.4%	11.1%	22.4%	12.8%	14.1%	10.1%	15.0%	9.5%	12.8%	7.4%	15.6%	5.6%	22.1%	5.5%	20.1%	3.8%	21.2%	3.2%
Cr	Mg	-2.4%	-3.3%	-3.8%	-4.5%	-5.1%	-5.3%	-4.9%	-5.3%	-4.7%	-4.8%	-4.7%	-4.8%	-4.1%	0.4%	0.3%	-0.1%	1.2%	1.6%
Cu	Mg	0.7%	0.2%	-0.9%	-1.4%	-4.5%	-3.7%	-3.4%	-3.3%	-3.2%	-3.5%	-3.5%	-4.4%	-3.9%	-2.9%	0.9%	0.5%	-5.5%	-5.4%
Ni	Mg	7.8%	4.3%	8.1%	3.1%	3.1%	1.2%	2.9%	0.6%	1.5%	-0.4%	2.6%	-0.5%	7.0%	2.8%	9.1%	1.8%	10.7%	2.3%
Se	Mg	9.5%	3.7%	10.0%	2.6%	5.9%	1.2%	5.5%	1.0%	2.7%	0.3%	4.3%	0.3%	6.9%	0.3%	5.2%	-0.5%	6.7%	-1.4%
Zn	Mg	-3.9%	-6.7%	-4.0%	-4.9%	-6.8%	-9.8%	-8.1%	-10.5%	-9.9%	-10.7%	-8.0%	-8.4%	-6.2%	-8.8%	-7.4%	-8.2%	-6.1%	-8.6%
Total PAHs	Mg	1.2%	-6.7%	-11.3%	-9.5%	-8.1%	-7.0%	-6.5%	-6.0%	-5.2%	-5.1%	-4.2%	-0.8%	-3.5%	-3.2%	-4.3%	-3.7%	-2.9%	-2.7%
PCDD/Fs	g I-TEQ	1.0%	-0.6%	-0.3%	-1.7%	-2.1%	-2.0%	-0.9%	-1.8%	-1.3%	-2.2%	-1.1%	-2.3%	0.0%	-1.4%	-1.0%	-2.8%	-0.9%	-3.2%
B(a)P	Mg	-4.2%	-7.8%	-10.0%	-8.0%	-7.5%	-6.2%	-5.8%	-5.3%	-4.4%	-4.4%	-3.6%	-2.9%	-2.9%	-2.2%	-3.7%	-2.5%	-1.8%	-1.5%
B(b)F	Mg	1.2%	-8.4%	-14.2%	-12.0%	-9.6%	-8.0%	-7.9%	-8.0%	-7.3%	-7.1%	-6.2%	-6.1%	-5.6%	-5.8%	-6.0%	-5.8%	-5.4%	-5.6%
B(k)F	Mg	17.3%	1.8%	-6.4%	-6.7%	-6.5%	-6.4%	-5.6%	-4.8%	-4.2%	-4.6%	-3.2%	-2.8%	-2.5%	-2.6%	-4.4%	-3.5%	-1.9%	-1.9%
IP	Mg	-10.4%	-14.6%	-15.9%	-12.8%	-10.7%	-9.2%	-7.9%	-6.1%	-4.4%	-4.2%	-3.3%	-1.2%	-1.0%	0.5%	-2.0%	-0.7%	1.0%	2.2%
HCb	kg	5.2%	1.6%	5.2%	1.1%	3.7%	1.1%	3.5%	0.9%	1.9%	0.5%	2.5%	0.2%	3.8%	0.4%	3.1%	-0.4%	3.7%	-0.4%
PCBs	kg	5.6%	2.3%	4.8%	0.4%	6.4%	4.6%	7.8%	5.1%	6.7%	3.7%	7.7%	3.1%	12.0%	3.0%	10.6%	1.9%	11.5%	1.8%
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-2.1%	-2.3%	-1.8%	-1.7%	-0.8%	-1.4%	-0.9%	-2.4%	-1.7%	-2.5%	-1.2%	-2.5%	0.3%	-2.2%	-1.5%	-6.3%
PM10	Gg			-2.4%	-2.7%	-2.1%	-2.1%	-1.1%	-1.7%	-1.2%	-2.5%	-1.9%	-2.7%	-1.2%	-2.4%	0.5%	-1.9%	-1.5%	-6.2%
TSPs	Gg			-1.8%	-2.2%	-1.9%	-1.8%	-0.9%	-1.5%	-1.1%	-2.4%	-1.9%	-2.6%	-1.4%	-2.5%	0.3%	-1.9%	-2.3%	-6.6%
BC	Gg			-2.1%	-1.8%	-2.2%	-1.3%	-1.1%	-0.7%	-0.2%	-1.4%	-1.8%	-1.6%	-2.6%	-2.4%	-0.5%	-1.0%	-3.0%	-6.8%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.10b** Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions for the non-road transport sector group

Relative difference Non-road transport																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	26	-10	19	-6	15	-3	17	3	14	4	20	10	30	10	24	9	31	4
NMVOcs	Gg	-3	-4	-2	-1	-11	-10	-5	-4	-3	-4	-2	-2	-1	-2	-1	-2	0	-2
SOx	Gg	22	11	20	8	5	3	9	6	7	5	7	5	12	5	3	1	3	1
NH3	Gg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO	Gg	-1	-3	-7	-9	-151	-147	-131	-131	-116	-117	-105	-86	-75	-69	-52	-49	-41	-51
Pb	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cd	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr	Mg	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
Cu	Mg	2	1	-2	-4	-12	-10	-9	-8	-8	-9	-9	-12	-11	-8	2	1	-15	-15
Ni	Mg	9	5	8	3	3	1	2	1	1	0	2	0	6	3	7	1	8	2
Se	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zn	Mg	-1	-2	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-1	-2	-2	-2	-1	-2
Total PAHs	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCDD/Fs	g I-TEQ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(a)P	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(b)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(k)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IP	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCb	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCBs	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-3	-3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-2
PM10	Gg			-4	-3	-2	-2	-1	-1	-1	-1	-2	-1	-2	-1	0	-1	-1	-3
TSPs	Gg			-3	-3	-2	-2	-1	-1	-1	-2	-1	-2	-1	-2	0	-1	-1	-3
BC	Gg			-1	-1	-1	0	0	0	0	0	0	0	-1	0	0	0	0	-1

#### 4.7 Agriculture sector

This sector group is responsible for 94% of NH<sub>3</sub> emissions in the EU. With regard to the size of the absolute values that the countries reported, France, Germany, Spain and Italy contributed most to NH<sub>3</sub> emissions in the current reporting cycle. In addition, the agriculture sector produces considerable emissions of NMVOCs, PM<sub>10</sub> and NO<sub>x</sub>.

Agricultural emissions of NH<sub>3</sub> have fallen by 37% since 1990 and by 16% since 2005 (Figure 4.12). France, which represents 17% of NH<sub>3</sub> emissions from the agricultural sector in the EU for the current reporting cycle, reports that the decrease in NH<sub>3</sub> emissions are mainly caused by a reduction in the use of mineral fertilizer and manure spreading and a drop in livestock numbers (France's IIR 2024).

Germany represents also 17% of NH<sub>3</sub> emissions from the agricultural sector in the EU. The main drivers for the historical reduction of NH<sub>3</sub> emissions in this category is the reduced number of livestock in Germany following the German reunification. Germany's NH<sub>3</sub> emissions in Manure Management (NFR 3.B) and Agricultural Soils (NFR 3.D) have reduced markedly since 1990 (Germany's IIR 2024).

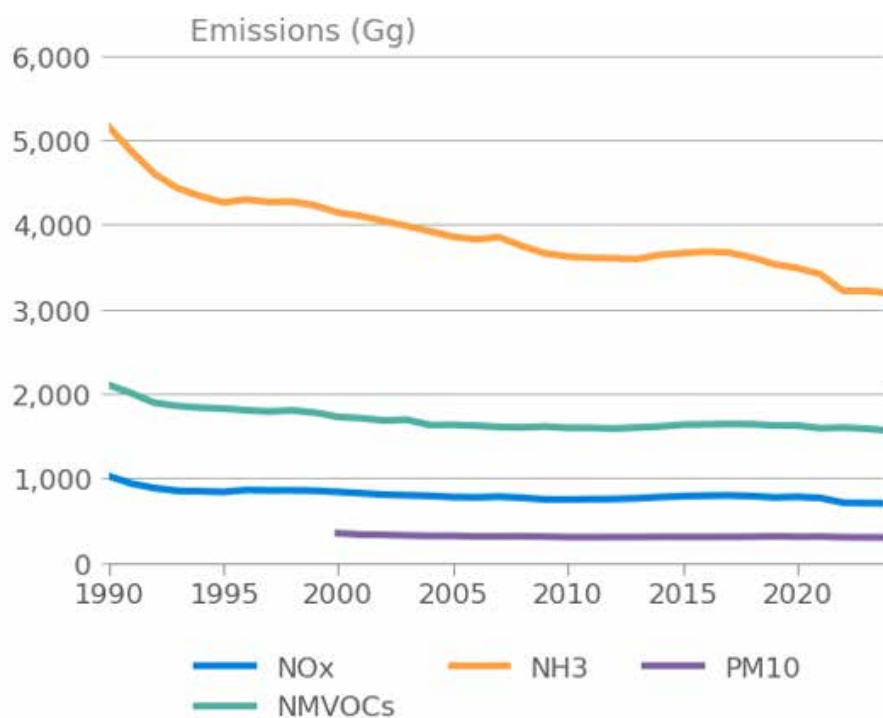
Spain represents 13% of NH<sub>3</sub> emissions from the agricultural sector for the current reporting cycle. The introduction of fertilization practices with NH<sub>3</sub> abatement measures from 2004 onwards and improvements in animal feed formulations, as well as the enforcement of animal welfare legislation affecting laying hens since 2010 have led to decreases in NH<sub>3</sub> emissions (Spain's IIR 2024).

Manure management (categories 3B1a and 3B1b) is the main source of NMVOC emissions in the agriculture sector. For PM<sub>10</sub> emissions in this sector the primary source is farm-level agricultural operations including storage, handling and transport of agricultural products (3Dc). NO<sub>x</sub> emissions arise especially in categories 3Da1 (Inorganic N-fertilizers (includes also urea application)), 3Da2a (Animal manure applied to soils) and 3Da3 (Urine and dung deposited by grazing animals).

Historically, agriculture has been a major source of HCB (Figure 4.13). Due to the banning of certain pesticides, HCB emissions from agriculture are now only 5%.

Table 4.11 presents the number of EU Member States reporting the notation keys 'NA', 'NO', 'NR' and 'NE' within the key categories. Table 4.12 shows the recalculations within the agriculture sector group. For explanations of EU recalculations, see Section 5.1.

**Figure 4.12 EU emission trends in the agriculture sector group for NH<sub>3</sub>, PM<sub>10</sub>, NMVOCs and NO<sub>x</sub> since 1990 (or 2000 for PM10)**



**Figure 4.13 EU emission trends in the agriculture sector group for HCB since 1990**



**Table 4.11** Number of EU Member States reporting notation keys within the key categories of the agriculture sector group

Key categories		NA	NO	NR	NE
NMVOC	3Da2a	0	0	0	1
HCB	3Df	1	2	0	2

Note: Only the key categories where notation keys were reported are considered.

**Table 4.12a** Relative difference (relative data, percentage of EU national totals) between reported emissions when comparing the EU's 2024 and 2025 submissions (relative data, percentage of EU national totals) for the agriculture sector group

		Relative difference Agriculture																	
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	2.5%	1.8%	1.4%	1.4%	1.5%	1.5%	1.5%	1.5%	1.6%	1.7%	1.7%	1.5%	1.5%	1.9%	2.1%	2.2%	2.6%	2.5%
NMVOCs	Gg	-2.9%	-1.5%	-1.7%	-2.1%	-2.7%	-2.9%	-3.0%	-3.2%	-3.2%	-3.4%	-3.3%	-3.5%	-3.6%	-3.8%	-3.9%	-4.2%	-4.3%	-4.5%
SOx	Gg	1.0%	0.4%	1.4%	1.8%	2.1%	2.0%	2.5%	1.8%	3.0%	2.6%	2.3%	4.2%	2.0%	4.6%	2.5%	3.9%	5.6%	5.4%
NH3	Gg	1.7%	1.6%	1.2%	1.0%	0.6%	0.4%	0.4%	0.4%	0.5%	0.3%	0.5%	0.4%	0.5%	0.8%	0.9%	1.0%	1.0%	0.7%
CO	Gg	0.7%	0.3%	1.0%	1.3%	1.5%	1.5%	1.9%	1.3%	2.2%	2.0%	1.7%	3.1%	1.5%	3.4%	1.8%	2.9%	4.2%	3.9%
Pb	Mg	0.8%	0.3%	0.8%	0.6%	0.6%	0.7%	0.9%	0.6%	1.1%	1.0%	0.9%	1.6%	0.8%	1.9%	1.0%	1.5%	2.1%	2.1%
Cd	Mg	1.1%	0.5%	1.5%	2.2%	2.4%	2.4%	2.9%	2.0%	3.5%	3.0%	2.6%	4.7%	2.3%	5.2%	2.8%	4.7%	6.7%	6.8%
Hg	Mg	0.9%	0.4%	1.4%	2.2%	2.4%	2.3%	2.9%	2.0%	3.4%	3.0%	2.6%	4.6%	2.2%	5.1%	2.8%	4.7%	6.6%	6.6%
As	Mg	0.4%	0.2%	0.4%	0.3%	0.3%	0.3%	0.4%	0.3%	0.6%	0.5%	0.4%	0.7%	0.4%	0.8%	0.4%	0.7%	1.6%	0.2%
Cr	Mg	0.6%	0.3%	1.0%	1.5%	1.8%	1.7%	2.1%	1.5%	2.5%	2.2%	1.9%	3.4%	1.6%	3.7%	2.0%	3.3%	5.0%	4.3%
Cu	Mg	0.8%	0.3%	1.1%	1.0%	1.2%	1.2%	1.6%	1.1%	1.9%	1.7%	1.4%	2.6%	1.3%	2.9%	1.5%	2.5%	3.6%	3.3%
Ni	Mg	1.0%	0.4%	1.4%	1.9%	2.2%	2.0%	2.6%	1.8%	3.1%	2.7%	2.3%	4.1%	2.0%	4.5%	2.4%	4.0%	5.9%	5.4%
Se	Mg	0.5%	0.2%	0.8%	0.9%	1.1%	1.0%	1.3%	1.0%	1.7%	1.4%	1.2%	2.2%	1.1%	2.4%	1.3%	2.1%	3.3%	2.6%
Zn	Mg	0.3%	0.1%	0.3%	0.1%	0.0%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.2%	0.1%	0.2%	0.1%	0.2%	0.4%	0.3%
Total PAHs	Mg	1.9%	2.2%	4.6%	16.1%	33.6%	33.3%	33.2%	36.9%	36.5%	32.1%	42.4%	50.5%	44.0%	47.4%	45.8%	46.5%	49.5%	49.2%
PCDD/Fs	g I-TEQ	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.3%	0.5%	0.2%	0.6%	0.3%	0.5%	0.7%	0.7%
B(a)P	Mg	0.3%	0.1%	0.4%	0.7%	1.4%	1.2%	1.4%	1.1%	1.7%	1.6%	1.6%	2.9%	1.3%	2.9%	1.5%	2.4%	3.3%	2.2%
B(b)F	Mg	0.4%	0.2%	0.6%	0.9%	1.7%	1.6%	1.9%	1.4%	2.4%	2.0%	1.9%	3.5%	1.6%	3.7%	1.9%	2.9%	4.1%	4.0%
B(k)F	Mg	0.4%	0.2%	0.6%	0.8%	1.7%	1.5%	1.9%	1.4%	2.4%	2.0%	1.9%	3.5%	1.6%	3.6%	1.9%	2.9%	4.0%	3.8%
IP	Mg	0.4%	0.1%	0.6%	0.8%	1.7%	1.5%	1.8%	1.3%	2.3%	1.9%	1.9%	3.5%	1.5%	3.5%	1.8%	2.8%	3.9%	3.6%
HCB	kg	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.2%	0.2%	0.3%	0.3%	0.8%	0.2%	0.5%	1.3%	1.7%
PCBs	kg	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-0.4%	-1.1%	-0.8%	-0.9%	-0.7%	-0.9%	-0.4%	-11.2%	-0.2%	-0.1%	-0.2%	0.1%	-0.3%	0.1%	0.2%	-0.1%
PM10	Gg			-1.7%	-1.8%	-1.6%	-1.5%	-1.5%	-1.5%	-1.3%	-1.3%	-1.2%	-1.3%	-1.4%	-1.2%	-1.6%	-1.3%	-1.3%	-2.0%
TSPs	Gg			-12.2%	-11.6%	-10.6%	-10.3%	-9.9%	-9.6%	-9.1%	-7.6%	-7.8%	-8.3%	-8.8%	-8.0%	-10.1%	-8.1%	-9.1%	-10.0%
BC	Gg			0.6%	0.6%	0.6%	0.7%	0.9%	0.7%	1.2%	1.0%	0.9%	1.7%	0.8%	1.9%	1.0%	1.6%	2.2%	2.1%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.12b Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions (relative data, percentage of EU national totals) for the agriculture sector group**

		Relative difference Agriculture																		
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
NOx	Gg	25	15	11	11	11	11	11	11	12	13	13	12	11	15	16	17	18	17	
NMVOCs	Gg	-62	-29	-30	-34	-44	-47	-49	-52	-53	-57	-56	-60	-61	-64	-66	-69	-72	-75	
SOx	Gg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NH3	Gg	88	69	51	37	20	14	15	14	18	12	20	13	18	27	32	35	32	22	
CO	Gg	7	2	4	2	2	2	2	1	2	2	1	2	1	2	1	2	2	2	
Pb	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cd	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hg	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
As	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cr	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cu	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ni	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Se	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Zn	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total PAHs	Mg	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PCDD/Fs	g I-TEQ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B(a)P	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B(b)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B(k)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
IP	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
HCB	kg	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	
PCBs	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
PM2.5	Gg			0	0	0	0	0	0	0	-5	0	0	0	0	0	0	0	0	
PM10	Gg			-6	-6	-5	-5	-4	-5	-4	-4	-4	-4	-4	-4	-5	-4	-4	-6	
TSPs	Gg			-116	-105	-95	-92	-89	-86	-82	-69	-71	-76	-80	-73	-91	-73	-81	-89	
BC	Gg			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

#### 4.8 Waste sector

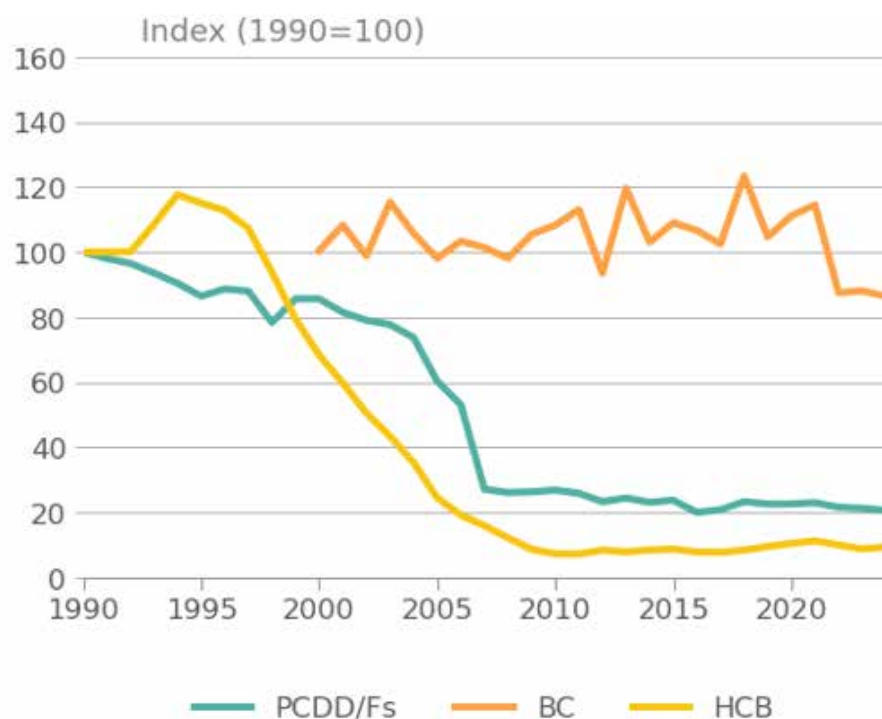
This sector group is a primary source of PCDD/Fs and BC and a significant source of HCB (Figure 4.14). With regard to the size of the absolute values that the countries reported, Spain and Romania contributed most to PCDD/F emissions during the current reporting cycle. For BC emissions, Spain with a share of 66% is the main contributor within this sector. For HCB emissions in this sector, the main contributor is Slovakia, with a share of 59%.

The decrease in PCDD/F emissions in the waste sector in the EU (66% since 1990 and 48% since 2005) is led by a decreasing trend in category 'Clinical waste incineration'. Other influencing factors have been the introduction of municipal waste incineration plants with energy recovery (1A1a) and a progressive reduction in the amount of clinical waste incinerated (5C1biii) (Portugal's and Spain's IIRs 2024).

BC emissions have decreased by 17% since 2000 and by 14% since 2005. Open burning of waste (category 5C2) is the most important subcategory with regard to BC emissions.

Table 4.13 presents the number of EU Member States reporting the notation keys 'NA', 'NO', 'NR' and 'NE' within the key categories. Table 4.14 shows the recalculations within the waste sector group. For explanations of EU recalculations, see Section 5.1.

**Figure 4.14** EU emission trends in the waste sector group for the PCDD/Fs and BC since 1990 (or 2000 or BC)



**Table 4.13** Number of EU Member States reporting notation keys within the key categories of the waste sector group

Key categories		NA	NO	NR	NE
PCB	5C1bi	5	10	0	2
Hg	5C1biii	0	9	0	0
dioxin	5C1biii	0	9	0	0
HCB	5C1biii	0	9	0	0
Hg	5C1bv	0	1	0	0
PM2.5	5C2	0	4	0	3
PM10	5C2	0	4	0	3
BC	5C2	0	3	2	4
CO	5C2	0	4	0	3
Cd	5C2	0	5	0	3
dioxin	5C2	0	4	0	3

Note: Only the key categories where notation keys were reported are considered.

**Table 4.14a** Relative difference (relative data, percentage of EU national totals) between reported emissions when comparing the EU's 2024 and 2025 submissions for the waste sector group

Relative difference Waste																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	-26.6%	-20.4%	-30.7%	-30.8%	-32.1%	-34.0%	-28.3%	-35.3%	-31.0%	-34.1%	-32.5%	-33.3%	-35.4%	-33.2%	-34.0%	-35.1%	-28.9%	-30.2%
NMVOcs	Gg	-11.1%	-9.1%	-10.9%	-10.1%	-8.8%	-9.8%	-6.2%	-10.7%	-7.6%	-9.7%	-8.2%	-9.5%	-11.1%	-9.8%	-10.1%	-11.4%	-7.9%	-5.2%
SOx	Gg	-5.9%	-4.5%	-13.7%	-14.6%	-21.5%	-23.4%	-17.3%	-24.6%	-20.4%	-23.8%	-21.1%	-23.5%	-25.9%	-22.9%	-24.8%	-25.5%	-19.4%	-20.2%
NH3	Gg	0.0%	0.0%	0.1%	0.1%	0.3%	0.5%	0.5%	0.4%	0.6%	0.6%	0.8%	0.5%	0.8%	0.4%	0.8%	1.3%	1.4%	1.6%
CO	Gg	-26.3%	-19.7%	-29.2%	-28.1%	-29.1%	-31.0%	-25.2%	-32.4%	-27.5%	-30.7%	-29.0%	-29.9%	-32.5%	-29.9%	-31.5%	-32.4%	-26.0%	-26.1%
Pb	Mg	-2.5%	-1.4%	-8.2%	-17.8%	-31.3%	-33.3%	-33.0%	-32.3%	-30.3%	-31.9%	-32.9%	-33.8%	-32.3%	-29.4%	-29.5%	-32.8%	-28.9%	-34.7%
Cd	Mg	-3.3%	0.8%	-5.4%	-21.5%	-40.5%	-41.0%	-43.5%	-37.1%	-36.7%	-38.2%	-36.8%	-37.8%	-37.8%	-34.6%	-36.1%	-36.7%	-35.7%	-36.8%
Hg	Mg	0.8%	1.3%	2.3%	0.5%	-2.2%	-2.7%	-4.3%	-1.6%	-0.9%	-2.1%	-1.5%	-2.3%	-1.2%	-0.8%	-1.4%	-2.6%	-1.5%	-1.2%
As	Mg	-4.5%	-1.2%	-6.2%	-4.4%	-5.0%	-6.0%	-3.1%	-7.2%	-4.0%	-5.6%	-4.9%	-4.9%	-7.2%	-5.4%	-6.3%	-6.4%	-3.1%	-1.9%
Cr	Mg	0.2%	2.0%	-0.6%	0.6%	0.7%	0.4%	1.0%	0.3%	1.2%	0.8%	1.0%	1.1%	0.4%	0.7%	0.5%	0.7%	1.4%	6.3%
Cu	Mg	-2.0%	0.8%	-4.4%	-6.2%	-7.3%	-8.4%	-4.5%	-10.0%	-6.4%	-8.5%	-7.8%	-7.9%	-10.3%	-8.2%	-9.2%	-9.9%	-5.8%	0.4%
Ni	Mg	-0.3%	0.7%	0.0%	2.0%	5.0%	5.3%	3.9%	6.3%	6.2%	5.5%	5.3%	6.1%	6.0%	5.9%	6.0%	6.6%	5.7%	12.9%
Se	Mg	-22.0%	-16.7%	-27.0%	-26.2%	-27.1%	-29.0%	-23.4%	-30.3%	-25.7%	-28.7%	-27.1%	-27.8%	-30.7%	-28.1%	-29.5%	-30.5%	-23.9%	-24.6%
Zn	Mg	-19.0%	-15.0%	-26.3%	-26.1%	-27.4%	-29.6%	-23.8%	-31.4%	-26.4%	-29.9%	-28.3%	-29.0%	-31.2%	-28.8%	-30.4%	-32.0%	-25.2%	-23.8%
Total PAHs	Mg	-0.5%	-0.3%	-0.8%	-0.7%	-0.8%	-0.8%	-0.5%	-1.1%	-0.7%	-1.0%	-0.5%	-0.7%	-1.1%	-0.9%	-0.8%	-0.4%	-0.4%	1.6%
PCDD/Fs	g I-TEQ	-1.5%	-6.7%	-13.7%	-7.5%	-32.6%	-34.8%	-41.3%	-30.1%	-31.9%	-33.3%	-42.1%	-41.1%	-38.6%	-35.9%	-37.4%	-38.4%	-37.0%	-36.8%
B(a)P	Mg	-0.8%	-0.7%	-1.0%	-1.1%	-1.0%	-0.9%	-0.7%	-1.1%	-0.7%	-1.0%	-0.3%	-0.6%	-0.9%	-0.8%	-0.7%	-0.6%	-0.3%	2.5%
B(b)F	Mg	-0.5%	-0.3%	-0.7%	-0.8%	-0.7%	-0.7%	-0.5%	-0.9%	-0.6%	-0.8%	-0.4%	-0.6%	-0.8%	-0.7%	-0.6%	-0.7%	-0.4%	1.4%
B(k)F	Mg	-0.9%	-0.6%	-1.3%	-1.3%	-1.4%	-1.5%	-1.0%	-1.9%	-1.2%	-1.6%	-1.0%	-1.3%	-1.8%	-1.5%	-1.5%	-1.7%	-1.0%	-0.1%
IP	Mg	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.5%	10.0%
HCb	kg	-4.0%	-3.6%	-6.1%	-33.8%	-56.8%	-55.6%	-58.8%	-65.3%	-62.0%	-58.9%	-63.5%	-68.8%	-65.8%	-61.7%	-59.8%	-56.0%	-59.3%	-55.8%
PCBs	kg	-16.3%	-16.8%	-22.1%	-25.6%	-35.7%	-27.3%	-23.9%	-35.7%	-31.8%	-40.1%	-16.8%	-15.8%	-25.6%	-25.3%	-23.0%	-16.7%	-20.4%	-15.0%
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-18.8%	-17.1%	-18.4%	-20.1%	-13.6%	-21.8%	-16.6%	-19.7%	-17.9%	-18.5%	-22.0%	-18.4%	-20.6%	-21.4%	-14.5%	-12.7%
PM10	Gg			-18.9%	-17.1%	-17.7%	-19.4%	-12.6%	-21.8%	-16.3%	-19.5%	-17.1%	-18.5%	-21.1%	-18.4%	-20.6%	-21.2%	-13.9%	-12.1%
TSPs	Gg			-18.5%	-16.6%	-17.3%	-19.0%	-12.1%	-21.3%	-15.8%	-19.0%	-16.6%	-18.0%	-20.7%	-17.9%	-20.1%	-20.8%	-13.4%	-11.6%
BC	Gg			-31.0%	-30.3%	-30.9%	-32.6%	-26.8%	-33.7%	-28.9%	-32.5%	-30.9%	-31.7%	-34.0%	-31.4%	-33.1%	-33.7%	-27.9%	-27.0%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 4.14b** Absolute difference between reported emissions when comparing the EU's 2024 and 2025 submissions for the waste sector group

Relative difference Waste																			
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	-17	-9	-21	-20	-23	-26	-16	-28	-20	-24	-22	-22	-30	-22	-26	-27	-16	-16
NMVOcs	Gg	-9	-7	-8	-7	-6	-6	-4	-7	-4	-6	-5	-5	-6	-5	-6	-6	-4	-3
SOx	Gg	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
NH3	Gg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
CO	Gg	-212	-119	-265	-251	-285	-322	-201	-358	-246	-308	-280	-280	-374	-282	-324	-344	-200	-200
Pb	Mg	-2	-1	-3	-4	-6	-6	-6	-6	-5	-6	-5	-5	-6	-5	-6	-6	-4	-5
Cd	Mg	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Hg	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cu	Mg	0	0	0	0	0	-1	0	-1	0	-1	0	0	-1	0	-1	-1	0	0
Ni	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Se	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zn	Mg	-60	-33	-75	-71	-80	-91	-56	-101	-69	-87	-79	-79	-106	-79	-92	-97	-56	-52
Total PAHs	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCDD/Fs	g I-TEQ	-31	-124	-271	-97	-260	-276	-327	-211	-217	-237	-291	-291	-293	-253	-269	-286	-254	-247
B(a)P	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(b)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B(k)F	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IP	Mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCb	kg	-3	-4	-4	-10	-8	-7	-10	-12	-11	-10	-11	-14	-13	-13	-13	-12	-12	-9
PCBs	kg	-36	-35	-39	-55	-37	-27	-28	-33	-29	-38	-13	-14	-25	-26	-21	-12	-16	-11
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-18	-16	-18	-21	-12	-23	-15	-19	-17	-17	-24	-18	-21	-22	-12	-10
PM10	Gg			-19	-16	-18	-21	-11	-24	-15	-20	-18	-18	-24	-19	-22	-23	-12	-10
TSPs	Gg			-19	-16	-18	-21	-11	-24	-15	-20	-18	-18	-24	-18	-22	-23	-12	-10
BC	Gg			-11	-10	-12	-13	-8	-15	-10	-13	-11	-11	-15	-12	-13	-14	-8	-8

# 5 Recalculations and implemented or planned improvements

## 5.1 Recalculations

Recalculations are changes made to previous emission estimates (for one or more years) to eliminate errors, consider additional factors and incorporate new data. The inventory guidebook (EMEP/EEA, 2023) stipulates that it is good practice to change or refine data and/or methods when:

- available data have changed;
- the method previously used is not consistent with good practice for a certain category;
- an emission source category has become a key category;
- the method previously used does not reflect mitigation activities transparently;
- the capacity (resources) for inventory preparation has increased;
- new inventory methods become available;
- the correction of errors is necessary.

It is important to identify inventory recalculations and to understand their origin in order to evaluate officially reported emission data properly. EU Member States often do not document why they report numbers that differ from those of the previous year.

Adjustments are not considered in the emission totals covered in this chapter.

### 5.1.1 Recalculations of the EU inventory

Table 5.1 compares total emissions from the EU submitted in 2025 with those submitted in 2026 both based on percentage (Table 5.1 a) and on absolute values (Table 5.1b). It can be seen that emission estimates for main pollutants were not subject to significant recalculations, with recalculations rarely exceeding 2% for any given year (Table 5.1a).

**Table 5.1a Comparison of data submitted in 2025 and 2026 by EU Member States based on relative difference (percentage of EU total)**

Pollutant	Unit	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	0.1%	-0.6%	0.0%	-0.1%	0.9%	0.7%	1.8%	1.1%	1.8%	1.0%	1.8%	1.3%	2.3%	0.8%
NMVOCs	Gg	-0.5%	-0.8%	-0.5%	-0.3%	-0.5%	-0.8%	-0.5%	-0.6%	-0.4%	-0.9%	-0.5%	-0.6%	-0.8%	-1.0%
SOx	Gg	0.3%	0.0%	0.5%	0.1%	0.5%	0.0%	0.7%	0.1%	0.9%	0.1%	0.3%	-0.3%	0.4%	-1.2%
NH3	Gg	1.7%	1.6%	1.2%	0.9%	0.6%	0.4%	0.6%	0.4%	0.5%	0.8%	0.9%	1.0%	1.0%	0.7%
CO	Gg	-0.3%	-0.8%	-1.1%	-0.5%	-1.5%	-1.6%	-1.3%	-1.1%	-1.5%	-1.8%	-1.6%	-1.4%	-1.0%	-1.6%
Pb	Mg	0.5%	0.1%	0.4%	-0.7%	0.7%	0.5%	1.0%	0.6%	1.0%	1.0%	1.3%	0.4%	0.3%	0.1%
Cd	Mg	0.7%	0.5%	1.6%	-0.1%	0.7%	-1.1%	1.0%	-0.9%	0.9%	-0.7%	0.4%	-0.9%	0.5%	-1.4%
Hg	Mg	0.9%	0.2%	1.8%	0.2%	2.4%	0.2%	2.8%	0.3%	2.7%	0.4%	2.2%	0.3%	3.7%	3.9%
As	Mg	0.2%	0.2%	0.8%	0.5%	1.3%	1.1%	2.4%	1.5%	2.6%	1.7%	2.8%	2.1%	2.6%	-2.0%
Cr	Mg	1.3%	1.7%	3.2%	2.9%	4.3%	4.0%	5.2%	4.3%	5.3%	5.0%	5.7%	5.2%	5.5%	4.6%
Cu	Mg	9.5%	10.5%	11.4%	11.0%	11.9%	13.1%	13.8%	13.4%	13.8%	13.8%	14.2%	14.1%	12.1%	11.0%
Ni	Mg	2.3%	0.4%	5.4%	0.8%	8.0%	-0.1%	9.1%	0.3%	10.4%	1.5%	9.2%	0.9%	7.7%	1.2%
Se	Mg	0.5%	0.0%	0.9%	0.2%	1.2%	0.2%	1.6%	0.4%	1.7%	0.4%	1.6%	0.6%	1.7%	21.1%
Zn	Mg	-0.1%	0.4%	-0.2%	-0.2%	-0.2%	-0.5%	0.1%	-0.1%	-0.6%	-0.1%	-0.5%	-0.6%	0.4%	-0.1%
Total PAHs	Mg	0.3%	0.2%	0.5%	0.3%	0.2%	-0.1%	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%	-1.0%	-1.2%
PCDD/Fs	g I-TEQ	0.5%	-0.3%	-2.4%	-0.2%	-9.7%	-10.6%	-13.4%	-13.6%	-13.5%	-12.7%	-14.0%	-14.7%	-14.5%	-15.4%
B(a)P	Mg	0.5%	0.6%	0.8%	0.7%	0.3%	0.2%	0.3%	0.3%	0.3%	0.3%	0.4%	-0.1%	-0.6%	-0.8%
B(b)F	Mg	0.8%	1.0%	1.2%	0.9%	0.4%	0.1%	0.2%	0.2%	0.2%	0.1%	0.2%	-0.3%	-0.8%	-1.0%
B(k)F	Mg	0.9%	1.0%	1.0%	0.6%	0.1%	-0.1%	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%	-1.0%	-1.1%
IP	Mg	0.7%	0.8%	1.0%	0.6%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	-0.5%	-1.1%	-1.5%
HCB	kg	0.0%	0.0%	0.1%	-0.6%	-3.2%	-4.1%	-3.6%	-4.2%	-5.3%	-5.5%	-9.2%	-9.6%	-10.1%	-8.7%
PCBs	kg	0.0%	-0.6%	0.5%	-1.6%	-0.5%	-2.6%	0.3%	-1.0%	-0.7%	-2.0%	-0.6%	-1.2%	-7.8%	-22.7%
				2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-0.8%	-0.7%	-0.8%	-1.7%	-1.0%	-1.0%	-1.4%	-1.4%	-1.3%	-1.4%	-1.6%	-2.0%
PM10	Gg			-0.5%	-0.3%	-0.3%	-0.9%	-0.6%	-0.7%	-0.8%	-0.8%	-0.8%	-0.9%	-1.0%	-1.4%
TSPs	Gg			-2.3%	-1.8%	-1.8%	-1.7%	-2.0%	-2.2%	-2.2%	-2.2%	-2.6%	-2.2%	-2.5%	-2.9%
BC	Gg			-3.5%	-3.3%	-4.0%	-5.4%	-4.8%	-5.1%	-6.8%	-5.8%	-6.7%	-6.6%	-4.7%	-5.8%

Note: Differences of +/- 10% or more are highlighted in red.

**Table 5.1b Comparison of data submitted in 2025 and 2026 by EU Member States based on absolute values**

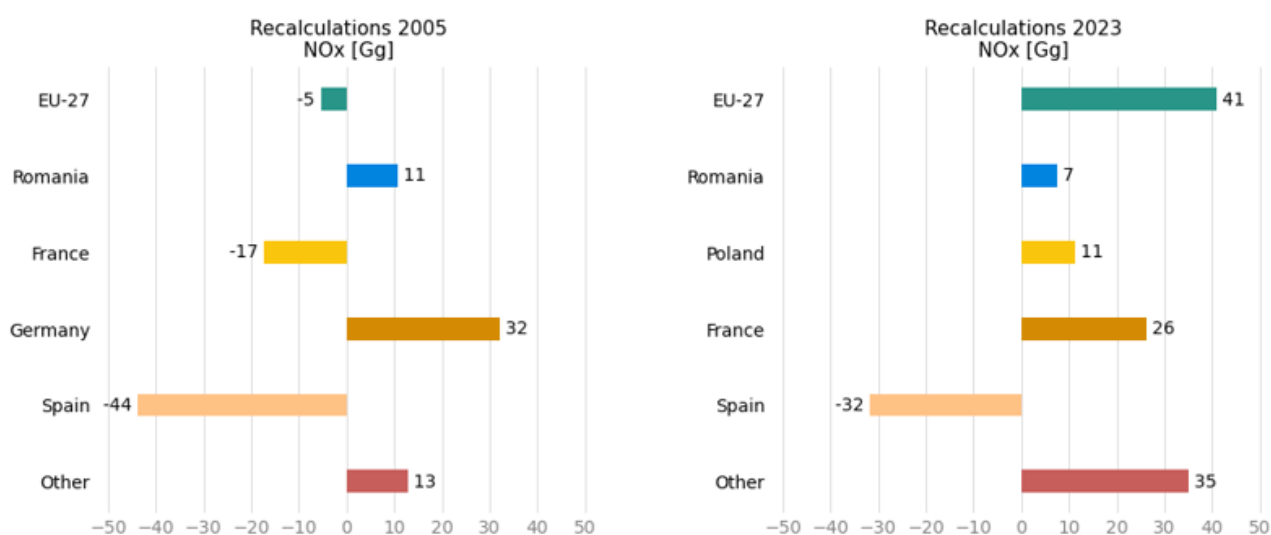
Pollutant	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NOx	Gg	14	-81	5	-5	77	6	90	35	136	50	127	76	118	61	101	75	125	41
NMVOCs	Gg	-90	-100	-55	-29	-44	-67	-40	-70	-29	-56	-36	-41	-27	-58	-33	-38	-50	-60
SOx	Gg	68	1	45	8	21	0	19	3	14	1	14	2	16	1	4	-4	5	-13
NH3	Gg	88	69	52	37	23	16	17	16	21	14	22	15	20	29	34	37	35	24
CO	Gg	-184	-367	-394	-150	-386	-480	-271	-446	-83	-328	-261	-223	-287	-342	-273	-254	-165	-251
Pb	Mg	112	10	14	-13	11	3	12	9	12	6	11	7	11	11	13	4	3	1
Cd	Mg	1	1	2	0	1	-1	0	-1	0	-1	1	-1	1	0	0	-1	0	-1
Hg	Mg	1	0	2	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1
As	Mg	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	-1
Cr	Mg	13	11	16	13	17	13	17	14	17	14	18	15	18	17	17	16	17	13
Cu	Mg	224	239	272	287	309	311	320	327	338	339	358	351	363	363	332	350	315	288
Ni	Mg	43	6	64	9	58	3	48	1	40	-1	45	2	48	7	36	4	32	5
Se	Mg	1	0	1	0	2	0	2	0	1	0	2	0	2	0	1	0	1	12
Zn	Mg	-7	20	-7	-7	-9	-24	17	-29	6	-18	3	-3	-23	-4	-17	-20	14	-5
Total PAHs	Mg	4	3	4	3	2	0	1	0	0	-1	0	0	0	-1	0	-3	-7	-8
PCDD/Fs	g I-TEQ	60	-33	-181	-11	-247	-268	-322	-206	-212	-234	-287	-292	-298	-263	-280	-304	-274	-280
B(a)P	Mg	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	0	-1	-2
B(b)F	Mg	4	4	3	3	1	1	1	0	0	0	0	0	1	0	0	-1	-2	-2
B(k)F	Mg	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
IP	Mg	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-2
HCB	kg	-1	-1	3	-2	-8	-7	-10	-12	-11	-10	-11	-14	-13	-12	-14	-12	-12	-9
PCBs	kg	2	-35	24	-55	-10	-28	-6	-34	-11	-41	4	-15	-10	-27	-8	-15	-86	-240
				2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PM2.5	Gg			-16	-13	-15	-24	-9	-23	-15	-27	-15	-15	-21	-19	-17	-19	-20	-24
PM10	Gg			-15	-8	-7	-18	-2	-15	-9	-21	-13	-14	-17	-18	-16	-18	-19	-26
TSPs	Gg			-114	-87	-83	-92	-72	-72	-76	-67	-76	-82	-85	-80	-92	-78	-85	-95
BC	Gg			-12	-10	-11	-14	-8	-14	-9	-13	-11	-11	-15	-12	-12	-13	-8	-9

Details of recalculations that influenced the EU recalculations are given below. In some cases, recalculations reflect changes in gap filling rather than ‘true’ recalculations by the countries themselves. Often, high recalculations for EU Member States are compensated for by low recalculations for other EU Member States, and therefore overall EU recalculations are only moderate.

### Recalculations of nitrogen oxide emissions

Figure 5.1 shows the recalculations for nitrogen oxide (NO<sub>x</sub>) emissions for the EU-27 and the four biggest contributing Member States to these recalculations for the years 2005 and 2024. For 2023, recalculations in the waste sector (5C2) contribute to the recalculations made by Spain. For 2005, Spain reported high recalculations in the waste (5C2) and non-road transport (1A4cii) sectors.

**Figure 5.1 Recalculations for NO<sub>x</sub> emissions for the years 2005 and 2023**



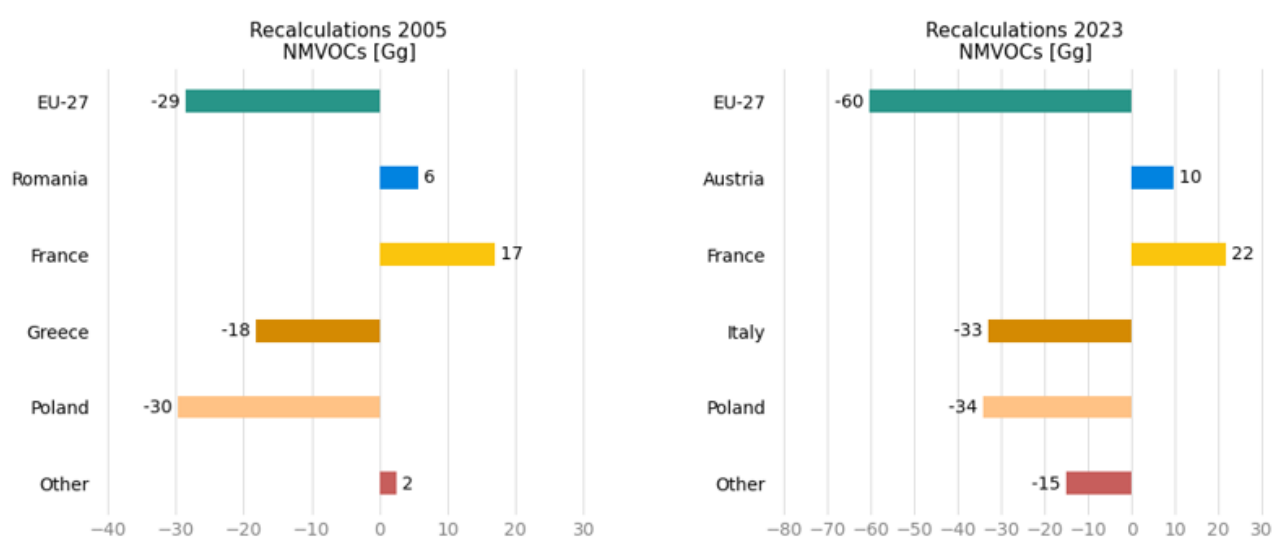
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. ‘Other’ is the sum of the recalculations from all other Member States.

### Recalculations of non-methane volatile organic compound emissions

Figure 5.2 shows the recalculations for non-methane volatile organic compound (NMVOC) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2023, high recalculations in the agriculture sector (3B1a and 3B1b) contributed to the change in Poland's reported emissions. For 2005 recalculations were made also in the Road transport sector (1A3bi) by Poland.

**Figure 5.2 Recalculations for NMVOC emissions for the years 2005 and 2023**



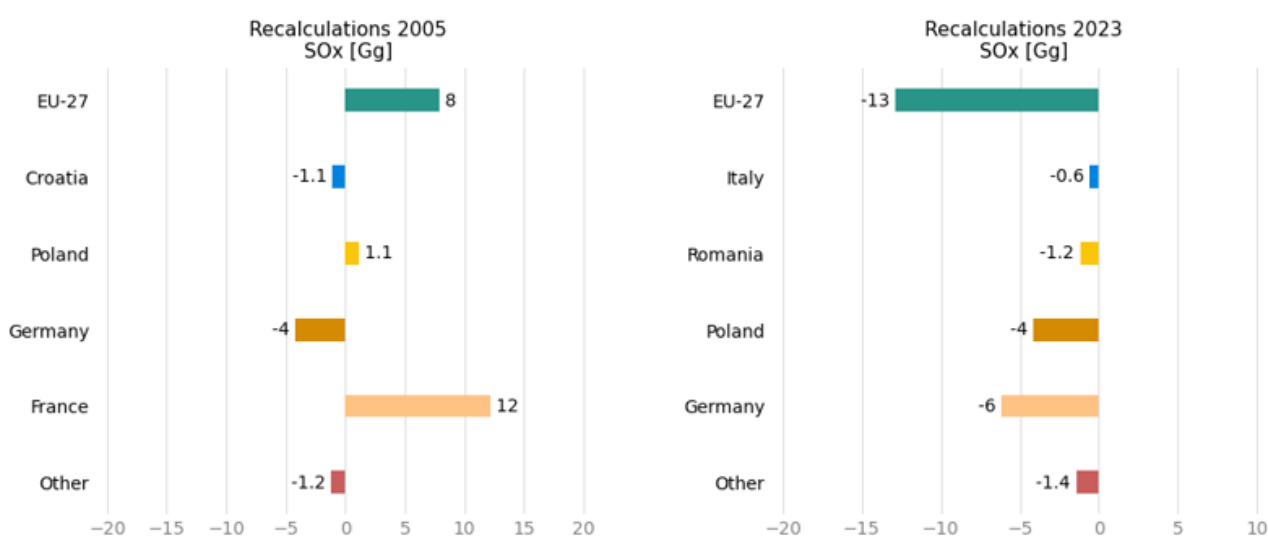
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of sulphur oxide emissions

Figure 5.3 shows the recalculations for sulphur oxide (SO<sub>x</sub>) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2005, France had the highest absolute change in SO<sub>x</sub> emissions due to recalculation in the transport sector (1A3). Energy use in industry sector (1A2g<sup>viii</sup>) contributed most to the recalculation by Germany for 2023.

**Figure 5.3 Recalculations for SO<sub>x</sub> emissions for the years 2005 and 2023**

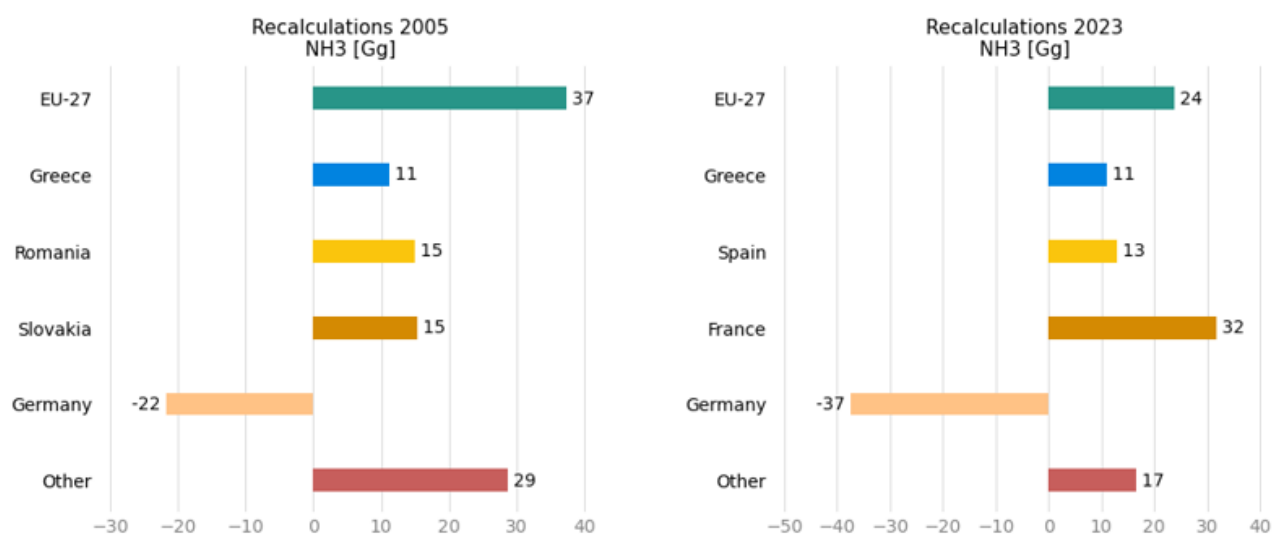


**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of ammonia emissions

Figure 5.4 shows the recalculations for NH<sub>3</sub> emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023. For both 2005 and 2023, major recalculations of NH<sub>3</sub> emissions were made Germany, to which recalculations in the agriculture sector (3Da1 and 3Da2a) had a major impact.

**Figure 5.4** Recalculations for NH<sub>3</sub> emissions for the years 2005 and 2023



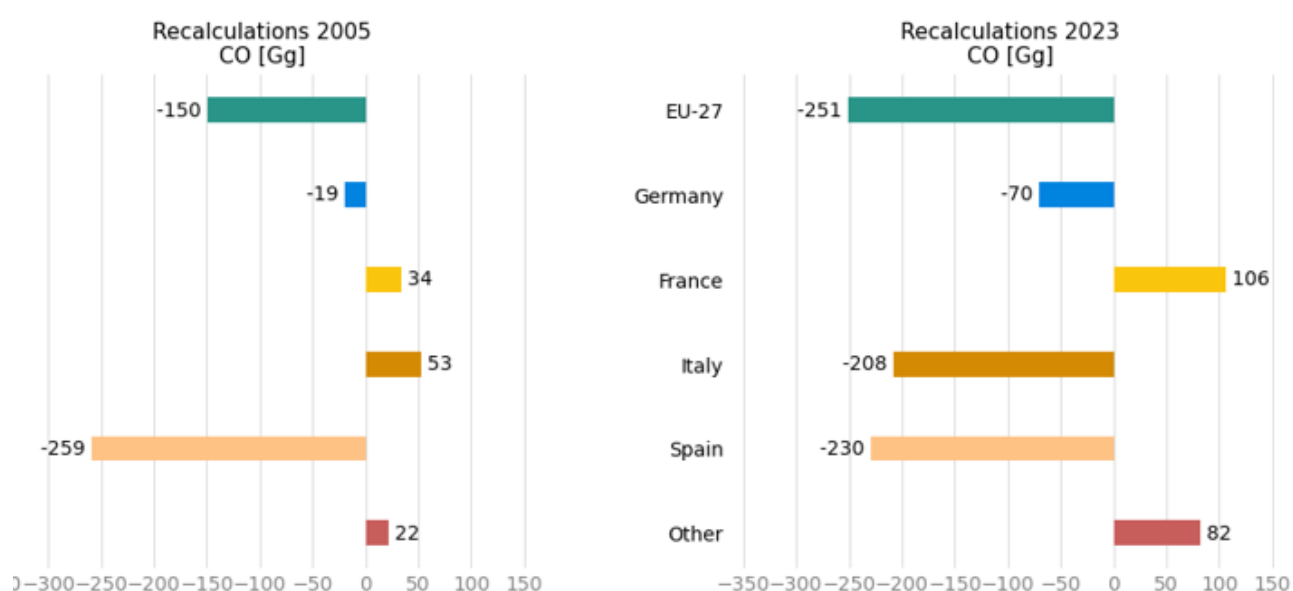
### Recalculations of carbon monoxide emissions

Figure 5.5 shows the recalculations for carbon monoxide (CO) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2005: The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

and 2023, recalculations in the waste sector (5C2) contributed to the major negative recalculation by Spain. For 2023, major recalculations of CO emissions were also reported by Italy for Commercial, institutional and households (1A4bi).

**Figure 5.5 Recalculations for CO emissions for the years 2005 and 2023**



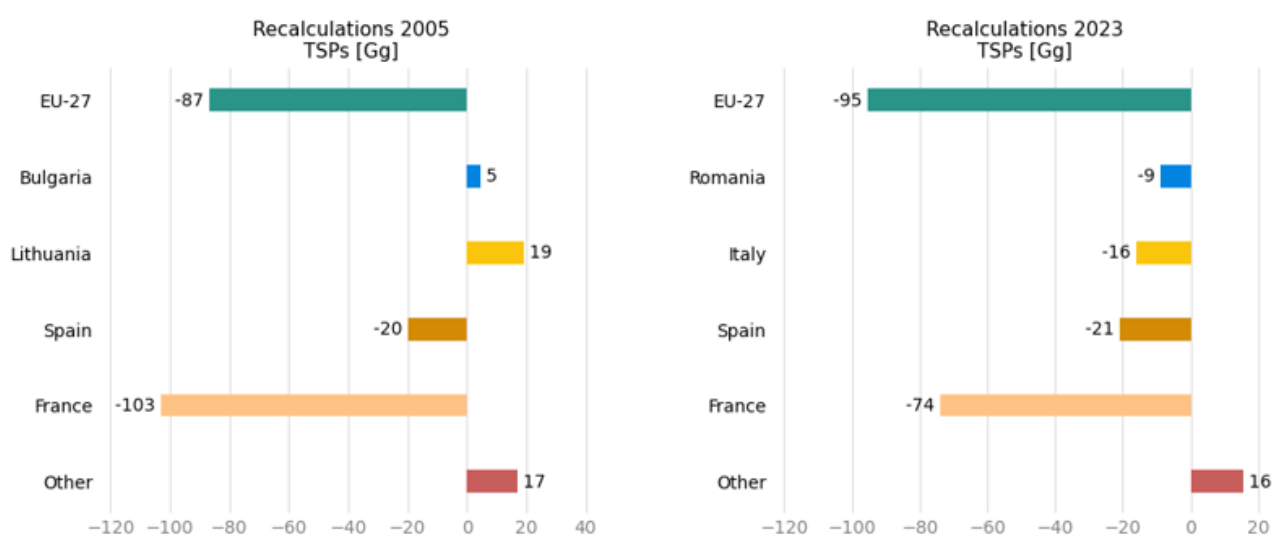
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of total suspended particle emissions

Figure 5.6 shows the recalculations for total suspended particulate (TSP) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2005 and 2023, recalculations made in the agriculture sector (3Dc) contributed to the recalculations by France.

**Figure 5.6 Recalculations for TSP emissions for the years 2005 and 2023**

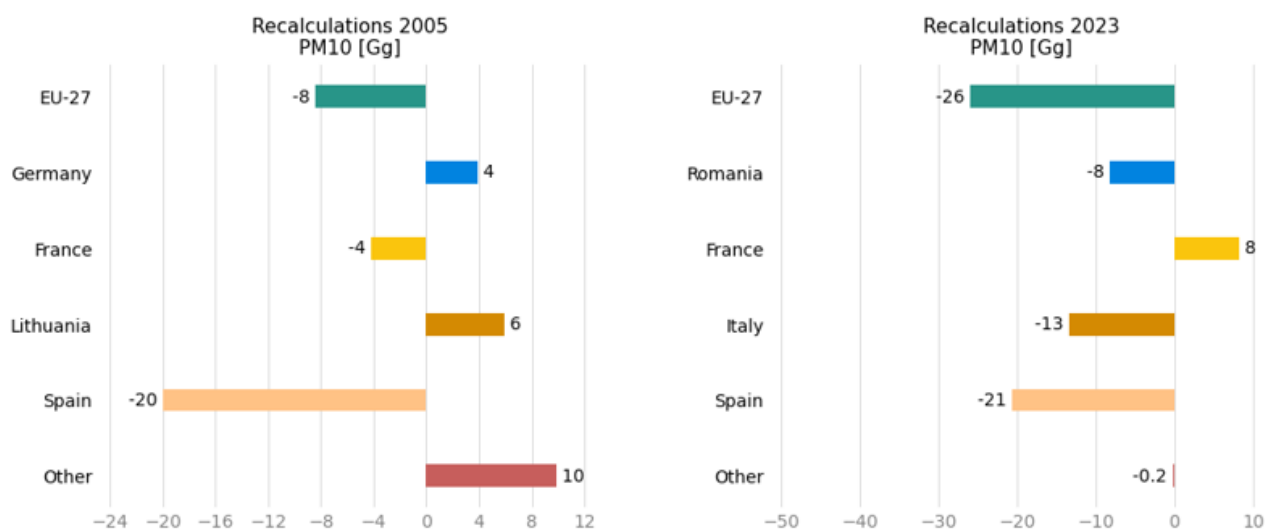


**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations for PM<sub>10</sub> emissions

Figure 5.7 shows the recalculations for emissions of PM<sub>10</sub> for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023. For both 2005 and 2023, the waste sector (5C2) contributed to the recalculations made by Spain.

**Figure 5.7** Recalculations of PM<sub>10</sub> emissions for the years 2005 and 2023



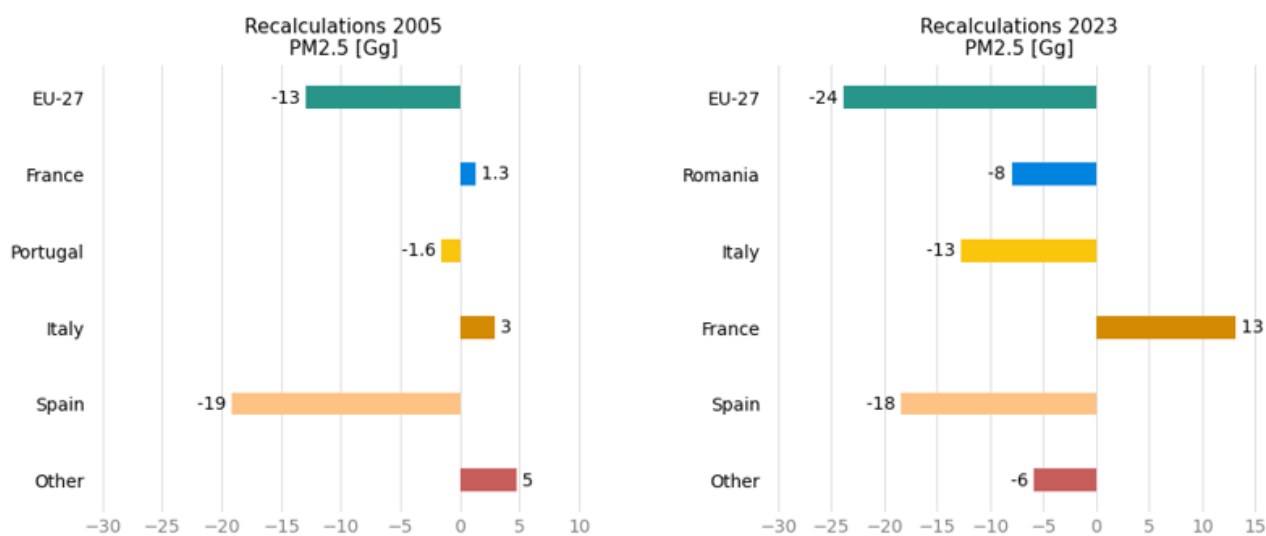
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of PM<sub>2.5</sub> emissions

Figure 5.8 shows the recalculations for emissions of PM<sub>2.5</sub> for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2023 and 2005, the negative recalculations by Spain are dominated by the waste sector (5C2).

**Figure 5.8 Recalculations for PM<sub>2.5</sub> emissions for the years 2005 and 2023**

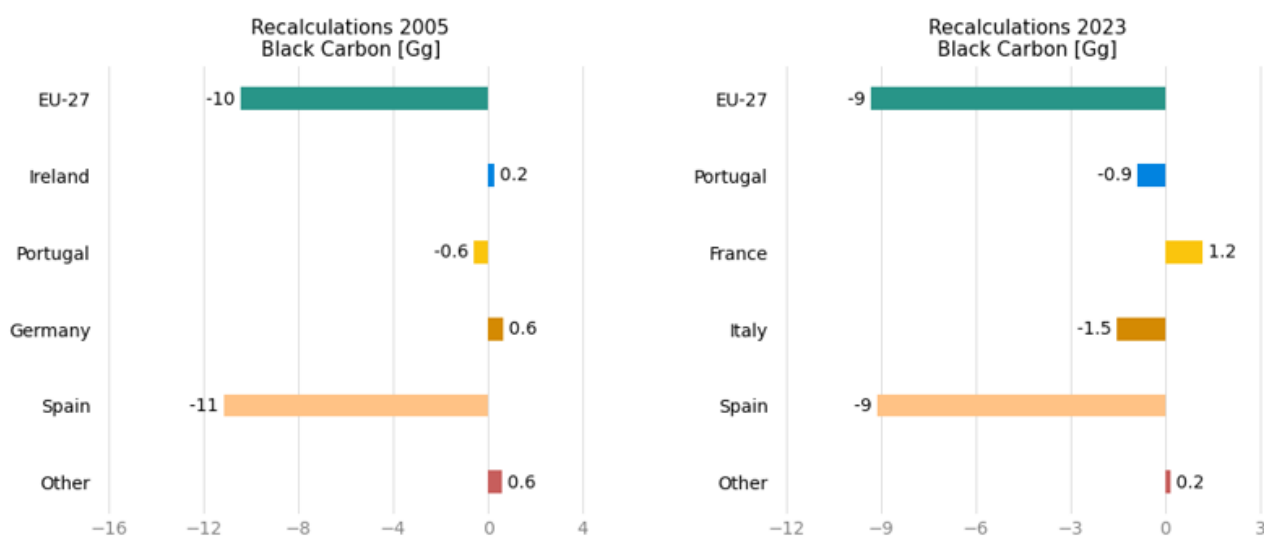


**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of black carbon emissions

Figure 5.9 shows the recalculations for BC emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023. For 2023 and 2005, the recalculations performed by Spain, were made for the waste sector (5C2).

**Figure 5.9 Recalculations for BC emissions for the years 2005 and 2023**

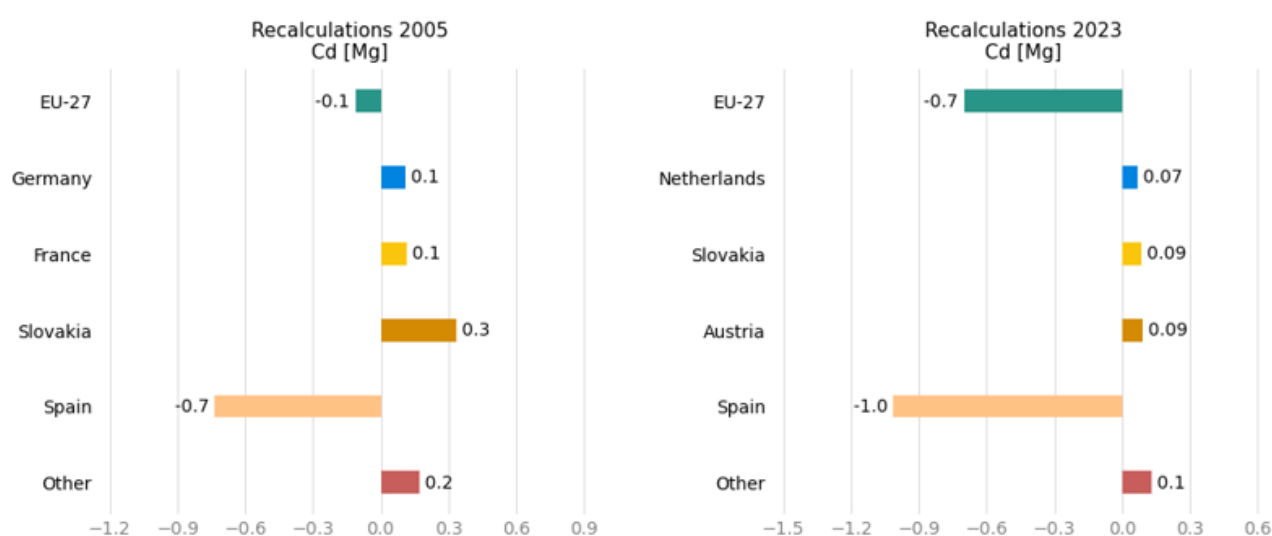


**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the impact on recalculations from all other Member States.

### Recalculations of cadmium emissions

Figure 5.10 shows the recalculations for cadmium (Cd) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023. In general, recalculations of Cd emissions were minor. The major contributing sector for the recalculations by Spain was the waste sector (5C1biv) in 2023 as well as in 2005.

**Figure 5.10** Recalculations for Cd emissions for the years 2005 and 2023



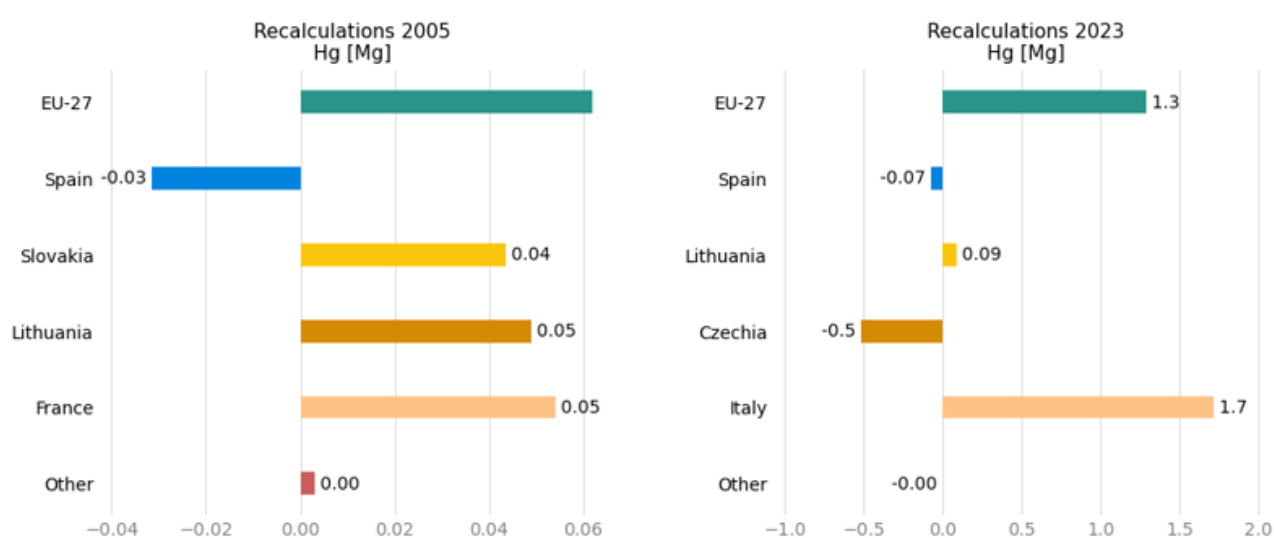
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of mercury emissions

Figure 5.11 shows the recalculations for mercury (Hg) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

In general, the recalculations for Hg were only minor. For 2023, the largest recalculations of Hg emissions were performed in sector Energy production and distribution (1B1a) by Italy. For 2005, the main contributing sector for the recalculations were the Energy production and distribution (1A1a) and stationary combustion in industries (NFR1A2) sectors in France, the Energy use in industry sector (1A2f) in Lithuania and the energy production and distribution sector (1A1b) in Slovakia.

**Figure 5.11 Recalculations for Hg emissions for the years 2005 and 2023**



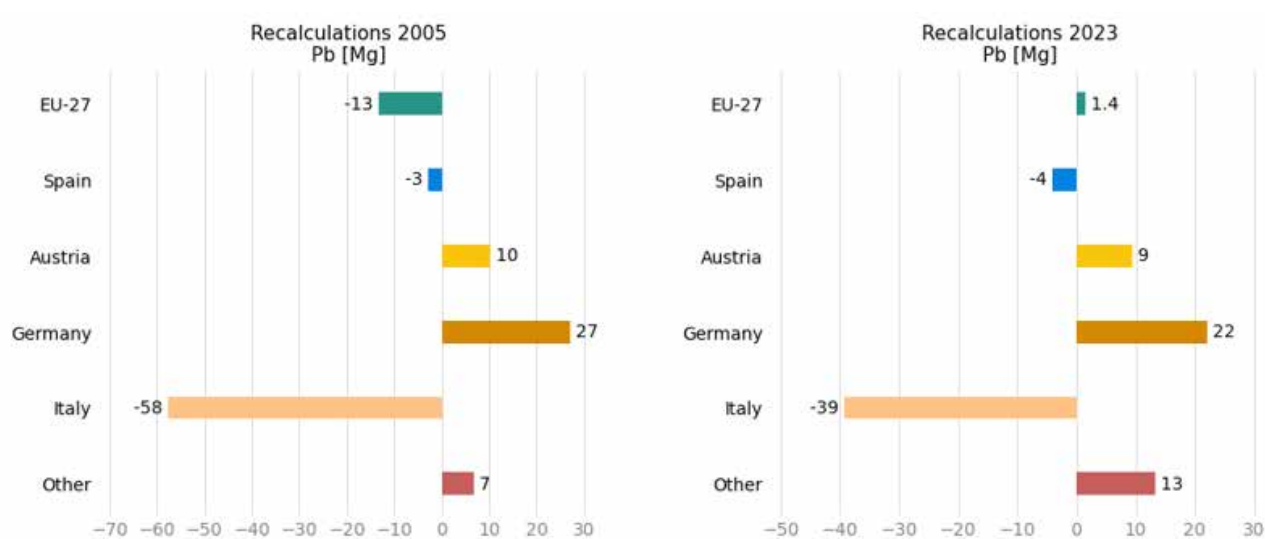
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of lead emissions

Figure 5.12 shows the recalculations for lead (Pb) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For both 2005 and 2023, recalculations of Pb emissions in Italy were dominated by recalculations in the energy use in industry sector (1A2f).

**Figure 5.12 Recalculations for Pb emissions for the years 2005 and 2023**



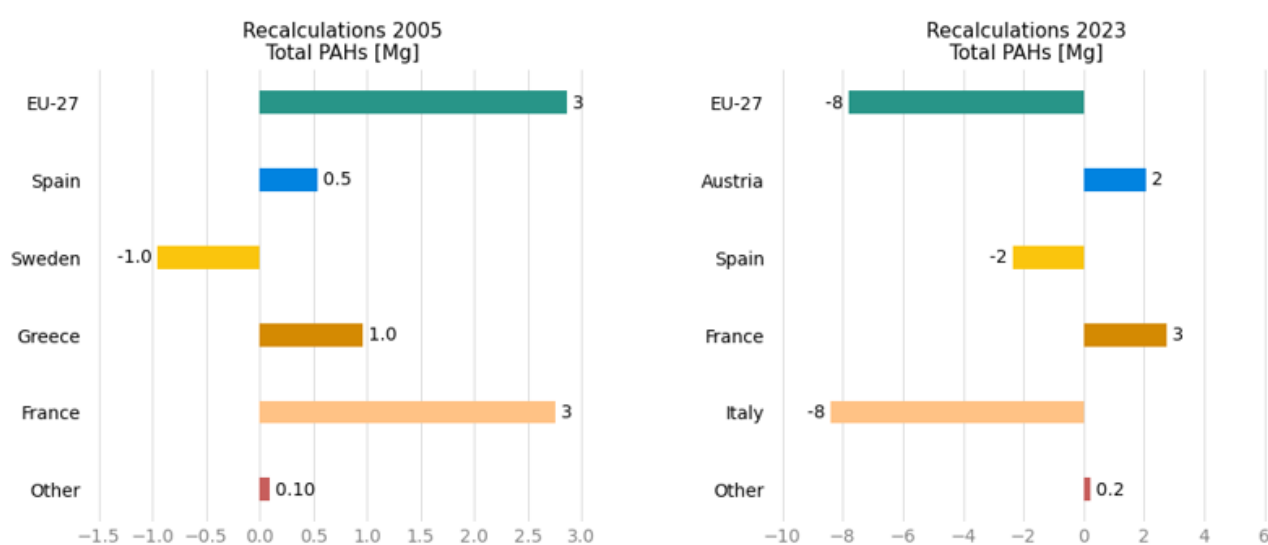
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of total polycyclic aromatic hydrocarbon emissions

Figure 5.13 shows the recalculations for total polycyclic aromatic hydrocarbons (PAHs) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2023, the largest recalculations for PAHs were performed by Italy in the commercial, institutional and households sector (1A4bi). For the 2005 recalculations by France, the new estimate of PAH emissions from bitumen blowing (2D3g) as well as the waste sector (5C2) were the main contributors.

**Figure 5.13 Recalculations for PAH emissions for the years 2005 and 2023**



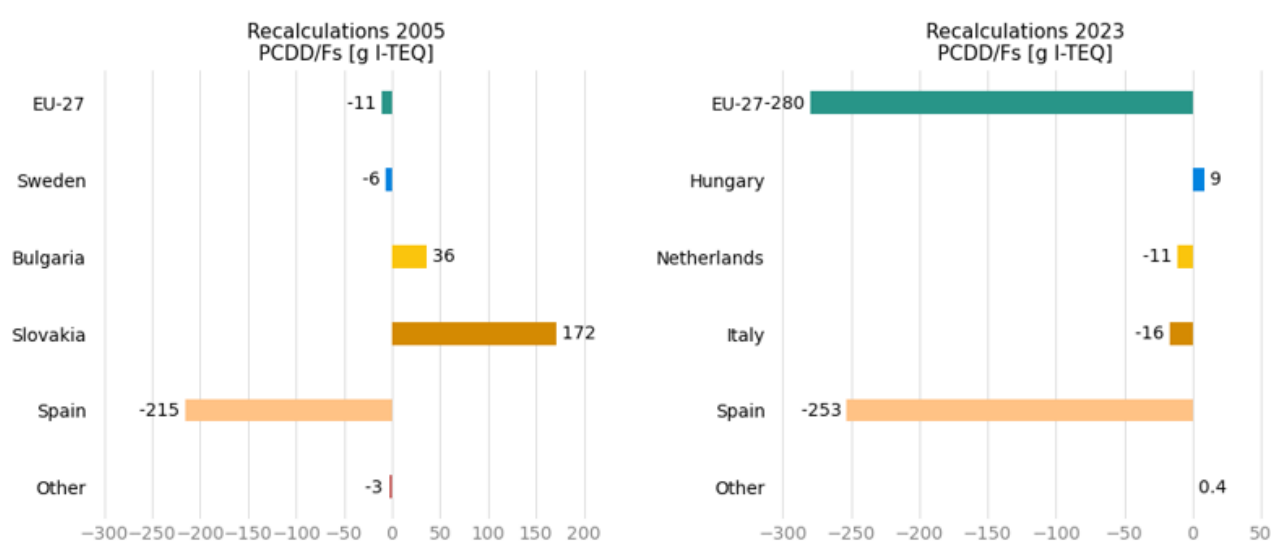
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of dioxin emissions

Figure 5.14 shows the recalculations for dioxin emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2005 and 2023, the major contributing sector to the recalculations performed by Spain, was the waste sector (5C1biv ). Additionally, for the year 2005 Slovakia reported high recalculations in sectors Energy production and distribution (1A1b ) and Waste (5C1bii).

**Figure 5.14 Recalculations for dioxin emissions for the years 2005 and 2023**



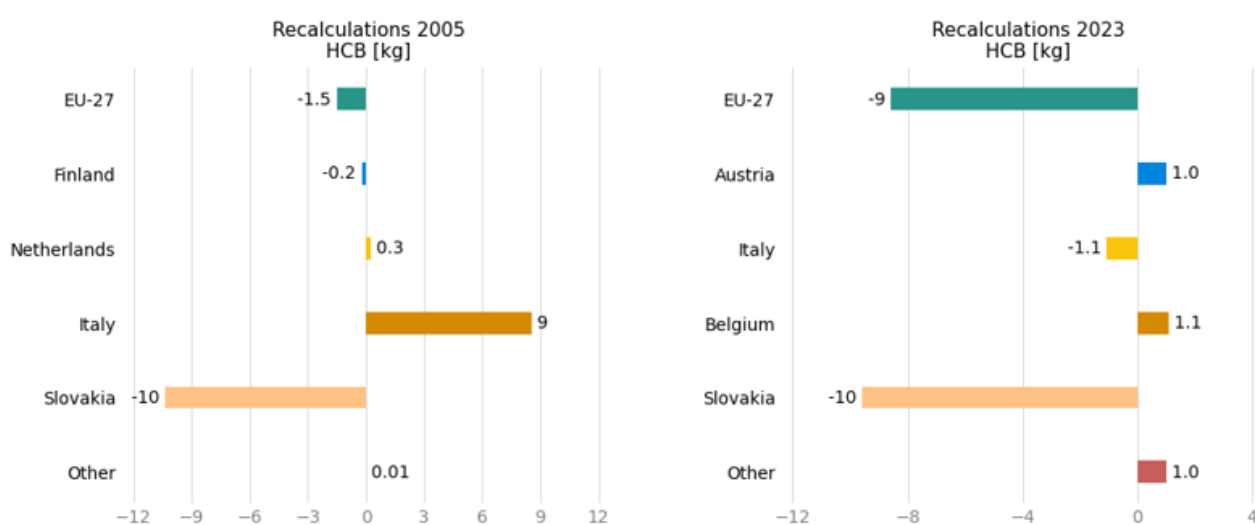
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of hexachlorobenzene emissions

Figure 5.15 shows the recalculations for hexachlorobenzene (HCB) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For both 2005 and 2023, significant recalculations of HCB emissions were performed by Slovakia in the waste sector (5C1bii).

**Figure 5.15 Recalculations for HCB emissions for the years 2005 and 2023**



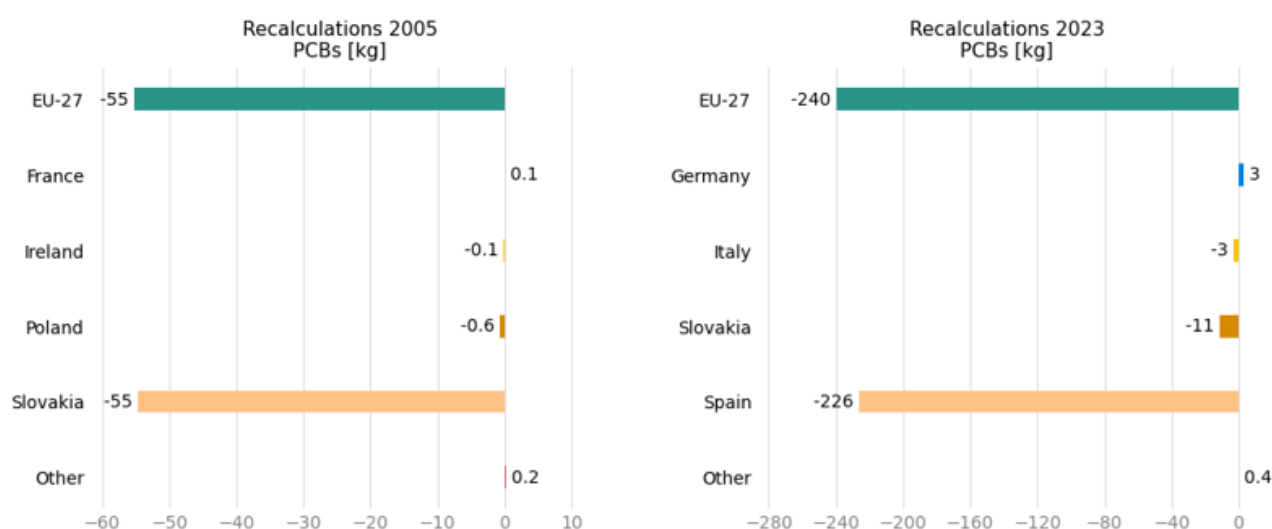
**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

### Recalculations of polychlorinated biphenyl emissions

Figure 5.16 shows the recalculations for polychlorinated biphenyl (PCB) emissions for the EU-27 and the four biggest contributors to these recalculations for the years 2005 and 2023.

For 2005 the largest recalculations of PCB emissions, when regarded as the absolute change, were performed by Slovakia in waste sector (5C1bi) and in 2023, by Spain in the industrial processes and product use (2K) sector.

**Figure 5.16 Recalculations for PCB emissions for the years 2005 and 2023**



**Note:** The figure shows recalculations for the EU-27 and the four biggest contributors. 'Other' is the sum of the recalculations from all other Member States.

#### 5.1.2 EU Member States' recalculations

Under the reporting guidelines (UNECE, 2022b), all countries should submit explanatory informative inventory reports (IIRs) that include details explaining any recalculations made. Some EU Member States provide very detailed explanations for their recalculations of parts of the time series or the whole time series (e.g. methodological improvements, revisions of emission factors, reallocations, revisions of activity data and corrections of errors). The annual European Monitoring and Evaluation Programme (EMEP) inventory review report presents a summary of the individual recalculations reported by EU Member States. This report will be available on the Centre on Emission Inventories and Projections (CEIP) website from July onwards each year (EMEP CEIP, 2023c).

## 5.2 Improvements of the EU inventory

In 2025, the in-depth review focused on review of projections. The EU was not in the scope of this review, and thus the results of the review are not considered here. The two most recent in-depth reviews with relevance to the EU inventory cover the 2024 and the 2020 in-depth reviews. In 2024, the in-depth review focused on the 'industrial processes and product use – solvents' sector with a special emphasis on NMVOC emissions; including gridded data. While the focus was set on NMVOC emissions, also all other pollutants covered by Air Convention and its protocols were checked for the time series years 1990 – 2022 (UNECE/CEIP, 2024). In 2020, the EU emission inventory report (1990-2018) under the Air Convention was reviewed (UNECE/CEIP, 2021). The findings, in relation to the EU inventory, and their implementation from both reviews are summarised in Table 5.2.

### 5.2.1 Improvements planned at the EU level

For the long-term improvement of the EU inventory, the EEA and the European Topic Centre on Human Health and the Environment (ETC HE) have noted that the main future challenge for EU Member States remains improving the quality of data submissions in order to deliver more complete and timely emission inventories to the Air Convention. Improvements cannot be implemented at the EU level alone; the EU Member States themselves must also make further efforts and prioritise reliable and timely inventory reporting systems.

The EEA and ETC HE have identified the following challenges:

- Further progress on the completeness of reporting. Although clear progress has been made in recent years on making reporting complete (especially for main pollutants, where most cases of incompleteness have been addressed <sup>(12)</sup>), a full set of emission inventory data for air pollutants is still not available for all EU Member States, as noted earlier in this report. In addition, for certain pollutants (mainly particulate matter (PM) and heavy metals (HMs)), data could not be fully gap filled because some EU Member States had only reported notation keys, but no emission values; this is especially the case for pollutants for which reporting is not obligatory (Figure 1.2 and Figure 1.3).
- Updating of emissions data by EU Member States, including for previous years. The ETC HE has also identified a problem with gap filling using data submitted several years ago. In a number of cases, because countries have not submitted corrected or updated data sets, the EU inventory unavoidably includes inconsistencies. Therefore, the quality of the EU's inventory will be enhanced if the consistency and completeness of EU Member States' submissions improve. Such improvements would help reliable trend analysis to inform policy. Since 2017, emission inventory reviews have been conducted for each MS inventory under the National Emission reduction Commitments (NEC) Directive (EU, 2016). The results of the review of these processes also improve the quality of the Air Convention submissions.
- Reducing the need for gap filling. This is achievable if the EU Member States report complete time series as far as possible, and if they have already provided the data in earlier submissions under the Air Convention. Current gap-filling procedures first use submissions received in the current years under various reporting mechanisms and then use older Air Convention submissions. However, because of the annual

(12) Commission Staff Working Document SWD(2025) 394 final 'Evaluation of the National Emission Reduction Commitments Directive', based on the results of the national inventory reviews under the NEC Directive.

inventory review under the NEC Directive, it is expected that the completeness of submissions (under the NEC Directive and Air Convention) will improve.

- Incorporating a quantitative trend analysis enabling an assessment on key factors contributing to trends and anomalies
- Further research on outliers in EU Member States' emission data to ensure that they reflect real emissions. A comparison of Member States' contributions to the EU total reveals extraordinarily high or low proportions in some instances. Future investigation could determine whether these high proportions reflect actual emissions or are attributable to incomplete reporting (or underestimates) by other EU Member States.

### 5.2.2 Stage 3 review recommendations from 2020 and 2024

Table 5.2 lists the status of improvements implemented in response to the stage 3 review by an expert review team (ERT) in 2020 (UNECE/CEIP, 2020). During the course of the 2025 reporting, focus by the EEA has been on improving the efficiency of compiling the EU inventory and the inventory report. Therefore, progress in other areas for improvement has been limited.

**Table 5.2 EU stage 3 review results for 2020 and improvements implemented**

Review findings (2020)			
Topic	Recommendation	Implemented	Comment
<b>Transparency</b>			
<b>Timeliness</b>	Submit the IIR a few weeks before the deadline of 30 May or, if that is not possible, provide the ERT with a draft IIR a few weeks earlier in those years when the EU is being reviewed, to facilitate the work of the ERT	Yes	The EU will provide the draft IIR before the reporting deadline in review years
<b>Methodologies</b>	Include in the IIR: summaries of the methodologies used by the MSs for emissions in the EU's key categories	Yes	Information on methodologies is included in the 2026 EU IIR for the first time
<b>Trends</b>	Include in the IIR: explanations for all emission trends in the EU inventory, in consultation with the MSs	Partly	The EU has made efforts to provide explanations for trends in consultation with the MSs. More information on emission trends will be included in future submissions
<b>Methods</b>	Include in the IIR: sub-sector-level information on methods used to calculate emissions	Yes	This is addressed in the 2026 EU IIR covering all EU key categories
<b>Sources included</b>	Include in the IIR: sub-sector-level information on sources included in the inventory, especially in the industry sector	No	MSs' inventories and IIRs are also part of the EU submission, and provide information on sources to sub-sectors. Including this information in the EU IIR is not feasible within the limited time-frame
<b>Gap-filling procedure</b>	Include in the IIR: information at the sector level in the main text of the IIR about the gap-filling procedure, or at least provide Annex D containing this information as a public part of the IIR	Yes	Annex D is made publicly available containing the EU gap-filled Inventory

<b>EU-level inventory improvement programme</b>	Include in the IIR: information on improvements and progress on improvement work	Yes	Chapter 5.2 documents improvements made and improvements planned (see also Table 5.2, and table 5.3).
<b>Condensable component</b>	Include in the IIR: summary information at the sectoral level on whether the condensable component of PM is included or not in MSs' inventories	Yes	Information on condensable components of PM is included in the EU IIR
<b>Include links</b>	Include in the IIR: links to relevant websites where gridded data and LPS data are available	Yes	The links are provided within the relevant sections of this report, if it is a reporting year for gridded data and LPS
<b>Sector-specific QA/QC, trends</b>	Implement sector-specific QA/QC procedures to investigate the data in detail and find explanations for real but unusual sector trends, and work with the individual MSs to provide more details on the drivers behind the trends	Ongoing	Further work on outliers and unusual trends is ongoing
<b>Accuracy</b>			
<b>KCA to prioritise improvements</b>	Use the results of the EU inventory's KCA to prioritise improvements in the inventory; include this issue in the improvement plan with clear steps and a schedule and report on progress in the next submissions	Ongoing	The EU is taking results from the KCA into account and included information on the methods used for all KCs. The EU will continue to improve the trend description of EU key categories.
<b>Completeness</b>			
<b>Completeness assessment</b>	Include in the IIR: sector-specific assessment of the completeness of the inventory	Yes	Within Annex D, the gap-filled inventory, information on values and NK reported is available on MS and EU level.
<b>Eurostat data for data gaps</b>	Further improve the completeness and comparability of the inventory in consultation with the MSs by exploring the potential to use the Eurostat data or other data sources in cases where an MS does not include an existing source in its inventory although methods are available in the inventory guidebook	No	MS inventories are reviewed under the NEC Directive and the Air Convention, which aim to improve the completeness and accuracy of MS inventories, and therefore support the completeness of the EU inventory. Additional activities to support completeness of MS inventories are within the limited time frame not possible.
<b>Activity data</b>	Further improve the completeness and comparability of the inventory in consultation with the MSs by using the results of the NEC Directive technical review to improve the reporting of activity data in the EU submission	No	Activity data is reported to the extent possible, i.e. only if all MS report activity data with the same unit. As reporting of activity data is not mandatory ("should" requirement in para 43 of ECE/EB.AIR/156/Add.3), MS can only be encouraged to do so.
<b>Fuel data</b>	Further improve the completeness and comparability of the inventory in consultation with the MSs by including fuel data in the NFR tables for the years and the sectors for which this is possible	Yes	Fuel data is provided in the NFR tables (Annex A) for those years and sectors, which is possible
<b>Uncertainty of information from MSs</b>	The ERT recommends that the Party include an uncertainty analysis in line with paragraph 31 of the reporting guidelines and work with the MSs to increase their reporting on uncertainties in their inventories and report on summarised information on uncertainties	Yes	Information of the uncertainties provided by Member States is included in Appendix 6.

<b>Uncertainty analysis</b>	The ERT also recommends that the Party develops a parallel uncertainty analysis independent of the MSs' submissions, including an assessment of the impacts of the gap-filling procedure and improvements following the NEC Directive technical review on inventory uncertainty	Yes	An uncertainty analysis for the EU is included in the 2026 EU IIR based on uncertainties reported by MS using weighted averages.
<b>Comparability</b>			
<b>Notation keys</b>	Always use notation keys in line with paragraph 12 of the reporting guidelines and especially check that the use of the notation key 'NE' is in line with the reporting guidelines. Include information in the IIR to justify the uses of the notation keys; for 'IE' also document where the emissions are included	Under consideration	As the EU inventory relies on MS inventories, the current aggregation considers the values reported and if one or a mix of notation keys is reported NE, is used, instead of a mix of notation keys. The added value of adding all notation keys used by countries is questionable.
<b>Compare MS data</b>	Further improve the completeness and comparability of the inventory in consultation with the MSs by ensuring the comparability of MS data before aggregation at the EU level	Yes	Incoming MS submissions are undergoing initial quality checks (see Table 1.6), and MS are informed about detected inconsistencies, allowing them to solve this issue and resubmit.
<b>Consistency</b>			
<b>Sector-specific QA/QC</b>	Include in the IIR: sector-specific information on QA/QC procedures	No	Checks on time series consistency on total and sector level are carried out, to detect outliers indicating potential errors, as described in chapter 1.3.6. It was decided to not repeat this information in sector chapters, as it applies to all sectors
<b>Sector-specific recalculations</b>	Include in the IIR: sector-specific information on recalculations wherever possible	Ongoing	Considerable efforts have already been undertaken to extract this information either from the IIRs or by contacting the MSs
<b>Recalculations</b>	Include in the IIR: information of the impacts of recalculations based on gap filling	Ongoing	Two figures to show this information were previously provided in the EU IIR. However, because of increasing completeness of reporting by the MSs, the percentage of gap-filled values within the EU inventory was too small to show in this way, another way to present this information will be provided in the future

**Note:** IE, included elsewhere; NE, not estimated; LPS, large point source; MS, Member State; NFR, nomenclature for reporting; QA/QC, quality assurance and quality control.

**Table 5.3 EU stage 3 review results for 2024**

Review findings (2024)			
Topic	Recommendation	Implemented	Comment
<b>Quality of reporting in the 'industrial processes and product use – solvents' sector</b>			
<b>Methodology</b>	Review the gap-filling methodology applied to Member States' submissions	Pending	The gap-filling methodology will be revised
<b>Methodology</b>	Develop a methodology to calculate the emissions from intra-EU navigation.	Pending	Method development and its feasibility will be considered
<b>Transparency</b>	Ensure that activity data is presented in the Annex I submission where possible and where not, provide information why it is not possible in the Solvent sector within the IPPU chapter in the IIR.	Implemented	Activity data is provided in Annex A in accordance with chapter 1.3.2 of the IIR
<b>Transparency</b>	Provide documentation on the Solvent sector within the IPPU chapter in the IIR	Pending	Pending feasibility assessment
<b>Transparency</b>	Provide commentary on the trends of emissions from solvent related categories (2D, 2G) in the IIR	Pending	Pending feasibility assessment
<b>Transparency</b>	Document the reasons for using specific notation keys within the IIR.	Pending	Pending feasibility assessment

### **5.2.3 Further improvements undertaken in 2026**

During 2025-2026 the methods to collate the tables and graphs for the EU IIR have been further refined. In 2026 uncertainty analysis was added (Chapter 1.3.6 and Appendix 6), as well as information on methods used by EU Member States.

### **5.2.4 Improvements at the Member State level**

Improvements at the Member State level also automatically improve the EU inventory. Information on Member State-level improvements can be found within the respective IIRs (see Appendix 5).

# Abbreviations

List of units, symbols and abbreviations referred to in the main text

<b>Abbreviation</b>	<b>Name</b>
As	Arsenic
B(a)P	Benzo(a)pyrene
B(b)F	Benzo(b)fluoranthene
BC	Black carbon
B(k)F	Benzo(k)fluoranthene
Cd	Cadmium
CDR	Central Data Repository
CEIP	Centre on Emission Inventories and Projections
CO	Carbon monoxide
Cr	Chromium
Cu	Copper
DG	Directorate-General
EEA	European Environment Agency
Eionet	European Environment Information and Observation Network
EMEP	European Monitoring and Evaluation Programme
ERT	Expert review team
ETC	European topic centre
ETC HE	European Topic Centre on Human Health and the Environment
EU	European Union
FGD	Flue gas desulphurisation
Gg	1 gigagram=109g=1kilotonne (kt)
GNFR	Gridding nomenclature for reporting

HCB	Hexachlorobenzene
HCE	Hexachloroethane
Hg	Mercury
HM	Heavy metal
IE	Included elsewhere
IIR	Informative inventory report
IP	Indeno(1,2,3-cd)pyrene
I-TEQ	International toxic equivalent
KCA	Key category analysis
kg	1 kilogram=103g (gram)
LPS	Large point source
LRTAP	Long-range Transboundary Air Pollution; (UNECE) Air Convention
LTO	Landing/take-off
Mg	1 megagram = 106 g = 1 tonne (t)
MMR	Monitoring Mechanism Regulation
NA	Not applicable
NE	Not estimated
NEC	National Emission reduction Commitments (Directive)
NFR	Nomenclature for reporting
NFR1	Nomenclature for reporting 1
NFR14	Nomenclature for reporting 14
NFR19	Nomenclature for reporting 19
NH <sub>3</sub>	Ammonia
Ni	Nickel
NM VOC	Non-methane volatile organic compound
NO	Not occurring
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Nitrogen oxides

## Abbreviations

NR	Not relevant
O <sub>3</sub>	Ozone
PAH	Polycyclic aromatic hydrocarbon
Pb	Lead
PCB	Polychlorinated biphenyl
PCDD/F	Polychlorinated dibenzodioxin/dibenzofuran
PM	Particulate matter
PM <sub>2.5</sub>	Particulate matter with a diameter of 2.5µm or less
PM <sub>10</sub>	Particulate matter with a diameter of 10µm or less
POP	Persistent organic pollutant
QA	Quality assurance
QC	Quality control
Se	Selenium
SO <sub>2</sub>	Sulphur dioxide
SO <sub>x</sub>	Sulphur oxides
t	1 tonne (metric) = 1 megagram (Mg) = 10 <sup>6</sup> g
TERT	Technical Expert Review Team
TFEIP	Task Force on Emission Inventories and Projections
TSP	Total suspended particulate
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VOC	Volatile organic compound
WM	With measures (projections)
WaM	With additional measures (projections)
Zn	Zinc

## Key category source sector abbreviations referred to in the main text

<b>Abbreviation</b>	<b>Name</b>
1A1a	Public electricity and heat production
1A1b	Petroleum refining
1A2a	Stationary combustion in manufacturing industries and construction: Iron and steel
1A2b	Stationary combustion in manufacturing industries and construction: Non-ferrous metals
1A2c	Stationary combustion in manufacturing industries and construction: Chemicals
1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals
1A2gvii	Mobile combustion in manufacturing industries and construction
1A2gviii	Stationary combustion in manufacturing industries and construction: Other
1A3bi	Road transport: Passenger cars
1A3bii	Road transport: Light duty vehicles
1A3biii	Road transport: Heavy duty vehicles and buses
1A3biv	Road transport: Mopeds and motorcycles
1A3bv	Road transport: Gasoline evaporation
1A3bvi	Road transport: Automobile tyre and brake wear
1A3bvii	Road transport: Automobile road abrasion
1A3dii	National navigation (shipping)
1A4ai	Commercial/institutional: Stationary
1A4bi	Residential: Stationary
1A4bii	Residential: Household and gardening (mobile)
1A4ci	Agriculture/forestry/fishing: Stationary
1A4cii	Agriculture/forestry/fishing: Off-road vehicles and other machinery
1B2aiv	Fugitive emissions oil: Refining/storage
1B2av	Distribution of oil products
2A1	Cement production
2A3	Glass production
2A5a	Quarrying and mining of minerals other than coal
2A5b	Construction and demolition
2B10a	Chemical industry: Other
2C1	Iron and steel production
2C3	Aluminium production
2C6	Zinc production
2C7a	Copper production
2D3a	Domestic solvent use including fungicides
2D3b	Road paving with asphalt
2D3d	Coating applications
2D3e	Degreasing
2D3g	Chemical products
2D3h	Printing
2D3i	Other solvent use

## Abbreviations

2G	Other product use
2H2	Food and beverages industry
2K	Consumption of POPs and heavy metals
2L	Other production, consumption, storage, transportation or handling of bulk products
3B1a	Manure management – Dairy cattle
3B1b	Manure management – Non-dairy cattle
3B3	Manure management – Swine
3B4gi	Manure management – Laying hens
3B4gii	Manure management – Broilers
3Da1	Inorganic N fertilisers (also includes urea application)
3Da2a	Animal manure applied to soils
3Da3	Urine and dung deposited by grazing animals
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products
3De	Cultivated crops
3Df	Use of pesticides
3F	Field burning of agricultural residues
5C1bi	Industrial waste incineration
5C1bii	Clinical waste incineration
5C1bv	Cremation
5C2	Open burning of waste
5E	Other waste

## Country codes

<b>Abbreviation</b>	<b>Name</b>
AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czechia
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia

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## Appendix 1: Notation keys

Where there are methodological or data gaps in the inventories, information on these gaps should be presented in a transparent manner. Parties should clearly indicate, which sources they have not considered in their inventories – although the inventory guidebook (EMEP/EEA, 2023) includes them – and explain the reason for excluding them. Similarly, each Party should indicate if it has excluded part of its territory and explain why. In addition, each Party should use the notations presented below to fill the blanks in all the tables in the nomenclature for reporting (NFR) inventory. This approach helps in assessing how complete the emission data reports are. Further explanation and guidance concerning the use of these notation codes are given in the European Monitoring and Evaluation Programme (EMEP) reporting guidelines (UNECE, 2022c). The notation keys are as follows:

**NO:** 'Not occurring' means that an emission source or process does not exist in a country.

**NE:** 'Not estimated' means that emissions occur but have not been estimated or reported. Where an inventory uses 'NE', the Party should indicate why it could not estimate emissions.

**NA:** 'Not applicable' means that a source exists but relevant emissions are considered never to occur.

**IE:** 'Included elsewhere' is for emissions that are estimated and included in the inventory but are not presented separately for the relevant source. Where it uses 'IE', the Party should indicate where the inventory includes the emissions from the displaced source category and should give the reasons for deviating from the expected category.

**C:** 'Confidential' is for aggregated emissions that the inventory includes elsewhere because reporting at a disaggregated level could lead to the disclosure of confidential information. Where an inventory uses 'C', it should make reference to the protocol provision that authorises it.

**NR:** 'Not relevant' eases reporting where different protocols do not strictly require details of the emissions. According to Article III paragraph 9 in the reporting guidelines, emission inventory reporting should cover all years from 1980 onwards if data are available. However, for example, some Parties do not need to report emissions of non-methane volatile organic compounds (NMVOCs) prior to 1988.

## Appendix 2: Air Convention emission-reporting programme for 2025

Emission data should be submitted to the European Monitoring and Evaluation Programme (EMEP) Centre on Emission Inventories and Projections (CEIP) by 15 February 2025. Informative inventory reports (IIRs) should reach the centre no later than 15 March 2025.

**Table A2.1 Summarises information in the revised reporting guidelines (UNECE, 2022b,c).**

Description of contents	Pollutant(s)	Reporting for the years(a)
<b>A. National total emissions – reported every year</b>		
Main pollutants other than PM	NO <sub>x</sub> , NMVOCs, SO <sub>x</sub> , NH <sub>3</sub> , CO	1990-2024
Particulate matter(b)	PM <sub>2.5</sub> , PM <sub>10</sub> (TSPs, BC)	2000-2024
Heavy metals(b)	Pb, Cd, Hg, (As, Cr, Cu, Ni, Se, Zn)	1990-2024
Persistent organic pollutants(b)	PCDD/Fs, total PAHs, PCBs, HCB (PAHs: B(a)P, B(b)F, B(k)F, IP)	1990-2024
<b>B. Emissions by NFR source category – reported every year</b>		
Main pollutants other than PM	NO <sub>x</sub> , NMVOCs, SO <sub>x</sub> , NH <sub>3</sub> , CO	1990-2024
Particulate matter(b)	PM <sub>2.5</sub> , PM <sub>10</sub> , (TSPs, BC)	2000-2024
Heavy metals(b)	Pb, Cd, Hg, (As, Cr, Cu, Ni, Se, Zn)	1990-2024
Persistent organic pollutants(b)	PCDD/Fs, total PAHs, PCBs, HCB (PAHs: B(a)P, B(b)F, B(k)F, IP)	1990-2024
<b>C. Activity data – reported every year</b>		
D. Gridded data in the EMEP 0.1°x0.1° longitude/latitude grid, sector emissions (GNFR19)(c) and national totals (optional) – reported every 4 years, from 2017 onwards	NO <sub>x</sub> , NMVOCs, SO <sub>x</sub> , NH <sub>3</sub> , CO, PM <sub>2.5</sub> , PM <sub>10</sub> , Pb, Cd, Hg, PCDD/Fs, PAHs, HCB, PCBs	2015, 2019, 2023 (1990, 1995, 2000, 2005, 2010 if not previously reported)
<b>E. Emissions from large point sources (LPSs) – reported every 4 years, from 2017 onwards</b>		
	NO <sub>x</sub> , NMVOCs, SO <sub>x</sub> , NH <sub>3</sub> , CO, PM <sub>2.5</sub> , PM <sub>10</sub> , Pb, Cd, Hg, PCDD/Fs, PAHs, HCB, PCBs	2015, 2019, 2023 (1990, 1995, 2000, 2005, 2010 if not previously reported)
<b>F. Projected emissions and projected activity data – reported every 4 years, from 2015 onwards (thus not a part of the 2026 reporting requirements)</b>		
1. National total emission projections	NO <sub>x</sub> , NMVOCs, SO <sub>x</sub> , NH <sub>3</sub> , PM <sub>2.5</sub> , BC	2025, 2030, where available 2040 and 2050
2. Emission projections by NFR19	NO <sub>x</sub> , NMVOCs, SO <sub>x</sub> , NH <sub>3</sub> , PM <sub>2.5</sub> , BC	2025, 2030, where available 2040 and 2050
3. Projected activity data by NFR19		2025, 2030, where available 2040 and 2050
Additional reporting for review and assessment purposes – reported every 5 years		
VOC speciation/height distribution/temporal distribution		Parties are encouraged to review the information used for modelling at <a href="https://www.ceip.at/webdab-emission-database/emissions-as-used-in-emep-models">https://www.ceip.at/webdab-emission-database/emissions-as-used-in-emep-models</a>
Land use data/Hg breakdown		
Percentage of toxic congeners of PCDD/F emissions		
Pre-1990 emissions of PAHs, HCB, PCDD/Fs and PCBs		
Information on natural emissions		

**Notes:** (a) 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 (i.e. the second-last before the current year) should be reported; (b) Parties report the pollutants listed in brackets voluntarily; (c) Gap-filled NFR19.

## Reporting format

Each Party should use the reporting format in Annex IV of the Air Convention reporting guidelines (UNECE, 2022b,c) for its annual submissions. It should submit the information to the CEIP formally, preferably in electronic format, and notify the Air Convention via the United Nations Economic Commission for Europe (UNECE) Secretariat. The reporting format, including the nomenclature for reporting (NFR), is standardised for reporting estimates of emissions. It includes activity data, projected activity data, projected emissions and other relevant information. The reporting format aims to facilitate electronic submissions by making it easier to process emission information and prepare useful documentation about technical analysis and synthesis.

The nomenclature for reporting 19 (NFR19) format covers:

- national annual emissions and national annual sector emissions (Annex I);
- total and aggregated sector emissions for reporting emissions of nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOCs), sulphur oxides (SO<sub>x</sub>), ammonia (NH<sub>3</sub>), particulate matter (PM), black carbon (BC), carbon monoxide (CO), lead (Pb), cadmium (Cd), mercury (Hg), polychlorinated dibenzodioxins/dibenzofurans (PCDD/Fs), polycyclic aromatic hydrocarbons (PAHs), hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs) for the EMEP 0.1°×0.1° grid cell and from large point sources (LPSS) (Annexes V and VI);
- for 2020, 2025, 2030, 2040 and 2050, projected activity data and projected national total emissions of NO<sub>x</sub>, NMVOCs, sulphur and NH<sub>3</sub>, which Parties are to report for the source categories listed in Annex IV (A-with measures (WM); B-WM; A-with additional measures (WaM); B-WaM).

**Table A2.2 EU: country groupings**

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EU-11 refers to the following 11 Member States of the EU: Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Greece, Portugal and Spain

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EU-27 refers to the 27 Member States of the EU

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## Appendix 3: Status of reporting and timeliness

**Table A3.1 EU Member State's inventory submissions 2026: date received by the EEA, years covered and information provided (as of 28th of May 2026)**

Member State	Submission date and format								
	Submission date*	Resubmission date	Adjustment date (Information or Annex submission)	Projection submission date	Grid submission date	LPS submission date	Date of additional information	Date of IIR	NFR template version
Austria	12/02/2026	12/03/2026						12/03/2026 15/04/2026	2019-1
Belgium	12/02/2026							15/03/2026	2019-1
Bulgaria	13/02/2026	13/03/2026						13/03/2026	2019-1
Croatia	11/02/2026						10/04/2026	02/03/2026	2019-1
Cyprus	13/02/2026	14/03/2026			20/02/2026			14/03/2026 16/03/2026	2019-1
Czechia	15/02/2026	14/03/2026	15/02/2026					14/03/2026	2019-1
Denmark	13/02/2026		13/02/2026					15/03/2026	2019-1
Estonia	12/02/2026	13/02/2026 12/03/2026						13/03/2026	2019-1
Finland	13/02/2026	13/02/2026 13/03/2026	13/02/2026 15/03/2026					15/03/2026	2019-1
France	12/02/2026		12/02/2026					13/03/2026	2019-1
Germany	06/02/2026							13/03/2026	2019-1
Greece	12/02/2026							10/03/2026	2019-1
Hungary	18/02/2026	20/04/2026					06/01/2026	20/04/2026	2019-1
Ireland	11/02/2026	13/03/2026	11/02/2026 13/03/2026	13/03/2026				13/03/2026	2019-1
Italy	12/02/2026							12/03/2026	2019-1
Latvia	13/02/2026	13/03/2026						13/03/2026	2019-1
Lithuania	15/02/2026	18/02/2026						15/03/2026	2019-1
Luxembourg	12/02/2026								2019-1
Malta	13/02/2026	25/05/2026		13/02/2026				20/03/2026	2019-1
Netherlands	11/02/2026		11/02/2026 11/02/2026					11/03/2026 12/03/2026 01/04/2026	2019-1
Poland	11/02/2026							10/03/2026	2019-1
Portugal	13/02/2026	13/03/2026						15/03/2026 13/04/2026	2019-1
Romania	04/02/2026							13/03/2026	2019-1
Slovakia	13/02/2026	13/03/2026						13/03/2026	2019-1
Slovenia	09/02/2026			13/03/2026				14/03/2026	2019-1
Spain	11/02/2026	12/02/2026 12/02/2026			28/04/2026	28/04/2026		11/03/2026	2019-1
Sweden	30/01/2026							25/02/2026	2019-1

**Notes:** Dates in red indicate that data were submitted after the formal deadline for submissions (see chapter 1.1.1).

(\* Refers to the first submission of inventory data to the Central Data Repository (CDR); submission of other data are possible at later dates.

IIR, informative inventory report; LPS, large point source; NFR, nomenclature for reporting.

**Table A3.2 Coverage of data in the 2025 inventory submissions by EU member States (as of 11th of April 2026)**

Member State	Years Reported					
	Main Pollutants	Priority Heavy Metals	Additional Heavy Metals	Particulate Matter	POPs	Activity Data
Austria	1990-2024	1990-2024		1990, 1995, 2000-2024	1990-2024	1990-2024
Belgium	1990-2024	1990-2024	1990-2024	2000-2024	1990-2024	1990-2024
Bulgaria	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Croatia	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Cyprus	1990-2024	1990-2024	1990-2024	2000-2024	1990-2024	1990-2024
Czechia	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Denmark	1980-2024	1990-2024	1990-2024	1990-2024	1990-2024	1980-2024
Estonia	1990-2024	1990-2024	1990-2024	2000-2024	1990-2024	1990-2024
Finland	1980-2024	1980-2024	1980-2024	1980-2024	1980-2024	1980-2024
France	1980-2024	1980-2024	1980-2024	1980-2024	1980-2024	1980-2024
Germany	1990-2024	1990-2024	1990-2024	1995-2024	1990-2024	1990-2024
Greece	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Hungary	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Ireland	1987, 1990-2024	1987, 1990-2024	1987, 1990-2024	1987, 1990-2024	1987, 1990-2024	1987, 1990-2024
Italy	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Latvia	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Lithuania	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Luxembourg	1990-2024	1990-2024		1990-2024	1990-2024	1990-2024
Malta	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Netherlands	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Poland	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Portugal	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Romania	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Slovakia	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024
Slovenia	1980-2024	1990-2024	1990-2024	2000-2024	1990-2024	1990-2024
Spain	1990-2024	1990-2024	1990-2024	2000-2024	1990-2024	1990-2024
Sweden	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024	1990-2024

Notes: Reporting of additional HMs is not mandatory.

## Appendix 4: Conversion chart for aggregated sector groups

To enable the presentation of sectoral emission trends, individual nomenclature for reporting (NFR) source categories for the EU-27 inventory were aggregated into the following main sector groups:

- energy production and distribution;
- energy use in industry;
- industrial processes and product use;
- commercial, institutional and households;
- road transport;
- non-road transport;
- agriculture;
- waste.

Table A4.1 provides a conversion chart showing which of the individual NFR source categories appeared in each of the aggregated sector groups.

**Table A4.1 Conversion chart for aggregated sector groups**

NFR code	Full name	EEA aggregated sector name
1A1a	Public electricity and heat production	Energy production and distribution
1A1b	Petroleum refining	Energy production and distribution
1A1c	Manufacture of solid fuels and other energy industries	Energy production and distribution
1A2a	Stationary combustion in manufacturing industries and construction: Iron and steel	Energy use in industry
1A2b	Stationary combustion in manufacturing industries and construction: Non-ferrous metals	Energy use in industry
1A2c	Stationary combustion in manufacturing industries and construction: Chemicals	Energy use in industry
1A2d	Stationary combustion in manufacturing industries and construction: Pulp, paper and print	Energy use in industry
1A2e	Stationary combustion in manufacturing industries and construction: Food processing, beverages and tobacco	Energy use in industry
1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals	Energy use in industry
1A2gvii	Mobile combustion in manufacturing industries and construction	Energy use in industry
1A2gviii	Stationary combustion in manufacturing industries and construction: Other	Energy use in industry
1A3ai(i)	International aviation LTO (civil)	Non-road transport

1A3aii(i)	Domestic aviation LTO (civil)	Non-road transport
1A3bi	Road transport: Passenger cars	Road transport
1A3bii	Road transport: Light duty vehicles	Road transport
1A3biii	Road transport: Heavy duty vehicles and buses	Road transport
1A3biv	Road transport: Mopeds and motorcycles	Road transport
1A3bv	Road transport: Gasoline evaporation	Road transport
1A3bvi	Road transport: Automobile tyre and brake wear	Road transport
1A3bvii	Road transport: Automobile road abrasion	Road transport
1A3c	Railways	Non-road transport
1A3di(ii)	International inland waterways	Non-road transport
1A3dii	National navigation (shipping)	Non-road transport
1A3ei	Pipeline transport	Non-road transport
1A3eii	Other	Non-road transport
1A4ai	Commercial/institutional: Stationary	Commercial, institutional and households
1A4aii	Commercial/institutional: Mobile	Commercial, institutional and households
1A4bi	Residential: Stationary	Commercial, institutional and households
1A4bii	Residential: Household and gardening (mobile)	Commercial, institutional and households
1A4ci	Agriculture/forestry/fishing: Stationary	Commercial, institutional and households
1A4cii	Agriculture/forestry/fishing: Off-road vehicles and other machinery	Commercial, institutional and households
1A4ciii	Agriculture/forestry/fishing: National fishing	Non-road transport
1A5a	Other stationary (including military)	Commercial, institutional and households
1A5b	Other, mobile (including military, land-based and recreational boats)	Commercial, institutional and households
1B1a	Fugitive emission from solid fuels: Coal mining and handling	Energy production and distribution
1B1b	Fugitive emission from solid fuels: Solid fuel transformation	Energy production and distribution
1B1c	Other fugitive emissions from solid fuels	Energy production and distribution
1B2ai	Fugitive emissions oil: Exploration, production, transport	Energy production and distribution
1B2aiv	Fugitive emissions oil: Refining/storage	Energy production and distribution
1B2av	Distribution of oil products	Energy production and distribution
1B2b	Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other)	Energy production and distribution
1B2c	Venting and flaring (oil, gas, combined oil and gas)	Energy production and distribution
1B2d	Other fugitive emissions from energy production	Energy production and distribution
2A1	Cement production	Industrial processes and product use
2A2	Lime production	Industrial processes and product use
2A3	Glass production	Industrial processes and product use
2A5a	Quarrying and mining of minerals other than coal	Industrial processes and product use
2A5b	Construction and demolition	Industrial processes and product use
2A5c	Storage, handling and transport of mineral products	Industrial processes and product use
2A6	Other mineral products	Industrial processes and product use
2B1	Ammonia production	Industrial processes and product use
2B2	Nitric acid production	Industrial processes and product use
2B3	Adipic acid production	Industrial processes and product use

2B5	Carbide production	Industrial processes and product use
2B6	Titanium dioxide production	Industrial processes and product use
2B7	Soda ash production	Industrial processes and product use
2B10a	Chemical industry: Other	Industrial processes and product use
2B10b	Storage, handling and transport of chemical products	Industrial processes and product use
2C1	Iron and steel production	Industrial processes and product use
2C2	Ferroalloys production	Industrial processes and product use
2C3	Aluminium production	Industrial processes and product use
2C4	Magnesium production	Industrial processes and product use
2C5	Lead production	Industrial processes and product use
2C6	Zinc production	Industrial processes and product use
2C7a	Copper production	Industrial processes and product use
2C7b	Nickel production	Industrial processes and product use
2C7c	Other metal production	Industrial processes and product use
2C7d	Storage, handling and transport of metal products	Industrial processes and product use
2D3a	Domestic solvent use including fungicides	Industrial processes and product use
2D3b	Road paving with asphalt	Industrial processes and product use
2D3c	Asphalt roofing	Industrial processes and product use
2D3d	Coating applications	Industrial processes and product use
2D3e	Degreasing	Industrial processes and product use
2D3f	Dry cleaning	Industrial processes and product use
2D3g	Chemical products	Industrial processes and product use
2D3h	Printing	Industrial processes and product use
2D3i	Other solvent use	Industrial processes and product use
2G	Other product use	Industrial processes and product use
2H1	Pulp and paper industry	Industrial processes and product use
2H2	Food and beverages industry	Industrial processes and product use
2H3	Other industrial processes	Industrial processes and product use
2I	Wood processing	Industrial processes and product use
2J	Production of POPs	Industrial processes and product use
2K	Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)	Industrial processes and product use
2L	Other production, consumption, storage, transportation or handling of bulk products	Industrial processes and product use
3B1a	Manure management – Dairy cattle	Agriculture
3B1b	Manure management – Non-dairy cattle	Agriculture
3B2	Manure management – Sheep	Agriculture
3B3	Manure management – Swine	Agriculture
3B4a	Manure management – Buffalo	Agriculture
3B4d	Manure management – Goats	Agriculture
3B4e	Manure management – Horses	Agriculture
3B4f	Manure management – Mules and asses	Agriculture
3B4gi	Manure management – Laying hens	Agriculture

3B4gii	Manure management – Broilers	Agriculture
3B4giii	Manure management – Turkeys	Agriculture
3B4giv	Manure management – Other poultry	Agriculture
3B4h	Manure management – Other animals	Agriculture
3Da1	Inorganic N-fertilisers (includes also urea application)	Agriculture
3Da2a	Animal manure applied to soils	Agriculture
3Da2b	Sewage sludge applied to soils	Agriculture
3Da2c	Other organic fertilisers applied to soils (including compost)	Agriculture
3Da3	Urine and dung deposited by grazing animals	Agriculture
3Da4	Crop residues applied to soils	Agriculture
3Db	Indirect emissions from managed soils	Agriculture
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products	Agriculture
3Dd	Off-farm storage, handling and transport of bulk agricultural products	Agriculture
3De	Cultivated crops	Agriculture
3Df	Use of pesticides	Agriculture
3F	Field burning of agricultural residues	Agriculture
3I	Agriculture other	Agriculture
5A	Biological treatment of waste – Solid waste disposal on land	Waste
5B1	Biological treatment of waste – Composting	Waste
5B2	Biological treatment of waste – Anaerobic digestion at biogas facilities	Waste
5C1a	Municipal waste incineration	Waste
5C1bi	Industrial waste incineration	Waste
5C1bii	Hazardous waste incineration	Waste
5C1biii	Clinical waste incineration	Waste
5C1biv	Sewage sludge incineration	Waste
5C1bv	Cremation	Waste
5C1bvi	Other waste incineration	Waste
5C2	Open burning of waste	Waste
5D1	Domestic waste water handling	Waste
5D2	Industrial waste water handling	Waste
5D3	Other waste water handling	Waste
5E	Other waste	Waste
6A	Other (included in national total for entire territory)	Other

Notes: LTO, landing/take-off; NFR, nomenclature for reporting; POPs, persistent organic pollutant.

## Appendix 5: EU Member State informative inventory reports

**Table A5.1 List of submitted informative inventory reports (IIRs) by the EU Member States including source and date of the latest submission (as of 30th of April 2026)**

Country code	Source	Date of submissions
AT	<a href="https://cdr.eionet.europa.eu/at/un/clrtap/iir">https://cdr.eionet.europa.eu/at/un/clrtap/iir</a>	15/04/2026
BE	<a href="https://cdr.eionet.europa.eu/be/un/clrtap/iir">https://cdr.eionet.europa.eu/be/un/clrtap/iir</a>	15/03/2026
BG	<a href="https://cdr.eionet.europa.eu/bg/un/clrtap/iir">https://cdr.eionet.europa.eu/bg/un/clrtap/iir</a>	13/03/2026
CY	<a href="https://cdr.eionet.europa.eu/cy/un/clrtap/iir">https://cdr.eionet.europa.eu/cy/un/clrtap/iir</a>	16/03/2026
CZ	<a href="https://cdr.eionet.europa.eu/cz/un/clrtap/iir">https://cdr.eionet.europa.eu/cz/un/clrtap/iir</a>	14/03/2026
DE	<a href="https://cdr.eionet.europa.eu/de/un/clrtap/iir">https://cdr.eionet.europa.eu/de/un/clrtap/iir</a>	13/03/2026
DK	<a href="https://cdr.eionet.europa.eu/dk/un/clrtap/iir">https://cdr.eionet.europa.eu/dk/un/clrtap/iir</a>	15/03/2026
EE	<a href="https://cdr.eionet.europa.eu/ee/un/clrtap/iir">https://cdr.eionet.europa.eu/ee/un/clrtap/iir</a>	13/03/2026
EL	<a href="https://cdr.eionet.europa.eu/gr/un/clrtap/iir">https://cdr.eionet.europa.eu/gr/un/clrtap/iir</a>	10/03/2026
ES	<a href="https://cdr.eionet.europa.eu/es/un/clrtap/iir">https://cdr.eionet.europa.eu/es/un/clrtap/iir</a>	11/03/2026
FI	<a href="https://cdr.eionet.europa.eu/fi/un/clrtap/iir">https://cdr.eionet.europa.eu/fi/un/clrtap/iir</a>	15/03/2026
FR	<a href="https://cdr.eionet.europa.eu/fr/un/clrtap/iir">https://cdr.eionet.europa.eu/fr/un/clrtap/iir</a>	13/03/2026
HR	<a href="https://cdr.eionet.europa.eu/hr/un/clrtap/iir">https://cdr.eionet.europa.eu/hr/un/clrtap/iir</a>	02/03/2026
HU	<a href="https://cdr.eionet.europa.eu/hu/un/clrtap/iir">https://cdr.eionet.europa.eu/hu/un/clrtap/iir</a>	20/04/2026
IE	<a href="https://cdr.eionet.europa.eu/ie/un/clrtap/iir">https://cdr.eionet.europa.eu/ie/un/clrtap/iir</a>	13/03/2026
IT	<a href="https://cdr.eionet.europa.eu/it/un/clrtap/iir">https://cdr.eionet.europa.eu/it/un/clrtap/iir</a>	12/03/2026
LT	<a href="https://cdr.eionet.europa.eu/lt/un/clrtap/iir">https://cdr.eionet.europa.eu/lt/un/clrtap/iir</a>	15/03/2026
LU		
LV	<a href="https://cdr.eionet.europa.eu/lv/un/clrtap/iir">https://cdr.eionet.europa.eu/lv/un/clrtap/iir</a>	13/03/2026
MT	<a href="https://cdr.eionet.europa.eu/mt/un/clrtap/iir">https://cdr.eionet.europa.eu/mt/un/clrtap/iir</a>	20/03/2026
NL	<a href="https://cdr.eionet.europa.eu/nl/un/clrtap/iir">https://cdr.eionet.europa.eu/nl/un/clrtap/iir</a>	01/04/2026
PL	<a href="https://cdr.eionet.europa.eu/pl/un/clrtap/iir">https://cdr.eionet.europa.eu/pl/un/clrtap/iir</a>	10/03/2026
PT	<a href="https://cdr.eionet.europa.eu/pt/un/clrtap/iir">https://cdr.eionet.europa.eu/pt/un/clrtap/iir</a>	13/04/2026
RO	<a href="https://cdr.eionet.europa.eu/ro/un/clrtap/iir">https://cdr.eionet.europa.eu/ro/un/clrtap/iir</a>	13/03/2026
SE	<a href="https://cdr.eionet.europa.eu/se/un/clrtap/iir">https://cdr.eionet.europa.eu/se/un/clrtap/iir</a>	25/02/2026
SI	<a href="https://cdr.eionet.europa.eu/si/un/clrtap/iir">https://cdr.eionet.europa.eu/si/un/clrtap/iir</a>	14/03/2026
SK	<a href="https://cdr.eionet.europa.eu/sk/un/clrtap/iir">https://cdr.eionet.europa.eu/sk/un/clrtap/iir</a>	13/03/2026

## Appendix 6: Uncertainty analysis

**Table A6.1 Overview of reporting on uncertainties by Member States in the current year**

MS	Reference in IIR	Years covered	Sectors covered	Pollutants covered						Tier method
				Main pollutants	PM	Other: CO	Priority HM	Additional HM	POPs	Method
AT	IIR 2026, page 87	1990, 2024	all sectors	yes	yes	yes	yes	no	yes	Approach 1
BE	IIR 2026, page 20ff. Annex 4	1990, 2024	key sectors	yes	yes	yes	yes	yes	yes	Approach 1
BG	IIR 2026, page 22	NR	NR	NR	NR	NR	NR	NR	NR	NR
HR	IIR 2026, page 42ff	1990, 2024	all sectors	yes	yes	yes	yes	yes	yes	Approach 1
CY	IIR 2026, page 20ff. Annex 4	1990, 2024	all sectors	yes	yes	yes	yes	no	yes	Approach 1
CZ	IIR 2026, page 15	partly 2024	only some sectors covered	NR	NR	NR	NR	NR	NR	NR
DK	IIR 2026, page 27 Appendix 6	1990, 2024	all sectors	yes	yes	yes	yes	yes	yes	Approach 1
EE	IIR 2026, page 38	1990, 2024	all sectors	yes	yes	yes	yes	no	yes	Approach 1
FI	IIR 2025, Part 1A, page 44 Annex 6	1990, 2024	all sectors	yes	yes	yes	yes	yes	yes	Approach 1
FR	IIR 2026, page 56 Annex 9	1990, 2024	all sectors	yes	yes	yes	yes	yes	yes	Approach 1
DE	IIR 2026, Chapter 1.7	1990, 2024	all sectors	yes	PM2.5	no	no	no	no	Approach 1 and 2
GR	IIR 2026, page 39 Annex II	1990, 2023	all sectors	yes	PM2.5	no	no	no	no	Approach 1
HU	not reported, page 16	NR	NR	NR	NR	NR	NR	NR	NR	NR
IE	IIR 2026, page 28 Annex G	1990, 2024	all sectors	yes	PM2.5	yes	no	no	no	Approach 1
IT	IIR 2026, page 30ff Appendix 2	1990, 2021 (NOx), 2022 (SOx), CO (2023),	all sectors	NOx, SOx	no	yes	no	no	no	Approach 1
LV	IIR 2026, page 18	1990, 2024	all sectors	yes	yes	yes	yes	no	yes	Approach 1

LT	IIR 2026, page 10	NR	only some sectors covered	NR	NR	NR	NR	NR	NR	NR
LU	IIR 2025, page 50	1990,2023	all sectors	yes	PM2.5	no	no	no	no	Approach 1
MT	IIR 2026, page 38	2005, 2024	all sectors	yes	PM2.5, PM10	no	no	no	no	Approach 1
NL	IIR 2026, page 28ff Appendix 6	2024	all sectors	yes	PM2.5, PM10	no	no	no	no	Approach 2
PL	IIR 2026, page 16 Appendix 8	1990, 2024	all sectors	yes	yes	yes	yes	no	yes	Approach 1
PT	IIR 2026, page 1-22, Annex G	1990, 2024	all sectors	yes	PM2.5	no	no	no	no	Approach 1
RO	IIR 2026, page 31ff	1990, 2025	all sectors	yes	PM2.5	no	no	no	no	Approach 1
SK	IIR 2026, page 30ff Annex 9	1990, 2024	all sectors	yes	yes	yes	yes	yes	yes	Approach 1
SI	IIR 2026, page 11 Annex 3	1980/1986/1990-2024	all sectors	yes	PM2.5	no	no	no	no	Approach 1
ES	IIR 2026, page 65 Annex 3	1990, 2023	all sectors	yes	PM2.5, BC	no	no	no	no	Approach 1
SE	IIR 2026, page 16 Annex 1	1990, 2024	all sectors	yes	yes	yes	yes	yes	yes	Approach 1

Table A6.2 Uncertainty results for NOx emissions in the current year

MS	Share in total EU emissions	Level uncertainty	Trend uncertainty	Weighted level uncertainty	Weighted trend uncertainty
AT	2.22%	17.9%	3.30%	0.40%	0.07%
BE	2.46%	23.25%	5.81%	0.57%	0.14%
BG	1.76%	26.89%	6.38%	0.47%	0.11%
HR	1.01%	18.40%	3.30%	0.19%	0.03%
CY	0.29%	42.78%	14.45%	0.12%	0.04%
CZ	2.53%	26.89%	6.38%	0.68%	0.16%
DK	1.61%	66.00%	10.00%	1.06%	0.16%
EE	0.36%	14.13%	2.73%	0.05%	0.01%
FI	1.86%	13.80%	5.90%	0.26%	0.11%
FR	13.12%	80.70%	15.30%	10.59%	2.01%
DE	16.38%	16.40%	8.60%	2.69%	1.41%

GR	4.42%	37.25%	11.19%	1.65%	0.49%
HU	1.91%	26.89%	6.38%	0.51%	0.12%
IE	1.81%	47.90%	14.20%	0.86%	0.26%
IT	10.87%	4.10%	0.90%	0.45%	0.10%
LV	0.63%	11.38%	2.31%	0.07%	0.01%
LT	0.81%	26.89%	6.38%	0.22%	0.05%
LU	0.22%	20.13%	3.28%	0.04%	0.01%
MT	0.09%	31.00%	7.00%	0.03%	0.01%
NL	3.66%	18.00%	6.38%	0.66%	0.23%
PL	9.65%	19.30%	5.00%	1.86%	0.48%
PT	2.72%	33.60%	0.80%	0.91%	0.02%
RO	4.15%	22.19%	5.82%	0.92%	0.24%
SK	1.03%	21.33%	4.71%	0.22%	0.05%
SI	0.51%	9.70%	2.20%	0.05%	0.01%
ES	11.91%	15.60%	4.90%	1.86%	0.58%
SE	2.01%	33.70%	8.60%	0.68%	0.17%
<b>EU</b>	<b>100.00%</b>			<b>28.07%</b>	<b>7.11%</b>

**Note:** The average value used for gap-filling is 26.89% for the level uncertainty and 6.38% for the trend uncertainty. These values were applied to MS marked in grey.

**Table A6.2** Uncertainty results for SO<sub>x</sub> emissions in the current year

<b>MS</b>	<b>Share in total EU emissions</b>	<b>Level uncertainty</b>	<b>Trend uncertainty</b>	<b>Weighted level uncertainty</b>	<b>Weighted trend uncertainty</b>
AT	1.03%	7.1%	1.20%	0.07%	0.01%
BE	2.08%	12.27%	0.76%	0.26%	0.02%
BG	4.11%	12.76%	0.86%	0.52%	0.04%
HR	0.45%	17.80%	0.50%	0.08%	0.00%
CY	1.09%	16.72%	4.03%	0.18%	0.04%
CZ	4.27%	12.76%	0.86%	0.55%	0.04%
DK	0.71%	21.00%	0.80%	0.15%	0.01%
EE	0.91%	8.34%	0.09%	0.08%	0.00%
FI	1.73%	5.40%	0.50%	0.09%	0.01%
FR	6.89%	12.80%	0.20%	0.88%	0.01%
DE	19.41%	8.10%	1.30%	1.57%	0.25%
GR	3.57%	8.71%	0.91%	0.31%	0.03%
HU	0.83%	12.76%	0.86%	0.11%	0.01%
IE	0.69%	14.10%	0.50%	0.10%	0.00%

IT	6.83%	5.40%	0.30%	0.37%	0.02%
LV	0.38%	5.86%	0.20%	0.02%	0.00%
LT	0.90%	12.76%	0.86%	0.11%	0.01%
LU	0.05%	17.33%	0.18%	0.01%	0.00%
MT	0.02%	14.00%	2.00%	0.00%	0.00%
NL	1.54%	21.00%	0.86%	0.32%	0.01%
PL	23.93%	12.10%	1.00%	2.90%	0.24%
PT	3.97%	13.77%	0.44%	0.55%	0.02%
RO	2.51%	14.48%	0.48%	0.36%	0.01%
SK	0.95%	19.39%	1.33%	0.18%	0.01%
SI	0.27%	8.30%	0.10%	0.02%	0.00%
ES	9.50%	20.60%	0.90%	1.96%	0.09%
SE	1.38%	8.90%	1.20%	0.12%	0.02%
<b>EU</b>	<b>100.00%</b>			<b>11.88%</b>	<b>0.90%</b>

**Note:** The average value used for gap-filling is 12.76% for the level uncertainty and 0.86% for the trend uncertainty. These values were applied to MS marked in grey.

**Table A6.3** Uncertainty results for NMVOC emissions in the current year

MS	Share in total EU emissions	Level uncertainty	Trend uncertainty	Weighted level uncertainty	Weighted trend uncertainty
AT	1.85%	24.5%	8.50%	0.45%	0.16%
BE	1.99%	27.38%	8.01%	0.54%	0.16%
BG	1.05%	37.88%	10.68%	0.40%	0.11%
HR	0.87%	23.10%	3.90%	0.20%	0.03%
CY	0.16%	50.58%	22.51%	0.08%	0.04%
CZ	3.68%	37.88%	10.68%	1.39%	0.39%
DK	1.76%	110.00%	26.00%	1.93%	0.46%
EE	0.37%	19.35%	2.73%	0.07%	0.01%
FI	1.24%	44.50%	19.90%	0.55%	0.25%
FR	17.35%	49.80%	10.30%	8.64%	1.79%
DE	15.94%	36.90%	21.00%	5.88%	3.35%
GR	2.07%	44.29%	9.44%	0.92%	0.20%
HU	1.80%	37.88%	10.68%	0.68%	0.19%
IE	1.84%	69.30%	18.60%	1.27%	0.34%
IT	14.10%	37.88%	10.68%	5.34%	1.51%
LV	0.58%	15.19%	4.91%	0.09%	0.03%
LT	0.76%	37.88%	10.68%	0.29%	0.08%

LU	0.15%	41.89%	11.06%	0.06%	0.02%
MT	0.05%	29.00%	3.00%	0.01%	0.00%
NL	3.92%	52.00%	10.68%	2.04%	0.42%
PL	10.28%	16.20%	6.80%	1.66%	0.70%
PT	2.53%	30.50%	2.20%	0.77%	0.06%
RO	3.46%	37.29%	15.40%	1.29%	0.53%
SK	1.25%	32.25%	7.43%	0.40%	0.09%
SI	0.46%	13.60%	4.10%	0.06%	0.02%
ES	8.38%	42.40%	12.50%	3.55%	1.05%
SE	2.11%	23.30%	6.00%	0.49%	0.13%
<b>EU</b>	100.00%			<b>39.10%</b>	<b>12.10%</b>

Note: The average value used for gap-filling is 37.88% for the level uncertainty and 10.68% for the trend uncertainty. These values were applied to MS marked in grey.

**Table A6.4** Uncertainty results for NH<sub>3</sub> emissions in the current year

MS	Share in total EU emissions	Level uncertainty	Trend uncertainty	Weighted level uncertainty	Weighted trend uncertainty
AT	2.14%	20.4%	5.20%	0.44%	0.11%
BE	1.79%	41.02%	24.61%	0.73%	0.44%
BG	1.55%	49.29%	17.23%	0.76%	0.27%
HR	0.77%	70.70%	17.20%	0.54%	0.13%
CY	0.22%	141.23%	42.51%	0.31%	0.09%
CZ	2.03%	49.29%	17.23%	1.00%	0.35%
DK	2.09%	20.00%	9.00%	0.42%	0.19%
EE	0.28%	40.88%	9.80%	0.12%	0.03%
FI	0.89%	63.80%	66.00%	0.57%	0.59%
FR	16.99%	41.40%	13.70%	7.03%	2.33%
DE	15.61%	10.00%	10.40%	1.56%	1.62%
GR	2.29%	68.84%	20.07%	1.58%	0.46%
HU	2.35%	49.29%	17.23%	1.16%	0.40%
IE	3.47%	81.30%	8.90%	2.82%	0.31%
IT	10.54%	49.29%	17.23%	5.20%	1.82%
LV	0.38%	21.95%	3.85%	0.08%	0.01%
LT	0.92%	49.29%	17.23%	0.45%	0.16%
LU	0.17%	8.73%	10.91%	0.01%	0.02%
MT	0.04%	31.00%	7.00%	0.01%	0.00%
NL	3.33%	28.00%	17.23%	0.93%	0.57%

PL	9.40%	41.50%	6.00%	3.90%	0.56%
PT	1.84%	71.30%	4.10%	1.31%	0.08%
RO	4.61%	91.10%	25.13%	4.20%	1.16%
SK	0.76%	89.63%	28.96%	0.68%	0.22%
SI	0.47%	48.20%	14.10%	0.23%	0.07%
ES	13.40%	37.80%	26.50%	5.07%	3.55%
SE	1.66%	15.70%	7.90%	0.26%	0.13%
<b>EU</b>	100.00%			<b>41.39%</b>	<b>15.68%</b>

**Note:** The average value used for gap-filling is 49.29% for the level uncertainty and 17.23% for the trend uncertainty. These values were applied to MS marked in grey.

**Table A6.5** Uncertainty results for PM<sub>2.5</sub> emissions in the current year

MS	Share in total EU emissions	Level uncertainty	Trend uncertainty	Weighted level uncertainty	Weighted trend uncertainty
AT	1.26%	33.9%	10.10%	0.43%	0.13%
BE	1.58%	17.83%	12.68%	0.28%	0.20%
BG	1.72%	47.60%	12.67%	0.82%	0.22%
HR	2.24%	57.90%	9.60%	1.30%	0.21%
CY	0.15%	33.52%	21.07%	0.05%	0.03%
CZ	3.29%	47.60%	12.67%	1.56%	0.42%
DK	0.96%	80.00%	11.00%	0.77%	0.11%
EE	0.41%	26.14%	14.22%	0.11%	0.06%
FI	1.17%	47.70%	18.00%	0.56%	0.21%
FR	15.51%	63.00%	4.30%	9.77%	0.67%
DE	6.89%	27.00%	14.50%	1.86%	1.00%
GR	2.92%	97.99%	23.77%	2.86%	0.69%
HU	2.90%	47.60%	12.67%	1.38%	0.37%
IE	0.88%	80.40%	16.90%	0.71%	0.15%
IT	11.36%	47.60%	12.67%	5.41%	1.44%
LV	1.33%	35.52%	24.05%	0.47%	0.32%
LT	0.88%	47.60%	12.67%	0.42%	0.11%
LU	0.12%	63.17%	2.29%	0.08%	0.00%
MT	0.04%	39.00%	2.00%	0.01%	0.00%
NL	1.29%	40.00%	12.67%	0.52%	0.16%
PL	19.81%	26.90%	6.60%	5.33%	1.31%
PT	3.82%	89.80%	6.20%	3.43%	0.24%
RO	7.95%	51.46%	42.59%	4.09%	3.38%

SK	1.12%	21.26%	3.09%	0.24%	0.03%
SI	0.81%	35.10%	6.70%	0.28%	0.05%
ES	8.41%	54.80%	13.90%	4.61%	1.17%
SE	1.17%	24.70%	2.60%	0.29%	0.03%
<b>EU</b>	100.00%			<b>47.63%</b>	<b>12.72%</b>

**Note:** The average value used for gap-filling is 47.60% for the level uncertainty and 12.67% for the trend uncertainty. These values were applied to MS marked in grey.



