umweltbundesamt

AUSTRIA'S ANNUAL AIR EMISSION INVENTORY 1990–2005

Submission under
National Emission Ceilings Directive
2001/81/EC

REPORT
REP-0058

Vienna, 2006

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TABLE OF CONTENTS

ZUSAMMENFASSUNG

Der Bericht zeigt die neueste Entwicklung jener Luftschadstoffe, für die es nationale Emissionshöchstgrenzen gibt. Er folgt in Format und Inhalt den verbindlichen Anforderungen der EU-Richtlinie 2001/81/EG über nationale Emissionshöchstmengen für bestimmte Luftschadstoffe, nach der englischen Bezeichnung "national emission ceilings" auch als "NEC-Richtlinie" bekannt.

In der NEC-Richtlinie sind für die einzelnen Mitgliedstaaten verbindliche nationale Emissionshöchstgrenzen für Schwefeldioxid (SO_2), Stickoxide (NO_x), flüchtige organische Verbindungen ohne Methan (NMVOC) und Ammoniak (NH_3) ab dem Jahr 2010 festgelegt.

Die NEC-Richtlinie wurde in Österreich mit dem Emissionshöchstmengengesetz-Luft (EG-L, BGBL. I Nr. 34/2003) in nationales Recht umgesetzt; das EG-L trat am 12. Juni 2003 in Kraft.

Artikel 7 in Verbindung mit Annex III der NEC-Richtlinie legt fest, dass für diese Luftschadstoffe eine jährliche Inventur zu erstellen ist, die den im Rahmen des UNECE-Übereinkommens über weiträumige grenzüberschreitende Luftverunreinigung (Long-Range Transboundary Air Pollution, LRTAP) beschlossenen Inventurregeln entspricht.

Emissionstrend

Die folgende Tabelle zeigt den Trend der nationalen Gesamtemissionen ab dem Jahr 1990 bis 2005 in Tausend Tonnen Gesamtmasse.

Tabelle: Nationale Gesamtemissionen von SO_2, NO_x, NMVOC und NH_3 1990–2005.

	Nationale Gesamtemissionen gemäß UN-Übereinkommen über weiträumige grenzüberschreitende Luftverunreinigung [Gg]							
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
SO_2	74,22	46,81	31,41	33,02	31,92	32,63	27,26	26,41
NO_x	211,07	192,07	204,82	213,78	219,90	229,28	224,63	225,06
NMVOC	284,74	218,19	169,58	172,40	166,68	162,71	157,34	154,14
NH_3	68,81	70,68	66,24	66,09	64,95	64,90	64,16	63,94

Diese nationalen Gesamtemissionen wurden auf Basis der in Österreich verkauften Treibstoffe errechnet. Dabei ist zu beachten, dass in Österreich in den letzten Jahren ein beachtlicher Teil der verkauften Treibstoffmenge im Inland getankt, jedoch im Ausland verfahren wurde (so genannter Tanktourismus ins Inland).

Gemäß Artikel 2 der NEC-Richtlinie gilt die Richtlinie für Emissionen von Schadstoffen im Gebiet der Mitgliedstaaten. Die folgende Tabelle zeigt daher die österreichischen Gesamtemissionen ohne Tanktourismus für einen Vergleich mit den Nationalen Emissionshöchstmengen der NEC-Richtlinie. Diese Emissionen sind Österreichs offizielle Inventurdaten gemäß Artikel 8 (1) der NEC-Richtlinie. Aus Gründen der Vergleichbarkeit und Konsistenz mit anderen Berichtspflichten bleiben die Tabellen der Nationalen Gesamtemissionen im Anhang I aber unverändert. In Anhang II ist eine zusätzliche Tabelle mit den Emissionen ohne Tanktourismus angeführt, um einen Vergleich mit den Nationalen Emissionshöchstmengen zu ermöglichen.

Tabelle: Österreichs NEC-Gas-Emissionen 1990–2005 und Ziele für 2010 gemäß NEC-Richtlinie 2001/81/EC.

	Emissionen in Tausend Tonnen [Gg]								Emissions-höchstmenge
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2010**
SO_2	74,77	46,64	30,96	32,43	31,25	31,87	27,20	26,35	39
NO_x	220,84	189,72	172,70	172,16	168,52	168,11	162,04	159,17	103
NMVOC	285,02	218,60	168,45	170,35	163,36	158,60	153,18	149,85	159
NH_3	68,81	70,73	66,27	66,03	64,73	64,61	63,86	63,65	66

Im Vergleich zu 2004 gingen 2005 die im Inland ausgestoßenen Emissionsmengen für die Luftschadstoffe SO_2, NO_x und NMVOC weiter zurück. Die NH_3-Emissionen blieben in den Berichtsjahren 2004 und 2005 in etwa konstant.

Die größte Abweichung zur festgesetzten nationalen Emissionshöchstmenge für 2010 ist derzeit bei den Stickoxiden zu verzeichnen, in erster Line aufgrund hoher Emissionen im Straßenverkehr.

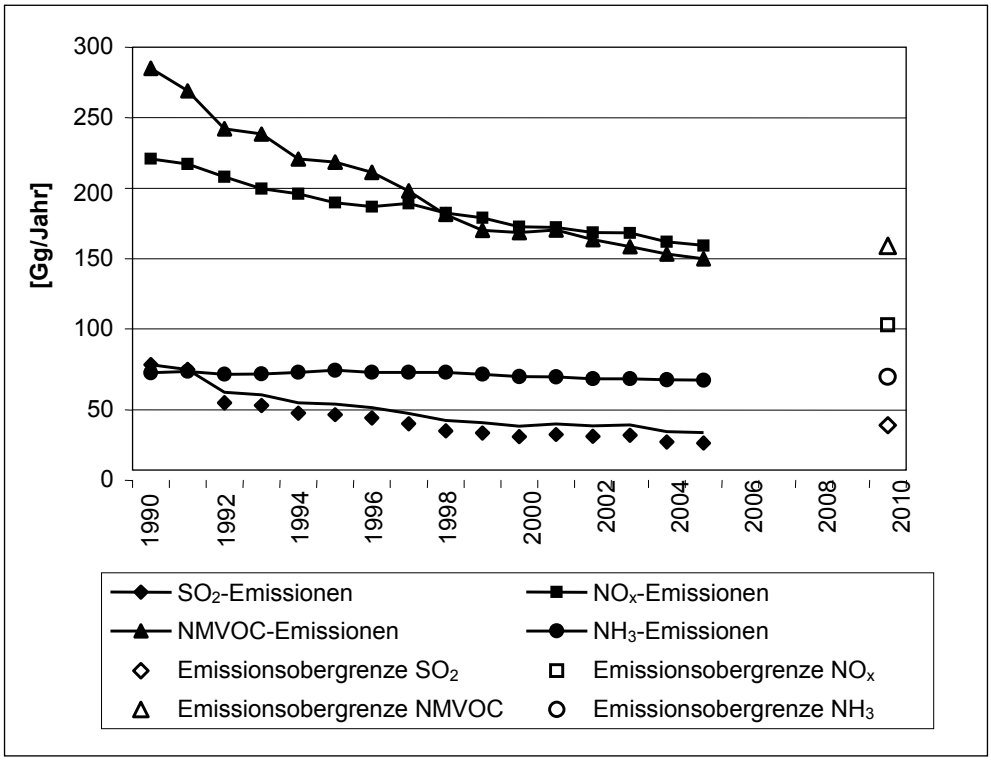

Abbildung: NEC-Gas-Emissionen ohne Tanktourismusanteile und Ziele gemäß NEC-Richtlinie 2001/81/EC.

SO_2-Emissionen

Die in der NEC-Richtlinie festgesetzte Emissionshöchstmenge für SO_2 von 39.000 Tonnen im Jahr 2010 wird in Österreich bereits seit mehreren Jahren unterschritten. Im Zeitraum 1990 bis 2005 konnten die SO_2-Emissionen (ohne Tanktourismusanteile) um beachtliche 65 % reduziert werden. Im Vergleich zu 2004 gingen die Emissionen 2005 um 3,1 % bzw. rd. 26.000 Tonnen zurück.

NO_x-Emissionen

Im Zeitraum 1990 bis 2005 sind die NO_x-Emissionen (ohne Tanktourismusanteile) um 28 % gesunken. Verglichen mit 2004 sind sie um 1,8 % auf rd. 159.000 Tonnen im Jahr 2005 gesunken. Damit sind die Stickoxidemissionen jedoch noch immer beträchtlich über der in der NEC-Richtline festgesetzten Emissionshöchstmenge von 103.000 Tonnen im Jahr 2010.

NMVOC-Emissionen

Mit einer Reduktion um 47 % seit 1990 und einer Emissionsmenge von rd.150.000 Tonnen im Jahr 2005 sind die NMVOC-Emissionen (ohne Tanktourismusanteile) bereits heute unter der in der NEC-Richtline für das Jahr 2010 festgesetzten Emissionshöchstmenge von 159.000 Tonnen. Von 2004 bis 2005 ist eine Reduktion um 2,2 % zu verzeichnen.

NH_3-Emissionen

Die in der NEC-Richtlinie für das Jahr 2010 festgesetzte Emissionshöchstmenge von 66.000 Tonnen NH_3 wird derzeit unterschritten. Von 1990 bis 2005 konnten die NH_3-Emissionen (ohne Tanktourismusanteile) um 7,5 % auf rd. 64.000 Tonnen reduziert werden. Verglichen mit 2004 blieben 2005 die Emissionen in etwa konstant.

Datengrundlage

Anhang III der NEC-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[1] angewandt. Die Darstellung erfolgt im NFR-Format[2] der UNECE.

In den gültigen Richtlinien zur Emissionsberichterstattung ist den einzelnen Staaten die Möglichkeit gegeben, die Emissionen vom Straßenverkehr entweder auf Basis des verkauften Treibstoffs (fuel sold) oder auf Basis des verbrauchten Treibstoffs (fuel consumed) zu berichten.

Emissionen des Tanktourismus

In der Österreichischen Luftschadstoff-Inventur (OLI) basieren die Emissionsberechnungen des Straßenverkehrs auf der in Österreich verkauften Treibstoffmenge.

Im Jahr 2004 wurde vom Lebensministerium eine Studie veröffentlicht, in welcher die Auswirkungen des Tanktourismus auf den Treibstoffverbrauch und die Entwicklung der verkehrsbedingten Emissionen in Österreich abgeschätzt wurden.

Tanktourismuseffekte[3] entstehen durch unterschiedliche Treibstoffpreise in den unterschiedlichen Ländern. Ist der Treibstoffpreis so wie in den vergangenen Jahren in Österreich niedriger als im benachbarten Ausland, wird teilweise in Österreich ge-

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[1] EMEP/CORINAIR Emission Inventory Guidebook – 2005. Technical report No 30. Prepared by the UNECE/EMEP Task Force on Emissions Inventories and Projections. December 2005 update. Internet site: http://reports.eea.eu.int

[2] Nomenclature For Reporting

[3] Der Tanktourismus stellt im Wesentlichen die Differenz von Treibstoffabsatz und Treibstoffverbrauch in Österreich dar.

tankt, der Treibstoff aber im Ausland „verfahren". In den 90er Jahren konnte der umgekehrte Effekt aufgrund höherer Treibstoffpreise in Österreich beobachtet werden (siehe folgende Tabelle).

Tabelle: Emissionen aus Tanktourismus

	Emissionen in Tausend Tonnen [Gg]							
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
SO_2	-0,55	0,17	0,45	0,59	0,67	0,77	0,06	0,06
NO_x	-9,77	2,35	32,12	41,62	51,39	61,17	62,59	65,89
NMVOC	-0,28	-0,41	1,13	2,05	3,32	4,11	4,16	4,29
NH_3	0,00	-0,05	-0,04	0,05	0,21	0,29	0,29	0,30

Die Tabelle zeigt, dass im Jahr 2005 etwa 29 % der nationalen Gesamtemissionen an NO_x auf Tanktourismuseffekte zurückzuführen sind.

Die Österreichische Luftschadstoff-Inventur

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.

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

Tabelle: Datengrundlage des vorliegenden Berichts.

Inventur	**Datenstand**	**Berichtsformat**
OLI 2006	Dezember 2006	NFR-Format der UNECE

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 EU mitzuwirken. In § 6 (2) Z. 20 werden die Erstellung 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 Umweltbundesamt genannt.

Im Anschluss an diese Zusammenfassung wird der von der Republik Österreich an die Europäische Kommission zu übermittelnde Emissionsbericht in englischer Sprache wiedergegeben. Es handelt sich hierbei um eine Beschreibung der wichtigsten Daten mit Anführung der wesentlichsten methodischen Änderungen. Der Anhang enthält Überblickstabellen für die Schadstoffe SO_2, NO_2, NH_3, und NMVOC. Der vollständige Datensatz wird der Europäischen Kommission im NFR-Format der UNECE in digitaler Form übermittelt, wobei diesem Datensatz eine Tabelle mit den Emissionen ohne Tanktourismus vorangestellt wurde, um einen Vergleich mit den Nationalen Emissionshöchstmengen zu ermöglichen.

1 INTRODUCTION

This report presents a summary of Austria's Annual Annual Air Emission Inventory 1990-2005 for 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.

The basis of this report is the Austrian air emission inventory 2006 (Österreichische Luftschadstoff-Inventur, OLI 2006) prepared by the Umweltbundesamt for the years 1980 to 2005. According to Article 7 and 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[4] guidebook in preparing these inventories and projections.

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. These guidelines define the format for reporting emission data (Nomenclature For Reporting/NFR) and offer guidance on how to provide supporting documentation. They specify minimum and additional reporting obligations.

Annex I of this report presents trend tables of SO_x, NO_x, NH_3 and NMVOC for the main NFR sectors as reported to the UNECE Convention on Long-range Transboundary Air Pollution. The complete tables of the NFR Format are uploaded to the Central Data Repository of the EIONET in digital form (excel files).

Annex II presents Austria’s NEC emissions 1990-2005 according to Directive 2001/81/EC. Emissions are reported on the basis of fuel used (without ‘tank tourism’, see chapter 6)

[4] EMEP/ CORINAIR Emission Inventory Guidebook - 2005. Technical report No 30. Prepared by the UNECE/ EMEP Task Force on Emissions Inventories and Projections. December 2005 update. Internet site: **http://reports.eea.eu.int**

2 EMISSION TRENDS

In the 2002 Emission Reporting Guidelines, Parties are given the choice of whether to report emissions on the basis of fuel used or fuel sold to the final consumer. It is recommended that they should clearly state the basis of their calculations in their submissions.

Austria's total emissions 1990–2005 according to LRTAP reporting

Table 1 shows national total emissions as reported to the UNECE Convention on Long-range Transboundary Air Pollution, based on fuel sold.

Table 1: Austria's total emissions 1990–2005 according to LRTAP reporting

	National Total Emissions [Gg]							
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
SO_2	74.22	46.81	31.41	33.02	31.92	32.63	27.26	26.41
NO_x	211.07	192.07	204.82	213.78	219.90	229.28	224.63	225.06
NMVOC	284.74	218.19	169.58	172.40	166.68	162.71	157.34	154.14
NH_3	68.81	70.68	66.24	66.09	64.95	64.90	64.16	63.94

As can be seen in Table 1 the major reductions from 1990 to 2005 were achieved in SO_2 and NMVOC emissions (–64% and –46%).

In 2005 total emissions of NH_3 were about 7% below the level of 1990, NO_x emissions were about 7% above the level of 1990 (see Figure 1).

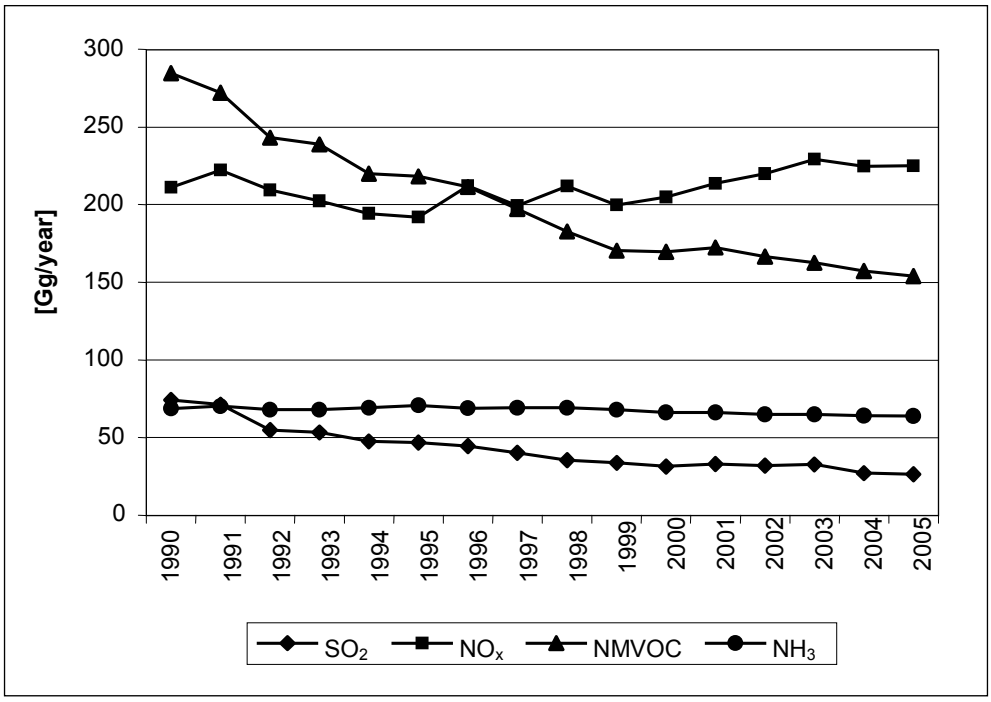

Figure 1: Trends of SO_2, NO_x, NMVOC and NH_3 emissions according to CLRTAP reporting

The increase of NO_x emissions from 1995 onwards has been caused by the so-called 'tank tourism' of the sector road transport (see Chapter 6, Table 6 'NEC gas emissions from tank tourism').

Austria's emissions 1990–2005 according to Directive 2001/81/EC and ceilings for 2010

According to Article 2 of Directive 2001/81/EC the Directive covers 'emissions on the territory of the Member States'. If fuel prices vary considerably in neighbouring countries, fuel sold within the territory of a Member State will be used outside its territory (the so-called 'tank tourism'). Austria has experienced a considerable amount of 'tank tourism' in the last few years; this needs to be taken into account for reporting emissions on the Austrian territory. For this reason Austria is reporting National Totals without 'tank tourism' according to Table 2 as Austria's official inventory under Article 8 (1) of the Directive. Details regarding 'tank tourism' are presented in Chapter 6.

Table 2: Austria's emissions 1990–2005 according to Directive 2001/81/EC and ceilings for 2010

	Emissions without 'tank tourism' [Gg]								Ceilings 2010 [Gg]
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2010**
SO_2	74.77	46.64	30.96	32.43	31.25	31.87	27.20	26.35	39
NO_x	220.84	189.72	172.70	172.16	168.52	168.11	162.04	159.17	103
NMVOC	285.02	218.60	168.45	170.35	163.36	158.60	153.18	149.85	159
NH_3	68.81	70.73	66.27	66.03	64.73	64.61	63.86	63.65	66

Figure 2 shows the trends of Austria's NEC emissions according to Directive 2001/81/EC without 'tank tourism':

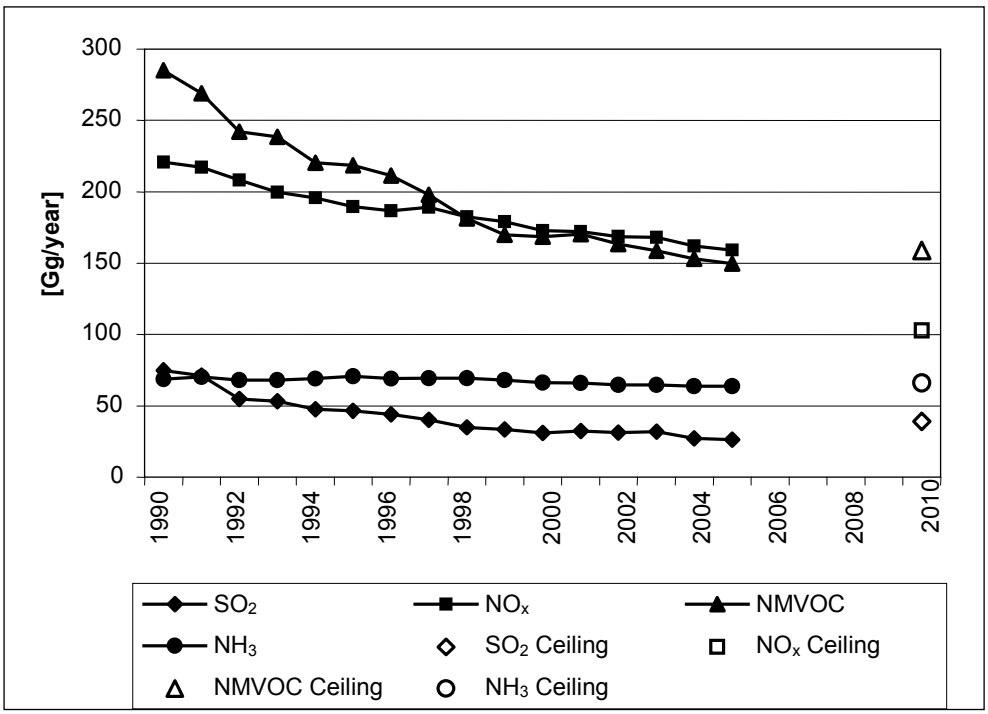

Figure 2: Trends of SO_2, NO_x, NMVOC and NH_3 emissions without 'tank tourism' and NEC emission ceilings

SO_2 Emissions

In 1990 SO_2 Emissions without 'tank tourism' amounted to 75 Gg; emissions have decreased steadily since then and by 2005 emissions were reduced by 65% mainly due to lower emissions from residential heating, combustion in industries and energy industries.

The 2010 national emission ceiling for SO_2 emissions in Austria as set out in the NEC Directive is 39 Gg. In the last seven years, Austrian total SO_2 emissions were already below the ceiling; in 2005 they amounted to 26 Gg.

NO_x Emissions

In 1990 NO_x Emissions without 'tank tourism' amounted to 221 Gg and were about 28% below the level of 1990 in 2005.

The 2010 national emission ceiling for NO_x emissions in Austria as set out in the NEC Directive is 103 Gg. With 159 Gg in 2005, emissions in Austria are at the moment well above this ceiling.

NMVOC Emissions

In 1990 NMVOC Emissions without 'tank tourism' amounted to 285 Gg; emissions have decreased steadily since then and by 2005 emissions were reduced by 47%.

The national emission ceiling 2010 for NMVOC emissions in Austria as set out in the NEC Directive is 159 Gg. With 150 Gg NMVOC in 2005, Austria's emissions are below this ceiling.

NH_3 Emissions

In 1990 NH_3 Emissions without 'tank tourism' amounted to 69 Gg; in 2005 emissions were 8% below 1990 levels.

The national emission ceiling of 2010 for NH_3 emissions in Austria as set out in the NEC Directive is 66 Gg. With 64 Gg NH_3 in 2005, emissions in Austria are at the moment below this ceiling.

3 RELATION TO DATA REPORTED EARLIER

As a result of the continuous improvement of Austria's Annual Air Emission Inventory, emissions of some sources have been recalculated based on updated data or revised methodologies, thus emission data for 1990 to 2004 submitted this year differ from data reported previously.

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.

Table 3: Recalculation difference compared to the previous submission

	1990	**2004**
	Recalculation Difference [%]	
SO_2	0%	-6%
NO_x	0%	-1%
NMVOC	0%	-9%
NH_3	0%	0%

The 9% decrease of NMVOC emissions for 2004 compared to the previous submission is mainly due to a recalculation of *Category 2 B – Chemical Industry* applying new data reported by the Austrian Association of Chemical Industry. An update of activity data in *Category 3 – Solvent and Other Product Use* led to lower emissions in 2004 too.

The 6% decrease of SO_2 emissions for 2004 is mainly due to the revision of the national energy balance and recalculations in *Category 1 A 3 b Road Transportation*.

A description of these recalculations by sector is given in Chapter 5.

4 SOURCES OF DATA

The following table presents the main data sources used for activity data as well as information on who carried out the actual calculations:

Table 4: Main data sources for activity data and emission values

Sector	Data Sources for Activity Data	Emission Calculation
Energy	Energy Balance from Statistik Austria, Steam boiler database;	Umweltbundesamt, operator reports
Industry	National production statistics, import/export statistics, direct information from industry or associations of industry;	Umweltbundesamt, operator reports
Waste	Austrian landfill database	Umweltbundesamt
LUCF	National forest inventory obtained from the Austrian Federal Office and Research Centre for Forests	Umweltbundesamt
Solvent	Import/export statistics, production statistics, consumption statistics;	Umweltbundesamt Based on a study by: Forschungsinstitut für Energie und Umweltplanung, Wirtschaft und Marktanalysen GmbH and Institut für industrielle Ökologie[5]
Agriculture	National Studies, national agricultural statistics obtained from Statistik Austria;	Umweltbundesamt based on studies by: University of Natural Resources and Applied Life Sciences & Research Center Seibersdorf

The main sources for emission factors are:

- National studies for country-specific emission factors
- Plant-specific data reported by plant operators
- EMEP/CORINAIR Guidebook

[5] Research Institute for Energy and Environmental Planning, Economy and Market Analysis Ltd./Institute for Industrial Ecology

5 METHODOLOGICAL CHANGES WITH RESPECT TO THE PREVIOUS SUBMISSION

This chapter describes the methodological changes by sector made to the inventory since the previous submission.

ENERGY (1A)

Update of activity data:

Update of activity data are due to updates of the energy balance compiled by the federal statistics authority Statistik Austria.

Update of national energy balance - general improvements:

The following improvements affect the years 1999 to 2004 only. It has to be noted that the following recalculations relate to official data published by Statistik Austria ("Österreich-Bilanzen") in November 2005.

Integration of 2003/2004 census data for improvement of the residential sector (*NFR 1 A 4 b*). Definition of improved and more detailed fuel classifications for industrial waste and biomass. Integration of 2004 and 2002 sampling data for recalculation of industrial sub categories from 1999 on. Improvement of companies' allocation to NACE sectors. Integration of 2004 material input survey. Model error correction 1999 to 2000 for residual fuel oil. Consideration of coke oven tar and benzene as refinery input from 2004 on. 1999-2004 correction of coal foreign trade statistics and stock changes which affects coal gross consumption. Integration of 2005 CO_2 emission trading system (ETS) data for improvement and validation of industry sectoral data, especially for non traded fuels and in-plant waste. Update of brown coal NCV by means of ETS data. Because most improvements affect inter-sectoral data without changing gross consumption, category *Commerce and Public Services* is chosen as the "residual category" in most cases. This leads to significant changes of NFR category *1 A 4 a* without enhancement of accuracy.

Update of national energy balance - data harmonisation and consistency:

In November 2005 Statistik Austria provided a dataset to emission inventory compilers which was consistent with data submitted to EUROSTAT/IEA but not fully consistent with official data published by Statistik Austria ("Österreich-Bilanzen"). Thus the following inventory recalculations prior to 1999 have been performed additionally to gain consistency with the official dataset.

1 A 2 Manufacturing Industries; 1 A 4 Other Sectors:

1990 to 1998: a share of residual fuel oil final consumption is shifted from *1 A 4 c Agriculture* to *1 A 2 Manufacturing Industries* subcategoories and *1 A 2 a Commercial* (1990: 40 kt). A share of the residual fuel previously considered as low sulphur fuel oil is now considered as high sulphur residual fuel oil and contributes to higher NO_X and SO_2 emissions (1990: 11 kt).

1 A 1 Energy Industries; 1 A 4 Other Sectors:

1990 to 1997: o*ther solid biomass* is shifted from *1A1* to *1A4* (1990: 0.2 PJ).

1 A 3 b Transport – Road:

Energy data, particularly biodiesel consumption 2004, has been revised according to the updated national energy balance.

1 A 3 e Transport - Pipeline compressors:

Revised 2004 natural gas consumption according to the updated national energy balance has been applied.

1 A 4 Other Sectors - Mobile Sources:

Revised energy data for railways (coal, diesel, electricity) up to 2000 according to the updated national energy balance has been applied.

Improvements of methodologies and emission factors:

Cross sectoral:

From 2005 on ETS activity data (356 PJ) has been used for refining sub categories activity data of *NFR 1 A 1 and 1 A 2* stationary sources (total 490 PJ). Increased accuracy of activity data for glass, cement, lime, bricks & tiles and magnesium & dolomite manufacturing industry significantly increases accuracy of NO_x emission calculation for these branches.

1 A 1 a Public Electricity and Heat Production:

For plants > 50 MW_{th} update of SO_2 and NO_x emissions for the year 2004 by means of the steam boiler reporting obligation (LRGK).

For biomass fired boilers <= 50 MW update of NO_x emission factors 1990-2004 by means of a sample survey.

For municipal waste incineration in boilers <= 50 MW update of NO_x emission factors 1999-2004 by means of actual measurements.

Steam boiler fuel consumption reported as *fuel wood* is now considered as *other solid biomass.*

1 A 1 b Petroleum Refining:

Liquid fuels NH_3 emission factor has been updated (error correction).

FUGITIVE EMISSIONS (1 B)

No recalculations

INDUSTRIAL PROCESSES (2)

Update of activity data:

2 B 5 Chemical Products – Other (organic chemical industries):

NMVOC Emissions have been updated for the years 1994-2004: From 1999 onwards data reported by the Austrian Association of Chemical Industry has been used; emissions between 1994 and 1998 have been estimated by interpolation. This recalculation results in a decrease of emissions compared to the previous submission, where a constant value was reported from 1993 onwards.

2 D 1 Other Production - Pulp and Paper (chipboard production):

Activity data for 2004 has been updated.

2 D 2 Other Production - Food and Drink (Bread, Wine, Beer and Spirits):

Activity data for 2004 has been updated.

SOLVENT USE (3)

Update of activity data:

NMVOC emissions from solvent use have been updated from 2002 onwards by using new activity data for 2005 as well as 2001 data of sector-specific technological and economic developments. This resulted in a decrease of total NMVOC emissions from solvent use compared to the previous submission, where emission data were constantly extrapolated from 2002 onwards.

AGRICULTURE (4)

Update of activity data:

4 D 1 Direct Soil Emissions - urea consumption data:

Revised urea application data from 2002 to 2004 have been used. In accordance with the other N mineral fertilizer application data, figures now relate to the economic year of the farmers and not to the calendar year.

4 D 1 Direct Soil Emissions – Grazing:

Unfertilized grassland area data from 2003 to 2005 has been updated, which resulted in lower NH_3 emissions.

Improvements of methodologies and emission factors:

4 B 1 a Dairy:

As encouraged in the Draft LRTAP trial Centralized Review 2006, housing systems of dairy cattle have been reviewed: for 2005 a share of dairy cattle held in loose housing systems of 25% and a share of dairy cattle held in tied housing systems of 75% has been applied, which resulted in higher emissions from dairy cattle.

Expert Judgements:

DI Alfred Pöllinger, Agricultural Research and Education Centre Gumpenstein. November 2006.

Dr. Leopold Kirner, Federal Institute of Agricultural Economics. Expert judgement (November 2006) based on following study:

Kirner, L. (2005): Sozioökonomische Aspekte der Milchviehhaltung in Österreich. Studien zu Wettbewerbsfähigkeit, Entwicklungstendenzen und Agrarreform. Schriftenreihe der Bundesanstalt für Agrarwirtschaft Nr. 95. Wien.

4 B 1 b Non-Dairy:

Due to quality checks a transcription error of N excretion values from cattle < 1 year has been corrected (25.7 kg instead of 25.3 kg/animal/year). This resulted in slightly higher NH_3 emissions.

WASTE (6)

Update of activity data:

6 A 1 Managed Waste Disposal:

The activity data for Residual Waste and Non-residual Waste has been updated. According to the Landfill Ordinance the operators of landfill sites have to report their activity data annually. Based on reports received after the due date, there are minor changes of the activity data for the whole time series and a major change for 2004 data compared to the previous submission.

Due to quality checks a calculation error in non-residual waste categories was detected and corrected, the effects on emissions are minor.

6 D Other – Compost production:

The changes between 2000 and 2004 are due to updated activity data, which were compiled by looking at the waste management concepts and plans of the federal provinces (Bundesländer). This bottom-up approach led to revised data.

6 METHOD OF REPORTING

The emission data presented in this report were 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 included together with emissions of greenhouse gases in a database based on the CORINAIR nomenclature (CORe INventory AIR)/ SNAP (Selected Nomenclature for sources of Air Pollution). This nomenclature was designed by the EEA to estimate emissions of all kinds 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 the Annex.

The following table summarises the status of the present report:

Table 5: Status of the present report

Reporting Obligation	Format	Inventory	Version
NEC Directive	NFR Format (UNECE)	OLI 2006	December 2006

Treatment of fuel

In the 2002 Emission Reporting Guidelines, Parties are given the choice of whether to report emissions on the basis of fuel used or fuel sold to the final consumer. It is recommended that they should clearly state the basis of their calculations in their submissions.

In the reports to the UNECE Convention on Long-range Transboundary Air Pollution and the EEA, emissions of the Austrian road transport sector are reported on the basis of fuel sold. Emissions from 'tank tourism' (see Table 6) are therefore included in the Austrian Total.

Emissions from 'tank tourism'

In the last few years, fuel prices in Austria were lower than in the neighbouring countries. One effect of this price situation has been the so-called 'tank tourism' which means that fuel is sold in Austria and used abroad. The amount of this effect was analysed in 2004 with the following study:

LEBENSMINISTERIUM (2005): Abschätzung der Auswirkungen des Tanktourismus auf den Treibstoffverbrauch und die Entwicklung der CO_2-Emissionen in Österreich. Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, Wien 2005.

The calculation is based on extensive questionnaires (of truckers on the border, truckage companies), results of the transport model and traffic countings.

Since 2004 the emissions of 'tank tourism' have been calculated separately from the Austrian inventory.

The results for 1990 to 2005 are shown in the following table:

Table 6: NEC emissions from 'tank tourism' 1990–2005 [Gg]

Emission	1990	1995	2000	2001	2002	2003	2004	2005
SO_2	-0,55	0,17	0,45	0,59	0,67	0,77	0,06	0,06
NO_x	-9,77	2,35	32,12	41,62	51,39	61,17	62,59	65,89
NMVOC	-0,28	-0,41	1,13	2,05	3,32	4,11	4,16	4,29
NH_3	0,00	-0,05	-0,04	0,05	0,21	0,29	0,29	0,30

In the early 1990s, fuel prices were lower in the neighbouring countries. Therefore the fuel was bought abroad and used in Austria.

Meanwhile prices in Austria have become notably cheaper than in the neighbouring countries. Therefore drivers buy fuel in Austria and use it abroad, which means the emissions are released abroad. Most of that fuel is used by heavy-duty vehicles for long-distance traffic (inside and outside the EU).

In 2005 about 29% of the reported NO_x emissions were caused by 'tank tourism'.

ANNEX I: EMISSION TRENDS

The following Annex contains tables describing trends of SO_x, NO_x, NMVOC and NH_3 as reported to the UNECE Convention on Long-range Transboundary Air Pollution. Calculations are based on fuel sold.

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 have been used for all tables:

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.

NO (not occurring): for emissions by sources and removals by sinks of greenhouse gases that do not occur for a particular gas or 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.

C (confidential): for emissions which could lead to the disclosure of confidential information if reported at the most disaggregated level. In this case a minimum of aggregation is required to protect business information.

Table A.I-1: SO_2 [Gg] 1990–2005

	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
1990	71.92	69.92	2.00	2.22	NA	0.00	NE	0.07	NO	**74.22**	0.28
1991	69.39	68.09	1.30	1.90	NA	0.00	NE	0.06	NO	**71.35**	0.32
1992	53.20	51.20	2.00	1.67	NA	0.00	NE	0.04	NO	**54.91**	0.34
1993	51.85	49.75	2.10	1.42	NA	0.00	NE	0.04	NO	**53.32**	0.36
1994	46.09	44.81	1.28	1.42	NA	0.00	NE	0.05	NO	**47.56**	0.38
1995	45.39	43.86	1.53	1.37	NA	0.00	NE	0.05	NO	**46.81**	0.42
1996	43.31	42.11	1.20	1.29	NA	0.00	NE	0.05	NO	**44.66**	0.47
1997	39.03	38.97	0.07	1.27	NA	0.00	NE	0.05	NO	**40.35**	0.48
1998	34.33	34.29	0.04	1.18	NA	0.00	NE	0.05	NO	**35.56**	0.50
1999	32.56	32.42	0.14	1.12	NA	0.00	NE	0.06	NO	**33.74**	0.49
2000	30.27	30.12	0.15	1.09	NA	0.00	NE	0.06	NO	**31.41**	0.53
2001	31.75	31.59	0.16	1.21	NA	0.00	NE	0.06	NO	**33.02**	0.52
2002	30.65	30.51	0.14	1.21	NA	0.00	NE	0.06	NO	**31.92**	0.48
2003	31.36	31.21	0.15	1.21	NA	0.00	NE	0.06	NO	**32.63**	0.41
2004	25.98	25.84	0.14	1.22	NA	0.00	NE	0.06	NO	**27.26**	0.49
2005	25.13	25.00	0.13	1.22	NA	0.00	NE	0.06	NO	**26.41**	0.55

Table A.I-2: NO_x [Gg] 1990–2005

	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
1990	200.09	200.09	IE	4.80	NA	6.09	NE	0.10	NO	**211.07**	2.77
1991	211.45	211.45	IE	4.48	NA	6.32	NE	0.09	NO	**222.34**	3.12
1992	198.87	198.87	IE	4.55	NA	5.96	NE	0.06	NO	**209.44**	3.40
1993	194.58	194.58	IE	1.98	NA	5.72	NE	0.05	NO	**202.33**	3.61
1994	186.26	186.26	IE	1.92	NA	6.13	NE	0.04	NO	**194.36**	3.77
1995	184.38	184.38	IE	1.46	NA	6.19	NE	0.05	NO	**192.07**	4.23
1996	204.77	204.77	IE	1.42	NA	5.86	NE	0.05	NO	**212.10**	4.66
1997	191.86	191.86	IE	1.50	NA	5.92	NE	0.05	NO	**199.32**	4.85
1998	204.55	204.55	IE	1.46	NA	5.92	NE	0.05	NO	**211.98**	5.01
1999	192.58	192.58	IE	1.44	NA	5.76	NE	0.05	NO	**199.83**	4.92
2000	197.62	197.62	IE	1.54	NA	5.61	NE	0.05	NO	**204.82**	5.36
2001	206.59	206.59	IE	1.57	NA	5.57	NE	0.05	NO	**213.78**	5.21
2002	212.71	212.71	IE	1.63	NA	5.51	NE	0.05	NO	**219.90**	4.88
2003	222.48	222.48	IE	1.34	NA	5.41	NE	0.05	NO	**229.28**	4.17
2004	218.04	218.04	IE	1.28	NA	5.26	NE	0.05	NO	**224.63**	4.90
2005	218.50	218.50	IE	1.29	NA	5.22	NE	0.05	NO	**225.06**	5.53

Table A.I-3: NMVOC [Gg] 1990–2005

	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
1990	154.68	142.47	12.22	11.10	116.95	1.85	NE	0.16	NO	**284.74**	0.31
1991	157.33	144.16	13.16	12.58	100.08	1.84	NE	0.16	NO	**271.99**	0.35
1992	145.16	132.04	13.12	13.78	82.33	1.78	NE	0.15	NO	**243.21**	0.38
1993	139.41	126.55	12.86	15.05	82.43	1.75	NE	0.15	NO	**238.79**	0.41
1994	127.44	117.19	10.26	13.57	77.06	1.81	NE	0.14	NO	**220.02**	0.44
1995	122.55	113.73	8.83	11.95	81.75	1.82	NE	0.13	NO	**218.19**	0.48
1996	121.14	113.24	7.90	10.37	78.07	1.80	NE	0.12	NO	**211.50**	0.57
1997	103.37	96.01	7.37	9.06	82.93	1.88	NE	0.12	NO	**197.37**	0.63
1998	97.50	91.65	5.85	7.71	75.54	1.84	NE	0.11	NO	**182.71**	0.69
1999	92.48	87.35	5.13	6.04	69.96	1.88	NE	0.11	NO	**170.47**	0.67
2000	85.00	79.83	5.16	4.96	77.74	1.78	NE	0.10	NO	**169.58**	0.70
2001	83.44	80.13	3.31	4.38	82.63	1.86	NE	0.10	NO	**172.40**	0.68
2002	79.20	75.73	3.47	4.57	80.95	1.85	NE	0.10	NO	**166.68**	0.64
2003	77.35	73.91	3.44	4.26	79.27	1.73	NE	0.10	NO	**162.71**	0.54
2004	73.29	70.02	3.27	4.40	77.59	1.97	NE	0.09	NO	**157.34**	0.64
2005	72.01	68.92	3.09	4.40	75.77	1.87	NE	0.09	NO	**154.14**	0.72

Table A.I-4: NH_3 [Gg] 1990–2005

	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
1990	2.04	2.04	IE	0.27	NA	66.12	NE	0.38	NO	**68.81**	0.00
1991	2.50	2.50	IE	0.51	NA	66.78	NE	0.39	NO	**70.19**	0.00
1992	2.69	2.69	IE	0.37	NA	64.40	NE	0.45	NO	**67.91**	0.00
1993	2.96	2.96	IE	0.22	NA	64.34	NE	0.54	NO	**68.06**	0.00
1994	3.04	3.04	IE	0.17	NA	65.27	NE	0.62	NO	**69.10**	0.00
1995	3.08	3.08	IE	0.10	NA	66.86	NE	0.64	NO	**70.68**	0.00
1996	3.10	3.10	IE	0.10	NA	65.08	NE	0.67	NO	**68.94**	0.00
1997	2.99	2.99	IE	0.10	NA	65.35	NE	0.65	NO	**69.10**	0.00
1998	3.03	3.03	IE	0.10	NA	65.40	NE	0.67	NO	**69.20**	0.00
1999	2.93	2.93	IE	0.12	NA	64.15	NE	0.71	NO	**67.90**	0.00
2000	2.73	2.73	IE	0.10	NA	62.68	NE	0.73	NO	**66.24**	0.00
2001	2.79	2.79	IE	0.08	NA	62.47	NE	0.74	NO	**66.09**	0.00
2002	2.74	2.74	IE	0.06	NA	61.38	NE	0.76	NO	**64.95**	0.00
2003	2.76	2.76	IE	0.08	NA	61.19	NE	0.87	NO	**64.90**	0.00
2004	2.58	2.58	IE	0.06	NA	60.72	NE	0.80	NO	**64.16**	0.00
2005	2.49	2.49	IE	0.07	NA	60.39	NE	0.99	NO	**63.94**	0.00

ANNEX II: EMISSIONS ACCORDING TO NEC DIRECTIVE

In following table Austria's emissions 1990-2005 according to Directive 2001/81/EC are listed. NEC emissions are reported on the basis of fuel used (without ‘tank tourism’).

Table A.II-1: Austria’s NEC Emissions [Gg] 1990–2005

Austria`s NEC emissions without ‘tank tourism’				
	SO_2	**NO_x**	**NMVOC**	**NH_3**
	[Gg]	[Gg]	[Gg]	[Gg]
1990	74.77	220.84	285.02	68.81
1991	71.38	217.23	269.00	70.08
1992	54.96	208.13	242.06	67.85
1993	53.20	199.70	238.42	68.04
1994	47.60	195.86	220.52	69.14
1995	46.64	189.72	218.60	70.73
1996	44.17	186.71	211.15	69.05
1997	40.16	189.06	197.97	69.23
1998	35.06	182.43	181.41	69.21
1999	33.41	178.98	170.02	67.98
2000	30.96	172.70	168.45	66.27
2001	32.43	172.16	170.35	66.03
2002	31.25	168.52	163.36	64.73
2003	31.87	168.11	158.60	64.61
2004	27.20	162.04	153.18	63.86
2005	26.35	159.17	149.85	63.65