

Final Review Report

2017 Comprehensive Technical Review of National Emission Inventories

pursuant to the Directive on the Reduction of National
Emissions of Certain Atmospheric Pollutants (Directive (EU)
2016/2284)

Germany

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Abbreviations

AD	Activity data
Adj	Adjustment
EC	European Commission
EEA	European Environment Agency
EF	Emission factor
EMRT	Emission Review Tool
EU	European Union
IE	Included elsewhere
kt	Kilotonnes
LR	Lead Reviewer
MS	Member State
NA	Not applicable
NE	Not estimated
NECD	National Emissions Ceilings Directive
NFR	Nomenclature for Reporting
NH ₃	Ammonia
NMVOC	Non-methane volatile organic compounds
NO	Not occurring
NO _x	Nitrogen oxides
PM _{2.5}	Particulate matter equal to or less than 2.5 micrometres in diameter
QC	Quality control
RE	Revised estimate
SO ₂	Sulphur dioxide
SO _x	Sulphur oxides
TC	Technical correction
TERT	Technical Expert Review Team
VOC	Volatile organic compounds

I Introduction

1. The review of the air pollution emission data submitted by Member States (MS) under the European Union's Directive on the Reduction of National Emissions of Certain Atmospheric Pollutants (Directive (EU) 2016/2284) (hereafter 'NECD') is defined in Article 10(3):

"The Commission, assisted by the European Environment Agency and in consultation with the Member States concerned, shall review the national emission inventory data in the first year of reporting and regularly thereafter. That review shall involve the following:

(a) checks to verify the transparency, accuracy, consistency, comparability and completeness of information submitted;

(b) checks to identify cases where inventory data is prepared in a manner which is inconsistent with the requirements set out under international law, in particular under the LRTAP Convention;

(c) where appropriate, calculation of the resulting technical corrections necessary, in consultation with the Member State concerned.

Where the Member State concerned and the Commission are unable to reach an agreement on the necessity or on the content of the technical corrections pursuant to point (c), the Commission shall adopt a decision laying down the technical corrections to be applied by the Member State concerned."

2. The 2017 comprehensive technical review of NECD inventories was undertaken in accordance with the EU Air emission inventory review guidelines under Service Contract: No 07.0201/2016/741511/SER/ENV.C.3.
3. The technical review was carried out with a focus on the years 2005, 2010 and 2015. This report presents the findings of the Technical Expert Review Team (TERT) on the NECD inventory submitted by Germany in 2017.
4. In accordance with the requirements of the NECD (Article 5(8)), adjustment applications were reviewed using the Technical Guidance for Parties Making Adjustment Applications and for the Expert Review of Adjustment Applications (ECE/EB.Air/130)¹.

II Objectives of the review

5. The primary objective of the comprehensive technical review of Member States' NECD inventories of the years 2005, 2010 and 2015 as reported in February 2017 (and updated before 15 March) was to ensure that the Commission has accurate, reliable and verified information on annual NECD emissions to determine compliance with the NECD targets.
6. A secondary objective of the review was to strengthen Member States' capacity in managing NECD inventories efficiently and in delivering high quality inventory data and Informative Inventory Reports (IIRs) to the European Commission in due time.
7. The review also sought to harmonise approaches used in monitoring inventories reported under the NECD with reviews undertaken by other organisations that have similar interests such as the reviews under the LRTAP Convention and the EU Greenhouse Gas Monitoring Mechanism (MMR)/United Nations Framework Convention on Climate Change (UNFCCC).

¹http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/ECE_EB_AIR_130_AV_for_the_web.pdf

III Review approach, team and scope

8. The 2017 comprehensive review of NECD air pollutant inventories of EU Member States focused on the years 2005, 2010 and 2015 and the pollutants SO_x, NO_x, NMVOC, NH₃ and PM_{2.5}. The TERT assessed the completeness (potential underestimations), accuracy (over- or underestimations), recalculations, consistency of time series and comparability across the Member States. Furthermore, the TERT checked if Member States used methodologies and emission factors consistent with the 2016 EMEP/EEA Guidebook.
9. The 2017 NECD Comprehensive Review consisted of a Comprehensive Desk Review and Centralised Review, which were performed by the TERT under service contract No 07.0201/2016/741511/SER/ENV.C.3 of the Directorate General Environment of the European Commission. The TERT consisted of the following experts:
 - Lead Reviewers: Justin Goodwin, Kevin Hausmann, Ole-Kenneth Nielsen and Kristina Saarinen
 - NFR categories 1A1, 1A2, 1A4ai, 1A4bi, 1A4ci (stationary combustion): Rianne Dröge, Laetitia Nicco, Stephan Poupa and Laetitia Serveau;
 - NFR categories 1A3bi to 1A3bvii (road transport): Jean Marc André, Giorgos Mellios, Tim Murrells and Yvonne Pang;
 - NRF categories 1A2gvii, 1A3a, 1A3c, 1A3d, 1A3e, 1A4aii, 1A4bii, 1A4cii, 1A4ciii, 1A5b (non-road transport including international aviation and navigation, non-road mobile machinery): Melanie Hobson and Michael Kotzulla;
 - NFR categories 1B (Fugitive) + 2A (Mineral Processes): Alicia Gonzalez and Jeroen Kuenen;
 - NFR categories 2B + 2C (other industrial processes): Katja Hjelgaard and Ils Moorkens;
 - NFR categories 2D, 2G - 2L (solvent and other product use): Patrik Fauser and Ardi Link;
 - NFR categories 3B - 3I (Agriculture): Michael Anderl, Mette Mikkelsen, Beatriz Sánchez and Jim Webb;
 - NFR categories 5A - 5E (Waste): Céline Gueguen and Intars Cakars.
10. The Comprehensive Desk Review and Centralised Review was coordinated by the project team (Katarina Mareckova, Sabine Schindlbacher, Chris Dore and Emma Salisbury).
11. The EEA Review Secretariat consisting of Anke Lükewille and Federico Antognazza supported the NECD 2017 Comprehensive Technical Review.
12. The review was performed on the basis of NECD emission data and the Informative Inventory Reports (IIRs) officially reported by Member States by 15 February (IIRs by 15 March 2017) under the NECD. Resubmissions and any other additional information provided by Member States were taken into account until 28 April 2017.
13. The lead reviewers and sector review experts did not review emission inventories of Member States where these individuals have themselves contributed to the compilation of that inventory, or presently are or have been any part of the decision-making process related to the compilation of that inventory. Reviewers who are nationals of the Member State whose inventory is concerned, did not take part in the review of that inventory.
14. All review experts signed confidentiality agreements in which they agreed to keep information received by Member States confidential.

Table 1: Scope of the comprehensive technical review NECD 2017 (under (EU) 2016/2284²)

Element	Scope	Further information
Member States	EU geographical coverage of the Member States	This Directive shall apply to emissions of the pollutants referred to in Annex I from all sources occurring in the territory of the Member States, their exclusive economic zones and pollution control zones. This Directive does not cover emissions in the Canary Islands, the French overseas departments, Madeira, and the Azores.
Years	2005, 2010 and 2015	In addition, time series consistency was reviewed across the whole time series.
Pollutants	NO _x , NMVOC, SO _x , NH ₃ , PM _{2.5}	According to NECD Article 1(1)
Categories	All NFR categories, including selected memo items	All NFR categories as listed in Annex 1 of reporting guidelines Including the following memo items: 1A3ai(ii) International aviation cruise (civil) 1A3aii(ii) Domestic aviation cruise (civil) 1A3di(i) International maritime navigation 1A3 Transport (fuel used) – where a MS uses fuel used for compliance purposes.
National totals	National total and National total for compliance	Rows 141 and 144 in Annex I to reporting Guidelines

² DIRECTIVE (EU) 2016/2284 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC

IV Findings and Conclusions from the Technical Expert Review Team (TERT)

15. The TERT checked the national inventory data submitted under the NECD for the years 2005, 2010, and 2015 submitted in 2017 by Germany pursuant to (Directive (EU) 2016/2284).
16. Germany did not provide to the Commission a resubmission after 15 April 2017.
17. The TERT carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the information submitted.
18. Transparency: The TERT found the submitted inventory to be sufficiently detailed and documented and noted that Tier 2 methods are generally used for key categories.
19. The TERT noted that the submitted inventory is generally compiled in line with the 2016 EMEP/EEA Guidebook and Directive (EU) 2016/2284.
20. The TERT noted that the reported national total for compliance (row 144) differs from the national total (row 141) and is reported in line with the NECD. The TERT checked the national total for compliance and considers that it was calculated consistently with the NECD.
21. The TERT noted that Germany has reported transport emissions based on fuel sold and has not additionally reported transport emission based on fuel used. This is in line with the reporting guidelines.
22. Notation keys: The TERT noted the use of the notation keys is generally consistent with the Reporting Guidelines.
23. The TERT identified one case where inventory data was prepared in a manner which is inconsistent with UNECE Reporting Guidelines documentation. In particular, the TERT identified underestimate exceeding the threshold of significance as established in EU Emission Inventory Review Guidelines.
24. The TERT did not deem necessary any technical corrections.
25. The TERT identified recommendations in order to improve the national inventory data of Germany (see section VII).
26. The TERT considers that it received a response from Germany that was sufficient in order to undertake the comprehensive technical review appropriately.
27. Germany did not submit in 2017 any adjustment applications that underwent review under this contract.

V National Totals (row 141 and 144) as reported and National Totals revised (row 141 and 144) by accounting for Revised Estimates and Technical Corrections

28. The table below shows differences between submitted inventories in Annex 1 table, rows 141 and 144 and revised national totals after accounting revised estimates and technical corrections. The table shows the direct changes in response to the NECD Review 2017. Recommendations related to the use of the 2013 EMEP/EEA Guidebook (for the submission in the year 2018) and adjustments previously approved under the LRTAP Convention are not considered in this table.

Table 2: National totals as reported and national totals including revised estimates (RE) and technical corrections (TC)³

Description	Reference	Pollutant estimates (kt)		
		2005	2010	2015
NO_x				
National total	Annex I, row 141	1,574.001	1,334.028	1,187.449
National total for compliance	Annex I, row 144	1,574.001	1,071.731	958.858
National total (row 141) including revised estimates and technical corrections	<i>Calculated using data above</i>	1,574.001	1,334.028	1,187.449
Total (row 144) estimate including revised estimates, technical corrections and adjustments recommended by TERT to be accepted by EC	<i>Calculated using data above</i>	1,574.001	1,071.731	958.858
SO_x				
National total	Annex I, row 141	471.677	409.310	351.768
National total for compliance	Annex I, row 144	471.677	409.310	351.768
National total (row 141) including revised estimates and technical corrections	<i>Calculated using data above</i>	471.677	409.310	351.768
Total (row 144) estimate including revised estimates, technical corrections and adjustments recommended by TERT to be accepted by EC	<i>Calculated using data above</i>	471.677	409.310	351.768
NMVOC				
National total	Annex I, row 141	1,311.655	1,216.116	1,020.181
National total for compliance	Annex I, row 144	1,311.655	1,014.889	811.702
National total (row 141) including revised estimates and technical corrections	<i>Calculated using data above</i>	1,311.655	1,216.116	1,020.181

³ The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations, all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals would be taken into account.

Total (row 144) estimate including revised estimates, technical corrections and adjustments recommended by TERT to be accepted by EC	<i>Calculated using data above</i>	1,311.655	1,014.889	811.702
NH₃				
National total	Annex I, row 141	678.130	681.429	759.265
National total for compliance	Annex I, row 144	678.130	641.490	695.494
National total (row 141) including revised estimates and technical corrections	<i>Calculated using data above</i>	678.130	681.429	759.265
Total (row 144) estimate including revised estimates, technical corrections and adjustments recommended by TERT to be accepted by EC	<i>Calculated using data above</i>	678.130	641.490	695.494
PM_{2.5}				
National total	Annex I, row 141	131.909	117.127	99.480
National total for compliance	Annex I, row 144	131.909	117.127	99.480
Difference between original estimate and revised estimate provided by Germany and accepted by the TERT				
5A Biological treatment of waste - Solid waste disposal on land	DE-5A-2017-0003	5.645	5.597	5.572
National total (row 141) including revised estimates and technical corrections	<i>Calculated using data above</i>	137.553	122.724	105.053
Total (row 144) estimate including revised estimates, technical corrections and adjustments recommended by TERT to be accepted by EC	<i>Calculated using data above</i>	137.553	122.724	105.053

VI Statement from Germany on the conclusions presented by the TERT

29. Germany agrees with the calculated estimates in Table 2.

VII Recommendations from the TERT

VII (i) Recommendations including revised estimates and technical corrections

Table 3: Recommendations from TERT, considering revised estimates (RE) and technical corrections (TC)

Observation	Key Category	NFR, Pollutant(s), Year(s)	Recommendation	RE or TC
DE-1A1-2017-0001	No	1A1 Energy Production, NH ₃ , 2005-2015	The TERT noted that in the NFR tables there are NH ₃ emissions estimated for most of stationary combustion activities. However, there is a lack of transparency regarding which EF are used to estimate these NH ₃ emissions in the IIR. In response to a question raised during the review, Germany provided NH ₃ EF for all stationary combustion sectors and all fuels. Germany also explained that for some NH ₃ EF, the source may be outdated and not well documented. The TERT acknowledged the explanation provided by Germany. The TERT noted that this issue does not relate to the threshold of significance for a technical correction. The TERT recommends that Germany presents its NH ₃ EF for stationary combustion in the next submission of its IIR and includes justifications for the values compared to 2016 EMEP/EEA Guidebook values.	no
DE-1A1a-2017-0001	Yes	1A1a Public Electricity and Heat Production, PM _{2.5} , 2005-2015	For NFR 1A1a Public Electricity and Heat Production, the TERT noted that Germany explains in its IIR (section 1A1a Public Electricity and Heat Production) that PM _{2.5} are calculated as a fraction of TSP (80%) regardless of the fuels. The 2016 EMEP/EEA Guidebook (chapter '1A1 Energy Industries'), presents different TSP/PM _{2.5} fractions given the fuels (tables 3-2 to 3-7). In response to a question raised during the review, Germany explained that the mentioned values in the IIR are only relevant for coal fired plants and that these emission factors are the result of a measurement project. Germany also provided information for other fuels: in terms of gaseous fuels the share of PM ₁₀ and PM _{2.5} is 100% in the German inventory; Co-incineration systems cannot be considered separately since this is one chimney thus in those cases the EF of the main fuel is used. The TERT agreed	no

			with the explanation provided by Germany. The TERT notes that this issue does not relate to an over or underestimate and recommends that Germany improves the transparency of its IIR regarding PM _{2.5} shares used for each fuel (solid fuels (coal and lignite) and gaseous fuels, but also biomass if relevant).	
DE-1A1a-2017-0003	No	1A1a Public Electricity and Heat Production, SO ₂ , NO _x , NH ₃ , NMVOC, PM _{2.5} , 2003-2015	In the IIR, chapter '1A1a Public Electricity and Heat Production, the TERT noted that the graph on AD for waste and biomass, years 2003 to 2011 seems overestimated compared to the trends 1990-2002 and 2012-2015. In response to a question raised during the review, Germany explained that there is a planned revision of activity data for biogas. Germany also provided some preliminary revised estimates based on discussions with the working group on renewable energy statistics (new consumptions and new SO ₂ /NO _x EFs for period 2003-2011) for years 2005 and 2010 for pollutants SO ₂ /NO _x /PM _{2.5} . The TERT agreed with the general approach and assumptions for this preliminary revised estimate provided by Germany (except that Germany provided emissions calculated in kt but they are actually tonnes). The TERT noted that this preliminary revised estimate is below the threshold of significance for technical correction for all mentioned pollutants. The TERT recommends that Germany includes the revised estimate in its next submission.	no
DE-1A1b-2017-0001	Yes	1A1b Petroleum Refining, SO ₂ , NO _x , NH ₃ , NMVOC, PM _{2.5} , 2005-2015	For category 1A1b Petroleum Refining, all pollutants, the TERT noted that the IIR is not fully transparent (chapter '1A1b Petroleum Refining', paragraph on emission factors). The IIR states that EF used come from a research project which is described in chapter 1A1a. The table in chapter 1A1a is titled 'IEF for Public Electricity and Heat Production' and is probably not applicable to NFR 1A1b. Moreover, fuels consumed in refineries are specific and no EF for refinery gas are presented. Recommendation 55 of the in-depth CLRTAP review in 2014 has already highlighted this lack of transparency. In response to a question raised during the review, Germany provided its country specific EF used in sector 1A1b for SO ₂ , NO _x , NMVOC and PM _{2.5} . The TERT notes that this issue does not relate to an over or underestimate and recommends that Germany includes the country specific EF for combustion in refineries in the relating chapter of its IIR to improve transparency.	no
DE-1A2-2017-0001	No	1A2 Stationary Combustion in Manufacturing Industries and	In the NFR tables, for NFR 1A2b Non-ferrous Metals and 1A2e Food Processing, Beverages and Tobacco, emissions of PM _{2.5} are not estimated ('NE'). The TERT notes with reference to the 2016 EMEP/EEA Guidebook, chapter 1A2, that PM _{2.5} EF are available in tables 3-2 to 3-5 for each type of fuels. In response to a question raised during the review, Germany explained that emission factors of PM _{2.5} for	no

		Construction, PM _{2.5} , 2005-2015	Food and Drink and the non-ferrous metals are derived by repeated emission measurement at the stack in the clean gas flow and reported in processes categories. Germany acknowledges that the use of notation key 'NE' is wrong and it should be 'IE' instead with reference to the related process emission. The TERT notes that this issue does not relate to an over or underestimate and recommends that Germany uses the right notation keys in the NFR tables for its next submissions.	
DE-1A2gviii-2017-0001	No	1A2gviii Stationary Combustion in Manufacturing Industries and Construction: Other, PM _{2.5} , 2005-2015	For NFR 1A2gviii Stationary Combustion in Manufacturing Industries and Construction: Other, the TERT noted that Germany explains in its IIR (section 1A2gviii 'stationary combustion in manuf. indus. and construction: other production') that PM _{2.5} are calculated as a fraction of TSP (80%) regardless of the fuels. The 2016 EMEP/EEA Guidebook (chapters '1A1 Energy Industries' and '1A2 Manufacturing Industries and Construction') presents Tier 1 EF for PM _{2.5} and TSP that give different PM _{2.5} fraction given the fuels (tables 3-2 to 3-7 in chapter 1A1 and tables 3-2 to 3-5 in chapter 1A2). In response to a question raised during the review, Germany explained that in source category 1A2gviii emissions from all industrial power plants were reported. Those industrial power plants use the same abatement technology as those public power plants reported in 1A1a Public Electricity and Heat Production and therefore the same share of PM is used (See DE-1A1a-2017-0001). The TERT agreed with the explanation provided by Germany. The TERT notes that this issue does not relate to an over or underestimate and recommends that Germany improves the transparency of its IIR to explain its assumptions on the PM _{2.5} fraction used for each fuel and particularly for liquid fuels, biomass and other fuels.	no
DE-2A1-2017-0001	Yes	2A1 Cement Production, PM _{2.5} , 2015	For category 2A1 Cement Production and pollutant PM _{2.5} , the TERT found that reported emissions and activity data in the NFR template did not correspond to the EF given in the IIR. In response to a question on this issue, Germany explained that the PM emissions are calculated based on grinded clinker rather than burnt clinker (the latter is indicated in the NFR as activity data). The TERT notes that this issue does not relate to an over or underestimate and recommends the explanation and rationale for using two sets of activity data to be included in the IIR for the next submission.	no

DE-2B10a-2017-0002	No	2B10a Chemical Industry: Other, PM _{2.5} , 1990-2015	For PM _{2.5} category 2B10a Flaring in Chemical Industry for 1990-2015 the TERT noted that Germany did not provide a clear response to a question from the TERT. The TERT noted that the issue could be above the threshold of significance for a technical correction but that it is related to a non-mandatory category. The TERT recommends that Germany investigates whether flaring occurs in relation to carbide production e.g. by contacting the single producer of carbide.	no
DE-2B3-2017-0001	No	2B3 Adipic Acid Production, NO _x , 1990-2015	For category 2B3 Adipic Acid Production for 1990 - 2015, in response to a question raised during the review Germany provided justification that NO _x and CO emissions from this source are below the threshold of significance. The TERT agrees that emissions are indeed expected to be below the threshold of significance. Since a method is available in the 2016 EMEP/EEA Guidebook for estimating NO _x and CO emissions from adipic acid production, the TERT recommends that Germany includes these emissions in the next submission preferably using a country specific method to account for the specific technologies and abatement equipment applied.	no
DE-2B6-2017-0001	No	2B6 Titanium Dioxide Production, NO _x , 1990-2015	For category 2B6 Titanium Dioxide Production for 1990 - 2015, in response to a question raised during the review Germany provided justification that greenhouse gas and air pollutant emissions from this source are below the threshold of significance. The TERT agrees that emissions are indeed below the threshold of significance. Since a method is available in the 2016 EMEP/EEA Guidebook for estimating NO _x , CO and TSP emissions from titanium dioxide production, the TERT recommends that Germany includes these emissions in the next submission.	no
DE-2C-2017-0001	No	2C Metal Industry, SO ₂ , 1990-2015	For categories 2C5 Lead Production, 2C6 Zinc Production and 2C7a Copper Production, 1990 - 2015 in response to a question raised during the review Germany explained that the constant SO ₂ emission factor currently applied across the three sources is a country specific value from 2010. Germany also explained that they agree with the TERT that it could calculate emissions using source specific emissions factors for each production. Germany did not provide a revised estimate. The TERT noted that the issue is below the threshold of significance for a technical correction. The TERT recommends that Germany updates the SO ₂ emission factors for 2C5, 2C6 and 2C7a for the next submission to reflect the individual production activities and to include more transparent information on primary vs. secondary production of lead, zinc and copper in the IIR.	no

DE-2C3-2017-0001	No	2C3 Aluminium Production, NO _x , 1990-2015	For NO _x emissions from category 2C3 Aluminium Production for years 1990-2015, in response to a question raised during the review Germany indicated that it did not include NO _x emissions because they believe the default 2016 EMEP/EEA Guidebook emission factor to be overestimated. The TERT noted that the issue is below the threshold of significance for a technical correction, as initial calculations done by the TERT show that NO _x emissions from primary aluminium production will not exceed 0.1% of national total emissions. The TERT recommends that Germany includes NO _x from aluminium production in the next submission to improve completeness and comparability. If country specific data cannot be estimated, then 2016 EMEP/EEA Guidebook emission factors should be used.	no
DE-2D3d-2017-0001	Yes	2D3d Coating Applications, NMVOC, 1994	For category 2D3d Coating Applications, NMVOC, 1994 the TERT notes a significant dip in the time series in 1994 that may relate to an under estimate in emissions. This under estimate may be above the threshold of significance. In response to a question raised during the review, the Germany explained that "the difference between 1993 and 1994 has to be mainly linked to the enhancement of the emission calculation method as from 1996. Since then national production and foreign trade statistics has been used for the calculation of product and solvent consumption instead of expert judgements. However, a recalculation could only be done backwards to the year 1994 due to the unavailability of production and foreign trade statistics before (German reunification)". The TERT recommends that this explanation is included in the next submission.	no
DE-3B-2017-0002	No	3B Manure Management, NO _x , 2000-2015	TERT noted that NH ₃ and NO _x emissions are based on an N mass flow approach. The IIR mentions that the NO _x and N ₂ emissions are approximated as proportional to the N ₂ O emission (the N ₂ O is based on IPCC 2006 Guidelines). In response to a question from the TERT Germany indicated that the proportional for NO-N is 0.1 * EF N ₂ O-N and for N ₂ it is 3 * EF N ₂ O-N and refer to Rösemann et al. 2017. The TERT recommends Germany to include the information for the proportional of NO-N and N ₂ and the reference in the IIR to improve transparency. Germany responded that information regarding the proportional of NO-N and N ₂ will be included in the next IIR.	no
DE-3B2-2017-0004	No	3B2 Manure Management - Sheep, NMVOC, 2000-2015	For 3B2 Manure management - Sheep, NMVOC, 2000-2015, the TERT noted that the IEF for sheep (NFR 3B2) and other poultry (NFR 3B4giv) is significantly lower than Tier 1 default given in the 2016 EMEP/EEA Guidebook Table 3.4. In response to a question raised during the review, Germany explained that the NMVOC	no

			<p>emission is based on Tier 1 approach for all livestock categories. Regarding the lower IEF NMVOC for sheep, Germany explained that the emissions from lambs are assumed to be 40% lower compared to mother sheep, in accordance with the difference in N excretion between lambs and mother sheep. Regarding the lower EF for other poultry, Germany explained that this category in the German inventory also includes pullets, which has no default value mentioned in the 2016 EMEP/EEA Guidebook. For pullets, an EF for broilers is used which is significantly lower than ducks and geese, and thus lowers the IEF. The TERT accepts the explanation provided by the Germany. The TERT recommends that Germany in the IIR for the next submission mention that NFR 3B2 includes lambs and also explain the lower EF NMVOC used for lambs. Furthermore, the TERT recommend that Germany in IIR mentioned that pullets are included in NFR 3B4giv other poultry.</p>	
DE-3Da2b-2017-0001	No	3Da2b Sewage Sludge Applied to Soils, NO _x , NH ₃ , 2000-2015	<p>TERT noted that the notation key 'NA' is used NFR 3Da2b Sewage Sludge Applied to Agricultural Soils for NH₃ and NO_x 2000-2015. In the German CRF 2015 Table 3.D data for sewage sludge applied to soils is included, indicating that this activity takes place. A Tier 1 approach is available (2016 EMEP/EEA Guidebook Table 3.1). Calculation based on a Tier 1 approach shows a change in total NH₃ and NO_x emission below the threshold of significance. In response to a question raised during the review, Germany explained that NH₃ and NO_x emission from sewage sludge applied to agricultural soils will be reported for the next submission in 2018. TERT recommend that Germany include the emission from sewage sludge applied to agricultural soils in the next submission.</p>	no
DE-3F-2017-0001	No	3F Field Burning of Agricultural Residues, SO ₂ , NO _x , NH ₃ , NMVOC, PM _{2.5} , 2000-2015	<p>TERT noted that no emission is estimated for NFR category 3F Field Burning of Agricultural Residues years 2000-2015. In response to a question raised during the review, Germany explained that field burning of agricultural residues is prohibited by law, emissions in category 3F did not occur ('NO') for the complete time series. In Germany's IIR it is mentioned that "There are no emissions from the category 3.F Field burning of agricultural residues" (Chapter 5 – section "Short description"). TERT recommends Germany includes more information in the IIR for the next submission, referring to the specific law and clarifying from which year the ban came into force. Furthermore, it is recommended to inform whether there are derogations for field burning under certain circumstances or for certain crop types. In some Western European countries field burning takes place under special</p>	no

			circumstances and for these countries the emissions of SO ₂ , NO _x , NH ₃ , NMVOC, PM _{2.5} is below the threshold of significance.	
DE-5A-2017-0001	No	5A Biological Treatment of Waste - Solid Waste Disposal on Land, NMVOC, PM _{2.5} , 2005;2010;2015	For NMVOC and PM _{2.5} emissions from 5A Biological Treatment of Waste - Solid Waste Disposal on Land for the full time series, the TERT noted that emissions are not reported although default EF are provided in the 2016 EMEP/EEA Guidebook. In response to a question raised during the review, Germany provided a draft estimate to demonstrate that the impact is below the threshold of significance of technical correction for NMVOC. The TERT agreed that NMVOC emissions are expected to be below the threshold of significance. The TERT also expects PM _{2.5} emissions to be below the threshold. The TERT recommends that Germany include NMVOC and PM _{2.5} emissions from 5A in its next submission. In addition, the TERT recognise that the 2013 EMEP/EEA Guidebook reference "US Environmental Protection Agency (US EPA) may not be presented in a clear way. However, Germany did undertake calculations that agree with reference material indicating that CH ₄ is a maximum of 30 to 40% of landfill gas (the rest mainly composed of CO ₂ and other gases, including NMVOC) and that the CH ₄ corresponds to 98.7% of VOC. The calculations made by Germany demonstrate that NMVOC emissions are below the threshold of significance.	no
DE-5A-2017-0003	No	5A Biological Treatment of Waste - Solid Waste Disposal on Land, SO ₂ , NO _x , NH ₃ , NMVOC, PM _{2.5} , 2005;2010;2015	For 5E the TERT noted that the notation key "NA" is reported in the NFR tables but there is a PM _{2.5} proposed in the 2016 EMEP/EEA GB and the TERT considered it is unlikely as it includes accidental car and house fires. In response to a question raised during the review Germany provide a revised estimate which was accepted by the TERT. The estimates demonstrate that the issue is above the threshold of significance. The TERT recommends that Germany includes an estimation of PM _{2.5} from 5E in its next submission.	RE
DE-5D-2017-0001	No	5D Wastewater Handling, NMVOC, 2005;2010;2015	For 5D Wastewater Handling, NMVOC 2005;2010;2015, in response to a question raised during the review Germany indicated that there is an underestimate that is far below the threshold of significance for a technical correction. Germany also indicated that it already planned to develop and implement a country specific methodology. The TERT recommends that Germany include the estimation of NMVOC emissions from wastewater treatment plant in its next submission.	no

VII (i) Recommendations considering the use of the 2013 EMEP/EEA Guidebook

30. In accordance with the review Guidelines, to facilitate transparency, recommendations that relate to MS using methodologies presented in the 2013 version of the EMEP/EEA Guidebook have been grouped together and presented separately to other recommendations.
31. For the emission estimates presented in Table 4 below, the TERT recommends that the methodologies used by the MS are updated from those presented in the 2013 version of the EMEP/EEA Guidebook to those used in the 2016 version of the EMEP/EEA Guidebook, or equivalent, and that this update is incorporated into the emissions inventory ahead of the next submission.

Table 4: Recommendations from the TERT, considering the use of the 2013 version of the Guidebook

Observation	Key Category	NFR, Pollutant(s), Year(s)	Recommendation
DE-3Da1-2017-0001	Yes	3Da1 Inorganic N-fertilisers (includes also urea application), NH ₃ , 2000-2015	TERT noted that the NH ₃ emission from NFR 3Da1 Inorganic N-fertilisers 2000-2015 is based on emissions factors given in the 2013 EMEP/EEA Guidebook. TERT recommends that Germany use the updated emission factors available in the 2016 EMEP/EEA Guidebook (Table 3.2) for the next submission. In response to a question raised during the review, Germany stated that updating based on the EF in the 2016 EMEP/EEA Guidebook will be implemented in the next submission. The TERT noted that calculation of NH ₃ emission from use of inorganic N-fertiliser used to be a relatively important emission source, and an update to the EF in the 2016 EMEP/EEA Guidebook could lead to change above threshold of significance.

VII (ii) Cross-cutting recommendations

32. The TERT identified recommendations in order to improve the national inventory data of Germany (see section VII).
33. The TERT considers that it received a response from Germany that was sufficient in order to undertake the comprehensive technical review appropriately.
34. The ERT identifies the following cross-cutting issues for improvement in the inventory and recommends that Germany:

- (a) Complete its emission inventory by estimating currently missing emissions, the TERT identified that currently emissions caused by accidental car and house fires are not included;
- (b) Calculates all emission for which methods are provided in the 2016 EMEP/EEA Guidebook;
- (c) Uses the EMEP/EEA Guidebook 2016 for all categories.

Annex I: Revised Estimates provided by Germany

Table 5: Summary of Technical Revisions

1	EMRT ID:	DE-5A-2017-0003					
	EMRT URL:	https://emrt-necd.eionet.europa.eu/2017/DE-5A-2017-0003					
	Member State:	Germany					
	Sector:	5E Other waste					
	Pollutant	PM _{2.5}					
	Completed by (SE):	Celine Guenguen					
	Reviewed by (LR):	Justin Goodwin					
	Reviewed by (Counterpart):	Intars Cakars					
	The underlying problem:	The notation key "NA" is reported in the NFR tables but the TERT considers it is unlikely as it includes accidental car and house fires					
	The rationale for the corrected estimate:	There is an underestimation because of a non-estimation					
Summarise the methodology used:	<p>Use of the tier 2 methodology proposed in the 2016 EMEP/EEA Guidebook:</p> <ul style="list-style-type: none"> - AD: number of fire based on population and a ratio of fires per 1000 inhabitant derived from an average of data published annually by the centre for fire statistics (CTIF) - Additional parameter : split between type of building based on national data - EF : Tier 1 default EF (table 3-2 for cars and tables 3-4 and 3-6 for buildings from chapter 5E Other waste) 						
Details of the corrected estimate							
		Original estimate (kt)					Notes
	Year	NO_x	SO₂	NMVOC	NH₃	PM_{2.5}	
DE-5A-2017-0003-OE	2005					0.000	emissions from car and building fires not reported
DE-5A-2017-0003-OE	2010					0.000	emissions from car and building fires not reported
DE-5A-2017-0003-OE	2015					0.000	emissions from car and building fires not reported
2	Was a Revised Estimate received from the MS?		yes				
		Revised Estimate received from MS (kt)					Notes
	Year	NO_x	SO₂	NMVOC	NH₃	PM_{2.5}	
DE-5A-2017-0003-RE	2005					5.645	using national split
DE-5A-2017-0003-RE	2010					5.597	using national split
DE-5A-2017-0003-RE	2015					5.572	using national split
	Was the Revised Estimate accepted by the TERT?		yes				

References and Supporting Documents

EEA, 2017. Tista M., Gager M., Ullrich B., NEC Directive status report 2015. European Environment Agency, Copenhagen. Available at:

<http://www.eea.europa.eu/themes/air/national-emission-ceilings/nec-directive-reporting-status-2015>

EU 2017, EU Air Emission inventory review Guidelines

EU 2017, Guidance for TERTs

Decision 2012/3 (ECE/EB.AIR/111/Add.1): Adjustments under the Gothenburg Protocol to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them

Decision 2012/12 (ECE/EB.AIR/113/Add.1): Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them

Decision 2014/1 (ECE/EB.Air/127/Add.1) Improving the guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them

EMEP/EEA, 2016 EMEP/EEA air pollutant emission inventory guidebook – 2016 EEA technical report No. 21/2016 European Environment Agency, Copenhagen. Available at: <http://www.eea.europa.eu/publications/emep-eea-guidebook-2016>

EMEP/EEA Air Pollutant Emission Inventory Guidebook 2013

<http://www.eea.europa.eu/publications/emep-eea-guidebook-2013>

EMEP/CORINAIR Air Pollutant Emission Inventory Guidebook 1999, 2nd edition

<http://www.eea.europa.eu/publications/EMEPCORINAIR>

2014 Reporting Guidelines (ECE/EB.AIR/125) for Estimating and Reporting Emission Data under CLRTAP

http://www.ceip.at/ms/ceip_home1/ceip_home/reporting_instructions/

ECE/EB.AIR/130: Technical Guidance for Parties Making Adjustment Applications and for the Expert Review of Adjustment Applications, 14 April 2015

http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/ECE_EB_AIR_130_AV_for_the_web.pdf

NEC Directive 2001, DIRECTIVE 2001/81/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL ,of 23 October 2001 on national emission ceilings for certain atmospheric pollutants

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02001L0081-20130701&from=EN>

NEC Directive 2016, DIRECTIVE (EU) 2016/2284 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2016.344.01.0001.01.ENG