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Progress in emissions inventories and other emissions-related issues: adjustments under the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone

Review of adjustment applications

Report by the Centre on Emission Inventories and Projections*

Summary

The present report was prepared by the Centre on Emission Inventories and Projections in line with its mandate under the 2016-2017 workplan for the implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/133/Add.1) and the tasks set out in the complementary document submitted to the Executive Body for the Convention at its thirty-fourth session, "Basic and multi-year activities in the 2016-2017 period" (item 1.7.1). The review is based on documents submitted by Parties and findings of the expert review team.

The report provides a summary of the 2017 review of applications for adjustments to emission inventories submitted by Spain in accordance with Executive Body decisions 2012/3, 2012/4 and 2012/12, as amended by decision 2014/1 (see ECE/EB.AIR/111/Add.1, ECE/EB.AIR/113/Add.1, ECE/AB.AIR/127/Add.1 and ECE/EB.AIR/130).

The report also provides information on the reporting of adjustments approved in years prior to 2017 by Belgium, Denmark, Finland, France, Germany, Luxembourg and Spain.

* The document was late submitted to reflect the incorporate changes.

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Introduction

1. Conscious of the uncertainties inherent in estimating and projecting emission levels and the need for continuous scientific and methodological improvements, and determined that the emergence of new methodologies should not put a Party at a disadvantage in terms of its emission reduction commitments, at its thirtieth session (Geneva, 30 April-4 May 2012), the Executive Body for the Convention on Long-range Transboundary Air Pollution adopted decisions 2012/3 and 2012/4 to allow Parties to make adjustments under the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them.

2. At its thirty-first session (Geneva, 11-13 December 2012), the Executive Body adopted decision 2012/12 on guidance for such adjustments. The guidance contained in the annex to that decision sets out, in a general way, the principles that Parties should follow in submitting applications for such adjustments.

3. However, following the first review of applications for adjustments by countries in 2014, it became evident that further, detailed technical guidance was needed. At its thirty-third session (Geneva, 8-12 December 2014), the Executive Body therefore adopted decision 2014/1 on improving the guidance for adjustments. The technical guidance for Parties making adjustment applications and for the expert review of adjustment applications (Technical Guidance) (ECE/EB.AIR/130) was prepared by the Task Force on Emission Inventories and Projections and published on 14 April 2015.

4. According to the Executive Body decisions, as clarified by the Technical Guidance, Parties may apply to adjust their inventory data or emission reduction commitments in extraordinary circumstances which fall into three broad categories:

(a) Emission sources are identified that were not accounted for at the time when the emission reduction commitments were set (for a more detailed definition see decision 2014/1, annex, para. 3 (a) (i)-(iii));

(b) Emission factors used to determine emissions levels for particular source categories 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;

(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.

5. Any Party applying for an adjustment to its inventory is required to notify the Convention secretariat through the Executive Secretary of the United Nations Economic Commission for Europe by 15 February at the latest if the application is to be reviewed that year. All supporting information requested in Executive Body decision 2012/12, as amended by decision 2014/1 and clarified in the Technical Guidance, must be provided as part of the Party's informative inventory report, or in a separate report, by 15 March of the same year for a review by the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP).

6. The present report provides a summary of the 2017 review of applications for adjustments to inventories submitted by Spain in accordance with Executive Body decisions 2012/3, 2012/4, 2012/12 and 2014/1 and following the Technical Guidance. The report also provides information on adjustments which were approved in years prior to 2017.

7. The report was prepared by the EMEP Centre on Emission Inventories and Projections (CEIP) in line with its mandate under the 2016-2017 workplan for implementation of the Convention (ECE/EB.AIR/133/Add.1) and the complementary document submitted to the Executive Body at its thirty-fourth session, "Basic and multi-year activities in the 2016-2017 period" (item 1.7.1). The report is based on the documents submitted by Parties plus documents elaborated by the expert review team during the review process in 2017.

I. Overview of 2017 adjustment applications

8. One party — Spain — submitted new applications for adjustments to the secretariat in early 2017. The Party applied for adjustments to its national emission inventories. The details of the applications are given in table 1 below.

Table 1
New applications for adjustments to emission reduction commitments or inventories in 2017

Country	*Sector*	*NFR source category*[a]	*Pollutant*	*Years*	*Extraordinary circumstances (decision 2012/3, para. 6*[a]*)*
Spain	Agriculture	3B	NO_x	2010-2015	new emission source category
	Agriculture	3B	NH_3	2010-2015	significant changes in methodologies applied
	Agriculture	3D1a, 3Da2a, 3Da3	NH_3	2010-2015	significant changes in methodologies applied

Abbreviations: NFR = Nomenclature for Reporting; NH_3 = ammonia; NO_x = nitrogen oxides.

[a] For a description of source categories, see the *EMEP/EEA air pollutant emission inventory guidebook 2016*, EEA Technical report No. 21/2016 (Luxembourg, Publications Office of the European Union, 2016). Available from https://www.eea.europa.eu/publications/emep-eea-guidebook-2016

II. Organization of the review

9. As mandated by Executive Body decision 2012/12, applications for adjustments submitted by Parties are subject to an expert review. Technical coordination and support for the 2017 review was provided by CEIP, led by Ms. Katarina Mareckova (Slovakia). The members of the review team were selected from the review experts nominated by Parties to the CEIP roster of experts.

10. The adjustment review was performed in parallel with the Stage 3 review. The expert review team was composed of a lead reviewer, Chris Dore (United Kingdom of Great Britain and Northern Ireland) and eight sectoral experts: Ms. Antonella Bernetti, transport (Italy); Mr. Juan Jose Rincon Cristobal, agriculture (Spain); Mr. Giannis Papadimitriu, transport (European Union); Ms. Simone Haider, agriculture (Austria); Mr. Ole Kenneth Nielsen, transport (Denmark); Ms. Isabelle Higuette stationary combustion (Belgium); Mr. Hakam al Hanbali, agriculture (Sweden); and Mr. Dirk Wever, stationary combustion (Netherlands). The expert review team assessed the 2017 applications for adjustments and checked the reporting on adjustments that were approved in years prior to 2017.

11. Each sector was reviewed by two independent sectoral experts during May and June 2017 (desk review). The findings were discussed at a meeting held at the European Environment Agency (EEA) in Copenhagen from 19 to 23 June 2017. The conclusions and

recommendations from the review for submission to the EMEP Steering Body were discussed during the review week. They are summarized in chapters III and IV below.

12. CEIP developed a dedicated web page[1] for the review process, presenting an introduction to the process and containing links to documentation and supporting information on adjustments submitted by Parties in 2017 and the adjustments approved in years prior to 2017. In addition, the tool for the assessment of adjustment applications approved prior to 2017 was provided to the reviewers on the CEIP website.

III. Assessment of new applications for adjustments

Spain — manure management (3B) and agriculture soils (3D1a, 3Da2a, 3Da3)

13. Spain made an application for adjustments of ammonia (NH_3) emissions from Nomenclature for Reporting (NFR) sectors manure management (3B) and agricultural soils (3D) based on significant changes in methodologies and for nitrogen oxides (NO_x) emissions from the manure management sector based on a new source of emissions. The expert review team undertook a full and thorough assessment of the application by Spain for an adjustment to its NH_3 and NO_x emissions inventory for 2010-2015 for the manure management source sector, NFR categories 3B1a, 3B1b, 3B2, 3B3, 3B4d, 3B4e, 3B4f, 3B4gi, 3B4gii and 3B4giv (henceforth referred to as 3B) and NH_3 emissions from inorganic nitrogen fertilizers (3D1a), animal manure applied to soils (3Da2a) and urine and dung deposited by grazing animals (3D3a) (henceforth referred to as 3D).

Nitrogen oxides adjustment applications

14. The reviewers noted that no methodologies for the estimation of NO_x emissions from manure management were included in the *EMEP/CORINAR Atmospheric Emission Inventory Guidebook 1999* (1999 Guidebook).[2] They concluded that the supporting evidence provided 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.

15. In its submission in 2017, Spain reported NO_x emissions from sector 3B for the first time. Calculations are based on the *EMEP/EEA air pollutant emission inventory guidebook 2016*[3] (2016 Guidebook). In its adjustment application (informative inventory report, chapter 11), Spain provided specific information to support its application for an adjustment. The adjustment application for NO_x emissions from source category 3B is for a new source and the quantification is defined as being equal to the sectoral emissions, in agreement with the methods for quantifying an adjustment presented in the Technical Guidance. Thus, the expert review team was able to deduce the adjustment values, even though the methodological descriptions in the informative inventory report were not fully transparent.

16. The expert review team concluded that the application does meet all of the requirements laid out in decision 2012/12 of the Executive Body and therefore recommends

[1] See http://www.ceip.at/adjustments_gp (updated on 13 February 2017).

[2] Technical report No. 30 (Copenhagen, European Environment Agency, 1999). Available from http://www.eea.europa.eu//publications/EMEPCORINAIR.

[3] Technical report No. 21/2016 (Luxembourg, Publications Office of the European Union, 2016). Available from https://www.eea.europa.eu/publications/emep-eea-guidebook-2016.

that the EMEP Steering Body accept this adjustment application. The impact of the proposed adjustment is summarized in table 2 below.

Table 2
Impact of adjustment on the NO_x emissions inventory of Spain for the manure management sector for 2010-2015

	Thousands of tons (ktons) of NO_x					
NFR Source category(ies)	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
3B Manure management	-3.9	-4.0	-3.9	-3.8	-3.9	-4.1
Total NO_x	**-3.9**	**-4.0**	**-3.9**	**-3.8**	**-3.9**	**-4.1**

Ammonia adjustments application

17. In its 2017 submission, Spain improved its methodologies for calculation of NH_3 emissions from the manure management (3B) and agricultural soils (3D) sectors, specifically for source categories inorganic N-fertilizers (3D1a), animal manure applied to soils (3Da2a) and urine and dung deposited by grazing animals (3D3a). This improvement is based on the 2016 Guidebook, which provides new emission factors for animal husbandry, manure management and agricultural soils.

18. The adjustment application requires the provision of specific supporting information to demonstrate compliance with specific criteria (decision 2012/3, para. 6 (a)-(c)) The expert review team reviewed the supporting documentation with regard to these criteria and noted that the methodologies used in the original air emission inventory of Spain used for determining NH_3 emissions from manure management and agricultural soils were not based on the latest available guidance at the time when NH_3 emissions ceilings were set.

19. In its informative inventory report, chapter 11 (Adjustments), Spain provided detailed documentation of the methodologies used at the time when emission ceilings were set. Emission calculations were based on the *CORINAIR Inventory-Default Emissions Factors Handbook* of January 1992.[4] However, the methods for quantifying an adjustment are presented in the Technical Guidance. This explains that for quantifying an adjustment, the original methodology is taken from the 1999 Guidebook, so that the quantification of the adjustment represents the change in the scientific understanding (irrespective of the methodologies that were used by the country at that time).

20. For NH_3 calculations within source category 3B, Spain used global-total emission factors per animal category including emissions from stable, application and meadow. Thus, the adjustment application provided for manure management also considers emissions reported in the 2017 submission under the categories animal manure applied to soils (3Da2a) and urine and dung deposited by grazing animals (3Da3). The chosen approach for NH_3 estimation corresponds to a tier 1 methodology. However, for key categories, best practice requires higher tier methods to be used.

21. In its response to a question of the expert review team, Spain submitted data on annually changing nitrogen (N) excretion amounts from animal livestock. Productivity (milk yields) and N excretion (Nex) from dairy cattle significantly increased since the time the ceilings were set (from 86.13 kilograms (kg) Nex in the year 2000 to 110.7 kg Nex in 2015). The expert review team notes that these are not changes which are considered to be

[4] Commission of the European Community, ed. (Paris, Centre Interprofessional Technique d'Études de la Pollution Atmosphérique, 1992).

valid cases for an adjustment, and the impacts of these changes therefore need to be removed from an adjustment quantification.

22. With the tier 1 approach, the emission factors do not consider increased productivity and changing farming practices. It is therefore not possible to separate the impacts of the changes in the scientific understanding from changes to, e.g., nitrogen excretion values, changing farming practices and changes to animal waste management systems, which are not considered to be changes that can be included in an adjustment application or quantification. To undertake the calculations necessary to quantify the adjustment, a tier 2 methodology is therefore necessary.

23. The expert review team recommends that Spain provide a detailed analysis that transparently demonstrates changes in methodologies caused by an improved understanding of the science for the quantification of the adjustment, and also that change in activity data be excluded from this quantification. In the meantime, the expert review team recommends that the EMEP Steering Body postpone the adjustments submitted for NH_3 emissions from the manure management sector to allow Spain to prepare additional information to support its application. The impact of proposed adjustments is summarized in table below.

Table 3
Calculated impact of potential adjustment (open status) on the NH_3 emissions inventory of Spain for the manure management and agricultural soils sectors for 2010-2015

	Thousands of tons (ktons) of NH_3					
NFR source category(ies)	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
3B Manure management	-101.0	-103.4	-100.5	-99.1	-100.7	-107.7
3Da2a Animal manure applied to soils[a]	40.5	38.8	38.5	38.3	40.2	41.4
3Da3-Urine and dung deposited by grazing animals[a]	22.8	22.0	22.0	22.2	23.0	23.3
Total NH_3	**-37.7**	**-42.6**	**-40.0**	**-38.6**	**-37.5**	**-43.0**

[a] In the original inventory, NH_3 emissions from NFR categories 3Da2 (Animal manure applied to soils) and 3Da3 (Urine and dung deposited by grazing animals) were considered under NFR category 3B (Manure management); in the 2017 submission it is reported separately.

24. For NH_3 calculations within the inorganic N-fertilizers sector (3Da1), Spain used an average default emission factor of 40 kg NH_3 per ton of total nitrogen in fertilizer. This emission factor was recommended in the *CORINAIR Inventory-Default Emissions Factors Handbook* of January 1992. However, the methods for quantifying an adjustment are presented in the Technical Guidance. This explains that the original methodology is taken from the 1999 Guidebook, so that the quantification of the adjustment represents the change in the scientific understanding (irrespective of the methodologies that were used by the country at that time). In addition, the expert review team noted that for key categories higher tier methods should be applied. The detailed methodology presented in the 1999 Guidebook is therefore the appropriate methodology for use as the original methodology.

25. The expert review team made an assessment of the adjustment using the methodology in the 1999 Guidebook as the original methodology and concluded that the adjustment would increase the emission estimates of NH_3. Consequently, the expert review team concluded that the application for an NH_3 adjustment did not meet the requirements laid out in Executive Body decision 2012/12. In particular, the expert review team noted that the application did not follow the methods for quantifying an adjustment presented in the Technical Guidance. The expert review team therefore recommends that the EMEP Steering Body reject the adjustments submitted for NH_3 emissions from the inorganic N-

fertilizers sector (3Da1). The potential impact of adjustment proposed for rejection is summarized in table 4 below.

Table 4
Adjustment application by Spain proposed for rejection – NH_3 sector 3D1a, 2010-2015

	Thousands of tons (ktons) of NH_3					
NFR source category(ies)	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
3D1a Inorganic N-fertilizers	-45.2	-40.6	-40.8	-48.1	-57.9	-51.8
Total NH_3	**-45.2**	**-40.6**	**-40.8**	**-48.1**	**-57.9**	**-51.8**

26. In its application for an adjustment, Spain indicated that its national totals of NH_3 emissions would be below their ceilings in accordance with the Gothenburg Protocol for the years 2011, 2012 and 2013, if the proposed adjustments were accepted. However, despite the adjustment, NH_3 emissions ceilings are still exceeded for years 2010, 2014 and 2015. In its application for an adjustment of NO_x, emissions these would be below their ceilings for all years; however for the years 2010, 2011 and 2012 this would be true only in combination with a complementary adjustment of road transport (approved in 2015).

IV. Assessment of adjustments approved prior to 2017

27. The reviewers assessed the adjustments reported by Belgium, Denmark, Finland, France, Germany, Luxembourg and Spain that had been approved in 2014 and 2015, as reported in annex VII by 2016. The detailed information on reported adjustments can be downloaded from the CEIP website. A summary is presented in table 5 below.

A. Belgium – road transport (1A3bi-iv)

28. The reviewers undertook a full and thorough assessment of the adjustment for Belgium of NO_x emissions from road transport (1A3bi-iv), approved in 2016. The reviewers concluded that the adjustment met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. The adjustment has been recalculated, and values have slightly increased (compared with 2016) by 0.028 per cent in 2010 and 0.052 per cent in 2011, and have decreased for other years (by 0.005 per cent in 2012, 0.710 per cent in 2013 and 0.803 per cent in 2014). However, the reviewers concluded that there has been no change in the methodology that changes the original approval of the adjustment application.

B. Belgium – manure management (3B), agricultural soils (3Da1, 3Da2a), and cultivated crops (3De)

29. The reviewers undertook a full and thorough assessment of the adjustments for Belgium regarding NO_x emissions in the manure management (3B) and agricultural soils (3Da1, 3Da2a) sectors and for non-methane volatile organic compounds (NMVOCs) for the agricultural sectors manure management (3B) and cultivated crops (3De), all originally approved in 2015 and 2016. The reviewers concluded that the adjustments met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. In the 2017 submission, the adjustments for NO_x have been recalculated for all years (2010-2014) owing to a revision in the animal numbers, the update of inorganic N-fertilizers activity data and the correction of an overestimation in the amount of organic fertilizer. The

result is that the adjustment is now lower than in the previous submission (by 1.1 per cent in 2014, 0.5 per cent in 2013 and less than 0.001 per cent for the other years). Additionally, NMVOC adjustments have been recalculated for 2010 owing to a revision in the animal numbers and their use without silage emission factors in the Flemish Region resulting in only small changes (< 0.001 per cent for 2010).

30. Belgium complies with the NMVOC Gothenburg Protocol ceiling from 2011 onwards without the need for an adjustment. The emissions are estimated using the same methodology as the methodology presented to and approved by the expert review team. The reviewers therefore concluded that there has been no change in the methodology that changes the original approval of the adjustment application.

C. Denmark – inorganic N-Fertilizers (3D1a), cultivated crops (3De) and manure management (3B)

31. The reviewers undertook a full and thorough assessment of the adjustments for Denmark regarding NH_3 emissions in the inorganic N-fertilizers (3Da1) and cultivated crops (3De) sectors, which were originally approved in 2014, 2015 and 2016, respectively, and also for NMVOC for the whole manure management sector (3B), originally approved in 2015 and 2016. The reviewers concluded that the adjustments met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. In the 2017 submission, the adjustment for NH_3 of inorganic N-Fertilizers (3Da1) has been recalculated for all years (2010-2014) owing to the application of the latest emission factors from the 2016 Guidebook. However, there have been no amendments of methodology. The result is that the adjustment is now lower than in the previous submission (by approximately 16 per cent for 2014). Additionally, the NMVOC adjustment of manure management (3B) has been recalculated because of revisions related to the number of animals for the years 2011-2014, resulting in only small changes (< 0.1 per cent for all affected years).

32. The emissions are estimated using the same methodology as the methodology presented to and approved by the expert review team. The reviewers therefore concluded that there has been no change in the methodology that changes the original approval of the adjustment application.

D. Finland – stationary combustion (1A4ai, 1A4bi, 1A4ci)

33. The reviewers undertook a full and thorough assessment of the adjustments for NH_3 emissions for Finland from the subsectors commercial/industrial stationary combustion (1A4ai), residential stationary combustion (1A4bi) and agriculture/forestry/fishing stationary combustion (1A4ci), originally approved in 2015. The reviewers concluded that the adjustments met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. More specifically, the adjustments have been recalculated owing to updated activity data, and in total values have decreased by approximately 3 per cent (for emission year 2014). Finland provided an explanation of these recalculations and the reviewers concluded that there has been no change in the methodology that changes the original approval of the adjustment application.

E. Finland – road transport (1A3bi-iv)

34. The reviewers undertook a full and thorough assessment of the adjustment for Finland for NH_3 emissions for the passenger cars (1A3bi), light duty vehicles (1A3bii), heavy duty vehicles and buses (1A3biii) and mopeds and motorcycles (1A3biv) subsectors, approved in 2016. The reviewers concluded that the adjustment met all of the requirements

laid out in Executive Body decision 2012/12 and in the Technical Guidance. The adjustment has been recalculated, and values have decreased by 9.8 to 17.9 per cent (total for 1A3bi-iv, compared with 2016; 9.8 per cent for the year 2010; 17.9 per cent for the year 2014). Finland provided information to the reviewers explaining that the above differences are due to revision of emission factors according to the 2016 Guidebook. In the previous submissions, expert estimates based on the *EMEP/EEA air pollutant emission inventory guidebook 2013*[5] (2013 Guidebook) were used. The reviewers checked that the revised emission factors are in accordance with the 2016 Guidebook and concluded that there has been no further change in the methodology that changes the original approval of the adjustment application.

F. France – road transport (1A3bi-iv)

35. The reviewers undertook a full and thorough assessment of the adjustment for France of NO_x emissions from road transport (1A3bi-iv) approved in 2016. In 2017 France submitted adjustments for road transport NO_x emissions relating to the years 2010-2015, declaring that the method and emission factors used for the calculation of emissions are the same as for road transport NO_x emissions approved in 2016. Nevertheless, the adjustment has been recalculated, and adjustment values differ by less than 2 per cent with respect to 2016 values (1.1 per cent in 2010 and 2014, 0.6 per cent in 2011, 1.8 per cent in 2012 and 1.6 per cent in 2013). France declared that in the 2017 submission various improvements had been implemented (using the same software tool used worldwide to calculate air pollutant and greenhouse gas emissions from road transport (COPERT) 4 version 11 methodology as in 2016), in respect to the previous submission, including: more detailed classification of the fleet by age; the use of the information that foreign vehicles are generally more recent than French vehicles; the use of more accurate national statistics about the mileage of buses and coaches; and improvement of the correction of the slope effect for heavy duty trucks.

36. The reviewers concluded that there has been no change in the methodology that changes the original approval of the adjustment application. The reviewers concluded that the adjustment met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance.

G. Germany – road transport (1A3bi-iv)

37. The reviewers undertook a full and thorough assessment of the adjustment for Germany for NO_x emissions from road transport (1A3bi-iv) originally approved in 2016. The reviewers concluded that the adjustment met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. The adjustment has been recalculated, and values have decreased by 0.1-0.7 per cent for the period 2011-2014 (compared with 2016 approval; 0.1 per cent decrease for the year 2011; 0.7 per cent decrease for the year 2014), while there is a slight increase of 0.02 per cent for the year 2010. However, the reviewers concluded that there has been no change in the methodology that changes the original approval of the adjustment application.

[5] EEA Technical report No. 12/2013 (Luxembourg, Publications Office of the European Union, 2013). Available from http://www.eea.europa.eu/publications/emep-eea-guidebook-2013.

H. Germany – manure management (3B), cultivated crops (3De), other organic fertilizers applied to soils (3Da2c) and agriculture other (3I)

38. The reviewers undertook a full and thorough assessment of the adjustment for Germany for NO_x and NMVOC emissions in the categories manure management (3B) and cultivated crops (3De), originally approved in 2014 (NO_x), 2015 (NMVOC and NO_x) and 2016 (NMVOC and NO_x), respectively, and for NO_x and NH_3 in the agriculture other (3I) sector, originally approved in 2016. The reviewers concluded that the adjustments met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance.

39. In the 2017 submission, the adjustments of NO_x and NH_3 in the categories manure management (3B), other organic fertilizers applied to soils (3Da2c) and agriculture other (3I) have been recalculated for all years (2010-2014) owing to the update in the time series of substrate data and the distribution of gastight storage. However, there have been no amendments of methodology. The result is that the adjustment for NH_3 is now lower than in the previous submission (by approximately 4 per cent for 2014). Additionally, the NO_x adjustment is also lower than in the previous submission (<0.5 per cent for all affected years). The emissions are estimated using the same methodology as the methodology presented to and approved by the expert review team. The reviewers therefore concluded that there has been no change in the methodology that changes the original approval of the adjustment application.

I. Luxembourg – road transport (1A3bi-iv)

40. The reviewers undertook a full and thorough assessment of the adjustment for Luxembourg for NO_x emissions originating from road transport (1A3bi-iv) approved in 2016. The reviewers concluded that the adjustment met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. The adjustment has been recalculated, and values have decreased by 4-5.3 per cent (compared with 2016; 4 per cent for the year 2010; 5.3 per cent for the year 2013; 4.6 per cent for the year 2014). Luxembourg provided information in its 2017 informative inventory report submission explaining that the above differences are owing to differences in the emission factors between the *Handbook Emission Factors for Road Transport*[6] versions 1.2 and 3.2. However, the reviewers concluded that there has been no further change in the methodology that changes the original approval of the adjustment application.

J. Luxembourg – manure management (3B), agricultural soils (3D) and cultivated crops (3De)

41. The reviewers undertook a full and thorough assessment of the adjustments for Luxembourg regarding NO_x and NMVOC in the manure management (3B) sector, for NO_x for agricultural soils (3Da1, 3Da2a, 3Da2b and 3Da2c) and for NMVOC for cultivated crops (3De), all originally approved in 2016. The adjustments for NO_x manure management (3B) and NMVOC for cultivated crops (3De) were not modified in the 2017 submission. The adjustments for NO_x for agricultural soils (3D) have been recalculated for all years (2010-2014) owing to the application of the latest emission factors from the 2016 Guidebook. The result is that the adjustment is now bigger than in the previous submission (more than 45 per cent for 2010-2013 and 37 per cent for 2014. This change is considered

[6] INFRAS, Bern.

as standard improvement of inventory and is consistent with requirements of reporting guidelines.

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42. The adjustment for NMVOC for manure management (3B) has been recalculated for all years (2010-2014) owing to the update to the 2016 Guidebook tier 2. The result is that the adjustment is now lower than in the previous submission (more than 30 per cent for all years). The recalculation is considered as standard improvement of inventories, however, the recalculated adjustment of NMVOC for manure management (3B) of this submission could not be checked in full detail as the information provided in the informative inventory report was not complete. Luxembourg provided additional information on request of the expert review team, but information provided did not allow to reproduce the reported values. The reviewers therefore concluded that there has been no change in the methodology that changes the original approval of the adjustment application. However, the reviewers note that improved transparency is required, and that a detailed check will be performed on the information to be provided in 2018.

K. Spain – road transport (1A3bi and 1A3biii)

43. The reviewers undertook a full and thorough assessment of the adjustment for Spain regarding NO_x emissions for passenger cars (1A3bi) and heavy duty vehicles (1A3biii), originally approved in 2015. Spain declares that the methods and criteria used for the calculation of NO_x emissions are the same as in 2015 (COPERT 4 version 10 and 2013 Guidebook), when the original adjustments were approved, except for NO_x emissions from passenger cars (1A3bi) for the years 2010, 2011 and 2012, recalculated in order to consider updated mileage data, in particular urban mileage, also taking into account the new EMEP geographical coverage.

44. The adjustment for road transport has been recalculated and it is more incisive in 2017. With respect to the adjustment application approved in 2016, adjustment values differ by about 4.3 per cent in 2010, 3.5 per cent in 2011 and 3.7 per cent in 2012. With respect to annual emissions of NO_x, the requested adjustment accounts on average for about 13 per cent. 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 is with no amendments to the methodology.

V. Conclusions and recommendations

A. Adjustment cases prior to 2017

45. This section provides a summary of the adjusted emissions accepted by the expert review team during the review performed in May and June 2017, as reported by Belgium, Denmark, Finland, France, Germany, Luxembourg and Spain in 2017 (table 5). The reported adjustments refer to NO_x, NMVOC and NH_3 emissions for various NFR sectors. More detailed information regarding each reported adjustment can be found in chapter IV.

46. The expert review team assessed the reported data and concluded that the adjustments met all of the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance, and therefore recommended that the EMEP Steering Body accept all adjustments as reported by the countries Belgium, Denmark, Finland, France, Germany, Luxembourg and Spain (see table 5).

Table 5
Emission adjustments approved in 2016, as reported by countries in 2017
(in thousands of tons)

Reference number	*Pollutant*	*NFR*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Belgium-A	NO_x	1A3bi-iv	-48.214	-47.975	-47.328	-47.242	-44.797	-40.453
Belgium-B	NO_x	3B	-0.379	-0.372	-0.369	-0.372	-0.376	-0.383
Belgium-C	NO_x	3Da1	-6.032	-5.922	-5.767	-5.725	-5.795	-5.723
Belgium-C	NO_x	3Da2a	-6.803	-6.526	-6.313	-6.311	-6.218	-6.118
Belgium-B	NMVOC	3B	-28.242	..	..	..	..	..
Belgium-C	NMVOC	3De	-1.215	..	..	..	..	..
Total (Belgium)	**NO_x**		**-61.427**	**-60.795**	**-59.776**	**-59.650**	**-57.186**	**-52.677**
Total (Belgium)	**NMVOC**		**-29.46**	**..**	**..**	**..**	**..**	**..**
Denmark_01	NH_3	3Da1	-2.042	-1.627	-1.511	-2.049	-2.251	-2.058
Denmark_02	NH_3	3De	-5.407	-5.419	-5.401	-5.375	-5.452	-5.401
Denmark_03	NMVOC	3B	-35.436	-35.307	-35.663	-35.876	-35.745	-35.683
Total (Denmark)	**NH_3**		**-7.449**	**-7.046**	**-6.912**	**-7.424**	**-7.703**	**-7.459**
Total (Denmark)	**NMVOC**		**-35.436**	**-35.307**	**-35.663**	**-35.876**	**-35.745**	**-35.683**
Finland	NH_3	1A4	-0.479	-0.372	-0.391	-0.340	-0.353	-0.339
Finland	NH_3	1A3bi-iv	-1.375	-1.264	-1.152	-1.067	-0.990	-0.906
Total (Finland)	**NH_3**		**-1.854**	**-1.637**	**-1.543**	**-1.407**	**-1.342**	**-1.245**
France	NO_x	1A3bi-iv	-148.559	-153.879	-152.787	-153.690	-147.135	-135.998
Total (France)	**NO_x**	**1A3bi-iv**	**-148.559**	**-153.879**	**-152.787**	**-153.690**	**-147.135**	**-135.998**
Germany	NO_x	1A3b	-151.300	-146.800	-145.000	-142.400	-127.200	-100.900
Germany	NO_x	3B	-2.046	-2.007	-1.980	-1.975	-1.985	-1.966
Germany	NO_x	3D	-108.789	-119.220	-114.900	-117.657	-119.892	-125.562
Germany	NO_x	3I	-0.161	-0.183	-0.154	-0.170	-0.163	-0.164
Germany	NMVOC	3B	-191.736	-191.699	-194.108	-198.356	-199.704	-198.633
Germany	NMVOC	3D	-9.491	-8.992	-10.021	-10.323	-11.340	-9.846
Germany	NH_3	3Da2c	-36.939	-46.340	-48.454	-57.735	-60.418	-60.726
Germany	NH_3	3I	-2.999	-3.401	-2.877	-3.172	-3.030	-3.045
Total (Germany)	**NO_x**		**-262.296**	**-268.210**	**-262.034**	**-262.202**	**-249.240**	**-228.592**
Total (Germany)	**NMVOC**		**-201.227**	**-200.692**	**-204.130**	**-208.678**	**-211.044**	**-208.479**
Total (Germany)	**NH_3**		**-39 939**	**-49.741**	**-51.331**	**-60.908**	**-63.448**	**-63.771**
Luxembourg	NO_x	1A3bi-iv	-2.588	-2.736	-2.827	-2.862	-2.879	-2.681
Luxembourg	NO_x	3B	-0.046	-0.044	-0.043	-0.045	-0.046	-0.045
Luxembourg[a]	NO_x	3Da1, 3Da2a, 3Da2b, 3Da2c	-1.270	-1.214	-1.139	-1.161	-1.094	-1.089

Reference number	*Pollutant*	*NFR*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Luxembourg[b]	NMVOC	3B	-1.549	-1.491	-1.454	-1.499	-1.550	-1.582
Luxembourg	NMVOC	3De	-0.113	-0.113	-0.113	-0.113	-0.112	-0.113
Total (Luxembourg)[a]	**NO_x**		**-3.761**	**-3.994**	**-4.009**	**-4.068**	**-4.019**	**-3.815**
Total (Luxembourg)[b]	**NMVOC**		**-0.113**	**-0.113**	**-0.113**	**-0.113**	**-0.112**	**-0.113**
Spain	NO_x	1A3bi, 1A3biii	-132.486	-125.727	-115.287	-114.974	-114.377	-89.968
Total (Spain)	**NO_x**		**-132.486**	**-125.727**	**-115.287**	**-114.974**	**-114.377**	**-89.968**

Note: Two dots (..) indicate "not applicable".

[a] Figures corrected by Luxembourg during the review.

[b] Within the available resources and time constraints, the expert review team has not been able to determine whether the recalculations of NMVOC emissions (3B) are performed correctly. Information provided by the country did not allow to fully reproduce the reported values. The expert review team, therefore, recommends that the EMEP Steering Body assign this adjustment application (NMVOC;-3B) an open status. Luxembourg has to provide additional information for the expert review team to be able to conclude whether the application should be accepted.

B. 2017 adjustment cases

47. Applications made by Spain in 2017 for adjustments were assessed. The expert review team determined that additional information was needed from the Party to enable a sufficiently detailed review. The Party provided additional information on NO_x and NH_3 adjustments. Table 6 below provides a summary of the adjustment applications received in 2017, and the subsequent expert review team recommendations to the EMEP Steering Body.

Table 6
Adjustment applications received in 2017 and expert review team recommendations

Country	*Sector*	*NFR*	*Pollutant*	*Years*	*Expert review team recommendation*
Spain	Agriculture	3B	NO_x	2010-2015	Accept
Spain		3B	NH_3	2010-2015	[a]
Spain		3D1a	NH_3	2010-2015	Reject
Spain		3Da2a, 3Da3	NH_3	2010-2015	[a]

[a] Within the available resources and time constraints, the expert review team has not been able to determine whether the basis for some of the submitted NH_3 applications for the manure management sector meets all of the requirements laid out in Executive Body decision 2012/12. The expert review team therefore recommends that the EMEP Steering Body assign such adjustment application an open status. The Party has to provide additional information for expert review team to be able to conclude whether the application should be accepted or rejected.

48. The detailed conclusions and recommendations regarding the 2017 adjustment applications can be found in chapter III of this report. The expert review team has prepared a country-specific report containing detailed explanations of the findings. These explanations will be made available to Spain and will also be published on the CEIP

website. The country-specific report will be available as informal document for the third joint session of the EMEP Steering Body and the Working Group on Effects.

49. In 2017, there has been a change in the demands on the expert review team in that there are considerably more previously approved adjustments to review, some significant recalculations and one new application. This has placed increased demands on the team. If countries do not report complete, sufficient information in due time (15 March) on a detailed level (NFR categories) and do not provide sufficient resources for reviewers, it cannot be ensured that submitted adjustment applications can be reviewed in the current year and recommendations provided to the EMEP Steering Body.

C. Recommendations from the reviewers

50. The declarations "on consistent reporting of approved adjustments" provided by countries on a voluntary basis were evaluated by the reviewers, and were considered to be very helpful in making the assessment process more efficient. It is recommended that the Steering Body continue to encourage countries to submit such a statement along with the completed annex VII on an annual basis.

51. In the road transport sector, there is a need for Parties to provide transparent information about the emission factors that have been assumed, particularly when making the "original" emission estimates for years which are beyond the emission factors available in the original models. For this calculation, the reviewers consider it best practice to continue to use Euro 4 emission factors, as this reflects the information that was available at the time, rather than emission factors which were established after 2010 emission ceilings were agreed.

52. Reviewers recognized the need for more detailed information along with annex VII if countries recalculate emissions owing to a shift to a higher tier method, improved activity data or a move to country-specific methods. It is important that Parties submit such information by the deadline of 15 March each year to allow efficient review in May and June of the same year.

53. It is important that Parties continue to use the same reporting format for information on previously approved adjustments, i.e., using the same units and the same level of disaggregation across the emission source sectors. The data handling systems can only process the information provided in different submissions if reported in a consistent way.