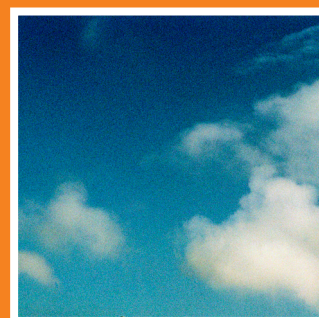


NEC Directive status report 2011

Reporting by the Member States under Directive 2001/81/EC
of the European Parliament and of the Council of 23 October 2001
on national emission ceilings for certain atmospheric pollutants

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Executive summary

This report documents the most recent emission information provided by the Member States of the European Union at the end of 2011 under Directive 2001/81/EC, known as the National Emission Ceilings Directive (NECD) (EC, 2001).

The directive requires all 27 Member States to report information annually concerning emissions and projections for four main air pollutants: nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC), sulphur dioxide (SO₂) and ammonia (NH₃). These pollutants can cause respiratory problems, contribute to the acidification of soil and surface water, and damage vegetation. To help protect human health and the environment, the NECD sets pollutant-specific and legally binding emission ceilings for each of these pollutants and for each country, which must be met by 2010. The ceilings set in the NECD were designed to reduce such adverse impacts by an agreed amount.

Comparison of preliminary emission data with the NECD emission ceilings for 2010

For the first time, preliminary data for the year 2010 reported to the European Environment Agency (EEA) by Member States allow a comparison with the legally binding emission limits for that year set in the NECD. Twelve Member States exceeded one or more of the emission limits set by the NECD, according to the official preliminary data for 2010 reported to the EEA. In some instances, the limits are reported to be exceeded by significant amounts.

The pollutant for which most exceedances were registered was NO_x. There were 12 Member States that exceeded their respective NO_x ceilings (Belgium, Denmark, Germany, Ireland, Spain, Finland, France, Luxembourg, Malta, the Netherlands, Austria and Sweden) (see Table ES.1).

The road transport sector is one of the main factors affecting the large number of NO_x exceedances, contributing approximately 40 % of total EU-27 NO_x emissions. Reductions of NO_x from this sector over the last two decades have not always been as large in many Member States as originally anticipated. This is partly because the sector has grown more than expected, and partly because vehicle real world emission factors are higher than those anticipated when the vehicle emission limit standards were set.

Spain was the only Member State to report exceeding three of its four emission ceilings under the NECD (NO_x, NMVOC, NH₃), followed by Germany (NO_x, NMVOC) and Finland (NO_x, NH₃) with two exceedances.

The EU itself also has emission ceilings for 2010 defined in the NECD. The aggregated Member State 2010 ceilings of Annex I to the NECD ⁽¹⁾ are exceeded only for NO_x on the basis of the reported preliminary emissions data (Figure ES.1). Similarly, of the three stricter Annex II emission ceilings designed with the aim of broadly meeting the interim environmental objectives as set out in Article 5 of the NECD, only the preliminary emission data of NO_x are above that ceiling. NMVOC preliminary emission data are only marginally below the Annex II ceiling.

Specifically for the four NECD pollutants:

- preliminary EU-27 NO_x emissions ⁽²⁾ for 2010 are 0.1 % above the aggregate emission ceiling given in Annex I (calculated on the basis of the individual Member State ceilings defined in the NECD), and 10 % above the stricter Annex II ceiling of the NECD for the EU-27 as a whole;

⁽¹⁾ Annexes I and II to the NECD define aggregated emission ceilings for the EU-27. The Annex I EU-27 ceilings represent the aggregation of individual Member State ceilings defined in that annex. The Annex II EU-27 ceilings are stricter than those of Annex I and are designed with the aim of attaining, by 2010, for the European Union as a whole, the interim environmental objectives set out in Article 5 of the NECD (i.e. a reduction of acidification and health- and vegetation-related ground-level ozone exposure by 2010, compared with the 1990 situation). There is no separate ceiling for NH₃ defined in Annex II to the NECD.

⁽²⁾ Preliminary EU-27 emissions are based on the aggregated preliminary emission data reported by individual Member States.

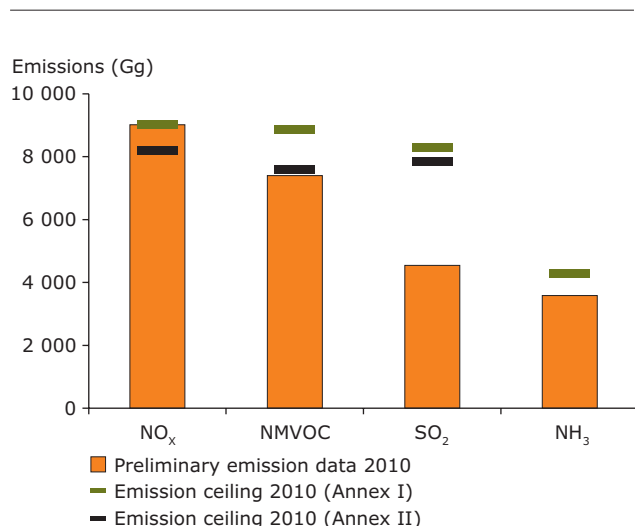
Table ES.1 EU Member State progress in meeting EU NECD 2010 emissions ceilings

Member State	NO _x	NM VOC	SO ₂	NH ₃
Austria	x	✓	✓	✓
Belgium	x	✓	✓	✓
Bulgaria	✓	✓	✓	✓
Cyprus	✓	✓	✓	✓
Czech Republic	✓	✓	✓	✓
Denmark	x	✓	✓	✓
Estonia	✓	✓	✓	✓
Finland	x	✓	✓	x
France	x	✓	✓	✓
Germany	x	x	✓	✓
Greece	✓	✓	✓	✓
Hungary	✓	✓	✓	✓
Ireland	x	✓	✓	✓
Italy	✓	✓	✓	✓
Latvia	✓	✓	✓	✓
Lithuania	✓	✓	✓	✓
Luxembourg	x	✓	✓	✓
Malta	x	✓	✓	✓
Netherlands	x	✓	✓	✓
Poland	✓	✓	✓	✓
Portugal	✓	✓	✓	✓
Romania	✓	✓	✓	✓
Slovakia	✓	✓	✓	✓
Slovenia	✓	✓	✓	✓
Spain	x	x	✓	x
Sweden	x	✓	✓	✓
United Kingdom	✓	✓	✓	✓
✓	15	25	27	25
x	12	2	0	2

Notes: '✓' indicates that the preliminary emission data reported by a Member State meet or lie below its respective emission ceiling. 'x' indicates that a ceiling is not met.

- NMVOC preliminary emission data for the EU-27 are 16 % below the aggregated emission ceiling given in Annex I for 2010, and are marginally below the Annex II ceiling (2.4 %);
- the EU-27 preliminary SO₂ emission data are 45 % below the Annex I SO₂ ceiling and 42 % below the Annex II SO₂ ceiling;
- the NH₃ preliminary emission data are 17 % below the EU-27 Annex I emission ceiling; there is no separate ceiling for NH₃ defined in Annex II to the NECD.

Figure ES.1 Aggregated Member State preliminary 2010 emission data compared with EU-27 emission ceilings defined in NECD Annexes I and II



Note: The aggregated preliminary emission estimates for the EU-27 are a mix of emission data based on fuel used (7 Member States) and fuel sold (20 Member States) for mobile sources. An overview of the emission basis used by the respective Member State is given in Table 2.2 of this report.

Table ES.2 Other EEA member countries' progress in meeting 2010 emission ceilings set in UNECE LRTAP Convention's Gothenburg Protocol

Country	NO _x	NMVOC	SO ₂	NH ₃
Liechtenstein	x	✓	✓	x
Norway	x	✓	✓	✓
Switzerland	✓	✓	✓	✓

Note: Emission data for Liechtenstein, Norway and Switzerland are the latest reported data under the LRTAP Convention and are compared with the respective listed emission ceilings of the Gothenburg Protocol. Liechtenstein has signed but not yet ratified the protocol. Of the remaining EEA member countries, neither Iceland nor Turkey has yet signed the Gothenburg Protocol.

Progress of non-EU countries in meeting 2010 emission ceilings under the Gothenburg Protocol to the UNECE LRTAP Convention

To provide comparison with the situation in other European countries, three non-EU EEA member countries (Liechtenstein, Norway and Switzerland) have emissions ceilings for 2010 set under the Gothenburg Protocol of the United Nations Economic Commission for Europe (UNECE) 1979 Convention on Long-range Transboundary Air Pollution (LRTAP) (UNECE, 1979). Data reported by these countries show that Liechtenstein has missed its NO_x and NH₃ emissions ceilings and Norway its NO_x emission ceiling, while Switzerland has achieved its four ceilings (Table ES.2).

Past emission trends, and effects of the economic recession on emission data for 2010

Under the NECD, Member States must formally submit only two years of emission data⁽³⁾. This therefore hampers any reliable assessment of long-term emission trends (either within individual Member States or for the EU-27 as a whole). Nevertheless, several Member States do submit updated emission data for all years as far back as 1990. The majority of the EU Member States that reported data back to 1990 report considerable emission reductions of the four NECD pollutants since 1990. A more complete picture of past emission trends in the European Union will be provided in mid 2012 when the EEA publishes its annual European Union emission report under the UNECE LRTAP Convention.

In terms of the impacts of the economic recession, rates of economic activity affect the emissions of certain air pollutants. For example, SO₂, NO_x and partly NMVOC emissions are to some extent dependent on the basic underlying rates of industrial activity, energy production and road transport found in countries.

Between 2008 and 2009, the EU gross domestic product (GDP) (measured in purchasing power standards) decreased by 6 % (Eurostat, 2012). In all Member States that reported 2008 and 2009 emission data for NO_x and SO₂, this downward trend in GDP is also reflected in their reported emissions.

⁽³⁾ By 31 December each year, Member States shall report to the European Commission and the EEA their national emission inventories; final emission data should be submitted for the previous year but one, as well as provisional emission data for the previous year.

In contrast, the increase in EU GDP between 2009 and 2010 of 4 % is not reflected in emissions reported by Member States — most of them note further decreases.

The assessment undertaken in this report is based on the preliminary emission estimates for 2010. In 2013, following reporting of data due by 31 December 2012, final emission data for the year 2010 will be available. The data reported by Member States for 2010 are therefore still subject to updates.

Completeness of data reporting

a) Assessment of possible underestimation

The international reporting guidelines of the UNECE LRTAP Convention (UNECE, 2009) (and through Annex III of the NECD, by extension applicable also to reporting under the NECD) allow Member States to report emissions as 'not estimated' (NE) for sectors where emissions are known to occur but have not been estimated or reported. Ideally 'NE' should only be used for sources that are very small in the respective Member State, where, for example, it may not be cost-effective to develop a specific estimation methodology compared with improving the accuracy of estimates for more significant sources.

Chapter 3 of this report presents an assessment of the magnitude of the possible underestimation in national emission inventories due to Member States' use of the 'NE' notation key. After grouping Member States into representative clusters, source categories reported as 'NE' in each national inventory were assumed to contribute the same proportion to the national total of the Member State as the mean contribution made by the same source sector to the aggregated total for the respective country group. In a final step, the potential underestimated emissions arising from use of the 'NE' notation key were added to the 2010 national total of the Member States and compared with the ceilings within the NECD to ascertain whether the difference in emissions is likely to affect the number of Member States attaining their ceilings.

For most Member States, the addition of the potential underestimate to their national totals does not change the evaluation if a Member State has emissions above or below the emission ceilings in 2010. However, for Denmark (NMVOC and NH₃)

and Slovenia (NO_x), the addition of the potential underestimation increases the 2010 emissions above the level of the respective 2010 ceiling.

This methodology uses an averaged approach based on representative country groupings and thus assumes, for example, that the economic structure of the countries in each of the country groups is similar — an assumption which may not hold in reality. Nevertheless, as an initial indicator of situations where underestimations might have occurred, and which can then be investigated in more detail, the method is considered to be a useful tool.

Member States are encouraged to review the source categories they report as 'NE' and in future to provide estimates, especially where these sources may add significantly to the currently reported national totals.

b) Pollutant-source combinations not included in the original 2010 emission ceilings

Since the original integrated assessment modelling undertaken to support the determination of the 2010 emissions ceilings, improved knowledge has become available on the sources of air pollutants. In several instances, 'new' emission source categories for the pollutants covered within the scope of the NECD have been recognised, and in some cases, on the basis of subsequent measurements, emission factors have been developed that now enable emission estimates to be made.

An analysis was performed for two such instances, NO_x and NMVOC emissions from the agriculture sector, in order to define the magnitude of these compared with the national totals and national emissions ceilings. Based on the NO_x emission estimates provided by 17 Member States, NO_x from agriculture contributes to less than 8 % to the national totals. NMVOC emissions from Agriculture (provided by 17 Member States) have a higher contribution, up to 35 % of total emissions.

The analysis demonstrates that incomplete reporting coupled with the apparent significant contribution of such sources to the national total in those Member States where data are available, may well cause emissions to be underestimated (in some cases significantly) in a number of Member States.

Transparency of reported information

Providing inventory reports or additional explanatory information that describes the methods and sources of the reported data is not mandatory under the NECD; this limits the transparency of submitted data. Nevertheless, nine Member States (Austria, Finland, Germany, Latvia, Poland, Romania, Slovakia, Spain and Sweden) voluntarily submitted an inventory report together with their NECD inventories.

Public access to data and reports

Data described in this report are available from the EEA online data viewer (EEA, 2012a) and from Annex 1 which accompanies this report.

The EEA website also has individual fact sheets (EEA, 2012b) for each Member State that provide additional analysis of various parameters: emissions per GDP, emissions per capita, and current progress towards achieving the respective emission ceilings for each pollutant etc.

Units and abbreviations

CDR	Eionet Central Data Repository
CEIP	EMEP Centre on Emission Inventories and Projections
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
EEA	European Environment Agency
Eionet	European Environmental Information and Observation Network of the EEA
EMEP	Cooperative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe
ETC/ACM	European Topic Centre for Air Pollution and Climate Change Mitigation
EU	European Union
GDP	gross domestic product
Gg	1 gigagram = 10 ⁹ g = 1 kiloton (kt)
HFCs	hydrofluorocarbons
HMs	heavy metals
IIR	Informative Inventory Report
LRTAP Convention	UNECE Convention on Long-range Transboundary Air Pollution
NE	not estimated
NECD	National Emission Ceilings Directive
NFR	nomenclature for reporting (UNECE)
NH ₃	ammonia
NMVOG	non-methane volatile organic compounds
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
PFCs	perfluorocarbons
PM	particulate matter
POPs	persistent organic pollutants
QA/QC	quality assurance/quality control
SF ₆	sulphur hexafluoride
SO ₂	sulphur dioxide
SO _x	sulphur oxides
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VOCs	volatile organic compounds (non-methane)

1 Introduction

'The aim [of the National Emission Ceilings Directive] is to limit emissions of acidifying and eutrophying pollutants and ozone precursors in order to improve the protection in the Community of the environment and human health... by establishing national emission ceilings...'

Directive 2001/81/EC, the National Emission Ceilings Directive (NECD) (EC, 2001) highlights the importance of reporting air pollutant emission data for assessing progress in reducing air pollution in the European Union region and for ascertaining the compliance of the Member States with their commitments.

This report provides an overview of emission data submitted by Member States under the NECD. It also presents a comparison of the emission ceilings of nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC) ⁽⁴⁾, sulphur dioxide (SO₂), and ammonia (NH₃) emissions and the reported preliminary emissions for 2010.

Throughout this report, the term 'European Union' refers to the 27 Member States as of 31 December 2011: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

1.1 Reporting obligations under the NECD

Articles 2, 6, 7 and 8 of the NECD set forth the requirements for the EU-27 Member States concerning national inventories, projections and programmes. Member States shall accordingly prepare and annually update national total emissions estimates and emission projections for 2010 and beyond for the pollutants NO_x, NMVOC, SO₂, and NH₃. In addition, by 31 December each year, the Member States shall report to the European Commission and the EEA these national emission inventories and emission projections; final emission data should be submitted for the previous year

but one, as well as provisional emission data for the previous year. Anticipated significant changes in the geographical distribution of national emissions shall also be indicated. In this year's report, 2010 preliminary emission data replace emission projections for 2010. Should Member States' projections differ from their 2010 preliminary emission data, these projections are not further analysed. Member States were asked to confirm that 2010 preliminary emission data are taken as their projections for 2010.

Member States were obliged to report their updated national programmes for progressive reduction of national emissions of NO_x, NMVOC, SO₂, and NH₃ to the European Commission by 2006. The reported national programmes should have included information on policies (adopted and envisaged) and quantified estimates of the effect of these policies and measures on emissions of those pollutants in 2010. A detailed evaluation of the reported NECD programmes was performed in 2007 for the European Commission. It analysed projections and programmes submitted by the Member States and the measures they planned to implement (AEA Technology, 2007).

To help ensure that information on emissions reported by Member States is consistent and harmonised, the NECD further states that the Member States shall establish emission inventories using the methodologies agreed upon by the Convention on Long-range Transboundary Air Pollution (LRTAP). It also requests (in Annex III to the NECD) that, in preparing these inventories and projections, Member States use the latest version of the *EMEP/Corinair emission inventory guidebook*, since renamed the *EMEP/EEA air pollutant emission inventory guidebook* (EMEP/EEA 2009).

It is considered good practice that, in preparing emission inventories and projections under the NECD, Member States apply the principles outlined in the United Nations Economic Commission for Europe (UNECE) guidelines for reporting emission data under the LRTAP Convention (UNECE, 2009). The historic and projected emission data presented must be 'transparent, consistent, comparable, complete and accurate'.

⁽⁴⁾ The NECD defines VOCs as being non-methane volatile organic compounds (NMVOC).

1.1.1 Scope

The NECD covers emissions from all sources of NO_x, NMVOC, SO₂, and NH₃, which arise as a result of human activities within the territory of the Member States and their exclusive economic zones, except:

- emissions from international maritime traffic;
- aircraft emissions beyond the landing and take-off cycle;
- for Spain, emissions in the Canary Islands;
- for France, emissions in the overseas departments;
- for Portugal, emissions in Madeira and the Azores.

1.1.2 Justification for the EU air emission inventory

As specified in Article 7 of the NECD, the European Commission, assisted by the EEA, shall, in cooperation with Member States and based on information provided by them, establish inventories and projections for the relevant pollutants. The inventories and projections shall be made publicly available ⁽⁵⁾.

1.1.3 Emission ceilings

By 2010 at the latest, Member States shall limit their annual emissions of NO_x, NMVOC, SO₂, and NH₃ to the ceilings defined in the directive. In this report, emissions by Member States for the year 2010 are compared with the emission ceilings defined in

Table 1.1 National 2010 emission ceilings for NO_x, NMVOC, SO₂ and NH₃, as defined in NECD Annex I

Member State	NO _x (Gg)	NMVOC (Gg)	SO ₂ (Gg)	NH ₃ (Gg)
Austria	103	159	39	66
Belgium	176	139	99	74
Bulgaria	247	175	836	108
Cyprus	23	14	39	9
Czech Republic	286	220	265	80
Denmark	127	85	55	69
Estonia	60	49	100	29
Finland	170	130	110	31
France	810	1 050	375	780
Germany	1 051	995	520	550
Greece	344	261	523	73
Hungary	198	137	500	90
Ireland	65	55	42	116
Italy	990	1 159	475	419
Latvia	61	136	101	44
Lithuania	110	92	145	84
Luxembourg	11	9	4	7
Malta	8	12	9	3
Netherlands	260	185	50	128
Poland	879	800	1 397	468
Portugal	250	180	160	90
Romania	437	523	918	210
Slovakia	130	140	110	39
Slovenia	45	40	27	20
Spain	847	662	746	353
Sweden	148	241	67	57
United Kingdom	1 167	1 200	585	297
EU-27	9 003	8 848	8 297	4 294

⁽⁵⁾ Data submitted by Member States under the NECD are available through the EEA data service (EEA, 2012c).

Table 1.2 EU 2010 emission ceilings for NO_x, NMVOC and SO₂ as defined in NECD Annex II

	NMVOC (Gg)	NO _x (Gg)	SO ₂ (Gg)
EU-27	7 585	8 180	7 832

Annex I to the NECD. Emission ceilings for the individual Member States and for the EU-27 as a whole (as defined in Annexes I and II to the NECD) are shown in Tables 1.1 and 1.2.

The emission ceilings given in Annex II to the NECD (Table 1.2) are designed with the aim of attaining the European Union's interim environmental objectives set out in Article 5 of the NECD by 2010. Meeting those objectives is expected to result in reduced acidification and reduced health- and vegetation-related ground-level ozone exposure by 2010, compared with the situation in 1990. The Annex II emission ceilings for the European Union are stricter than the aggregated Member State emission ceilings given in NECD Annex I. There is no ceiling for NH₃ in Annex II of the NECD.

1.2 Preparation of NECD inventories in the European Union

1.2.1 Institutional arrangements and dataflow

Preparation of the aggregated European Union NECD inventory involves several stages: the Member States provide data; the European Commission and the EEA receive the data; and the EEA (via its ETC/ACM) compiles the data and prepares the inventory data and this assessment report. The EEA and the European Commission also communicate with the Member States and disseminate the results.

For reporting purposes, EU Member States are requested to make use of the EEA Eionet ReportNet tools. Within the Eionet priority dataflow agreement, the EEA requests that its members supply a copy of their report on NECD emissions, projections and programmes, as reported to the European Commission. The European Commission encourages EU accession and candidate countries to provide data on a voluntary basis.

A flowchart diagram illustrating the dataflow necessary to compile the European Union's NECD emission inventory is presented in Figure 1.1.

1.2.2 Inventory QA/QC activities

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

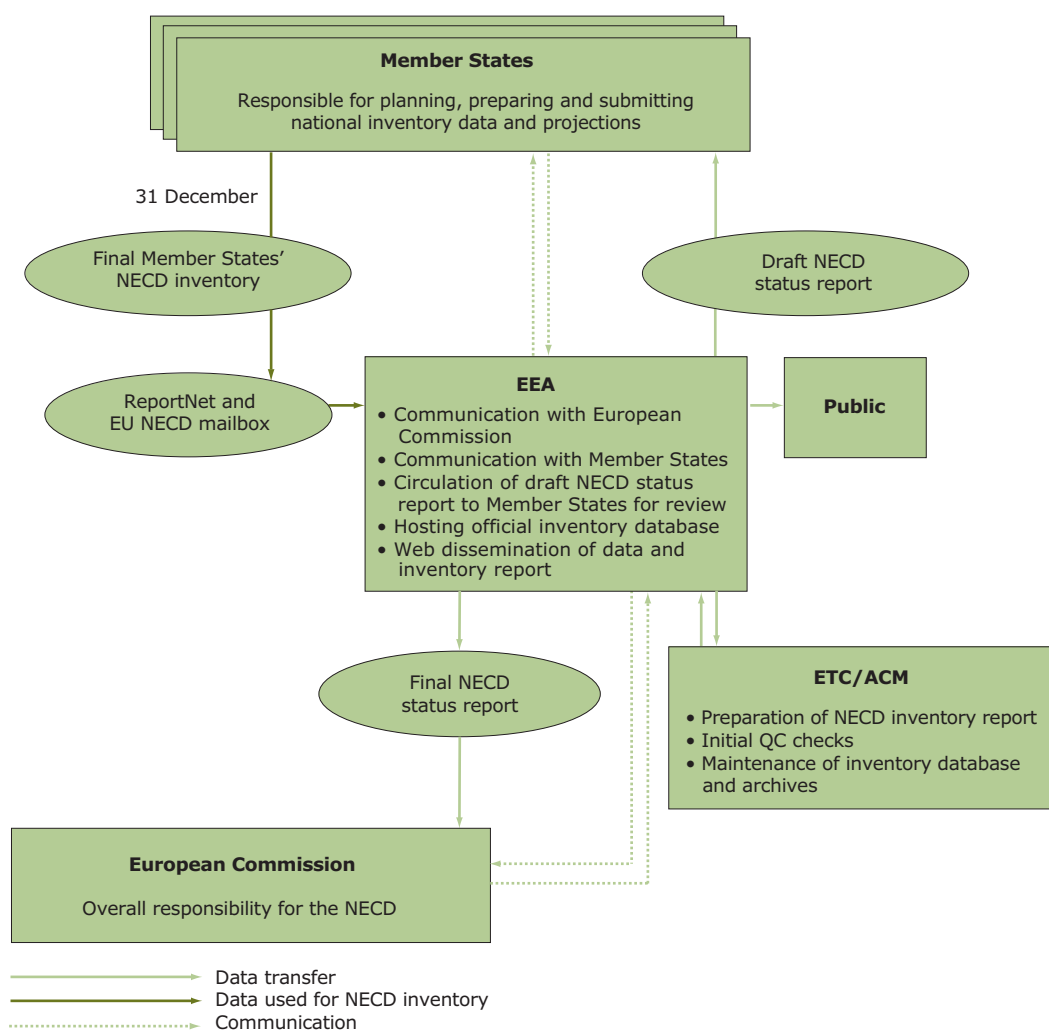
There is no formal QA/QC plan in place for the European Union's NECD inventory. The main activities enhancing the quality of the inventory are the checks performed by the EEA's ETC/ACM on the status of each submission. More detailed quality assurance activities are performed by ETC/ACM and the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) through the process of annual reviews of emission inventories. The review process includes checks on timeliness, consistency, accuracy, completeness and comparability. A summary of the review findings is published annually by the EMEP Centre on Emission Inventories and Projections (CEIP) and the EEA (see, for instance, EMEP/EEA (2012)).

All NECD inventory documents (submissions, inventory master file, inventory report, status reports and related correspondence) are archived electronically at the ETC/ACM.

1.2.3 Differences between NECD, LRTAP Convention and UNFCCC inventory reporting

In addition to reporting emission data under the NECD, Member States are also required to report emissions of certain pollutants under two other international reporting obligations: the UNECE LRTAP Convention, and the EU Monitoring Mechanism (EC, 2004) and its implementing provisions (EC, 2005). Table 1.3 provides an overview of Member States' air pollution reporting obligations.

These three reporting obligations differ mainly in the number and type of air pollutants for which reporting is required, the geographical coverage of countries (e.g. the inclusion or not of overseas dependencies in the territories of France, Portugal,

Figure 1.1 Dataflow for compilation of EU NECD emission inventory**Table 1.3 Overview of air pollutant emission reporting obligations in the EU**

Legal obligation	Emission reporting requirements	Annual reporting deadline for EU Member States	Annual reporting deadline for the European Union
NEC Directive	Emissions of NO _x , NMVOC, SO ₂ and NH ₃	31 December	–
LRTAP Convention	Emissions ^(a) of NO _x (as NO ₂), NMVOC, SO _x (as SO ₂), NH ₃ , CO, HMs, POPs and PM	15 February	30 April
EU Monitoring Mechanism/UNFCCC	Emissions(b) of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , N ₂ O _x , CO, NMVOC and SO ₂	15 January (to the European Commission) 15 April (to the UNFCCC)	15 April

Note: ^(a) 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.

Spain or the United Kingdom), and the inclusion of domestic and international aviation and navigation in the national total. The NECD, LRTAP Convention and UNFCCC inventories differ in terms of the

pollutants included, and slightly in terms of the sectors included in the official national totals. The major differences are summarised in Table 1.4.

Table 1.4 Major differences between reporting obligations of LRTAP Convention, NECD and Council Decision No 280/2004/EC

	Included in national totals	Not included in National Totals: memo item
Domestic aviation (landing and take-off)	NEC, LRTAP, UNFCCC	-
Domestic aviation (cruise)	UNFCCC	NEC, LRTAP
International aviation (landing and take-off)	NEC, LRTAP	UNFCCC
International aviation (cruise)	NEC, LRTAP, UNFCCC	-
National navigation (domestic shipping)	NEC, LRTAP, UNFCCC	-
International inland shipping	NEC, LRTAP	UNFCCC
International maritime navigation	-	NEC, LRTAP, UNFCCC
Road transport (fuel sold *)	NEC, LRTAP, UNFCCC	-

Note: NEC: NO_x, NMVOC, SO₂ and NH₃.

LRTAP: NO_x, NMVOC, SO_x, NH₃, CO, HMs, POPs and PM.

UNFCCC: NO_x, NMVOC, SO_x and CO.

(*) In addition, Member States may also report emission estimates based on fuel used as an additional 'memo item'.

2 Assessment of EU and Member State emissions

This chapter presents the comparison of emissions and ceilings, and emission trends of NO_x , NMVOC, SO_2 and NH_3 , as reported by the Member States under the NECD. The NECD does not require that Member States annually report a complete time series of emissions from 1990 onwards. Rather, 'preliminary' emission data for the previous year, 'final' emission data for the previous year but one and projections for the year 2010 are formally the only data for which reporting is required. Complete time-series data were thus not available for all Member States. Appendices 2 and 3 provide an overview of the data available from the current NECD reporting round used in the tables within this report. Data provided in previous reporting cycles is not taken into account in this report.

2.1 Impact of economic developments on emission trends

Economic developments affect air emissions, as the magnitude of SO_2 , NO_x and partly NMVOC emissions are dependent on the levels of industrial activity, energy production and road transport. Between 2008 and 2009, EU GDP (measured in purchasing power standards) decreased by – 6 % (Eurostat, 2012). In all Member States that reported 2008 and 2009 emission data for NO_x and SO_2 , this downward trend in GDP is also reflected in their reported emissions. In contrast, the increase in EU GDP between 2009 and 2010 of 4 % is not reflected in emissions reported by Member States; most of them report further decreases.

The following examples illustrate the impacts of recent economic developments as described by three selected Member States:

- In its Informative Inventory Report (Federal Environment Agency, 2011), Germany stated that the 2009 economic crisis clearly demonstrated the link between economic growth or disruption and the amount of pollutants released. In 2009, fuel consumption of all fossil fuels in Germany decreased remarkably as a result of the economic crisis.
- Latvia explained in its IIR (Ministry of Environmental Protection and Regional Development, 2011) that emissions of the energy

sector from 2008 to 2010 were mainly affected by the crisis: the types of imported fuels previously used were switched to in-country solid biomass fuels because of the increase in global prices and national taxes and the decrease of purchasing capacity.

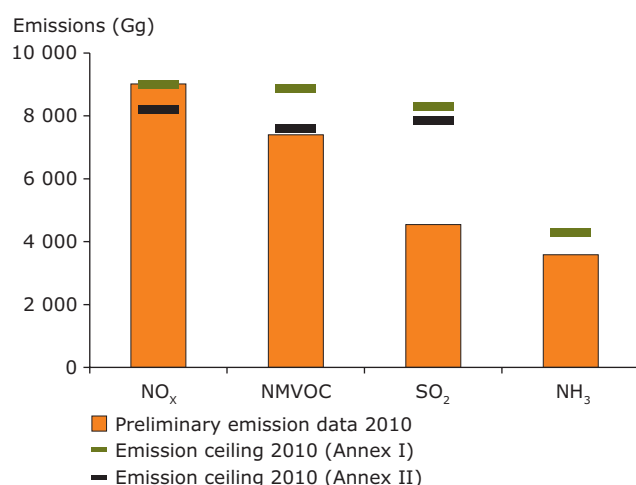
- Sweden (Swedish Environmental Protection Agency, 2012) reported that the low emissions of the category 'Manufacture of solid fuels and other energy industries' (NFR code 1A1c) in 2009 are affected by the financial crisis due to the low demand of iron and steel on the global market. The levels of fuel combustion and emissions in this category are closely correlated to the iron and steel production.

2.2 Progress of the EU-27 in meeting their 2010 emission ceilings under the NECD

Figure 2.1 and Table 2.1 illustrate the progress of the EU-27 towards meeting its emission ceilings specified in Annexes I and II to the NECD. The preliminary emission data in the EU-27 for NO_x are slightly greater than the aggregated 2010 ceiling (Annex I to the NECD) but lower than the ceilings for the remaining pollutants (SO_2 , NMVOC and NH_3). Similarly, of the three stricter Annex II emission ceilings designed with the aim of broadly meeting the interim environmental objectives as set out in Article 5 of the NECD, only the NO_x ceiling is missed. NMVOC emissions are only marginally below the Annex II ceiling.

In order that the EU-27 also meets its NO_x emission ceiling, a further reduction of 13 Gg of NO_x is required. There is some uncertainty underlying this number: as the assessment is based on preliminary emission data for 2010, final emission data for 2010 will only be available in 2013. To estimate the range of uncertainty, the difference of preliminary emission data for 2009 (submitted in 2010) and final emission data for 2009 (submitted in 2011) are compared. This shows for the EU-27 that for all pollutants, emissions are lower in the final estimate (– 1.0 % for NO_x , – 4.8 % for SO_2 , – 5.0 % for NMVOC and – 3.4 % for NH_3). Luxembourg had the highest recalculations for 2009 (– 45 % for SO_2), followed by Bulgaria (– 33 % for SO_2 and – 32 %

Figure 2.1 Aggregated Member State preliminary 2010 emission data compared with EU-27 emission ceilings defined in NECD Annexes I and II



Note: The emission ceilings shown are the aggregated EU-27 emission ceilings defined in Annexes I and II to the NECD ⁽⁶⁾. Annex II to the NECD does not define a ceiling for NH₃.

for NMVOC). Interestingly, most of the countries revised their 2009 emission estimates downwards. The highest increase in 2009 emissions due to recalculations was that of Luxembourg's NMVOC (+ 18 %).

If one takes these results as an indication of a potential change in 2010 final emission data for the EU-27, it is possible that the meeting of ceilings still may undergo a change, but this will probably not affect the meeting of ceilings already achieved.

Table 2.2 provides an overview of Member State preliminary emission data submitted under the NECD in comparison with the 2010 ceilings. The highest number of exceedances of the preliminary data to the respective ceilings is noted for NO_x (12 Member States: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, Malta, the Netherlands, Spain and Sweden). The highest exceedance in percentage terms was reported for Luxembourg (87 %) — see also Figure 2.2.

Preliminary emission data of NMVOC are above the ceilings for two Member States (Germany (5.8 %) and Spain (1.6 %)) — see also Figure 2.3. The same number of exceedances is shown in the preliminary emission data for NH₃ (Finland (20 %) and Spain (4.4 %)) — see also Figure 2.5. The SO₂ preliminary emission data show no exceedances of the ceilings — see also Figure 2.4.

Table 2.1 Comparison of aggregated EU-27 preliminary 2010 emission data and emission ceilings

	Preliminary emission data (Gg)	Annex I emission ceilings (Gg)	Difference from emissions (Gg)	Difference from emissions (%)	Annex II emission ceilings (Gg)	Difference from emissions (Gg)	Difference from emissions (%)
NO _x	9 016	9 003	13	0.1	8 180	836	10
NMVOC	7 400	8 848	- 1 448	- 16	7 585	- 185	- 2.4
SO ₂	4 542	8 297	- 3 755	- 45	7 832	- 3 290	- 42
NH ₃	3 581	4 294	- 713	- 17	-	-	-

Note: The emission ceilings shown are the aggregated EU-27 emission ceilings defined in Annexes I and II to the NECD. Annex II to the NECD does not define a ceiling for NH₃.

⁽⁶⁾ Annexes I and II to the NECD define aggregated emission ceilings for the EU-27. The Annex I EU-27 ceilings represent the aggregation of individual Member State ceilings defined in that annex. The Annex II EU-27 ceilings are stricter than those of Annex I and are designed with the aim of attaining, by 2010, for the European Union as a whole, the interim environmental objectives set out in Article 5 of the NECD (i.e. a reduction of acidification and health- and vegetation-related ground-level ozone exposure by 2010, compared with the 1990 situation). There is no separate ceiling for NH₃ defined in Annex II to the NECD.

Table 2.2 Overview of Member State preliminary emission data submitted under the NECD (as of 14 February 2012) and emission ceilings for 2010

Member State	NO _x preliminary emission data (Gg)	NO _x ceilings	Emissions-ceiling comparison	NMVOc preliminary emission data (Gg)	NMVOc ceilings	Emissions-ceiling comparison	SO ₂ preliminary emission data (Gg)	SO ₂ ceilings	Emissions-ceiling comparison	NH ₃ preliminary emission data (Gg)	NH ₃ ceilings	Emissions-ceiling comparison	Emission estimates from mobile sources based on
Austria	144	103	x	132	159	✓	19	39	✓	62	66	✓	Fuel used
Belgium	221	176	x	105	139	✓	67	99	✓	69	74	✓	Fuel used
Bulgaria	120	247	✓	93	175	✓	387	836	✓	51	108	✓	Fuel used
Cyprus	18	23	✓	11	14	✓	22	39	✓	5.3	9.0	✓	Fuel sold
Czech Republic	239	286	✓	154	220	✓	170	265	✓	69	80	✓	Fuel sold
Denmark	129	127	x	84	85	✓	14	55	✓	69	69	✓	Fuel sold
Estonia	37	60	✓	38	49	✓	83	100	✓	10	29	✓	Fuel sold
Finland	172	170	x	117	130	✓	68	110	✓	37	31	x	Fuel sold
France	1 080	810	x	852	1 050	✓	262	375	✓	645	780	✓	Fuel sold
Germany	1 323	1 051	x	1 053	995	x	449	520	✓	548	550	✓	Fuel sold
Greece	315	344	✓	183	261	✓	266	523	✓	65	73	✓	Fuel sold
Hungary	162	198	✓	109	137	✓	32	500	✓	65	90	✓	Fuel sold
Ireland	73	65	x	44	55	✓	26	42	✓	106	116	✓	Fuel used
Italy	966	990	✓	1 103	1 159	✓	210	475	✓	379	419	✓	Fuel sold
Latvia	35	61	✓	65	136	✓	7.3	101	✓	17	44	✓	Fuel sold
Lithuania	58	110	✓	69	92	✓	38	145	✓	30	84	✓	Fuel sold
Luxembourg	21	11	x	8.8	9.0	✓	1.7	4.0	✓	4.0	7.0	✓	Fuel used
Malta	8.1	8.0	x	2.5	12	✓	8.1	9.0	✓	1.5	3.0	✓	Fuel sold
Netherlands	276	260	x	151	185	✓	34	50	✓	122	128	✓	Fuel used
Poland	867	879	✓	662	800	✓	974	1 397	✓	271	468	✓	Fuel sold
Portugal	180	250	✓	169	180	✓	68	160	✓	48	90	✓	Fuel sold
Romania	272	437	✓	441	523	✓	372	918	✓	161	210	✓	Fuel sold
Slovakia	89	130	✓	62	140	✓	69	110	✓	24	39	✓	Fuel sold
Slovenia	45	45	✓	34	40	✓	10	27	✓	17	20	✓	Fuel sold
Spain	900	847	x	672	662	x	444	746	✓	368	353	x	Fuel sold
Sweden	161	148	x	197	241	✓	34	67	✓	52	57	✓	Fuel sold
United Kingdom	1 106	1 167	✓	789	1 200	✓	406	585	✓	284	297	✓	Fuel used
EU-27	9 016	9 003	x	7 400	8 848	✓	4 542	8 297	✓	3 581	4 294	✓	

Note: '✓' indicates that the preliminary emission data reported by a Member State meets or lies below its respective emission ceiling.

'x' indicates that a ceiling is not met.

Overall, 12 Member States reported emission data above the ceiling of at least one pollutant. The preliminary emission data exceeded the respective ceilings for three of the four pollutants in Spain (NO_x, NMVOC, NH₃), and for two pollutants in Germany (NO_x, NMVOC) and Finland (NO_x, NH₃). The remaining nine Member States reported preliminary emission data above the ceilings of one pollutant.

Over half of the Member States reported emission reductions between 2009 and 2010 for all pollutants

(see Trend tables A1.1, A1.2, A1.3, A1.4, Appendix 1). The year 2009 was affected by the economic recession. Emission reductions between 2008 and 2009 were higher than between 2009 and 2010 for NO_x, NMVOC and SO₂.

Further information by individual Member States in achieving the emission ceilings is provided in subsequent sections of Chapter 2.

2.3 Progress of non-EU countries in meeting 2010 emission ceilings under the Gothenburg Protocol to the UNECE LRTAP Convention

Three non-EU EEA member countries (Liechtenstein, Norway and Switzerland) have emissions ceilings for 2010 set under the Gothenburg Protocol of the UNECE LRTAP Convention. Liechtenstein reports it has missed its NO_x and NH₃ emissions ceilings, as has Norway its NO_x emission ceiling, while Switzerland has achieved its four ceilings (see Table 2.3).

2.4 Analysis of emissions per pollutant

Figure 2.2, Figure 2.3, Figure 2.4, and Figure 2.5 illustrate the relative difference (7) between emissions in 2010 and the emission ceilings. Where percentage values are positive, it indicates that 2010 emissions were above the emission ceiling.

2.4.1 NO_x emissions

For the EU-27, it was only possible to calculate NO_x emission totals for 2009 and 2010. For other years, data from several Member States were missing (8) (Appendix 1, Table A1.1).

Table 2.3 Achievements by other EEA member countries in meeting 2010 emission ceilings set in UNECE LRTAP Convention's Gothenburg Protocol

Country	NO _x	NM VOC	SO ₂	NH ₃
Liechtenstein	x	✓	✓	x
Norway	x	✓	✓	✓
Switzerland	✓	✓	✓	✓

Note: Emission data for Liechtenstein, Norway and Switzerland are the latest reported data under the LRTAP Convention and are compared with the respective emission ceilings of the Gothenburg Protocol. Liechtenstein has signed but not ratified the protocol yet. Neither Iceland nor Turkey has yet signed the Gothenburg Protocol.

Compared with 1990, emissions decreased in all Member States for which data for 1990 and 2010 data was available (i.e. 14 Member States). The largest emitters in 2010 were Germany, the United Kingdom, and France.

Between 2009 and 2010, 15 of 27 Member States reported emission reductions. The reductions between 2008 and 2009 were larger, reflecting the onset of economic recession. The total reduction for the EU-27 between 2009 and 2010 amounts to – 1.4 %. The highest absolute reductions between 2009 and 2010 occurred in Spain and Greece.

Preliminary NO_x emission data of 15 Member States were in the year 2010 below their respective ceilings (Figure 2.2). Twelve Member States (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, Malta, the Netherlands, Spain and Sweden)) did not achieve their ceilings in the year 2010. The preliminary emission data of Finland, Denmark and Malta are only marginally above their emission ceilings (1.0 to 1.4 %). Denmark's emissions have declined continuously, and the emissions of Malta have likewise decreased continuously over the past seven years. Finland's emissions were actually below the ceiling in the year 2009 (see Appendix 1, Table A1.1). Therefore it seems likely that Finland, Denmark and Malta will meet their ceilings in the near future. The aggregated preliminary emission data for NO_x in the EU-27 are slightly greater than the respective EU ceilings.

2.4.2 NMVOC emissions

For the EU-27, it was only possible to calculate NMVOC emission totals for 2009 and 2010. For other years, data of several Member States were missing (9) (see Appendix 1, Table A1.2).

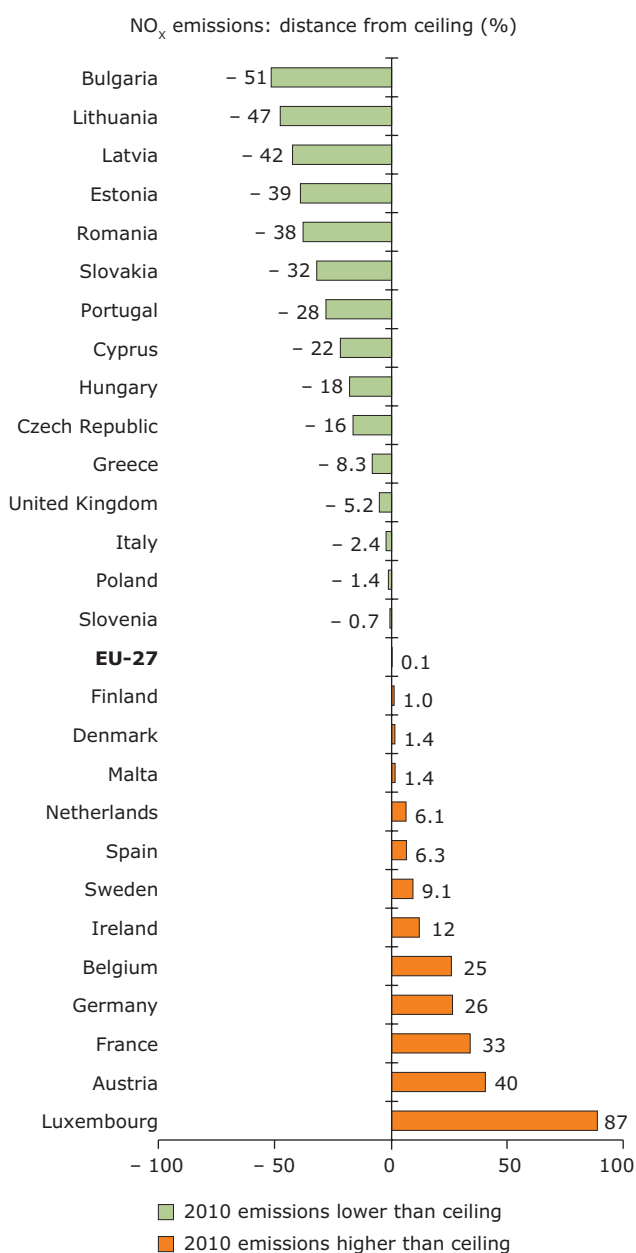
Compared with 1990, emissions decreased in all Member States that reported 1990 and 2010 data (14 Member States). The largest emitters in 2010 were Italy, Germany, and France. Between 2009 and 2010, 17 Member States reported emission reductions. The reductions between 2008 and 2009 were larger, which again most likely reflects the onset of the economic recession (17 of 18 Member States that reported data for the years 2008 and 2009 show emission reductions).

(7) The relative difference between emissions in 2010 and the emission ceilings was estimated as $100 \times (E_{2010} - E_{\text{ceiling}}) / E_{\text{ceiling}}$ (%), where E_{2010} and E_{ceiling} are the 2010 emissions and the 2010 emission ceiling value.

(8) As noted previously, the NECD does not require the reporting of emissions from 1990; however, Member States are encouraged to do so to enable an improved analysis of the emission trends.

(9) As noted previously, the NECD does not require the reporting of emissions from 1990; however, Member States are encouraged to do so to enable an improved analysis of the emission trends.

Figure 2.2 Distance from ceiling (%) for NO_x emissions in 2010



Note: The reported national totals of Austria, Belgium, Bulgaria, Ireland, Luxembourg, the Netherlands and the United Kingdom are based on fuel used. All other Member States reported a national total based on fuel sold. The aggregated EU-27 emission total is a mix of data based on fuel used and fuel sold.

The total change for the EU-27 between 2009 and 2010 amounts to + 0.9 %. The highest absolute reductions between 2009 and 2010 occurred in the United Kingdom, Greece and Hungary.

In the year 2010, preliminary NMVOC emission data of 25 Member States were below their respective ceilings (see Figure 2.3). Two Member States (Germany and Spain) did not achieve their ceilings in the year 2010. The preliminary emission data of Germany and Spain are only marginally above their emission ceilings (1.6 % for Spain and 5.8 % for Germany). The emissions of both countries have generally declined over time; Germany's emissions were actually below the ceiling in the year 2009 (see Appendix 1, Table A1.2). The increase of emissions in Germany between 2009 and 2010 might be linked to economic recovery. Should Spain continue its decreasing emission trend, it is anticipated that it may meet its ceiling in the near future.

The aggregated preliminary NMVOC emission data in the EU-27 are lower than the respective EU-27 ceilings.

2.4.3 SO₂ emissions

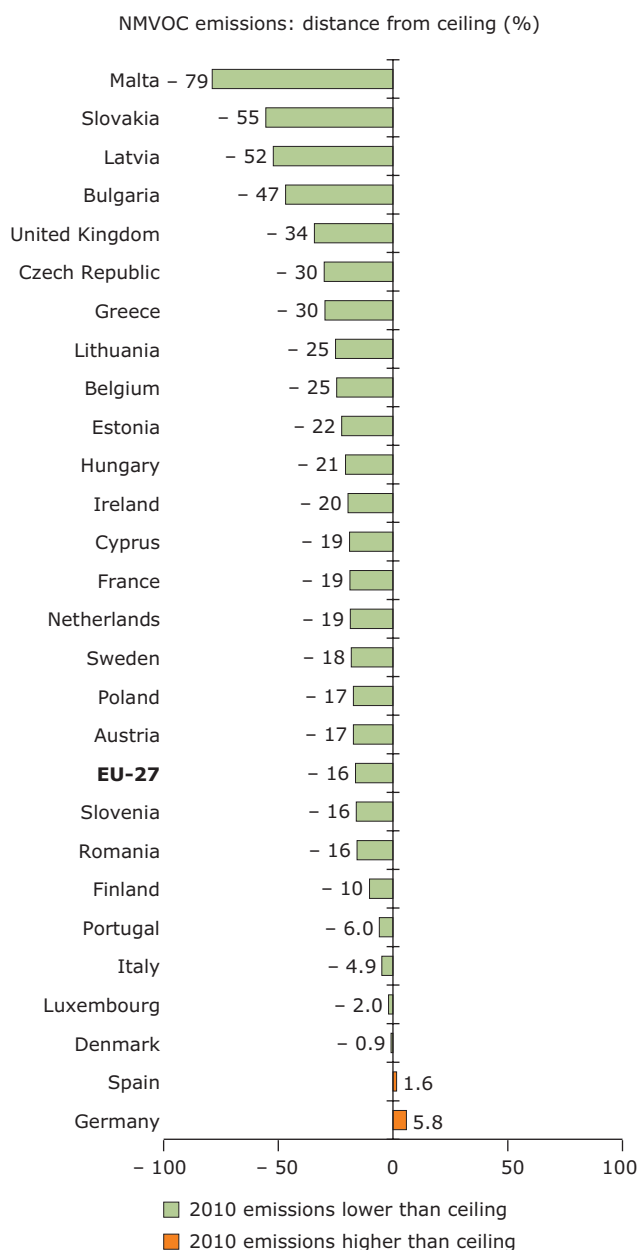
For the EU-27, it was only possible to calculate SO₂ emission totals for 2009 and 2010. For other years, data of several Member States were missing ⁽¹⁰⁾ (Annex 1, Table A1.3).

Compared with 1990, emissions decreased in all Member States which reported 1990 and 2010 data (14 Member States). The largest emitters in 2010 were Poland, Germany and Spain.

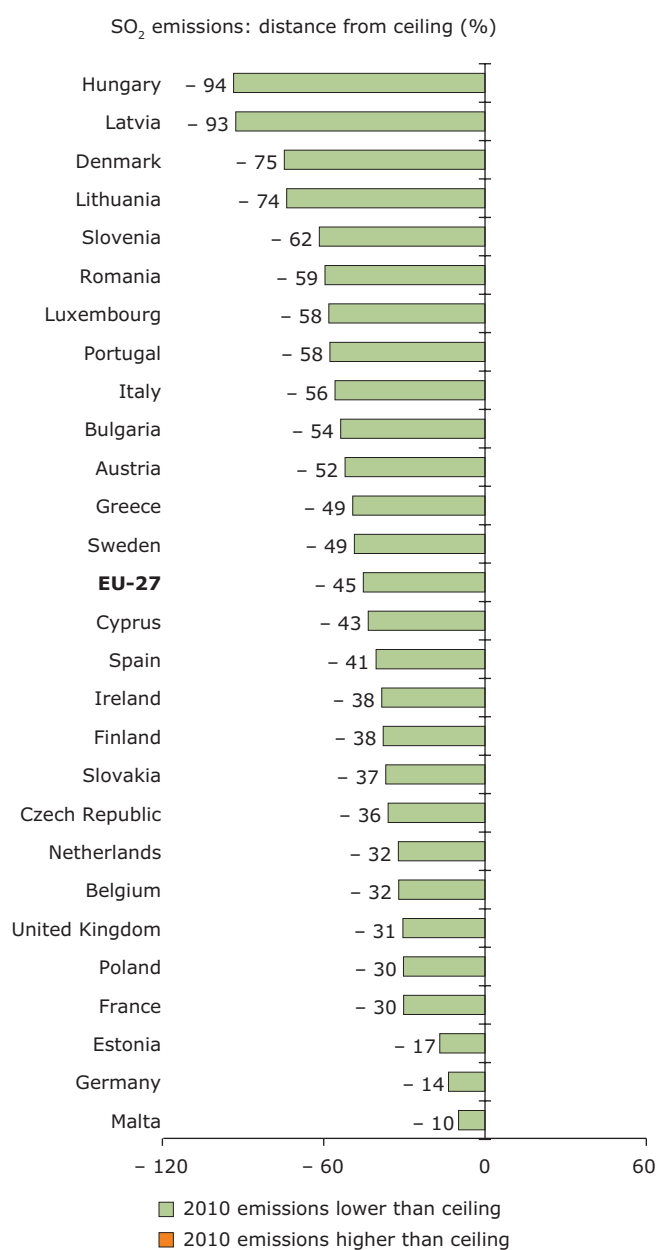
Between 2009 and 2010, 15 Member States reported emission reductions. The total reduction for the EU-27 between 2009 and 2010 amounts to - 5.3 %. The highest absolute reductions between 2009 and 2010 occurred in Greece and Romania.

Preliminary SO₂ emission data of all Member States were in the year 2010 below their respective ceilings (Figure 2.4). Therefore, all Member States have achieved their ceilings with the year 2010. The accumulated preliminary emission data in the EU-27 for SO₂ are lower than the ceilings.

⁽¹⁰⁾ As noted previously, the NECD does not require the reporting of emissions from 1990; however, Member States are encouraged to do so to enable an improved analysis of the emission trends.

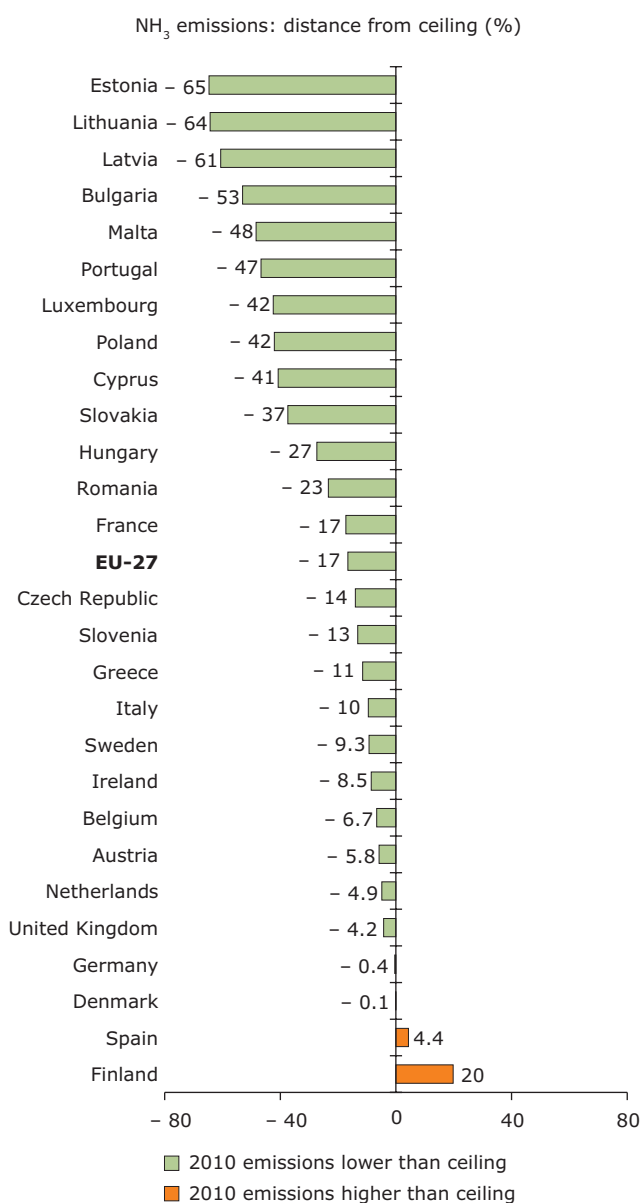
Figure 2.3 Distance from ceiling (%) for NMVOC emissions in 2010


Note: The national totals of Austria, Belgium, Bulgaria, Ireland, Luxembourg, the Netherlands and the United Kingdom are based on fuel used. All other Member States reported a national total based on fuel sold. The aggregated EU-27 emission total is a mix of data based on fuel used and fuel sold.

Figure 2.4 Distance from ceiling (%) for SO₂ emissions in 2010


Note: The national totals of Austria, Belgium, Bulgaria, Ireland, Luxembourg, the Netherlands and the United Kingdom are based on fuel used. All other Member States reported a national total based on fuel sold. The aggregated EU-27 emission total is a mix of data based on fuel used and fuel sold.

Figure 2.5 Distance from ceiling (%) for NH₃ emissions in 2010



Note: The national totals of Austria, Belgium, Bulgaria, Ireland, Luxembourg, the Netherlands and the United Kingdom are based on fuel used. All other Member States reported a national total based on fuel sold. The aggregated EU-27 emission total is a mix of data based on fuel used and fuel sold.

2.4.4 NH₃ emissions

For the EU-27, it was only possible to calculate NH₃ emission totals for 2009 and 2010. For other years, data of several Member States were missing ⁽¹¹⁾ (see Appendix 1, Table A1.4).

Compared with 1990, emissions decreased in 13 Member States (from 14 Member States which reported 1990 and 2010 data). The largest emitters in 2010 were France, Germany and Italy. Between 2009 and 2010, 16 of 27 Member States reported emission reductions. The total reduction for the EU-27 between 2009 and 2010 amounts to - 2.0 %. The highest absolute reductions between 2009 and 2010 occurred in Germany and Romania.

Preliminary NH₃ emission data of 25 Member States in the year 2010 were below their respective ceilings (Figure 2.5). Two Member States (Spain and Finland) did not achieve their ceilings in the year 2010; emissions from these countries show a rather stable development over the years. The accumulated preliminary emission data in the EU-27 are for NH₃ lower than the ceilings.

2.5 Reporting status

Information in this section is based on submissions from Member States delivered to the EEA via the Eionet ReportNet Central Data Repository (CDR), submissions delivered directly to the Commission and explanatory information provided by Member States directly to ETC/ACM.

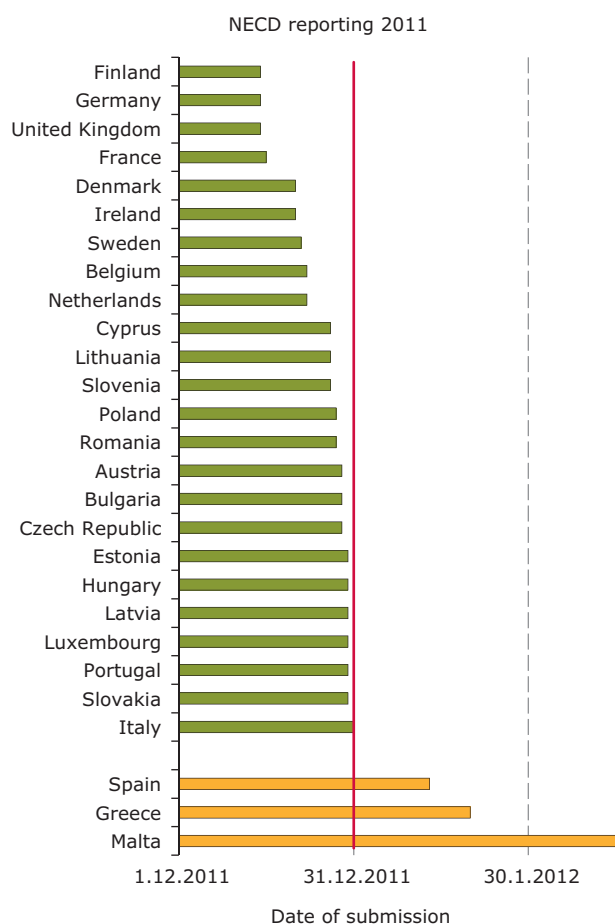
Timeliness (Figure 2.6) and completeness: In the 2011 reporting cycle ⁽¹²⁾, all Member States provided the mandatory information on final emissions for the year 2009 and the preliminary emission data for 2010. Four Member states submitted (parts of) these data after the date of submission: Hungary (final emission data of 2009), Spain, Greece and Malta.

According to the NECD, Member States are required to report 2010 projections, as well as 2010 provisional emission inventories. As the 2010 provisional emission inventories fulfil a very similar role to 2010 projections, Member States

⁽¹¹⁾ As noted previously, the NECD does not require the reporting of emissions from 1990; however, Member States are encouraged to do so to enable an improved analysis of the emission trends.

⁽¹²⁾ The reporting deadline for the 2011 reporting cycle was 31 December 2011.

Figure 2.6 Reporting status – date of first NECD inventory submission to CDR or European Commission



were requested to indicate that their 2010 provision emission inventory fulfils the reporting of 2010 projections.

A compilation of data from all Member States is required in order to allow comparison with the respective EU-27 ceilings as defined in Annexes I and II to the NECD. It is therefore extremely important that Member States report complete emission data sets.

Consistency and comparability: The NECD does not require that emission data be provided using a standard format. However, both the European Commission and the EEA encourage Member States to use the standardised NFR templates as defined in the guidelines for reporting emission data under the LRTAP Convention (UNECE, 2009) when estimating and reporting emissions. For more information on the actual reporting format used by Member States for 2011, see Appendix 3.

Transparency of submitted information: Providing inventory reports or explanatory information that describe the methods and sources of the reported data is not mandatory under the NECD, meaning that the transparency of submitted information is rather limited. Nevertheless, nine Member States (Austria, Finland, Germany, Latvia, Poland, Romania, Slovakia, Spain and Sweden) voluntarily submitted an inventory report together with their NECD inventories ⁽¹³⁾.

More detailed information about the quality of the 2011 NECD submissions (for example, in terms of its internal consistency and completeness) will be provided in the annual joint EEA and EMEP/CEIP inventory review report (EMEP/EEA, 2012).

⁽¹³⁾ For comparison, 19 Member States submitted Informative Inventory Reports (IIRs) under the LRTAP Convention by 7 May 2012.

3 Additional information on emission estimation

3.1 Basis for estimating emissions from mobile sources

It is considered good practice that, in preparing emission inventories and projections under the NECD, Member States should apply the principles outlined in the UNECE guidelines for reporting emission data under the LRTAP Convention (UNECE, 2009). These guidelines specify how emissions from transport should be reported (paragraph 15): 'For emissions from transport, Parties within the EMEP region should calculate and report emissions consistent with national energy balances reported to Eurostat or the International Energy Agency. Emissions from road vehicle transport should therefore be calculated and reported **on the basis of the fuel sold in the Party concerned. [...] In addition** ⁽¹⁴⁾, Parties may report emissions from road vehicles based on fuel used or kilometres driven in the geographic area of the Party. The method for the estimate(s) should be clearly specified in the IIR (informative inventory report)'.

In paragraph 16 of the guidelines, the basis for compliance checking is detailed: 'For Parties within the EMEP region for which emission ceilings are derived from national energy projections based on the amount of fuels sold, compliance checking will be based on the reporting on the basis of fuels sold in the geographic area of the Party. Other Parties within the EMEP region (Austria, Belgium, Ireland, Lithuania, Luxembourg, the Netherlands, Switzerland and United Kingdom) 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.'

The difference between transport emissions estimated using the amount of fuel sold within a country and emissions estimated using the amount of fuel consumed in a country can be significant for countries where 'tank tourism' occurs, i.e. where fuel purchased within a country is actually used outside the country and vice versa. This can therefore lead to omissions or double counting at the EU level.

The sum of EU-27 emissions is based on a mix of emissions reported by Member States based upon fuel used (7 Member States) and fuel sold (20 Member States) data. Table 3.1 gives an overview of the reporting by the Member States. The 'Method used' column lists the different models used by Member States in order to provide an indication of consistency for the calculation of emissions from road transport.

3.2 Potential underestimation of Member State emissions due to non-reporting of sectors

3.2.1 Objectives

The official reporting guidelines of the LRTAP Convention (UNECE, 2009) (and through Annex III to the NECD, by extension applicable also to reporting under the NECD) allow countries to report emissions as 'not estimated' (NE) for those sectors where emissions are known to occur but have not been estimated or reported.

Countries should separately report the reasons why emissions are not estimated. The *EMEP/EEA air pollutant emission inventory guidebook — 2009* (EMEP/EEA, 2009) recommends the following points concerning 'NE' emissions as elements to be included in an informative inventory report:

- a list of sources not estimated in the inventory;
- a qualitative assessment of their importance, currently and in future;
- a description of intentions to calculate these in future or an explanation of why there are no such plans.

In the previous NECD status report (EEA, 2011a), a simple assessment was made of the underestimation in national emission inventories that may occur due to the use of the notation key

⁽¹⁴⁾ Emphasis added.

Table 3.1 Basis for estimating emissions from mobile sources

	Emission estimates from mobile sources		Method used
	Based on fuel sold	Based on fuel used	
Austria (*)	Yes	Yes	ARTEMIS, v2.1 ^(a)
Belgium (*)	No	Yes	n/a
Bulgaria	No	Yes	COPERT IV, v9 ^(b)
Cyprus	Yes	No	COPERT IV, v8.1
Czech Republic	Yes	Yes	Country-specific model
Denmark	Yes	No	COPERT IV
Estonia	Yes	No	COPERT IV, v9.0
Finland	Yes	No	LIISA ^(c) , sub-model of LIPASTO ^(d)
France	Yes	No	COPERT IV
Germany	Yes	No	TREMOT, v5.03 ^(e)
Greece	Yes	No	COPERT IV, v7.1
Hungary	Yes	No	COPERT IV, v8.1
Ireland (*)	Yes	Yes	COPERT IV, v8.0
Italy	Yes	No	COPERT IV, v9
Latvia	Yes	No	COPERT IV
Lithuania (*)	Yes	No	COPERT IV v9.0
Luxembourg (*)	No	Yes	COPERT IV, v8
Malta	Yes	No	n/a
Netherlands (*)	Yes	Yes	VERSIT+ ^(f)
Poland	Yes	No	Country-specific model
Portugal	Yes	No	COPERT IV, v9.0
Romania	Yes	No	COPERT III
Slovakia	Yes	No	COPERT IV, v8.1
Slovenia	Yes	No	COPERT IV, v6.1
Spain	Yes	No	n/a
Sweden	Yes	No	ARTEMIS
United Kingdom (*)	No	Yes	COPERT IV, v8.1

Notes: (*) indicates that these countries may additionally report national emission totals calculated on the basis of fuels used in the geographic area of the Party as a basis for compliance.

Shaded cells indicate the basis of the emissions estimates from mobile sources used to compile EU figures and comparisons with ceilings.

^(a) Assessment and Reliability of Transport Emission Models and Inventory Systems (André, 2004).

^(b) Computer Programme to Calculate Emissions from Road Transportation (EMEP/EEA, 2009).

^(c) Road traffic exhaust emissions calculation software (Mäkelä et al., 2002).

^(d) Calculation system for traffic exhaust emissions and energy consumption in Finland (VTT, 2012).

^(e) Transport Emission Estimation Model (Knörr et al., 2009).

^(f) 'VERSIT' refers to 'verkeerssituatie', 'traffic situation' in Dutch (Smit et al., 2006, 2007).

'NE' by Member States. This analysis was repeated again in this year's assessment (Annex 4; see also Figure 3.1), although the method of clustering Member States into representative groups was improved. The main intention of the analysis is to encourage Member States to review source categories reported as 'NE' and in future provide estimates, especially where these sources may add significantly to the currently reported national totals.

A separate analysis was also performed in order to assess the number of Member States that report emissions from NO_x and NMVOC from the agriculture sector, which was not included in the original modelling undertaken to support the determination of the 2010 emissions ceilings.

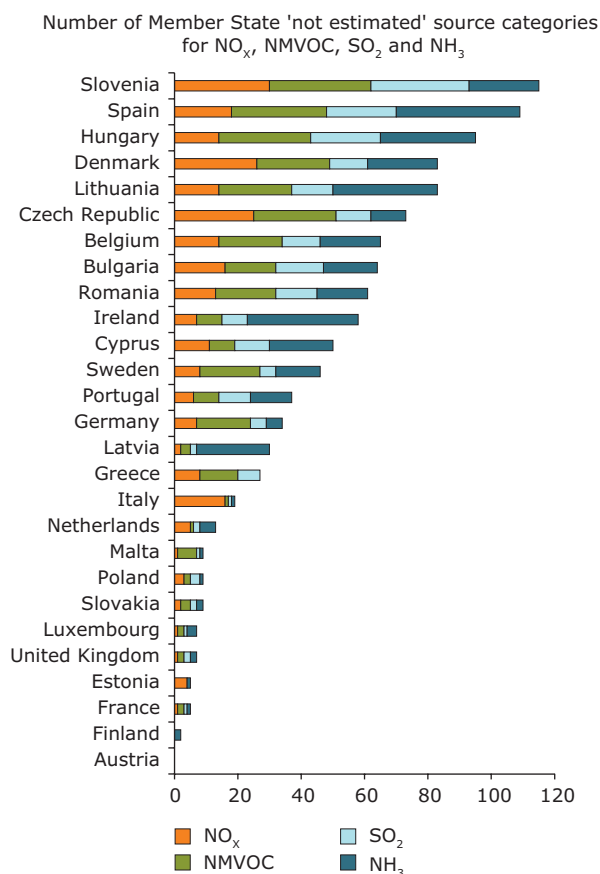
3.2.2 Assessment method

In assessing the importance of source categories reported as 'NE', Member States were first assigned to representative groups using a statistical clustering procedure⁽¹⁵⁾.

For each of these groups, the average contribution made to total emissions in 2010 by the specific NFR source categories was estimated. Source categories reported as 'NE' in national inventories were then assumed to contribute (in percentage terms) as much to the national total of the Member State as the mean contribution made by the same source sector to the aggregated total for the respective country group. In a final step, the potential underestimated emissions arising from use of the 'NE' notation key were added to the 2010 national total of the Member States, and compared with the ceilings within the NECD to determine whether the difference in emissions is likely to affect the number of Member States attaining their ceilings.

The method to quantify potential underestimates is the same as used in previous years, with the exception of the way in which Member State were initially clustered into groups. The method is recognised as being a simple tool, but nevertheless does provide an initial indication of situations where underestimations might have occurred, and which can then be investigated in more detail.

Figure 3.1 Number of Member State 'not estimated' source categories for NO_x, NMVOC, SO₂ and NH₃



3.2.3 Assessment results

Certain Member States used the notation key 'NE' for a considerable number of source categories (Figure 3.1 and Appendix 4). Spain, for example, reported 39 source categories of NH₃ to be 'NE'. In contrast, 8 Member States used 'NE' for up to 10 source categories, or for no source category at all in the case of Austria.

Annex 4 also shows, for the sources reported as 'NE', the estimated underestimation of these sources as a percentage of the original reported national total. Generally, the potential underestimation is low for all pollutants. There are only a few cases where the potential underestimation is above 10 % (NMVOC in

⁽¹⁵⁾ In a first step, for each pollutant NFR source categories were selected where data were available for all 27 Member States. These categories were used to calculate the Euclidean distance between the Member States (based on the relative share each source category contributed to the national totals). In a final step, similar Member States were clustered together using the Ward method.

Cyprus, Lithuania and Malta; NH₃ in Lithuania). In general, it seems that for NO_x and SO₂, the potential underestimation is lower than for NMVOC and NH₃.

For most Member States, the addition of the potential underestimate to their national totals does not change the evaluation if a Member State has emissions above or below the emission ceilings in 2010. For Denmark (NMVOC and NH₃) and Slovenia (NO_x), the addition of the potential underestimation increases the 2010 emissions above the level of the respective 2010 ceiling.

Fifteen Member States provided reasons for using the 'NE' notation key for emissions in their data submissions under the NECD, and it should be noted that Member States might provide more information under their LRTAP Convention submissions. The information made available, however, varied somewhat in its informative value.

3.2.4 Assessment of Member State reporting for 'new' source categories

Since the original integrated assessment modelling undertaken to support the determination of the 2010 emissions ceilings, improved knowledge has become available on the sources of air pollutants. In several instances, 'new' emission sources for the pollutants covered within the scope of the NECD have been recognised; on the basis of subsequent measurements, emission factors have been developed that now enable emission estimates to be made.

As a result, several (but not all) Member States now report emissions from 'new' pollutant-source category combinations that were not included in the original modelling. Examples of such combinations are NO_x and NMVOC emissions from the Agriculture sector (NFR code 4).

The EMEP/EEA guidebook (EMEP/EEA, 2009) provides Member States with default methodologies and emission factors that they can use in order to estimate emissions. Not all 'new' pollutant-source combinations have a default method with default emission factors defined in the guidebook. This occurs, for example, when scientific evidence is deemed insufficient to recommend an emission

factor suitable for use across Europe. Nevertheless, in a number of Member States, national methods and data are available that have been applied to estimate emissions for these combinations.

A study was therefore performed to assess the number of Member States that report emissions from selected 'new' sources (NO_x and NMVOC from the Agriculture sector), and to determine the significance of these emissions with respect to the reported national totals and national emissions ceilings. The detailed results of the analyses undertaken are provided in Annex 2 which accompanies this report.

NO_x emissions from the Agriculture sector (Annex 2, Table 2.1): Data for NO_x in the Agriculture sector were reported by 17 Member States for the year 2010, although again, nine countries reported data only for one of the Agriculture source categories. Germany, Hungary, Austria and Cyprus submitted data for the highest number of categories (11 to 15). In 2010, NO_x emissions in the Agriculture sector corresponded to 9.9 %, 6.1 % and 5.4 % of the emission ceilings in Germany, Hungary and Austria respectively. The share of national total NO_x emissions that was attributed to Agriculture was 7.8 % and 7.7 % for Germany and Hungary respectively. In other Member States, NO_x emissions from Agriculture accounted for a relatively small share (below 4 %) of total NO_x emissions in 2010.

NMVOC emissions from the Agriculture sector (Annex 2, Table 2.2): Data for NMVOC in the Agriculture sector were reported by 17 Member States, nine of which reported data only for one of the Agriculture source categories. Cyprus, Estonia, Italy and Romania submitted data for the highest number of categories (7 to 10). In 2010, NMVOC emissions in the Agriculture sector often made up a notable fraction of the respective emission ceiling in some of the Member States (Bulgaria (18.6 %), Cyprus (17.1 %) and Romania (12.5 %)). For the Member States reporting NMVOC emissions from this sector, the emissions reported are sometimes very significant compared to their national totals: Bulgaria (35.0 %), Cyprus (21.1 %), Romania (14.8 %), Estonia (9.6 %) and Spain (7.1 %). In other Member States, NMVOC emissions from Agriculture formed only a relatively small share (below 2.1 %) of total NMVOC emissions in 2010.

4 Conclusions

This chapter summarises the overall emission trends in the Member States, problems encountered during the compilation of the inventory submissions and suggestions for improvements.

4.1 Emission trends and ceiling assessments

4.1.1 Emission trends

The majority of the EU Member States for which data back to 1990 are available report considerable emission reductions of the four NECD pollutants since 1990. Emissions decreased for all pollutants in all Member States which reported 1990 and 2010 data, with the exception of NH₃ in Spain.

Over half of the Member States reported emission reductions for all pollutants. The year 2009 was affected by the economic recession. For the Member States that reported data, emission reductions between 2008 and 2009 were higher than between 2009 and 2010 for NO_x, NMVOC and SO₂. A more complete picture of past emission trends in the European Union will be provided in mid 2012 when the EEA publishes its annual European Union emission inventory report under the UNECE Convention on Long-range Transboundary Air Pollution.

4.1.2 Comparison of 2010 preliminary emission estimates and ceilings

Twelve Member States reported emission data above the ceiling of at least one pollutant. The preliminary emission data exceed the respective ceilings for three of the four pollutants in Spain (NO_x, NMVOC and NH₃), and for two pollutants in Germany (NO_x and NMVOC) and Finland (NO_x and NH₃).

The highest number of preliminary data exceedances of the respective ceilings was for NO_x (12 Member States). Preliminary emission data of NMVOC were above the ceilings for two Member States, and two countries also reported exceedances of NH₃. All Member States met their SO₂ ceilings.

A number of Member States used the notation key 'NE' to signify that emissions from specific source

categories were not estimated. Generally speaking, the potential underestimation occurring as a result of this (in percentage terms) is low for all pollutants. There are only a few cases where the potential underestimation is above 10 % (NMVOC: Cyprus, Lithuania and Malta; NH₃: Lithuania). For Denmark (NMVOC, NH₃) and Slovenia (NO_x), the addition of the underestimation increase the 2010 emissions above the level of the respective 2010 ceiling. Member States are encouraged to review their use of 'NE' when reporting emission data, and to provide numerical estimates where resources allow adequate estimates to be made.

4.2 Outlook post-2010

The NECD requires that emission ceilings not only have to be met by 2010, but also shall not be exceeded in any year following. Therefore, as economic activity – and potentially also emissions – increase in future years, it is important that all Member States take appropriate measures to limit any increase to emissions which would result in their ceilings being exceeded.

It is noted that a number of Member States have reported emissions for 2010 which lie just below the value of their respective ceilings, e.g. Denmark and Germany for NH₃, Denmark for NMVOC, and Poland and Slovenia for NO_x. For these countries in particular, appropriate measures to ensure they remain within the ceilings will be required in future years.

4.3 Improvements

Suggested improvements: To help improve the transparency of the reported NECD data, part of the formal mandatory inventory reporting by the Member States should, in the future, involve the submission of an accompanying inventory report, for example under a future revised NECD. Such a report should include explanatory information on the reported inventory, such as whether countries report on the basis of fuel used or sold). It is also important that there be improved transparency regarding measures taken by Member States and the contribution of these measures to compliance with the national emission ceilings, e.g. increasing

the standards for best available techniques (BATs) or including specific additional requirements for certain types of industry or agriculture.

A further goal is the production of higher quality emission inventories that enable accurate monitoring of progress towards the ceilings, and an earlier and more accurate definition of any further emission reduction policies and measures that could facilitate lower costs for compliance solutions.

It is important that the completeness of Member States' reporting improves in accordance with the reporting criteria of the EMEP reporting guidelines. Classifying specific emission source categories as 'not estimated (NE)' should be limited to only insignificant sources of emissions, as is intended by the definitions included in the reporting guidelines. The reporting of the best performing Member

States might be used to establish a benchmark to encourage such a general improvement in reporting completeness over the next few years.

The importance of providing inventories in standardised formats has been repeatedly stressed by the European Commission and the EEA in their communications with Member States. The need each year to transfer reported data provided into older reporting formats is not only time-consuming; it is also a potential source of errors. Finally, any changes made to the reporting of information under the NECD should ensure, as far as possible, that harmonisation is retained between the different international reporting requirements, thereby reducing the administrative burden for Member States and facilitating greater consistency in the use of assumptions and relevant parameters that underpin data sets reported by countries.

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Appendix 1 Emission trend tables

The trend tables (Tables A1.1 to A1.4) below show, for each pollutant, a comparison ⁽¹⁶⁾ between 2010 emissions and those reported for the years 1990 and 2010 (if data were available). This illustrates the development of the emission trends within

individual Member States. The national totals of the Member States are either emission estimates based fuel used or fuel sold for mobile sources. An overview is given in Table 2.2 and Table 3.1.

Table A1.1 NO_x emission trends for Member States, 1990–2010

NO _x (Gg)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change 2009–2010 (%)	Change 1990–2010 (%)	Contribution to EU-27 in 2010 (%)
Austria	181	163	163	165	162	165	164	168	168	164	159	146	144	- 1.4	- 21	1.6
Belgium	401	NE	332	NE	NE	NE	NE	291	265	262	239	207	221	6.4	- 45	2.4
Bulgaria	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	118	120	1.7	NE	1.3
Cyprus	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	20	18	- 8.1	NE	0.2
Czech Republic	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	252	239	- 5.3	NE	2.6
Denmark	275	264	199	199	197	205	189	181	182	168	150	132	129	- 2.1	- 53	1.4
Estonia	72	38	37	39	40	41	38	36	34	38	34	29	37	27	- 49	0.4
Finland	323	279	201	211	201	215	195	169	188	187	168	155	172	11	- 47	1.9
France	1 865	1 721	1 602	1 565	1 530	1 496	1 464	1 430	1 358	1 289	1 194	1 106	1 080	- 2.3	- 42	12.0
Germany	2 882	2 177	1 925	1 848	1 768	1 713	1 650	1 578	1 564	1 491	1 418	1 321	1 323	0.1	- 54	14.7
Greece	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	375	315	- 16	NE	3.5
Hungary	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	167	162	- 2.7	NE	1.8
Ireland	126	122	122	125	116	117	119	121	116	112	105	84	73	- 13	- 42	0.8
Italy	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	981	966	- 1.5	NE	11
Latvia	65	39	36	39	39	39	39	37	37	38	34	32	35	10	- 46	0.4
Lithuania	137	87	NE	NE	NE	NE	NE	NE	NE	69	55	54	58	8.0	- 58	0.6
Luxembourg	24	21	20	20	20	21	22	21	22	21	20	20	21	3.2	- 13	0.2
Malta	NE	NE	8.4	9.1	9.2	10	10	9.3	9.3	9.2	9.0	9.0	8.1	- 10	NE	0.1
Netherlands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	280	276	- 1.6	NE	3.1
Poland	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	829	867	4.6	NE	10
Portugal	225	259	258	263	271	251	256	256	233	228	207	193	180	- 6.8	- 20	2.0
Romania	NE	NE	NE	NE	NE	NE	NE	309	323	309	280	247	272	10	NE	3.0
Slovakia	NE	NE	107	108	100	98	100	102	96	96	94	84	89	5.2	NE	1.0
Slovenia	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	46	45	- 2.3	NE	0.5
Spain	1 231	1 272	1 289	1 263	1 301	1 284	1 326	1 314	1 269	1 264	1 078	964	900	- 6.6	- 27	10
Sweden	269	246	205	196	191	187	179	174	173	168	158	153	161	5.4	- 40	1.8
United Kingdom	NE	NE	NE	NE	NE	NE	NE	1580	1525	1461	1317	1 143	1 106	- 3.3	NE	12.3
EU-27	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	9 146	9 016	- 1.4	NE	100

Note: 'NE' denotes 'not estimated or not provided'.

⁽¹⁶⁾ Changes of emissions in each country during 2009 and 2010 are expressed as $100 \times (E_{\text{curr}} - E_{\text{prev}})/E_{\text{prev}}$ (%), where E_{curr} and E_{prev} are current and previous total emissions in each year. Changes of emissions in each country from 1990 to 2010 are expressed as $100 \times (E_{\text{curr}} - E_{1990})/E_{1990}$ (%), where E_{curr} and E_{1990} are current and 1990 total emissions in each year.

Table A1.2 NMVOC emission trends for Member States, 1990–2010

NMVOC (Gg)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change 2009–2010 (%)	Change 1990–2010 (%)	Contribution to EU-27 in 2010 (%)
Austria	273	224	175	174	172	169	150	159	170	157	148	120	132	10	- 52	1.8
Belgium	315	NE	206	NE	NE	NE	NE	143	148	127	118	105	105	- 0.4	- 67	1.4
Bulgaria	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	91	93	1.7	NE	1.3
Cyprus	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	11	11	- 0.6	NE	0.2
Czech Republic	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	159	154	- 3.2	NE	2.1
Denmark	164	161	132	123	120	114	112	109	104	99	94	87	84	- 3.5	- 49	1.1
Estonia	70	50	46	46	45	44	44	41	40	41	38	36	38	4.8	- 46	0.5
Finland	239	203	168	164	162	155	150	136	131	129	118	111	117	4.7	- 51	1.6
France	2 589	2 166	1 712	1 628	1 495	1 410	1 329	1 232	1 123	1 032	957	866	852	- 1.5	- 67	12
Germany	3 128	1 806	1 391	1 290	1 229	1 163	1 175	1 144	1 132	1 070	1 017	931	1 053	13	- 66	14
Greece	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	211	183	- 13	NE	2.5
Hungary	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	128	109	- 15	NE	1.5
Ireland	98	86	68	66	62	59	56	55	54	52	50	47	44	- 6.4	- 55	0.6
Italy	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	1 106	1 103	- 0.3	NE	15
Latvia	102	67	65	69	61	65	110	73	75	83	74	61	65	7.4	- 36	0.9
Lithuania	101	87	NE	NE	NE	NE	NE	NE	NE	74	66	66	69	4.1	- 32	0.9
Luxembourg	19	19	14	14	15	13	14	12	12	11	10	10	8.8	- 10	- 53	0.1
Malta	NE	NE	3.1	3.1	3.2	2.9	3.2	3.3	3.5	3.3	3.0	2.6	2.5	- 3.5	NE	0.0
Netherlands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	152	151	- 1.1	NE	2.0
Poland	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	634	662	4.5	NE	8.9
Portugal	294	279	253	241	238	224	217	207	201	197	192	178	169	- 5.1	- 42	2.3
Romania	NE	NE	NE	NE	NE	NE	NE	426	435	436	466	432	441	2.0	NE	6.0
Slovakia	NE	NE	66	69	69	69	72	73	70	67	67	64	62	- 2.9	NE	0.8
Slovenia	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	34	34	- 1.1	NE	0.5
Spain	1 008	938	959	938	859	866	849	811	795	783	732	674	672	- 0.2	- 33	9.1
Sweden	359	278	223	212	206	206	201	197	194	197	196	197	197	0.1	- 45	2.7
United Kingdom	NE	NE	NE	NE	NE	NE	NE	1 088	1 039	1 002	922	822	789	- 4.1	NE	11
EU-27	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	7 337	7 400	0.9	NE	100

Note: 'NE' denotes 'not estimated or not provided'.

Table A1.3 SO₂ emission trends for Member States, 1990–2010

SO ₂ (Gg)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change 2009–2010 (%)	Change 1990–2010 (%)	Contribution to EU-27 in 2010 (%)
Austria	74	47	31	32	30	31	27	27	28	24	22	17	19	7.7	- 75	0.4
Belgium	362	NE	172	NE	NE	NE	NE	145	135	125	97	77	67	- 12	- 81	1.5
Bulgaria	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	440	387	- 12	NE	8.5
Cyprus	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	18	22	23	NE	0.5
Czech Republic	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	175	170	- 3.1	NE	3.7
Denmark	176	139	29	28	26	33	26	23	26	24	19	14	14	- 1.8	- 92	0.3
Estonia	274	116	97	91	87	100	88	76	70	88	69	55	83	52	- 70	1.8
Finland	263	99	79	86	80	100	84	69	84	83	70	59	68	15	- 74	1.5
France	1 354	979	644	577	523	501	485	467	429	412	344	289	262	- 10	- 81	5.8
Germany	5 292	1 718	653	643	590	573	547	517	520	497	490	435	449	3.4	- 92	9.9
Greece	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	426	266	- 38	NE	5.8
Hungary	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	80	32	- 59	NE	0.7
Ireland	183	161	139	134	101	79	72	71	61	55	45	33	26	- 21	- 86	0.6
Italy	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	230	210	- 8.8	NE	4.6
Latvia	105	49	16	13	11	8.8	6.8	6.6	5.9	5.7	4.7	4.1	7.3	79	- 93	0.2
Lithuania	209	91	NE	NE	NE	NE	NE	NE	NE	39	27	30	38	29	- 82	0.8
Luxembourg	15	8.3	3.1	3.8	2.7	2.5	2.8	2.5	2.2	2.3	1.7	1.7	1.7	- 1.8	- 89	0.0
Malta	NE	NE	24	26	25	27	11	11	11	12	11	8.0	8.1	1.5	NE	0.2
Netherlands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	37	34	- 9.4	NE	0.7
Poland	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	862	974	13	NE	2.1
Portugal	294	302	281	261	259	175	177	177	155	149	108	74	68	- 8.2	- 77	1.5
Romania	NE	NE	NE	NE	NE	NE	NE	643	697	575	566	460	372	- 19	NE	8.2
Slovakia	NE	NE	127	131	103	105	96	89	88	71	69	64	69	8.3	NE	1.5
Slovenia	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	11	10	- 2.3	NE	0.2
Spain	2 104	1 741	1 476	1 456	1 551	1 288	1 335	1 287	1 179	1 166	525	472	444	- 6.1	- 79	9.8
Sweden	105	69	42	41	40	41	37	36	36	33	30	30	34	16	- 67	0.8
United Kingdom	NE	NE	NE	NE	NE	NE	NE	706	665	586	491	397	406	2.3	NE	8.9
EU-27	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	4 798	4 542	- 5.3	NE	100

Note: 'NE' denotes 'not estimated or not provided'.

Table A1.4 NH₃ emission trends for Member States, 1990–2010

NH ₃ (Gg)	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change 2009–2010 (%)	Change 1990–2010 (%)	Contribution to EU-27 in 2010 (%)
Austria	65	71	65	65	63	63	62	62	62	63	62	63	62	- 1.5	- 5.0	1.7
Belgium	120	NE	86	NE	NE	NE	NE	71	71	68	67	69	69	0.02	- 43	1.9
Bulgaria	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	52	51	- 3.1	NE	1.4
Cyprus	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	5.2	5.3	2.7	NE	0.1
Czech Republic	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	70	69	- 2.0	NE	1.9
Denmark	98	87	83	82	82	81	80	77	74	74	73	70	69	- 1.1	- 30	1.9
Estonia	25	11	10	10	9	10	10	10	10	10	11	10	10	4.1	- 58	0.3
Finland	38	35	37	36	37	38	38	39	38	38	38	37	37	- 0.1	- 2.6	1.0
France	704	678	699	684	688	667	663	661	655	656	672	656	645	- 1.7	- 8.3	18
Germany	692	599	602	608	596	590	582	573	569	567	568	576	548	- 4.8	- 21	15
Greece	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	63	65	2.9	NE	1.8
Hungary	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	68	65	- 3.7	NE	1.8
Ireland	107	111	112	112	112	112	110	109	109	106	107	108	106	- 2.1	- 0.5	3.0
Italy	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	392	379	- 3.4	NE	11
Latvia	48	16	13	15	14	15	15	16	16	16	16	17	17	5.0	- 64	0.5
Lithuania	84	37	NE	NE	NE	NE	NE	NE	NE	36	29	28	30	6.0	- 64	0.8
Luxembourg	5.0	4.9	4.8	4.7	4.6	4.4	4.5	4.5	4.4	4.5	4.5	4.5	4.0	- 11	- 19	0.1
Malta	NE	NE	1.8	1.8	1.8	1.7	1.7	1.6	1.6	1.7	1.5	1.5	1.5	1.9	NE	0.0
Netherlands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	125	122	- 2.6	NE	3.4
Poland	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	273	271	- 0.8	NE	7.6
Portugal	63	59	61	58	58	52	53	50	49	49	48	48	48	0.4	- 24	1.3
Romania	NE	NE	NE	NE	NE	NE	NE	199	197	203	187	188	161	- 14	NE	4.5
Slovakia	NE	NE	32	32	33	32	29	29	27	27	25	25	24	- 2.9	NE	0.7
Slovenia	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	18	17	- 1.9	NE	0.5
Spain	316	309	378	379	375	390	383	365	376	386	354	355	368	3.9	17	10
Sweden	55	64	59	56	55	56	56	55	54	53	52	50	52	3.2	- 5.9	1.4
United Kingdom	NE	NE	NE	NE	NE	NE	NE	307	307	296	283	283	284	0.5	NE	7.9
EU-27	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	3 655	3 581	- 2.0	NE	100

Note: 'NE' denotes 'not estimated or not provided'.

Appendix 2 Data sources

An overview of the emission data sources, as of 26 April 2012, used in the trend tables Table A1.1 to Table A1.4 is shown below in Table A2.1.

Table A2.1 Inventory submissions

Member State	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Belgium	SUBM11						SUBM11					SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Bulgaria																SUBM11	SUBM11
Cyprus																SUBM11	SUBM11
Czech Republic																SUBM11	SUBM11
Denmark	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Estonia	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Finland	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
France	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Germany	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Greece																	SUBM11
Hungary																SUBM11	SUBM11
Ireland	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Italy																SUBM11	SUBM11
Latvia	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Lithuania	SUBM11	SUBM11												SUBM11	SUBM11	SUBM11	SUBM11
Luxembourg	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Malta							SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Netherlands																SUBM11	SUBM11
Poland																SUBM11	SUBM11
Portugal	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Romania												SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Slovakia							SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Slovenia																SUBM11	SUBM11
Spain	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
Sweden	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11
United Kingdom												SUBM11	SUBM11	SUBM11	SUBM11	SUBM11	SUBM11

Note: SUBM11 = inventory submission with the reporting deadline of 31 December 2011.

Appendix 3 Reporting status of NECD emissions

The status of reporting NECD emissions (2011 reporting round) as of 26 April 2012 is shown in Table A3.1 below.

Table A3.1 Submission overview

Member State	Submission		Resubmissions	Years covered	Format	NO _x , NMVOC, SO ₂ , NH ₃		Projections table	Updated NECD programmes	Socio-economic data (Table 2B)	IIR
	uploaded to CDR	to the EC				2009 final	2010 preliminary				
Austria	29.12.2011	n/a	n/a	1990–2010	NFR 2009-1	x	x	np	n/a	n/a	29.12.2011
Belgium	23.12.2011	n/a	n/a	1990, 2000, 2005–2010	NFR 2009-1	x	x	np	n/a	x	np
Bulgaria	29.12.2011	n/a	n/a	2009–2010	NFR 2009-1	x	x	2010, 2015, 2020	n/a	n/a	np
Cyprus	27.12.2011	n/a	11.01.2012	2009–2010	NFR 2009-1	x	x	2010	n/a	x	np
Czech Republic	29.12.2011	n/a	n/a	2009–2010	NFR 2009-1	x	x	2010	n/a	n/a	np
Denmark	21.12.2011	n/a	n/a	1980–2010	NFR 2009-1	x	x	2010, 2015, 2020, 2030	n/a	n/a	np
Estonia	30.12.2011	n/a	n/a	1990–2010	NFR 2009-1	x	x	2010, 2015	n/a	x	np
Finland	15.12.2011	n/a	16.03.2012	1980–2010	NFR 2009-1	x	x	2020, 2030 (NH ₃), 2050	n/a	x	15.12.2011
France	16.12.2011	n/a	n/a	1980–2010	NFR 2009-1	x	x	2010	n/a	n/a	np
Germany	15.12.2011	n/a	n/a	1990–2010	NFR 2009-1	x	x	np	n/a	n/a	15.12.2011
Greece	20.01.2012	n/a	24.01.2012	2009–2010	NFR 2009-1	x	x	np	n/a	n/a	np
Hungary	30.12.2011	n/a	16.02.2012, 22.02.2012	2009–2010	NFR 2009-1	x	x	np	n/a	n/a	np
Ireland	21.12.2011	n/a	26.01.2012	1990–2010	NFR 2009-1	x	x	np	n/a	n/a	np
Italy	31.12.2011	n/a	n/a	2009–2010	NFR 2008-1	x	x	np	n/a	n/a	np
Latvia	30.12.2011	n/a	n/a	1990–2010	NFR 2009-1	x	x	np	n/a	n/a	30.12.2011
Lithuania	27.12.2011	n/a	09.01.2012, 24.04.2012	1990, 1995, 2007–2010	NFR 2009-1	x	x	2010, 2015, 2020	n/a	x	np
Luxembourg	30.12.2011	n/a	n/a	1990–2010	NFR 2009-1	x	x	np	n/a	n/a	np
Malta	14.02.2012	n/a	n/a	2000–2010	NFR 2009-1	x	x	np	n/a	n/a	np
Netherlands	23.12.2011	n/a	n/a	2009–2010	NFR 2009-1	x	x	2010, 2015, 2020, 2030	n/a	x	np
Poland	28.12.2011	n/a	19.01.2012, 05.04.2012	2009–2010	NFR 2009-1	x	x	2010	n/a	x	28.12.2011
Portugal	30.12.2011	n/a	06.01.2012	1990–2010	NFR 2008-1	x	x	2020	n/a	x	np
Romania	28.12.2011	n/a	n/a	2005–2010	NFR 2009-1	x	x	2010	n/a	x	28.12.2011
Slovakia	30.12.2011	n/a	n/a	2000–2010	NFR 2009-1	x	x	2010, 2015, 2020, 2030, 2050	n/a	x	30.12.2011
Slovenia	27.12.2011	n/a	n/a	2009–2010	NFR 2009-1	x	x	2010, 2015, 2020, 2030	n/a	x (2009)	np
Spain	13.01.2012	n/a	25.01.2012	1990–2010	NFR 2009-1	x	x	2010, 2015, 2020	n/a	x	13.01.2012
Sweden	22.12.2011	n/a	n/a	1990–2010	NFR 2009-1	x	x	np	n/a	n/a	22.12.2011
United Kingdom	15.12.2011	n/a	n/a	2005–2010	NFR 2009-1	x	x	np	n/a	n/a	np

Note: 'np' denotes 'not provided'.

'x' denotes 'provided'.

'NFR' denotes 'nomenclature for reporting' — the sectoral classification system developed by UNECE/EMEP for reporting air emissions.

Appendix 4 Number of source categories that are 'not estimated'

The number of source categories that are 'not estimated', and an indication of the contribution of these source categories to the reported total emissions of Member States for NO_x, NMVOC, SO₂ and NH₃ are shown in Table A4.1.

Table A4.1 'Not estimated' source categories and their contribution to total emissions

	NO _x				NMVOC				SO ₂				NH ₃			
	Number of source categories NE	Potential underestimation of emissions (%)	Are 2010 emissions lower than ceiling?	Are 2010 emissions + potential underestimation lower than ceiling?	Number of source categories NE	Potential underestimation of emissions (%)	Are 2010 emissions lower than ceiling?	Are 2010 emissions + potential underestimation lower than ceiling?	Number of source categories NE	Potential underestimation of emissions (%)	Are 2010 emissions lower than ceiling?	Are 2010 emissions + potential underestimation lower than ceiling?	Number of source categories NE	Potential underestimation of emissions (%)	Are 2010 emissions lower than ceiling?	Are 2010 emissions + potential underestimation lower than ceiling?
Austria	0	0 %	No	No	0	0 %	Yes	Yes	0	0 %	Yes	Yes	0	0.0 %	Yes	Yes
Belgium	14	1 %	No	No	20	0 %	Yes	Yes	12	2 %	Yes	Yes	19	0.2 %	Yes	Yes
Bulgaria	16	8 %	Yes	Yes	16	7 %	Yes	Yes	15	0 %	Yes	Yes	17	6.5 %	Yes	Yes
Cyprus	11	0 %	Yes	Yes	8	17 %	Yes	Yes	11	0 %	Yes	Yes	20	5.9 %	Yes	Yes
Czech Republic	25	1 %	Yes	Yes	26	6 %	Yes	Yes	11	0 %	Yes	Yes	11	5.6 %	Yes	Yes
Denmark	26	2 %	No	No	23	2 %	Yes	No	12	2 %	Yes	Yes	22	4.9 %	Yes	No
Estonia	4	0 %	Yes	Yes	0	0 %	Yes	Yes	0	0 %	Yes	Yes	1	0.0 %	Yes	Yes
Finland	0	0 %	No	No	0	0 %	Yes	Yes	0	0 %	Yes	Yes	2	0.0 %	No	No
France	1	0 %	No	No	2	0 %	Yes	Yes	1	0 %	Yes	Yes	1	0.0 %	Yes	Yes
Germany	7	0 %	No	No	17	0 %	No	No	5	0 %	Yes	Yes	5	0.2 %	Yes	Yes
Greece	8	0 %	Yes	Yes	12	4 %	Yes	Yes	7	1 %	Yes	Yes	0	0.0 %	Yes	Yes
Hungary	14	1 %	Yes	Yes	29	9 %	Yes	Yes	22	3 %	Yes	Yes	30	5.1 %	Yes	Yes
Ireland	7	0 %	No	No	8	6 %	Yes	Yes	8	1 %	Yes	Yes	35	4.0 %	Yes	Yes
Italy	16	1 %	Yes	Yes	1	0 %	Yes	Yes	1	0 %	Yes	Yes	1	0.0 %	Yes	Yes
Latvia	2	0 %	Yes	Yes	3	3 %	Yes	Yes	2	0 %	Yes	Yes	23	0.6 %	Yes	Yes
Lithuania	14	0 %	Yes	Yes	23	23 %	Yes	Yes	13	1 %	Yes	Yes	33	11.9 %	Yes	Yes
Luxembourg	1	0 %	No	No	2	0 %	Yes	Yes	1	0 %	Yes	Yes	3	0.7 %	Yes	Yes
Malta	1	0 %	No	No	6	10 %	Yes	Yes	1	0 %	Yes	Yes	1	0.0 %	Yes	Yes
Netherlands	5	0 %	No	No	1	0 %	Yes	Yes	2	0 %	Yes	Yes	5	3.5 %	Yes	Yes
Poland	3	1 %	Yes	Yes	2	0 %	Yes	Yes	3	1 %	Yes	Yes	1	3.0 %	Yes	Yes
Portugal	6	0 %	Yes	Yes	8	2 %	Yes	Yes	10	1 %	Yes	Yes	13	1.0 %	Yes	Yes
Romania	13	2 %	Yes	Yes	19	2 %	Yes	Yes	13	0 %	Yes	Yes	16	2.5 %	Yes	Yes
Slovakia	2	0 %	Yes	Yes	3	0 %	Yes	Yes	2	0 %	Yes	Yes	2	0.0 %	Yes	Yes
Slovenia	30	6 %	Yes	No	32	10 %	Yes	Yes	31	4 %	Yes	Yes	22	3.6 %	Yes	Yes
Spain	18	1 %	No	No	30	0 %	No	No	22	3 %	Yes	Yes	39	2.4 %	No	No
Sweden	8	0 %	No	No	19	0 %	Yes	Yes	5	0 %	Yes	Yes	14	0.2 %	Yes	Yes
United Kingdom	1	0 %	Yes	Yes	2	0 %	Yes	Yes	2	0 %	Yes	Yes	2	0.0 %	Yes	Yes

Note: To enable comparison between Member States, the analysis is based on converted NFR tables for Member States that submitted their inventories in older NFR formats. Therefore, in these instances the number of source categories that were not estimated could vary slightly from the number originally reported by Member States as presented in the table above.

Bold numbers: Number of the notation key 'NE' increased by more than five compared with the submissions of 2009.

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