



**BESTANDSAUFNAHME
LUFTVERUNREINIGENDER STOFFE
1980 BIS 2002**

**Berichterstattung gemäß des
UN-Übereinkommens über weiträumige
grenzüberschreitende Luftverunreinigung**

BERICHTE

BE-242

Wien, Juni 2004



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VORWORT

Der vorliegende Bericht präsentiert eine Zusammenfassung der Daten zur Erfüllung des UNECE-Übereinkommens über weiträumig grenzüberschreitende Luftverunreinigungen, BGBl. Nr. 158/1983, einschließlich seiner Protokolle für das Jahr 2002.

Zur Ermittlung der Daten wurde das Handbuch von EMEP/CORINAIR¹ angewandt. Die Darstellung erfolgt im NFR-Format² der UNECE.

Im Anschluß an dieses Vorwort wird der von der Republik Österreich an die Wirtschaftskommission der Vereinten Nationen für Europa (UNECE) zu übermittelnde Emissionsbericht in englischer Sprache wiedergegeben. Es handelt sich hierbei um eine Zusammenfassung der wichtigsten Daten mit Anführung der wesentlichsten methodischen Änderungen.

Dieser Bericht enthält im Anhang Überblickstabellen für die Schadstoffe SO₂, NO₂, NH₃, NMVOC, CO und Staub sowie für Schwermetalle und persistente organische Verbindungen. Der vollständige Datensatz wird der Wirtschaftskommission der Vereinten Nationen für Europa in digitaler Form übermittelt. Das Umweltbundesamt wird noch in diesem Jahr eine detaillierte Darstellung der (in der diesjährigen Inventur) angewandten Methodik in einem eigenen Bericht ("Informative Inventory Report 2004 – Submission under the UNECE/ CLRTAP Convention") veröffentlichen.

Der vorliegende Bericht wurde vom Umweltbundesamt auf Grundlage des Umweltkontrollgesetzes BGBl. Nr. 152/1998 erstellt. In § 6 (2) Z.15 wird der Umweltbundesamt GmbH unter anderem die Erstellung fachlicher Grundlagen zur Erfüllung des Übereinkommens über weiträumige grenzüberschreitende Luftverunreinigung, BGBl. Nr. 158/1983 einschließlich seiner Protokolle, übertragen. In § 6 (2) Z.20 werden die Entwicklung und Führung von Inventuren und Bilanzen zur Dokumentation des Zustandes und der Entwicklung der Umwelt sowie der Umweltbelastungen und ihrer Ursachen ausdrücklich als besondere Aufgaben des Umweltbundesamtes genannt.

Das Umweltbundesamt versteht den vorliegenden Bericht als Beitrag im Rahmen der Wahrnehmung seiner Funktion als Umweltschutzfachstelle des Bundes in Erfüllung der ihm im Umweltkontrollgesetz zugewiesenen Kompetenzen.

Datengrundlage

Das Umweltbundesamt führt jährlich eine Inventur des Ausstoßes von Luftschadstoffen durch, die als Grundlage für die Erfüllung der nationalen und internationalen Berichtspflichten herangezogen wird. Diese *Österreichische Luftschadstoff-Inventur* (OLI) wird erforderlichenfalls auch für zurückliegende Jahre aktualisiert, um eine konsistente Zeitreihe zur Verfügung zu haben. Die in diesem

¹ EMEP/CORINAIR Emission Inventory Guidebook. Third edition. Prepared by the EMEP Task Force on Emission Inventories. October 2002 update. Internet site: <http://reports.eea.eu.int>

² Nomenclature For Reporting

Bericht dargestellten Emissionsdaten ersetzen somit die publizierten Daten vorhergehender Berichte.

Tabelle 1 fasst den Stand der Daten und das Berichtsformat des vorliegenden Berichtes zusammen.

Tabelle 1: Datengrundlage des vorliegenden Berichtes

<i>Inventur</i>	<i>Datenstand</i>	<i>Berichtsformat</i>
OLI 2003	Juni 2004	NFR-Format der UNECE

**AUSTRIA'S
NATIONAL AIR EMISSIONS INVENTORY
1980 - 2002**

Submission under the Convention on
Long-range Transboundary Air Pollution (CLRTAP)

Title of Inventory	<i>Austria's Annual National Inventory 1980-2002. Submission under the Convention on Long-range Transboundary Air Pollution (CLRTAP)</i>
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Revised Version
Vienna, June 2004

Prepared by the UMWELTBUNDESAMT

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1 INTRODUCTION

This report presents a summary of the inventory data in fulfilment of Austria's annual reporting obligation under the UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and its Protocols for the year 2002. For this report the NFR-format¹ of the UNECE was used. The inventory itself follows the EMEP/CORINAIR³ Emission Inventory Guidebook.

Basis of this report is the Austrian Air Emission Inventory 2003 (Österreichische Luftschadstoff-Inventur, OLI 2003) prepared by the UMWELTBUNDESAMT for the years 1980 to 2002.

In 2002 the Executive Body adopted new guidelines for estimating and reporting emission data to further improve transparency, consistency, comparability, completeness and accuracy of reported emissions. The new guidelines define the format for reporting of emission data (Nomenclature For Reporting / NFR) and offer guidance on how to provide supporting documentation. They specify minimum and additional reporting obligations.

The “Informative Inventory Report 2004” to be published in October 2004 by the UMWELTBUNDESAMT contains a detailed and complete background information on the compilation of the 2003 inventory.

Annex 1 of this report presents trend tables of SO₂, NO₂, NH₃, NMVOC, CO, particulate matter, heavy metals and persistent organic pollutants. The complete tables of the NFR-Format, including in particular sectoral reports and sectoral background tables are submitted to the UNECE separately in digital form only (excel files).

2 RELATION WITH EARLIER REPORTED DATA

As a result of the continuous improvement of Austria's air emissions inventory, emissions of some sources have been recalculated based on updated data or revised methodologies, thus emission data for the years 1990 to 2001 submitted this year differ from previously reported data.

A description of these recalculations by sector is given in Chapter 4. The most important revision with respect to data submitted last year is the recalculation of the solvents sector based upon a new study which combines a top-down with a bottom-up approach.

The figures presented in this report replace data reported earlier by the UMWELTBUNDESAMT under the reporting framework of the UNECE/LRTAP Convention and NEC-Directive of the European Union.

³ EMEP/CORINAIR Emission Inventory Guidebook. Third edition. Prepared by the EMEP Task Force on Emission Inventories. October 2002 update. Internet site: <http://reports.eea.eu.int>

3 SOURCES OF DATA

- The energy balance of STATISTIK AUSTRIA is the main data supplier of Austria's air emissions inventory.
- Operators of steam boilers of public electricity and heating plants with more than 50 MW report their emissions and activity data to the UMWELTBUNDESAMT. Emissions of the pollutants addressed in the inventory are calculated on the basis of these reported data.
- Operators of landfill sites report their activity data directly to the UMWELTBUNDESAMT. Emissions of the years 1998-2002 are calculated on the basis of these data.
- Activity data for calculation of non energetic emissions are based on several statistics collected by STATISTIK AUSTRIA and national and international studies.
- For some sources of the Industrial Processes sector Associations of Industries or individual plant operators provide information on activity and emission data.

4 METHODOLOGICAL CHANGES WITH RESPECT TO THE PREVIOUS UNECE-SUBMISSION

This chapter describes the methodological changes made to the inventory since the previous submission. Further background information and a complete description of the 2003 inventory will be given in the "Informative Inventory Report 2004" to be published in October 2004.

ENERGY (1A)

Update of data:

Energy balance

From 1999 on a new industry inquiry (Güterinsatzstatistik) of the 2000 most important Austrian companies have been considered.

From 1990 on fuel consumption of iron and steel industry and petroleum refinery have been revised by means of energy efficiency information.

From 1990 on the transformation sector have been revised [KWK-Statistik].

The revisions above partly affected the final energy consumption of manufacturing industry and the small combustion sector.

I A 1 a: For the year 2001 the emission declarations of combustion plants ≥ 50 MW have been updated.

I A 1, I A 2, I A 4: Fuel consumption of stationary sources have been updated according to the revised energy balance.

Addition of source categories:

I A 1 a: PM emissions of public power and district heating plants < 50 MW_{th} are now estimated.

Changes in allocation of emissions:

I A 2 a: Emissions from fuel combustion of two iron and steel plants so far reported under category *2 C 1* are now reported under this category.

1 A 2 f: Emissions from fuel combustion in cement industry so far reported under category 2 A 1 are now reported under this category.

1 A 5 b: Emissions from military aviation so far reported under 1 A 3 a are now reported under this category.

1 A 5 b: Emissions from military transportation so far reported under 1 A 3 b are now reported under this category.

Changes in methodology:

1 A 1, 1 A 2, 1 A 4: Cd, Hg, and Pb emission factors of fuel oil and gasoil are now estimated by means of analyses of delivered oil products. The previously applied emission factors were mainly based on the much higher values from USEPA.

1 A 1 a: PM emissions of plants ≥ 50 MW_{th} are directly taken from emission declarations.

1 A 1 b: PM emissions are now directly taken from emission declarations.

1 A 2 a: PM emissions from blast furnaces so far double counted with 2 C were eliminated.

1 A 4: NMVOC emission factors were updated. In the previous submission the measurements for TOC of small combustion devices had not been converted correctly into NMVOC emission factors.

1 A 5 b: The basis of the recalculation of emissions from military aviation is a new study by Kalivoda M., Kudrna M.: "Air Traffic Emission Calculation for Austria 1990-2000"; a study for the UMWELTBUNDESAMT, 2002. Unpublished report.

The emission factors for SO₂, NMVOC and NO_x were taken from the emission inventory guidebook. Because of similar conditions in Switzerland, Swiss emission factors were chosen.

FUGITIVE EMISSIONS (1 B)

Addition of source categories:

1 B 2 a ii: NMVOC emissions from oil and gas production

Update of data:

NMVOC emissions from 1998 onwards have been updated.

INDUSTRIAL PROCESSES (2)

Changes in allocation of emissions:

2 C 1: All emissions except NMVOC emissions from rolling mills have been allocated to category 1 A 2 a.

2 A 1: Cement Production: all emissions (except CO₂ emissions from decarbonising) are now reported in category 1 A 2 f.

2 A 7: Glass Production: all emissions (except CO₂ emissions from decarbonising) have been allocated to the energy sector.

Update of data:

NO_x emissions from inorganic chemical industries have been updated.

NH₃ emissions until 1994 from ammonium nitrate production have been recalculated (before these emissions were calculated with the implied emission factor for 1995, now the actual emission value for 1994 has become available and the IEF for 1994 was used for the years before).

SOLVENT AND OTHER PRODUCT USE (3)

A new study covering the Solvents sector which combines a top-down with a bottom-up approach has been finished. Results were considered for the inventory.

SCHÖRNER, G. & WINDSPERGER, A. (2004): Studie zur Anpassung der Lösemittelmmissionen der österreichischen Luftschadstoff-Inventur (OLI) 1980-2002. Unpublished study commissioned by the UMWELTBUNDESAMT.

AGRICULTURE (4)***4 B 1 a, 4 D:***

The time series of annual milk yields was revised by STATISTIK AUSTRIA. As the methodology for emissions from manure production of dairy cattle is based on milk yield data, this revision resulted in higher emissions from this category.

4 B 8:

As recommended in the centralised review (October 2003), the age class split for swine categories for the years 1990–1992 were adjusted. There is an inconsistency in the time series in the statistical data set resulting from a changing methodology of the statistical survey in 1992/1993. That's why the time series has been adjusted using the split from 1993.

4 D:

Data on synthetic fertiliser use have been updated for the years 2001 and 2002.

WASTE (6)***6 A 1:***

Residual Waste: activity data from 1998 to 2002 have been updated on the basis of the Austrian database for solid waste disposals. In the previous submission the amount of waste from administrative facilities of industry was included in the years from 1998 to 2002 but not included in the years before 1998. Therefore the activity data for the time series 1990 to 1997 have been recalculated.

Non Residual Waste: previously the amount of non-residual waste has been estimated based on expert judgement, now activity data for the years from 1998 to 2002 is taken from the Austrian database for solid waste disposal sites. No data was available for the years before 1998 from this database, therefore the values of 1998 was also used for the years 1990-1997.

The operators of landfill sites reported their annual collected landfill gas in the context of an investigation of the UMWELTBUNDESAMT. Emissions have been recalculated on the basis of following study:

ROLLAND, CH. & OLIVA, J. (2004): Erfassung von Deponiegas. Statusbericht von Österreichischen Deponien. UMWELTBUNDESAMT (Report BE-238).

The Bio-degradable organic carbon content (DOC) has been corrected according to following new study of the UMWELTBUNDESAMT:

ROLLAND, CH. & SCHEIBENGRAF, M. (2003): Biologisch abbaubarer Kohlenstoff im Restmüll. UMWELTBUNDESAMT (Report BE-236).

5 METHOD OF REPORTING AND DATA BASIS

Emission data presented in this report was compiled according to the guidelines for estimating and reporting emission data (EB.AIR/GE.1/2002/7) approved by the Executive Body for the UNECE/ LRTAP Convention at its 20th session.

In Austria, emissions of air pollutants are estimated together with emissions of greenhouse gases in a data base based on the CORINAIR (CORe INventory AIR)/ SNAP (Selected Nomenclature for sources of Air Pollution) systematic. This nomenclature was designed by the EEA to estimate emissions of all kind of air pollutants. To comply with the reporting obligations under the UNECE/LRTAP Convention, emissions are transformed into the NFR (Nomenclature For Reporting) format.

The complete set of tables of the NFR-format, including in particular sectoral reports and sectoral background tables are submitted separately in digital form only (excel files). In this report the NFR-summary tables are presented in Annex 1.

The following table summarises the status of the present report:

Table 3: Status of the present report

<i>Reporting Obligation</i>	<i>Format</i>	<i>Inventory</i>	<i>Version</i>
UNECE/ LRTAP Convention	NFR-format (UNECE)	OLI 2004	June 2004

6 ANNEX 1

In Annex 1 trend tables of SO_x, NO_x, NH₃ and NMVOC are presented. The complete tables of the NFR-Format, including in particular Sectoral Reports and Sectoral Background Tables are submitted separately in digital form only (excel files).

In this report the following notation keys are used for all tables:

- “NO” (not occurring): for activities or processes in a particular source or sink category that do not occur within a country
- “NE” (not estimated): for existing emissions by sources and removals by sinks of greenhouse gases which have not been estimated
- “IE” (included elsewhere): for emissions by sources and removals by sinks of greenhouse gases estimated but included elsewhere in the inventory instead of the expected source/sink category.
- “NA” (not applicable): for activities in a given source/sink category that do not result in emissions or removals of a specific gas
- “0” : for emissions by sources of compounds which are estimated to be less than one half the unit being used to record the inventory table and which therefore appear as zero after rounding.

Trend table 1: SO_x [Gg] 1980-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1980	344.49	341.93	2.56	14.88	NA	0.05	NA	0.41	NO	359.82	0.12
1981	303.67	301.78	1.89	14.43	NA	0.05	NA	0.41	NO	318.56	0.13
1982	288.07	286.32	1.75	13.98	NA	0.05	NA	0.41	NO	302.50	0.12
1983	212.79	211.20	1.59	13.53	NA	0.05	NA	0.41	NO	226.78	0.15
1984	193.31	191.64	1.67	13.08	NA	0.05	NA	0.41	NO	206.85	0.20
1985	174.91	173.38	1.53	12.64	NA	0.05	NA	0.41	NO	187.99	0.21
1986	155.55	154.09	1.46	12.09	NA	0.05	NA	0.41	NO	168.09	0.19
1987	134.49	132.97	1.52	11.54	NA	0.05	NA	0.41	NO	146.48	0.21
1988	102.93	101.28	1.65	5.02	NA	0.05	NA	0.21	NO	108.20	0.23
1989	96.70	94.98	1.73	4.49	NA	0.05	NA	0.13	NO	101.37	0.28
1990	76.58	74.58	2.00	3.34	NA	0.00	NA	0.06	NO	79.99	0.28
1991	73.58	72.28	1.30	3.46	NA	0.00	NA	0.05	NO	77.10	0.32
1992	57.68	55.68	2.00	3.67	NA	0.00	NA	0.03	NO	61.38	0.34
1993	54.82	52.72	2.10	3.86	NA	0.00	NA	0.04	NO	58.73	0.36
1994	49.16	47.88	1.28	3.88	NA	0.00	NA	0.05	NO	53.08	0.38
1995	48.03	46.50	1.53	3.88	NA	0.00	NA	0.05	NO	51.96	0.42
1996	45.43	44.23	1.20	3.85	NA	0.00	NA	0.05	NO	49.33	0.47
1997	41.50	41.44	0.07	3.89	NA	0.00	NA	0.05	NO	45.44	0.48
1998	36.58	36.54	0.04	3.91	NA	0.00	NA	0.05	NO	40.55	0.50
1999	34.53	34.39	0.14	3.90	NA	0.00	NA	0.05	NO	38.49	0.49
2000	31.40	31.25	0.15	3.93	NA	0.00	NA	0.05	NO	35.39	0.53
2001	33.61	33.45	0.16	3.94	NA	0.00	NA	0.05	NO	37.60	0.51
2002	31.97	31.83	0.14	3.93	NA	0.00	NA	0.05	NO	35.96	0.48

Trend table 2: NO_x [Gg] 1980-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1980	226.85	226.85	IE	13.98	NA	5.08	NA	0.19	NO	246.11	1.15
1981	213.73	213.73	IE	12.71	NA	5.14	NA	0.19	NO	231.77	1.25
1982	210.76	210.76	IE	11.45	NA	5.16	NA	0.19	NO	227.57	1.15
1983	214.32	214.32	IE	10.27	NA	5.25	NA	0.19	NO	230.03	1.44
1984	215.44	215.44	IE	9.07	NA	5.29	NA	0.19	NO	229.99	1.94
1985	220.62	220.62	IE	7.88	NA	5.28	NA	0.19	NO	233.97	2.11
1986	215.33	215.33	IE	6.68	NA	5.27	NA	0.19	NO	227.47	1.87
1987	213.88	213.88	IE	5.49	NA	5.72	NA	0.19	NO	225.27	2.07
1988	208.17	208.17	IE	5.27	NA	4.98	NA	0.11	NO	218.52	2.28
1989	204.14	204.14	IE	4.99	NA	5.27	NA	0.07	NO	214.47	2.79
1990	201.67	201.67	IE	4.80	NA	5.52	NA	0.04	NO	212.03	2.77
1991	206.84	206.84	IE	4.48	NA	5.92	NA	0.03	NO	217.27	3.12
1992	197.88	197.88	IE	4.55	NA	4.95	NA	0.02	NO	207.41	3.40
1993	191.59	191.59	IE	1.97	NA	5.37	NA	0.02	NO	198.95	3.61
1994	185.84	185.84	IE	1.92	NA	5.92	NA	0.02	NO	193.70	3.77
1995	182.48	182.48	IE	1.47	NA	5.43	NA	0.02	NO	189.40	4.23
1996	186.95	186.95	IE	1.45	NA	5.22	NA	0.02	NO	193.65	4.66
1997	182.93	182.93	IE	1.55	NA	5.57	NA	0.03	NO	190.08	4.85
1998	187.22	187.22	IE	1.53	NA	5.27	NA	0.03	NO	194.04	5.01
1999	182.80	182.80	IE	1.53	NA	5.16	NA	0.03	NO	189.51	4.92
2000	183.49	183.49	IE	1.66	NA	5.10	NA	0.03	NO	190.28	5.36
2001	189.54	189.54	IE	1.71	NA	5.17	NA	0.03	NO	196.44	5.16
2002	197.88	197.88	IE	1.71	NA	4.85	NA	0.03	NO	204.47	4.84

Trend table 3: NMVOC [Gg] 1980-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1980	197.30	186.09	11.21	23.98	210.53	4.91	NA	0.20	NO	436.91	0.12
1981	197.46	186.74	10.72	22.77	187.39	4.84	NA	0.20	NO	412.66	0.13
1982	196.45	186.42	10.03	21.84	184.22	4.96	NA	0.20	NO	407.67	0.12
1983	198.59	188.79	9.80	21.54	181.11	4.87	NA	0.20	NO	406.31	0.16
1984	202.13	192.17	9.96	21.34	178.05	4.93	NA	0.20	NO	406.65	0.21
1985	201.63	191.61	10.02	20.36	172.82	4.96	NA	0.20	NO	399.97	0.23
1986	196.86	186.80	10.06	19.36	171.65	4.87	NA	0.20	NO	392.95	0.20
1987	195.40	185.20	10.20	19.45	170.50	4.90	NA	0.20	NO	390.44	0.22
1988	183.53	173.46	10.07	19.91	169.36	5.02	NA	0.19	NO	378.01	0.25
1989	172.28	161.99	10.29	19.89	148.42	4.97	NA	0.20	NO	345.75	0.30
1990	162.63	152.00	10.63	16.37	116.95	1.94	NA	0.19	NO	298.09	0.30
1991	166.14	154.75	11.39	17.88	100.08	1.93	NA	0.19	NO	286.22	0.33
1992	153.16	141.85	11.31	19.40	82.33	1.87	NA	0.18	NO	256.95	0.37
1993	145.11	134.14	10.97	20.88	82.43	1.84	NA	0.18	NO	250.44	0.39
1994	132.34	124.12	8.22	21.28	77.06	1.90	NA	0.17	NO	232.76	0.42
1995	127.65	120.22	7.43	21.01	81.75	1.91	NA	0.17	NO	232.48	0.46
1996	124.67	118.14	6.52	20.99	78.07	1.89	NA	0.16	NO	225.78	0.54
1997	107.19	101.20	5.99	20.89	82.93	1.97	NA	0.15	NO	213.13	0.60
1998	102.95	97.13	5.81	20.54	75.54	1.93	NA	0.15	NO	201.11	0.66
1999	96.87	91.78	5.09	20.79	69.96	1.97	NA	0.14	NO	189.73	0.64
2000	90.07	84.97	5.10	20.48	77.74	1.87	NA	0.14	NO	190.30	0.67
2001	89.76	86.50	3.26	21.01	82.63	1.95	NA	0.13	NO	195.47	0.65
2002	86.95	83.56	3.39	21.00	82.63	1.94	NA	0.13	NO	192.65	0.60

Trend table 4: CO[Gg] 1980-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1980	1689.04	1689.04	IE	52.80	NA	30.26	NA	13.83	NO	1785.93	0.35
1981	1648.14	1648.14	IE	50.65	NA	30.26	NA	13.82	NO	1742.87	0.38
1982	1624.39	1624.39	IE	48.26	NA	30.26	NA	13.85	NO	1716.76	0.35
1983	1601.29	1601.29	IE	47.85	NA	30.25	NA	13.79	NO	1693.19	0.44
1984	1647.76	1647.76	IE	48.06	NA	30.25	NA	13.77	NO	1739.84	0.59
1985	1623.02	1623.02	IE	46.71	NA	30.25	NA	13.74	NO	1713.71	0.64
1986	1560.95	1560.95	IE	44.69	NA	30.24	NA	13.61	NO	1649.49	0.57
1987	1489.74	1489.74	IE	44.95	NA	30.24	NA	13.63	NO	1578.56	0.63
1988	1406.02	1406.02	IE	45.92	NA	30.24	NA	13.82	NO	1496.00	0.69
1989	1346.65	1346.65	IE	46.27	NA	30.24	NA	14.16	NO	1437.32	0.85
1990	1186.40	1186.40	IE	46.37	NA	1.75	NA	14.12	NO	1248.63	0.85
1991	1195.56	1195.56	IE	41.67	NA	1.75	NA	14.07	NO	1253.06	0.93
1992	1148.79	1148.79	IE	44.97	NA	1.75	NA	13.73	NO	1209.24	1.01
1993	1108.38	1108.38	IE	47.15	NA	1.75	NA	13.56	NO	1170.84	1.08
1994	1054.93	1054.93	IE	48.65	NA	1.75	NA	13.00	NO	1118.33	1.14
1995	968.76	968.76	IE	48.44	NA	1.74	NA	12.45	NO	1031.38	1.26
1996	979.46	979.46	IE	45.31	NA	1.74	NA	11.92	NO	1038.44	1.41
1997	915.69	915.69	IE	48.65	NA	1.73	NA	11.47	NO	977.54	1.52
1998	875.46	875.46	IE	49.76	NA	1.73	NA	11.11	NO	938.05	1.62
1999	829.50	829.50	IE	48.58	NA	1.72	NA	10.74	NO	890.53	1.59
2000	769.65	769.65	IE	51.40	NA	1.72	NA	10.24	NO	833.01	1.65
2001	772.98	772.98	IE	52.49	NA	1.72	NA	9.80	NO	836.99	1.59
2002	748.27	748.27	IE	52.36	NA	1.72	NA	9.49	NO	811.85	1.49

Trend table 5: NH₃ [Gg] 1980-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7	NATIONAL TOTAL	International Bunkers
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER		
1980	1.43	1.43	IE	0.21	NA	49.93	NA	0.01	NO	51.57	0.00
1981	1.34	1.34	IE	0.20	NA	50.79	NA	0.01	NO	52.34	0.00
1982	1.32	1.32	IE	0.20	NA	51.08	NA	0.01	NO	52.61	0.00
1983	1.29	1.29	IE	0.19	NA	52.09	NA	0.01	NO	53.58	0.00
1984	1.32	1.32	IE	0.20	NA	52.49	NA	0.01	NO	54.01	0.00
1985	1.36	1.36	IE	0.19	NA	52.18	NA	0.01	NO	53.73	0.00
1986	1.38	1.38	IE	0.18	NA	51.60	NA	0.01	NO	53.16	0.00
1987	1.38	1.38	IE	0.18	NA	52.54	NA	0.01	NO	54.11	0.00
1988	1.35	1.35	IE	0.19	NA	49.93	NA	0.01	NO	51.48	0.00
1989	1.37	1.37	IE	0.19	NA	51.02	NA	0.01	NO	52.58	0.00
1990	1.35	1.35	IE	0.19	NA	55.54	NA	0.38	NO	57.45	0.00
1991	1.50	1.50	IE	0.18	NA	56.52	NA	0.39	NO	58.58	0.00
1992	1.47	1.47	IE	0.16	NA	53.04	NA	0.45	NO	55.12	0.00
1993	1.56	1.56	IE	0.18	NA	54.83	NA	0.54	NO	57.10	0.00
1994	1.53	1.53	IE	0.13	NA	56.42	NA	0.62	NO	58.71	0.00
1995	1.56	1.56	IE	0.10	NA	55.94	NA	0.64	NO	58.24	0.00
1996	1.64	1.64	IE	0.10	NA	54.42	NA	0.67	NO	56.83	0.00
1997	1.61	1.61	IE	0.10	NA	55.74	NA	0.61	NO	58.06	0.00
1998	1.60	1.60	IE	0.10	NA	54.94	NA	0.62	NO	57.26	0.00
1999	1.54	1.54	IE	0.12	NA	53.66	NA	0.64	NO	55.96	0.00
2000	1.44	1.44	IE	0.10	NA	51.98	NA	0.62	NO	54.13	0.00
2001	1.55	1.55	IE	0.08	NA	52.23	NA	0.61	NO	54.48	0.00
2002	1.48	1.48	IE	0.06	NA	50.84	NA	0.61	NO	53.00	0.00

Trend table 6: Cd [Mg] 1985-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1985	2.08	2.08	IE	0.84	0.00	0.22	NA	0.14	NO	3.27	0.00
1986	1.84	1.84	IE	0.71	0.00	0.22	NA	0.12	NO	2.89	0.00
1987	1.44	1.44	IE	0.65	0.00	0.22	NA	0.10	NO	2.42	0.00
1988	1.20	1.20	IE	0.62	0.00	0.22	NA	0.08	NO	2.12	0.00
1989	1.09	1.09	IE	0.58	0.00	0.22	NA	0.06	NO	1.95	0.00
1990	1.01	1.01	IE	0.46	0.00	0.01	NA	0.06	NO	1.54	0.00
1991	1.03	1.03	IE	0.38	0.00	0.01	NA	0.05	NO	1.48	0.00
1992	0.97	0.97	IE	0.26	0.00	0.01	NA	0.01	NO	1.25	0.00
1993	0.92	0.92	IE	0.22	0.00	0.01	NA	0.00	NO	1.15	0.00
1994	0.85	0.85	IE	0.18	0.00	0.01	NA	0.00	NO	1.05	0.00
1995	0.78	0.78	IE	0.16	0.00	0.01	NA	0.00	NO	0.95	0.00
1996	0.82	0.82	IE	0.15	0.00	0.01	NA	0.00	NO	0.98	0.00
1997	0.79	0.79	IE	0.16	0.00	0.01	NA	0.00	NO	0.97	0.00
1998	0.74	0.74	IE	0.16	0.00	0.01	NA	0.00	NO	0.91	0.00
1999	0.73	0.73	IE	0.17	0.00	0.01	NA	0.00	NO	0.91	0.00
2000	0.70	0.70	IE	0.18	0.00	0.01	NA	0.00	NO	0.89	0.00
2001	0.77	0.77	IE	0.19	0.00	0.01	NA	0.00	NO	0.97	0.00
2002	0.81	0.81	IE	0.20	0.00	0.01	NA	0.00	NO	1.02	0.00

Trend table 7: Hg [Mg] 1985-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7	NATIONAL TOTAL	International Bunkers
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER		
1985	2.98	2.98	IE	0.67	NA	0.03	NA	0.09	NO	3.77	0.00
1986	2.60	2.60	IE	0.63	NA	0.03	NA	0.08	NO	3.34	0.00
1987	2.15	2.15	IE	0.61	NA	0.03	NA	0.07	NO	2.86	0.00
1988	1.81	1.81	IE	0.59	NA	0.03	NA	0.06	NO	2.50	0.00
1989	1.61	1.61	IE	0.58	NA	0.03	NA	0.06	NO	2.28	0.00
1990	1.58	1.58	IE	0.53	NA	0.00	NA	0.05	NO	2.16	0.00
1991	1.50	1.50	IE	0.49	NA	0.00	NA	0.05	NO	2.04	0.00
1992	1.19	1.19	IE	0.44	NA	0.00	NA	0.02	NO	1.65	0.00
1993	0.97	0.97	IE	0.41	NA	0.00	NA	0.02	NO	1.40	0.00
1994	0.76	0.76	IE	0.40	NA	0.00	NA	0.02	NO	1.18	0.00
1995	0.72	0.72	IE	0.47	NA	0.00	NA	0.02	NO	1.21	0.00
1996	0.72	0.72	IE	0.43	NA	0.00	NA	0.02	NO	1.17	0.00
1997	0.70	0.70	IE	0.43	NA	0.00	NA	0.02	NO	1.15	0.00
1998	0.61	0.61	IE	0.33	NA	0.00	NA	0.01	NO	0.96	0.00
1999	0.63	0.63	IE	0.28	NA	0.00	NA	0.01	NO	0.92	0.00
2000	0.63	0.63	IE	0.24	NA	0.00	NA	0.01	NO	0.88	0.00
2001	0.69	0.69	IE	0.24	NA	0.00	NA	0.01	NO	0.95	0.00
2002	0.68	0.68	IE	0.26	NA	0.00	NA	0.01	NO	0.95	0.00

Trend table 8: Pb [Mg] 1985-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1985	257.61	257.61	IE	62.45	0.06	1.12	NA	5.85	NO	327.09	0.00
1986	254.56	254.56	IE	52.38	0.06	1.12	NA	5.27	NO	313.39	0.00
1987	248.78	248.78	IE	47.85	0.06	1.12	NA	4.69	NO	302.52	0.00
1988	224.24	224.24	IE	45.16	0.07	1.12	NA	2.59	NO	273.18	0.00
1989	195.72	195.72	IE	41.74	0.07	1.12	NA	1.64	NO	240.28	0.00
1990	170.58	170.58	IE	32.09	0.07	0.06	NA	1.02	NO	203.81	0.00
1991	140.41	140.41	IE	27.09	0.06	0.06	NA	0.78	NO	168.40	0.00
1992	97.47	97.47	IE	18.61	0.06	0.06	NA	0.49	NO	116.68	0.00
1993	68.13	68.13	IE	15.15	0.05	0.06	NA	0.38	NO	83.77	0.00
1994	46.18	46.18	IE	12.03	0.05	0.06	NA	0.27	NO	58.57	0.00
1995	11.43	11.43	IE	4.68	0.04	0.06	NA	0.01	NO	16.22	0.00
1996	11.30	11.30	IE	4.25	0.04	0.06	NA	0.01	NO	15.66	0.00
1997	9.90	9.90	IE	4.79	0.04	0.06	NA	0.01	NO	14.80	0.00
1998	8.36	8.36	IE	4.71	0.04	0.06	NA	0.01	NO	13.18	0.00
1999	7.51	7.51	IE	4.91	0.04	0.06	NA	0.01	NO	12.53	0.00
2000	6.32	6.32	IE	5.47	0.04	0.06	NA	0.01	NO	11.90	0.00
2001	6.91	6.91	IE	5.59	0.04	0.06	NA	0.01	NO	12.61	0.00
2002	6.86	6.86	IE	5.93	0.04	0.06	NA	0.00	NO	12.89	0.00

Trend table 9: PAH [Mg] 1985-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1985	11.95	11.95	IE	7.88	0.15	8.47	NA	0.00	NO	28.45	NE
1986	11.28	11.28	IE	7.82	0.15	8.46	NA	0.00	NO	27.72	NE
1987	11.08	11.08	IE	7.91	0.15	8.46	NA	0.00	NO	27.60	NE
1988	10.26	10.26	IE	7.46	0.15	8.46	NA	0.00	NO	26.34	NE
1989	9.75	9.75	IE	7.57	0.15	8.46	NA	0.00	NO	25.93	NE
1990	9.62	9.62	IE	7.44	0.15	0.49	NA	0.00	NO	17.69	NE
1991	10.43	10.43	IE	7.18	0.15	0.49	NA	0.00	NO	18.25	NE
1992	9.56	9.56	IE	3.59	0.11	0.49	NA	0.00	NO	13.74	NE
1993	9.32	9.32	IE	0.52	0.07	0.48	NA	0.00	NO	10.40	NE
1994	8.38	8.38	IE	0.59	0.06	0.48	NA	0.00	NO	9.51	NE
1995	8.82	8.82	IE	0.49	0.04	0.48	NA	0.00	NO	9.83	NE
1996	9.51	9.51	IE	0.90	0.02	0.48	NA	0.00	NO	10.91	NE
1997	8.57	8.57	IE	0.47	0.01	0.48	NA	0.00	NO	9.52	NE
1998	8.21	8.21	IE	0.41	0.00	0.48	NA	0.00	NO	9.10	NE
1999	8.01	8.01	IE	0.25	0.00	0.48	NA	0.00	NO	8.74	NE
2000	7.49	7.49	IE	0.19	0.00	0.48	NA	0.00	NO	8.16	NE
2001	8.46	8.46	IE	0.19	0.00	0.48	NA	0.00	NO	9.13	NE
2002	8.20	8.20	IE	0.21	0.00	0.48	NA	0.00	NO	8.88	NE

Trend table 10: DIOXIN [g] 1985-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7	NATIONAL TOTAL	International Bunkers
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER		
1985	109.92	109.92	IE	51.30	5.19	6.05	NA	15.90	NO	188.36	NE
1986	108.06	108.06	IE	51.02	6.20	6.05	NA	15.89	NO	187.22	NE
1987	115.76	115.76	IE	50.81	0.24	6.05	NA	15.89	NO	188.75	NE
1988	111.55	111.55	IE	41.60	1.06	6.05	NA	15.48	NO	175.73	NE
1989	103.11	103.11	IE	41.13	1.06	6.05	NA	15.29	NO	166.64	NE
1990	102.16	102.16	IE	39.00	1.06	0.35	NA	18.19	NO	160.77	NE
1991	80.60	80.60	IE	35.15	1.04	0.35	NA	17.75	NO	134.90	NE
1992	53.30	53.30	IE	21.88	0.02	0.35	NA	0.53	NO	76.09	NE
1993	49.43	49.43	IE	17.01	0.02	0.35	NA	0.22	NO	67.03	NE
1994	44.20	44.20	IE	11.26	0.00	0.35	NA	0.08	NO	55.90	NE
1995	45.50	45.50	IE	12.22	0.00	0.35	NA	0.08	NO	58.16	NE
1996	47.57	47.57	IE	11.17	0.00	0.35	NA	0.08	NO	59.17	NE
1997	46.91	46.91	IE	12.15	0.00	0.35	NA	0.08	NO	59.49	NE
1998	43.56	43.56	IE	11.45	0.00	0.35	NA	0.08	NO	55.44	NE
1999	38.46	38.46	IE	12.60	0.00	0.35	NA	0.08	NO	51.48	NE
2000	35.17	35.17	IE	14.05	0.00	0.35	NA	0.08	NO	49.64	NE
2001	39.43	39.43	IE	14.26	0.00	0.35	NA	0.08	NO	54.11	NE
2002	36.78	36.78	IE	15.25	0.00	0.35	NA	0.08	NO	52.45	NE

Trend table 11: HCB [kg] 1985-2002

NFR-Sectors											
	1	1 A	1 B	2	3	4	5	6	7	NATIONAL TOTAL	International Bunkers
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	SOLVENT AND OTHER PRODUCT USE	AGRICULTURE	LAND USE CHANGE AND FORESTRY	WASTE	OTHER		
1985	83.35	83.35	IE	13.27	7.71	1.21	NA	1.11	NO	106.65	NE
1986	80.33	80.33	IE	13.21	8.12	1.21	NA	1.11	NO	103.98	NE
1987	82.79	82.79	IE	13.18	8.11	1.21	NA	1.11	NO	106.40	NE
1988	78.47	78.47	IE	11.16	8.22	1.21	NA	0.70	NO	99.76	NE
1989	74.18	74.18	IE	11.06	9.34	1.21	NA	0.52	NO	96.31	NE
1990	73.47	73.47	IE	9.71	9.05	0.07	NA	0.39	NO	92.70	NE
1991	69.81	69.81	IE	8.03	6.39	0.07	NA	0.28	NO	84.58	NE
1992	56.53	56.53	IE	4.94	7.49	0.07	NA	0.11	NO	69.14	NE
1993	53.86	53.86	IE	3.70	6.47	0.07	NA	0.04	NO	64.15	NE
1994	47.71	47.71	IE	2.45	1.25	0.07	NA	0.02	NO	51.50	NE
1995	50.08	50.08	IE	2.67	0.00	0.07	NA	0.02	NO	52.84	NE
1996	52.93	52.93	IE	2.44	0.00	0.07	NA	0.02	NO	55.46	NE
1997	49.08	49.08	IE	2.65	0.00	0.07	NA	0.02	NO	51.83	NE
1998	46.12	46.12	IE	2.50	0.00	0.07	NA	0.02	NO	48.71	NE
1999	43.01	43.01	IE	2.76	0.00	0.07	NA	0.02	NO	45.86	NE
2000	39.12	39.12	IE	3.07	0.00	0.07	NA	0.02	NO	42.29	NE
2001	44.54	44.54	IE	3.12	0.00	0.07	NA	0.02	NO	47.75	NE
2002	41.49	41.49	IE	3.34	0.00	0.07	NA	0.02	NO	44.91	NE

Trend table 12: TSP [Mg] 1990-2002

NFR sectors		1990	1995	1999	2000	2001	2002
1	ENERGY	30 748	31 675	32 434	32 442	34 953	36 317
1 A	FUEL COMBUSTION ACTIVITIES	30 748	31 675	32 434	32 442	34 953	36 317
1 B	FUGITIVE EMISSIONS FROM FUELS	IE	IE	IE	IE	IE	IE
2	INDUSTRIAL PROCESSES	23 897	25 075	28 352	27 442	27 241	27 479
3	SOLVENT AND OTHER PRODUCT USE	NA	NA	NA	NA	NA	NA
4	AGRICULTURE	17 068	16 775	16 759	15 871	15 878	15 853
5	LAND USE CHANGE AND FORESTRY	NA	NA	NA	NA	NA	NA
6	WASTE	166	184	62	84	65	65
7	OTHER	NO	NO	NO	NO	NO	NO
NATIONAL TOTAL		71 879	73 710	77 607	75 839	78 137	79 714
International Bunkers		307	456	530	576	555	520

Trend table 13: PM 10 [Mg] 1990-2002

NFR sectors		1990	1995	1999	2000	2001	2002
1	ENERGY	23 916	24 335	24 210	23 781	25 447	25 992
1 A	FUEL COMBUSTION ACTIVITIES	23 916	24 335	24 210	23 781	25 447	25 992
1 B	FUGITIVE EMISSIONS FROM FUELS	IE	IE	IE	IE	IE	IE
2	INDUSTRIAL PROCESSES	13 188	12 893	14 426	14 007	13 919	14 090
3	SOLVENT AND OTHER PRODUCT USE	NA	NA	NA	NA	NA	NA
4	AGRICULTURE	7 689	7 555	7 553	7 142	7 148	7 138
5	LAND USE CHANGE AND FORESTRY	NA	NA	NA	NA	NA	NA
6	WASTE	79	87	29	40	31	31
7	OTHER	NO	NO	NO	NO	NO	NO
NATIONAL TOTAL		44 871	44 871	46 218	44 970	46 544	47 251
International Bunkers		307	456	530	576	555	520

Trend table 14: PM 2,5 [Mg] 1990-2002

NFR sectors	1990	1995	1999	2000	2001	2002
1 ENERGY	20 263	20 623	20 238	19 725	20 986	21 242
1 A FUEL COMBUSTION ACTIVITIES	20 263	20 623	20 238	19 725	20 986	21 242
1 B FUGITIVE EMISSIONS FROM FUELS	IE	IE	IE	IE	IE	IE
2 INDUSTRIAL PROCESSES	5 067	4 463	4 935	4 808	4 786	4 870
3 SOLVENT AND OTHER PRODUCT USE	NA	NA	NA	NA	NA	NA
4 AGRICULTURE	908	868	870	804	808	805
5 LAND USE CHANGE AND FORESTRY	NA	NA	NA	NA	NA	NA
6 WASTE	25	27	9	12	10	10
7 OTHER	NO	NO	NO	NO	NO	NO
NATIONAL TOTAL	26 262	25 982	26 051	25 350	26 589	26 926
International Bunkers	307	456	530	576	555	520