

Annual European Community CLRTAP emission inventory 1990–2003

Submission to the Executive Body of the UNECE Convention
on long-range transboundary air pollution

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Summary

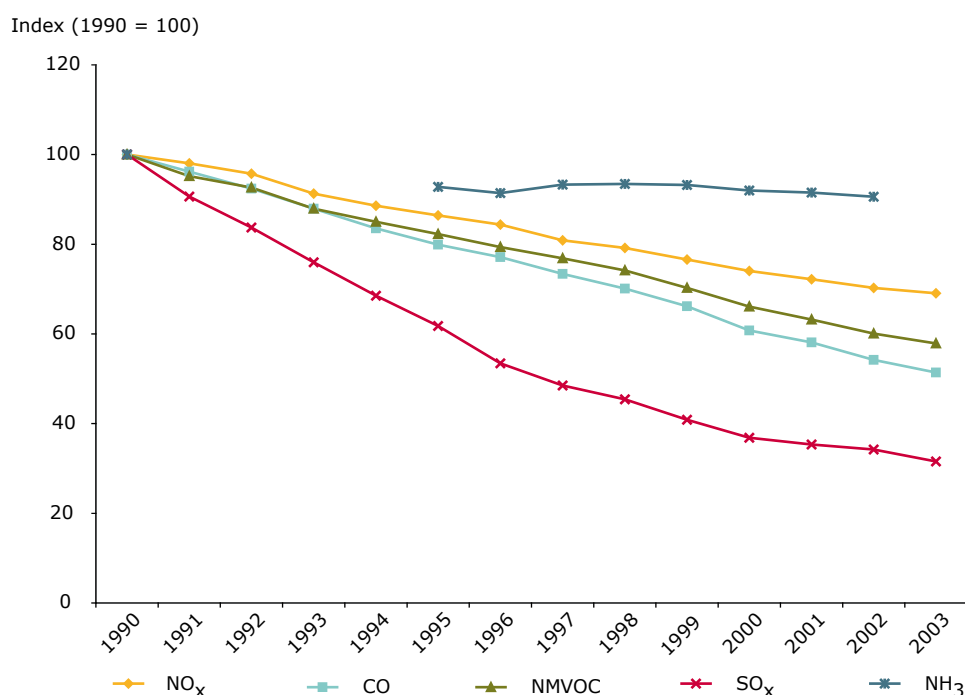
This report is the annual European Community CLRTAP emission inventory presenting the European Community air pollution data from the years 1990 to 2003. The report provides an overview of emission trends and data availability for EU-25; NFR Tables IV 1A are provided for EU-15 only. Due to data gaps, EU-15 totals were estimated for NO_x, CO, NMVOCs, SO_x and NH₃ only. Data reported for particulate matter (PM), persistent organic pollutants (POPs) and heavy metals (HM) are presented in Annex F.

The figure and table below show the EU-15 emission trends for NO_x, CO, NMVOCs and SO_x between 1990 and 2003, and for NH₃ for 1990 and 1995–2002.

The largest reductions in relative terms were in SO_x emissions (– 68 %), followed by CO (– 49 %), NMVOC (– 42 %) and NO_x (– 31 %). NH₃ emissions decreased by 9 % between 1990 and 2002.

This report also shows the data availability of the emission data under the European Community directive on national emission ceilings for certain atmospheric pollutants. This year, for the first time, NEC data for all EU-15 Member States are available. Up to now, there is no formal quality assurance and quality control (QA/QC) plan available for the EC inventory. However, with data availability increasing from year to year, more emphasis will be laid on QA/QC activities.

EU-15 Emission trends for NO_x, CO, NMVOCs, SO_x between 1990 and 2003, and for NH₃ in 1990 and 1995–2002



Total EU-15 emissions of NO_x, CO, NMVOCs, SO_x and NH₃ in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
NO _x	13 410	13 147	12 839	12 243	11 882	11 593	11 316	10 843	10 618	10 269	9 931	9 682	9 422	9 261
CO	50 058	48 147	46 253	44 022	41 809	40 009	38 607	36 735	35 097	33 119	30 428	29 091	27 138	25 732
NMVOC	14 306	13 617	13 251	12 581	12 161	11 770	11 357	10 997	10 609	10 053	9 454	9 042	8 596	8 280
SO _x	16 500	14 957	13 813	12 537	11 308	10 190	8 818	8 004	7 491	6 740	6 077	5 834	5 650	5 205
NH ₃	3 634	NE	NE	NE	NE	3 372	3 321	3 391	3 396	3 388	3 343	3 326	3 292	NE

1 Introduction to the EU long-range transboundary air pollution inventory

1.1 Background information on the inventory

The United Nations Economic Commission for Europe Convention on long-range transboundary air pollution (UNECE CLRTAP) was ratified by the European Community in 1979. The Convention does not include any binding commitments to undertake concrete measures for reducing specific pollutants. Under Article 2 of the Convention, however, 'the Contracting Parties, taking due account of the facts and problems involved, are determined to protect man and his environment against air pollution and shall endeavour to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution.'

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

Under the Convention, the reporting of air emission data is important for assessing the state

of air pollution in the UNECE region and for ascertaining the compliance of the parties with their commitments. This report follows the data request as outlined in the letter of the UNECE Environment and Human Settlements Division (the secretariat for the executive body of the Convention) from 19 November 2004, asking the European Community to report its 2003 emission data on SO_x (as SO₂), NO_x (as NO₂), NH₃, NMVOCs, CO, heavy metals (HMs), persistent organic pollutants (POPs), and particulate matter (PM). The report provides an overview of emission trends and data availability for EU-25; NFR Tables IV 1A are provided for EU-15 only. This report was prepared by the European Environment Agency on behalf of the European Commission.

Throughout this report, the European Community refers to the 25 Member States: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. EU-15 refers to the 15 Member States up to 1 May 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

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

Convention/Protocol	Status
The 1979 Convention on long-range transboundary air pollution	Signed and ratified
The 1984 Protocol on long-term financing of the cooperative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe	Signed and ratified
The 1985 Protocol on the reduction of sulphur emissions or their transboundary fluxes by at least 30 percent	
The 1988 Protocol concerning the control of emissions of nitrogen oxides or their transboundary fluxes	Ratified
The 1991 Protocol concerning the control of emissions of volatile organic compounds or their transboundary fluxes	Signed
The 1994 Protocol on further reduction of sulphur emissions	Signed and ratified
The 1998 Protocol on persistent organic pollutants	Signed and ratified
The 1998 Protocol on heavy metals	Signed and ratified
The 1999 Protocol to abate acidification, eutrophication and ground-level ozone	Ratified

1.2 A description of the institutional arrangements for inventory preparation

There is no directive to monitor the air emissions and the preparation of the air emission inventories for the LRTAP Convention. The legal reporting obligation for the Member States and for the European Community remains the 1979 LRTAP Convention. Within the European Community, the Member States are requested to post a copy of their official submission to CLRTAP in the central data repository of the European environmental information system (Eionet ⁽¹⁾) by 15 February of each year. EEA/ETC-ACC collects the data from the central data repository and compiles the European Community CLRTAP inventory database, producing a European Community CLRTAP inventory and inventory report.

Additionally, a European Community directive, the NEC Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants ⁽²⁾,

requests the European Community Member States to report by 31 December each year to the European Commission and to the EEA their national emission inventories for SO₂, NO_x, NMVOCs and NH₃, and their emission projections for 2010. They have to report their final emission inventories for the year before last and their provisional emission inventories for the previous year.

The Member States also report their NO_x, CO, NMVOC, SO₂ emissions under the greenhouse gas monitoring mechanism for the United Nations Framework Convention on climate change (UNFCCC) ⁽³⁾. Table 2 provides an overview of air pollution reporting obligations for the European Community Member States.

Within this legal framework, preparing the CLRTAP inventory involves the Member States providing their data, the European Commission receiving the data, and the EEA and its ETC-ACC collecting the data and preparing the actual inventory.

Table 2 Overview of air emission reporting obligations in the European Community

Convention	Legal obligation	Reporting requirements	Reporting deadline for EU Member States	Reporting deadline for the EU
CLRTAP	1979 Convention on long-range transboundary air pollution	Emission of SO _x (as SO ₂), NO _x (as NO ₂), NH ₃ , NMVOCs, CO, heavy metals (HMs), persistent organic pollutants (POPs), and particulate matter (PM)	15 February	15 February
	Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants	Emission of SO ₂ , NO _x , NMVOCs, NH ₃	31 December	
UNFCCC	Council Decision 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol	Emission of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NO _x , CO, NMVOC, SO ₂	15 January (to the European Commission) 15 April (to the UNFCCC)	15 April

⁽¹⁾ Council Regulation (EC) No 933/1999 of 29 April 1999 amending Regulation (EEC) No 1210/90 on the establishment of the European Environment Agency and Eionet. Eionet is an extended network consisting of the EEA as central node (supported by European Topic Centres) and national institutions in the EEA member countries that supply and/or analyse national data on the environment.

⁽²⁾ OJ L 309, 27.11.2001, p. 22.

⁽³⁾ OJ L 49, 19.2.2004, p. 1. Council Decision 280/2004/EC.

1.3 General description of methods and data sources used

The European Community CLRTAP inventory is the sum of the Member States' inventories. The methods used by the Member States are based on the joint EMEP/CORINAIR (Emission Inventory) guidebook ⁽⁴⁾. For the inventory prepared in 2005, 17 out of 25 Member States provided CLRTAP data. Table 3 provides an overview of available emission data submissions at the EEA by 15 September 2005.

Table 3 Date of receipt of CLRTAP submission, years covered and NFR tables available from Member States by 15 September 2005

Member State	Submission date	Latest data available	Years covered	Gases covered	Format emissions
Austria	15 Feb 2005	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, priority metals, POP	New NFR
Czech Republic	18 Feb 2005	2003	2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
	21 Apr 2005	2003	2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Denmark	21 Feb 2005	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
	21 Apr 2005	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Estonia	15 Feb 2005	2003	1980/ 1985–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	1980, 1985–1989 totals; 1990–2000 SNAP1; 2001–2003 new NFR
France	23 Feb 2005	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Germany	21 Feb 2005	2003	1990–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, Pb, POP	New NFR
Greece	28 June 2005	2003	2003	SO _x , NO _x , NMVOC, CO	New NFR
	16 Sep 2005	2003	1990–2003	SO _x , NO _x , NMVOC, CO	New NFR
Hungary	22 Aug 2005	2003	1980/ 1985–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM	SNAP1
Ireland	22 Feb 2005	2003	2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Latvia	15 Feb 2005	2003	1990–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Luxembourg	4 July 2005	2003	1990, 2003	SO _x , NO _x , NMVOC, CO, POP	SNAP
Netherlands	16 Feb 2005	2003	1990/1995/ 2000–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Poland	11 July 2005	2003	2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Slovenia	15 Feb 2005	2003	2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, priority metals, POP	New NFR
Spain	18 Mar 2005	2003	1990–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
Sweden	11 Feb 2005	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM, HM, POP	New NFR
United Kingdom	17 Feb 05	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM _{10r} , PM _{2.5r} , HM, POP	New NFR
	24 Feb 2005	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM _{10r} , PM _{2.5r} , HM, POP	New NFR
	10 Mar 05	2003	1980–2003	SO _x , NO _x , NMVOC, NH ₃ , CO, PM _{10r} , PM _{2.5r} , HM, POP	New NFR

⁽⁴⁾ EMEP/CORINAIR Emission inventory guidebook. Latest version available third edition, October 2003 update, EEA Technical report No 30. Prepared by the EMEP Task Force on Emission Inventories. Internet site: <http://reports.eea.eu.int/EMEP-CORINAIR4>

Submission of national CLRTAP inventory reports (NIRs)

National CLRTAP inventory reports were submitted by Austria, Denmark, Spain, Sweden and Latvia.

1.4 Information on the quality assurance and quality control plan

There is no formal quality assurance and quality control (QA/QC) plan available for the EC inventory. The main activities enhancing the quality of the inventory are the checks by EEA on the status of each submission. For this purpose, the EEA fills out a status report form similar to that of the UNFCCC (included in Annex B of this report).

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

More detailed quality assurance activities are performed by the EEA and EMEP (European monitoring evaluation programme) in an annual review process. The review process includes checks on timeliness, consistency, accuracy, completeness and comparability.

1.5 General assessment of the completeness

Due to data gaps and due to lack of an agreed data gap filling procedure, total European Community emissions can be estimated only for NO_x, CO, NMVOCs, SO_x and NH₃. Data reported for particulate matter (PM), persistent organic pollutants (POPs) and heavy metals (HM) are presented in Annex F.

1.5.1 Data gaps and gap filling

For Member States which did not provide their CLRTAP inventory submission to the EEA, the emissions of air pollutants reported to the European

Commission and the EEA under NEC and under the GHG Monitoring Mechanism were used.

Table 4 shows for which Member States the new NFR (nomenclature for reporting) and the CRF (common reporting format) data were used in order to estimate SO_x, NO_x, CO and NMVOC emissions at EC level (see also Annex A for more details for EU-15 Member States).

Adaptations for the calculation of the NFR Tables IV 1A for the EU-15

Although the new NFR and the CRF are now widely compatible, an additional table was included for EU-15 in order to use the new NFR data together with the CRF data (for those Member States which did not provide data in the new NFR). The adaptation was necessary because the new NFR does not allow for reporting of sub-category totals for civil aviation and international aviation. As the CRF includes only sub-category totals, an additional table is provided including sub-category totals for civil aviation and international aviation. This additional table is provided for each year in a separate sheet to NFR Table IV 1A.

1.5.2 Data basis of the European Community LRTAP inventory

Annex A provides a detailed overview of data availability for NO_x, CO, NMVOCs, SO_x, NH₃, particulate matter (PM), heavy metals (HMs), and persistent organic pollutants (POPs) for each EU-15 Member State.

Annex B provides the status reports for the EC Member States.

Annex C provides the Tables IV 1A for the years 1990–2003 for the EU-15. Because of lack of data and lack of a data gap filling procedure, emissions can be provided for only a limited number of gases.

Table 4 Data basis for SO_x, NO_x, CO and NMVOC from the new NFR and from the CRF

Member States	New NFR as provided as CLRTAP submission under Eionet	New NFR as provided under NEC	CRF as provided under Council Decision 280/2004/EC and used in EEA (2005)
Austria	1990–2003		
Belgium	2001–2002 (NO _x , NMVOC, SO ₂)	2000, 2003 (NO _x , NMVOC, SO ₂ , NH ₃)	1990–1999 (NO _x , NMVOC, SO ₂); 1990–2003 (CO)
Cyprus			1990–2003
Czech Republic	2002–2003		
Denmark	1990–2003		
Estonia	2001–2003		
Finland	2001–2002		1990–2000, 2003
France	1990–2003		
Germany	1990–2003		
Greece	1990–2003		
Hungary	1990–2003		
Ireland	2001–2003		1990–2000
Italy			1990–2003
Latvia	1990–2003		
Lithuania	2002	2003 (NO _x , NMVOC, SO ₂ , NH ₃)	1990, 1998, 2001, 2003 (CO)
Luxembourg			1990–2003
Netherlands	1990, 1995, 1998–2003		1991–1994, 1996–1997
Malta			1990–2000
Poland	2001 (NMVOC), 2003		2001–2002 (NO _x , CO, SO ₂); 2002 (NMVOC)
Portugal	1990–2002	2003 (NO _x , NMVOC, SO ₂ , NH ₃ , CO)	
Slovakia	2000–2001		2002–2003
Slovenia	2001–2003	2002, 2003 (NO _x , NMVOC, SO ₂ , CO)	1986, 1990–2003 (NO _x , NMVOC, SO ₂ , CO)
Spain	1990–2003		
Sweden	1990–2003		
United Kingdom	1990–2003		

2 European Community air pollution trends

Total emissions of air pollutants for the EU-25 cannot fully be estimated because of lack of data. EU-25 totals are only available for NO_x, CO, NMVOC and SO_x for the years 1990 and 1998 (see Tables 6–9).

For EU-15 Figure 1 and Table 5 show the trends of NO_x, CO, NMVOCs, and SO_x between 1990 and 2003. NH₃ is shown for 1990 and 1995–2002. All gases were reduced. The largest reductions in absolute terms were in CO emissions (– 24 325 Gg), followed by SO_x (– 11 295 Gg), NMVOC (– 6 025 Gg) and NO_x (– 4 149 Gg). NH₃ emissions reduced by 342 Gg between 1990 and 2002. In relative terms, largest reductions were in SO_x emissions between 1990 and 2003 (– 68 %).

Tables 6–10 show the contribution of the EC Member States to the EU-15 and EU-25 total emissions for NO_x, CO, NMVOCs, SO_x and NH₃ in Gg.

Most EU-15 Member States reported a decreasing trend of NO_x emissions between 1990 and 2003 (Table 6). Germany and the United Kingdom had the largest decreases in absolute and relative terms.

The largest increase of NO_x emissions in absolute and relative terms was in Spain. Between 2002 and 2003 NO_x emissions decreased in most EU-15 Member States, but increased in Austria, Belgium, Finland and Greece. Germany, Spain and the United Kingdom were the largest emitters of NO_x emissions in 2003.

Figure 1 EU-15 emission trends for NO_x, CO, NMVOCs, SO_x between 1990 and 2003, and for NH₃ in 1990 and 1995–2002

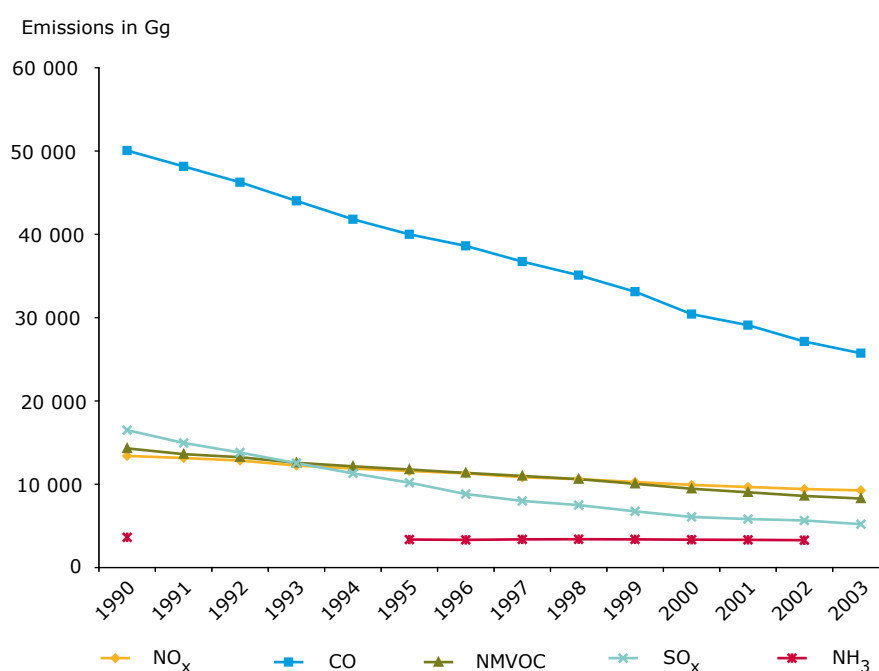


Table 5 Total EU-15 emissions of NO_x, CO, NMVOCs, SO_x and NH₃ in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
NO_x	13 410	13 147	12 839	12 243	11 882	11 593	11 316	10 843	10 618	10 269	9 931	9 682	9 422	9 261
CO	50 058	48 147	46 253	44 022	41 809	40 009	38 607	36 735	35 097	33 119	30 428	29 091	27 138	25 732
NMVOC	14 306	13 617	13 251	12 581	12 161	11 770	11 357	10 997	10 609	10 053	9 454	9 042	8 596	8 280
SO_x	16 500	14 957	13 813	12 537	11 308	10 190	8 818	8 004	7 491	6 740	6 077	5 834	5 650	5 205
NH₃	3 634	NE	NE	NE	NE	3 372	3 321	3 391	3 396	3 388	3 343	3 326	3 292	NE

Table 6 Member States contribution to European Community emissions of NO_x Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	211	221	210	203	195	192	212	199	211	199	204	214	220	229
Belgium	358	362	358	348	354	347	332	326	327	300	329	292	284	299
Denmark	283	332	290	290	290	273	311	265	243	225	208	203	201	198
Finland	294	274	266	267	268	246	250	243	228	222	208	222	208	218
France	1 830	1 892	1 856	1 742	1 697	1 646	1 619	1 554	1 534	1 462	1 390	1 335	1 275	1 220
Germany	2 846	2 611	2 418	2 299	2 130	2 000	1 918	1 823	1 766	1 717	1 634	1 560	1 493	1 428
Greece	300	312	315	314	321	321	326	332	350	337	330	344	341	343
Ireland	116	118	129	117	114	114	118	117	120	117	123	135	125	120
Italy	1 945	2 000	2 019	1 919	1 840	1 808	1 731	1 653	1 552	1 456	1 377	1 366	1 275	1 259
Luxembourg	22	22	22	22	22	20	22	18	19	16	17	17	17	17
Netherlands	559	432	423	407	380	473	455	418	428	429	393	382	371	364
Portugal	257	270	289	281	279	287	276	277	288	287	285	280	305	273
Spain	1 247	1 293	1 325	1 300	1 329	1 351	1 317	1 365	1 376	1 447	1 477	1 459	1 522	1 519
Sweden	315	305	299	284	286	274	262	250	243	232	219	214	208	206
United Kingdom	2 828	2 704	2 622	2 450	2 377	2 241	2 165	2 004	1 935	1 822	1 737	1 660	1 578	1 570
EU-15	13 410	13 147	12 839	12 243	11 882	11 593	11 316	10 843	10 618	10 269	9 931	9 682	9 422	9 261
Cyprus	19	20	25	24	24	24	25	25	26	22	22	22	22	22
Czech Republic	544	521	496	454	375	368	366	349	321	313	321	332	318	323
Estonia	68	63	39	38	41	42	44	45	46	40	47	38	40	39
Hungary	238	203	183	184	187	190	196	200	203	201	185	185	186	186
Latvia	70	58	47	47	44	42	44	43	40	38	35	38	37	37
Lithuania	158								60			55	51	53
Malta	10	10	11	11	11	10	9	9	10	10	10			
Poland	1 280	1 205	1 130	1 120	1 105	1 120	1 154	1 114	991	951	838	805	796	808
Slovakia	226	205	191	184	174	182	130	125	130	118	106	106	105	98
Slovenia	63	58	58	63	66	67	70	71	64	58	60	59	60	56
EU-25	16 086	NE	NE	NE	NE	NE	NE	NE	12 509	NE	NE	NE	NE	NE

Nearly all new Member States had a decreasing trend in NO_x emissions between 1990 and 2003. The highest decrease in absolute terms had Poland; the highest decrease in relative terms was reported for Lithuania (– 67 %). In Cyprus, emissions increased since 1990. Between 2002 and 2003, NO_x emissions decreased or were stable in most new Member States, only in the Czech Republic, Lithuania and Poland emissions increased.

All EU-15 Member States decreased their CO emissions between 1990 and 2003 (Table 7). The largest reductions in absolute and relative terms

were made in Germany and the United Kingdom. Between 2002 and 2003, most countries reduced CO emissions; small increases were reported by Austria and Denmark. France, Germany and Italy emitted most CO in 2003.

Almost all new Member States had a decreasing trend in CO emissions between 1990 and 2003. The largest decrease in absolute and relative terms was reported for Poland. CO emission increased in about half of the new Member States between 2002 and 2003, only in Lithuania, Poland, Slovenia and Slovakia they decreased.

Table 7 Member States contribution to European Community emissions of CO in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	1 244	1 255	1 205	1 165	1 106	1 018	1 032	962	923	876	810	804	775	802
Belgium	1 347	1 309	1 286	1 171	1 086	1 058	1 020	973	938	941	927	868	865	742
Denmark	772	814	805	812	781	772	771	718	655	626	615	618	590	591
Finland	702	673	662	651	636	632	623	624	620	611	594	605	600	564
France	10 817	10 706	10 244	9 712	9 038	8 881	8 322	7 889	7 748	7 262	6 695	6 406	6 105	5 897
Germany	11 212	9 528	8 351	7 701	7 080	6 581	6 166	5 994	5 554	5 200	4 913	4 561	4 300	4 155
Greece	1 302	1 312	1 341	1 344	1 340	1 334	1 360	1 361	1 391	1 316	1 364	1 275	1 244	1 201
Ireland	397	391	391	347	326	301	303	308	313	281	275	273	254	239
Italy	7 091	7 436	7 629	7 539	7 354	7 133	6 837	6 571	6 156	5 890	5 188	5 108	4 506	4 403
Luxembourg	172	172	172	172	145	104	102	80	58	49	49	53	48	48
Netherlands	1 126	785	752	708	691	847	832	754	739	702	707	659	626	609
Portugal	833	844	874	863	848	843	831	807	806	791	785	738	735	640
Spain	3 538	3 605	3 664	3 441	3 414	3 106	3 198	3 029	3 004	2 752	2 597	2 544	2 427	2 377
Sweden	1 189	1 166	1 146	1 097	1 073	1 058	1 021	938	902	850	794	758	724	697
United Kingdom	8 318	8 152	7 732	7 300	6 889	6 341	6 188	5 727	5 288	4 972	4 117	3 820	3 336	2 768
EU-15	50 058	48 147	46 253	44 022	41 809	40 009	38 607	36 735	35 097	33 119	30 428	29 091	27 138	25 732
Cyprus	71	69	77	76	74	74	71	67	65	93	92	91	88	89
Czech Republic	1 257	1 179	1 170	1 103	1 125	999	1 012	944	765	716	648	649	546	578
Estonia	434	399	208	210	241	242	268	283	281	215	203	177	178	183
Hungary	997	913	836	796	774	761	727	733	737	722	633	576	563	565
Latvia	528	624	613	318	327	404	409	386	384	374	333	310	290	295
Lithuania	519								358			229	224	223
Malta	24	25	27	28	29	30	31	31	31	31	30			
Poland	7 406		7 083	8 655	5 115	4 547	4 837	4 700	4 301	4 363	3 463	3 528	3 410	2 626
Slovakia	535	485	430	456	446	435	360	352	318	310	290	287	312	308
Slovenia	81	78	78	87	93	91	95	93	77	70	99	93	89	81
EU-25	61 910	NE	NE	NE	NE	NE	NE	NE	42 414	NE	NE	NE	NE	NE

Almost all EU-15 Member States reduced their NMVOC emissions between 1990 and 2003, only Greece and Spain increased them slightly (Table 8). Largest reductions in absolute and relative terms were made in Germany. Also the United Kingdom and the Netherlands reduced their emissions by more than 50 %. The largest emitters of NMVOC emissions in 2003 were France, Germany and Italy.

Most new Member States had a decreasing trend in NMVOC emissions between 1990 and 2003. The largest decrease in absolute terms was in the Czech Republic, the largest decrease in relative terms was reported for Estonia (– 55 %). In Cyprus, Poland and Slovenia, NMVOC emissions increased

between 1990 and 2003. In most new Member States, NMVOC emissions increased between 2002 and 2003, only in Poland and Slovenia, they decreased.

All EU-15 Member States except Greece decreased SO_x emissions between 1990 and 2003. The largest reductions in absolute and relative terms were made in Germany, followed by the United Kingdom and Italy (Table 9). Reductions of more than 80 % were reported by Germany, Denmark and Luxembourg. Between 2002 and 2003 the largest reductions in absolute terms were made in Spain, Portugal and Italy, the largest increase was in Greece. The largest emitter of SO_x in 2003 was Spain.

Table 8 Member States contribution to European Community emissions of NMVOCs in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	286	273	245	239	221	221	216	204	191	180	181	185	182	182
Belgium	328	317	314	297	286	270	255	247	238	227	245	275	263	226
Denmark	229	228	223	219	214	201	208	200	173	169	172	140	145	158
Finland	223	209	202	192	188	182	175	170	166	161	155	157	151	144
France	2 416	2 395	2 346	2 242	2 118	2 033	1 946	1 874	1 819	1 740	1 661	1 586	1 475	1 400
Germany	3 534	3 082	2 807	2 581	2 404	2 248	2 110	2 042	1 966	1 842	1 697	1 592	1 492	1 460
Greece	280	288	296	302	308	305	309	308	312	307	299	294	289	288
Ireland	106	107	110	101	103	101	107	111	113	94	85	87	81	78
Italy	2 023	2 090	2 146	2 102	2 046	2 022	1 970	1 904	1 798	1 711	1 538	1 453	1 344	1 307
Luxembourg	18	18	18	18	18	17	17	15	14	12	13	12	11	11
Netherlands	486	278	262	247	243	357	322	290	301	291	260	242	230	225
Portugal	303	321	352	328	331	331	332	331	335	335	329	318	323	265
Spain	1 135	1 177	1 189	1 119	1 142	1 093	1 112	1 126	1 184	1 181	1 162	1 147	1 139	1 146
Sweden	517	496	482	449	429	420	406	376	353	331	320	311	303	303
United Kingdom	2 421	2 338	2 259	2 146	2 110	1 967	1 870	1 798	1 647	1 471	1 335	1 241	1 166	1 089
EU-15	14 306	13 617	13 251	12 581	12 161	11 770	11 357	10 997	10 609	10 053	9 454	9 042	8 596	8 280
Cyprus	14	14	15	15	15	16	15	15	15	16	16	16	16	16
Czech Republic	441	394	366	346	310	292	293	277	242	234	227	220	203	203
Estonia	88	82	45	42	45	48	50	54	54	42	34	33	38	40
Hungary	205	150	142	149	142	150	150	145	141	170	173	158	158	155
Latvia	121	95	76	61	66	71	74	79	79	79	70	73	77	79
Lithuania	108								79			71	72	74
Malta	5	5	5	5	6	6	11	8	9	10	7			
Poland	831	833	805	756	819	769	766	774	730	731	599	873	898	892
Slovakia	148			122		107	104	90	87	79	89	90	82	82
Slovenia	44	41	40	42	44	44	49	48	42	40	51	49	48	46
EU-25	16 311	NE	NE	NE	NE	NE	NE	NE	12 087	NE	NE	NE	NE	NE

Table 9 Member States contribution to European Community emissions of SO_x in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	76	71	57	55	49	48	46	42	37	36	33	34	33	34
Belgium	356	361	353	326	283	256	242	221	207	168	172	160	153	153
Denmark	177	236	182	147	145	136	171	99	76	55	28	26	25	30
Finland	241	200	153	133	120	100	104	101	92	86	77	85	82	99
France	1 330	1 451	1 264	1 105	1 041	974	950	800	815	701	605	544	500	492
Germany	5 326	3 996	3 307	2 945	2 473	1 937	1 339	1 039	836	735	636	643	611	616
Greece	487	525	544	542	513	536	523	518	527	544	493	502	513	545
Ireland	183	180	170	161	175	161	147	166	176	157	131	126	96	76
Italy	1 795	1 677	1 578	1 477	1 387	1 320	1 209	1 132	995	899	752	708	632	506
Luxembourg	15	15	15	15	15	15	15	6	4	4	3	3	2	2
Netherlands	189	108	101	98	87	128	121	102	108	103	73	73	66	65
Portugal	335	338	410	345	318	353	296	309	356	371	341	316	334	202
Spain	2 166	2 168	2 134	1 999	1 948	1 796	1 566	1 749	1 598	1 608	1 489	1 447	1 550	1 353
Sweden	112	111	106	92	91	78	75	69	66	52	49	49	50	52
United Kingdom	3 711	3 521	3 443	3 098	2 663	2 354	2 014	1 653	1 598	1 219	1 194	1 118	1 002	979
EU-15	16 500	14 957	13 813	12 537	11 308	10 190	8 818	8 004	7 491	6 740	6 077	5 834	5 650	5 205
Cyprus	45	36	41	45	44	43	45	47	48	50	53	53	51	45
Czech Republic	1 881	1 780	1 543	1 424	1 275	1 089	944	697	438	268	264	251	237	231
Estonia	252	246	187	154	149	119	125	119	110	103	99	92	88	101
Hungary	1 010	913	827	757	741	705	673	659	592	590	486	400	365	347
Latvia	99	81	67	67	77	48	54	40	36	29	15	11	9	8
Lithuania	222								94			49	43	43
Malta	19	19	21	19	24	30	31	32	34	30	26			
Poland	3 210	3 156	2 820	2 725	2 605	2 376	2 368	2 181	1 897	1 719	1 511	1 564	1 455	1 375
Slovakia	543	445	380	325	239	239	227	202	179	171	124	129	103	106
Slovenia	196	180	186	183	177	125	112	118	123	104	99	68	71	66
EU-25	23 976	NE	NE	NE	NE	NE	NE	NE	11 042	NE	NE	NE	NE	NE

Almost all new Member States had a decreasing trend in SO_x emissions between 1990 and 2003. The largest decrease in absolute terms was in the Czech Republic and Poland, the largest decrease in relative terms was reported for Latvia (– 92 %). SO_x emissions decreased in all new Member States between 2002 and 2003, except in Estonia and Slovakia.

All EU-15 Member States except Ireland, Spain and Sweden decreased NH₃ emissions between 1990 and

2002/2003 (Table 10). Largest reductions in absolute terms were made in Germany and in relative terms in the Netherlands.

All new Member States, for which data was available, had a decreasing trend in NH₃ emissions since 1990. The largest decrease in absolute terms was in Poland, the largest decrease in relative terms was reported for Latvia (– 71 %).

Table 10 Member States contribution to European Community emissions of NH₃ in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	57	59	57	57	59	59	58	58	58	57	55	55	54	54
Belgium	107	93	93	97	96	97	99	99	102	100	86	85	83	77
Denmark	133	129	127	125	121	114	110	110	111	106	105	105	102	98
Finland	38		41			35	35	38	38	35	33	33	33	32
France	787	772	777	757	766	771	774	788	786	779	788	774	777	753
Germany	736	654	637	634	602	611	615	609	613	612	607	616	606	601
Greece	79	78	75	75	73	85	73	71	74	73	74	74	73	
Ireland	112	115	117	117	119	120	122	123	127	127	122	123	119	116
Italy	466	451	440	449	459	461	430	444	438	448	438	446	447	448
Luxembourg	8			8	7	7	7	7	7	7	7	7	5	
Netherlands	249	228	180	191	166	193	146	189	170	166	152	143	136	128
Portugal	107	106	103	102	102	102	103	101	104	105	103	104	104	81
Spain	329	318	316	297	317	306	340	339	358	370	388	384	385	399
Sweden	55	55	55	62	62	64	61	61	61	58	58	56	56	56
United Kingdom	370	372	357	355	357	347	350	354	348	346	326	321	311	300
EU-15	3 634	NE	NE	NE	NE	3 372	3 321	3 391	3 396	3 388	3 343	3 326	3 292	NE
Cyprus														
Czech Republic	156	134	115	99	91	86	81	81	80	75	74	77	72	82
Estonia	24	22	18	13	13	11	10	10	10	8	9	9	9	8
Hungary	124	93	84	77	76	77	78	76	74	71	71	66	65	67
Latvia	52	48	35	21	18	16	15	15	14	13	13	15	14	15
Lithuania													51	34
Malta														
Poland	512	443	447	382	384	380	364	350	371	341	322			323
Slovakia	63	59	51	45	43	41	41	38	35	36	30	28		
Slovenia	24	23	24	23	22	22	22	19	20	20	19	19	19	19
EU-25	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

3 Future improvements of the inventory

The inventory suffers mostly from the lack of data that prohibits the compilation of a more detailed inventory at the European Community level. The compilation procedure itself does not have any detailed QA/QC plan, and no uncertainty estimation has been developed. It is essential for the inventory preparation that the completeness of Member States' submission increases and that more formal QA/QC procedures are developed. Also, an uncertainty estimation could assess the quality of the reported data to identify areas of further improvement. To be able to recognise the weaknesses of the European Community inventory, a discussion on the qualitative level could be provided in the future. Likely causes of uncertainty, potential reasons for biases and random errors could be discussed and the degree of quality (e.g. high, good, fair or poor) could be provided, if the relevant information is available from the Member States.

The EEA now sees that the main future challenge for the European Community is to improve the

data reporting procedures, in order to obtain more complete and timely UNECE/CLRTAP emission inventories at European Community level. The improvements cannot take place only at the EC level but should also involve the development of inventory systems in the Member States.

Possibilities for further streamlining and harmonisation of emission reporting, especially with the UNFCCC and the European Community greenhouse gas monitoring mechanism, should be explored. The final goal of emission reporting within the European Community will be a system at national and European Community level for the main international reporting requirements (UNECE/CLRTAP and UNFCCC). In addition, the further implementation of Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants is expected to contribute to improving the timeliness and quality of the European Community CLRTAP inventory.

4 Reporting under the EU national emission ceilings directive

4.1 Requirements of the directive

Under Article 7 of the national emission ceilings directive (NECD), Member States are required to prepare and update emission inventories on an annual basis. Table 11 includes the national ceilings for each Member State according to the directive as amended by the Accession Treaty ⁽⁵⁾.

Further, according to the directive, the Commission, assisted by the EEA, shall establish inventories and make them publicly available.

Table 11 National EU-15 emission ceilings for SO₂, NO_x, NMVOC and NH₃ (in Gg) to be attained by 2010

Member State	SO ₂	NO _x	VOC	NH ₃
Austria	39	103	159	66
Belgium	99	176	139	74
Denmark	55	127	85	69
Finland	110	170	130	31
France	375	810	1 050	780
Germany	520	1 051	995	550
Greece	523	344	261	73
Ireland	42	65	55	116
Italy	475	990	1 159	419
Luxembourg	4	110	9	7
Netherlands	50	260	185	128
Portugal	160	250	180	90
Spain	746	847	662	353
Sweden	67	148	241	57
UK	585	1 167	1 200	297
EU-15	3 850	6 519	6 510	3 110
Cyprus	39	23	14	9
Czech Republic	265	286	220	80
Estonia	100	60	49	29
Hungary	500	198	137	90
Latvia	101	61	136	44
Lithuania	145	110	92	84
Malta	9	8	12	3
Poland	1 397	879	800	468
Slovakia	110	130	140	39
Slovenia	27	45	40	20
EU-25	6 543	8 319	8 150	3 976

⁽⁵⁾ Accession Treaty AA2003/ACT/Annex II/en 2073 – p. 153

4.2 Data basis of the European Community NEC inventory

Table 12 provides an overview of available NEC emission data submissions by 15 September 2005. It shows that for the 2005 inventory, 20 out of 25 Member States provided NEC data.

Table 12 Date of receipt of NEC submission, years covered and NFR tables available from Member States by 15 September 2005

EU-15 Member State	Submission date	Latest data available	Years covered	Gases covered	Format emissions
Austria	23 Dec 2004	2003	1990–2003	NO _x , CO, NMVOC, SO _x , NH ₃	New NFR
Belgium	24 Dec 2004	2003	2000, 2002–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
Czech Republic	21 Jan 2005	2003	1990–2003	NO _x , NMVOC, SO _x , NH ₃	Totals
Denmark	22 Dec 2004	2003	1980–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
Estonia	30 Dec 2004	2003	2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
Finland	17 Dec 2004	2003	2000–2003	NO _x , NMVOC, SO _x , NH ₃	2000–2002 old NFR; 2003 totals
France	23 Dec 2004	2003	1980–2003	NO _x , CO, NMVOC, SO _x , NH ₃ , PM, HM, POPs	New NFR
Germany	27 Jan 2005	2003	2000–2003	NO _x , NMVOC, SO _x , NH ₃	Totals
	11 Aug 2005	2003	2000–2003	NO _x , NMVOC, SO _x , NH ₃	Totals
Greece	04 Apr 2005	2002	1990–2002	NO _x , NMVOC, SO _x , NH ₃	Old NFR
Ireland	23 Dec 2004	2003	2002–2003	NO _x , CO, NMVOC, SO _x , NH ₃	New NFR
Italy	30 Dec 2004	2003	2000–2003	NO _x , NMVOC, SO _x , NH ₃	Totals
Latvia	17 Jan 2005	2003	1990–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
Lithuania	05 Jan 2005	2003	2002–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
Luxembourg	11 Apr 2005	2002	2001–2002	NO _x , NMVOC, SO _x , NH ₃	SNAP2
Netherlands	23 Dec 2004	2003	2002–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
Portugal	25 Jan 2005	2003	1990–2003	NO _x , CO, NMVOC, SO _x , NH ₃ , PM, HM	New NFR
Slovenia	30 Dec 2004	2002	2002	NO _x , CO, NMVOC, SO _x , NH ₃ , PM, HM, POPs	New NFR
	31 Dec 2004	2003	2003	NO _x , CO, NMVOC, SO _x , NH ₃ , PM, HM, POPs	New NFR
Spain	4 Mar 2005	2003	2000–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
	18 Mar 2005	2003	2000–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
Sweden	20 Dec 2004	2003	1988–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR
United Kingdom	20 Jan 2005	2003	2001–2003	NO _x , NMVOC, SO _x , NH ₃	New NFR

Table 13 provides an overview of NEC national programmes and projections available by 15 September 2005.

Table 13 Availability of NEC national programmes and projections by 15 September 2005

EU-15 Member State	National programmes (due 31 December 2003)	Projections (due 31 December 2004)	Background data projections
Austria	Yes	Totals (2010)	
Belgium	Yes	Sectoral (2010)	
Czech Republic	Yes	Totals (2010)	
Denmark	Yes (01/2004)	Totals (2010)	Energy consumption
Estonia		Totals (2010)	
Finland	Yes	Totals (2010)	Primary energy
France	Yes	Totals (2010)	Table 2b, 2c, 2d, 2e
Germany	Yes	Totals (2010)	Table 2d
Ireland	Yes	Sectoral (2010)	
Italy	Yes	Totals (2010)	
Latvia		Sectoral (2010)	
Lithuania		Totals (2010)	
Luxembourg	Yes	Sectoral (2010)	
Netherlands		Totals (2010)	
Portugal	Yes	Sectoral (2010)	Energy demand and consumption, transport, agriculture
Spain	Yes	Totals (2010)	
Sweden	Yes	Totals (2010)	
United Kingdom		Sectoral (2010)	

Table 14 shows that a more detailed NEC inventory cannot be compiled because for some Member States no NEC submissions are available. EU-15 totals are available for the years 2001 and 2002.

Table 14 Data availability as by 15 September 2005

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05
Belgium											INV05	INV04	INV05	INV05
Cyprus														
Czech Rep.														
Denmark	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05
Estonia														INV05
Finland											INV04	INV04	*)	*)
France	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05
Germany											INV05	INV05	INV05	INV05
Greece	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	
Hungary														
Ireland												INV04	INV05	INV05
Italy	INV04	INV04	INV04	INV04	INV04	INV04	INV04	INV04	INV04	INV04	INV05	INV05	INV05	INV05
Latvia	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05
Lithuania													INV05	INV05
Luxembourg												INV05	INV05	
Malta														
Netherlands												INV04	INV05	INV05
Poland														
Portugal	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05
Slovakia														
Slovenia													INV05	INV05
Spain											INV05	INV05	INV05	INV05
Sweden	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05	INV05
United Kingdom											INV04	INV05	INV05	INV05

(*) Finish Environment Institute (2004)

4.3 NEC emission trends

Tables 15–18 show the NEC emission trends of the EC Member States for NO_x, NMVOCs, SO_x and NH₃ in Gg ⁽⁶⁾.

NO_x emissions of all EU-15 Member States in 2003 exceeded the national emission ceilings (Table 15). Greece and Luxembourg were below their ceilings in 2002. NO_x emission of the new Member States except Slovenia was lower than their national emission ceilings.

Table 15 NEC emission trends of EC Member States of NO_x in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	211	221	210	203	195	192	212	199	211	199	204	214	220	229
Belgium											329	284	301	299
Denmark	283	332	290	290	290	273	311	265	243	225	208	203	201	209
Finland											214	215	211	218
France	1 830	1 892	1 856	1 742	1 697	1 646	1 619	1 554	1 534	1 462	1 390	1 335	1 275	1 220
Germany											1 634	1 560	1 493	1 428
Greece	300	312	315	314	321	321	326	332	350	337	330	344	341	
Ireland												135	125	120
Italy	1 925	1 978	1 997	1 900	1 819	1 785	1 725	1 647	1 546	1 445	1 367	1 353	1 261	1 200
Luxembourg												17	18	
Netherlands												420	396	389
Portugal	254	267	286	278	277	286	280	275	282	294	287	285	292	273
Spain											1 371	1 351	1 418	1 407
Sweden	315	305	299	284	286	274	262	250	243	232	219	214	208	206
United Kingdom											1 512	1 660	1 578	1 570
EU-15	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	9 590	9 336	NE
Cyprus														
Czech Republic														
Estonia														46
Hungary														
Latvia	70	58	47	47	44	42	44	43	40	38	35	37	37	37
Lithuania													51	53
Malta														
Poland														
Slovakia														
Slovenia													58	56
EU-25	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

⁽⁶⁾ Note that for some Member States NEC estimates differ from CLRTAP figures. In most cases these differences are small, but in some cases they are larger than 10 %. The differences may be explained by small differences in the reporting obligations under NEC and UNECE, different geographical coverage, and the submission of recalculated data under one of the reporting obligations.

Concerning the EU-15 Member States, only the United Kingdom's NMVOC emissions are lower than their national emission ceilings. All other Member States have NMVOC emissions exceeding their national emission ceilings (Table 16). Regarding the new Member States, only NMVOC emissions in Slovenia exceeded the national emission ceilings.

Table 16 NEC emission trends of EC Member States of NMVOCs in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	286	273	245	239	221	221	216	204	191	180	181	185	182	182
Belgium											245	263	230	226
Denmark	229	228	223	219	214	201	208	200	173	169	172	140	145	158
Finland											160	157	152	147
France	2 416	2 395	2 346	2 242	2 118	2 033	1 946	1 874	1 819	1 740	1 661	1 586	1 475	1 400
Germany											1 697	1 592	1 494	1 460
Greece	280	288	296	302	308	305	309	308	312	307	299	294	289	
Ireland												87	81	78
Italy	2 038	2 098	2 146	2 102	2 045	2 021	1 974	1 908	1 803	1 711	1 542	1 443	1 341	1 246
Luxembourg												14	13	
Netherlands												251	232	227
Portugal	261	268	277	270	278	278	281	283	283	274	269	270	270	265
Spain											1 114	1 097	1 091	1 099
Sweden	517	496	482	449	429	420	406	376	353	331	320	311	303	303
United Kingdom											1 683	1 241	1 166	1 089
EU-15	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	8 932	8 465	NE
Cyprus														
Czech Republic														
Estonia														40
Hungary														
Latvia	121	95	76	61	66	71	74	79	79	79	70	73	77	79
Lithuania													72	74
Malta														
Poland														
Slovakia														
Slovenia													48	46
EU-25	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

SO_x emissions reported for Austria, Denmark and Sweden are below the national emission ceilings in 2003, Finland's SO_x emissions match the national emission ceiling. 2002 values of Greece and Luxembourg were also below national ceilings. All other Member States exceed their national emission ceilings (Table 17). Of the new Member States, SO_x emissions in Estonia and Slovenia exceeded the national emission ceilings, in Latvia and Lithuania, SO_x emissions were lower than the emission ceilings.

Table 17 NEC emission trends of EC Member States of SO_x in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	76	71	57	55	49	48	46	42	37	36	33	34	33	34
Belgium											172	153	158	153
Denmark	177	236	182	147	145	136	171	99	76	55	28	26	25	31
Finland											76	85	83	110
France	1 330	1 451	1 264	1 105	1 041	974	950	800	815	701	605	544	500	492
Germany											634	641	608	614
Greece	487	525	544	542	513	536	523	518	527	544	493	502	513	
Ireland												126	96	76
Italy	1 774	1 655	1 557	1 454	1 359	1 287	1 227	1 151	1 016	922	771	736	664	582
Luxembourg												3	2	
Netherlands												89	67	66
Portugal	323	313	374	321	299	335	274	294	342	343	307	294	293	202
Spain											1 459	1 417	1 521	1 320
Sweden	112	111	106	92	91	78	75	69	66	52	49	49	50	52
United Kingdom											1 165	1 118	1 002	979
EU-15	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	5 817	5 616	NE
Cyprus														
Czech Republic														
Estonia														105
Hungary														
Latvia	99	81	67	67	77	48	54	40	36	29	14	10	9	8
Lithuania													43	43
Malta														
Poland														
Slovakia														
Slovenia													71	66
EU-25	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

NH₃ emissions for Austria, France, Portugal and Sweden are lower than the national emission ceilings. Ireland and the Netherlands match their national emission ceilings exactly; 2002 values of Greece and Luxembourg were equal or below national ceilings (Table 18). NH₃ emissions were lower than the national emissions ceilings in all new Member States in 2003 for which data was available.

Table 18 NEC emission trends of EC Member States of NH₃ in Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Austria	57	59	57	57	59	59	58	58	58	57	55	55	54	54
Belgium											79	83	79	77
Denmark	133	129	127	125	121	113	110	109	111	106	105	104	101	97
Finland											33	33	33	32
France	787	772	777	757	766	771	774	788	786	779	788	774	777	753
Germany											607	616	606	601
Greece	79	78	75	75	73	85	73	71	74	73	74	74	73	
Ireland												123	119	116
Italy	429	436	428	429	425	427	420	435	435	437	433	446	447	448
Luxembourg												7	5	
Netherlands												142	136	128
Portugal	79	79	77	75	77	77	78	78	79	80	79	80	81	81
Spain											385	381	382	396
Sweden	55	55	55	62	62	64	61	61	61	58	58	56	56	56
United Kingdom											297	321	311	300
EU-15	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	3 296	3 262	NE
Cyprus														
Czech Republic														
Estonia														8
Hungary														
Latvia	52	48	35	21	18	16	15	15	14	13	13	15	14	15
Lithuania													51	34
Malta														
Poland														
Slovakia														
Slovenia													19	18
EU-25	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

4.4 Member State projections

For all EU-15 Member States data on projections are available (see Table 19). Therefore, also for the EU-15 as a whole projections for 2010 can be estimated. Additionally, five new Member States reported projected emissions for 2010.

Table 19 Member States projections for 2010 for SO₂, NO_x, NMVOC and NH₃ (in Gg)

Member State	SO _x (as SO ₂)	NO _x (as NO ₂)	NH ₃	NMVOC
Austria	31	157	52	151
Belgium	102	259	85	147
Denmark	56	146.4	83	82.8
Finland	97.5	151	31	130
France	461	988	857	954
Germany	513	1126	585	1192
Greece	<300	344	73	261
Ireland	42	94	110	66
Italy	434	1 065	433	1 117
Luxembourg	2.3	14.2	5.5	7.2
Netherlands	65	288	120	200
Portugal (*)	165.1/170	248.6/ 261.5	88.3/ 91.2	239.9/264.7
Spain	746	847	353	662
Sweden	67	148	57	241
United Kingdom	585	1167	297	1200
EU-15	3 667/3 672	7 043/7 056	3 230/3 233	6 651/6 676
Czech Republic	247.4	333.9	80.7	204.1
Estonia	100	60	29	49
Lithuania	145	110	84	92
Latvia	5.8	38.1	16	67
Slovenia	27	45	20	40

(*) Emissions were projected based on a low and high scenario.

Grey fields indicate emission projections exceeding NEC targets.

For the EU-15 as a whole, emission projections for SO₂ are below the emission ceiling included in the NEC Directive, whereas the projections for NO_x, NMVOC and NH₃ are above the emission ceilings.

For the EU-15 Member States, projected SO_x emissions for 2010 exceed the emission ceilings in Belgium, Denmark, France, the Netherlands and Portugal. Projected NO_x emissions exceed the national emission ceilings in most countries except in Finland, Greece and Luxembourg. Projected NMVOC emissions are mostly smaller than the national emission ceilings, only in Belgium,

Germany, Ireland, the Netherlands and Portugal, projected emissions exceed the ceilings. Projected NH₃ emissions for 2010 are equal or lower than the emissions ceilings in nine Member States, in six Member States they exceed the ceilings. In Spain, Sweden and the United Kingdom, the projected emissions equalled the national emission ceilings for all gases.

In the new Member States, projected emissions were mostly smaller than the national emission ceilings. Only projected NO_x and NH₃ emissions in the Czech Republic exceeded the national emissions ceilings.

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Units and abbreviations

t	1 tonne (metric) = 1 megagram (Mg) = 10 ⁶ g
Mg	1 megagram = 10 ⁶ g = 1 tonne (t)
Gg	1 gigagram = 10 ⁹ g = 1 kilotonne (kt)
Tg	1 teragram = 1 012 g = 1 megatonne (Mt)
TJ	1 terajoule
Cd	cadmium
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CLRTAP	Convention on long-range transboundary air pollution
CRF	Common reporting format
EC	European Community
EEA	European Environment Agency
Eionet	European environmental information and observation network
EMEP	European monitoring evaluation programme
ETC/ACC	European Topic Centre on Air and Climate Change
EU	European Union
HFCs	hydrofluorocarbons
Hg	mercury
HM	heavy metals
INV05	NEC Inventory 2005
NECD	national emission ceilings directive
NFR	nomenclature for reporting
NH ₃	ammonia
NM VOC	non-methane volatile organic compounds
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
N ₂ O	nitrous oxide
Pb	lead
PFCs	perfluorocarbons
PM	particulate matter
POP	persistent organic pollutants
QA/QC	quality assurance/quality control
SF ₆	sulphur hexafluoride
SO ₂	sulphur dioxide
SO _x	sulphur oxides
TSP	total suspended particles
Umweltbundesamt	Federal Environment Agency — Austria
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on climate change
VOC	volatile organic compounds

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