

Austria's Inventory

Adjustment Report 2019

Austria's applications for inventory adjustment
pursuant to Article 5 (1) of the NEC Directive 2016/2284
(Addendum to Austria's IIR 2019)



AUSTRIA'S INVENTORY ADJUSTMENT REPORT 2019

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REPORT
REP-0683

Vienna, 2019

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The information covered refers to the following accreditation scope of the IBE: EMEP 2016 (www.bmdw.gv.at/akkreditierung)



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This report is an addendum to “Austria’s Informative Inventory Report 2019”, published as inspection report in accordance with the Accreditation Law and the international standard ISO/IEC 17020, in fulfilment of and in compliance with the EMEP/EEA air pollutant emission inventory guidebook (scope of accreditation regarding air pollutants).

For further information about the publications of the Umweltbundesamt please go to: <http://www.umweltbundesamt.at/>

Imprint

Owner and Editor: Umweltbundesamt GmbH
Spittelauer Lände 5, 1090 Vienna/Austria

This publication is only available at: <http://www.umweltbundesamt.at/>

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ISBN 978-3-99004-502-2

CONTENT

1	INTRODUCTION	5
2	APPROVED ADJUSTMENTS.....	6
2.1	NO _x emissions from transport sector	6
2.2	NO _x emissions from the agriculture sector	7
2.3	NH ₃ emissions from the agriculture sector.....	10
3	REFERENCES	12

1 INTRODUCTION

Following the NEC Directive Article 5 – Flexibilities, Member States may establish, in accordance with Part 4 of Annex IV, adjusted annual national emission inventories for sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and fine particulate matter where non-compliance with their national emission reduction commitments would result from applying improved emission inventory methods updated in accordance with scientific knowledge.

Annex IV, Part 4, includes three broad categories under which adjustments to the national emission inventories may be applied:

- New emission source categories are identified which were not included in the relevant historic national emission inventory at the time when emission reduction commitments were set;
- The emission factors used for determining emission levels for specific source categories at the time when emission reduction commitments are to be attained differ significantly from the original emission factors used when the emission reduction commitments were set;
- The methodologies used for determining emission levels for specific source categories have undergone significant changes since the time when the emission reduction commitments were set.

2 APPROVED ADJUSTMENTS

Due to exceedance of the national emission ceilings from 2010 onwards, Austria applied for the following adjustments to be made to its national emission inventory, in accordance with Article 5(1):

- NO_x emissions from sector transport based on significantly different methodologies,
- NO_x emissions from sector agriculture, based on new emission source categories.

Due to exceedance of the national emission ceilings from 2014 onwards, Austria applied for the following adjustments to be made to its national emission inventory, in accordance with Article 5(1):

- NH₃ emissions from sector agriculture based on new emission source categories.

Adjustments were proposed by Austria in 2017¹ and 2018² (UMWELTBUNDESAMT 2017 & UMWELTBUNDESAMT 2018) and accepted³ in the 2017 and 2018 NEC Reviews of the adjustment applications of Austria (EEA 2017 & EEA 2018)

The report “*Declaration on consistent reporting of Approved Adjustments*” (submitted on 15th February 2019) declares that Austria’s criteria and methodologies used for the calculation of emissions for the years 2010 – 2017 (as submitted on 15th February 2019) for all sectors and pollutants (1.A.3.b Road transport – NO_x; 3.B Manure management – NO_x; 3.D.a.2.a Animal manure applied to soils – NO_x; 3.D.a.2.b Sewage sludge applied to soils – NO_x and NH₃; 3.D.a.2.c Other organic fertilisers applied to soils – NO_x and NH₃) are exactly the same as in the year the adjustments were approved (2018).

The details on the approved adjustments are included below.

2.1 NO_x emissions from transport sector

The emission ceilings laid down in Directive 2001/81/EC were derived from model calculations within the RAINS model of the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, which were based on knowledge available at the end of the 1990s. Concerning the trend in vehicle specific emissions, it was assumed that emission levels would decrease at the same rate as the emission limits required under the vehicle type approval system.

¹ <http://www.umweltbundesamt.at/fileadmin/site/publikationen/REP0613.pdf>

² <http://www.umweltbundesamt.at/fileadmin/site/publikationen/REP0648.pdf>

³ <http://ec.europa.eu/environment/air/reduction/implementation.htm>

In the meantime it has been found that the actually achieved reductions in vehicle specific NO_x emissions under real world driving conditions are much smaller than expected at the time when the targets were established. The findings are based on test bench measurements which were performed in the course of several studies through international co-operation. The findings apply especially to diesel passenger cars and light commercial vehicles certified according to the emission standards EURO 1 to EURO 6 as well as for heavy duty vehicles from EURO I to EURO V.

Austria's inland road transport emissions which are based on current (significantly higher) NO_x emission factors are more than 50% higher for recent years than the emissions based on the original emission factors. The emission factors are taken from the "Handbook of emission factors for road transport" (HBEFA): HBEFA version 1.2 (released in January 1999; basis for the definition of the NEC limits) and HBEFA version 3.3 (released in March 2017; latest reference database including all available in-use emission tests and recent forecasts for upcoming vehicle technology). The update of the emission factors in the inventory has been accompanied by an improvement in the way in which emission factors are applied to different vehicle types across the time series.

Table 1 shows approved adjustments (NO_x emissions) from the sub-category *road transport (1.A.3.b)* submitted in 2018 and in 2019, and the difference between these two submissions:

Table 1: Approved adjustments submitted in 2018 and 2019, sub-category road transport (1.A.3.b).

[kt NO _x]	2010	2011	2012	2013	2014	2015	2016	2017
Submission 2018	-29.19	-31.72	-32.99	-34.18	-35.67	-35.23	-33.95	-
Submission 2019	-29.27	-31.80	-33.07	-34.51	-35.74	-35.34	-34.01	-31.32
Difference	-0.08	-0.08	-0.08	-0.33	-0.07	-0.11	-0.05	-

Figures reported in submission 2018 are almost the same as the approved ones based on inventory submission 2018. The small difference can be explained by the use of the latest available activity data in line with Austria's national emission inventory submission 2019.

More information on the calculation methods used in the current inventory can be found in the IIR 2019 (UMWELTBUNDESAMT 2019) and in the supporting report "Assessment of transport emissions in Austria for the year 2017 based on emission factors from HBEFA1.2 and HBEFA3.3" (SCHWINGSHACKL & REXEIS 2019).

2.2 NO_x emissions from the agriculture sector

For the sector Agriculture the following new NO_x emission sources have been included after the 1999 submission:

- Manure Management (3.B) and

- Organic fertilisers” (3.D.a.2) including the following sub-categories:
 - Animal manure applied to soils (3.D.a.2.a)
 - Sewage sludge applied to soils (3.D.a.2.b)
 - Other organic fertilisers applied to soils (3.D.a.2.c), including
 - Digestates applied to soils
 - Compost applied to soils

These sources of nitrogen oxide were not included in the EMEP/CORINAIR atmospheric emission inventory guidebook, second edition 1999 and third edition 2001.

These sources were not included in the considerations for establishing the emission ceiling; nor were they included in the RAINS model.

- Austria reported NO_x emissions from manure management (from manure storage) for the first time in its NEC submission of 31st December 2009 by applying the default Tier 1 emission factors for NO as outlined in the EMEP/EEA air emission inventory guidebook 2009.
- Austria reported NO_x emissions from animal manure applied to soils (under source category *manure management*) for the first time in its NEC submission of 31st December 2003.
- Austria reported NO_x emissions from sewage sludge application for the first time in its NEC submission of 31st December 2010.
- Austria reported NO_x emissions from energy crops applied to soils as fertilisers after the digestion process (digestate) for the first time in its NEC submission of 31st December 2014.
- Austria reported NO_x emissions from compost applied to soils for the first time in its NEC submission of 15th February 2017.

Table 2 shows approved adjustments (NO_x emissions) from category *Manure Management (3.B)* submitted in 2018 and in 2019, and the difference between these two submissions:

Table 2: Approved adjustments submitted in 2018 and 2019, category *manure management (3.B)*.

[kt NO _x]	2010	2011	2012	2013	2014	2015	2016	2017
Submission 2018	-0.37	-0.37	-0.37	-0.37	-0.37	-0.37	-0.37	-
Submission 2019	-0.59	-0.59	-0.58	-0.58	-0.57	-0.57	-0.56	-0.57
Difference	-0.22	-0.21	-0.21	-0.21	-0.20	-0.20	-0.19	-

The difference in emissions compared to the previous year is due to inventory improvements carried out within submission 2019. The calculations of NO_x emissions have been improved by applying the Tier 2 methodology according to the 2016 EMEP/EEA Guidebook.

Table 3 shows approved adjustments (NO_x emissions) from sub-category Animal manure applied to soils (3.D.a.2.a) submitted in 2018 and in 2019, and the difference between these two submissions:

Table 3: Approved adjustments submitted in 2018 and 2019, sub-category Animal manure applied to soils (3.D.a.2.a).

[kt NO _x]	2010	2011	2012	2013	2014	2015	2016	2017
Submission 2018	-5.38	-5.31	-5.28	-5.28	-5.29	-5.29	-5.30	-
Submission 2019	-5.09	-5.01	-4.97	-4.96	-4.96	-4.96	-4.96	-4.99
Difference	0.28	0.29	0.30	0.32	0.33	0.33	0.34	-

The consideration of N₂ losses and improved NO_x calculations in sector manure management resulted in smaller N amounts available for application. Thus, lower NO_x emissions have been determined for the whole time series.

Table 4 shows approved adjustments (NO_x emissions) from sub-category Sewage sludge applied to soils (3.D.a.2.b) submitted in 2018 and in 2019, and the difference between these two submissions:

Table 4: Approved adjustments submitted in 2018 and 2019, sub-category sewage sludge applied to soils (3.D.a.2.b).

[kt NO _x]	2010	2011	2012	2013	2014	2015	2016	2017
Submission 2018	-0.07	-0.07	-0.06	-0.06	-0.06	-0.07	-0.08	-
Submission 2019	-0.07	-0.07	-0.06	-0.06	-0.06	-0.07	-0.08	-0.07
Difference	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-

The figures reported in submission 2019 are identical with the approved figures from inventory submission 2018.

Table 5 shows approved adjustments (NO_x emissions) from sub-category Other organic fertilisers applied to soils (3.D.a.2.c) submitted in 2018 and in 2019, and the difference between these two submissions:

Table 5: Approved adjustments submitted in 2018 and 2019, sub-category other organic fertilisers applied to soils (3.D.a.2.c).

[kt NO _x]	2010	2011	2012	2013	2014	2015	2016	2017
Submission 2018	-0.34	-0.32	-0.35	-0.36	-0.37	-0.38	-0.38	-
Submission 2019	-0.42	-0.41	-0.43	-0.44	-0.45	-0.47	-0.43	-0.44
Difference	-0.08	-0.08	-0.08	-0.08	-0.08	-0.09	-0.05	-

The difference is due to updated activity data (digestates from biogas plants used as fertiliser) in submission 2019.

In 2018 new information on input materials for Austria's biogas plants became available, taken from the latest annual report of the Austrian energy regulator E-Control.

Furthermore, updated data on management systems and agriculture practices (PÖLLINGER et al. 2018) were implemented (AMON & HÖRTENHUBER 2019). Both improvements resulted in revised amounts of digested manure and energy crops.

2.3 NH₃ emissions from the agriculture sector

In Austria's NH₃ inventory for the agriculture sector the following new sources have been included after the 1999 submission:

- Sewage sludge applied to soils (3.D.a.2.b)
- Other organic fertilisers applied to soils (3.D.a.2.c)
 - Digestates applied to soils
 - Compost applied to soils

These sources of ammonia were not included in the EMEP/CORINAIR atmospheric emission inventory guidebook, second edition 1999 and third edition 2001.

These sources were not included in the considerations for establishing the emission ceiling; nor were they included in the RAINS model.

- Austria reported NH₃ emissions from sewage sludge application for the first time in its NEC submission of 31st December 2010.
- Austria reported NH₃ emissions from energy crops applied to soils as fertilisers after the digestion process (digestate) for the first time in its NEC submission of 31st December 2014.
- Austria reported NH₃ emissions from compost applied to soils for the first time in its NEC submission of 15th February 2017.

Austria does not exceed national emission ceilings for the years 2010 to 2013. Due to an exceedance for the years from 2014 onwards, Austria applied for adjustments to be made to the national ammonia emission inventory, in accordance with Article 5(1).

Table 6 shows approved adjustments (NH₃ emissions) from sub-category *sewage sludge applied to soil (3.D.a.2.b)* submitted in 2018 and in 2019, and the difference between these two submissions:

Table 6:
Approved adjustments
submitted in 2018 and
2019, sub-category
sewage sludge
(3.D.a.2.b.)

[kt NH ₃]	2014	2015	2016	2017
Submission 2018	-0.20	-0.24	-0.24	-
Submission 2019	-0.20	-0.24	-0.24	-0.24
Difference	0.00	0.00	0.00	-

The figures reported in submission 2019 are identical with the approved figures from inventory submission 2018.

Table 7 shows approved adjustments (NH₃ emissions) from sub-category *other organic fertilisers applied to soils (3.D.a.2.b)* submitted in 2018 and in 2019, and the difference between these two submissions:

[kt NH₃]	2014	2015	2016	2017
Submission 2018	-0.75	-0.76	-0.76	-
Submission 2019	-0.90	-0.95	-0.87	-0.87
Difference	-0.16	-0.19	-0.11	-

*Table 7:
Approved adjustments
submitted in 2018 and
2019, sub-category
other organic fertilisers
(3.D.a.2.c).*

The difference is due to updated activity data (digestates from biogas plants used as fertiliser) in submission 2019.

In 2018 new information on input materials for Austria's biogas plants became available, taken from the latest annual report of the Austrian energy regulator E-Control.

Furthermore, updated data on management systems and agriculture practices (PÖLLINGER et al. 2018) were implemented (AMON & HÖRTENHUBER 2019). Both improvements resulted in revised amounts of digested manure and energy crops.

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Following the NEC Directive Article 5 – Flexibilities, EU Member States may submit adjusted annual national inventories for SO₂-, NO_x-, NMVOC-, NH₃- und PM_{2,5} emissions, in case of non compliance with their national emission reduction commitments due to improvements in emission inventory methods over time.

Austria´s Inventory Adjustment Report 2019 includes updated emission data of the adjustments proposed by Austria in 2017 and 2018 and accepted in the 2017 and 2018 NEC Reviews of the adjustment applications of Austria.

This report is an addendum to “Austria’s Informative Inventory Report 2019” and includes supportive information pursuant to the NEC Directive (EU) 2016/2284 Annex IV Part 4. Adjusted emission estimates documented in this report are identical to those reported in the NFR reporting template Annex VII.