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Review of the 2016 Adjustment Application by Germany

Expert Review Team Report for the EMEP Steering Body

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Basic checks (Step 1 and 2)	N/A	Katarina Mareckova	CEIP

Executive Summary

1. As mandated by Decision 2012/3 (ECE/EB.AIR/111/Add.1) of the Executive Body to the Convention on Long-range Transboundary Air Pollution (CLRTAP) the nominated expert review team (“the reviewers”) undertook a detailed review of the adjustment application submitted by Germany. The review was undertaken on behalf of the EMEP¹ Steering Body (SB) and following the guidance published in the Annex to decision 2012/12 (ECE/EB.AIR/113/Add.1) and 2014/1 (ECE/EB.Air/130).
2. Each sector of the application was reviewed by two independent sectoral experts during May and June 2016. The findings were discussed at the meeting held from 20-24 June 2016 in Copenhagen at the EEA. The conclusions and recommendations for the EMEP SB are documented in this country report.

Table ES1: Summary information on the submitted application, Germany 2015

Reasons for adjustment application (Decision 2012/3, para 6 as amended by decision 2014/1, annex, para 3)	Road transport, 1A3bi-iv: Revision to emission factors and methodology Agriculture, 3Da2c, 3I: New Source
Pollutant for which adjustment is applied for	Road Transport: NO _x Agriculture: NO _x , NH ₃
Year(s) for which inventory adjustment is applied	2010 - 2014
Date of notification of adjustment to the Secretariat	15/02/2016
Date of submission of supporting documentation	25/05/2016

3. The reviewers studied and evaluated the documents submitted by Germany and requested additional information where needed.
4. **Road transport 1A3bi-iv, NO_x:** Germany reported significantly revised emission estimates for the road transport NO_x adjustment originally approved in 2014 on the basis of revisions to both emission factors and the methodology. The reviewers therefore chose to undertake a full review of the revised adjustment, which Germany explained was caused by the adoption of improved data. The reviewers have concluded that the adjustment does still meet all of the requirements laid out in Decision 2012/12 of the Executive Body of the CLRTAP, and therefore recommends that the EMEP Steering Body **continue ACCEPT** this adjustment.
5. **Agriculture, 3Da2c and 3I, NO_x and NH₃:** Germany has reported NO_x and NH₃ emissions from the agriculture sector under the framework of the CLRTAP. The emissions arise from 3Da2c Other organic fertilisers applied to soils (including compost) and 3I Storage of digestates from energy crops. There was no methodology for estimating emissions from these sources at the time when emission reduction commitments were set. The Expert Review Team has concluded that the application does meet all of the requirements laid out in Decision 2012/12 of the Executive Body of

¹ Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe

the CLRTAP, and therefore recommends that the EMEP Steering Body **ACCEPT** this adjustment application.

6. The quantity and impact of the adjustments recommended for acceptance is summarized in tables Table ES2 and Table ES3 below.

Table ES2: Aggregated sum of inventory adjustments application reviewed in 2016 (ktonnes), Germany 2010-2014

Pollutant		2010	2011	2012	2013	2014
Road Transport* NOx	kt	-151.27	-146.86	-145.10	-142.50	-128.09
Agriculture NOx	kt	-0.16	-0.18	-0.15	-0.18	-0.19
Agriculture NH ₃	kt	-40.03	-49.85	-51.46	-61.14	-66.12

*Road transport adjustments are based on the revised calculation provided by Germany 21-06-2016

Table ES3: Impact of 2016 adjustments on national emissions, Germany 2010 and 2014

Poll.	GP Emission Commitment (kt)	2010 Emission reported in 2016 (kt)	2010 Emission (adjusted) (kt)	Difference (%)	2014 Emission reported in 2016 (kt)	2014 Emissions (adjusted) (kt)	Difference (%)
NOx	1081	1,336.73	1,185.30	-11%	1,224.29	1,096.01	-10%
NH ₃	550	681.61	641.58	-6%	739.79	673.67	-9%

7. **Adjustments approved in 2014 and 2015:** The reviewers had undertaken a full and thorough assessment of the adjustments previously accepted, and recommend that the EMEP Steering Body continue accept these adjustments.

Table ES4: Impact of all adjustments on national emissions, Germany 2010 and 2014

Poll.	GP Emission Commitment (kt)	2010 Emission reported in 2016 (kt)	2010 Emission adjusted (kt)	Difference (%)	2014 Emission reported in 2016 (kt)	2014 Emissions adjusted (kt)	Difference (%)
NOx	1081	1,336.73	1,074.29	-20%	1,224.29	973.86	-20%
NH ₃	550	681.61	641.58	-6%	739.79	673.67	-9%
NM VOC	995	1,235.61	1,034.38	-16%	1,041.36	830.32	-20%

8. Germany's national total emissions for NOx will be below the Gothenburg Protocol ceilings from 2010 onwards, if the proposed adjustments are accepted. However for NH₃, Germany's national total emissions exceed the Gothenburg Protocol ceilings.

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1 Introduction and Context

9. Parties may apply to adjust their inventory data or emission reduction commitments if they are (or expect to be) in non-compliance with their emission reduction targets². However, in making an adjustment application, they must demonstrate that extraordinary circumstances have given rise to revisions to their emissions estimates. These extraordinary circumstances fall into three broad categories:

- a) Emission source categories are identified that were not accounted for at the time when the emission reduction commitments were set; or
- b) For a particular source, the emission factors used to estimate emissions for the year in which emissions reduction commitments are to be attained are significantly different to those used when the emission reduction commitments were set; or
- c) The methodologies used for determining emissions from specific source categories have undergone significant changes between the time when emission reduction commitments were set and the year they are to be attained.

10. Any Party submitting an application for an adjustment to its inventory is required to notify the Convention Secretariat through the Executive Secretary by 15 February at the latest. The supporting information detailed in Decision 2012/12 must be provided (either as part of the Informative Inventory Report, or in a separate report) by 15 March of the same year.

11. As mandated by Decision 2012/12 as amended by the Decision 2014/1 of the Executive Body of the CLRTAP, applications for adjustments that are submitted by Parties are subject to an expert review³. Technical coordination and support to the review is provided by EMEP's Centre on Emission Inventories and Projections (CEIP). The members of the review team are selected from the available review experts⁴ that Parties have nominated to the CEIP roster of experts.

12. The expert review team undertakes a detailed technical review of the adjustment application in cooperation with the EMEP technical bodies and makes a recommendation to the EMEP Steering Body on the acceptance or rejection of the application. The EMEP Steering Body then takes its decision on any adjustment application based on the outcome of the technical assessment completed by the reviewers.

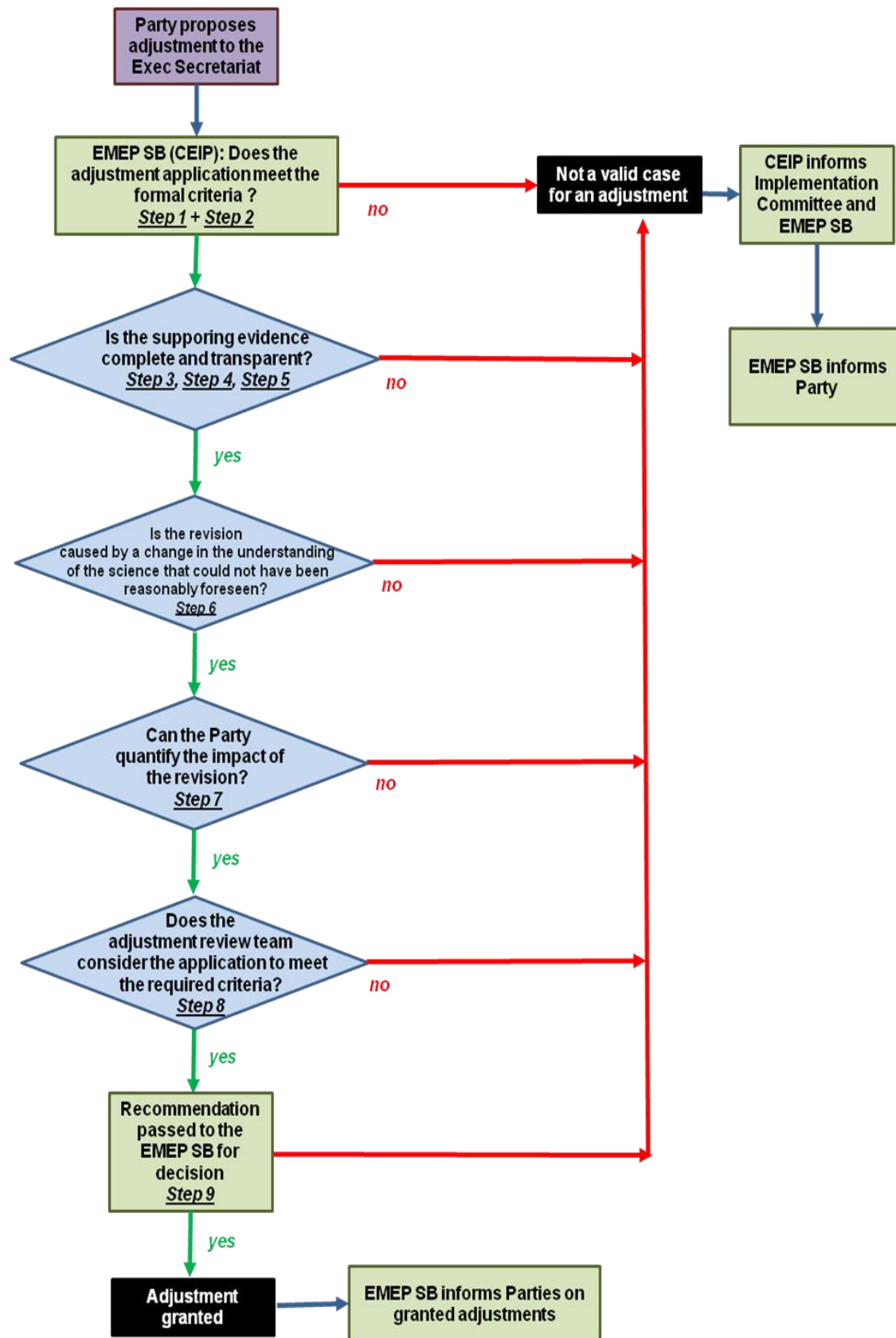
13. The flow diagram below outlines the different stages of the technical review. The following sections of this report are structured in the same way, and describe in detail the findings of the reviewers at each of the decision gates in the process.

² Throughout this report the term "emission reduction commitments" is used. However, the term "emission ceilings" is equally applicable.

³ The EMEP Steering Body, in conjunction with other appropriate technical bodies under EMEP, shall review the supporting documentation and assess whether the adjustment is consistent with the circumstances described in paragraph 6 of EB decision 2012/3 and the further guidance in EB decision 2012/12 as amended by EB decision 2014/1 and Technical guidance document ECE/AB.Air/130.

⁴ http://www.ceip.at/fileadmin/inhalte/emep/pdf/2015/0_Roster_2015.pdf

Figure 1 Flow Diagram/Decision Tree for the Review of Adjustment Applications



2 Review of Adjustments submitted in 2016

2.1 Assessment of Formal Criteria

14. Germany notified the Convention Secretariat through the Executive Secretary of its intention to apply for a new adjustment on 09/02/2015 and thus before the legal deadline of 15 February. All supporting information requested by Decision 2012/12 amended by Decision 2014/1 was provided as part of the Informative Inventory Report before the legal deadline of the 15 March of the same year that it is being submitted for review by the EMEP Steering Body (Decision 2012/12, annex, para 1). Additional documentation was provided during the review in response to requests from the reviewers. Section 4 lists the documentation provided by the Party.

15. Germany submitted an application for emissions adjustments to **NO_x and NH₃** for 2010-2014 for *3Da2c Other organic fertilisers applied to soils* (including compost) and *3I Storage of digestates from energy crops*. In addition, Germany reported significantly revised emission estimates for the *road transport NO_x* adjustment originally approved in 2014. The reviewers therefore chose to undertake a full review of the revised emission estimates for the road transport NO_x adjustment.

16. Germany does not comply with its emission reduction commitments listed in Annex II of the 1999 Gothenburg Protocol (paragraph 1 of Decision 2012/3) for NO_x or NH₃.

17. Germany provided information on the impact of the adjustment to its emission inventory, and the extent to which it would reduce the current exceedance and possibly bring the Party in compliance with emission reduction commitments.

18. Germany presented national emissions and adjustments with emission ceilings in the on-line wiki IIR. This indicates that, should current adjustment applications be approved, Germany met its NO_x Gothenburg Protocol ceiling in 2010, and that compliance for NH₃ will only be possible with additional measures, even when taking adjustments into account.

2.2 Road Transport 1A3bi-iv (NO_x)

2.2.1 Assessment of Consistency with Requirements of Decision 2012/3

19. The adjustment application requires the provision of specific supporting information to demonstrate compliance with specific criteria (Decision 2012/3, para. 6a-c). The reviewers studied the supporting documentation (see Annex 1) with regard to these criteria and concluded that emission factors used to determine emission levels for the road transport source categories *1A3bi-iv* for the year in which emissions reduction commitments are to be attained are significantly different than the emission factors applied to these categories when emission reduction commitments were set.

20. The changes in EFs highlighted in the adjustment application could not have been foreseen at the time of setting 2010 emission ceilings, and result entirely from the Euro standards not delivering the originally predicted emissions reductions in the real world.

21. The reviewers therefore conclude that the provided supporting evidence does comply with the criteria presented in Decision 2012/3. The application was based on significant revisions to emission factors (EFs).

22. Germany originally submitted an application in 2014 and reported it in 2015 again. NOx adjustments reported for road transport in 2016 significantly differed from the ones approved in 2015. The supporting information provided by the Party on the revisions made to emission factors was extensive. However the reviewers considered there to be a calculation error for the year 2012, and also questioned a number of underlying assumptions made by the Party.

23. The Party responded to the reviewers' observations with detailed updated calculations for the NOx emissions estimates, answering all of the reviewers' questions and amending the observed calculation error in 2012.

2.2.2 Assessment of the Quantification of the Impact of the Revision

24. The adjustment application process requires that the Party submit a quantification of the impact of the adjustment for which an application has been submitted. Table 1 provides an overview of the NOx adjustment applications of Germany in the Road Transport sector.

Table 1: Germany's NOx adjustment application for road transport*

Reference number	Pollutant	NFR14	unit	2010	2011	2012	2013	2014
De-A-NOx	NOx	1A3bi-iv	kt	-151.27	-146.86	-145.10	-142.50	-128.09

*Road transport adjustments are based on the revised calculation provided by Germany 21-06-2016

25. The reviewers concludes that the quantification of the impact of this adjustment, as calculated by the Party, on national total emissions uses an appropriate methodology and does not include any calculation errors. Furthermore, the reviewers conclude that the information presented by the Party is line with the most up-to-date available guidance from the EMEP/EEA Emissions Inventory Guidebook and the scientific literature.

2.3 Agriculture, 3Da2c, 3I (NOx and NH₃)

2.3.1 Assessment of Consistency with Requirements of EB Decision 2012/3 as amended by EB Decision 2014/1

26. Germany made an application based on *new sources* in **3Da2c** and **3I** for both **NOx** and **NH₃**.

27. The adjustment application requires the provision of specific supporting information to demonstrate compliance with specific criteria (Decision 2012/3, para. 6a-c as amended by decision 2014/1, annex, para 3). The reviewers considered the supporting information provided by Germany to be complete.

28. The reviewers noted that no methodologies for NOx or NH₃ emissions from either *3Da2c Other organic fertilisers applied to soils (including compost)* and *3I Storage of digestives from energy crops* were included in the Second Edition of the EMEP/CORINAR Emissions Inventory Guidebook 1999 and conclude that the provided supporting evidence does comply with the criteria presented in Decision 2012/3, and that the circumstances on which the adjustment is based could not have been reasonably foreseen by the Party when the emission ceilings were established for 2010.

2.3.2 Assessment of the quantification of the impact of the revision

29. The reviewers undertook a full and thorough assessment of Germany's application for an adjustment to its **NO_x** and **NH₃** emissions inventory for *3Da2c Other organic fertilisers applied to soils (including compost)* and *3I Storage of digestives from energy crops*.

30. Germany reported NO_x and NH₃ emissions from 3Da2c and 3I, however, these NO_x and NH₃ emissions were not accounted for when emission reduction commitments were set by the Gothenburg Protocol. NO_x and NH₃ emissions up to and including 2014 were calculated using a country specific methodology presented in the German IIR wiki.

31. The reviewers concluded that the application meets all of the requirements laid out in decision 2012/12, and therefore recommends that the EMEP Steering Body **ACCEPT** this adjustment application. The impact of the adjustment is summarized in Table 2 below.

Table 2: Impact of adjustment to Germany's NO_x and NH₃ emissions inventory from 3Da2c Other organic fertilisers applied to soils (including compost) and 3I Storage of digestives from energy crops 2010 -2014

Reference number	NFR14	Pollutant	unit	2010	2011	2012	2013	2014
DE-D-NO _x	3Da2c	NO _x	kt	IE	IE	IE	IE	IE
DE-D-NO _x	3I	NO _x	kt	-0.16	-0.18	-0.15	-0.18	-0.19
DE-D-NH ₃	3Da2c	NH ₃	kt	-37.03	-46.45	-48.58	-57.83	-62.54
DE-D-NH ₃	3I	NH ₃	kt	-3.00	-3.40	-2.88	-3.31	-3.58

32. The reviewers conclude that the quantification of the impact of this adjustment, as calculated by Germany, on national total emissions uses an appropriate methodology and does not include any calculation errors. Furthermore, the reviewers conclude that the information presented by Germany is in line with the most up-to-date available guidance from the EMEP/EEA Emissions Inventory Guidebook and the scientific literature.

33. In its application for an adjustment, Germany noted that emissions of NO_x would reach compliance under the Gothenburg Protocol (ceiling of 1081 kt) as of 2010 (1074 kt), but not for NH₃ (ceiling of 550 kt) without further measures, if the proposed adjustments presented in this report are accepted.

3 Assessment of Previously Approved Adjustments

34. In addition to adjustment applications submitted in 2016, the reviewers assessed previously approved adjustments. Germany has previously approved adjustments for *3B Manure Management* and *3De Cultivated crops, NMVOC* in 2015; *3B Manure Management and 3De Cultivated crops, NO_x* in 2014.

35. The reviewers undertook a full and thorough assessment of the adjustment for Germany NO_x and NMVOC 3B, 3De Agriculture originally approved in 2014 and 2015 respectively. The reviewers concluded that the adjustment met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. More specifically the adjustment for NO_x has been recalculated, with values increasing by values of less than 10%, caused by revisions to the activity data. However there have been no amendments to the methodology.

Table 3: Emission adjustments for agriculture sectors 3B and 3De approved in 2014 and 2015, as reported by Germany in 2016 (in ktonnes)

Reference number	Pollutant	NFR14	2010	2011	2012	2013	2014
DE-B (2014)	NO _x	3B	-2.05	-2.01	-1.98	-1.98	-1.99
DE-C (2014)	NO _x	3De	-108.78	-119.22	-114.90	-117.64	-120.14
DE-B (2015)	NMVOC	3B	-191.74	-191.70	-194.11	-198.36	-199.70
DE-C (2015)	NMVOC	3De	-9.49	-8.99	-10.02	-10.32	-11.34

4 Conclusions and Recommendations

36. The reviewers has undertaken a full and thorough review of the application for an adjustment of NO_x emissions from 1A3bi-iv Road Transport that was previously submitted by Germany in 2015 and recalculated for 2016. The reviewers have also undertaken a full and thorough review of the application for an adjustment of NO_x and NH₃ emissions from Agriculture (3Da2c, 3I) submitted in 2016.

37. The review of the submitted application and the recalculated previously approved adjustment followed the guidance provided in the Annex to Decision 2012/12 of the Executive Body of the CLRTAP. The findings of the reviewers are described in detail in Section 2 of this report.

38. Table 2 below provides a summary of the adjustment applications received from Germany in 2016, and the subsequent recommendations made by the reviewers to the EMEP SB.

Table 4: Recommendations from the reviewers to the EMEP SB, Germany 2016 applications

Country	Sector	NFR14	Pollutant	Years	reviewers Recommendation
Germany	Road Transport	1A3bi-iv	NO _x	2010- 2014	Accept
Germany	Agriculture	3Da2c	NO _x	2010- 2014	Accept
Germany	Agriculture	3I	NO _x	2010- 2014	Accept
Germany	Agriculture	3Da2c	NH ₃	2010- 2014	Accept
Germany	Agriculture	3I	NH ₃	2010- 2014	Accept

39. **Road transport (NO_x) and Agriculture (NO_x, and NH₃):** Germany provided information to support their recalculation of the NO_x adjustment in road transport, and their application for an adjustment to NO_x and NH₃ in agriculture (3Da2c and 3I). During the review, the reviewers requested more detailed information from Germany – in particular regarding the data that had been used in quantifying the recalculation of the NO_x adjustment for road transport, and this was provided by Germany. The reviewers has concluded that the applications do meet all of the requirements laid out in Decision 2012/12 of the Executive Body of the CLRTAP, and therefore recommends that the EMEP Steering Body **ACCEPT** these adjustment applications.

40. Germany presented information on its wiki IIR comparing adjusted national totals and the Gothenburg Protocol ceilings. Germany will comply with the NO_x ceiling from 2010 onwards, however additional measures will be required to comply with the NH₃ ceiling.

41. **Previously approved adjustments:** The reviewers have undertaken a full and thorough assessment of the adjustments of Agriculture sector previously accepted in 2014 and 2015, and recommend that the EMEP Steering Body **continue ACCEPT** these adjustments.

5 Information Provided by the Party

42. Table 5 below lists the information provided by the Party in its adjustment application. The information provided by Party can be downloaded from the CEIP website⁵.

Table 5: Information provided by Germany

Filename	Short description of content
DE_Notification DE 2016	Documentation of the application of emission inventory adjustments
DE_IIR_2016	The atmospheric emissions inventory for Germany is provided on a wiki site and includes details of adjustment calculations: http://iir-de.wikidot.com/adjustments

43. The CEIP and the reviewers found it necessary to ask the Germany for further information. The information was partly provided in emails and updates to the IIR wiki site. Documents supplied are described in Table 5 below.

Table 6: Additional information provided by Germany

Filename	Short description of content
DE_2016_Table II_Adjustment_Applied_for.xlsx	Table 1: Summary of Adjustment(s) Applied for by the Party (by NFR, year and pollutant) (Excel spreadsheet, 28/04/15)
DE_2016_appendix_B1_Adjustment_Application_Table.xlsx	Tabulation summarizing the adjustment applications made for the annual application/review
DE_2016_Table_VII_Approved_Adjustments_Revised.xls	Annex VII: Reporting of approved adjustments, by NFR, year and pollutant.
Adjustment_NOx_Road_Transport.xlsx	Detailed calculations of road transport (Excel spreadsheet, 31/05/2016)
Adjustment_NOx_Verkehr_rev_2016-06-21.xlsm	Revised detailed calculations of road transport (Excel spreadsheet, 21/06/2016)

⁵ http://www.ceip.at/ms/ceip_home1/ceip_home/adjustments_gp/

6 References

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

Data submitted by Parties applying for an adjustment:

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

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

The 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone http://www.unece.org/env/lrtap/multi_h1.html