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## Economic Commission for Europe

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**

**Seventh joint session**
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Item 2 (a) (i) of the provisional agenda
**Progress in activities of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe in 2021 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 2021 review of applications for adjustments to emission inventories submitted by Czechia and France in accordance with Executive Body decisions 2012/3, 2012/4 and 2012/12, as amended by decision 2014/1.[a]

It also provides information on applications for the adjustments approved for Belgium, Czechia, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland prior to 2021. The review is based on documents submitted by Parties and findings of the Expert Review Team.

[a] 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[1] 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;[2]

(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.[3]

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 and France in 2021 in accordance with Executive Body decisions 2012/3, 2012/4, 2012/12 and 2014/1 and in the light of the Technical Guidance. It also provides information on adjustments approved prior to 2021.

[1] All Executive Body decisions referred to in the present document are available at www.unece.org/env/lrtap/executivebody/eb_decision.html.

[2] For a more detailed definition, see Executive Body decision 2014/1, annex, para. 3.

[3] ECE/EB.AIR/130, para. 5

7. The report is based on the documents submitted by Parties and those prepared by the Expert Review Team (ERT) during the review process in 2021. It was prepared by the EMEP Centre on Emission Inventories and Projections in line with its revised mandate (Executive Body decision 2019/14).

# 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 2021 review was provided by the Centre on Emission Inventories and Projections, represented 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. ERT was composed of two lead reviewers, Ms. Marion Pinterits (European Union) and Mr. Michael Anderl (Austria), and eight sectoral experts: Ms. Thamara Vieira da Rocha, transport (France); Ms. Antonella Bernetti, transport, (Italy); Mr. Giannis Papadimitriou, transport (European Union); Ms. Pinterits, energy (European Union); Mr. Garmt Jans Venhuis, energy (Netherlands); Ms. Nicole Mandl, agriculture (Austria); Mr. Tim van der Zee, agriculture (Netherlands); and Ms. Rikke Albrektsen, agriculture (Denmark). The team assessed:

(a) New adjustment applications submitted in 2021;

(b) Adjustments approved prior to 2021.

10. Each sector was reviewed by two independent sectoral experts during May and June 2021 (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.[4]

11. The Centre on Emission Inventories and Projections has updated a dedicated web page[5] for the review process, which provides an introduction, links to documentation and other information on the adjustments submitted by Parties in 2021 and those approved prior to 2021, as well as the tool used by the reviewers in assessing adjustment applications approved prior to 2021.

# III. Assessment of new adjustment applications

## A. Czechia – manure management (3.B) and agriculture soils (3.D.a.2.a, 3.D.a.2.b, 3.D.a.2.c and 3.D.a.3)

12. Czechia submitted new adjustment applications in annex II to the secretariat in early 2021. Limited supporting information on method has been provided in the informative inventory report (IIR). The Party applied for adjustments to its national emission inventory. For details of the applications, see table 1 below.

[4] The findings and recommendations have been consulted with those of the review team under the European Union National Emission reduction Commitments Directive (Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC, *Official Journal of the European Union*, L 344 (2016), pp. 1–31).

[5] See www.ceip.at/gothenburg-protocol/review-of-adjustments (last updated in May 2021).

Table 1
**New applications for adjustments to emission inventories in 2021**

| *Country* | *Sector* | *NFR* | *Pollutant* | *Years* | *Extraordinary circumstances (decision 2012/3, para. 6 (a))* |
|---|---|---|---|---|---|
| Czechia | Agriculture | 3.B, 3.D.a.2.a | $NH_3$ | 2015 | Significantly different methodology and significantly different EF |
| Czechia | Agriculture | 3.D.a.2.b, 2.D.a.2.c, 3.D.a.3 | $NH_3$ | 2015 | New emission source category |

*Abbreviations*: EF, emission factor ; $NH_3$, ammonia; NFR, nomenclature for reporting.
*Notes*: For a description of source categories, see European Environment Agency (EEA), *EMEP/EEA air pollutant emission inventory guidebook: 2019. Technical guidance to prepare national emission inventories*, Report No. 13/2019 (Luxembourg, Publications Office of the European Union, 2019). Available at https://www.eea.europa.eu/publications/emep-eea-guidebook-2019; and annex I to the Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/125). Available at www.ceip.at/reporting-instructions/annexes-to-the-2014-reporting-guidelines.

13. Czechia made an application on adjustments for ammonia ($NH_3$) emissions from sectors 3.B Manure management and 3.D Agricultural soils. ERT undertook a full and thorough assessment of the application by Czechia for an adjustment to its $NH_3$ emissions inventory for 2015 for sector 3.B Manure management, nomenclature for reporting (NFR) categories 3.B.1.a, 3.B.1.b, 3.B.2, 3.B.3, 3.B.4.d and 3.B.4.e (henceforth referred to as 3.B) and $NH_3$ emissions from Animal manure applied to soils (3.D.a.2.a), Sewage sludge applied to soils (3.D.a.2.b), Other organic fertilizers applied to soils (3.D.a.2.c) and Urine and dung deposited by grazing animals (3.D.a.3 (henceforth referred as 3.D). ERT had to ask Party for additional explanatory information.

14. The new $NH_3$ adjustments for Manure management (3.B) and Animal manure applied to soils (3.D.a.2.a) has been justified with the explanation that Czechia has moved from the tier 1 to the tier 2 methodology in accordance to the EMEP/EEA air pollutant emission inventory guidebook 2019 (hereinafter the EMEP/EEA Guidebook) following a recommendation from the 2020 review process. ERT notes that categories 3.B.1, 3.B.3 and 3.D.a.2.a are key categories and, as such, emissions should always have been estimated using a higher tier methodology. For 3.D.a.2.b, 3.D.a.2.c and 3.D.a.3, the adjustment application is based on these being new sources. ERT does not find that moving from the tier 1 to the tier 2 methodology in the EMEP/EEA Guidebook constitutes a "significantly different methodology" as foreseen by Executive Body decision 2012/12. Emissions from key sources should be estimated using a higher tier methodology (called detailed methodology in older versions of the EMEP/EEA Guidebook) and this requirement was also in place at the time when the emission ceiling was set. Hence, ERT is of the view that the application for adjustment does not meet the criteria as outlined in Executive Body decision 2012/12 and in the Technical Guidance. ERT notes that Czechia could analyse whether an adjustment taking into account changes in methodology between the detailed methodology when the emission ceiling was established and the current tier 2 methodology in the EMEP/EEA Guidebook would meet the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance.

15. ERT is of the view that the application by Czechia fails the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. ERT notes that $NH_3$ emissions from sewage sludge (3.D.a.2.b) and other organic fertilizers (3.D.a.2.c) were not included in the EMEP/EEA Guidebook at the time of setting the emission ceilings. However, a methodology for grazed grassland was included in the EMEP/EEA Guidebook at the time of the establishment of the emission ceiling and, as such, this does not meet the criteria for an adjustment based on the "new source" circumstance. ERT notes that the impact of adjustments for sewage sludge (3.D.a.2.b) and other organic fertilizers applied to soils

(3.D.a.2.c) is minor and that adjustments for these new sources will not bring Czechia into compliance. Furthermore, ERT acknowledges that the methodology for estimating $NH_3$ emissions from grazed grassland has changed significantly and could be subject to an adjustment based on significantly different methodology. This would require Czechia to submit a new application, providing all the supporting documentation required to assess an application for an adjustment under the circumstance of a significantly different methodology.

16. ERT recommends that Czechia withdraw the $NH_3$ adjustment application for all NFR categories at this stage, carry out the necessary analysis and, depending on the results, potentially apply for adjustments, including all the supporting documentation required by Executive Body decision 2012/12, in the next submission. ERT notes that an application for an adjustment should only be made if it can be expected to result in compliance with the emission ceiling.

## B. France – manure management (3.B) and agricultural soils (3.D)

17. France indicated in the Notification form 2021 the addition of biogenic nitrogen oxides ($NO_x$) and non-methane volatile organic compound (NMVOC emissions to the national total emissions. France submitted two new adjustment applications to the secretariat in early 2021. The Party applied for $NO_x$ and NMVOC adjustments to its national emission inventory. For the details of the applications, see table 2 below.

Table 2
**New applications for adjustments to emission inventories in 2021**

| *Country* | *Sector* | *NFR* | *Pollutant* | *Years* | *Extraordinary circumstances (decision 2012/3, para. 6 (a))* |
|---|---|---|---|---|---|
| France | Agriculture | 3.B, 3.D [a] | NMVOC | 2010–2018 | New emission source category |
| France | Agriculture | 3.B, 3.D [a] | $NO_x$ | 2010–2014 | New emission source category |

*Notes*: For a description of source categories, see European Environment Agency, *EMEP/EEA air pollutant emission inventory guidebook: 2019*; and annex I to the Guidelines for Reporting Emissions and Projections Data (ECE/EB.AIR/125).

18. The reviewers conducted an assessment of the new adjustment of $NO_x$ and NMVOC emissions from the entire manure management 3.B category and from agricultural soils categories 3.D.a.1, 3.D.a.2.a, 3.D.a.2.b, 3.D.a.2.c and 3.D.a.3 (see table 3 below for impact of adjustments). France has applied these adjustments as they constitute new emission sources that were not known when the ceilings were set. The second edition of the EMEP/CORINAIR Guidebook1999 [6]did not provide methodologies for estimating NMVOC and $NO_x$ from these sources (3.B, 3.D.a.1, 3.D.a.2.a, 3.D.a.2.b, 3.D.a.2.c and 3.D.a.3) and France did not report emissions at the time the ceilings were set.

19. France indicated that $NO_x$ emissions of 3.B had been calculated using the tier 1 method from the EMEP/EEA Guidebook 2019. The NOx emission from 3.D.a.1, 3.D.a.2.a, 3.D.a.2.b, 3.D.a.2.c and 3.D.a.3 have been calculated distinguishing the type of fertilizer following a tier 2 method from the EMEP/EEA Guidebook 2019 and from a Food and Agriculture Organization of the United Nations (FAO) report 2003. France explained in its answer to question 3 of the review team that it considers the FAO values to be more correct, as they do not include the natural $NO_x$ emissions occurring from soils.

[6] European Environment Agency, *EMEP/CORINAIR Atmospheric Emission Inventory Guidebook – Second edition 1999*, Technical report No. 30/2000 (Copenhagen, 1999). Available at www.eea.europa.eu//publications/EMEPCORINAIR.

20. France indicted in its IIR, that the NMVOC emissions from manure management (3.B), and agricultural soils (3.D.a.2.a, 3.D.a.3 and 3.D.e) were calculated using a tier 2 approach provided in EMEP/EEA Guidebook 2019. The information provided in the IIR allows a detailed calculation of NMVOC emissions.

21. France did report annex II and supporting information in the IIR. However, the review team had to request additional explanations, particularly for the $NO_x$ estimation. France provided additional information during the review. France provided additional detailed explanation of methods used to the review team and plans to include these explanations in the next IIR in 2022. The reviewers were satisfied with the explanations provided and concluded that they met all of the requirements set out in Executive Body decision 2012/12 and in the Technical Guidance. The reviewers recommend to accept the adjustments.

Table 3
**Impact of adjustments on the NMVOC and $NO_x$ emission inventories of France**
(Thousands of tons)

| *Reference* | *Pollutant* | *NFR* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* | *2018* | *2019* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| France 1 | NMVOC | 3.B | -10.207 | -10.081 | -10.030 | -10.092 | -10.205 | -10.257 | -10.106 | -9.959 | -9.772 | |
| France 2 | NMVOC | 3.D | -61.130 | -60.565 | -60.948 | -60.173 | -61.707 | -62.524 | -62.708 | -62.712 | -61.955 | |
| France 3 | $NO_x$ | 3.B | -202.754 | -201.983 | -200.245 | -200.164 | -203.598 | | | | | |
| France 4 | $NO_x$ | 3.D | -177.664 | -185.611 | -179.015 | -181.267 | -184.724 | | | | | |

# IV. Assessment of adjustments approved prior to 2021

22. The reviewers assessed the adjustments reported by Belgium, Czechia, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland that had been approved prior to 2021, as reported in annex VII to the reporting guidelines.[7] Details on these adjustments may be downloaded from the Centre on Emission Inventories and Projections website. Hungary did not report adjustments in 2021. A summary of adjustments approved by ERT is presented in table 5 below.

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

23. 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 change in emission factors. The adjustment has been recalculated in 2021 and the corresponding values present small changes compared to the latest approved version (2020). Specifically, a 1.877 per cent increase for 2010, a 1.611 per cent increase for 2011, a 1.433 per cent increase for 2012, a 1.349 per cent increase for 2013, a 1.295 per cent increase for 2014 and a 1.411 per cent increase for 2015. Belgium explained that these small differences resulted from the use of the newer COPERT model version with an update on vehicle stock classification (i.e. new vehicle categories and activity data readjusted as a consequence). The emissions were estimated using the methodology previously approved by ERT.

24. The reviewers 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.

[7] See www.ceip.at/reporting-instructions.

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

25. The reviewers conducted an assessment of the adjustment for Belgium, based on a new source, for $NO_x$ 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). Belgium did not report NMVOC adjustment from manure management (3.B) and cultivated crops (3.D.e) in 2021.

26. Belgium provided a declaration stating that the criteria and methodologies used in the calculation of $NO_x$ adjustments for the period 2010–2015 for all sectors and pollutants were unchanged from the year in which the adjustments had been approved. The reviewers noted that recalculations with an impact on quantification of the adjustment (revisions to livestock numbers in the Flanders Region, correction of the amount of excreted nitrogen (N) in the Walloon Region and revisions of activity data for inorganic fertilizer in the Flanders Region) had been made. In total values, the adjustments increased by up to 2 per cent compared with the last approved adjustment (2020). 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.

27. 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 ERT.

## C. Czechia - manure management (3.B)

28. The reviewers conducted an assessment of the adjustment of NMVOC emissions from agriculture (3.B) for Czechia, originally approved in 2020, based on a new emission source. The adjustment was recalculated in 2021 due to a change from tier 1 to tier 2 methodology for all animal categories. This increases the emission of NMVOC from 3.B by 57–67 per cent in the period 2010–2018. During the review, the Party provided a spreadsheet showing the new tier 2 calculation. Review of the spreadsheet showed an error in the calculation of emissions from non-dairy cattle. The Party recalculated the emissions and provided an updated annex VII. Reviewers were satisfied with the explanations provided by Czechia 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. Denmark – manure management (3.B), inorganic N-Fertilizers (3.D.a.1) and cultivated crops (3.D.e)

29. The reviewers conducted an assessment of the emissions of NMVOC from manure management (3.B) for Denmark originally approved in 2015, due it to being a new source. The adjustment was recalculated in 2021 due to a shift to the tier 2 methodology, the discovery of a calculation error and the reallocation of emissions to NFR categories animal manure applied to soils (3.D.a.2.a) and urine and dung deposited by grazing animals (3.D.a.3). These recalculations decreased the emissions by around 27 per cent between 2010 and 2018.

30. The reviewers conducted an assessment of the adjustment of $NH_3$ from mineral fertilizers and cultivated crops (3.D.a.1 and 3.D.e) for Denmark, originally approved in 2014, due to having a changed emission factor and being a new source respectively. The adjustment has been recalculated in 2021 and the corresponding values of 3.D.a.1 present large changes compared to the latest approved version (2020). This is due to revised emission factor for

artificial fertilizers in the EMEP guidebook of 2019, a reclassification of certain fertilizer types and a new study leading to a change in the classification of soils. These changes led to an increase of 289 per cent in 2010 to 376 per cent in 2018. The emissions have been estimated using the methodology previously approved by ERT.

31. The reviewers were satisfied with the explanations provided and concluded that there have been no changes 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. The reviewers recommended that the adjustments continue to be accepted.

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

32. 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).

33. The adjustments were recalculated comparing them to the previous submission owing to updated activity data. In total values, the adjustments have changed by -2.0 to +1.7 per cent (in the period 2010–2018). Finland provided an explanation of these recalculations; all relevant information concerning these changes was provided in the declaration on consistent reporting of approved adjustments. The emissions were estimated using the methodology previously approved by ERT. 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.

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

34. The reviewers conducted an assessment of the adjustment of $NH_3$ emissions from road transport (1.A.3.b.i–iv) for Finland, originally approved in 2015, mainly due to significant changes in emission factors. The adjustment was recalculated in 2021 and the corresponding values are identical compared to the latest approved version (2020), apart from a small change in 2018, for which there is a 1.233 per cent increase for 1.A.3.b.i (passenger cars) and a 0.821 per cent increase for 1.A.3.b.ii (light commercial trucks). Finland explained that this small difference resulted from a revision of the kilometrage data (i.e. vehicle km – annual distance driven) for some categories of passenger cars and vans in the national road transport emissions model. The emissions were estimated using the methodology previously approved by ERT.

35. 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.

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

36. The reviewers conducted an assessment of the adjustment of $NO_x$ emissions from road transport (1.A.3.b.i–iv) for France, originally approved in 2015, mainly due to significant changes in emission factors. The adjustment was recalculated in 2021 and the corresponding values present small changes compared to the latest approved version (2020). Specifically, a 1.652 per cent increase for 2010, a 1.536 per cent increase for 2011, a 0.219 per cent decrease for 2012, a 0.799 per cent decrease for 2013, a 0.485 per cent increase for 2014, a 1.903 per cent increase for 2015, and a 1.469 per cent increase for 2016. France explained that these small differences resulted from updates in activity data/parameter improvements, i.e. updated

statistical data traffic parameters and refined energy balance process. In addition, adjustment for the years 2017 and 2018 has been provided for the first time. For the year 2019, the national total of $NO_x$ emissions is under the Gothenburg Protocol ceilings for France (without adjustment) and, hence, no adjustment is applied for $NO_x$ 2019. The emissions were estimated using the methodology previously approved by ERT.

37. Therefore, ERT 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, ERT recommends that the adjustment continue to be accepted.

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

38. 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. Adjustments originally proposed are explained by a change of the methodology, depending both on methodological changes and changes of emission factor. Germany declares that the methods used for the calculation of emissions for the years 2005 – 2019 are the same for all sectors and pollutants as in the year the adjustments were approved. The adjustment was recalculated in 2021 and the corresponding values present the following changes compared to the latest approved version (2020): a 0.580 per cent decrease in 2010, a 0.506 per cent decrease in 2011, a 0.308 per cent decrease in 2012, a 0.286 per cent decrease in 2013, a 0.130 per cent increase in 2014, a 2.167 per cent increase in 2015, a 2.697 per cent increase in 2016, a 2.888 per cent increase in 2017 and a 2.883 per cent increase in 2018.

39. In response to questions about transparency issues raised by ERT during the review, Germany provided additional explanations updating the adjustment chapter of the online IIR. In particular as regards the differences between the 2020 and 2021 adjustments, Germany updated the relevant section of the online IIR, adding the missing years and data and the explanation that, in comparison to 2020, the transport emission model (TREMOD) applied for the 2021 submission had been revised in terms of $NO_X$ emission factors, taking into account results from ongoing measurement campaigns, especially for EURO 6 vehicles. As regards the clarification requested on the 2011 adjustment value, about which an inconsistency had been found in the tables of the online IIR, Germany answered, confirming the value of -300.740 kt and updating the relevant section of the online IIR accordingly.

40. The emissions were estimated using the methodology previously presented to and approved by ERT. 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.

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

41. 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.

42. Germany provided a declaration stating that the methods used for the calculation of emissions for the years 2005–2019 were the same for all sectors and pollutants as in the year 2014 when the adjustments were originally approved. Nitrogen oxides ($NO_x$) and $NH_3$ emissions from manure management (3.B) had been recalculated for the entire time series and the adjusted values are significantly lower (by 6–7 per cent) than emissions reported in

2020. The IIR states that this decrease is predominantly due to the update of the models of dairy cows, calves, heifers and male beef cattle.

43. The $NO_x$ from agricultural soils (3.D) have been revised for the whole time series. The IIR for 2021 states that, for 3.D.a.1 - Inorganic N-fertilizers, the procedure of temporal averaging of activity data was applied for the first time in 2021. Another reason for recalculations was the update of the models of dairy cows, calves, heifers and male beef cattle. Hence, emissions from fertilizer application and animal manure applied to soils changed markedly in every year compared to last year's submission. The $NO_x$ emissions from storage of energy crops (3.I) had been recalculated for the year 2018 only. Here, the IIR for 2021 explains that these recalculations were due to an update of activity data for 2018 in these categories. The $NH_3$ emissions from agricultural soils (3.D) and storage of energy crops (3.I) had been recalculated for the year 2018 only. The IIR for 2021 states and documents that these recalculations were due to an update of activity data for 2018 in these categories.

44. The emissions were estimated using the methodology previously presented to and approved by ERT. 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.

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

45. Hungary did not report adjustments in 2021.

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

46. The reviewers conducted an assessment of the adjustment of NOx emissions from road transport (1.A.3.b.i–iv) for Luxembourg, originally approved in 2015, mainly due to significant change in emission factors. The adjustment was recalculated in 2021 and the corresponding values present small changes compared to the latest approved version (2020). Specifically, a 0.743 per cent increase for 2014, a 0.368 per cent decrease for 2015, a 0.384 per cent decrease for 2016, a 0.367 per cent decrease for 2017, and a 0.350 per cent decrease for 2018 (identical values are calculated between 2010 and 2013). Luxembourg explained that these small differences resulted from a revision in energy balance and an update of transportation model inputs (fleet compositions and characteristics, traffic parameters).

47. The emissions were estimated using the methodology previously approved by ERT. 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.

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

48 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).

49. Luxembourg provided a declaration that the adjustments submitted in 2021 are identical to the adjustments as approved in 2020. Compared to the approved adjustments in 2020, some minor changes in the parameters/emission factors and activity data used for the calculation of emissions for the years 2010–2019 had to be made in order to fulfil the continuous improvement obligation of the reporting guidelines.

50. $NO_x$ emissions from manure management (3.B) and from crop production and agricultural soils (3.D) were recalculated for the entire time series and the adjusted values decreased by 8–10 per cent for 3.B and increased by 11–12 per cent for 3.D compared with the last approved version (2020). The IIR for 2021 of Luxembourg states that several adaptions were made in the reporting of 2021. Recalculations occurred due to an adapted manure management system and adapted slurry storage system assumptions. There was also revised N excreted for suckler cows, revised N-flow and the use of a tier 2 approach rather than a tier 1 approach for $NH_3$ emissions originating from synthetic fertilizer. These changes resulted in lower $NO_x$ emission from manure management compared to the previous submission, but higher $NO_x$ emission from crop production and managed soil compared to the previous submission.

51. 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.

52. NMVOC emissions from manure management (3.B) and from crop production and agricultural soils (3.D) were recalculated for the entire time series. The adjustment values decreased for 3.B compared with the last approved version (2020), while for agricultural soils they increased. The IIR 2021 of Luxembourg states and documents that the adaptation of the manure management system and the revised N flow, and hence revised $NH_3$ emission factor, were affecting the NMVOC emissions. In addition, the splitting and reporting of the NMVOC emission from animal manure into 3.B, 3.D.a.2.a and 3.D.a.3 largely affected the reported NMVOC emissions under 3.B and 3.D in comparison to the one from the previous submission.

53. The emissions were estimated using the methodology previously presented to and approved by ERT. 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. 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)

54. The reviewers conducted an assessment of the adjustment of the 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 a new source.

55. The Netherlands provided a declaration stating that the methods and criteria used for the calculation of emissions for the years 2010–2018 are the same for the sectors 3.B and 3.D and pollutants NMVOC and $NH_3$ as in the year the adjustments were last approved (2020).

56. The calculations of NMVOC emissions for the years 2010–2019 are the same for most subcategories of sector 3.B, except for 3.B.a, 3.B.3, 3.B.4.e, 3.B.4.h, 3.B.4.g.i and 3.B.4.g.ii. The IIR 2021 states that, for horses (3.B.4.e), an estimated 300,000 additional animals were included in the inventory for the whole time series to account for privately owned animals. The change in animal numbers explains the significant increase in emissions from 3.B.4.e in 2010 compared to 2020 values. The Netherlands explained that recalculations of NMVOC emissions for other categories, such as 3.B.3, 3.B.4.g.i and 3.B.4.g.ii, are related to recalculation of $NH_3$ emissions (see below). Due to theses recalculations, more $NH_3$ is emitted in the stables and less $NH_3$ is emitted during application. The ratio between $NH_3$ emissions from animal housing and manure application is a measure of the NMVOC emissions from housing and after application, as described in the EMEP/EEA Guidebook.

57. Ammonia emissions from cultivated crops (3.D.e) and crop residues applied to soils (3.D.a.4) for the years 2014–2018 are the same compared with the last approved version (2020). For ammonia emissions from manure (3B3), the IIR 2021 states that new research (a study by Statistics Netherlands) led to a small change in the $NH_3$ emission factor for low-emission housing of all pig categories with floor or manure storage adaptations. The Methodology Report for Agriculture (additional information to be considered as part of the IIR submission) further explains that this adjustment led to a higher emission factor for $NH_3$. The adjustment was recalculated and the adjustment values increased by 54 per cent and 75 per cent, respectively, for the years 2017 and 2018 compared with the last approved version (2020).

58. The emissions were estimated using the methodology previously presented to and approved by ERT. 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.

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

59. The reviewers conducted an assessment of the adjustment of $NO_X$ emissions from road transport (1.A.3.b.i and 1.A.3.b.iii) for Spain, originally approved in 2015, mainly due to significant changes in emission factors. In the 2021 Inventory, the adjustments were applied for reported years 2010–2012 (annex I), where total national emissions exceeded the national ceiling, while in annex VII the complete adjustment time series for the years 2010–2019 is reported. For both road transport categories NFR-1.A.3.b.i and NFR-1.A.3.b.iii, differences regarding 2021 adjustment for the years 2010–2012 are 0.00 per cent compared to the latest approved version (2020). Spain explains that the differences regarding road transport between the reported adjustment figures and the approved ones are mainly due to the update of COPERT 4 equations and parameters introduced by the May 2017 version of the 2016 EMEP/EEA Guidebook and to the inclusion of Euro 6/VI vehicle technologies in the latest versions of the Inventory. Spain declares that the methods/criteria used for the calculation of $NO_X$ emissions for the years 2010–2019 are the same for NFR-1.A.3.b.i – Passengers cars and NFR-1.A.3.b.iii – Heavy duty vehicles as in the year the adjustments were approved.

60. The emissions were estimated using the methodology previously presented to and approved by ERT. 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.

## O. Spain – manure management (3.B)

61. The reviewers conducted an assessment of the adjustment of NOx emissions from manure management (3.B) for Spain, originally approved in 2017, due to it being a new source. The adjustment was recalculated in 2021 and the corresponding values present small decreases compared to the latest approved version (2020). Ranging from -3.1 per cent to -2.7 per cent in period 2010 - 2012. Spain explained that these small differences are due to corrections of the number of animals and new estimations of the N content of manure and manure management systems (non-dairy cattle, swine, goats, horses, mules and asses and laying hens). The emissions were estimated using the methodology previously approved by ERT.

62. The reviewers were satisfied with the explanations provided and concluded that there has 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.

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

63. The reviewers conducted an assessment of the adjustment of $NO_x$ emissions from road transport (1.A.3.b.i–iv) for the United Kingdom, originally approved in 2018, mainly due to significant changes in emission factors. The adjustment was recalculated in 2021 and the corresponding value for 2010 presents a small increase, i.e. 0.534 per cent, compared to the latest approved version (2020). There is also an adjustment applied for the year 2012, which presents a small increase, i.e. 1.406 per cent, compared to the approved version 2019 (i.e. there was no adjustment applied for the year 2012 in the 2020 submission). The United Kingdom explained that these small differences resulted from minor revisions to the underlying data used to calculate road transport emissions. No adjustment is applied for other years (i.e. 2011, 2013–2019), since the country is under the Gothenburg Protocol ceilings (without adjustment) for these years. The emissions were estimated using the methodology previously approved by ERT.

64. 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. 2021 adjustment cases

65. Adjustment applications made by France and Czechia in 2021 were thoroughly assessed. ERT determined that additional information was needed for both Parties. Parties provided the requested information during the review. ERT recommends that the EMEP Steering Body accept the $NO_x$ and NMVOC adjustments submitted by France and reject the $NH_3$ adjustment submitted by Czechia. Table 4 below provides a summary of the new adjustment applications received in 2021 and the resulting ERT recommendations to the EMEP Steering Body.

66. ERT recommends that Czechia consider withdrawing the $NH_3$ adjustment application for all NFR categories at this stage, carry out the necessary analysis and, depending on the results, potentially apply for adjustments, including all the supporting documentation required by the European Union National Emission Ceilings Directive, in the next submission.

Table 4
**Expert Review Team recommendations on adjustment applications received in 2021**

| *Country* | *Sector* | *NFR* | *Pollutant* | *Years* | *Expert Review Team recommendation* |
|---|---|---|---|---|---|
| France | Agriculture | 3.B, 3.D | NMVOC | 2010–2014 | Accept |
| France | Agriculture | 3.B, 3.D | NOx | 2010–2018 | Accept |
| Czechia | Agriculture | 3.B, 3.D | $NH_3$ | 2015 | Reject |

67. A more detailed discussion regarding the 2021 adjustment applications may be found in section III of the present report. ERT has prepared a country-specific reports explaining the findings, which will be made available to France and Czechia and published on the Centre on Emission Inventories and Projections website. The report will also be available as an informal document for the seventh joint session of the EMEP Steering Body and the Working Group on Effects.

## B. Adjustment cases approved prior to 2021

68. The present section provides a summary table of the emissions adjustments reported by Belgium, Czechia, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland accepted by ERT during the review performed in May and June 2021. Hungary did not report adjustments in 2021. The reported adjustments refer to $NO_x$, NMVOC and $NH_3$ emissions for various Nomenclature for Reporting (NFR) sectors. More detailed information on each reported adjustment may be found in section IV of the present report.

69. ERT assessed these 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, Czechia, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland as listed in table 5 below.

Table 5
**Emission adjustments approved in previous years, as reported by countries in 2021**
(Thousands of tons)

| *Reference number* | *Pollutant* | *NFR* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* | *2018* | *2019* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belgium-1 | $NO_x$ | 1.A.3.b.i–iv | -49.516 | -49.493 | -50.729 | -50.058 | -48.371 | -46.234 | - | - | - | - |
| Belgium-2 | $NO_x$ | 3.B | -1.359 | -1.365 | -1.386 | -1.385 | -1.410 | -1.461 | - | - | - | - |
| Belgium-3 | $NO_x$ | 3.D.a.1 | -5.970 | -5.730 | -5.645 | -5.919 | -6.079 | -6.078 | - | - | - | - |
| Belgium-4 | $NO_x$ | 3.D.a.2.a | -6.416 | -6.270 | -6.294 | -6.083 | -6.079 | -6.004 | - | - | - | - |
| **Total (BE)** | **$NO_x$** | | **-63.260** | **-62.858** | **-64.054** | **-63.445** | **-61.940** | **-59.777** | **-** | **-** | **-** | **-** |
| Czechia 1 | NMVOC | 3.B | -31.155 | -29.968 | -30.217 | -30.580 | -31.205 | -32.171 | -33.081 | -32.873 | -34.128 | - |
| **Total (CZ)** | **NMVOC** | | **-31.155** | **-29.968** | **-30.217** | **-30.580** | **-31.205** | **-32.171** | **-33.081** | **-32.873** | **-34.128** | **0.000** |
| Denmark_01 | $NH_3$ | 3.D.a.1 | -6.191 | -6.401 | -6.051 | -6.248 | -6.583 | -6.795 | -7.408 | -8.714 | -7.855 | -8.853 |
| Denmark_02 | $NH_3$ | 3.D.e | -5.407 | -5.418 | -5.400 | -5.375 | -5.452 | -5.400 | -5.407 | -5.401 | -5.445 | -5.417 |
| Denmark_03 | NMVOC | 3.B | -36.771 | -36.835 | -36.966 | -37.186 | -37.329 | -37.226 | -37.666 | -38.196 | -38.619 | -37.930 |
| **Total (DK)** | **$NH_3$** | | **-11.60** | **-11.82** | **-11.45** | **-11.62** | **-12.03** | **-12.20** | **-12.82** | **-14.12** | **-13.30** | **-14.27** |
| **Total (DK)** | **NMVOC** | | **-36.77** | **-36.84** | **-36.97** | **-37.19** | **-37.33** | **-37.23** | **-37.67** | **-38.20** | **-38.62** | **-37.93** |
| Finland 12-14 | $NH_3$ | 1.A.4 | -0.862 | -0.730 | -0.803 | -0.706 | -0.721 | -0.692 | -0.774 | -0.747 | -0.731 | -0.719 |
| Finland 15-18 | $NH_3$ | 1.A.3.b.i–iv | -1.515 | -1.403 | -1.274 | -1.176 | -1.097 | -1.005 | -0.916 | -0.833 | -0.754 | -0.683 |
| **Total (FI)** | **$NH_3$** | | **-2.378** | **-2.132** | **-2.077** | **-1.882** | **-1.818** | **-1.697** | **-1.690** | **-1.579** | **-1.485** | **-1.402** |
| France | $NO_x$ | 1.A.3.b.i–iv | -145.483 | -150.882 | -150.407 | -157.384 | -160.254 | -161.434 | -151.862 | -139.359 | -116.881 | - |
| **Total (FR)** | **$NO_x$** | **1.A.3.b.i–iv** | **-145.483** | **-150.882** | **-150.407** | **-157.384** | **-160.254** | **-161.434** | **-151.862** | **-139.359** | **-116.881** | **-** |
| Germany-A | $NO_x$ | 1.A.3.b | -296.114 | -300.740 | -300.420 | -305.225 | -294.868 | -274.854 | -250.898 | -221.079 | -179.619 | -144.771 |
| Germany-B | $NO_x$ | 3.B | -1.529 | -1.502 | -1.480 | -1.475 | -1.482 | -1.465 | -1.455 | -1.444 | -1.418 | -1.401 |
| Germany-C | $NO_x$ | 3.D | -114.115 | -117.072 | -119.601 | -120.483 | -123.969 | -125.048 | -124.530 | -119.707 | -114.097 | -110.663 |
| Germany-D | $NO_x$ | 3.I | -0.163 | -0.185 | -0.157 | -0.178 | -0.176 | -0.179 | -0.177 | -0.176 | -0.172 | -0.172 |
| Germany-B | NMVOC | 3.B | -296.786 | -297.133 | -299.168 | -304.378 | -306.739 | -305.376 | -303.069 | -300.939 | -297.863 | -295.827 |
| Germany-C | NMVOC | 3.D | -9.530 | -9.025 | -10.053 | -10.361 | -11.402 | -9.913 | -9.694 | -9.744 | -7.820 | -8.559 |
| Germany-D | $NH_3$ | 3.D | -50.205 | -46.755 | -48.814 | -56.273 | -56.562 | -56.419 | -56.111 | -55.370 | -54.625 | -54.625 |
| Germany-D | $NH_3$ | 3.I | -3.043 | -3.450 | -2.921 | -3.306 | -3.281 | -3.343 | -3.300 | -3.274 | -3.201 | -3.201 |

| *Reference number* | *Pollutant* | *NFR* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* | *2018* | *2019* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (DE)** | **$NO_x$** | | **-411.922** | **-428.473** | **-423.229** | **-430.759** | **-421.354** | **-402.005** | **-372.551** | **-340.47** | **-293.222** | **-257.007** |
| **Total (DE)** | **NMVOC** | | **-306.315** | **-326.286** | **-329.004** | **-335.159** | **-338.32** | **-335.362** | **-332.53** | **-329.946** | **-324.314** | **-304.386** |
| **Total (DE)** | **$NH_3$** | | **-53.248** | **-50.205** | **-51.735** | **-59.580** | **-59.843** | **-59.762** | **-59.412** | **-58.644** | **-57.827** | **-57.827** |
| Luxembourg | $NO_x$ | 1.A.3.b.i–iv | -5.002 | -5.288 | -5.490 | -5.582 | -5.590 | -5.367 | -4.862 | -4.152 | -3.577 | -3.158 |
| Luxembourg | $NO_x$ | 3.B | -0.077 | -0.074 | -0.071 | -0.072 | -0.074 | -0.074 | -0.075 | -0.076 | -0.075 | -0.074 |
| Luxembourg | $NO_x$ | 3.D.a.1, 3.D.a.2.a – c | -1.172 | -1.176 | -1.163 | -1.152 | -1.149 | -1.146 | -1.197 | -1.197 | -1.167 | -1.183 |
| Luxembourg | NMVOC | 3.B | -2.520 | -2.429 | -2.369 | -2.445 | -2.538 | -2.603 | -2.656 | -2.699 | -2.682 | -2.678 |
| Luxembourg | NMVOC | 3.D.e | -0.783 | -0.755 | -0.740 | -0.749 | -0.767 | -0.777 | -0.771 | -0.781 | -0.771 | -0.776 |
| **Total (LU)** | **$NO_x$** | | **-6.251** | **-6.538** | **-6.725** | **-6.807** | **-6.813** | **-6.587** | **-6.134** | **-5.425** | **-4.819** | **-4.415** |
| **Total (LU)** | **NMVOC** | | **-3.303** | **-3.184** | **-3.109** | **-3.194** | **-3.304** | **-3.379** | **-3.427** | **-3.480** | **-3.453** | **-3.454** |
| Netherlands | NMVOC | 3.B | -59.402 | -58.486 | -58.980 | -51.356 | -45.001 | -54.891 | -58.263 | -57.505 | -54.937 | -54.004 |
| Netherlands | NMVOC | 3.D | -20.307 | -20.682 | -20.454 | -21.761 | -20.287 | -22.122 | -10.822 | -10.392 | -9.938 | 0.000 |
| Netherlands | $NH_3$ | 3.B.3 | - | - | - | - | - | - | - | -0.751 | -0.831 | - |
| Netherlands | $NH_3$ | 3.D.a.4 | - | - | - | - | -2.108 | -1.798 | -1.961 | -2.315 | -2.240 | - |
| Netherlands | $NH_3$ | 3.D.e | - | - | - | - | - | - | - | -1.821 | -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 | -119.222 | -109.945 | -104.546 | -94.934 | -81.937 | -68.677 | -47.281 | -28.704 |
| Spain 3-11 | $NO_x$ | 3.B | -5.265 | -5.105 | -5.072 | -5.009 | -5.101 | -5.249 | -5.349 | -5.418 | -5.537 | -5.517 |
| **Total (ES)** | **$NO_x$** | | **-147.765** | **-137.056** | **-124.294** | **-114.954** | **-109.648** | **-100.184** | **-87.286** | **-74.095** | **-52.818** | **-34.220** |
| United Kingdom | NOx | 1.A.3.b.i–iv | -103.116 | | -101.281 | - | - | - | - | - | - | - |
| **Total (GB)** | **$NO_x$** | | **-103.116** | **-** | **-101.281** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |

## C. Recommendations from the reviewers

70. 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.

71. 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.

72. 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.

73. 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.

74. There is still a high demand for ERT 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.

75. The expert review team raised questions on the review of adjustment from 2022 onwards and agreed that, to ensure a consistent process, there is a need to provide additional guidance for reporting and also for review of adjustment applications from 2022 onwards.