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

Technical Guidance for Parties Making Adjustment Applications and for the Expert Review of Adjustment Applications*

Prepared by the Task Force on Emission Inventories and Projections

Summary

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

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

However, following the first review of applications for adjustments by countries in 2014, it became evident that further, detailed technical guidance was needed. At its thirty-third session (Geneva, 8–11 December 2014), the Executive Body therefore adopted decision 2014/1 on improving the guidance for adjustments. It also requested the secretariat (ECE/EB.AIR/127 para. 25) to update an informal technical guidance document submitted to its thirty-third session, in accordance with revisions made during the session, and to publish the additional guidance in the three official languages of the United Nations Economic Commission for Europe.

The present document contains that technical guidance, as revised by the Executive Body. It includes not only the main principles of the review process, but also a guide to the step-by-step process that has been established.

* The entire document comprises the Guidance for Parties while annexes III-V provide specific guidance for the Expert Review Teams.

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Contents

List of abbreviations and acronyms

1SER	Primary sectoral expert reviewer
2SER	Secondary sectoral expert reviewer
AD	activity data
C	carbon
CEIP	Centre on Emission Inventories and Projections
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
COPERT	COmputer Programme to Calculate Emissions from Road Transport
ECE	United Nations Economic Commission for Europe
EEA	European Environment Agency
EFs	emission factors
EFi	emission factor for type i
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
ERT	Expert Review Team
EU	European Union
g	gram
GAINS	Greenhouse Gas and Air Pollution Interactions and Synergies
HDV	heavy-duty vehicle
HBEFA	Handbook of Emission Factors for Road Transport
IEFs	implied emission factors
IFEU	Institute for Energy and Environmental Research
IIASA	International Institute for Applied Systems Analysis
kg	kilogram
kt	kiloton
kW	kilowatt
kWh	kilowatt hour
LDV	light-duty vehicle
N	nitrogen
NECD	Directive 2001/81/EC of the European Parliament and the Council on National Emission Ceilings for certain pollutants
NFR	Nomenclature For Reporting
NH_3	ammonia
NH_3-N	ammonia-nitrogen
NH_4	ammonium

NMVOC	non-methane volatile organic compounds
NO_3	nitrate
NO_x	nitrogen oxides
NK	nitrogen-potassium
NPK	nitrogen-phosphorus-potassium
NRMM	non-road mobile machinery
N_2O	nitrous oxide
PM	particulate matter
$PM_{2.5}$	fine particulate matter (< 2.5 micrometre)
PM_{10}	coarse particulate matter (< 10 micrometre)
RAINS	Regional Air Pollution Information and Simulation model
S	sulphur
TREMOD	German Transport Emission Model
TSP	total suspended particulates

I. Background and context

A. The need for "adjustments" to emission inventories

1. Developments in the scientific understanding of emission sources can mean that substantial revisions are made to national emission estimates. Revisions to emission estimates can sometimes result in countries exceeding their commitments in the form of emission ceilings (or emission reduction targets) simply because they are better able to make emission estimates.

2. The scientific community and users of emission inventories have a need for emission estimates to be "best science", i.e., to represent emission estimates as accurately as is practicable. However, it is also recognized that it is unreasonable for Parties to become non-compliant with their international commitments as a result of unforeseeable improvements in the scientific understanding of the emission estimates. So, under the amended Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to the Convention on Long Range Transboundary Air Pollution, a mechanism has been created that allows Parties to apply for an "adjustment" to their best science emission estimates. If this application is successful, the adjustment process effectively creates a "compliance" version of the inventory which can be used to compare against the set commitments.[1]

3. This document has been drafted by a team of emission inventory experts. The co-Chair of the Task Force on Emission Inventories and Projections was the lead author, with other emission inventory experts contributing specialist knowledge. The purpose of this document is to provide guidance to Parties when submitting the applications for inventory adjustments, as well as to the experts who are appointed to review whether applications meet the required criteria. It therefore includes not only the principles of the review process, but also a guide to the step-by-step process that has been established.

B. Mandate and legal framework

4. Executive Body decisions 2012/3, 2012/4 and 2012/12 (see ECE/EB.AIR/111/Add.1 and ECE/EB.AIR/113/Add.1) implementing article 3, paragraph 11 quinquies, and article 13, paragraph 2, of the Gothenburg Protocol, provide the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP), in conjunction with other technical bodies under EMEP, with the mandate to organize the review of adjustments submitted by Parties. These Executive Body decisions state when and how Parties are to inform the secretariat of their intention to apply for an adjustment, and include general guidance (decision 2012/12, annex) on the information that they are required to submit to support their application. The decisions also outline the process that is used to review each application, and ultimately provide an "acceptance" or "rejection" outcome.

5. Decision 2012/3, paragraph 6, states that Parties may apply to adjust their inventory data or emission reduction commitments in the following "extraordinary" circumstances:

> "(a) Emission source categories are identified that were not accounted for at the time when the emission reduction commitments were set;

[1] It is also possible to apply for an adjustment to an emission ceiling or emission reduction target, instead of the emission estimates. This guidance refers specifically to adjustments of emission inventories.

(b) Emission factors used to determine emissions levels for particular source categories for the year in which emissions reduction commitments are to be attained are significantly different than the emission factors applied to these categories when emission reduction commitments were set;

(c) The methodologies used for determining emissions from specific source categories have undergone significant changes between the time when emission reduction commitments were set and the year they are to be attained."

6. The Executive Body decisions also specify the application process and outline the information that the Party needs to submit. However, following the first reviews in 2014, it was agreed that the guidance required updating, to provide more detailed information for both Parties submitting an application and the team of experts reviewing them. This document has been compiled to provide more detailed, technical guidance for the reviewers and Parties submitting an application than is included in the existing Executive Body decisions, and in particular to clarify some definitions of terms and the general principles that are to be used throughout the review process to arrive at an acceptance/rejection decision.

II. Principles of the review

7. A number of terms in decisions 2012/3, 2012/4 and 2012/4 require more detailed clarification, and are provided here, along with the general approach that is to be used throughout the review of the adjustment application.

A. Definitions of relevant terms

1. The scope of an adjustment application

8. An "adjustment application" is defined as being for a specific pollutant and a specific source sector (at the most detailed the Nomenclature For Reporting (NFR) level). For the purposes of review, Parties may choose to submit multiple adjustment applications that are grouped by, e.g., emission source and/or pollutant.

2. Extraordinary circumstances

9. Executive Body decision 2012/3 states that Parties may apply for an adjustment under "extraordinary" circumstances. This term does not present a difficulty for the reviewers, as three different criteria are set out in the decision text to identify what constitutes extraordinary circumstances. The three criteria are themselves considered in more detail below.

3. A "new" source

10. If a previously unknown or unquantifiable source is added to the emission inventory, then this is typically considered to be a valid basis for an adjustment. Executive Body decision 2012/3, paragraph 6 (a), gives one of the three acceptable criteria as "emission source categories are identified that were not accounted for at the time when the emission reduction commitments were set". However, some more detailed clarification is required to support the work of the adjustment review process. For the purposes of the adjustment review, a new source category is defined as one for which emission estimates were not included in the inventory when the ceilings were set, and where no methodology for calculating such estimates was included in the version of the EMEP/EEA air pollutant

emission inventory guidebook (EMEP/EEA Guidebook)[2] (or national/international emissions models) at that time.

11. The content of the EMEP/CORINAIR Emission Inventory Guidebook, second edition (EMEP/CORINAIR Guidebook; 1999 Guidebook)[3] was made available in 1999 (although it was finally published in 2000). This edition of the Guidebook is therefore expected to be a key reference for adjustment applications under the Gothenburg Protocol (2010 emission ceilings), as it will define the methodologies available to Parties in 1999.

4. Changes to emission factors

12. If there have been revisions to emission factors (EFs), caused by a change in the scientific understanding of the source, then this is typically considered to be a valid basis for an adjustment.

13. Executive Body decision 2012/3, paragraph 6 (b), gives as an acceptable criteria for an adjustment that "emission factors used to determine emissions levels for particular source categories for the year in which emissions reduction commitments are to be attained are significantly different than the emission factors applied to these categories when emission reduction commitments were set". The guidance for the review further requires that the Party provides the "rationale for deciding whether the changes in the emission factors are significant" (decision 2012/12, annex, para. 2).

14. It is important to identify which versions of emission factors are to be compared and contrasted:

(a) The 2010 emission ceilings for the Gothenburg Protocol were set in 1999. Therefore, EFs "used when the ceilings were set" will be the version of national emissions inventories reported in 1999 (which include the emission estimates for 1980–1997). The content of the EMEP/CORINAIR Guidebook and the software program for the calculation of air pollutant emissions from road transport (COPERT II model)[4] are therefore expected to be key references for adjustment applications, as they will contain many of the emission factors used by Parties in 1999;

(b) The 2020 emission reduction targets for the amended Gothenburg Protocol were set in 2012. Therefore EFs "used when the ceilings were set" will be in the version of national emissions inventories reported in 2012 (which include the emission estimates for 1980–2010).

5. Changes to methodologies

15. In some cases, improving the methodology can result in increases to emission estimates. However, as with revisions to EFs, it is important to understand what guidance was available when the emission ceilings were set. Executive Body decision 2012/3, paragraph 6, gives one of the three acceptable criteria as "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". Again, the general guidelines (decision 2012/12, annex) require the Party to provide "the rationale for deciding whether the change in methodology is significant".

16. There are several possible scenarios, but the following guiding principle applies: an adjustment is acceptable where increased emissions result from a Party improving the

[2] See http://www.eea.europa.eu/publications/emep-eea-guidebook-2013.

[3] All references in this Technical Guidance to the EMEP/CORINAIR Guidebook refer to the second edition. See http://www.eea.europa.eu/publications/EMEPCORINAIR/page001.html.

[4] See http://www.emisia.com/copert.

accuracy of their estimates by moving to a methodology which was not in the EMEP/EEA Emissions Inventory Guidebook available when the ceilings were set (i.e., the EMEP/CORINAIR Guidebook).[5]

17. The implications of this definition are illustrated in the following example.

18. A Party obtains more detailed activity data, and is therefore able to use a higher tier[6] methodology than was used when the ceilings were set. This may result in an increase in the emission estimates:

(a) **Scenario 1**: The higher tier methodology that the Party now uses was available when the ceilings were set. This revision is not considered to be caused by a "change in the scientific understanding", and is therefore not a valid case for an adjustment;

(b) **Scenario 2**: The higher tier methodology that the Party now uses was not available when the ceilings were set. This is considered to be new scientific understanding, and is therefore a valid case for an adjustment.

19. Note that the "higher tier methodology" cited here refers to the basis of the approach, and not revisions to, e.g., EFs within the methodology (this would be considered in "changes to emission factors" — as explained above).

B. Reviewing an adjustment application

20. The individual procedures of the review are detailed in chapter III below. However, the approach used by the reviewers must take several aspects into account, as set out in subsections 1 and 2 below.

1. Understanding the information provided by the Parties: Using a constructive approach (but one which is time bounded)

21. The expert reviewers must make reasonable efforts to review and understand the information provided by the Parties. They should be constructive and supportive in their approach but, at their discretion and should the lead reviewer agree, expert reviewers are entitled to recommend the rejection of an adjustment application on the basis that fully complete/transparent/detailed enough information was not provided to the review team in time to allow the review to be undertaken.

22. However, if the expert reviewer considers that clarification or additional simple information from the Party would aid the review, then they are encouraged to collate questions for the Party, and provide these to the Centre on Emission Inventories and Projections (CEIP).[7] CEIP will act as an intermediary between the Expert Review Team (ERT) and the Party, handling all communications during the review. The Party will be required to respond to CEIP request(s) within three working days, to allow the review to be undertaken to the required timetable.

[5] Where models are being used, it will be necessary to identify and resolve improvements caused by changes to the understanding of the science (typically all revisions to emission factors and the calculation/methodology parts of the model) and improvements caused by the Party using improved input data — e.g., annual vehicle kilometres or vehicle fleet data — which is not typically driven by an improved scientific understanding.

[6] For definitions of tier 1, tier 2 and tier 3 methodology, see the EMEP/EEA Guidebook.

[7] See http://www.ceip.at/ms/ceip_home1/ceip_home/ceip_topnavi/home_emep/.

2. Consistency

23. The reviews must be consistent across all Parties, pollutants and sectors. It is therefore essential that the expert reviewers remain within their remit, and also follow the step-by-step process of the review, which helps to ensure that the detailed guidelines presented in this document are followed. The lead reviewer will also oversee all of the work undertaken by the individual expert reviewers to ensure consistency both in terms of approach and the drafting of the findings in the country reports.

C. Drafting the review report

24. Detailed guidance on drafting the review report is provided in chapter IV. A report template is provided to support the work of the expert reviewers (annex IV to the present document). If the expert reviewers agree to recommend that an application is rejected, then they must show that the application does not fully comply with one or more of the three criteria in Executive Body decision 2012/3. The evidence for reaching this conclusion must be presented clearly in the review report, with references to the relevant sections of the Executive Body decisions.

25. When an application is rejected, it is not the role of the expert reviewers to indicate to Parties whether a reapplication with additional supporting information would be successful. However, the text of the EMEP Steering Body report will explain the basis for the rejection of the application and may indicate if the underlying reason for not complying with one of the three criteria in the Executive Body decision was, e.g., a lack of transparency, or that information provided by the Party was not provided promptly enough for the expert reviewers to consider it.

26. While this information will be helpful, Parties will be left to draw their own conclusions as to whether it is sensible for them to reapply for an adjustment to the same pollutant/source combination by providing additional or new supporting information.

D. Quantifying the adjustment

27. The three different criteria for an adjustment require different data sets to be clearly presented by the Party, so that quantification of the adjustment application is fully transparent.

1. New source

28. The Party needs to clearly demonstrate that no methodology was available in the EMEP/CORINAIR Guidebook. Quantification of the adjustment is typically simply the value of the new source that has been added to the emissions inventory — because the value of the source in the version of the inventory when the ceilings were set was zero. This value, and hence the adjustment, may be year specific.

2. Changes to emission factors

29. The Party needs to quantify the impact of the revision to EFs only, and not include the impact of any revisions to activity data or other underlying assumptions. This is because revisions to activity data do not typically represent a change in the scientific understanding of the emission source. If a Party considers that there have been changes to activity data and/or other underlying assumptions which have been driven by a change in the scientific understanding, then it would have been more appropriate for them to make the adjustment application under the “changes to methodologies” criteria (see the following section).

30. For changes to EFs only, there are examples where it is not straightforward to assess and/or demonstrate the impact arising from only changes to EFs (e.g., where models are used).

31. The following approach for quantifying the adjustment takes into account the fact that changes might have been made to assumptions and activity data (AD) as well as emission factors:

(a) We assume here that the adjustment application is being made for year Y. Current emission estimates may therefore be described as:

$E_{Y\ Current} = EF_{Current} \times AD_{Y\ Current}$

Where:

$E_{Y\ Current}$ is the emission estimate for year Y (using the current input data and methodology);

$EF_{Current}$ is the EF for year Y used in the current methodology;

$AD_{Y\ Current}$ is the activity data for year Y used as input into in the current methodology;

(b) Emission estimates for year Y using the original input data and methodology (at the time the ceilings were set) may be described as:

$E_{Y\ Original} = EF_{Original} \times AD_{Y\ Original}$

Where:

$E_{Y\ Original}$ is the emission that is estimated for year Y using the original input data and methodology;

$EF_{Original}$ is the EF that was used when the ceilings were set, and is now outdated;

$AD_{Y\ Original}$ is the activity data for year Y that was used prior to the current activity data;

(c) *Quantification of the adjustment*: The value for the adjustment for year Y is the difference between the current emission estimate, and the current emission estimate determined by using the now outdated EF. This can be described as:

$A_Y = AD_{Y\ Current} \times (EF_{Current} - EF_{Original})$

Where:

A_Y is the value of the adjustment for year Y.

32. Individual applications may be more complex than this, but the principles presented above should be used in quantifying the value of the adjustment that is applied for.

3. Changes to methodologies

33. The general approach used above, for changes to EFs, can also generally be applied to a change in the methodology. However it is necessary to account for the fact that changes to the scientific understanding of the AD may have arisen, and the impact of this will need to be taken into account. Hence the adjustment can be described as:

$$\mathbf{A_Y = E_{Y\ Current} - (EF_{Original} \times AD_{Y\ Original}) = E_{Y\ Current} - E_{Y\ Original}}$$

Y will be 2010 or later, and therefore $E_{Y\ Original}$ will, of course, not be available from the current inventory (it is the emission of a relatively recent year determined by using an outdated methodology). So it will need to be calculated by the Party and presented in a transparent way as part of the supporting information provided with the adjustment application.

4. Calculation errors and "corrected" applications

34. In checking the applications, expert reviewers may find calculation errors in applications which otherwise meet all other adjustment criteria. While it is not the role of the expert reviewer to make a correct calculation on behalf of the Party, the review team may elect to ask for clarification or additional simple information where they consider this would aid the review (see chapter II, section B, above). This might include requesting the Party (through CEIP) to correct a calculation error and provide a revised adjustment estimate.

E. Granting an adjustment

35. When the review team recommend an adjustment application for acceptance, it is both the principle of the adjustment (i.e., that required criteria are met) and the calculation to quantify the adjustment that are considered to be acceptable by the review team. The EMEP Steering Body then chooses whether to follow this recommendation or not, and grant an adjustment. Any Party, in principle, can raise the issue again at a meeting of the Executive Body should there be concern regarding the decision made by the EMEP Steering Body. All relevant information to support the recommendation from the review team should be presented in the country report.

F. Subsequent annual reporting of a granted adjustment

36. When the EMEP Steering Body grants an adjustment, it is both the principle of the adjustment (i.e., that required criteria are met) and the calculation to quantify the adjustment in its first year that are considered to be accepted. Therefore, a granted adjustment needs to be updated and presented in years following the successful application.

37. Most granted adjustments will have a value which varies from year to year (although some may remain constant). The method for presenting the updated information is to include the calculation methodology and updated quantification of the adjustment in the Party's Informative Inventory Report (IIR). This will need to be done for each year following the successful adjustment application, until the adjustment is terminated. A process for reviewing these annual updates has not been established within the current procedures.

G. Period of validity of a granted adjustment

38. Parties are required to provide an annual update to any granted adjustment. This will continue until the adjustment is no longer valid. For each source category for which an adjustment has been granted, Parties shall use the same methodology and emission factors in preparing their adjusted estimates in subsequent years as were contained in their original and accepted submission.

III. The application process

A. Preparing for an adjustment application

39. Parties wishing to make an application are recommended to undertake the following steps:

(a) **Review the relevant Executive Body decisions**: This will provide initial information to help determine whether the Party has a valid case for making an adjustment;

(b) **Review this Technical Guidance**: This will provide more detailed information on the application and review process. In particular, it includes guidance for the expert reviewers, and an explanation of the steps that are undertaken to review an application. The Party should then have a clear indication of whether their situation would be classed as a valid case for an adjustment by an expert reviewer;

(c) **Review the annexes to this Technical Guidance**: The annexes to this Technical Guidance provide sector-specific guidance that will help the Party prepare supporting information to be provided as part of their application. The annexes also include reporting templates that will need to be used as part of the application process. Familiarization with this information will help the Party to prepare and present all the relevant information that the expert reviewers are likely to require;

(d) **Prepare and submit the application**: Parties will need to invest time in preparing text that explains the background to the application, including the underlying causes, and demonstrates that their application complies with the requirements of the relevant Executive Body decisions. They will also need to prepare data that clearly demonstrate the quantification of the adjustment applied for.

B. Application from a Party

40. Any Party applying for an adjustment to its inventory is required to notify the secretariat through the Executive Secretary of the United Nations Economic Commission for Europe (ECE) by 15 February at the latest. The information provided should indicate the pollutant(s) and source sector(s) for which applications are being made.

41. All supporting information requested in the text of Executive Body decisions 2012/3, 2012/4 and 2012/12 must be provided as part of the Party's IIR, or in a separate report, by 15 March of the same year. The Party shall also provide quantitative information in a standardized format (see annex II).

42. All submitted adjustment applications will be subject to an expert review. This includes:

(a) An assessment of formal criteria;

(b) An assessment of consistency with the requirements of decision 2012/3;

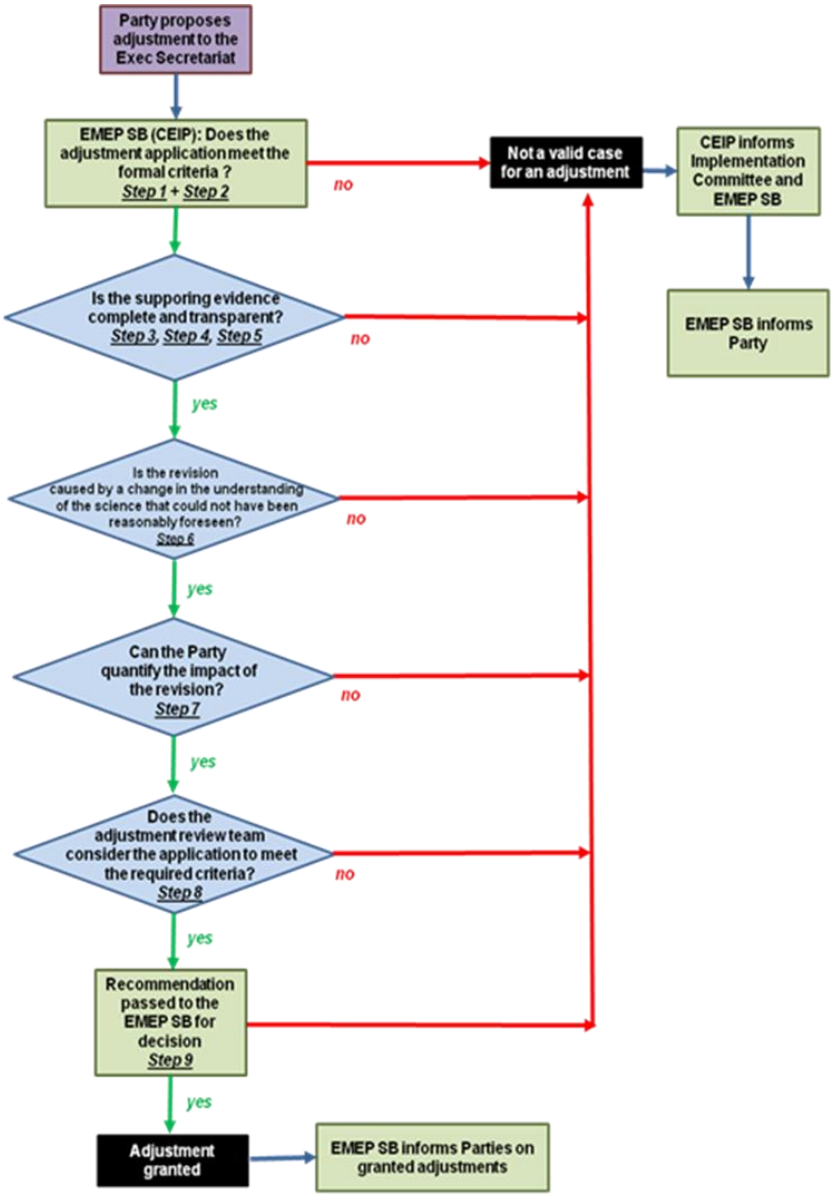
(c) An assessment of the quantification of the impact of the adjustment.

IV. The review process

43. The decision tree for the adjustment review process is presented in the figure below. This shows the different steps that are taken to review the application from a Party, and how the recommendations from the ERT are passed to the EMEP Steering Body. To ensure consistency, the review process uses a clearly defined stepwise approach. In undertaking

the review, the expert reviewers use templates and a checklist (annexes III-V) to guide them through the decision-making process. This ensures transparency.

The decision tree of the adjustment review process



Roles in the review

44. Each application will be reviewed by an individual with particularly relevant expertise, not just in emission inventories, but in the sources relevant to the adjustment application. Consequently, there may be several reviewers involved in assessing different aspects of the information provided by the Party. Once the expert reviewer completes their work and reaches a conclusion, a second reviewer checks the first reviewer's work and discusses the findings with them.

45. The work of all reviewers, across all sectors and all adjustment applications is overseen by a lead reviewer. The lead reviewer ensures that the review process is followed

correctly, provides expert technical input where required, ensures consistency across all of the reviews, and — in general — drives the quality of the output.

46. CEIP supports the reviewers by managing the review process overall, including the provision of Party information to the reviewers. CEIP also acts as an intermediary between the Party and the reviews should there be points which require clarification during the review.

The review timetable

47. The timetable for key steps in the review of adjustments will be issued by CEIP each year. However, an indicative timetable might be as shown in the table below.

Review timetable

Dates/deadlines	*Activity*
15 February	Parties indicate their intention to submit an adjustment application for specific pollutants/source sectors.
15 March	Parties provide the detail of their application, quantification of the proposed adjustment and supporting documentation.
15 April–7 May	The ERT assesses the information provided by the Parties.
8–31 May	Country reports, which include the review recommendations, are drafted.
1–15 June	Parties are allowed to review the draft report relating to their adjustment applications and to request the correction of any factual errors. The adjustment review reports (one for reach country) are then finalized.
	A status report is provided to the secretariat.
16–22 June	The secretariat makes the ERT findings and recommendations available to the Parties.
September	The EMEP Steering Body makes a decision based on the recommendations from the review team (acceptance or rejection), and reports this information to the secretariat.
September	The secretariat informs the Implementation Committee of adjustment applications that have been rejected.

V. Procedures during the review of adjustment applications

A. Preparing for the review of an adjustment application

48. The coordination of the review will be performed by CEIP. The main responsibilities of CEIP prior to the review will be to appoint the ERT, and manage all of the information provided by Parties to support their adjustment applications.

49. The technical review of adjustments is conducted by a team of expert reviewers. Each expert reviewer will be selected from the EMEP roster of experts. The structure of the ERT will be as follows:

(a) Two independent expert reviewers will be assigned to each adjustment application. One will be assigned the primary sectoral expert reviewer role, and the other will check the work of the first, and will be called the second sectoral expert reviewer;

(b) A lead reviewer will coordinate the work of the team, and provide expert input as necessary. The role of the lead reviewer is also to ensure that a consistent approach is taken across all Parties/pollutants/source sectors.

50. CEIP will make the information provided from Parties available by posting files on their website.[8] It will provide information and passwords for the reviewers. Expert reviewers are expected to review the material provided by the Parties according to the timetable specified by CEIP. Queries and requests for additional supporting information may be compiled by expert reviewers and sent to CEIP, which will manage the communications with the Party during the review. Parties will need to ensure that they have national inventory compilers available to respond quickly to any requests for additional information during the review.

51. The review of adjustment applications for compliance purposes is independent of the "Stage 3" scientific reviews[9] which are conducted each year. However, it may be that an expert is appointed to roles within both of these review processes.

B. Sectoral review expert activities

52. Expert reviewers will be assigned review responsibilities on the basis of their expertise in a particular emissions source sector. For each adjustment application, there will be a primary sectoral expert reviewer (1SER), and a secondary sectoral expert reviewer (2SER). The work of sectoral expert reviewers will be coordinated by the lead reviewer.

53. The 1SER will need to:

(a) Check the information provided by a given Party for a given source category, and the complete the adjustments "checklist" spreadsheet (annex III);

(b) Draft a report chapter on the findings of the review. A template will be provided for this.

54. The 2SER will review the work of the 1SER. These two sectoral experts will liaise with the aim of achieving consensus on each individual adjustment that they have been assigned to.

55. Following this, the findings and recommendations from the two sectoral experts will be discussed with the lead reviewer and relevant sections will be drafted for the EMEP Steering Body adjustment status report and for the country report. The ERT has to achieve a consensus regarding the acceptance/rejection of each application. Should this prove to be challenging, the lead reviewer will liaise with CEIP, and may elect to introduce additional experts to the process to provide additional technical viewpoints.

56. The chapters drafted by the sectoral expert reviewers will then be collated by the lead reviewer, to create a single report for each country submitting an adjustment application. This report will clearly indicate a recommendation for acceptance and rejection for each adjustment application, and the reasons for reaching these recommendations, in line with the criteria and principles of the Executive Body decisions 2012/3 and 2012/12.

57. The responsibility for the findings and recommendations of the review lies with the ERT. The recommendations of the ERT (as documented in the country report) will be

[8] See http://www.ceip.at/ms/ceip_home1/ceip_home/adjustments_gp/.

[9] See http://www.ceip.at/ms/ceip_home1/ceip_home/review_proces_intro/review_proces/.

reported to the EMEP Steering Body in the form of an "Adjustment Status Report" (compiled by CEIP). Throughout the process, the ERT will keep CEIP informed of progress and draft recommendations.

C. Review checklist

58. A spreadsheet checklist (see annex III) has been compiled to allow the review process to be undertaken in a transparent way that aligns with the aims of the Executive Body decisions, and ensures that reviewers remain within their remit and field of expertise. The following sections provide a summary of the different stages of the checklist, and include who is responsible for each step. Timescales for completion are included as a guide only — the precise timetable will be issued by CEIP each year.

1. Check of formal submission criteria

Steps 1 and 2 of the adjustment checklist

59. *Main objective:* A preliminary check of whether the adjustment has been notified on time and whether the required supporting documentation has been submitted on time (requirements according to Executive Body decision 2012/12) will be undertaken by CEIP. CEIP will complete the adjustment checklist.

60. If the check is positive, the adjustment application can be forwarded to the ERT. If the check is negative, CEIP informs the secretariat and the EMEP Steering Body.

Undertaken by: CEIP

Deadline: 14 April

2. Check of supporting evidence

61. A check of the supporting evidence aims to establish whether the revision to the emissions inventory was caused by a change in the understanding of the science.

Steps 3 to 6 of the adjustment checklist

62. *Main objective:* This is a check to establish whether the supporting evidence listed in the checklist under steps 3 to 5 provided by the country is complete, transparent and detailed enough to allow proper checking of the submitted adjustment. The 1SER completes the adjustment checklist. Questions for clarification and questions to be discussed by the review team are noted.

63. Based on the findings, the reviewer decides:

(a) Whether the supporting evidence is complete and sufficiently transparent to allow for a suitably detailed review;

(b) Whether the supporting evidence is only partially complete and transparent and questions have to be posed to the Party for clarification;

(c) Whether the supporting evidence is not complete and transparent and the review of the adjustment will be stopped, with the application being rejected.

64. If the check of the supporting evidence is positive, the 1SER proceeds to the next step. If not, the reviewer sends the adjustment checklist with steps 3–5 completed (and any other relevant information) to CEIP.

65. The expert reviewers may ask a Party to provide additional information on a particular issue, whenever they think that this is required to support or progress the review. Requests will be made through CEIP.

66. If the check of the supporting evidence is negative, the 1SER informs the 2SER and asks for their agreement on the issue. Their common position is then forwarded to the lead reviewer and copied to CEIP.

Undertaken by: 1SER

Deadline: 30 April

3. Cross-check of steps 3 to 6 by second sectoral expert reviewer

Steps 3 to 6 of the adjustment checklist

67. *Main objective:* These steps are designed to deliver an independent view on the findings of the 1SER. The 1SER and 2SER should achieve consensus on the submitted adjustment concerning the checks included in steps 3–6 of the adjustment checklist.

68. The 2SER steps through the submitted data and the adjustment checklist, and checks/reviews the findings of the 1SER. The 2SER completes the respective fields for the 2SER in steps 3 to 6 of the adjustment checklist and provides the checklist to the 1SER and CEIP.

69. If the 2SER agrees with the finding of the 1SER, then the 1SER continues with the next steps. If the 1SER and 2SER cannot find a common position, then they will inform the lead reviewer and CEIP.

Undertaken by: 2SER

Deadline: 7 May

4. Review of the quantification of the impact of the revision

Step 7 of the adjustment checklist

70. *Main objective:* This check is designed to determine whether the calculated adjustments are accurate and properly documented.

71. The 1SER carries out a detailed assessment of the supporting evidence provided by the Party, and checks this against the EMEP/CORINAIR Guidebook, the EMEP/EEA Guidebook and other relevant literature, as required. The 1SER should also check whether the adjustment has been calculated without errors and whether the information in table 7 (a) provided by the Party is correct.

72. The 1SER submits findings to the 2SER and the lead reviewer (copied to CEIP). The 2SER checks and confirms the findings of the 1SER and documents the decision in the respective fields in the adjustment checklist under step 7.

73. The 1SER provides a summary to the lead reviewer.

Undertaken by: 1SER and 2SER

Deadline: 7 May

5. Confirming and drafting conclusions and recommendations of the adjustment review

Step 8 of the adjustment checklist

74. *Main objective:* Confirming the findings of the 1SER and 2SER, and drafting the recommendations for the EMEP Steering Body and the adjustment reports for individual countries.

75. The 1SER and 2SER will discuss the findings with the lead reviewer and other sectoral reviewers, and will confirm the findings of the review of each individual adjustment application. Remaining review activities are agreed. The lead reviewer completes step 8 of the adjustment checklist and sends the completed file to CEIP.

76. The ERT will draft conclusions and recommendations for the EMEP Steering Body in an agreed template (see annex V) and provide the relevant text and tables to the CEIP according to the timetable issued by CEIP. The 1SERs and 2SERs will draft relevant chapters for country reports and send them to the lead reviewer.

Undertaken by: All members of the ERT

Deadline: 31 May

6. Draft country adjustment reports

77. *Main objective*: Draft the country adjustment reports.

78. The lead reviewer will, based on the chapters provided by 1SERs and the country report template (see annex IV), compile the individual country adjustment reports. Where substantive changes are made, these will be checked with the relevant 1SERs and 2SERs. The lead reviewer will send the draft country reports to CEIP.

Undertaken by: lead reviewer

Deadline: 7 June

7. Liaison with Parties

79. *Main objective*: Error-checking the country adjustment reports.

80. CEIP will send the draft adjustment reports to the relevant Parties. The Parties will be invited to review the draft reports and reply within five days to address any substantive errors. The Parties will not be asked to challenge the findings of the ERT, unless the findings clearly arise from factual errors. CEIP will pass comments from Parties to the lead reviewer, who will then convert the draft reports into final versions.

Undertaken by: CEIP, Parties, lead reviewer

Deadline: 15 June

8. Publication of findings and recommendations

81. CEIP will publish the finalized individual country reports on its website and send a copy of each report to the secretariat. The secretariat will check the wording in individual country reports prior to publication. A copy of the finalized report will also be sent to each of the corresponding Parties.

Undertaken by: CEIP

Deadline: 22 June

9. EMEP Steering Body assessment

Step 9 of the adjustment checklist

82. The EMEP Steering Body will consider the findings of the ERT, and will make the formal decision on the acceptance/rejection of each adjustment application. The EMEP Steering Body will then inform the secretariat accordingly. The secretariat will make the review available to the Parties and inform the Implementation Committee of adjustments that have been rejected.

Undertaken by: EMEP Steering Body

Deadline: September

Annex I

Sector-specific guidance

A. Non-road mobile machinery: revisions to emission factors

1. Introduction

1. In 1999 when the emission ceilings for the Gothenburg Protocol were set, the second edition of the EMEP/CORINAIR Guidebook was available for countries setting up national emission inventories. For non-road mobile machinery (NRMM) sources the methodology chapter remained unchanged from the previous edition of the Guidebook.

2. The 1999 NRMM methodology chapter proposed a simple and detailed inventory methodology. The simple methodology had later been replaced by a Tier 1 and a Tier 2 methodology as one of the outcomes of the guidebook revision project carried out in 2008. However, due to project resource limitations, the 1999 detailed methodology remained unchanged and is still in the current version of the EMEP/EEA Guidebook.[a]

3. This sector-specific guidance uses a case study from Denmark to demonstrate the impact on emissions that arose as a consequence of updating the emission factors from the EMEP/CORINAIR Guidebook to those available in 2012.

4. This section of the sector-specific guidance explains the changes in emission factors that arise from changing from the 1999 simple method towards the current Tier 1 method for diesel and gasoline 2-stroke/4-stroke engines. The following sections also explain the impact on emission factors for diesel machinery that arise from changing from the 1999 detailed methodology to a more modern detailed methodology (which includes updated data for the entire range of NRMM technology stages defined by the European Union (EU) emission legislation, and several pre-EU NRMM emission technology stages as well). As previously mentioned, this latter method is not currently described in the 2013 edition of the EMEP/EEA Guidebook (2013 Guidebook). Instead, it is derived from the German Transport Emission Model (TREMOD) NRMM model.[b] Emission assessment calculations are also made using country-specific NRMM inventory data.

[a] See http://www.eea.europa.eu/publications/emep-eea-guidebook-2013.

[b] Institute for Energy and Environmental Research (IFEU), "Entwicklung eines Modells zur Berechnung der Luftschadstoffemissionen und des Kraftstoffverbrauchs von Verbrennungsmotoren in mobilen Geräten und Maschinen — Endbericht"(Development of a model to calculate air pollutant emissions and fuel use of combustion engines in mobile machinery), final report (Heidelberg, Germany, 2004); IFEU, "Aktualisierung des Modells TREMOD — Mobile Machinery (TREMOD-MM), Endbericht; Institut für Energie- und Umweltforschung" (Update of the model TREMOD — mobile machinery (TREMOD-MM)), final report (Heidelberg, Germany, 2009); IFEU, "Erarbeitung eines Konzepts zur Minderung der Umweltbelastung aus NRMM (non-road mobile machinery) unter Berücksichtigung aktueller Emissionsfaktoren und Emissionsverminderungsoptionen für den Bestand" (Development of a concept to mitigate environmental pollution from NRMM (non-road mobile machinery) taking into account latest emission factors and options for emission reduction for the non-road fleet), Texte 24/2014 (Heidelberg, Germany, 2014).

2. Changes to emission factors

(a) Simple methodology — emission factors and emission factor changes between 1999 Guidebook and 2013 Guidebook

5. Tables 1 and 2 show the fuel-related simple (1999 Guidebook) and Tier 1 (2013 Guidebook) emission factors and emission factor ratios for NRMM diesel, and 2-stroke/ 4-stroke gasoline, respectively.

Table 1
Fuel-related simple and Tier 1 emission factors (g/kg of fuel) and emission factor ratios for NRMM diesel machinery, by pollutant

	Sector	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*[a]	*NH_3*	*TSP*
Source								
1999 Guidebook	Agriculture	50.30	7.27	0.17	16.00	1.29	0.007	5.87
	Forestry	50.30	6.50	0.17	14.50	1.32	0.007	5.31
	Industry	48.80	7.08	0.17	15.80	1.30	0.007	5.73
2013 Guidebook	Agriculture	35.04	3.37	0.055	10.94	0.14	0.008	1.74
	Forestry	29.09	2.02	0.033	7.83	0.14	0.008	0.98
	Industry	32.79	3.38	0.055	10.72	0.14	0.008	2.09
Ratios								
1999:2013	Agriculture	1.44	2.16	3.11	1.46	9.52	0.90	3.38
	Forestry	1.73	3.22	5.18	1.85	9.55	0.89	5.44
	Industry	1.49	2.09	3.09	1.47	9.61	0.91	2.75

[a] At a later stage the 1999 Guidebook emission factors for N_2O were regarded as unrealistically high, and were reduced by a factor of 10 in the 2013 Guidebook.

Table 2
Fuel-related simple and Tier 1 emission factors (g/kg of fuel) and emission factor ratios for NRMM gasoline 2-stroke and 4-stroke machinery

	Engine type (gasoline)	*Sector*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*TSP*
1999 Guidebook	2-stroke	Agriculture	1.70	617	6.17	1 070	0.02	0.004	n.a.
		Forestry	1.55	762	7.67	1 407	0.02	0.004	n.a.
		Industry	2.10	602	6.00	1 103	0.02	0.004	n.a.
		Household	1.77	813	8.13	1 572	0.02	0.004	n.a.
	4-stroke	Agriculture	7.56	73.6	3.68	1 486	0.07	0.005	n.a.
		Forestry	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Industry	9.61	43.4	2.17	1 193	0.08	0.005	n.a.
		Household	8.00	110	5.50	2193	0.07	0.005	n.a.
2013 Guidebook	2-stroke	All	2.77	242.20	2.20	620.79	0.02	0.003	3.76
	4-stroke	All	7.12	17.60	1.96	770.37	0.06	0.004	0.16

	Engine type (gasoline)	*Sector*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*TSP*
1999:2013 Guidebook	2-stroke	Agriculture	0.61	2.55	2.80	1.72	1.18	1.33	-
		Forestry	0.56	3.15	3.49	2.27	1.18	1.33	-
		Industry	0.76	2.49	2.73	1.78	1.18	1.33	-
		Household	0.64	3.36	3.70	2.53	1.18	1.33	-
	4-stroke	Agriculture	1.06	4.18	1.88	1.93	1.19	1.25	-
		Forestry	-	-	-	-	-	-	-
		Industry	1.35	2.47	1.11	1.55	1.36	1.25	-
		Household	1.12	6.25	2.81	2.85	1.19	1.25	-

Note: A hyphen (-) indicates not applicable and "n.a." indicates that the data are not available.

(b) Detailed methodology — emission factors and emission factor changes between 1999 Guidebook and factors representing today's state-of-the-art-emission knowledge

6. Tables 3 and 4 show the kilowatt (kW)-based emission factors for the 1999 Guidebook, and updated emission factors representing today's best available emission factor knowledge. A direct comparison between the two emission factor tables tells that the 1999 Guidebook emission factors are missing data for the newest Stage IIIA and IIIB engine technologies and the future Stage IV standard as well. Furthermore, pre-EU emission stages are covered by only one technology stage (Uncontrolled) in the 1999 Guidebook, whereas emission data allows for distinguishing between three conventional (< 1981; 1981–1990; 1991–Stage I) emission levels in the updated case.

Table 3
kW-based detailed 1999 Guidebook emission factors (g/kWh) for NRMM diesel machinery

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*[a]	*NH_3*	*PM*	*Fuel*
0–20	Uncontrolled	14.4	3.82	0.05	8.38	0.35	0.002	2.22	271
0–20	Stage I	14.4	3.82	0.05	8.38	0.35	0.002	2.22	271
0–20	Stage II	14.4	3.82	0.05	8.38	0.35	0.002	2.22	271
20–37	Uncontrolled	14.4	2.91	0.05	6.43	0.35	0.002	1.81	269
20–37	Stage I	14.4	2.91	0.05	6.43	0.35	0.002	1.81	269
20–37	Stage II	8.5	1.5	0.05	5.5	0.35	0.002	0.8	269
37–75	Uncontrolled	14.4	2.28	0.05	5.06	0.35	0.002	1.51	265
37–75	Stage I	9.2	1.3	0.05	6.5	0.35	0.002	0.85	265
37–75	Stage II	8	1.3	0.05	5	0.35	0.002	0.4	265
75–130	Uncontrolled	14.4	1.67	0.05	3.76	0.35	0.002	1.23	260
75–130	Stage I	9.2	1.3	0.05	5	0.35	0.002	0.7	260
75–130	Stage II	7	1	0.05	5	0.35	0.002	0.3	260
130–300	Uncontrolled	14.4	1.3	0.05	3	0.35	0.002	1.1	254
130–300	Stage I	9.2	1.3	0.05	5	0.35	0.002	0.54	254
130–300	Stage II	7	1	0.05	3.5	0.35	0.002	0.2	254
300–560	Uncontrolled	14.4	1.3	0.05	3	0.35	0.002	1.1	254
300–560	Stage I	9.2	1.3	0.05	5	0.35	0.002	0.54	254
300–560	Stage II	7	1	0.05	3.5	0.35	0.002	0.2	254

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*[a]	*NH_3*	*PM*	*Fuel*
560–1000	Uncontrolled	14.4	1.3	0.05	3	0.35	0.002	1.1	254
560–1000	Stage I	14.4	1.3	0.05	3	0.35	0.002	1.1	254
560–1000	Stage II	14.4	1.3	0.05	3	0.35	0.002	1.1	254
> 1000	Uncontrolled	14.4	1.3	0.05	3	0.35	0.002	1.1	254
>1000	Stage I	14.4	1.3	0.05	3	0.35	0.002	1.1	254
>1000	Stage II	14.4	1.3	0.05	3	0.35	0.002	1.1	254

[a] At a later stage the 1999 Guidebook emission factors for N_2O were regarded as unrealistically high, and were reduced by a factor of 10 in the 2013 Guidebook.

Table 4
Modern kW-based detailed emission factors (g/kWh) for NRMM diesel machinery

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
P<19	<1981	12	4.92	0.080	7	0.035	0.002	2.8	300
P<19	1981–1990	11.5	3.74	0.061	6	0.035	0.002	2.3	285
P<19	1991–Stage I	11.2	2.46	0.040	5	0.035	0.002	1.6	270
P<19	Stage I	11.2	2.46	0.040	5	0.035	0.002	1.6	270
P<19	Stage II	11.2	2.46	0.040	5	0.035	0.002	1.6	270
P<19	Stage IIIA	11.2	2.46	0.040	5	0.035	0.002	1.6	270
P<19	Stage IIIB	11.2	2.46	0.040	5	0.035	0.002	1.6	270
P<19	Stage IV	11.2	2.46	0.040	5	0.035	0.002	1.6	270
19<=P<37	<1981	18	2.46	0.040	6.5	0.035	0.002	2	300
19<=P<37	1981–1990	18	2.16	0.035	5.5	0.035	0.002	1.4	281
19<=P<37	1991–Stage I	9.8	1.77	0.029	4.5	0.035	0.002	1.4	262
19<=P<37	Stage I	9.8	1.77	0.029	4.5	0.035	0.002	1.4	262
19<=P<37	Stage II	6.5	0.59	0.010	2.2	0.035	0.002	0.4	262
19<=P<37	Stage IIIA	6.18	0.56	0.009	2.2	0.035	0.002	0.4	262
19<=P<37	Stage IIIB	6.18	0.56	0.009	2.2	0.035	0.002	0.4	262
19<=P<37	Stage IV	6.18	0.56	0.009	2.2	0.035	0.002	0.4	262
37<=P<56	<1981	7.7	2.36	0.038	6	0.035	0.002	1.8	290
37<=P<56	1981–1990	8.6	1.97	0.032	5.3	0.035	0.002	1.2	275
37<=P<56	1991–Stage I	11.5	1.48	0.024	4.5	0.035	0.002	0.8	260
37<=P<56	Stage I	7.7	0.59	0.010	2.2	0.035	0.002	0.4	260
37<=P<56	Stage II	5.5	0.39	0.006	2.2	0.035	0.002	0.2	260
37<=P<56	Stage IIIA	3.94	0.29	0.005	2.2	0.035	0.002	0.2	260
37<=P<56	Stage IIIB	3.94	0.29	0.005	2.2	0.035	0.002	0.0225	260
37<=P<56	Stage IV	3.94	0.29	0.005	2.2	0.035	0.002	0.0225	260
56<=P<75	<1981	7.7	1.97	0.032	5	0.035	0.002	1.4	290
56<=P<75	1981–1990	8.6	1.57	0.026	4.3	0.035	0.002	1	275
56<=P<75	1991–Stage I	11.5	1.18	0.019	3.5	0.035	0.002	0.4	260
56<=P<75	Stage I	7.7	0.39	0.006	1.5	0.035	0.002	0.2	260
56<=P<75	Stage II	5.5	0.30	0.005	1.5	0.035	0.002	0.2	260
56<=P<75	Stage IIIA	4.01	0.22	0.004	1.5	0.035	0.002	0.2	260

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
56<=P<75	Stage IIIB	2.97	0.17	0.003	1.5	0.035	0.002	0.0225	260
56<=P<75	Stage IV	0.36	0.17	0.003	1.5	0.035	0.002	0.0225	260
75<=P<130	<1981	10.5	1.97	0.032	5	0.035	0.002	1.4	280
75<=P<130	1981–1990	11.8	1.57	0.026	4.3	0.035	0.002	1	268
75<=P<130	1991–Stage I	13.3	1.18	0.019	3.5	0.035	0.002	0.4	255
75<=P<130	Stage I	8.1	0.39	0.006	1.5	0.035	0.002	0.2	255
75<=P<130	Stage II	5.2	0.30	0.005	1.5	0.035	0.002	0.2	255
75<=P<130	Stage IIIA	3.40	0.20	0.003	1.5	0.035	0.002	0.2	255
75<=P<130	Stage IIIB	2.97	0.17	0.003	1.5	0.035	0.002	0.0225	255
75<=P<130	Stage IV	0.36	0.17	0.003	1.5	0.035	0.002	0.0225	255
130<=P<560	<1981	17.8	1.48	0.024	2.5	0.035	0.002	0.9	270
130<=P<560	1981–1990	12.4	0.98	0.016	2.5	0.035	0.002	0.8	260
130<=P<560	1991–Stage I	11.2	0.49	0.008	2.5	0.035	0.002	0.4	250
130<=P<560	Stage I	7.6	0.30	0.005	1.5	0.035	0.002	0.2	250
130<=P<560	Stage II	5.2	0.30	0.005	1.5	0.035	0.002	0.1	250
130<=P<560	Stage IIIA	3.40	0.20	0.003	1.5	0.035	0.002	0.1	250
130<=P<560	Stage IIIB	1.8	0.17	0.003	1.5	0.035	0.002	0.0225	250
130<=P<560	Stage IV	0.36	0.17	0.003	1.5	0.035	0.002	0.0225	250

7. Table 5 shows the ratios between detailed 1999 Guidebook and detailed modern emission factors for NRMM diesel machinery. In the table, the 1999 Guidebook emission stage "Uncontrolled" is compared with the three conventional (< 1981; 1981–1990; 1991–Stage I) emission levels from the modern emission factor set. The factors for the newest emission technology level Stage II in the 1999 Guidebook are compared with the newer EU Stage IIIA, IIIB and IV emission stages from the modern emission factor base.

8. The "missing 1999 Guidebook data" comparison in table 5 particularly highlights the emission factor consequences of filling the 1999 Guidebook data gap in the most simple way for countries that during recent years have continued to use the detailed 1999 Guidebook methodology after Stage IIIA and IIIB technologies entered into the fleet.

Table 5

Ratios between detailed 1999 Guidebook and detailed modern emission factors (g/kWh) for NRMM diesel machinery

Size class	*kW size*	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
A	P<19	<1981	1.20	0.78	0.63	1.20	10.00	1.00	0.79	0.90
A	P<19	1981–1990	1.25	1.02	0.82	1.40	10.00	1.00	0.97	0.95
A	P<19	1991–Stage I	1.29	1.55	1.25	1.68	10.00	1.00	1.39	1.00
A	P<19	Stage I	1.29	1.55	1.25	1.68	10.00	1.00	1.39	1.00
A	P<19	Stage II	1.29	1.55	1.25	1.68	10.00	1.00	1.39	1.00
A	P<19	Stage IIIA	1.29	1.55	1.25	1.68	10.00	1.00	1.39	1.00
A	P<19	Stage IIIB	1.29	1.55	1.25	1.68	10.00	1.00	1.39	1.00
A	P<19	Stage IV	1.29	1.55	1.25	1.68	10.00	1.00	1.39	1.00
B	19<=P<37	<1981	0.80	1.18	1.25	0.99	10.00	1.00	0.91	0.90

Size class	*kW size*	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
B	19<=P<37	1981–1990	0.80	1.34	1.42	1.17	10.00	1.00	1.29	0.96
B	19<=P<37	1991–Stage I	1.47	1.64	1.74	1.43	10.00	1.00	1.29	1.03
B	19<=P<37	Stage I	1.47	1.64	1.74	1.43	10.00	1.00	1.29	1.03
B	19<=P<37	Stage II	1.31	2.54	5.21	2.50	10.00	1.00	2.00	1.03
B	19<=P<37	Stage IIIA	1.38	2.67	5.48	2.50	10.00	1.00	2.00	1.03
B	19<=P<37	Stage IIIB	1.38	2.67	5.48	2.50	10.00	1.00	2.00	1.03
B	19<=P<37	Stage IV	1.38	2.67	5.48	2.50	10.00	1.00	2.00	1.03
C	37<=P<56	<1981	1.87	0.97	1.30	0.84	10.00	1.00	0.84	0.91
C	37<=P<56	1981–1990	1.67	1.16	1.56	0.95	10.00	1.00	1.26	0.96
C	37<=P<56	1991–Stage I	1.25	1.54	2.08	1.12	10.00	1.00	1.89	1.02
C	37<=P<56	Stage I	1.19	2.20	5.21	2.95	10.00	1.00	2.13	1.02
C	37<=P<56	Stage II	1.45	3.30	7.81	2.27	10.00	1.00	2.00	1.02
C	37<=P<56	Stage IIIA	2.03	4.56	10.78	2.27	10.00	1.00	2.00	1.02
C	37<=P<56	Stage IIIB	2.03	4.56	10.78	2.27	10.00	1.00	17.78	1.02
C	37<=P<56	Stage IV	2.03	4.56	10.78	2.27	10.00	1.00	17.78	1.02
D	56<=P<75	<1981	1.87	1.16	1.56	1.01	10.00	1.00	1.08	0.91
D	56<=P<75	1981–1990	1.67	1.45	1.95	1.18	10.00	1.00	1.51	0.96
D	56<=P<75	1991–Stage I	1.25	1.93	2.60	1.45	10.00	1.00	3.78	1.02
D	56<=P<75	Stage I	1.19	3.30	7.81	4.33	10.00	1.00	4.25	1.02
D	56<=P<75	Stage II	1.45	4.40	10.42	3.33	10.00	1.00	2.00	1.02
D	56<=P<75	Stage IIIA	1.99	6.01	14.20	3.33	10.00	1.00	2.00	1.02
D	56<=P<75	Stage IIIB	2.69	7.73	18.27	3.33	10.00	1.00	17.78	1.02
D	56<=P<75	Stage IV	22.22	7.73	18.27	3.33	10.00	1.00	17.78	1.02
E	75<=P<130	<1981	1.37	0.85	1.56	0.75	10.00	1.00	0.88	0.93
E	75<=P<130	1981–1990	1.22	1.06	1.95	0.87	10.00	1.00	1.23	0.97
E	75<=P<130	1991–Stage I	1.08	1.41	2.60	1.07	10.00	1.00	3.08	1.02
E	75<=P<130	Stage I	1.14	3.30	7.81	3.33	10.00	1.00	3.50	1.02
E	75<=P<130	Stage II	1.35	3.39	10.42	3.33	10.00	1.00	1.50	1.02
E	75<=P<130	Stage IIIA	2.70	6.61	15.63	3.33	10.00	1.00	3.50	1.02
E	75<=P<130	Stage IIIB	3.10	7.73	18.27	3.33	10.00	1.00	31.11	1.02
E	75<=P<130	Stage IV	25.56	7.73	18.27	3.33	10.00	1.00	31.11	1.02
F	130<=P<560	<1981	0.81	0.88	2.08	1.20	10.00	1.00	1.22	0.94
F	130<=P<560	1981–1990	1.16	1.32	3.13	1.20	10.00	1.00	1.38	0.98
F	130<=P<560	1991–Stage I	1.29	2.64	6.25	1.20	10.00	1.00	2.75	1.02
F	130<=P<560	Stage I	1.21	4.40	10.42	3.33	10.00	1.00	2.70	1.02
F	130<=P<560	Stage II	1.35	3.39	10.42	2.33	10.00	1.00	2.00	1.02
F	130<=P<560	Stage IIIA	2.06	5.08	15.63	2.33	10.00	1.00	2.00	1.02
F	130<=P<560	Stage IIIB	3.89	5.94	18.27	2.33	10.00	1.00	8.89	1.02
F	130<=P<560	Stage IV	19.44	5.94	18.27	2.33	10.00	1.00	8.89	1.02

(c) Quantifying the adjustment

9. The Danish NRMM inventory fleet and activity data for 2012[c] is used to calculate the fuel consumption for diesel and gasoline 2-stroke/4-stroke engines for the simple methodology case, and is further stratified into engine size and emission technology stage for the detailed methodology case.

(d) Simple methodology — emission impact of using 1999 Guidebook instead of 2013 Guidebook emission factors

Table 6
NRMM emissions (tons) calculated with the simple and Tier 1 methods for diesel machinery

		NO_x	NMVOC	CH_4	CO	N_2O	NH_3	TSP	Fuel
1999 Guidebook	Agriculture	20 784	3 004	70	6 611	533	3	2 425	413 196
	Forestry	187	24	1	54	5	0.03	20	3 718
	Industry	14 649	2 125	51	4 743	390	2	1 720	300 186
Total		**35 620**	**5 153**	**122**	**11 408**	**928**	**5**	**4 165**	**717 101**
2013 Guidebook	Agriculture	14 480	1 391	23	4 520	56	3	718	413 196
	Forestry	108	8	-	29	1	-	4	3 718
	Industry	9 844	1 016	17	3 218	41	2	626	300 186
Total		**24 431**	**2 414**	**39**	**7 767**	**97**	**6**	**1 348**	**717 101**
1999:2013 Guidebook	Agriculture	1.44	2.16	3.11	1.46	9.52	0.90	3.38	1.00
	Forestry	1.73	3.22	5.18	1.85	9.55	0.89	5.44	1.00
	Industry	1.49	2.09	3.09	1.47	9.61	0.91	2.75	1.00
Total		**1.46**	**2.13**	**3.11**	**1.47**	**9.55**	**0.90**	**3.09**	**1.00**

Notes: Totals may not add up due to rounding. A hyphen (-) indicates not applicable.

10. Important for diesel, table 6 shows that close to 50 per cent more nitrogen oxides (NO_x) and more than 200 per cent of particulate matter (PM) is estimated for Denmark — as an example — by using 1999 Guidebook factors instead of 2013 Guidebook factors as the basis for the simple inventory.

Table 7
NRMM emissions (tons) calculated with the simple and Tier 1 methods for gasoline 2-stroke and 4-stroke machinery

	Engine type (gasoline)	Sector	NO_x	NMVOC	CH_4	CO	N_2O	NH_3	TSP	Fuel
1999 Guidebook	2-stroke	Agriculture	1	494	5	856	0.016	0.003	n.a.	800
		Forestry	1	610	6	1 126	0.016	0.003	n.a.	800
		Industry	-	136	1	249	0.005	0.001	n.a.	226

[c] Ole-Kenneth Nielsen and others, "Annual Danish Informative Inventory Report to UNECE: Emission inventories from the base year of the protocols to year 2012", Scientific Report No. 94 (Aarhus, Denmark, Danish Centre for Environment and Energy, 2014).

	Engine type (gasoline)	*Sector*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*TSP*	*Fuel*
		Household	25	11 692	117	22 607	0.288	0.058	n.a.	14 381
Total			**29**	**12 931**	**129**	**24 837**	**0.324**	**0.065**	**n.a.**	**16 207**
1999 Guidebook	4-stroke	Agriculture	7	66	3	1 332	0.063	0.004	n.a.	896
		Forestry	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	896
		Industry	32	145	7	3 988	0.267	0.017	n.a.	3343
		Household	470	6 463	323	128 845	4.113	0.294	n.a.	58 753
Total			**509**	**6 674**	**334**	**134 165**	**4.443**	**0.315**	**n.a.**	**63 888**
2013 Guidebook	2-stroke	All	45	3 925	36	10 061	0.28	0.05	61	16 207
	4-stroke	All	455	1 125	125	49 217	3.77	0.26	10	63 888
1999:2013 Guidebook	2-stroke	All	0.64	3.29	3.63	2.47	1.18	1.33	n.a.	1.00
	4-stroke	All	1.12	5.93	2.67	2.73	1.18	1.23	n.a.	1.00

Notes: Totals may not add up due to rounding. A hyphen (-) indicates not applicable and "n.a." indicates that the data are not available.

11. Important for gasoline, table 7 shows that for 2-stroke engines the 1999 Guidebook emissions of non-methane volatile organic compounds (NMVOC) and carbon monoxide (CO) become 229 per cent and 147 per cent higher compared with 2013 Guidebook-based estimates for the simple inventory. For 4-stroke engines the emission differences become even higher: 493 per cent and 173 per cent in the corresponding cases.

(e) Detailed methodology — emission impact of using 1999 Guidebook instead of today's state-of-the-art emission factors

Table 8
NRMM emissions (tons) calculated with the detailed 1999 Guidebook method for diesel machinery

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
P<19	<1981	-	-	-	-	-	-	-	n.a.
P<19	1981–1990	-	-	-	-	-	-	-	n.a.
P<19	1991–Stage I	269	59	1	120	1	-	38	6 488
P<19	Stage I	-	-	-	-	-	-	-	n.a.
P<19	Stage II	-	-	-	-	-	-	-	n.a.
P<19	Stage IIIA	-	-	-	-	-	-	-	n.a.
P<19	Stage IIIB	-	-	-	-	-	-	-	n.a.
P<19	Stage IV	-	-	-	-	-	-	-	n.a.
19<=P<37	<1981	-	-	-	-	-	-	-	n.a.
19<=P<37	1981–1990	-	-	-	-	-	-	-	n.a.
19<=P<37	1991–Stage I	260	47	1	119	1	-	37	6 939
19<=P<37	Stage I	-	-	-	-	-	-	-	n.a.

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
19<=P<37	Stage II	673	61	1	228	4	-	41	27 123
19<=P<37	Stage IIIA	810	74	1	288	5	-	52	34 345
19<=P<37	Stage IIIB	-	-	-	-	-	-	-	n.a.
19<=P<37	Stage IV	-	-	-	-	-	-	-	n.a.
37<=P<56	<1981	-	-	-	-	-	-	-	n.a.
37<=P<56	1981–1990	236	54	1	145	1	-	33	7 536
37<=P<56	1991–Stage I	988	127	2	386	3	-	69	22 330
37<=P<56	Stage I	253	19	-	72	1	-	13	8 549
37<=P<56	Stage II	493	35	1	197	3	-	18	23 283
37<=P<56	Stage IIIA	259	19	-	145	2	-	13	17 107
37<=P<56	Stage IIIB	-	-	-	-	-	-	-	n.a.
37<=P<56	Stage IV	-	-	-	-	-	-	-	n.a.
56<=P<75	<1981	-	-	-	-	-	-	-	n.a.
56<=P<75	1981–1990	521	95	2	260	2	-	61	16 654
56<=P<75	1991–Stage I	520	53	1	158	2	-	18	11 754
56<=P<75	Stage I	160	8	-	31	1	-	4	5 417
56<=P<75	Stage II	243	13	-	66	2	-	9	11 471
56<=P<75	Stage IIIA	123	7	-	46	1	-	6	7 969
56<=P<75	Stage IIIB	19	1	-	10	-	-	-	1 675
56<=P<75	Stage IV	-	-	-	-	-	-	-	n.a.
75<=P<130	<1981	-	-	-	-	-	-	-	n.a.
75<=P<130	1981–1990	929	124	2	338	3	-	79	21 092
75<=P<130	1991–Stage I	1 924	171	3	506	5	-	58	36 886
75<=P<130	Stage I	313	15	-	58	1	-	8	9 848
75<=P<130	Stage II	1 949	111	2	562	13	1	75	95 561
75<=P<130	Stage IIIA	1 757	102	2	774	18	1	103	131 637
75<=P<130	Stage IIIB	288	16	-	145	3	-	2	24 734
75<=P<130	Stage IV	-	-	-	-	-	-	-	n.a.
130<=P<560	<1981	-	-	-	-	-	-	-	n.a.
130<=P<560	1981–1990	85	7	-	17	-	-	5	1 777
130<=P<560	1991–Stage I	1 032	45	1	230	3	-	37	23 043
130<=P<560	Stage I	31	1	-	6	-	-	1	1 036
130<=P<560	Stage II	783	44	1	226	5	-	15	37 668
130<=P<560	Stage IIIA	1 285	74	1	566	13	1	38	94 381
130<=P<560	Stage IIIB	222	21	-	185	4	-	3	30 796
130<=P<560	Stage IV	-	-	-	-	-	-	-	n.a.
All	All	16 424	1 404	23	5 888	98	6	837	717 101

Notes: Totals may not add up due to rounding. A hyphen (-) indicates not applicable and “n.a.” indicates that the data are not available.

Table 9
NRMM emissions (tons) calculated with the detailed modern emission factors for diesel machinery

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
P<19	<1981	-	-	-	-	-	-	-	n.a.
P<19	1981–1990	-	-	-	-	-	-	-	n.a.
P<19	1991–Stage I	345	91	1	201	8	-	53	6 488
P<19	Stage I	-	-	-	-	-	-	-	n.a.
P<19	Stage II	-	-	-	-	-	-	-	n.a.
P<19	Stage IIIA	-	-	-	-	-	-	-	n.a.
P<19	Stage IIIB	-	-	-	-	-	-	-	n.a.
P<19	Stage IV	-	-	-	-	-	-	-	n.a.
19<=P<37	<1981	-	-	-	-	-	-	-	n.a.
19<=P<37	1981–1990	-	-	-	-	-	-	-	n.a.
19<=P<37	1991–Stage I	371	75	1	166	9	-	47	6 939
19<=P<37	Stage I	-	-	-	-	-	-	-	n.a.
19<=P<37	Stage II	857	151	5	555	35	-	81	27 123
19<=P<37	Stage IIIA	1 085	192	6	702	45	-	102	34 345
19<=P<37	Stage IIIB	-	-	-	-	-	-	-	n.a.
19<=P<37	Stage IV	-	-	-	-	-	-	-	n.a.
37<=P<56	<1981	-	-	-	-	-	-	-	n.a.
37<=P<56	1981–1990	410	65	1	144	10	-	43	7 536
37<=P<56	1991–Stage I	1 213	192	4	426	29	-	127	22 330
37<=P<56	Stage I	297	42	2	210	11	-	27	8 549
37<=P<56	Stage II	703	114	4	439	31	-	35	23 283
37<=P<56	Stage IIIA	516	84	3	323	23	-	26	17 107
37<=P<56	Stage IIIB	-	-	-	-	-	-	-	n.a.
37<=P<56	Stage IV	-	-	-	-	-	-	-	n.a.
56<=P<75	<1981	-	-	-	-	-	-	-	n.a.
56<=P<75	1981–1990	905	143	3	318	22	-	95	16 654
56<=P<75	1991–Stage I	639	101	2	224	16	-	67	11 754
56<=P<75	Stage I	188	27	1	133	7	-	17	5417
56<=P<75	Stage II	346	56	2	216	15	-	17	11 471
56<=P<75	Stage IIIA	241	39	2	150	11	-	12	7 969
56<=P<75	Stage IIIB	51	8	-	32	2	-	3	1 675
56<=P<75	Stage IV	-	-	-	-	-	-	-	n.a.
75<=P<130	<1981	-	-	-	-	-	-	-	n.a.
75<=P<130	1981–1990	1 168	135	4	305	28	-	100	21 092
75<=P<130	1991–Stage I	2 043	237	7	533	50	-	174	36 886
75<=P<130	Stage I	348	49	2	189	13	-	27	9 848
75<=P<130	Stage II	2 573	368	18	1 838	129	1	110	95 561
75<=P<130	Stage IIIA	4 658	658	25	2 531	177	1	354	131 637

kW size	*Emission level*	*NO_x*	*NMVOC*	*CH_4*	*CO*	*N_2O*	*NH_3*	*PM*	*Fuel*
75<=P<130	Stage IIIB	875	124	5	476	33	-	67	24 734
75<=P<130	Stage IV	-	-	-	-	-	-	-	n.a.
130<=P<560	<1981	-	-	-	-	-	-	-	n.a.
130<=P<560	1981–1990	101	9	-	21	2	-	8	1 777
130<=P<560	1991–Stage I	1 306	118	5	272	32	-	100	23 043
130<=P<560	Stage I	38	5	-	20	1	-	2	1 036
130<=P<560	Stage II	1 038	148	7	519	52	-	30	37 668
130<=P<560	Stage IIIA	2 601	372	19	1 301	130	1	74	94 381
130<=P<560	Stage IIIB	849	121	6	424	42	-	24	30 796
130<=P<560	Stage IV	-	-	-	-	-	-	-	n.a.
All	All	25 765	3 725	138	12 669	964	6	1 822	717 101

Notes: Totals may not add up due to rounding. A hyphen (-) indicates not applicable and "n.a." indicates that the data are not available.

12. The results from tables 8 and 9 show that in total 57 per cent more NO_x and 118 per cent more PM is estimated for diesel NRMM with the detailed 1999 Guidebook method compared with the results based on modern emission factors.

B. Road transport: revisions to methodologies and revisions to emission factors

1. Introduction

13. It is not anticipated that there will be new emissions sources (vehicle types or processes) from the road transport sector that have not been considered in the EMEP/CORINAIR Guidebook when the ceilings were set in 1999. Methodologies for different emission processes (hot exhaust, cold start, evaporative and non-exhaust emissions) were included for the relevant main vehicle types and fuels in the 1999 Guidebook (cars, light duty commercial vehicles, heavy goods vehicles, buses, coaches, mopeds and motorcycles). New technologies such as hybrid electric vehicles are not considered to be new sources. Therefore, adjustment applications for the road transport sector are expected to be made for the two circumstances described below.

2. Significant changes in emission factors

14. At the time when the ceilings were set, emission factors for (then) future vehicle emission technologies were based on emission reductions (relative to current vehicles) anticipated at the time. These reductions were expected mainly on the basis of the relative change in the regulatory emission limit values (the Euro standards). Therefore, it is natural to expect that emission factors for (then) future emission technologies would be reviewed (and revised if appropriate) as real-world emission measurements were made for these vehicles as they entered the fleet. In particular, recent evidence on the real-world emission performance of diesel vehicles has indicated that some Euro standards have failed to introduce the reductions for NO_x that were estimated prior to and during introduction into vehicle fleets, and thus emission factors have been increased since then to reflect the change in the scientific understanding.

3. Significant changes in methodology

15. Many Parties use models to estimate road transport emissions and the methodology which underpins these models might have been updated over time to improve the accuracy of emission estimations. One of the commonly used models is COPERT (COmputer Programme to Calculate Emissions from Road Transport), which uses the methodology adopted by the EMEP/EEA Guidebook. Since 1997, COPERT has evolved from COPERT II to COPERT 4 version 11.0 (September 2014 — the latest version to date). The types of changes include extended vehicle classification, accounting for the effect of the use of improved fuel quality and the effect of vehicle age (mileage) on emissions and an alternative approach for modelling evaporative emissions. Moreover, these changes are often coupled by revision of the emission factors. It should be noted that fixing errors or "bugs" in a model (which leads to any changes in emission results) is not a valid case for adjustment application as it does not represent changes in the scientific understanding of the emission source.

4. Changes to emission factors and methodologies

16. The COPERT methodology for the road transport sector, adopted by the EMEP/EEA Guidebook, has evolved over time. These changes include updates of emission factors for various pollutants and other changes, such as an extension of vehicle classification (and thus inclusion of emission factors associated with these new vehicle subcategories) to improve the accuracy of emission estimations for road transport.

17. The principal underlying approaches in COPERT have not changed since emission ceilings were set. The main changes that have occurred have been to the emission factors for those vehicles in the vehicle fleet in 2010. Modifications to details in the emission calculation methodologies (e.g., the procedure for cold start emissions) have not led to fundamental changes to the approach and are likely to have led to less significant changes to emission estimations. Such method changes for road transport would be difficult to separate out from the changes in emission factors in an adjustment procedure.

18. So far as road transport is concerned, the ability of a Party to attain the emission ceiling is most likely to have been affected by a combination of emission factor changes and differences in activity data to that which had been anticipated when the ceilings were set. In particular, the failure to attain ceilings for NO_x will have been affected by changes to the emission factors for diesel vehicles combined with greater than originally expected dieselization of the fleet. This was demonstrated in an European Topic Centre on Air and Climate Change (ETC/ACC) technical paper,[d] which showed the impacts of changing COPERT model versions (COPERT II to COPERT 4 version 8.0) and activity data in the context of meeting the commitments under Directive 2001/81/EC of 23 October 2001 on national emission ceilings for certain atmospheric pollutants (NEC Directive; NECD). This study modelled fuel consumption and NO_x emissions for four selected countries (Belgium, France, Germany and the Netherlands) and found higher NO_x emissions were estimated for the road transport sector than originally modelled by the Regional Air Pollution Information and Simulation (RAINS) model of the International Institute for Applied Systems Analysis (IIASA), which underpinned the setting of 2010 ceilings. This was mainly due to:

(a) NO_x emission factors that did not follow the reductions as set by the emission standards for diesel passenger cars;

[d] Leonidas Ntziachristos and Thomas Papageorgiou, "Road transport emission projections in the context of the EU NEC Directive ceiling commitments. Impacts of model versions", ETC/ACC technical paper 2010/20 (Bilthoven, the Netherlands, 2011).

(b) Diesel fuel consumption (which is important for NO_x) exceeding what was foreseen by RAINS.

19. The results of this study showed that it is the combination of different parameters which might affect the ability (to different extents) of a Party to attain the emission ceilings. For road transport, the exceedances in the past and the expected exceedances in the future are due to the underperforming diesel light duty vehicles (LDVs) with respect to NO_x emissions. In such a case, an adjustment approach should be based on the changes to the emission factors.

20. An increase in the dieselization of the vehicle fleet (in this case a revision to the activity data) is not a valid case for adjustment because it represents an inability to predict future trends accurately, and does not represent a change in the understanding of the science.

5. Original emission factors and methodologies

21. The RAINS model was used as a basis for setting the 2010 ceilings for the 1999 Gothenburg Protocol. Emission factors from COPERT II were used by RAINS to calculate road transport emissions and the references are as follows:

(a) RAINS Scenarios developed on Acidification and Ground-Level Ozone Control;[e]

(b) COPERT II Computer Programme to calculate Emissions from Road Transport;[f]

(c) EMEP/CORINAIR Guidebook. Road Transport Chapter Version 3.1 – February 1999.

22. Similarly, the Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model of IIASA was used a basis of setting the 2020 emission reduction targets and the following version of COPERT underpinned the IIASA analysis:

(a) The Gains Baseline Emission Projections with a 2010 perspective;[g]

(b) COPERT 4 version 8.0;

(c) EMEP/EEA Guidebook, 2011 Update.

23. If Parties use the COPERT methodology for their national emission inventories, these references will provide the starting point for an adjustment calculation. As an example, table 10 shows relative NO_x emissions levels used for key vehicle categories in the different projection activities. Relative emissions levels may slightly vary for each Party due to national particularities (vehicle sizes, road patterns, ambient conditions, etc.).

[e] Markus Amann and others, "Cost-effective Control of Acidification and Ground-Level Ozone. Part A: Methodology and Databases", Sixth Interim Report (Laxenburg, Austria, IIASA, 1998), p. 111.

[f] Peter Ahlvik and others, "COPERT II Computer Programme to calculate Emissions from Road Transport. Methodology and Emission Factors", Technical Report No. 6 (Copenhagen, European Environment Agency, 1997), p. 55.

[g] Fabian Wagner and others, "Baseline Emission Projections and Further cost-effective reductions of Air Pollution Impacts in Europe — A 2010 perspective", Technical Report No. 7 (Laxenburg, Austria, IIASA, 2010), p. 50.

Table 10
Relative emission levels (Euro 1/I assigned a value of 100) used in the original and revised[h] NEC Directive projections for key vehicle categories, and comparison with emission standards

Vehicle type	*Euro standard*	*Original NECD*	*Revised NECD*	*Emission standard*
Diesel HDV	Conventional	149	146	n.a.
	Euro I	100	100	100
	Euro II	85	109	87
	Euro III	60	95	63
	Euro IV	24	56	44
	Euro V	24	32	25
	Euro VI	n.a.	6	5
Gasoline LDV	Conventional	400	400	n.a.
	Euro 1	100	100	100
	Euro 2	50	48	52
	Euro 3	26	20	36
	Euro 4	13	12	19
	Euro 5	13	10	16
	Euro 6	n.a.	10	16
Diesel LDV	Conventional	145	93	n.a.
	Euro 1	100	100	100
	Euro 2	73	105	70
	Euro 3	59	116	38
	Euro 4	29	87	29
	Euro 5	29	63	29
	Euro 6	n.a.	28	21

Note: "n.a." indicates that the data are not available.

24. There are other sources of emissions factors used by Parties, such as the Handbook of Emission Factors for Road Transport (HBEFA).[i] If other sources of EFs (and/or methodology) are used, Parties should provide the relevant information in their supporting document in accordance with decision 2012/12 (annex, paragraph 2 (d) (ii) a-c):

(a) A description of the original emission factors, including a detailed description of the scientific basis upon which the emission factor was derived;

(b) Evidence that the original emission factors were used for determining the emission reductions at the time when they were set;

(c) A description of the updated emission factors, including detailed information on the scientific basis upon which the emission factor was derived.

[h] As part of its new Clean Air Programme for Europe, often called the Clean Air Policy Package, in December 2013 the EU agreed to revise the National Emission Ceilings Directive, with stricter national emission ceilings for the six main pollutants. The new Directive has been drafted, but has not yet been adopted. See http://ec.europa.eu/environment/air/clean_air_policy.htm.

[i] See http://www.hbefa.net/e/index.html.

25. With regard to fulfilling the requirement laid out in decision 2012/12, annex, paragraph 2 (d) (ii) b (corresponding to paragraph 24 (b) above), an example can be drawn from Germany's adjustment application in 2014. The Party uses TREMOD to calculate emissions from the road transport sector. The Party attempted to reproduce the NO_x emission estimates as calculated by the RAINS model in 1999 (the original NEC Directive scenarios). This was done by using activity data and emission factors from the TREMOD 3.1 model (2002), which is the oldest version that is still available to the Party. The difference in NO_x results for 2010 were 4 per cent compared with the values from the NECD original scenarios, which could be attributed to the different aggregation and modelling systems in RAINS and TREMOD. Given this good agreement with the original NEC scenarios, the ERT considered this step had provided evidence that the emission factors and activity data used in TREMOD 3.1 were in line with the original emission factors (and activity data) that were used for determining the emission reductions at the time when they were set.

6. Quantifying the adjustment

26. As the adjustment applications for road transport are essentially related to changes in emission factors, the following principle is used for quantifying the adjustments:

$$A_Y = AD_{Y\ Current} \times (EF_{current} - EF_{Original})$$

Where:

A_Y is the value for the adjustment for inventory year Y

$EF_{Current}$ is the current EF used

$EF_{Original}$ is the original EF used when the ceilings were set

$AD_{Y\ Current}$ is the current activity data for inventory year Y.

27. Table 11 below provides a simple work template when applying the above principle in practice. This can also be applied to the following scenarios:

(a) **Scenario 1**: Changes in model version underpinned by changes in EFs (e.g., from COPERT II to COPERT 4 or from original to current country model);

(b) **Scenario 2**: Changes in methodology underpinned by changes in EFs (e.g., from COPERT II/4 to other source of emission factors such as HBEFA);

(c) **Scenario 3**: Moving to higher Tier of methodology underpinned by changes in EFs (e.g., from Tier 1 to Tier 3 (such as the COPERT 4 model).

Table 11
Adjustment calculation template for road transport

Vehicle category (vehicle type, fuel type, Euro standard) (A)	*$AD_{Y\ Current}$ (B)*	*$EF_{Original}$ (C)*	*$EF_{Current}$ (D)*	*Emissions based on current EF for Year Y (B x D) (E)*	*Emissions based on original EF for Year Y (B x C) (F)*	*A_Y (E - F) (G)*
e.g., Diesel car Pre-Euro 1						
e.g., Diesel car Euro 1						
and so on…						
∑ Total						

28. Column A will reflect the vehicle categorization used by the Party, but a detailed categorization for a Tier 3 methodological approach is shown here. Entries can be further disaggregated by engine size or vehicle weight associated with the relevant vehicle and fuel type. Columns C and D are implied emission factors (IEFs), i.e., weighted by activity over a range of speeds/engine size/vehicle weight. The table can be expanded to show IEFs for different main road types (urban, rural and motorway) if appropriate. The current EFs might have different or extended vehicle classifications compared with the original EFs. In such case, emission factors should be weighted by the common (or current) disaggregation level.

29. Column B represents the current activity data assigned to each Euro standard for inventory year Y. This should correspond to the level of disaggregation chosen for Columns A, C and D.

30. Columns E, F and G combine the data collected to give the emissions results based on current and original emission factors, and the subsequent adjustment value for inventory year Y. The overall adjustment for road transport will be the sum of the adjustments for the individual vehicle categories.

31. It is recommended that the Party provide such a table of information in their supporting document, in order to allow the expert reviewers to check that:

(a) The original and current (implied) emission factors by Euro standard used by the Party are broadly in line with the original and current Guidebook factors;

(b) The adjustments are accurate and correctly calculated.

32. It is important to specify the sources of emission factors and how the IEFs have been derived in the supporting document. The units used for each column should be clearly stated.

33. If the application is made for more than one inventory year, the same calculations should be repeated following the same principle as outlined above; otherwise the Party needs to state clearly how they have derived the adjustments for other inventory years. For example, this might be done in by scaling factors to adjust the results for other inventory years. The methodology (and any assumptions) used by the Party to calculate the final adjustments should be clearly stated in the supporting document to allow the expert reviewers to understand the rationales and approaches used.

7. A summary of what the Expert Review Team will be looking for

34. In accordance with the checklist, the expert reviewers will check whether documentation provided by the Party is complete and transparent and that the adjustments are accurate, correctly calculated and properly documented. Thus, the following items will be required:

(a) A description of the original and updated emission factors (or methodology), including a detailed description of the scientific basis upon which the EF (or methodology) was derived. The Party should clearly state the version and year of the Guidebook or any other source when referring to information taken from the literature;

(b) Evidence that the original EFs were used for determining the emission reductions at the time when they were set;

(c) A comparison of emission estimates made using the original and the updated emission factors (or methodologies), demonstrating that the change in EFs (or methodologies) contributes to a Party being unable to meet its emission ceilings under the Gothenburg Protocol;

(d) A description of the approach used in quantifying the adjustments for the years concerned;

(e) In order for the expert reviewers to validate the quantification of the adjustments for the road transport sector, the Party should provide a table of both the original and current EFs (by Euro standards) and the corresponding current activity data for the concerned year(s). Table 11 provides a working template;

(f) The rationale for deciding whether the changes in EFs (or methodology) are significant. This can be demonstrated by expressing the percentage changes in emissions of total road transport emissions as well as the changes in the national total for the year(s) concerned.

C. Agriculture: new sources and revisions to emission factors

1. Introduction

35. The methodologies for estimating emissions from the agriculture sector have undergone significant development since 1999. This can be observed by comparing the agriculture chapters in the EMEP/CORINAIR Guidebook with those in the most up-to-date version of the EMEP/EEA Guidebook. Emission factors have been revised for some sources, new methodologies have been developed and new pollutants have been added. This section summarizes the main changes to the Guidebook between the time the ceilings were set and today.[j]

2. New sources/pollutants

36. **NH_3 from growing crops:** NH_3 emissions from growing (or standing) crops are not included as a source in the EMEP/CORINAIR Guidebook that was available when the ceilings were set for the Gothenburg Protocol in 1999. The current version of the EMEP/EEA Guidebook refers to NH_3 emissions from this source, but does not include default emission factors for estimating emissions, or provide a clearly defined methodology. Despite this, some countries do include this source in their emission inventories, by using country-specific methodologies. Where countries do include emissions from this source in their emissions inventory, it would be, in principle, a valid case for an emissions adjustment as a "new" source.

37. **Non-methane volatile organic compounds:** In 1999 the available guidance material for the agriculture sector provided methodologies for estimating NMVOC from crops only. Methodologies for estimating NMVOC emissions from animal manure and waste management systems were not available. The current guidance recognizes that there is still a high degree of uncertainty regarding NMVOC emissions from animal waste, and that available information requires review and improvement. As a result, few countries currently include NMVOC emissions from this source in their national emission inventory totals. But, where this is the case, emissions from this source can in principle be considered a valid case for an adjustment application as a "new" source.

38. **Particulate matter:** Methodologies for estimating emissions of coarse PM (PM_{10}), fine PM ($PM_{2.5}$) and total suspended particles (TSP) have been added to the Guidebook since 1999. Consequently all sources of these pollutants may be considered new sources (although none of these pollutants are relevant for the 2010 emission ceilings under the Gothenburg Protocol).

[j] 2010 emission ceilings were set in 1999, and while the second edition of the EMEP/CORINAIR Guidebook was published in 2000, the methodologies were available in 1999.

3. Changes to emission factors

NH_3 emissions from synthetic fertilizer

39. There have been a number of revisions to EFs for NH_3 emissions arising from the application of synthetic fertilizers. The emission factors available in 1999 are presented in table 12 (EMEP/CORINAIR Guidebook, Group10, table 5.1).

Table 12
Total NH_3 emissions from cultures due to nitrogen fertilizer volatilization, foliar emissions and decomposing vegetation

Fertilizer type	*Simpler Methodology*	*Group I*	*Group II*	*Group III*
Ammonium sulphate	0.08	0.15	0.10	0.05
Ammonium nitrate	0.02	0.03	0.02	0.01
Calcium ammonium nitrate	0.02	0.03	0.02	0.01
Anhydrous ammonia	0.04	0.04	0.04	0.04
Urea	0.15	0.20	0.15	0.15
Combined ammonium phosphates (generally di-ammonium phosphate)	0.02–0.05	0.05	0.05	0.05
Other complex NK, NPK fertilizers	0.02	0.03	0.02	0.01
Nitrogen solutions (mixed urea and ammonium nitrate)	0.08	0.08	0.08	0.08

Notes: Values are kilogram (kg) NH_3-N volatilized per kg of nitrogen (N) fertilizer applied. Groups I–III are defined as:

(a) **Group I**: Warm temperate countries with a large proportion of calcareous soils (e.g., Greece and Spain);

(b) **Group II**: Temperate and warm-temperate countries with some calcareous soils (or managed with soil pH >7), but with large areas of acidic soils (e.g., Belgium, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal and the United Kingdom of Great Britain and Northern Ireland);

(c) **Group III**: Temperate and cool-temperate countries with largely acidic soils (e.g., Austria, Germany, Switzerland and the Nordic countries).

40. The current version of the EMEP/EEA Guidebook explains that emission factors are likely to have some temperature dependence, but that more review of the literature is needed before anything definitive can be included in the Guidebook. However, the EFs are presented according to pH of the soil.

Table 13
Emission factors for total NH_3 emissions from soils due to nitrogen fertilizer volatilization and foliar emissions

Fertilizer type	*Simpler methodology*	*Low soil pH (=<7)*	*High soil pH (>7)*
Ammonium nitrate (AN)	0.081	0.037	0.037
Anhydrous ammonia	0.081	0.011	0.011
Ammonium phosphate (MAP and DAP)	0.081	0.113	0.293
Ammonium sulphate (AS)	0.081	0.013	0.270
Calcium ammonium nitrate (CAN)	0.081	0.022	0.022
Calcium nitrate (CN)	0.081	0.009	0.009
Ammonium solutions (AN)	0.081	0.037	0.037
Ammonium solutions (Urea AN)	0.081	0.125	0.125
Urea ammonium sulphate (UAS)	0.081	0.195	0.195
Urea	0.081	0.243	0.243
Other NK and NPK	0.081	0.037	0.037

Note: Each Tier 2 emission factor for fertilizer type i (EFi) is expressed as: kg NH_3 kg N^{-1}.

41. Tables 12 and 13 (2013 Guidebook, chapter 3D, tables 5.1 and 3.2) provide data with different stratification (and also in different units — kilograms of NH_3-N and kilograms of NH_3, respectively). But it is still evident that there are potential revisions both in an upward and downward direction should a Party be updating EFs from the original to the most recently available information.

42. Furthermore, it is possible that Parties have developed more sophisticated country-specific methodologies for estimating emissions, which may take other parameters into account (such as temperature). If this is the case, then Parties will need to present transparent information to demonstrate that the EF (or IEF) has increased from values originally used in the emissions inventory in 1999.

4. Quantifying the adjustment

43. There are no sector-specific requirements in quantifying adjustment values, and Parties should refer to the guidance provided in the main body of this report. However, it will be important that Parties focus on clearly presenting the quantified impacts of any revisions to EFs. This may not be straightforward if the resolution of the calculations, or the stratification of source sectors, has changed between the different versions of the inventory.

5. A summary of what the Expert Review Team will be looking for

44. In accordance with the guidance for Parties and expert reviewers contained in the annex to decision 2012/12, the expert reviewers will check whether documentation provided by the Party is complete and transparent and that the quantified adjustments are accurate, correctly calculated and properly documented.

45. For the agriculture sector, care must be taken to present information on NH_3 emission factors in as transparent a way as possible. This is because there have been some fundamental changes in the methodologies that are in use now, compared with those available in 1999.

46. There are no other sector-specific requirements for adjustments in the agriculture sector beyond the general guidance provided in the main body of the Technical Guidance. So only the following will be required:

(a) For new sources:

(i) Demonstration of the fact that the source was not included in the inventory in 1999, and that a methodology was not available to quantify the emission;

(ii) Demonstration that emissions from this source are now included in the inventory, due to changes in the understanding of the science;

(iii) Quantification of the adjustment, expected to be the value of the new source, and the rationale for deciding that this change is significant;

(b) For revisions to EFs or methodologies:

(i) A description of the original and updated emission factors (or methodology), including a detailed description of the scientific basis upon which the emission factor (or methodology) was derived. The Party should clearly state the version and year of the Guidebook or any other source when referring to information from taken from the literature;

(ii) Evidence that the original emission factors were used for determining the emission reductions at the time when they were set;

(iii) A comparison of emission estimates made using the original and the updated emission factors (or methodologies), demonstrating that the change in EFs (or methodologies) contributes to a Party being unable to meet its emission ceilings under the Gothenburg Protocol;

(iv) A description of the approach used in quantifying the adjustments for the years concerned;

(v) The rationale for deciding whether the changes in EFs (or methodology) are significant.

Annex II

Template for an adjustment application by a Party

1. Reporting of quantitative information is inevitable for the success of an adjustment review. Without transparent information provided by the applicants, the reviewers will not be able to asses if the adjustment application is consistent with decisions 2012/3 and 2012/ and 12.

2. Annex II is an Excel file, supplied with this Technical Guidance document. It provides basic tables for the reporting of calculation details. Parties are invited to add more tables if needed.

3. Instructions are included in the template.

Annex III

Expert reviewers' checklist

The expert reviewers' checklist is an Excel file, supplied with this Technical Guidance document.

Annex IV

Template for a report by the Expert Review Team on a country adjustment application

1. The Expert Review Team compiles a report to the EMEP Steering Body summarizing its review of a country's application. A template for the main elements of the report is given below. The secretariat will review and format the report as an informal United Nations document.

2. Some parts of the report are presented with text in square brackets for the ERT to fill in. Others provide sample text, which should be deleted and replaced with the text for the particular source and pollutant, for example.

[Template starts here]

Expert Review Team report for the EMEP Steering Body

Review of the [YEAR] Adjustment Application by [COUNTRY]	**CEIP/Adjustment Review Report/ [YEAR]/[COUNTRY]**
Expert Review Team report for the EMEP Steering Body	[DD/MM/YEAR]
Report title	Review of the [YEAR] Adjustment Application by [COUNTRY]
Country	[COUNTRY]
Report reference	CEIP/Adjustment Review Report/ [YEAR]/[COUNTRY]
Date	[DD/MM/YEAR]
Version No.	Final

Expert Review Team composition

Role	*Sectors*	*Name*
Adjustment lead reviewer	All	[NAME]
Primary expert reviewer	[SECTOR 1]	[NAME]
Secondary expert reviewer	[SECTOR 1]	[NAME]
Primary expert reviewer	[SECTOR 2]	[NAME]
Secondary expert reviewer	[SECTOR 2]	[NAME]
Basic checks (Step 1 and 2)	All	[NAME] (CEIP)

Executive summary

1. As mandated by decision 2012/3 (see ECE/EB.AIR/111/Add.1) of the Executive Body, the nominated Expert Review Team (ERT) undertook a detailed review of the adjustment application submitted by [COUNTRY]. (See appendix for a summary of the information provided by the Party.) The review was undertaken on behalf of the EMEP

Steering Body and following the guidance published in the annex to decision 2012/12 (see ECE/EB.AIR/113/Add.1).

2. Each sector of the application was reviewed by two independent sectoral experts during [MONTH YEAR]. The findings were discussed at the Review Team Meeting held [DD/MMM/YEAR]. The conclusions and recommendations for the EMEP Steering Body are documented in this country report.

Table 1
Summary information on the application

Reasons for adjustment application (decision 2012/3, para. 6)	[e.g., Road Transport 1.A.3.b: Significantly different EFs]
Pollutants for which adjustment is applied for	[e.g., NO_x]
Year(s) for which inventory adjustment is applied	[e.g., 2010, 2011, 2012]
Date of notification of adjustment to the secretariat	[e.g., 15 February 2014]
Date of submission of supporting documentation	[e.g., 15 March 2014]

3. The ERT reviewed and evaluated the documents submitted by [COUNTRY].

[Paragraphs 4 to 7 below provide sample text for an evaluation, by source and pollutant. The actual evaluation will differ obviously for each case.]

4. [**Source X (NFR) (e.g., Road Transport (1.A.3.b)), pollutant (e.g., NO_x)]:** The ERT concludes that emissions from [Source X] is a "new" source, because no methodology for quantifying emissions is included in the EMEP/CORINAIR Emissions Inventory Guidebook (1999). The ERT therefore recommends that the EMEP Steering Body **ACCEPT** this adjustment application from [COUNTRY].

5. [**Source X (NFR), pollutant]:** The ERT concludes that emissions from [Source X] cannot be considered as a "new" source, because an emission factor is included in the EMEP/CORINAIR Emissions Inventory Guidebook. The ERT therefore recommends that the EMEP Steering Body **REJECT** this adjustment application from [COUNTRY].

6. [**Source X (NFR), pollutant]:** [COUNTRY] provided information that transparently presented "extraordinary" revisions to emission factors (EFs) for [POLLUTANT], and also clearly quantified the impact of the revisions to the emissions arising from the changes in EFs alone. The ERT has concluded that the application does meet all of the requirements laid out in decision 2012/12, and therefore recommends that the EMEP Steering Body **ACCEPT** this adjustment application.

7. [**Source X (NFR), pollutant]:** [COUNTRY] provided information that did not transparently present "extraordinary" revisions to [POLLUTANT] emissions arising from the changes in EFs alone. The ERT has concluded that the application therefore does not meet all of the requirements laid out in decision 2012/12, and recommends that the EMEP Steering Body **REJECT** this adjustment application.

8. Table 2 provides a summary of the inventory adjustments that are accepted by the ERT.

Table 2
Aggregated sum of accepted inventory adjustments (kt)

Pollutant	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
[e.g., NO_x]								
[e.g., SO_2]								

Table 3
Impact of the accepted inventory adjustments on national emissions (kt)

Pollutant	*Gothenburg Protocol emission commitment*	*2010 emission reported in [YEAR]*	*2010 emission (adjusted)*	*Difference (%)*	*[YEAR] emission reported in [YEAR]*	*[YEAR] emissions (adjusted)*	*Difference (%)*

9. The total national emissions of [COUNTRY] for [POLLUTANT] will be below the Gothenburg Protocol ceilings from [YEAR] onwards, if the proposed adjustments are accepted.

I. Introduction and context

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

(a) Emission source categories are identified that were not accounted for at the time when the emission reduction commitments were set;

(b) For a particular source, the EFs used to estimate emissions for the year in which emissions reduction commitments are to be attained are significantly different to those used when the emission reduction commitments were set;

(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.

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

12. As mandated by decision 2012/12, applications for adjustments that are submitted by Parties are subject to an expert review.[l] Technical coordination and support to the review

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

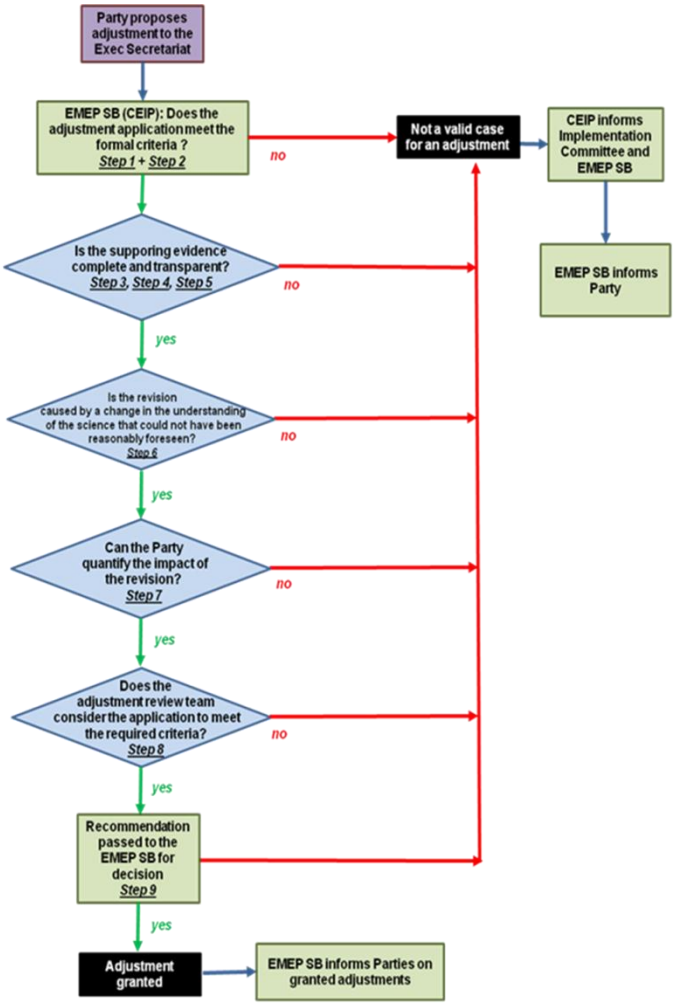
[l] The EMEP Steering Body, in conjunction with other appropriate technical bodies under EMEP, shall review the supporting documentation and assess whether the adjustment is consistent with the circumstances described in paragraph 6 of decision 2012/3 and the further guidance in decision 2012/12.

is provided by CEIP. The members of the review team are selected from the available review experts[m] that Parties have nominated to the CEIP roster of experts.

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

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

Flow diagram/decision tree for the Review of adjustment applications



[m] See http://www.ceip.at/fileadmin/inhalte/emep/pdf/2014/0_Roster_2014.pdf.

II. Review of submitted adjustments

A. Assessment of formal criteria

15. [COUNTRY] notified the secretariat through the ECE Executive Secretary of its intention to apply for a new adjustment on 15 February [YEAR], and thus before the legal deadline of 15 February. All supporting information requested by decision 2012/12 was provided as part of the Informative Inventory Report before the legal deadline of 15 March of the same year that it is being submitted for review by the EMEP Steering Body (decision 2012/12, annex, para. 1). Additional documentation was provided during the review in response to requests from ERT. The documentation provided by the Party is listed in an annex to this report.

16. [COUNTRY] submitted an application for emissions adjustments to [POLLUTANTS] for [YEARS] for the following sectors:

(a) [Sector, NFR];

(b) [Sector, NFR];

(c) [etc.]

17. [COUNTRY] does not comply with its emission reduction commitments listed in annex II to the Gothenburg Protocol (decision 2012/3, para. 1).

18. [COUNTRY] [did not provide/provided] information on the impact of the adjustment to its emission inventory, and the extent to which it would reduce the current exceedance and possibly bring the Party into compliance with its emission reduction commitments.

19. [COUNTRY] [did not include/included] [any] information on when it will meet its emission ceiling for [POLLUTANT] in the supporting documentation.

[Section B, paragraphs 20 to 28 below provide sample text for an evaluation, by source and pollutant with some additional guidance in square brackets. The actual evaluation(s) will obviously differ for each case.]

B. Road transport 1.A.3.bi-iv (NO_x)

1. Assessment of consistency with the requirements of decision 2012/3

20. The Party made an application based on significant revisions to EFs and methodology.

21. The adjustment application requires the provision of specific supporting information to demonstrate compliance with specific criteria (decision 2012/3, para. 6). The ERT reviewed the supporting documentation (see annex) with regard to these criteria and concluded that the EFs used to determine emission levels for the road transport source categories 1.A.3.bi-iv for the year in which emissions reduction commitments are to be attained are significantly different than the EFs applied to these categories when emission reduction commitments were set.

22. The changes in EFs highlighted in the adjustment application arise because [ADD a few words of technical explanation — in this case revisions to the Euro standards caused by the mismatch between test cycles and real world performance]. The ERT therefore conclude that these changes were driven by a change in the understanding of the science relating to this source.

23. The ERT concludes that the supporting evidence provided complies with the criteria presented in decision 2012/3, and that the circumstances on which the adjustment is based relate to a change in the understanding of the science relating to this source.

24. The ERT reviewed the documentation that was provided to support the application (see annex).

25. The supporting information provided by the Party on the revisions made to EFs was considered to be complete. The ERT found that the information provided by the Party on the impact on [NO_x] emissions from the revisions made to the emission estimates was fully transparent.

26. [The ERT found that the information provided was not fully transparent/complete, and asked the Party to provide further supporting information. The Party provided clarifications on these issues (explain which "issues"). However, the ERT concluded that the additional information did not fully explain the impact on the pollutant emissions from different revisions that resulted in the exceedance of the 2010 ceiling.]

2. Assessment of the quantification of the impact of the revision

27. The adjustment application process requires that the Party submit a quantification of the impact of the adjustment for which an application has been submitted. Table 4 provides an overview of the [POLLUTANT] adjustment applications of [COUNTRY] in the [ROAD TRANSPORT] sector.

Table 4
[Pollutant] adjustment applications by [COUNTRY] for road transport (kt)

Reference number	*NFR09*	*2010*	*2011*	*2012*
[COUNTRY/YEAR/1a]	[e.g., 1.A.3.b.i			
[COUNTRY/YEAR/1b]	1.A.3.b.ii			
[COUNTRY/YEAR/1c]	1.A.3.b.iii			
	Total 1.A.3.b]			

28. The ERT reviewed the quantification of the emissions adjustments provided by the country. The ERT concluded that the information provided [was/was not] accurate and error free, and [is/is not] consistent with the most up-to-date available EMEP/EEA Emissions Inventory Guidebook and scientific literature.

III. Conclusions and recommendations

29. The ERT has undertaken a full and thorough assessment of the application for an adjustment of the [POLLUTANT] emissions inventory that was submitted by [COUNTRY] for the source sector(s) as described below.

30. The review of the submitted application followed the guidance provided in the annex to decision 2012/12 of the Executive Body [and the Technical Guidance issued in 2015]. The findings of the ERT are described in detail in the executive summary.

31. Table 5 below provides a summary of the adjustment applications received from [COUNTRY], and the subsequent recommendations made by the ERT to the EMEP Steering Body.

Table 5
Recommendations from the ERT to the EMEP Steering Body

Country	*Sector*	*NFRs*	*Pollutant*	*Years*	*ERT Recommendation*
[Country	Sector Name	NFR	Pollutant	Years	Accept/Reject
	Sector Name	NFR	Pollutant	Years	Accept/Reject
	Sector Name	NFR	Pollutant	Years	Accept/Reject]

32. [COUNTRY] [did/did not] provide information on when it will meet its emission ceiling for [POLLUTANT] in the supporting documentation [add year here if provided].

Appendix (to annex IV)
[Annex]

Information provided by the Party

[1. The table/Table A1] below lists the information provided by the Party in its adjustment application. The information provided by Party can be downloaded from the CEIP website.[n]

[Table A1]
Information provided by the Party

Filename	*Short description of content*

[OPTIONAL:

2. The ERT found it necessary to ask the Party for further information. The information provided is described in table A2 below.

Table A2
Additional information provided by the Party

Filename	*Short description of content*

....]

[n] http://www.ceip.at/ms/ceip_home1/ceip_home/adjustments_gp/.

Annex V

Template for the summary of the review of adjustment applications by the Centre on Emission Inventories and Projections and the Expert Review Team

1. A summary of the review of adjustment applications for a given year is jointly compiled by the Expert Review Team and CEIP for submission to the EMEP Steering Body. The EMEP Steering Body considers the document and forwards its recommendations on it to the Executive Body for the Convention.

2. A template for the main elements of the summary review document is given below. (The text will be edited and formatted by the secretariat in accordance with United Nations style guidelines.)

[Template starts here]

Review of adjustment applications for ([YEAR])

Report by the Centre on Emission Inventories and Projections

Introduction

1. The present report was prepared by the Centre on Emission Inventories and Projections (CEIP) of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP), in line with its mandate under the 2014–2015 workplan for implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/122/Add.2, item 1.7.1). The report provides a summary of the [YEAR] review of applications for adjustments under the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to emission reduction commitments or inventories submitted by the following Parties to the Convention — [LIST OF PARTIES] — in accordance with Executive Body decisions 2012/3, 2012/4 and 2012/12 (see ECE/EB.AIR/111/Add.1 and ECE/EB.AIR/113/Add.1).

I. Overview of adjustment applications

2. [NUMBER] Parties applied for adjustments to their national emission inventories in [YEAR]. The details of the applications are given in table 1 below.

II. Organization of the review

3. As mandated by Executive Body decision 2012/12, applications for adjustments submitted by Parties are subject to an expert review. Technical coordination and support for the 2014 review was provided by CEIP, led by Ms. Katarina Mareckova (Slovakia). The members of the review team were selected from the review experts nominated by Parties to the CEIP roster of experts.[o]

[o] See www.ceip.at/fileadmin/inhalte/emep/pdf/2014/0_Roster_2014.pdf.

4. The Expert Review Team (ERT) was composed of a lead reviewer, [NAME (COUNTRY)] and the following sectoral experts: [NAMES (COUNTRIES)], [SECTORS]. The ERT assessed the applications for adjustments and elaborated the relevant documentation.

5. Each sector was reviewed by two independent sectorial experts. The findings were discussed with the lead reviewer and CEIP, and are summarized in the sections below.

III. Assessment of applications for adjustments

A. Rejection recommended [COUNTRY — SECTOR (NFR)]

6. The ERT undertook a full and thorough assessment of the application by [COUNTRY] for an adjustment to its [POLLUTANT] emissions inventory for [YEAR] for the [SECTOR] sector (Nomenclature for Reporting (NFR) [source category NFR]).

7. The ERT concluded that the application by [COUNTRY] for an adjustment to emissions from the [e.g., energy] sector does not meet all the requirements laid out in Executive Body decision 2012/12. In particular, the ERT notes that this application is not based on one of the three circumstances listed in paragraph 6 of decision 2012/3.

8. Therefore, the ERT recommends that the EMEP Steering Body reject this adjustment application.

B. Acceptance recommended [COUNTRY — SECTOR (NFR)]

9. The ERT undertook a full and thorough assessment of the application by [COUNTRY] for an adjustment to its [POLLUTANT] emissions inventory for [YEAR] for the [SECTOR] sector ([source categories NFR]).

10. [NFR (SECTOR NAME)]: [Summary of Party application/explanation].

11. The ERT concluded that the application does meet all of the requirements laid out in decision 2012/12, and therefore recommends that the EMEP Steering Body accept this adjustment application. The impact of the adjustment is summarized in table 1 below.

Table 1
Impact of adjustment to Party pollutant emissions inventory for the [SECTOR] sector for [YEAR]

	Thousands of tons (kt) of [POLLUTANT]		
NFR source category(ies)	*[YEAR]*	*[YEAR]*	*[YEAR]*
[NFR]	[VALUE]	[VALUE]	[VALUE]
etc.			

12. The national total emissions of [COUNTRY] will be below its ceilings in accordance with the Gothenburg Protocol from [YEAR] onwards, if the proposed adjustments are accepted.

IV. Conclusions and recommendations

13. Table 2 provides a summary of the adjustment applications received, and the subsequent ERT recommendations to the EMEP Steering Body.

Table 2
Adjustment applications received and Expert Review Team recommendations

Country	*Sector*	*NFR*	*Pollutant*	*Years/emissions reduction commitment*	*ERT recommendation*
[Country name	Sector name	NFR code	Pollutant name	Years or emission reduction commitment	Accept/Reject]
[Country name	Sector name	NFR code	Pollutant name	Years or emission reduction commitment	Accept/Reject]
etc.					

14. The ERT has prepared country-specific reports containing detailed explanations of the findings. These explanations will be made available to the Parties and will also be published on the CEIP website before the [NUMBER] session of the EMEP Steering Body in September [YEAR]. The country-specific reports will be available as informal documents for that session.