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Executive Body for the Convention on Long-range Transboundary Air Pollution

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

Working Group on Effects

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Progress in activities of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe in 2020 and future work: improvement and reporting of emission data and adjustments under the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone: 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 2020–2021 workplan for the implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/144/Add.2).

The report provides a summary of the 2020 review of applications for adjustments to emission inventories submitted by Czechia in accordance with Executive Body decisions 2012/3, 2012/4 and 2012/12, as amended by decision 2014/1.[1]

It also provides information on applications on the adjustments approved for Belgium, Denmark, Finland, France, Germany, Hungary, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland prior to 2020. The review is based on documents submitted by Parties and findings of the Expert Review Team.

[1] Available at www.unece.org/env/lrtap/executivebody/eb_decision.html.

I. Introduction

1. At its thirtieth session (Geneva, 30 April–4 May 2012), aware of the uncertainties inherent in estimating and projecting emission levels and of the need for continuous scientific and methodological improvements and determined that the emergence of new methodologies should not place a Party at a disadvantage in terms of its emission reduction commitments, the Executive Body for the Convention on Long-range Transboundary Air Pollution adopted decisions 2012/3 and 2012/4[2] in order to allow Parties to make adjustments to emission reduction commitments, or to inventories for the purposes of comparing total national emissions with them, pursuant to the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to the Convention on Long-range Transboundary Air Pollution.

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 annex to that decision, sets out the general principles that Parties should follow in submitting applications for adjustments.

3. However, following the first review of adjustment applications by countries in 2014, it became evident that more detailed technical guidance was needed. At its thirty-third session (Geneva, 8–11 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 28 April 2015.

4. Pursuant to the Executive Body's decisions, as clarified by the Technical Guidance, Parties may apply to adjust their inventory data or emission reduction commitments under 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 Executive Body 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 from 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. A 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 (ECE) by 15 February at the latest if the application is to be reviewed during the same 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 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 summarizes the review of the inventory adjustment applications submitted by Czechia in 2020 in accordance with Executive Body decisions 2012/3, 2012/4, 2012/12 and 2014/1 and in light of the Technical Guidance. It also provides information on adjustments approved prior to 2020.

7. The report is based on the documents submitted by Parties and those prepared by the Expert Review Team during the review process in 2020. It was prepared by the EMEP Centre

[2] Available at www.unece.org/env/lrtap/executivebody/eb_decision.html.

on Emission Inventories and Projections in line with its mandate under the 2020–2021 workplan for implementation of the Convention (ECE/EB.AIR/144/Add.2).

II. Organization of the review

8. As mandated by Executive Body decision 2012/12, applications for adjustments submitted by Parties are subject to expert review. Technical coordination of and support for the 2019 review was provided by the Centre on Emission Inventories and Projections, led by Ms. Katarina Mareckova (Slovakia). The members of the review team were selected from the experts appointed to the Centre on Emission Inventories and Projections roster of experts by the Parties.

9. The adjustment review was performed in parallel with the stage 3 review. The Expert Review Team was composed of a lead reviewer, Ms. Kristina Saarinen (Finland), and seven sectoral experts: Ms. Magdalena Zimakowska-Laskowska, transport (Poland); Mr. Giannis Papadimitriou, transport (European Union); Ms. Marion Pinterits, energy (European Union); Mr. Erik Honig, energy (Netherlands); Ms. Gwenaëlle Le Borgne, agriculture (France); Mr. Hakam Al-Hanbali, agriculture (Sweden); and Mr. Peder Gjølstad Røhnebæk, agriculture (Norway). The team assessed:

(a) New adjustment applications submitted in 2020;

(b) Adjustments approved prior to 2020.

10. Each sector was reviewed by two independent sectoral experts during May and June 2020 (desk review). The findings were discussed within the review team. The conclusions and recommendations from the review for submission to the EMEP Steering Body were elaborated by the review team and are summarized in sections III and IV below.

11. The Centre on Emission Inventories and Projections has updated a dedicated web page[3] for the review process, which provides an introduction, links to documentation and other information on the adjustments submitted by Parties in 2020 and those approved prior to 2020, as well as the tool used by the reviewers in assessing adjustment applications approved prior to 2020.

III. Assessment of new adjustment applications of Czechia

12. Czechia submitted new adjustment applications to the secretariat in early 2020. The Party applied for adjustments to its national emission inventory. For the details of the applications, see table 1 below.

[3] See https://www.ceip.at/ms/ceip_home1/ceip_home/adjustments_gp/adj_country_data/index.html. (last updated in June 2020).

Table 1
New applications for adjustments to emission inventories in 2020

Country	*Sector*	*NFR*	*Pollutant*	*Years*	*Extraordinary circumstances (decision 2012/3, para. 6(a))*
Czechia	Agriculture	3.B [a]	NMVOC	2010–2018	New emission source category
Czechia	Agriculture	3.B [a]	NO_x	2010–2018	New emission source category

Abbreviations: NFR, nomenclature for reporting; NMVOC, non-methane volatile organic compound; NO_x, nitrogen oxides.

Notes: [a] For a description of source categories, see European Environment Agency, *EMEP/EEA air pollutant emission inventory guidebook: 2016. Technical guidance to prepare national emission inventories*, Report No. 21/2016 (Luxembourg, Publications Office of the European Union, 2016). Available at www.eea.europa.eu/publications/emep-eea-guidebook-2016; and annex I to the Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution (Reporting Guidelines), available at https://www.ceip.at/ms/ceip_home1/ceip_home/reporting_instructions/annexes_to_guidelines/index.html

13. The Expert Review Team conducted a full and thorough assessment of the application of Czechia (see table 2 below)for an adjustment to its non-methane volatile organic compound (NMVOC) emissions inventory for 2010–2018: NMVOC manure management (3.B.1.a–b, 3.B.2, 3.B.3 and 3.B.4.d–h).

14. During the review, emissions calculations and two updated tables for the informative inventory report were received from Czechia and included in the assessment. In the 2020 submission, Czechia included NMVOC and nitrogen oxides (NO_x) emissions from manure management (3.B) in its inventory in accordance with the methodology presented in the 2016 *EMEP/EEA air pollutant emission inventory guidebook* (2016 Guidebook[4]) and identified these as new sources that were not accounted for when its emission reduction commitments were set. The second edition of the Guidebook (*EMEP/CORINAIR Atmospheric Emission Inventory Guidebook 1999* (1999 Guidebook))[5] did not provide methodologies for estimating NMVOC and NO_x from these sources. Czechia indicated that, if the proposed adjustments are accepted, its national total of NMVOC emissions will be below the emission ceiling in accordance with the Gothenburg Protocol as from 2014 for NMVOCs. The Expert Review Team concluded that the NMVOC adjustment applications met all of the requirements set out in the Executive Body decision 2012/12 and in the Technical Guidance and therefore recommended that the EMEP Steering Body accept these adjustment applications.

15. For NO_x emissions, agriculture is only a small contributor to the national total, which will be below the emission ceiling in accordance with the Gothenburg Protocol as from 2010, even without the adjustments. Review team concluded that Czechia was in compliance with NO_x emissions also without adjustments and therefore there is no need to approve these.

[4] https://www.eea.europa.eu//publications/emep-eea-guidebook-2016.

[5] European Environment Agency, *EMEP/CORINAIR Atmospheric Emission Inventory Guidebook 1999*, Technical report No. 30 (Copenhagen, 1999). Available at: www.eea.europa.eu//publications/EMEPCORINAIR.

Table 2
Impact of adjustments on the non-methane volatile organic compound and NO_x emission inventories of Czechia for 2010-2018
(Thousands of tonnes)

Reference number	*Pollutant*	*NFR*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
Czechia 1	NMVOC	3.B	-19.865	-19.240	-19.149	-19.521	-19.548	-19.990	-20.120	-20.171	-20.472

IV. Assessment of adjustments approved prior to 2020

16. The reviewers assessed the adjustments reported by Belgium, Denmark, Finland, France, Germany, Hungary, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland that had been approved prior to 2020, as reported in annex VII to the reporting guidelines.[6] Details on these adjustments may be downloaded from the Centre on Emission Inventories and Projections website. A summary is presented in table 4 below.

A. Belgium – road transport (1.A.3.b.i–iv)

17. The reviewers conducted an assessment of the adjustment of NO_x emissions from road transport (1.A.3.b.i–iv) for Belgium, originally approved in 2015, mainly due to significant changes in emission factors. The adjustment was recalculated in 2020 and the corresponding values present small changes compared to the latest approved version (2019): specifically, a 0.778 per cent increase for 2010, a 1.142 per cent increase for 2011, a 4.475 per cent increase for 2012, a 0.547 per cent increase for 2013, a 0.073 per cent decrease for 2014, and a 0.947 per cent increase for 2015. Belgium explained that these differences resulted from the use of a newer (updated) version of the emission calculation tool, which resulted in changes in the vehicle classification and stock module and, hence, changes in the mobility data.

18. The emissions were estimated using the methodology previously presented to and approved by the Expert Review Team. The reviewers therefore concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that the application met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; hence, it is recommended that the adjustment continue to be accepted.

B. Belgium – manure management (3.B), agricultural soils (3.D.a.1 and 3.D.a.2.a) and cultivated crops (3.D.e)

19. The reviewers conducted an assessment of the adjustment for Belgium, based on a new source, for:

(a) NO_x emissions from manure management (3.B), inorganic N-fertilizers (also includes urea application) (3.D.a.1) and animal manure applied to soils (3.D.a.2.a);

(b) NMVOC from manure management (3.B) and cultivated crops (3.D.e).

20. Belgium provided a declaration stating that the criteria and methodologies used in the calculation of NO_x adjustments for the period 2010–2015[7] for all sectors and pollutants were unchanged from the year in which the adjustments had been approved. The reviewers noted

[6] See https://www.ceip.at/ms/ceip_home1/ceip_home/reporting_instructions/index.html.
[7] Original document provided to the Centre on Emission Inventories and Projections indicated years 2010–2016; during the review, Belgium corrected the period to 2010–2015.

that recalculations with an impact on quantification of the adjustment (revisions to livestock numbers in Flanders for 2014 and 2015, correction of the amount of excreted nitrogen (N) from poultry in Flanders for 2013, and a downward revision of the amount of organic fertilizer used in Wallonia) had been made. In total values, the adjustments have increased by 2–4 per cent compared with the last approved adjustment (2019). 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. Reviewers were satisfied with the explanations provided and concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that it met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; they recommended that the adjustment continue to be accepted.

C. Denmark – inorganic N-Fertilizers (3.D.a.1), cultivated crops (3.D.e) and manure management (3.B)

21. The reviewers conducted an assessment of the adjustment for Denmark for:

(a) NH_3 emissions from inorganic N-fertilizers (3.D.a.1) and cultivated crops (3.D.e) based on significantly different emission factors and new sources, respectively;

(b) NMVOC emissions from cultivated crops (3.D.e) based on a new source.

22. For NH_3 from inorganic N-fertilizers, no recalculations have been carried out compared to the previous year. NH_3 emissions from cultivated crops also remained unchanged. In summary, the adjustments regarding NH_3 were not changed from the values approved in 2019.

23. For NMVOC, the reviewers noted that the methodology for NMVOC from manure management had changed from tier 1 to tier 2 for all animal categories. The change in tier had resulted in an increase of about 44 per cent compared with the last approved version (2019). Denmark is using the EMEP/EEA Guidebook tier 2 methodology; this change has increased the emission of NMVOC from cattle, swine, sheep, goats and horses, while the emission has decreased for poultry and other animals. Data for most parameters are included in the informative inventory report (i.e. number of animals, feed intake, volatile solids, grazing days, Fracsilage). Reviewers were satisfied with the explanations provided by Denmark and concluded that the change in the tier level for 3.B NMVOC did not affect the original approval of the adjustment application. The reviewers concluded that there had been no change in the methodologies that would alter the original approval of the adjustment applications and that they met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; they recommended that the adjustments continue to be accepted.

D. Finland – stationary combustion (1.A.4.a.i, 1.A.4.b.i and 1.A.4.c.i)

24. The reviewers conducted an assessment of the NH_3 emissions adjustments for Finland based on significant revisions to emission factors originally approved in 2015 for source categories:

(a) Commercial/industrial stationary combustion (1.A.4.a.i);

(b) Residential stationary combustion (1.A.4.b.i);

(c) Agriculture/forestry/fishing stationary combustion (1.A.4.c.i).

25. The adjustments have been recalculated comparing them to previous submission owing to updated activity data, and to corrected emission factors due to new carbon monoxide emission factors measurement data from which NH_3 emission factors are deduced. In total values, the adjustments have changed by -1 to +1.6 per cent per cent (in the period 2010–2017, see table 4 below). Finland provided an explanation of these recalculations; all relevant information concerning these changes was provided in the declaration on consistent reporting of approved adjustments and the reviewers concluded that there had been no change in the

methodology that changed the original approval of the adjustment application. The reviewers concluded that the adjustments met all the requirements laid out in Executive Body decision 2012/12 and in the Technical Guidance. It is recommended that the adjustments continue to be accepted.

E. Finland – road transport (1.A.3.b.i–iv)

26. The reviewers conducted an assessment of the NH_3 emissions adjustments for Finland for passenger cars (1.A.3.b.i), light duty vehicles (1.A.3.b.ii), heavy duty vehicles and buses (1.A.3.b.iii) and mopeds and motorcycles (1.A.3.b.iv) based on significant changes in emission factors. The adjustments had been recalculated and values had increased by 0.05 per cent for the year 2015 and by 0.04 for the years 2016 and 2017 compared to the last approved version. Finland explained that those differences had resulted from updates in emissions factors and activity data (revised mileage in the national road transport emissions model). The emissions were estimated using the methodology previously approved by the Expert Review Team.

27. The reviewers concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that it met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. The reviewers recommended that the adjustment continue to be accepted.

F. France – road transport (1.A.3.b.i–iv)

28. The reviewers conducted an assessment of the adjustment for France with respect to NO_x emissions from road transport based on significant changes in emission factors. The informative inventory report indicates that the methodology is unchanged from last year's submission, which is already approved by the Expert Review Team. Minor recalculations occurred for the whole time series (2010–2016) and are in the range of -0.175 to +3.231 per cent. France explained in its informative inventory report that those differences had resulted from updates in activity data (revised oil consumption and cold start calculation for vehicles younger than Euro 4).

29. Therefore, the Expert Review Team concluded that there had been no change in the methodology that would alter the original approval of the adjustment and that the application met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. Consequently, the Expert Review Team recommends that the adjustment continue to be accepted.

G. Germany – road transport (1.A.3.b.i–iv)

30. The reviewers conducted an assessment of the adjustment of NO_x emissions from road transport (1.A.3.b.i–iv) for Germany, originally approved in 2014, mainly due to significant changes in emission factors. The adjustment was recalculated in 2020 and the corresponding values present significant changes (increase) compared to the latest approved version (2019), ranging from 70 per cent to 129 per cent (2010–2017): specifically, a 73 per cent increase for 2010 and 2011, a 70 per cent increase for 2012 and 2013, a 72 per cent increase for 2014, an 81 per cent increase for 2015, a 98 per cent increase for 2016, and a 129 per cent increase for 2017. Germany provided a detailed section in the online informative inventory report explaining all the background information related to this adjustment application and stating that these differences resulted from the fundamental revision of the emission calculation tool, having a significant impact on emission factors. In response to a question raised by the Expert Review Team during the review, Germany provided more explanations, clarifying that the recalculation had been performed due to: (a) major revision in the hot emission factors; and (b) a new version of the passenger car and heavy-duty emission model, followed by a routine update of input vehicle parameters. Germany also provided further clarifications regarding a follow-up question raised by the Expert Review Team, attaching an Excel file with an overview of the changes in NO_x emission factors.

31. The emissions were estimated using the methodology previously presented to and approved by the Expert Review Team. The reviewers therefore concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that the application met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; hence, it is recommended that the adjustment continue to be accepted.

H. Germany – manure management (3.B), crop production and agricultural soils (3.D) and storage of energy crops (3.I)

32. The reviewers conducted an assessment of the adjustment for Germany for:

(a) NO_x from manure management (3.B), agricultural soils (3.D), and storage of energy crops (3.I) based on new sources;

(b) NH_3 from crop production and agricultural soils (3.D) and storage of energy crops (3.I) based on significant revisions to emission factors and a new source, respectively;

(c) NMVOCs from manure management (3.B) and crop production and agricultural soils (3.D) based on new sources.

33. Germany provided a declaration stating that the criteria and methodologies used in the calculation of adjustments for the period 2010–2018 for all sectors and pollutants were unchanged, from the year in which the adjustments had been approved. The reviewers noted that the methodology for NMVOC from manure management had changed from tier 1 to tier 2 for dairy cattle and other cattle. They were satisfied with the explanations provided and concluded that the change in the tier level for 3.B NMVOC did not affect the original approval of the adjustment application.

34. Nitrogen oxides emissions from manure management (3.B) had been recalculated for the entire time series and the adjusted values had increased slightly by 0.4 per cent. The NH_3 and NO_x from agricultural soils (3.D) and storage of energy crops (3.I) had also been recalculated for the entire time series. The informative inventory report for 2020 stated and documented that there had been changes in factors (3.B) and activity data (3.D and 3.I) due to improvements. The reviewers concluded that there had been no change in the methodology on estimation of NO_x or NH_3 that would alter the original approval of the adjustment application. All the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance are also met, so it is recommended that the adjustment continue to be accepted with the corrected figures.

35. Non-methane volatile organic compound emissions from manure management (3.B) had been recalculated due to change of methodology from tier 1 to tier 2 for dairy cattle and other cattle. The adjustment values increased by more than 60 per cent compared with the last approved version (2019). The informative inventory report for 2020 for Germany states and documents the new method and the recalculation comparing old and new methods. Clarifying information on the tier 2 method was received during the review due to questions asked by the Expert Review Team. The adjustment figures for NMVOC from 3.D had been recalculated for the whole time series. The difference was due to new activity data on new crop species. Additional information on the calculation was received during the review.

36. The reviewers concluded that there had been no change in the methodologies that would alter the original approval of the adjustment applications and that all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance had been met. It is recommended that the adjustments continue to be accepted.

I Hungary - manure management (3.B) and cultivated crops (3.D.e)

37. The Expert Review Team conducted an assessment of the application of Hungary for an adjustment to its NMVOC emissions inventory for 2010–2013, based on new sources, for:

(a) Manure management (3.B);

(b) Cultivated crops (3.D.e).

38. Emissions of NMVOC from manure management (3.B) were recalculated in line with the updated tier 2 methodology in the 2019 EMEP/EEA Guidebook. In addition, slightly revised swine data (i.e., piglets under 20 kg was split into suckling piglets under 8 kg and weaned piglets 8–20 kg) have been aligned with the tier 1 methodology provided in the 2019 EMEP/EEA Guidebook. These changes are documented in the informative inventory report, submission 2020. No recalculations have been made with respect to cultivated crops (3.D.e). In total values, the adjustments increased by 15–16 per cent in the period 2010–2013. Hungary indicated in its adjustment application that adjustment was needed only for the years 2010–2013, and Hungary is in compliance with its commitments for the more recent years.

39. The reviewers concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that it met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; they recommended that the adjustment continue to be accepted.

J. Luxembourg – road transport (1.A.3.b.i–iv)

40. The reviewers conducted an assessment of the adjustment of NO_x emissions from road transport (1.A.3.b.i–iv) for Luxembourg, originally approved in 2015, mainly due to significant changes in emission factors. The adjustment has been recalculated in 2020 and the corresponding values present significant changes (increase) compared to the latest approved version (2019), ranging from 46 to 76 per cent (2010–2017): specifically, a 76 per cent increase for 2010, a 72 per cent increase for 2011, a 69 per cent increase for 2012, a 67 per cent increase for 2013, a 61 per cent increase for 2014, a 62 per cent increase for 2015, a 57 per cent increase for 2016, and a 46 per cent increase for 2017. Luxembourg stated that these differences resulted from minor changes to fuel consumption activity data, in order to be consistent with revisions in the energy balance. In response to a question raised by the Expert Review Team during the review, Luxembourg provided more explanations, clarifying that the recalculation has been performed due to: (a) a switch to an updated version of the emission calculation tool, having a significant impact on emission factors; and (b) the scheduled update of the transportation model (performed every 2–3 years), having an impact on fleet and activity data.

41. The emissions were estimated using the methodology previously presented to and approved by the Expert Review Team. The reviewers therefore concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that the application met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; hence, it is recommended that the adjustment continue to be accepted.

K. Luxembourg – manure management (3.B), crop production and agricultural soils (3.D) and cultivated crops (3.D.e.)

42. The reviewers conducted an assessment of the adjustment for Luxembourg with regard to:

(a) NO_x from manure management (3.B) and crop production and agricultural soils (3.D.a.1, 3.D.a.2.a, 3.D.a.2.b and 3.D.a.2.c);

(b) NMVOC emissions from manure management (3.B) and cultivated crops (3.D.e).

43. Nitrogen oxides emissions from manure management (3.B) and from crop production and agricultural soils (3.D) had been recalculated for the entire time series and the adjusted values increased by 13–15 per cent for 3.B and 4–8 per cent for 3.D compared with the last approved version (2019). The informative inventory report for 2020 of Luxembourg states and documents that livestock categories have been adapted, activity data revised and corrections made in N-factors due to improvements. The informative inventory report also

provides full details of the emission factor used to calculate NO_x emissions from manure management (3.B) and cultivated crops (3.D).

44. The reviewers concluded that there had been no change in the methodology on estimation of NO_x that would alter the original approval of the adjustment application and that it met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; they recommended that the adjustment continue to be accepted with the corrected figures.

45. Non-methane volatile organic compound emissions from manure management (3.B) and from crop production and agricultural soils (3.D) had been recalculated for the entire time series due to updated activity data. The adjustment values decreased for 3.B compared with the last approved version (2019). The informative inventory report for 2020 of Luxembourg states and documents that there have been new activity data and changes in data and emission factors/parameters due to improvements. The informative inventory report also provides full details of the emission factor used to calculate NMVOC emissions from manure management (3.B) and cultivated crops (3.D).

46. The reviewers therefore concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that it met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; they recommended that the adjustment continue to be accepted.

L. The Netherlands manure management (3.B), crop production and agricultural soils (3.D), crop residues applied to soils (3.D.a.4) and cultivated crops (3.D.e)

47. The reviewers conducted an assessment of the adjustment Netherlands for:

(a) NMVOC manure management (3.B) and crop production and agricultural soils (3.D.a.2.a, 3.D.a;3, 3.D.c and 3.D.e) based on new source;

(b) NH_3 manure management (3.B.3), crop residues applied to soils (3.D.a.4) and cultivated crops (3.D.e), based on new source.

48. The calculation of NMVOC emissions for the years 2010–2018 are the same for sectors 3.B and 3.D for pollutant NMVOC compared with the last approved version (2019). The reviewers confirmed that the calculations of NMVOC emissions from 3.B and 3.D were made appropriately and that the adjustment should continue to be accepted.

49. Regarding ammonia emissions from manure management (3.B.3) and cultivated crops (3.D.e), the calculation of emissions for the years 2010–2018 are the same compared with the last approved version (2019). For source crop residues applied to soils (3.D.a;4), the informative inventory report 2020 states that new research led to a small change in the NH_3 emission factor. The adjustment was recalculated and the adjustment values increased by 2.1 to 2.9 per cent compared with the last approved version (2019). During the review, the reviewers noted that total adjustment given in the adjustment application for NH_3 (-4.540 thousands of tonnes (kt) in 2018) did not match the adjustment given in the main emissions reporting template (annex I) and in the NFR tables for the year 2018 (-2.245 kt). The Party sent a revised annex VII with the correct amount of adjustment (-2.245 kt) and clarified that only NFR 3.D.a.4 was included in this amount for achieving compliance; NFRs 3.B.3 and 3.D.e were excluded.

50. The reviewers therefore concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that it met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. They recommended that the adjustment continue to be accepted.

M. Spain – road transport (1.A.3.b.i and 1.A.3.b.iii)

51. The reviewers conducted an assessment of the adjustment of NO_x emissions from road transport (passenger cars 1.A.3.b.i and heavy duty vehicles 1.A.3.b.iii) for Spain, originally

approved in 2015, mainly due to significant changes in emission factors. The adjustment was recalculated in 2020 and the corresponding values present slight changes for each year 2010–2017 compared to the latest approved version (2019). Specifically, for 1.A.3.b.i, the change ranges from 0.004 to 0.244 per cent (depending on the year); for 1.A.3.b.iii the change ranges from 0.051 to 1.007 per cent (depending on the year). Spain explained that these differences resulted from updates in the equations of the emission calculation tool and parameters introduced by the May 2017 version of the 2016 Guidebook and from the inclusion of Euro 6/VI vehicle technologies. Spain provided in annex VII adjustments for the years 2010–2018. However, the country is in compliance with the Gothenburg Protocol 2014 onwards, therefore reviewers assessed only adjustments for the years 2010–2013.

52. The emissions were estimated using the methodology previously presented to and approved by the Expert Review Team. The reviewers therefore concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that the application met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance; hence, it is recommended that the adjustment continue to be accepted.

N. Spain – manure management (3.B)

53. The reviewers conducted an assessment of the adjustment for Spain with respect to NO_x emissions from manure management (3.B) based on a new source. The adjustment was recalculated and the adjustment values increased by 22–25 per cent compared with the last approved version (2019). Spain explained that the recalculation of NO_x was related to changes in estimation of nitrogen emission in manure management systems fundamentally for non-dairy cattle (NFR 3.B.1.b) and goats (NFR 3.B.4.d) but not to changes in the methodology in estimating NO_x. Spain provided in annex VII adjustments for the years 2010–2018. However, the country is in compliance with the Gothenburg Protocol 2014 onwards, therefore reviewers assessed only adjustments for the years 2010–2013. The reviewers concluded that there had been no change in the methodology that would alter the original approval of the adjustment application and that it met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. They recommended that the adjustment continue to be accepted.

O United Kingdom of Great Britain and Northern Ireland – road transport (1.A.3.b.i–iv)

54. The Expert Review Team conducted an assessment of the application by the United Kingdom of Great Britain and Northern Ireland for an adjustment to its NO_x emissions inventory for 2010 for road transport (1.A.3.b.i–iv) based on significant changes in emission factors.

55. The adjustment was recalculated comparing to 2019 submission (due to revision of underlying data) and the adjustments had values increased (by 0.162 per cent for 2010) compared to the last approved version. Due to recalculation of inventory, the country is in compliance in the year 2012 comparing to the inventory submitted in 2019. The United Kingdom of Great Britain and Northern Ireland explained that those differences had resulted from changes in activity data. The emissions were estimated using the methodology already approved by the Expert Review Team during previous review. The reviewers therefore concluded that there had been no change in the principle that would alter the original approval of the adjustment application and that the application met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. They recommended that the adjustment continue to be accepted.

V. Conclusions and recommendations

A. 2020 adjustment cases

56. Adjustment applications made by Czechia in 2020 were thoroughly assessed. The Expert Review Team determined that additional information was needed and the Party provided the requested information during the review. Table 3 below provides a summary of the new adjustment applications received in 2020 and the resulting Expert Review Team recommendations to the EMEP Steering Body.

Table 3
Expert Review Team recommendations on adjustment applications received in 2020

Country	*Sector*	*NFR*	*Pollutant*	*Years*	*Expert Review Team recommendation*
Czechia	Agriculture	3.B	NMVOC	2010–2018	Accept

57. The detailed conclusions and recommendations regarding the 2020 adjustment applications may be found in section III of the present report. The Expert Review Team has prepared a country-specific report explaining the findings, which will be made available to Czechia and published on the Centre on Emission Inventories and Projections website. The report will also be available as informal document for the sixth joint session of the EMEP Steering Body and the Working Group on Effects.

B. Adjustment cases approved prior to 2020

58. The present section provides a summary of the emissions adjustments reported by Belgium, Denmark, Finland, France, Germany, Hungary, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland accepted by the Expert Review Team during the review performed in May and June 2020. The reported adjustments refer to NOx, NMVOC and NH3 emissions for various Nomenclature for Reporting sectors. More detailed information on each reported adjustment may be found in section IV of the present report.

59. The Expert Review Team assessed the reported data and concluded that the adjustments met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. It therefore recommended that the EMEP Steering Body accept all of the adjustments reported by Belgium, Denmark, Finland, France, Germany, Hungary, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland (see table 4 below).

Table 4
Emission adjustments approved in previous years, as reported by countries in 2020
(Thousands of tonnes)

Reference number	*Pollutant*	*NFR*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
Belgium-1	NO_x	1.A.3.b.i–iv	-48.604	-48.708	-50.012	-49.392	-47.753	-45.591	-	-	-
Belgium-2	NO_x	3.B	-1.39	-1.396	-1.408	-1.41	-1.437	-1.49	-	-	-
Belgium-3	NO_x	3.D.a.1	-5.97	-5.73	-5.645	-5.919	-6.079	-6.077	-	-	-
Belgium-4	NO_x	3.D.a.2.a	-6.544	-6.396	-6.292	-6.091	-6.18	-6.114	-	-	-
Belgium-B	NMVOC	3.B	-31.388	-	-	-	-	-	-	-	-
Belgium-C	NMVOC	3.D.e	-1.214	-	-	-	-	-	-	-	-
Total (BE)	**NO_x**		**-62.508**	**-62.230**	**-63.357**	**-62.812**	**-61.449**	**-59.272**	**-**	**-**	**-**
Total (BE)	**NMVOC**		**-32.602**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Denmark_01	NH_3	3.D.a.1	-2.140	-1.691	-1.593	-2.118	-2.459	-2.230	-2.841	-2.317	-2.089
Denmark_02	NH_3	3.D.e	-5.407	-5.419	-5.401	-5.375	-5.452	-5.400	-5.407	-5.401	-5.445
Denmark_03	NMVOC	3.B	50.611	-50.525	-50.15	-50.508	-50.993	-50.767	-51.582	-52.227	-53.012
Total (DK)	**NH_3**		**-7.547**	**-7.110**	**-6.994**	**-7.492**	**-7.911**	**-7.630**	**-8.248**	**-7.718**	**-7.534**
Total (DK)	**NMVOC**		**50.611**	**-50.525**	**-50.150**	**-50.508**	**-50.993**	**-50.767**	**-51.582**	**-52.227**	**-53.012**
Finland 12-14	NH_3	1.A.4	-0.863	-0.739	-0.789	-0.706	-0.722	-0.699	-0.759	-0.746	-0.731
Finland 15-17	NH_3	1.A.3.b.i–iv	-1.515	-1.403	-1.274	-1.176	-1.098	-1.004	-0.915	-0.833	-0.745
Total (FI)	**NH_3**		**-2.378**	**-2.142**	**-2.063**	**-1.882**	**-1.820**	**-1.703**	**-1.674**	**-1.579**	**-1.476**
France	NO_x	1.A.3.b.i–iv	-143.118	-148.599	-150.737	-158.652	-159.480	-158.420	-149.663	-	-
Total (FR)	**NO_x**	**1.A.3..i–iv**	**-143.118**	**-148.599**	**-150.737**	**-158.652**	**-159.480**	**-158.420**	**-149.663**	**-**	**-**
Germany-A	NO_x	1.A.3.b	-297.841	-302.270	-301.347	-306.099	-294.485	-269.025	-244.309	-214.873	-174.585
Germany-B	NO_x	3.B	-1.632	-1.604	-1.582	-1.579	-1.588	-1.572	-1.562	-1.548	-1.519

Reference number	*Pollutant*	*NFR*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
Germany-C	NO_x	3.D	-114.073	-124.414	-120.143	-122.903	-125.105	-131.229	-126.503	-123.873	-116.941
Germany-D	NO_x	3.I	-0.163	-0.185	-0.157	-0.178	-0.176	-0.179	-0.177	-0.176	-0.177
Germany-B	NMVOC	3.B	-317.246	-317.261	-318.951	-324.798	-326.918	-325.449	-322.836	-320.202	-316.494
Germany-C	NMVOC	3.D	-9.529	-9.025	-10.053	-10.361	-11.402	-9.913	-9.694	-9.744	-7.820
Germany-D	NH_3	3.D	-37.268	-46.755	-48.814	-56.273	-56.562	-56.419	-56.111	-55.370	-55.658
Germany-D	NH_3	3.I	-3.043	-3.450	-2.921	-3.306	-3.281	-3.343	-3.300	-3.274	-3.290
Total (DE)	**NO_x**		**-413.709**	**-428.473**	**-423.229**	**-430.759**	**-421.354**	**-402.005**	**-372.551**	**-340.470**	**-293.222**
Total (DE)	**NMVOC**		**-326.775**	**-326.286**	**-329.004**	**-335.159**	**-338.320**	**-335.362**	**-332.530**	**-329.946**	**-324.314**
Total (DE)	**NH_3**		**-40.311**	**-50.205**	**-51.735**	**-59.579**	**-59.843**	**-59.762**	**-59.411**	**-58.644**	**-58.948**
Hungary-01	NMVOC	3.B	-25.431	-25.179	-25.436	-25.550	-	-	-	-	-
Hungary-02	NMVOC	3.D.e	-3.633	-3.57	-3.618	-3.613	-	-	-	-	-
Total (HU)	**NMVOC**		**-29.064**	**-28.749**	**-29.054**	**-29.163**	-	-	-	-	-
Luxembourg	NO_x	1.A.3.b.i–iv	-5.002	-5.288	-5.490	-5.582	-5.548	-5.387	-4.881	-4.167	-3.590
Luxembourg	NO_x	3.B	-0.084	-0.081	-0.078	-0.080	-0.082	-0.083	-0.083	-0.085	-0.083
Luxembourg	NO_x	3.D.a.1, 3.D.a.2.a, 3.D.a.2.b, 3.D.a.2.c	-1.055	-1.062	-1.050	-1.039	-1.031	-1.026	-1.076	-1.073	-1.046
Luxembourg	NMVOC	3.B	-3.016	-2.904	-2.831	-2.913	-3.016	-3.085	-3.129	-3.176	-3.149
Luxembourg	NMVOC	3.D.e	-0.112	-0.112	-0.113	-0.112	-0.112	-0.113	-0.112	-0.113	-0.113
Total (LU)	**NO_x**		**-6.141**	**-6.431**	**-6.618**	**-6.701**	**-6.661**	**-6.496**	**-6.040**	**-5.325**	**-4.719**
Total (LU)	**NMVOC**		**-3.128**	**-3.016**	**-2.944**	**-3.025**	**-3.128**	**-3.198**	**-3.241**	**-3.289**	**-3.262**
Netherlands	NMVOC	3.B	-59.330	-58.667	-59.166	-51.359	-45.003	-54.898	-58.274	-57.515	-54.947
Netherlands	NMVOC	3.D	-23.184	-22.627	-22.067	-24.004	-22.654	-24.225	-14.417	-14.349	-13.244
Netherlands	NH_3	3.B.3	-	-	-	-	-	-	-	-0.487	-

Reference number	*Pollutant*	*NFR*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
Netherlands	NH_3	3.D.a.4	-	-	-	-	-2.108	-1.798	-1.961	-2.315	-2.245
Netherlands	NH_3	3.D.e	-	-	-	-	-	-	-	-1.821	-
Total (NL)	**NMVOC**		**-82.514**	**-81.294**	**-81.233**	**-75.363**	**-67.657**	**-79.123**	**-72.691**	**-71.864**	**-68.191**
Total (NL)	**NH_3**		**-**	**-**	**-**	**-**	**-2.108**	**-1.798**	**-1.961**	**-4.623**	**-2.245**
Spain 1-2	NO_x	1.A.3.b.i,1.A.3.b.iii	-142.500	-131.952	-119.221	-	-	-	-	-	-
Spain 3-11	NO_x	3.B	-5.431	-5.248	-5.213	-	-	-	-	-	-
Total (ES)	**NO_x**		**-147.931**	**-137.200**	**-124.434**	**-**	**-**	**-**	**-**	**-**	**-**
United Kingdom	NOx	1.A.3.b.i–iv	-102.568	-	-	-	-	-	-	-	-
Total (GB)	**NO_x**		**-102.568**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

C. Recommendations from the reviewers

60. The declarations on consistent reporting of approved adjustments that had been provided by countries on a voluntary basis were evaluated by the reviewers and made the assessment process more efficient. It is recommended that the Steering Body continue to encourage countries to submit these declarations annually, together with the completed annex VII to the reporting guidelines.

61. In the road transport sector, Parties should provide transparent information on assumed emission factors, particularly when making original emission estimates for years in which the emission factors available in the original models are not applicable.

62. The reviewers recognized that more detailed information should accompany annex VII to the reporting guidelines where countries recalculate emissions owing to a shift to a higher tier method, improved activity data or a move to country-specific methods. Parties should submit such information annually by the deadline of 15 March so that it can be reviewed in May and June of the same year.

63. It is important that Parties continue to use the same reporting format – i.e. the same units and level of disaggregation across the emission source sectors – for information on previously approved adjustments. The data-handling systems cannot process the information provided in different submissions unless it is reported in a consistent manner.

64. There is still a high demand for Expert Review Team adjustment reviews and unless countries provide complete, sufficient and detailed (NFR categories) information in a timely manner and sufficient resources for reviewers, it may not be possible for adjustment applications to be reviewed and recommendations provided to the EMEP Steering Body in the year of submission.