

6.1.5 Manufacturing Industries and Construction (1.A.2)

The changes in this category mainly result from the revisions of the energy balance. The largest recalculations for the year 2015 took place for category 1.A.2.g.7 with higher NO_x emissions (+0.8 kt), lower NMVOC emissions (-0.39 kt) and lower PM_{2.5} emissions (-0.05 kt), and for category 1.A.2.g.8 with higher NO_x emissions (+0.69 kt), higher SO₂ emissions (+0.1 kt), and higher PM_{2.5} emissions (+0.12 kt)

6.1.6 Households, Institutional/Commercial and Agriculture sector (1.A.4.a.i, 1.A.4.b.i and 1.A.4.c.i)

The following table (Table 7) shows recalculations totals for categories 1.A.4.a.i, 1.A.4.b.i and 1.A.4.c.i for selected years.

Table 7: Recalculation totals for categories 1.A.4.a.i, 1.A.4.b.i and 1.A.4.c.i.

Recalculations (kt)	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015
1A4ai NO _x	-0.27	-0.09	-0.06	0.71	0.53	0.48	0.22	0.23	0.11	0.27
1A4ai SO ₂	-0.29	-0.15	-0.10	0.12	0.01	0.02	0.03	0.02	-0.02	-0.09
1A4ai NMVOC	0.67	0.52	-0.68	0.14	0.66	0.46	0.65	0.67	0.55	1.02
1A4ai PM _{2.5}	0.08	0.08	0.05	0.14	0.14	0.10	0.12	0.12	0.11	0.20
1A4bi NO _x	1.84	2.11	0.51	0.66	1.05	1.08	1.35	1.29	1.30	1.13
1A4bi SO ₂	0.01	0.01	0.53	-0.14	0.05	0.08	0.13	0.07	0.06	-0.05
1A4bi NMVOC	-16.68	-13.72	-2.95	-0.36	1.21	1.60	1.77	1.94	2.14	1.59
1A4bi PM _{2.5}	1.22	1.38	1.30	1.71	1.73	1.63	1.69	1.76	1.48	1.42
1A4ci NO _x	0.03	0.04	-0.06	-0.31	-0.20	-0.16	-0.11	-0.26	-0.22	-0.29
1A4ci SO ₂	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.02	-0.01	-0.02
1A4ci NMVOC	1.54	1.56	-0.33	-0.20	0.44	0.48	0.94	0.94	0.68	0.57
1A4ci PM _{2.5}	0.12	0.10	0.07	-0.01	0.06	0.06	0.13	0.09	0.06	0.03

Emission calculations for 1.A.4.a.i, 1.A.4.b.i and 1.A.4.c.i are now calculated on the basis of a new energy demand model for space heating. The model considers more detailed technologies (boilers, stoves) and provides an improved time series consistency.

Emissions from industrial waste incineration for the years 1990 to 2000 have been shifted from category 1.A.4.a.i to category 1.A.1.a in order to increase time series consistency of those sectors. The shift results in lower NO_x emissions (-0.23 kt) and lower SO₂ emissions (-0.29 kt) for the year 1990.

6.1.7 Aviation (1.A.3.a)

An update of the aviation emission model for calculating emissions of 2016 has been performed which includes the newest EMEP/EEA 2016 (Annex 5) emission factors. Flight movement data and the calculation of distances between airports have been improved.

As a recalculation of the whole time series (1990-2015) with the updated emission model is not possible due to a lack of detailed data (which are needed from now on) and budgetary resources, the result for 2016 cannot be compared with the result for 2015 in the submission for 2017. An application of the updated emission model to all inventory years, or a calibration to ensure a consistent time series is planned for the next submission in 2019.

6.1.8 Road Transport (1.A.3.b)

In road transport several improvements have been implemented. The most important are:

- Update of NO_x emission factors for diesel passenger cars (PC) in the model NEMO according to the latest HBEFA Version V3.3 (March 2017).

The latest measurements of EURO 4, 5 and 6a/b for diesel PC have shown higher real-drive NO_x emissions compared to the previous version. These findings were implemented in HBEFA V3.3 including the effect of different ambient temperatures on the behaviour of exhaust gas after-treatment systems.

NO _x	NEMO HBEFA3.2	NEMO HBEFA3.3
PRE ECE	1,01	1,01
ECE15/01	1,01	1,01
ECE15/02	1,01	1,01
ECE15/03	1,01	1,01
ECE15/04	1,01	1,01
US 83	0,75	0,75
Gesetz A	0,77	0,77
EURO 2	0,82	0,82
EURO 3	0,86	0,86
EURO 4	0,57	0,64
EU4+DPF	0,57	0,64
EURO 5	0,69	0,85
EURO 6a/b	0,27	0,50
EURO 6d temp	0,14	0,17
EURO 6d	-	0,11

Table 8:
Comparison of NO_x emission factors
for diesel PC of HBEFA v3.2 and v3.3

As the first EURO 4 diesel PC entered the fleet in the model NEMO in the year 2004, higher NO_x emissions can be seen for PC (excluding fuel exports) from the year 2004 onwards. This effect cannot be seen when looking at the total NO_x emissions from PC including fuel exports. Up to 2010, NO_x emissions from PC which include fuel exports are lower for the whole time series compared to the last submission. This can be explained by this year's higher estimated fuel consumption by PC in Austria (excl. fuel exports) caused by:

- Refined calibration of specific CO₂ emissions from newly registered PCs and LDVs for all years, taking into account the special characteristics of the fuels used in the type approval process.

In the model NEMO this revision leads to a shift between fuel consumption in Austria and fuel exports. In total, fuel consumption by PC is lower until 2009 and shows a strong upward trend for the years after 2010, which can be explained by another improvement compared to last year's submission:

- Increase in the specific yearly mileage for diesel PC from 2010 onwards.

The upward revision of NO_x emissions from PC from 2010 onwards shows the same development as fuel consumption and is reinforced by the higher NO_x emission factors for diesel PC from EURO 4 onwards.

The changes in the NO_x emissions from HDV are caused by shifts between fuel consumption in Austria and fuel exports. In the newest NEMO version (4.0.3 from Dec. 2017) activity data for inland road transport has been increased due to new findings for the yearly mileage for passenger cars and mopeds and higher specific CO₂ emissions from newly registered cars. In the emission model, higher fuel consumption in Austria leads to lower fuel export activities. Because of the specific fleet composition for fuel exports (mainly HDV EURO 6), the decrease can be fully observed in category 1A3b3.

Further improvements:

- Calculation of PM_{2.5} emissions for 1A3b4 (mopeds and motorcycles) based on the Tier 2 methodology and emission factors according to the EMEP/EEA Guidebook 2016.
- Separate calculation of PM_{2.5} emissions for 1.A.3.b.6 (tyre and brake ware) and 1.A.3.b.v.7 (road wear). According to the EMEP/EEA Guidebook 2016, road resuspension is no longer reported under 1.A.3.b.6 or 1.A.3.b.7.
- Separate calculation of the different evaporation emissions (diurnal, running losses and hot soak emissions).
- For the year 2015 there are marginal changes in emissions, caused by downward revisions of the levels for liquefied petroleum gas (LPG) in the national energy balance.

For 2015, the mentioned improvements lead to the following overall changes in emissions for 1.A.3 Transport (excluding fuel exports): +7.3 kt NO_x, +1.2 kt NMVOC, -0.2 kt NH₃. (Changes in emissions for 1A3 Transport including fuel exports: +6.6 kt NO_x, +1.6 kt NMVOC, -0.07 kt NH₃, +0.3 kt PM_{2.5}.)

6.1.9 Rail transport (1.A.3.c)

Changes in emissions for the year 2015 are caused by revised levels for diesel consumption in the national energy balance. Recalculations for the whole time series can be explained by a transcription error in the overview table of the emission model showing the results per sector, which was resolved in this submission. The main emission changes for 2015 are: -0.1 kt NO_x, -0.01 kt SO₂, -0.01 kt NMVOC, -0.01 kt PM_{2.5}.

6.1.10 NRMM for Industry (1.A.3.g.7) and Agriculture (1.A.4.c.2)

Emission factors for NO_x and PM_{2.5} in the model GEORG have been updated for non-road mobile machinery (NRMM) in industry and agriculture of the emission standards (stages) IIIA, IIIB and IV. The update is based on new emission measurements commissioned by the Federal Ministry of Sustainability and Tourism (the former Federal Ministry of Agriculture, Forestry, Environment and Water Management).

NO_x emission factors for stage IIIA, IIIB and IV have been increased considerably and are now way above the limit values. Measurements showed that NO_x emission levels of stage IIIA machinery were consistently above those of stage II machinery. Only stage IIIB shows lower emissions compared to stage II.

For 2015 the mentioned improvements lead to the following overall changes in emissions:

- 1.A.2.g.7 Mobile Combustion in Manufacturing Industries and Construction: +0.8 kt NO_x, -0.4 kt NMVOC, -0.05 kt PM_{2.5}.
- 1.A.4.c.2 Mobile Combustion in Manufacturing Industries and Construction: +1.03 kt NO_x, -0.6 kt NMVOC, -0.05 kt PM_{2.5}.

6.1.11 Coal mining and handling (1.B.1.a)

Recalculations of PM_{2.5} emissions for the years 2005 (-0.001 kt), 2006 (-0.001 kt), 2007 (-0.001 kt), 2008 (-0.0001 kt), 2014 (-0.0004 kt) and 2015 (-0.0003 kt) follow the revisions of the energy balance.

6.1.12 Distribution of oil products (1.B.2.a.5)

NMVOC emissions from this source were revised for 2015 to correct a transcription error (-0.03 kt NMVOC)

6.2 INDUSTRIAL PROCESSES (2)

6.2.1 Update of activity data

6.2.1.1 Iron and Steel Production (2.C.1)

Due to an update of the activity data for one cast iron facility in 2015, SO₂ and NMVOC emissions for 2015 have been revised.

6.2.1.2 Non Energy Products from Fuel and Solvent Use (2.D)

Due to a transcription error, activity data and emission data for 2015 had to be updated, which led to an increase of 0.21 kt of NMVOC for '2.D.3.a Domestic solvent use including fungicides' and '2.D.3.g Chemical products'

6.2.2 Methodological changes

6.2.2.1 Other Production (2.H)

NMVOC emissions from chipboard production had been double counted. These emissions were reported under 2.H and in 2.D. In order to avoid any further double counting, these emissions are now reported only under 2.D.

6.2.2.2 Chemical Industry (2.B.10)

Calculations of NMVOC emissions have been revised, now only emissions on facility level are used. Emissions from smaller plants are included in the solvents model and reported under 2.D.

6.2.2.3 Non-ferrous metals industries (2.C.7)

Calculations of non-ferrous metals have been improved, based on available facility data and the 2016 guidelines. PM emissions occurring in secondary copper, aluminum and lead production have been included in this year's submission. Emissions occurring during secondary copper production were previously partly reported in the energy sector.

6.2.2.4 Other product use (2.G)

New emission factors became available with the EMEP Guidebook 2016 and were applied to emissions from Tobacco Smoking and Fireworks. The amount of tobacco smoked is based on two statistical surveys on smoking carried out by Statistik Austria in the years 2014 and 2006/7. Additional data was taken from the OECD health statistics 2017 for 1997 and 1986, and data on the number of smokers in relation to the total population was interpolated. The number of cigarettes smoked per smoker was taken from the Austrian surveys on smokers, and the number of cigarettes smoked per capita was extra/interpolated from 2006/7 and 2014 data. According to the 2016 EMEP guidebook, the amount of tobacco per cigarette smoked was assumed to be 1g.

As for fireworks, the amount of fireworks in kg was taken from statistics. The amount placed on the market in Austria was calculated in the following way: 'import – export + production'.

6.3 AGRICULTURE (3)

6.3.1 Update of activity data

Milk yield data (3.B, 3.D)

Milk yield data on dairy cows for the years 1991-1993 and 2001 was updated on the basis of official data from the Ministry of Agriculture (BMLFUW 2017). The revision resulted in slightly higher emissions for the years 1991-1993 and slightly lower emissions for 2001.

Detailed raw material and energy balances (3.D.a.2.a, 3.D.a.2.c)

In 2017 new information on input materials for Austria's biogas plants became available (raw material balances for 2014 and 2015). The updated data were taken from (E-Control 2017) and resulted in revised amounts of digested manure and energy crops for 2012-2015 (the latest available raw material balance used in the previous inventory was for 2011).

Urea consumption (3.D.a.1)

The amount of urea consumption for 2015 was revised, which resulted in higher NH₃ emissions for the respective year (244 t).

Cropland and grassland (3.D.e)

The cropland and grassland areas for the years 2014 and 2015 were revised according to the results of the farm structure survey 2016.

6.3.2 Methodological changes

6.3.2.1 Agricultural Soils (3.D) – NMVOC

Cultivated Crops (3.D.e)

In previous submissions NMVOC emissions from cropland had been calculated by applying the EMEP/EEA 2016 default NMVOC EF of wheat for the total cropland area. As recommended in the NEC Review 2017, estimates have now been provided for all relevant crop type areas for which EFs are available in the 2016 EMEP/EEA Guidebook (Table 3.3). For the remaining cropland area an average of the highest and lowest EF (wheat and oilseed rape) was applied. The revision resulted in increased emissions (+563 t of NMVOC in 2015).

6.3.2.2 Agricultural Soils (3.D) – Particulate matter (TSP, PM₁₀, PM_{2.5})

Farm-level agricultural operations including storage, handling and transport of agricultural products (3.D.c)

In previous submissions, PM emissions from field operations had been calculated following a country-specific methodology. As recommended in the NEC Review 2017, Austria has revised its methodology by applying the Tier 1 approach according to the 2016 EMEP/EEA Guidebook. The revision has resulted in lower PM emissions for the whole time series (-836 t of PM_{2.5}). As recommended in the NEC Review 2017, emissions were reallocated from the NFR category 3.D.a.1 Inorganic N fertilisers to the NFR category 3.D.c Farm-level agricultural operations.

6.3.3 Additional data sources

6.3.3.1 Manure management (3.B) – NMVOC

Following a recommendation of the NEC Review 2017, Austria has included NMVOC emissions from sector 3.B Manure Management in its inventory submission for the first time. Estimates are based on the Tier 1 methodology according to the 2016 EMEP/EEA Guidebook. NMVOC emissions for 2015 amount to about 22 kt.

6.4 WASTE (5)

6.4.1 Update of activity data

6.4.1.1 Wastewater Treatment and Discharge (5.D)

During the NEC review in 2017, the ERT recommended excluding activity data from individual septic tanks, and taking into account only wastewater handled in centralised wastewater treatment plants. The used default emission factor applies only to wastewater handled in centralised wastewater treatment plants. NMVOC is only emitted in very small quantities from individual septic tanks, so the emission factor is much smaller.

This resulted in recalculations for NMVOC for the whole time series, with a decrease in emissions from 1990 to 2016 as the use of septic tanks has been steadily decreasing. According to the recalculation, the decrease for 2015 amounts to -0.02 t of NMVOC.

6.4.1.2 Other waste (5.E)

During the stage 3 CLRTAP review, Austria was encouraged to report on car fires and building fires and to use the default emission factors. Activity data have been collected from fire statistics. PM_{2.5} emissions are now reported for 1990-2016.

ANNEX 1: AUSTRIA'S EMISSIONS BASED ON FUEL USED (WITHOUT 'FUEL EXPORTS')

Notation keys:

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.

The complete tables in the NFR format are submitted separately in digital form only (excel files).

Table A.I-1: SO₂ emissions [Kilotonnes] 1990–2016 based on fuel used

	NFR Sectors							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	71.00	69.00	2.00	1.93	0.00	0.07	NO	73.01	0.26
1991	68.18	66.88	1.30	1.61	0.00	0.06	NO	69.85	0.29
1992	51.91	49.91	2.00	1.36	0.00	0.04	NO	53.32	0.31
1993	50.55	48.45	2.10	1.11	0.00	0.04	NO	51.70	0.33
1994	44.99	43.71	1.28	1.12	0.00	0.05	NO	46.16	0.34
1995	44.78	43.25	1.53	1.07	0.00	0.05	NO	45.90	0.38
1996	42.30	41.10	1.20	0.99	0.00	0.05	NO	43.34	0.43
1997	38.80	38.73	0.07	0.96	0.00	0.05	NO	39.82	0.44
1998	34.05	34.01	0.04	0.87	0.00	0.05	NO	34.98	0.46
1999	32.38	32.34	0.04	0.81	0.00	0.06	NO	33.26	0.45
2000	30.24	30.20	0.04	0.78	0.00	0.06	NO	31.08	0.48
2001	31.11	31.07	0.05	0.71	0.00	0.06	NO	31.88	0.47
2002	30.09	30.05	0.04	0.71	0.00	0.06	NO	30.86	0.43
2003	29.93	29.88	0.05	0.71	0.00	0.06	NO	30.70	0.40
2004	26.17	26.12	0.04	0.72	0.01	0.06	NO	26.95	0.47
2005	24.81	24.77	0.04	0.72	0.00	0.06	NO	25.59	0.55
2006	25.57	25.52	0.05	0.73	0.00	0.05	NO	26.35	0.58
2007	22.19	22.14	0.05	0.75	0.00	0.04	NO	22.98	0.61
2008	19.41	19.37	0.04	0.78	0.00	0.03	NO	20.22	0.61
2009	13.89	13.83	0.06	0.70	0.00	0.02	NO	14.61	0.53
2010	15.56	15.51	0.05	0.70	0.00	0.01	NO	16.28	0.57
2011	14.62	14.58	0.05	0.68	0.00	0.01	NO	15.31	0.60
2012	14.41	14.37	0.05	0.65	0.00	0.01	NO	15.07	0.57
2013	14.50	14.46	0.04	0.59	0.00	0.01	NO	15.10	0.54
2014	14.28	14.24	0.04	0.55	0.00	0.01	NO	14.84	0.54
2015	14.05	14.01	0.04	0.57	0.00	0.01	NO	14.62	0.58
2016	13.23	13.20	0.02	0.57	0.00	0.01	NO	13.81	0.54

Table A.I-2: NO_x emissions [Kilotonnes] 1990–2016 based on fuel used

	NFR Sectors							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	187.96	187.96	IE	4.82	11.89	0.10	NO	204.77	2.44
1991	188.67	188.67	IE	4.50	12.78	0.09	NO	206.04	2.76
1992	179.12	179.12	IE	4.57	11.62	0.06	NO	195.37	3.00
1993	173.06	173.06	IE	2.00	10.59	0.05	NO	185.70	3.18
1994	168.82	168.82	IE	1.94	12.33	0.05	NO	183.14	3.31
1995	168.02	168.02	IE	1.48	12.54	0.05	NO	182.08	3.73
1996	168.20	168.20	IE	1.44	11.40	0.05	NO	181.09	4.14
1997	168.54	168.54	IE	1.52	11.46	0.05	NO	181.57	4.29
1998	166.37	166.37	IE	1.48	11.52	0.05	NO	179.41	4.43
1999	166.11	166.11	IE	1.46	11.16	0.05	NO	178.79	4.33
2000	165.13	165.13	IE	1.56	10.97	0.05	NO	177.71	6.44
2001	167.35	167.35	IE	1.59	10.93	0.05	NO	179.92	6.32
2002	164.93	164.93	IE	1.65	10.95	0.05	NO	177.59	5.67
2003	167.37	167.37	IE	1.36	10.48	0.05	NO	179.25	5.21
2004	166.47	166.47	IE	1.29	9.93	0.05	NO	177.75	6.09
2005	167.85	167.85	IE	1.77	9.99	0.05	NO	179.66	6.99
2006	166.90	166.90	IE	1.84	10.05	0.04	NO	178.83	7.54
2007	161.40	161.40	IE	1.73	10.22	0.04	NO	173.38	7.99
2008	154.68	154.68	IE	1.93	10.82	0.03	NO	167.46	7.90
2009	141.65	141.65	IE	1.56	10.61	0.02	NO	153.84	6.86
2010	142.42	142.42	IE	1.83	9.71	0.02	NO	153.98	7.60
2011	140.79	140.79	IE	1.84	10.23	0.02	NO	152.88	7.98
2012	137.22	137.22	IE	1.64	10.35	0.02	NO	149.23	7.68
2013	136.26	136.26	IE	1.47	10.27	0.02	NO	148.01	7.46
2014	130.90	130.90	IE	1.52	10.58	0.02	NO	143.02	7.49
2015	129.85	129.85	IE	1.74	10.96	0.02	NO	142.56	8.18
2016	126.68	126.68	IE	1.69	11.19	0.02	NO	139.57	10.29

Table A.I-3: NMVOC emissions [Kilotonnes] 1990–2016 based on fuel used

	NFR Sectors							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	152.19	136.70	15.49	118.50	31.20	0.16	NO	302.05	0.18
1991	146.83	131.72	15.12	111.97	30.82	0.16	NO	289.78	0.20
1992	135.25	120.06	15.19	105.21	29.59	0.15	NO	270.20	0.22
1993	125.42	110.76	14.65	98.51	29.28	0.15	NO	253.36	0.24
1994	112.52	101.40	11.12	91.94	29.03	0.14	NO	233.64	0.25
1995	105.70	96.21	9.49	85.24	28.13	0.14	NO	219.20	0.29
1996	101.61	93.15	8.46	83.68	27.53	0.13	NO	212.95	0.34
1997	92.67	84.72	7.95	82.34	27.48	0.13	NO	202.62	0.37
1998	85.11	78.68	6.43	81.02	27.30	0.13	NO	193.56	0.40
1999	80.59	74.91	5.67	78.27	26.65	0.12	NO	185.63	0.39
2000	74.74	69.05	5.69	75.47	25.65	0.12	NO	175.98	0.42
2001	71.42	67.59	3.84	74.98	25.40	0.11	NO	171.92	0.41
2002	66.69	62.66	4.03	74.86	24.90	0.11	NO	166.56	0.37
2003	64.38	60.43	3.96	74.68	24.55	0.11	NO	163.72	0.34
2004	60.75	57.18	3.57	73.77	24.37	0.11	NO	159.00	0.40
2005	58.92	55.58	3.34	72.80	24.11	0.11	NO	155.94	0.47
2006	55.79	52.43	3.36	71.84	24.01	0.10	NO	151.74	0.50
2007	52.23	49.25	2.98	70.84	24.09	0.10	NO	147.26	0.53
2008	51.33	48.57	2.75	69.81	23.99	0.10	NO	145.23	0.52
2009	48.04	45.45	2.59	68.90	24.27	0.09	NO	141.30	0.45
2010	49.77	47.31	2.45	67.99	24.21	0.09	NO	142.06	0.49
2011	46.57	44.16	2.41	67.54	23.89	0.08	NO	138.08	0.51
2012	47.51	45.11	2.40	66.93	23.74	0.08	NO	138.26	0.49
2013	49.10	46.79	2.30	66.96	23.81	0.07	NO	139.93	0.46
2014	42.98	40.56	2.42	67.56	23.87	0.07	NO	134.48	0.46
2015	44.87	42.55	2.32	68.12	23.81	0.07	NO	136.86	0.50
2016	44.19	41.91	2.27	68.70	23.78	0.06	NO	136.74	0.23

Table A.I-4: NH₃ emissions [Kilotonnes] 1990–2016 based on fuel used

	NFR Sectors							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	2.24	2.24	IE	0.32	63.23	0.36	NO	66.14	0.00
1991	2.71	2.71	IE	0.55	63.93	0.37	NO	67.56	0.00
1992	3.04	3.04	IE	0.42	61.96	0.42	NO	65.83	0.00
1993	3.41	3.41	IE	0.27	62.64	0.50	NO	66.81	0.00
1994	3.65	3.65	IE	0.21	63.76	0.57	NO	68.20	0.00
1995	3.84	3.84	IE	0.14	64.96	0.58	NO	69.53	0.00
1996	4.10	4.10	IE	0.14	63.42	0.60	NO	68.27	0.00
1997	4.18	4.18	IE	0.15	63.82	0.59	NO	68.73	0.00
1998	4.29	4.29	IE	0.15	64.03	0.60	NO	69.07	0.00
1999	4.42	4.42	IE	0.16	62.55	0.64	NO	67.77	0.00
2000	4.32	4.32	IE	0.14	61.23	0.67	NO	66.35	0.00
2001	4.25	4.25	IE	0.12	61.25	0.75	NO	66.37	0.00
2002	3.94	3.94	IE	0.10	60.50	0.82	NO	65.37	0.00
2003	3.75	3.75	IE	0.12	60.30	0.89	NO	65.06	0.00
2004	3.52	3.52	IE	0.10	59.90	1.12	NO	64.65	0.00
2005	3.39	3.39	IE	0.11	60.02	1.21	NO	64.74	0.00
2006	3.25	3.25	IE	0.12	60.44	1.22	NO	65.03	0.00
2007	3.13	3.13	IE	0.12	61.83	1.24	NO	66.32	0.00
2008	3.03	3.03	IE	0.12	61.69	1.22	NO	66.06	0.00
2009	2.85	2.85	IE	0.13	62.98	1.20	NO	67.16	0.00
2010	2.88	2.88	IE	0.13	62.25	1.22	NO	66.48	0.00
2011	2.74	2.74	IE	0.14	61.86	1.23	NO	65.97	0.00
2012	2.68	2.68	IE	0.14	62.06	1.23	NO	66.11	0.00
2013	2.67	2.67	IE	0.14	62.08	1.16	NO	66.05	0.00
2014	2.47	2.47	IE	0.13	62.70	1.20	NO	66.50	0.00
2015	2.53	2.53	IE	0.12	63.12	1.22	NO	66.99	0.00
2016	2.46	2.46	IE	0.13	63.79	1.26	NO	67.64	0.00

Table A.I-5: PM_{2.5} emissions [Kilotonnes] 1990–2016 based on fuel used

	NFR Sectors							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	21.39	21.29	0.11	3.68	0.40	0.26	NO	25.74	0.28
1995	21.10	21.01	0.09	3.03	0.40	0.27	NO	24.79	0.42
2000	20.34	20.25	0.09	2.81	0.37	0.26	NO	23.77	0.52
2001	20.51	20.42	0.09	2.71	0.38	0.26	NO	23.86	0.51
2002	19.75	19.65	0.10	2.33	0.37	0.27	NO	22.72	0.46
2003	19.45	19.34	0.10	2.29	0.37	0.27	NO	22.37	0.43
2004	19.02	18.93	0.09	2.26	0.42	0.28	NO	21.97	0.51
2005	18.98	18.89	0.09	2.20	0.37	0.27	NO	21.83	0.59
2006	18.75	18.66	0.09	1.96	0.36	0.28	NO	21.34	0.63
2007	17.99	17.91	0.08	1.76	0.36	0.29	NO	20.40	0.66
2008	17.60	17.52	0.08	1.87	0.36	0.28	NO	20.10	0.66
2009	16.48	16.43	0.06	1.73	0.35	0.28	NO	18.84	0.57
2010	17.22	17.15	0.07	1.73	0.35	0.29	NO	19.59	0.62
2011	16.56	16.49	0.07	1.80	0.33	0.29	NO	18.98	0.65
2012	16.57	16.50	0.07	1.74	0.32	0.30	NO	18.92	0.62
2013	17.03	16.97	0.07	1.73	0.31	0.30	NO	19.37	0.59
2014	14.95	14.89	0.06	1.74	0.32	0.32	NO	17.33	0.59
2015	15.31	15.25	0.07	1.66	0.31	0.33	NO	17.61	0.63
2016	15.02	14.96	0.06	1.68	0.31	0.33	NO	17.34	0.70

ANNEX 2: AUSTRIA'S EMISSIONS BASED ON FUEL SOLD (WITH 'FUEL EXPORTS')

Notation keys:

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.II-1: SO₂ emissions [Kilotonnes] 1990–2016 based on fuel sold

	NFR							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	71.89	69.89	2.00	1.93	0.00	0.07	NO	73.90	0.26
1991	69.33	68.03	1.30	1.61	0.00	0.06	NO	71.00	0.29
1992	53.08	51.08	2.00	1.36	0.00	0.04	NO	54.48	0.31
1993	51.85	49.75	2.10	1.11	0.00	0.04	NO	53.00	0.33
1994	46.20	44.92	1.28	1.12	0.00	0.05	NO	47.37	0.34
1995	45.89	44.36	1.53	1.07	0.00	0.05	NO	47.01	0.38
1996	43.10	41.90	1.20	0.99	0.00	0.05	NO	44.15	0.43
1997	39.29	39.22	0.07	0.96	0.00	0.05	NO	40.30	0.44
1998	34.77	34.73	0.04	0.87	0.00	0.05	NO	35.70	0.46
1999	32.91	32.87	0.04	0.81	0.00	0.06	NO	33.79	0.45
2000	30.84	30.80	0.04	0.78	0.00	0.06	NO	31.68	0.48
2001	31.82	31.77	0.05	0.71	0.00	0.06	NO	32.59	0.47
2002	30.85	30.80	0.04	0.71	0.00	0.06	NO	31.62	0.43
2003	30.74	30.70	0.05	0.71	0.00	0.06	NO	31.51	0.40
2004	26.23	26.18	0.04	0.72	0.01	0.06	NO	27.01	0.47
2005	24.86	24.82	0.04	0.72	0.00	0.06	NO	25.65	0.55
2006	25.61	25.56	0.05	0.73	0.00	0.05	NO	26.39	0.58
2007	22.23	22.18	0.05	0.75	0.00	0.04	NO	23.02	0.61
2008	19.44	19.40	0.04	0.78	0.00	0.03	NO	20.25	0.61
2009	13.92	13.87	0.06	0.70	0.00	0.02	NO	14.64	0.53
2010	15.60	15.55	0.05	0.70	0.00	0.01	NO	16.31	0.57
2011	14.65	14.61	0.05	0.68	0.00	0.01	NO	15.34	0.60
2012	14.44	14.40	0.05	0.65	0.00	0.01	NO	15.10	0.57
2013	14.54	14.50	0.04	0.59	0.00	0.01	NO	15.13	0.54
2014	14.31	14.27	0.04	0.55	0.00	0.01	NO	14.87	0.54
2015	14.08	14.04	0.04	0.57	0.00	0.01	NO	14.65	0.58
2016	13.26	13.24	0.02	0.57	0.00	0.01	NO	13.84	0.54

Table A.II-2: NO_x emissions [Kilotonnes] 1990–2016 based on fuel sold

	NFR							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	203.37	203.37	IE	4.82	11.89	0.10	NO	220.18	2.44
1991	211.61	211.61	IE	4.50	12.78	0.09	NO	228.98	2.76
1992	199.62	199.62	IE	4.57	11.62	0.06	NO	215.87	3.00
1993	194.08	194.08	IE	2.00	10.59	0.05	NO	206.72	3.18
1994	186.75	186.75	IE	1.94	12.33	0.05	NO	201.07	3.31
1995	186.98	186.98	IE	1.48	12.54	0.05	NO	201.04	3.73
1996	205.99	205.99	IE	1.44	11.40	0.05	NO	218.88	4.14
1997	192.67	192.67	IE	1.52	11.46	0.05	NO	205.70	4.29
1998	205.12	205.12	IE	1.48	11.52	0.05	NO	218.17	4.43
1999	196.95	196.95	IE	1.46	11.16	0.05	NO	209.63	4.33
2000	202.68	202.68	IE	1.56	10.97	0.05	NO	215.26	6.44
2001	212.97	212.97	IE	1.59	10.93	0.05	NO	225.55	6.32
2002	218.88	218.88	IE	1.65	10.95	0.05	NO	231.53	5.67
2003	227.93	227.93	IE	1.36	10.48	0.05	NO	239.82	5.21
2004	226.16	226.16	IE	1.29	9.93	0.05	NO	237.43	6.09
2005	227.95	227.95	IE	1.77	9.99	0.05	NO	239.76	6.99
2006	214.48	214.48	IE	1.84	10.05	0.04	NO	226.41	7.54
2007	203.99	203.99	IE	1.73	10.22	0.04	NO	215.98	7.99
2008	187.61	187.61	IE	1.93	10.82	0.03	NO	200.38	7.90
2009	172.69	172.69	IE	1.56	10.61	0.02	NO	184.88	6.86
2010	173.21	173.21	IE	1.83	9.71	0.02	NO	184.77	7.60
2011	164.15	164.15	IE	1.84	10.23	0.02	NO	176.23	7.98
2012	159.08	159.08	IE	1.64	10.35	0.02	NO	171.09	7.68
2013	160.09	160.09	IE	1.47	10.27	0.02	NO	171.84	7.46
2014	149.61	149.61	IE	1.52	10.58	0.02	NO	161.72	7.49
2015	146.47	146.47	IE	1.74	10.96	0.02	NO	159.18	8.18
2016	141.36	141.36	IE	1.69	11.19	0.02	NO	154.26	10.29

Table A.II-3: NMVOC emissions [Kilotonnes] 1990–2016 based on fuel sold

	NFR							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	152.72	137.24	15.49	118.50	31.20	0.16	NO	302.58	0.18
1991	151.95	136.83	15.12	111.97	30.82	0.16	NO	294.90	0.20
1992	137.16	121.97	15.19	105.21	29.59	0.15	NO	272.11	0.22
1993	125.90	111.25	14.65	98.51	29.28	0.15	NO	253.85	0.24
1994	111.62	100.51	11.12	91.94	29.03	0.14	NO	232.74	0.25
1995	104.88	95.39	9.49	85.24	28.13	0.14	NO	218.38	0.29
1996	100.61	92.14	8.46	83.68	27.53	0.13	NO	211.94	0.34
1997	90.90	82.94	7.95	82.34	27.48	0.13	NO	200.84	0.37
1998	85.46	79.03	6.43	81.02	27.30	0.13	NO	193.91	0.40
1999	79.87	74.20	5.67	78.27	26.65	0.12	NO	184.92	0.39
2000	74.57	68.88	5.69	75.47	25.65	0.12	NO	175.81	0.42
2001	72.40	68.57	3.84	74.98	25.40	0.11	NO	172.89	0.41
2002	69.46	65.43	4.03	74.86	24.90	0.11	NO	169.33	0.37
2003	68.16	64.21	3.96	74.68	24.55	0.11	NO	167.50	0.34
2004	64.62	61.05	3.57	73.77	24.37	0.11	NO	162.88	0.40
2005	62.72	59.37	3.34	72.80	24.11	0.11	NO	159.73	0.47
2006	58.74	55.39	3.36	71.84	24.01	0.10	NO	154.70	0.50
2007	54.85	51.87	2.98	70.84	24.09	0.10	NO	149.88	0.53
2008	53.15	50.39	2.75	69.81	23.99	0.10	NO	147.05	0.52
2009	49.70	47.12	2.59	68.90	24.27	0.09	NO	142.97	0.45
2010	51.34	48.89	2.45	67.99	24.21	0.09	NO	143.63	0.49
2011	47.84	45.43	2.41	67.54	23.89	0.08	NO	139.35	0.51
2012	48.66	46.26	2.40	66.93	23.74	0.08	NO	139.40	0.49
2013	50.08	47.77	2.30	66.96	23.81	0.07	NO	140.92	0.46
2014	43.83	41.42	2.42	67.56	23.87	0.07	NO	135.33	0.46
2015	45.75	43.43	2.32	68.12	23.81	0.07	NO	137.75	0.50
2016	45.07	42.79	2.27	68.70	23.78	0.06	NO	137.62	0.23

Table A.II-4: NH₃ emissions [Kilotonnes] 1990–2016 based on fuel sold

	NFR							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	2.24	2.24	IE	0.32	63.23	0.36	NO	66.14	0.00
1991	2.84	2.84	IE	0.55	63.93	0.37	NO	67.70	0.00
1992	3.09	3.09	IE	0.42	61.96	0.42	NO	65.89	0.00
1993	3.40	3.40	IE	0.27	62.64	0.50	NO	66.80	0.00
1994	3.53	3.53	IE	0.21	63.76	0.57	NO	68.08	0.00
1995	3.70	3.70	IE	0.14	64.96	0.58	NO	69.38	0.00
1996	3.81	3.81	IE	0.14	63.42	0.60	NO	67.98	0.00
1997	3.82	3.82	IE	0.15	63.82	0.59	NO	68.37	0.00
1998	4.10	4.10	IE	0.15	64.03	0.60	NO	68.88	0.00
1999	4.07	4.07	IE	0.16	62.55	0.64	NO	67.42	0.00
2000	3.97	3.97	IE	0.14	61.23	0.67	NO	66.01	0.00
2001	4.09	4.09	IE	0.12	61.25	0.75	NO	66.21	0.00
2002	4.16	4.16	IE	0.10	60.50	0.82	NO	65.59	0.00
2003	4.19	4.19	IE	0.12	60.30	0.89	NO	65.50	0.00
2004	4.00	4.00	IE	0.10	59.90	1.12	NO	65.13	0.00
2005	3.87	3.87	IE	0.11	60.02	1.21	NO	65.21	0.00
2006	3.70	3.70	IE	0.12	60.44	1.22	NO	65.47	0.00
2007	3.56	3.56	IE	0.12	61.83	1.24	NO	66.75	0.00
2008	3.32	3.32	IE	0.12	61.69	1.22	NO	66.35	0.00
2009	3.13	3.13	IE	0.13	62.98	1.20	NO	67.45	0.00
2010	3.17	3.17	IE	0.13	62.25	1.22	NO	66.77	0.00
2011	3.00	3.00	IE	0.14	61.86	1.23	NO	66.23	0.00
2012	2.93	2.93	IE	0.14	62.06	1.23	NO	66.36	0.00
2013	2.85	2.85	IE	0.14	62.08	1.16	NO	66.23	0.00
2014	2.65	2.65	IE	0.13	62.70	1.20	NO	66.68	0.00
2015	2.74	2.74	IE	0.12	63.12	1.22	NO	67.20	0.00
2016	2.68	2.68	IE	0.13	63.79	1.26	NO	67.86	0.00

Table A.II-5: PM_{2.5} emissions [Kilotonnes] 1990–2016 based on fuel sold

	NFR							NATIONAL TOTAL	International Bunkers
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER		
1990	21.93	21.82	0.11	3.68	0.40	0.26	NO	26.27	0.28
1995	21.81	21.73	0.09	3.03	0.40	0.27	NO	25.51	0.42
2000	21.18	21.09	0.09	2.81	0.37	0.26	NO	24.62	0.52
2001	21.57	21.48	0.09	2.71	0.38	0.26	NO	24.92	0.51
2002	21.14	21.04	0.10	2.33	0.37	0.27	NO	24.10	0.46
2003	21.06	20.96	0.10	2.29	0.37	0.27	NO	23.99	0.43
2004	20.62	20.53	0.09	2.26	0.42	0.28	NO	23.57	0.51
2005	20.56	20.47	0.09	2.20	0.37	0.27	NO	23.41	0.59
2006	20.02	19.93	0.09	1.96	0.36	0.28	NO	22.61	0.63
2007	19.10	19.02	0.08	1.76	0.36	0.29	NO	21.51	0.66
2008	18.39	18.31	0.08	1.87	0.36	0.28	NO	20.90	0.66
2009	17.20	17.14	0.06	1.73	0.35	0.28	NO	19.56	0.57
2010	17.91	17.84	0.07	1.73	0.35	0.29	NO	20.29	0.62
2011	17.09	17.02	0.07	1.80	0.33	0.29	NO	19.51	0.65
2012	17.04	16.97	0.07	1.74	0.32	0.30	NO	19.39	0.62
2013	17.50	17.43	0.07	1.73	0.31	0.30	NO	19.83	0.59
2014	15.30	15.24	0.06	1.74	0.32	0.32	NO	17.68	0.59
2015	15.61	15.55	0.07	1.66	0.31	0.33	NO	17.91	0.63
2016	15.28	15.22	0.06	1.68	0.31	0.33	NO	17.60	0.70

Umweltbundesamt GmbH

Spittelauer Lände 5
1090 Wien/Österreich

Tel.: +43-(0)1-313 04

Fax: +43-(0)1-313 04/5400

office@umweltbundesamt.at

www.umweltbundesamt.at

The report on Austria's Annual Air Emission Inventory 1990–2016, compiled by the Umweltbundesamt (Environment Agency Austria), provides a summary of Austria's SO₂, NO_x, NH₃, NMVOC and PM_{2.5} emissions for the years 1990 to 2016.

The report includes first information on emission trends and performed recalculations for the years 1990 and 2016. More detailed descriptions will be provided in Austria's Informative Inventory Report (IIR) 2018, which is to be submitted under the NEC Directive on 15 March 2018.

The results of the calculations compiled in the report show that between 2015 and 2016, emissions of sulphur dioxide (SO₂) decreased by 5.6%, nitrogen oxide emissions (NO_x) decreased by 2.1%, non-methane volatile organic compounds (NMVOCs) decreased by 0.1%, ammonia emissions (NH₃) increased by 1.0% and particulate matter (PM_{2.5}) decreased by 1.5%.