



**BESTANDSAUFNAHME DER EMISSIONEN  
VERSAUERNDER UND  
EUTROPHIERENDER SCHADSTOFFE  
SOWIE DER  
OZONVORLÄUFERSUBSTANZEN  
1990 BIS 2002**

**Berichterstattung gemäß Richtlinie 2001/81/EG  
des Europäischen Parlaments und des Rates**

BERICHTE

BE-235

Wien, Dezember 2003



## **Autoren**

Michael Anderl  
Agnes Kurzweil  
Günther Lichtblau  
Roman Ortner  
Stephan Poupa  
Klaus Radunsky  
Manfred Ritter  
Daniela Wappel  
Manuela Wieser

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## VORWORT

Der vorliegende Bericht präsentiert eine Zusammenfassung der Daten zur Erfüllung der Richtlinie 2001/81/EG des Europäischen Parlaments und des Rates vom 23. Oktober 2001 über nationale Emissionshöchstmengen für bestimmte Luftschadstoffe (SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>). Nach der englischen Bezeichnung "national emission ceilings" ist sie auch als "NEC-Richtlinie" bekannt. Sie legt für die einzelnen Mitgliedstaaten verbindliche nationale Emissionshöchstgrenzen ab dem Jahr 2010 fest. Für Österreich gelten folgende Werte:

Tabelle1: Nationale Emissionshöchstgrenzen für Österreich

	<i>Zielwerte 2010 (in 1000 t)</i>
SO <sub>2</sub>	39
NO <sub>x</sub>	103
NH <sub>3</sub>	66
NMVOC	159

Anhang III der Richtlinie sieht die Erstellung der Inventur unter Anwendung jener Verfahren vor, welche im Rahmen des Übereinkommens über weiträumige grenzüberschreitende Luftverunreinigung vereinbart wurden. Zur Ermittlung der Daten wurde das gemeinsame Handbuch von EMEP/CORINAIR<sup>1</sup> angewandt. Die Darstellung erfolgt im neuen NFR-Format<sup>2</sup> der UNECE.

Im Anschluß an dieses Vorwort wird der von der Republik Österreich an die Europäische Kommission 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 SO<sub>2</sub>, NO<sub>2</sub>, NH<sub>3</sub>, und NMVOC. Der vollständige Datensatz wird der Europäischen Kommission in digitaler Form übermittelt. Im Oktober 2004 wird das UMWELTBUNDESAMT 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. Der UMWELTBUNDESAMT GmbH wird in diesem Bundesgesetz in § 6 (2) Z.19 unter anderem die Aufgabe übertragen, an der Erfüllung der Berichtspflichten an die Europäische Kommission gemäß Richtlinien und Entscheidungen der EG mitzuwirken. 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.

<sup>1</sup> 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>

<sup>2</sup> Nomenclature For Reporting

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 Bericht dargestellten Emissionsdaten ersetzen somit die publizierten Daten vorhergehender Berichte.

Tabelle 2 fasst den Stand der Daten und das Berichtsformat des vorliegenden Berichtes zusammen.

Tabelle 2: Datengrundlage des vorliegenden Berichtes

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

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**AUSTRIA'S  
NATIONAL AIR EMISSIONS INVENTORY  
1990 - 2002**

Submission under the Directive 2001/81/EC  
on national emission ceilings for certain atmospheric pollutants

Title of Inventory	<i>Austria's Annual National Inventory 1990-2002 on acidifying and eutrophying emissions and ozone precursors</i>
Contact Name	<i>Manfred Ritter</i>
Organisation	<i>UMWELTBUNDESAMT</i>
Address	<i>Spittelauer Lände 5 A-1090 Vienna AUSTRIA</i>
Fax	<i>+ 43 - 1 - 31304 - 5400</i>
Phone	<i>+ 43 - 1 - 31304 - 5951</i>
E-mail	<i>manfred.ritter@umweltbundesamt.at</i>

Vienna, December 2003

Prepared by the UMWELTBUNDESAMT



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## 1 INTRODUCTION

This report presents a summary of Austria's Annual National Inventory 1990-2002 on acidifying and eutrophying emissions and ozone precursors. The inventory is submitted to the European Commission by the Austrian Federal Government in fulfilment of Austria's annual reporting obligation under Directive 2001/81/EC of the European Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants. In Table 1 Austria's National Emission Ceilings are listed:

Table 1: Austria's National Emission Ceilings 2010

	Emission Ceilings 2010 (1000 t)
SO <sub>2</sub>	39
NO <sub>x</sub>	103
NH <sub>3</sub>	66
NMVOc	159

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. According to Annex III of the Directive 2001/81/EC, the Member States shall establish emission inventories and projections using the methodologies agreed upon by the UNECE Convention on Long-range Transboundary Air Pollution (LRTAP). Thus they are requested to use the joint EMEP/CORINAIR<sup>3</sup> guidebook in preparing these inventories and projections. Table 2 shows the summary of Austria's NEC-emissions:

Table 2: Summary of Austria's NEC-emissions 1990-2002 (1000 t)

Emission	1990	1995	1996	1997	1998	1999	2000	2001	2002
SO <sub>2</sub>	79.99	51.96	49.33	45.44	40.55	38.49	35.39	37.60	35.96
NO <sub>x</sub>	212.03	189.40	193.65	190.08	194.04	189.51	190.28	196.44	204.47
NH <sub>3</sub>	57.45	58.24	56.83	58.06	57.26	55.96	54.13	54.48	53.00
NMVOc	298.09	232.48	225.78	213.13	201.11	189.73	190.30	195.47	192.65

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.

Annex 1 of this report presents trend tables of SO<sub>x</sub>, NO<sub>x</sub>, NH<sub>3</sub> and NMVOc. The complete tables of the NFR-Format, including in particular sectoral reports and sectoral background tables are submitted to the European Commission separately in digital form only (excel files).

Following an recommendation of the guidelines mentioned above, this year the UMWELTBUNDESAMT has provided an "Informative Inventory Report 2003 – Submission under the UNECE/ LRTAP Convention". This report contains detailed and complete

<sup>3</sup> 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>

background information on the compilation of the 2002 emission inventory for NO<sub>x</sub>, SO<sub>2</sub>, NMVOC and NH<sub>3</sub>. The “Informative Inventory Report 2004” will be published in October 2004.

## **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 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" 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.

*1 A 1 a:* For the year 2001 the emission declarations of combustion plants  $\geq 50$  MW have been updated.

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

#### *Changes in allocation of emissions:*

*1 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 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 SO<sub>2</sub>, NMVOC and NO<sub>x</sub> 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 CO<sub>2</sub> emissions from decarbonising) are now reported in category 1 A 2 f.

*2 A 7:* Glass Production: all emissions (except CO<sub>2</sub> emissions from decarbonising) have been allocated to the energy sector.

### *Update of data:*

NO<sub>x</sub> emissions from inorganic chemical industries have been updated.

NH<sub>3</sub> 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 (9)

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 Lösemittlemissionen 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 20<sup>th</sup> 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>
NEC-Directive	NFR-Format (UNECE)	OLI 2003	December 2003

## 6 ANNEX 1

In Annex 1 trend tables of SO<sub>x</sub>, NO<sub>x</sub>, NH<sub>3</sub> 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 emissions by sources of compounds that do not occur for a particular compound or source category within a country.

**“NE”** (not estimated) for existing emissions by sources of compounds that have not been estimated.

**“IE”** (included elsewhere) for emissions by sources of compounds that are estimated but included elsewhere in the inventory instead of in the expected source category.

**“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<sub>x</sub> [Gg]

NFR sectors		1990	1995	1996	1997	1998	1999	2000	2001	2002
1	ENERGY	76.58	48.03	45.43	41.50	36.58	34.53	31.40	33.61	31.97
1 A	FUEL COMBUSTION ACTIVITIES	74.58	46.50	44.23	41.44	36.54	34.39	31.25	33.45	31.83
1 B	FUGITIVE EMISSIONS FROM FUELS	2.00	1.53	1.20	0.07	0.04	0.14	0.15	0.16	0.14
2	INDUSTRIAL PROCESSES	3.34	3.88	3.85	3.89	3.91	3.90	3.93	3.94	3.93
3	SOLVENT & OTHER PRODUCT USE	NO	NO	NO	NO	NO	NO	NO	NO	NO
4	AGRICULTURE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	LAND USE CHANGE AND FORESTRY	NE	NE	NE	NE	NE	NE	NE	NE	NE
6	WASTE	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
7	OTHER	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>NATIONAL TOTAL</b>		<b>79.99</b>	<b>51.96</b>	<b>49.33</b>	<b>45.44</b>	<b>40.55</b>	<b>38.49</b>	<b>35.39</b>	<b>37.60</b>	<b>35.96</b>
International Bunkers		0.28	0.42	0.47	0.48	0.50	0.49	0.53	0.51	0.48

Trend table 2: NO<sub>x</sub> [Gg]

NFR sectors		1990	1995	1996	1997	1998	1999	2000	2001	2002
1	ENERGY	201.67	182.48	186.95	182.93	187.22	182.80	183.49	189.54	197.88
1 A	FUEL COMBUSTION ACTIVITIES	201.67	182.48	186.95	182.93	187.22	182.80	183.49	189.54	197.88
1 B	FUGITIVE EMISSIONS FROM FUELS	IE	IE	IE	IE	IE	IE	IE	IE	IE
2	INDUSTRIAL PROCESSES	4.80	1.47	1.45	1.55	1.53	1.53	1.66	1.71	1.71
3	SOLVENT & OTHER PRODUCT USE	NO	NO	NO	NO	NO	NO	NO	NO	NO
4	AGRICULTURE	5.52	5.43	5.22	5.57	5.27	5.16	5.10	5.17	4.85
5	LAND USE CHANGE AND FORESTRY	NE	NE	NE	NE	NE	NE	NE	NE	NE
6	WASTE	0.04	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
7	OTHER	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>NATIONAL TOTAL</b>		<b>212.03</b>	<b>189.40</b>	<b>193.65</b>	<b>190.08</b>	<b>194.04</b>	<b>189.51</b>	<b>190.28</b>	<b>196.44</b>	<b>204.47</b>
International Bunkers		2.77	4.23	4.66	4.85	5.01	4.92	5.36	5.16	4.84



Trend table 3: NH<sub>3</sub> [Gg]

NFR sectors		1990	1995	1996	1997	1998	1999	2000	2001	2002
1	ENERGY	1.35	1.56	1.64	1.61	1.60	1.54	1.44	1.55	1.48
1 A	FUEL COMBUSTION ACTIVITIES	1.35	1.56	1.64	1.61	1.60	1.54	1.44	1.55	1.48
1 B	FUGITIVE EMISSIONS FROM FUELS	IE	IE	IE	IE	IE	IE	IE	IE	IE
2	INDUSTRIAL PROCESSES	0.19	0.10	0.10	0.10	0.10	0.12	0.10	0.08	0.06
3	SOLVENT & OTHER PRODUCT USE	NO	NO	NO	NO	NO	NO	NO	NO	NO
4	AGRICULTURE	55.54	55.94	54.42	55.74	54.94	53.66	51.98	52.23	50.84
5	LAND USE CHANGE AND FORESTRY	NE	NE	NE	NE	NE	NE	NE	NE	NE
6	WASTE	0.38	0.64	0.67	0.61	0.62	0.64	0.62	0.61	0.61
7	OTHER	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>NATIONAL TOTAL</b>		<b>57.45</b>	<b>58.24</b>	<b>56.83</b>	<b>58.06</b>	<b>57.26</b>	<b>55.96</b>	<b>54.13</b>	<b>54.48</b>	<b>53.00</b>
International Bunkers		0.002	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.003

Trend table 4: NMVOC [Gg]

NFR sectors		1990	1995	1996	1997	1998	1999	2000	2001	2002
1	ENERGY	162.63	127.65	124.67	107.19	102.95	96.87	90.07	89.76	86.95
1 A	FUEL COMBUSTION ACTIVITIES	152.00	120.22	118.14	101.20	97.13	91.78	84.97	86.50	83.56
1 B	FUGITIVE EMISSIONS FROM FUELS	10.63	7.43	6.52	5.99	5.81	5.09	5.10	3.26	3.39
2	INDUSTRIAL PROCESSES	16.37	21.01	20.99	20.89	20.54	20.79	20.48	21.01	21.00
3	SOLVENT & OTHER PRODUCT USE	116.95	81.75	78.07	82.93	75.54	69.96	77.74	82.63	82.63
4	AGRICULTURE	1.94	1.91	1.89	1.97	1.93	1.97	1.87	1.95	1.94
5	LAND USE CHANGE AND FORESTRY	NE	NE	NE	NE	NE	NE	NE	NE	NE
6	WASTE	0.19	0.17	0.16	0.15	0.15	0.14	0.14	0.13	0.13
7	OTHER	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>NATIONAL TOTAL</b>		<b>298.09</b>	<b>232.48</b>	<b>225.78</b>	<b>213.13</b>	<b>201.11</b>	<b>189.73</b>	<b>190.30</b>	<b>195.47</b>	<b>192.65</b>
International Bunkers		0.30	0.46	0.54	0.60	0.66	0.64	0.67	0.65	0.60