

Convention on Long-range Transboundary Air Pollution

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*Co-operative programme for monitoring
and evaluation of the long-range
transmission of air pollutants in Europe*

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Methodologies applied to the technical review of emission data 2025

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CONTENTS

CONTENTS.....	3
EXECUTIVE SUMMARY.....	5
1 INTRODUCTION.....	7
1.1 Reporting obligations - Scope.....	7
1.1.1 Substances and frequency of reporting.....	7
1.1.2 Sectors.....	7
1.1.3 Reporting of projected emission data, LPS emissions and gridded emissions.....	7
1.1.4 Geographical coverage.....	8
1.1.5 Transparency and Informative Inventory Reports (IIRs).....	8
1.1.6 Reporting of adjusted inventories.....	8
1.1.7 Fuel sold fuel used.....	9
1.2 Quality parameters of the inventory.....	9
2 REVIEW PROCESS.....	10
2.1 Technical review.....	10
2.1.1 Review under the LRTAP Convention.....	10
2.2 Access to the data and review results.....	11
3 INITIAL (STAGE I) REVIEW.....	12
3.1 Timeliness.....	12
3.2 Format.....	12
3.3 Completeness.....	13
3.3.1 Example of completeness check results per sector for the current reporting year.....	13
3.3.2 Example of completeness check results per pollutant.....	13
4 STAGE 2 REVIEW.....	15
4.1 Recalculations.....	15
4.2 Time series consistency.....	16
4.3 Trends.....	17
4.4 Key category analysis (KCA).....	18
5 CHECKS AS PART OF THE REVIEW REPORT.....	20
6 REVIEW OF GRIDDED DATA AND LPS.....	21
6.1 Gridded data.....	21
6.2 Large Point Sources (LPS).....	21
7 CENTRALISED IN-DEPTH REVIEW (STAGE 3).....	23
7.1 Preparation for the review.....	23
7.2 Desk Review.....	24
7.3 Centralized Review.....	24
7.4 Preparation of Review Reports.....	25
7.5 The key outcomes of the review are the:.....	25
7.6 History of stage 3 in depth reviews of air emission inventories 2008-2022.....	25
7.7 The Review in 2022.....	26
7.8 The Review in 2023.....	27

7.9	The Review in 2024	27
7.10	The Review in 2025	28
8	UNITS AND ABBREVIATIONS.....	30
9	REFERENCES	32

EXECUTIVE SUMMARY

The main guidance documents for reporting air emission inventories under the Air Convention (CLRTAP, Convention on long range transboundary air pollution) are the *UNECE Reporting Guidelines* (UNECE, 2025) and the *EMEP/EEA Inventory Guidebook* (EMEP/EEA, 2023).

Reporting requirements

Parties are formally only required to report on the substances and for the years set forth in the Air Convention and the Protocols and their amendments that they have ratified and that have entered into force for them (UNECE, 2025). Parties that have obligations to report emission inventories under Protocols that they have ratified and that are in force shall annually report emission inventories (UNECE, 2025). Annual reporting shall include national emissions and should include activity data for the sectors identified in Annex I to these Guidelines for the years indicated (UNECE, 2025). Parties are strongly encouraged to submit the Informative Inventory Report (IIR). The IIR should be submitted annually (UNECE, 2025). Parties to the Gothenburg Protocol within the geographical scope of EMEP shall regularly update their projections and report every four years from 2015 onward their updated projections, for the years 2025 and 2030 and, where available, also for 2040 and 2050. Parties to the other Protocols are encouraged to regularly update their projections and report every four years from 2015 (UNECE, 2025). Every four years from 2017 onward, Parties shall report for the year x-2 updated aggregated sectoral (GNFR) gridded emissions and LPS emissions (UNECE, 2025).

The review process

Each year the air pollutant emission inventories are checked in a technical review that is performed in accordance with the review guidelines (UNECE, 2018) - hereafter referred to as the 'Review Guidelines 2018'. The aim of the review is to improve the quality of emission data and associated information reported to the Air Convention. The present report documents the review methods. Details on the review results can be found in the annual CEIP Inventory Review reports¹.

The review process of the emission inventories is carried out in three stages. At each stage, national experts have the opportunity to clarify issues or provide additional information.

The stage 1 review (initial review) consists of automated tests which assess the timeliness, completeness and format of the submitted national inventories. Sectoral data as well as national total emissions are checked within these tests.

The stage 2 review (extended review) assesses the recalculations, time series consistency, key category analysis, inventory comparison and comparability of the submitted national inventories. Recalculations are checked to identify differences between national total emissions reported in the current and the previous submission. Key category analyses are made to identify the most important sources for each country. Inventories reported under the Air Convention and UNFCCC are compared. Inconsistencies of time series of sectoral data and national totals are highlighted.

¹ <https://www.ceip.at/status-of-reporting-and-review-results>

The stage 3 review (in-depth review) is an in depth review of selected inventories. The aim is to check if inventories are consistent with EMEP/EEA inventory Guidebook, complete, consistent over time, properly documented, comparable between the countries and accurate. Annually, approximately ten Parties are reviewed by expert review teams² set-up by CEIP based on nominations by countries³. Alternatively, an ad hoc review may be performed to focus on specific aspects of inventory data quality or science. (UNECE, 2018)

The review of gridded data and LPS information comprise a few standard tests. It is checked if sectoral gridded data or point sources for all pollutants/years are reported as requested by the UNECE Reporting Guidelines (UNECE, 2025). Within the tests, the position of the cells/LPS is checked. The grid-sum data on sectoral level (GNFR) is compared with sectoral emissions (aggregated from NFR to GNFR sector level) reported in the NFR table.

The officially reported emission data, gap-filled and gridded emission data are made available via the CEIP database⁴.

Review findings are annually published at the CEIP website and in the Inventory Review reports⁵.

² <https://www.ceip.at/review-of-emission-inventories/in-depth-review-of-ae-inventories>

³ <https://www.ceip.at/review-of-emission-inventories/review-process>

⁴ <https://www.ceip.at/webdab-emission-database>

⁵ <https://www.ceip.at/status-of-reporting-and-review-results>

1 INTRODUCTION

The review process of emission data has been developed on the basis of feedback from Parties and from the Task Force on Emission Inventories and Projections (TFEIP) and is seen by Parties as efficient tool to improve their national emission inventories.

The technical review of national inventories checks and assesses Parties' data submissions in accordance the 'Review Guidelines 2018' (UNECE, 2018)⁶ in order to improve the quality of emission data and associated information reported to the Convention. In recent years, CEIP's regular inventory reviews have facilitated the identification of a number of inventory issues and contributed to inventory improvement.

1.1 Reporting obligations - Scope

1.1.1 Substances and frequency of reporting

Parties are formally only required to report on the substances and for the years set forth in the Convention and the Protocols and their amendments that they have ratified and that have entered into force for them (UNECE, 2025).

Parties that have obligations to report emission inventories under Protocols that they have ratified and that are in force shall annually report emission inventories (UNECE, 2025).

1.1.2 Sectors

Annual reporting shall include national emissions and should include activity data for the sectors identified in Annex I to the UNECE Reporting Guidelines (UNECE, 2025). Annex I lists 127 "NFR sectors" that represent anthropogenic activities that cause air emissions. These 127 "NFR sectors" are summed up to the National Total. In addition eight "memo items" are listed. These "memo items" are not included in the National Total. Three of these "memo items" represent natural sources. The 127 "NFR sectors" that together sum up to the National Total are aggregated into 13 GNFR sectors (NFR Aggregation for Gridding and LPS sectors).

1.1.3 Reporting of projected emission data, LPS emissions and gridded emissions

Parties to the Gothenburg Protocol within the geographical scope of EMEP shall regularly update their projections and report every four years from 2015 onward their updated projections, for the years 2025 and 2030 and, where available, also for 2040 and 2050. Parties to the other Protocols are encouraged to regularly update their projections and report every four years from

⁶ <https://www.ceip.at/review-of-emission-inventories/review-process>

2015 (UNECE, 2025). Every four years from 2017 onward, Parties shall report for the year x-2 updated aggregated sectoral (GNFR) gridded emissions and LPS emissions (UNECE, 2025).

1.1.4 Geographical coverage

According to the definition given in the Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP): "The geographical scope of EMEP means the area within which, coordinated by the international centres of EMEP, monitoring is carried out." (UNECE, 1984)⁷ This definition has been referred to in all following Protocols to the Convention. The EMEP domain covers the geographic area between 30°N-82°N latitude and 30°W-90°E longitude.

1.1.5 Transparency and Informative Inventory Reports (IIRs)

Transparency means that Parties provide clear documentation (IIR) and report emissions and activity data at a level of disaggregation, which provides sufficient understanding of how the inventory was compiled, assuring it meets good practice requirements.

According to the UNECE Reporting Guidelines (UNECE, 2025) Parties should submit annually an IIR along with their emission data. The IIRs shall be submitted in one of the working languages of the UNECE (English, French or Russian), and where relevant, Parties are encouraged to submit also an English translation of their reports (UNECE, 2025). For the transparency of inventories, it is essential that information such as reasons for recalculations, new (or closed) large emission sources, explanation of trends and the implementation of country-specific methods/data are provided in a transparent manner (see Annex II to the UNECE Reporting Guidelines "Informative Inventory Report").

The provision of an IIR is essential for an efficient stage 3 review (in depth review).

1.1.6 Reporting of adjusted inventories

Inventories shall be calculated without corrections or normalization relating, for example, to climate variations or trade patterns of electricity (UNECE, 2014a). Parties may apply to adjust their emission reduction commitments or inventory data in extraordinary circumstances, as defined in Executive Body decisions 2012/3 and 2012/4 (UNECE, 2012a, UNECE, 2012b) and amended in Executive Body decisions 2014/1 (UNECE, 2014a). Detailed instructions for reporting adjustments are given in the "Technical Guidance for Parties Making Adjustment Applications and for the Expert Review of Adjustment Applications (ECE/EB.Air/130)" and for emissions Inventory Adjustments under the Amended Gothenburg Protocol in the "Technical Guidance for Emissions Inventory Adjustments under the Amended Gothenburg Protocol: Inventory adjustments in the context of Emission Reduction Commitments" (TFEIP, 2022).

⁷ http://www.unece.org/env/lrtap/emep_h1.html

1.1.7 Fuel sold fuel used

Paragraph 22 of the UNECE Reporting Guidelines (UNECE, 2025) specifies the basis for reporting emissions from transport: *“For emissions from transport, all Parties should calculate emissions consistent with national energy balances reported to Eurostat or the International Energy Agency. Emissions from road vehicle transport should therefore be calculated on the basis of the fuel sold in the Party concerned. In addition, Parties may voluntarily calculate emissions from road vehicles based on fuel used or kilometres driven in the geographic area of the Party and report in memo items. The method for the estimate(s) should be clearly specified in the IIR.”*

A summary of the reporting obligations can be downloaded from the CEIP website⁸. The UNECE Reporting Guidelines (UNECE, 2025) give detailed instructions on the reporting in section VI. Reporting.

1.2 Quality parameters of the inventory

Parties shall as a minimum use the methodologies in the latest version of the EMEP/EEA Guidebook, as approved by the Executive Body to estimate emissions and projections for each source category. Parties can use, as an alternative to the EMEP/EEA Guidebook, national or international methodologies that they consider better able to reflect their national situation, provided that the methodologies produce more accurate estimates than the default methods, are scientifically based, are compatible with the EMEP/EEA Guidebook and are documented in their IIRs, as described in Annex II to these Guidelines (UNECE, 2025).

It is considered good practice to report inventories which are complete, consistent, comparable, and transparent and neither overestimated nor underestimated according to the best judgement.

The terms transparency, consistency, comparability, completeness and accuracy are defined in detail in the UNECE Reporting Guidelines (UNECE, 2025).

⁸ <https://www.ceip.at/reporting-instructions>

2 REVIEW PROCESS

2.1 Technical review

2.1.1 Review under the LRTAP Convention

At the 38th session of Executive Body (EB) to EMEP (Geneva, December 2018) the document '**Updated methods and procedures for the review of emission inventories**' was adopted (Decision 2018/1). **The Appendix on Technical Revisions** provides guidance on the quantification of necessary technical corrections if the data are found to be inconsistent with recommended methodologies of the EMEP/EEA Guidebook or where the emission estimates are not provided for an NFR source category.

The technical review of national inventories checks and assesses Parties' data submissions in accordance with the 'Review Guidelines 2018' (UNECE, 2018)⁹ in order to improve the quality of emission data and associated information reported to the Convention. The technical review is carried out annually by EMEP. It is performed in accordance with the 'Review Guidelines 2018' (UNECE, 2018). The process of determining and calculating Technical Revisions is described in the Appendix of this document.

The process is carried out in three stages. The technical review of inventories is carried out in the following three stages:

- *initial review (stage 1)*: An initial check of submissions for timeliness, completeness and formats;
- *extended review (stage 2)*: A synthesis and assessment of all national submissions with respect to consistency, comparability, key categories, trends of data with recommendations for data quality improvement;
- *in-depth reviews (stage 3)*: In-depth reviews of selected inventories, by pollutant, country or sector, as in the workplan approved by the EMEP Steering Body. Up to ten countries are checked annually by two review teams. Alternatively, an ad hoc review may be performed to focus on specific aspects of inventory data quality or science. (UNECE, 2018)

At each stage, national experts have the opportunity to clarify issues or provide additional information. They may also express their views at meetings of the Task Force on Emission Inventories and Projections. **Nominated CEIP contact points** are provided with passwords which allow them to access the review findings. Parties are requested to respond within four weeks after the notification.

⁹ <https://www.ceip.at/review-of-emission-inventories/review-process>

2.2 Access to the data and review results

The review assesses emission data (including gridded data and LPS) reported under the CLRTAP to the UNECE Secretariat.

The information submitted by Parties during the reporting rounds can be accessed from the CEIP webpage.¹⁰ In addition, the *officially reported emission data* are made available via the CEIP database¹¹. *Gap-filled and gridded emission data* for modellers are also made available at the CEIP website¹².

Review findings of the stage 1 and stage 2 review under CLRTAP are published at the CEIP website.¹³ Summaries of findings are annually published in the *Inventory review report (CEIP, 2025)*¹⁴.

¹⁰ <https://www.ceip.at/status-of-reporting-and-review-results>

¹¹ <https://www.ceip.at/webdab-emission-database/reported-emissiondata>

¹² <https://www.ceip.at/the-emep-grid/gridded-emissions>

¹³ <https://www.ceip.at/status-of-reporting-and-review-results/2025-submission>

¹⁴ <https://www.ceip.at/ceip-reports>

3 INITIAL (STAGE I) REVIEW

The stage 1 review performed by CEIP consists of automated tests which assess the *timeliness, completeness and format* of the submitted national inventories. It presents results of these initial automated tests to countries and supports the subsequent stage 2 and stage 3 review process. Stage 1 tests are:

- Timeliness of reporting
- Format of submission
- Completeness per sector for emissions for 2023
- Completeness per pollutant for submitted time series (separately for, 1990-1999, and from 2000 to 2023).

Sectoral data as well as national total emissions were checked within these tests.

The results of these initial automated tests are presented online, in the form of individual country *Stage 1 Status reports* annually in March. Parties were invited to provide comments or re-submissions, if applicable, within two weeks.

Data included in tests:

- Emissions reported under the Convention on LRTAP.

3.1 Timeliness

Example of feedback provided to country:

Date of submission of CLRTAP : 15.02.2025 , received within deadline 15.02.2025

3.2 Format

The submissions were checked against the **'NFR19' format** agreed by the EMEP Executive Body (EB) at its 27th session and amended taking into account changes to the POPs Protocol.

Parties were invited to submit entire time series in standard format to enable quality control of historical sector emissions, consistency of sectoral trends and a comparison of inventories between the Parties. It is highly recommended that Parties take advantage of consistency control (via RepDab) of their emission data upon submission (<https://www.ceip.at/repdab>) before the submission of their inventory to the UNECE secretariat, the EMEP Centre on Emission Inventories and Projections (CEIP) and/or the European Commission/European Environment Agency.

3.3 Completeness

The revised UNECE Reporting Guidelines (UNECE, 2025) ask Parties to submit emissions for 1980 – latest year for Main Pollutants, 1990 – latest year for HMs and POPs, and for 2000 – latest year for PM. It has to be noted that the pollutant-specific CLRTAP Protocols formally request reporting only from Parties which have ratified the Protocol for the Protocol base year, for the year after the entry into force of that Protocol and for subsequent years.

Parties to the Gothenburg Protocol shall report their latest available projections at least every four years, and provide any updated projections annually by 15 March. Parties to the Convention that are not Parties to the Gothenburg Protocol are encouraged to provide this information (UNECE, 2025).

3.3.1 Example of completeness check results per sector for the current reporting year

“NE” in the figure below (Figure 3.1) shows for which sectors countries reported 'Not Estimated' for the year 2023. Only priority pollutants are included in this analysis. At the end of the table, the number of the notation key and the number of the notation key “NE” are given for each pollutant.

Sector	NOx	NM VOC	SOx	NH3	PM2.5	PM10	TSP	BC	CO	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	DIOX	PAH	HCB	PCB
1A3ai(i)																			NE	NE		
1A3aii(i)																			NE	NE		
2B10a																				NE		
2B10b		NE																				
2B5					NE	NE	NE															
2C2									NE	NE	NE								NE	NE	NE	
2C3																				NE		
2C5												NE										
2C7a		NE							NE													
2C7c					NE	NE	NE		NE	NE	NE								NE	NE	NE	
2D3i					NE	NE	NE															
2G																						NE
5E		NE	NE	NE					NE											NE	NE	NE
11B		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE
11C		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE							NE	NE	NE	NE
1A3ai(ii)																			NE	NE		
1A3aii(ii)																			NE	NE		
17 of 135 Sectors listed																						
Count of overall notation keys	82	67	97	79	67	67	67	142	97	93	94	97	142	142	142	142	142	142	101	103	103	108
Count of 'NE' notation keys	3	5	3	2	5	5	5	0	4	4	4	5	0	0	0	0	0	0	8	11	6	3

Figure 3.1: Example of findings: CLRTAP emission (Completeness per sector for the current reporting year)

3.3.2 Example of completeness check results per pollutant

The completeness of the data in the WebDab database (**Stage 1 review**) was evaluated on the basis of the criteria outlined in the UNECE Reporting Guidelines (UNECE, 2025). The table shows

the fraction of total cells reported for the analysed interval for which a value, a zero or one of the defiend notation keys was reported (examples see Figure 3.2). Flagging occurs

- when the number of cells containing a value or a notation key is less than 80 % of the total number of cells,
- if there are more than 10 % zeroes reported,
- if 'Not Estimated' is reported in cells and/or
- if the number of values reported is less than 10 %.

The completeness of CLRTAP NFR Sectors is divided in three sections:

- completeness of NFR Sectors from 2000 to 2023 without National Totals
- completeness of NFR Sectors from 1990 to 1999 without National Totals
- completeness of National Totals from 1990 to 2023 including NFR and SNAP

Completeness of NFR Sectors from 2000 to 2023 without National Totals

Component	%Value	%0	%NO	%NE	%NA	%IE	%C	%NR	%All
NOx	43.0	0.0	17.0	1.0	31.0	8.0	0.0	0.0	100.0
NMVOC	54.3	0.0	17.0	2.0	18.7	8.0	0.0	0.0	100.0
SOx	31.0	0.0	17.0	1.0	43.0	9.0	0.0	0.0	100.0
NH3	45.7	0.0	17.0	0.0	30.0	8.0	0.0	0.0	100.0
PM2.5	53.9	0.0	17.0	2.0	22.0	6.0	0.0	0.0	100.0
PM10	53.9	0.0	17.0	2.0	22.0	6.0	0.0	0.0	100.0
TSP	53.9	0.0	17.0	2.0	22.0	6.0	0.0	0.0	100.0
BC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
CO	31.0	0.0	17.0	2.0	44.0	6.0	0.0	0.0	100.0
Pb	33.9	0.0	17.0	2.0	43.0	6.0	0.0	0.0	100.0
Cd	32.9	0.0	17.0	2.0	43.0	6.0	0.0	0.0	100.0
Hg	31.0	0.0	17.0	2.0	44.0	6.0	0.0	0.0	100.0
As	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Cr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Cu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Ni	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Se	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Zn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
DIOX	29.9	0.0	17.0	3.0	45.0	6.0	0.0	0.0	100.0
PAH	27.9	0.0	17.0	6.0	45.0	6.0	0.0	0.0	100.0
HCB	28.2	0.0	17.0	3.0	45.9	6.0	0.0	0.0	100.0
PCB	24.0	0.0	16.0	1.0	54.0	6.0	0.0	0.0	100.0

"Value" – the cell contains a number > 0.005
"0" – the cell contains 0 or a number < 0.005
"NO", "NE", "NA", "IE", "C" and "NR" are notation keys as defined in Reporting Guidelines and NFR (Annex B)
In certain cases the total percentage value may not be exactly the sum of the other columns because of rounding differences

Figure 3.2: Example for the results of test, CLRTAP (completeness of NFR Sectors from 2000 to 2023 without National Totals)

4 STAGE 2 REVIEW

The following stage 2 tests were performed:

- Recalculations
- Key category analysis – CLRTAP
- Inventory comparisons
- Time series
- Trends

Data included in the stage 2 review are the emissions submitted under the Air Convention and emissions reported under the UNFCCC and EEA. The results of the tests are published annually in the form of individual synthesis and assessment reports on the CEIP website¹⁵, usually in March and April (update). Parties are asked to respond within four weeks after notification.

4.1 Recalculations

Recalculations should be made if

- there are changes in methodologies
- changes in the manner in which emission factors and activity data are obtained or used
- or if estimates are provided for sources which have existed since the reference year but which were not accounted for in previous submissions.

Parties should apply any recalculations to every relevant year in the full time series to ensure consistency across years (UNECE, 2025). The aim of this test is to identify differences between national totals submitted by Parties in the present year and the latest available national totals submitted in previous reporting years.

It is important and necessary to identify inventory recalculations and to understand their origin in order to correctly evaluate the officially reported emission data.

- In this test, differences between national total emissions reported by Parties to the CLRTAP in the last and the last but one year are determined and variances larger than $\pm 10\%$ are flagged¹⁶. An example for this test is given in Figure 4.1.
- a minus value indicates that the latest available emission submitted in previous years is higher
- blank cells indicates that data or notation keys in the present reporting year or in the previous reporting years are missing.

¹⁵ <https://www.ceip.at/status-of-reporting-and-review-results>

¹⁶ The formula used to calculate the magnitude of recalculations is $100 * [(X_{\text{present year}} - X_{\text{previous year}}) / X_{\text{previous year}}]$, where $X_{\text{present year}}$ is emissions reported in the present year and $X_{\text{previous year}}$ represents emission reported in the previous year.

- 0 % is given when data (value or notation key) in the present reporting year and in the latest available previous reporting year are equal.
- if there is a number and a notation key reported, the difference is the number.

Year	NOx	NMVOc	SOx	NH3	PM2.5	PM10	TSP	BC	CO	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	DIOX	PAH	HCB	PCB
1990	-0.16%	2.80%	0.00%	21.25%	0.11%	0.11%	-0.29%		0.04%	0.00%	0.00%	0.00%							0.00%	-0.01%	0.00%	0.00%
1991	-0.17%	2.74%	-0.01%	20.61%					0.04%	0.00%	0.00%	0.00%							0.00%	0.00%	0.00%	0.00%
1992	-0.15%	2.78%	-0.01%	20.22%					0.04%	0.00%	0.00%	0.00%							0.00%	-0.01%	0.00%	0.00%
1993	-0.14%	2.92%	-0.01%	19.82%					0.05%	0.01%	0.00%	0.00%							0.00%	-0.01%	0.00%	0.00%
1994	-0.13%	3.11%	-0.01%	19.72%					0.05%	0.01%	0.00%	0.00%							0.00%	-0.01%	0.00%	0.00%
1995	-0.10%	3.31%	-0.01%	19.72%	0.23%	0.26%	0.29%		0.06%	0.02%	0.00%	0.00%							0.00%	-0.01%	0.00%	0.00%
1996	-0.06%	2.90%	0.00%	19.58%					0.07%	0.02%	0.00%	0.00%							0.00%	-0.01%	0.00%	0.00%
1997	-0.06%	2.51%	0.00%	19.17%					0.07%	0.03%	0.00%	0.00%							0.00%	-0.01%	0.00%	0.00%
1998	-0.02%	2.08%	0.00%	19.17%					0.09%	0.03%	0.00%	0.00%							0.00%	-0.02%	0.00%	0.00%
1999	-0.02%	1.62%	0.00%	19.49%					0.10%	0.03%	0.00%	0.00%							0.00%	-0.02%	0.00%	0.00%
2000	-0.01%	8.62%	0.00%	19.83%	1.02%	1.07%	1.14%		0.09%	0.03%	0.00%	0.00%							0.00%	-0.03%	0.01%	0.00%
2001	0.00%	8.39%	-0.01%	19.62%	0.84%	0.84%	0.83%		0.10%	0.03%	0.00%	0.00%							0.00%	-0.04%	0.01%	0.00%
2002	0.03%	7.50%	-0.01%	19.52%	0.10%	-0.06%	-0.31%		0.10%	0.03%	0.00%	0.00%							0.00%	-0.05%	0.00%	0.00%
2003	0.06%	7.21%	-0.01%	19.48%	-0.49%	-0.67%	-0.93%		0.10%	0.03%	0.00%	0.00%							0.00%	-0.07%	0.00%	0.00%
2004	0.04%	12.45%	-0.01%	19.59%	-0.86%	-1.04%	-1.30%		0.08%	0.03%	0.00%	0.00%							0.00%	-0.08%	0.00%	0.00%
2005	-0.04%	6.12%	-0.01%	19.19%	-1.21%	-1.58%	-2.07%		0.06%	0.03%	0.00%	0.00%							-0.01%	-0.08%	0.00%	0.00%
2006	0.02%	0.88%	-0.01%	19.07%	-1.42%	-1.48%	-1.51%		0.07%	0.03%	0.00%	0.00%							-0.01%	-0.08%	0.00%	0.00%
2007	-0.01%	0.02%	-0.01%	17.62%	-1.80%	-1.78%	-1.76%		0.05%	0.06%	0.00%	0.00%							-0.01%	-0.08%	0.00%	0.00%
2008	-0.20%	0.20%	-0.02%	17.47%	-1.60%	-1.41%	-1.14%		-0.04%	0.11%	0.01%	0.00%							-0.02%	-0.08%	-0.01%	0.00%
2009	-0.17%	5.96%	-0.03%	17.06%	-1.95%	-1.85%	-1.73%		-0.05%	0.10%	0.00%	0.00%							-0.02%	-0.08%	-0.01%	0.00%
2010	-0.09%	4.62%	-0.03%	16.77%	-1.74%	-1.87%	-1.99%		-0.05%	0.11%	0.01%	0.00%							-0.02%	-0.08%	-0.01%	0.00%
2011	-0.13%	3.49%	-0.03%	16.20%	-1.86%	-1.96%	-2.02%		-0.06%	0.19%	0.01%	0.00%							1.10%	-0.09%	1.55%	0.00%
2012	-0.03%	3.20%	-0.03%	15.65%	-1.73%	-1.78%	-1.89%		-0.06%	0.47%	0.01%	0.00%							5.09%	-0.08%	2.60%	0.00%
2013	-0.03%	5.53%	-0.03%	15.39%	-1.23%	-1.32%	-1.32%		-0.06%	0.33%	0.01%	0.00%							3.05%	-0.08%	0.51%	0.00%
2014	-0.02%	5.85%	-0.03%	15.21%	-1.49%	-1.51%	-1.63%		-0.06%	0.40%	0.01%	0.00%							4.34%	-0.09%	0.65%	0.00%
2015	0.00%	7.68%	-0.35%	14.57%	-2.00%	-1.98%	-1.97%		-0.04%	0.50%	-0.02%	0.00%							4.82%	-0.12%	7.27%	0.00%
2016	0.07%	8.06%	-0.03%	14.06%	-2.37%	-2.33%	-2.34%		-0.02%	0.19%	0.02%	0.00%							0.47%	-0.05%	0.66%	0.00%
2017	0.03%	6.73%	-0.01%	13.21%	-2.65%	-2.57%	-2.61%		0.01%	0.09%	0.02%	0.00%							-0.31%	-0.01%	-0.41%	0.00%
2018	0.06%	6.22%	-0.01%	13.00%	-3.08%	-2.86%	-2.89%		-0.02%	0.30%	0.02%	0.00%							2.24%	0.00%	2.93%	0.00%
2019	0.03%	5.14%	0.00%	12.69%	-2.83%	-2.59%	-2.61%		-0.03%	0.28%	0.03%	0.00%							1.18%	0.04%	1.45%	0.00%
2020	0.01%	4.47%	0.31%	12.43%	-0.42%	-0.55%	-0.67%		0.12%	0.13%	0.16%	0.06%							-0.07%	0.08%	-0.29%	0.00%
2021	-0.07%	6.05%	-0.30%	11.90%	-0.98%	-0.86%	-0.81%		-0.06%	0.11%	-0.05%	-0.12%							-0.13%	1.14%	-0.96%	-0.61%
2022	0.48%	5.65%	-0.39%	11.65%	-0.35%	-0.40%	-0.14%		0.52%	2.25%	2.45%	2.34%							1.06%	1.92%	1.43%	-0.18%

Figure 4. 1: Results for recalculation check, Example

The recalculation of the entire time series usually indicates a revision of inventory methods and/or improvement of activity data. Recalculation of part of the time series or individual historical years might indicate the corrections of errors or inconsistent time series or only partial recalculation.

4.2 Time series consistency

The time series is a central element of an air pollutant inventory as it provides information on historical emission trends and tracks the effects of emission reduction strategies at the national level. Emission trends should be neither over- nor underestimated. All emission estimates in a time series should be estimated consistently, i.e. the time series should, if possible, be calculated for all years using the same method and data sources. When different methods and data are used in a time series, the estimated emissions trend reflects not only the actual emissions changes but also the pattern of methodological refinements (EMEP/EEA, 2023).

The aim of these tests is to highlight inconsistencies in time series of sectoral data and national totals reported by Parties. Sudden changes in subsequent years often indicate an inconsistency of methods and/or of emissions factors and/or of activity data used in national inventories.

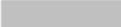
Color Key													
		Indicates a dip in the time series data											
		Indicates a jump in the time series data											
		Indicates time series data with large sigma											
MAIN (Unit = Mg)													
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
NOx	1A2d	7174	7986	6555	6725	7152	6377	5711	6144	5840	5596	5068	
NOx	1A3ai(ii)	2406	2719	2971	3170	3326	3733	4116	4291	4451	4384	6254	
NOx	1A4bi	15391	16740	15430	14985	13679	14574	15688	14101	14034	14144	13290	
NOx	3Da1	5599	5581	5497	5208	5046	5095	5066	5142	5186	4940	4822	
NMVOG	2D3a	16296	17110	17923	18736	19550	20363	19996	19628	19261	18894	18526	
SOx	1A2d	4300	4912	2600	2246	2208	1971	1955	2022	1706	1295	1216	
SOx	1A3ai(ii)	242	272	296	314	328	367	406	423	439	430	471	
SOx	1B2b	2000	1300	2000	2100	1280	1530	1200	67	42	42	43	
SOx	NATIONALTOTAL	73700	70724	54195	52816	47327	47302	43937	40378	35584	33699	31518	
SOx	NTCOMPLIANCE	73700	70724	54195	52816	47327	47302	43937	40378	35584	33699	31518	

Figure 4.2: Results from the time series check, Example

Only data in the NFR02, NFR09, NFR14 and NFR19 reporting format that were reported for at least three years were analyzed. All datasets where data was only available in NFR02 or NFR09 sectors were converted to NFR14/NFR19. Only the converted sectors are displayed in the time series analysis. The reported time series data were log 10-transformed prior to analysis to reduce intra-series variability and improve general time series linearity. A linear regression was subsequently applied to the log-transformed values for each time series. An individual value within the time series was identified as a dip/jump if the respective residual value (regression forecast value - reported value) was greater than 2 standard deviations from the mean of all residuals within the time series. Only time series for which the flagged data value contributed a significant fraction (>3%) of the national total for the respective year are included in this dataset for expert review.

Time series where sigma grows largely (i.e. larger than 20% of the time series mean value) because of extreme variation in the emission data are also flagged. Zero values indicate small numbers rounded to zero.

4.3 Trends

The trend figures of national total emissions visualise inconsistencies in the time series. All submitted data regardless of the reporting format chosen is used for the trendgraphs (e.g. SNAP sectors and NFR sectors as well (see examples in Figure 4.3).

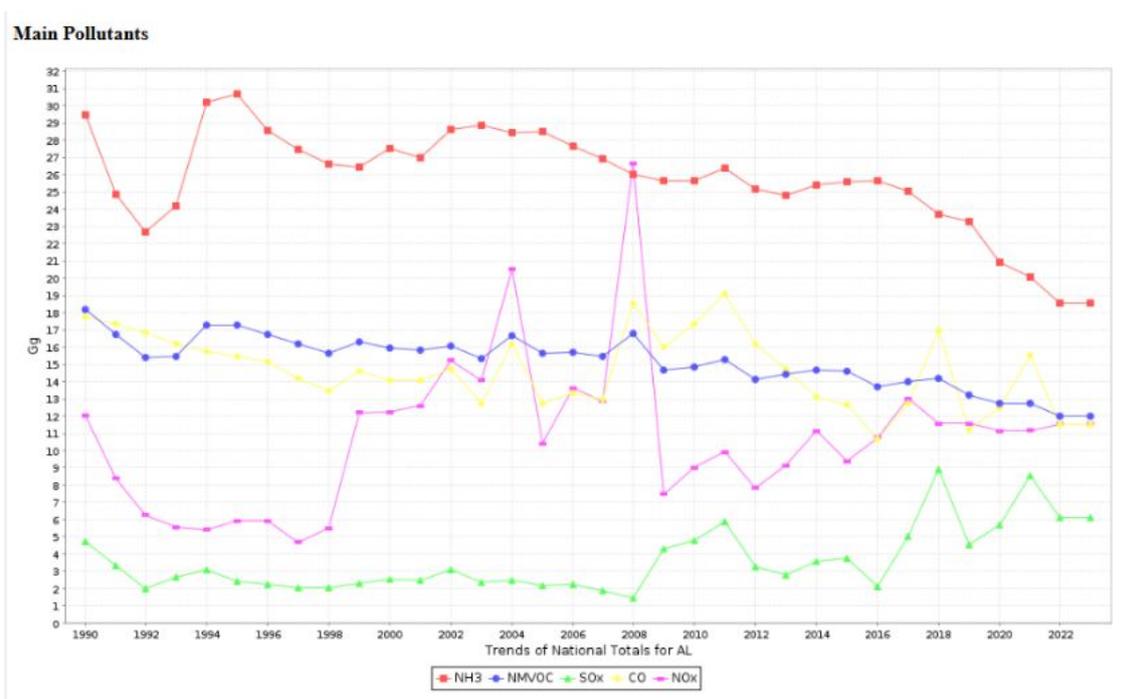


Figure 4.3: Example of a trend graph with dips and jumps highlighted in time series consistency tests.

4.4 Key category analysis (KCA)

“Key category” for a given substance means a source category of emissions that has a significant influence on a Party’s total emissions in terms of the

- absolute level of emissions of that substance
- the trend in emissions over a given time period
- and/or, for a Tier 2 key category analysis, the uncertainty in the estimates for that Party.

The concept of key categories is an important aspect in inventory development because it helps to identify priorities for resource allocation in data collection and compilation, quality assurance/quality control and reporting (UNECE, 2025).

Following the revised EMEP/EEA Air Pollutant Emission Inventory Guidebook (EMEP/EEA, 2023), the key categories are those which, when summed up in descending order of magnitude, cumulatively add up to 80 % of the total level (EMEP/EEA, 2023).

Key category analysis – Level assessment is carried out for all Parties that submit relevant information. The KCA is performed at the level of NFR categories as provided in the reporting template (Table 1). Each air pollutant emitted from each category is considered separately.

5 CHECKS AS PART OF THE REVIEW REPORT

As part of the review report (CEIP 2025) a few additional checks are performed. The results and methodological details of these checks are included in the review report and its Annexes¹⁷.

¹⁷ <https://www.ceip.at/review-of-emission-inventories/technical-review-reports/inventory-review-2025-dataviewer>

6 REVIEW OF GRIDDED DATA AND LPS

Every four years from 2017 onward, Parties shall report for the year x-2 updated aggregated sectoral (GNFR) gridded emissions in a grid of 0.1 x 0.1 degrees and LPS emissions.

6.1 Gridded data

It has to be noted that gridded emissions are used in models only on sectoral level (13 GNFRs) and therefore only submitted gridded sectoral emissions can be used.

During the annual review process CEIP performs a few standard tests: check if sectoral gridded data for all pollutants/years are reported as requested by the revised UNECE Reporting Guidelines (UNECE, 2025)

- compare sectoral grid-sum data with emissions reported in NFR table (aggregated to GNFR)
- check if all reported cells are inside the country (position of the cells)

6.2 Large Point Sources (LPS)

Large point sources (LPS) are defined as facilities¹⁸ whose combined emissions, within the limited identifiable area of the site premises exceed the pollutant emission thresholds specified below. The pollutant emission thresholds have been extracted from the full list of pollutants in the E-PRTR Regulation (EC, 2006, Annex II) and listed in Table 6.1 below (UNECE, 2025).

Table 6.1: List of pollutants to be reported for a LPS if the applicable threshold value is exceeded based on thresholds specified in E-PRTR Regulation (Annex II)

Pollutants/Substances	Thresholds in kg/year
SO ₂	150 000
NO _x	100 000
CO	500 000
NMVOCS	100 000
NH ₃	10 000
PM _{2.5}	50 000
PM ₁₀	50 000
Pb	200
Cd	10
Hg	10

¹⁸ As defined in Article 2 (4) and (5) of the E-PRTR Regulation, “(4) ‘Facility’ means one or more installations on the same site that are operated by the same natural or legal person; (5) ‘Site’ means the geographical location of the facility;” (EC, 2006).

Pollutants/Substances	Thresholds in kg/year
PAHs	50
PCDD/F	0.0001
HCB	10

Parties that do not report combustion process emissions under any other international or EU wide Protocols or decisions may limit their criteria for Combustion Process LPS selection to > 300 mw thermal capacity.

Table 6.2: The stack height classes (physical height of stack) in the reporting templates

Height class	
1.	Height class 1 < 45 metres;
2.	45 metres ≤ Height class 2 < 100 metres;
3.	100 metres ≤ Height class 3 < 150 metres;
4.	150 metres ≤ Height class 4 < 200 metres;
5.	Height class 5 < 200 metres.

During the annual review process CEIP performs a few standard tests:

- check if point sources for all pollutants/years are reported as requested by the revised UNECE Reporting Guidelines (UNECE, 2025)
- check if all reported point sources are inside the country (position of the LPS)
- comparison with E-PRTR facilities (planned for the future)

7 CENTRALISED IN-DEPTH REVIEW (STAGE 3)

The mandate and overall objectives for the emission inventory review process under the Air Convention is given by the 'Review Guidelines 2018' (UNECE, 2018).

Paragraph 7 (c) of the 'Review Guidelines 2018' (UNECE, 2018) defines that stage 3 Reviews may be annual centralized reviews or ad hoc reviews. Paragraph 18 of the 'Review Guidelines 2018' further specifies that such ad hoc reviews could, for instance, focus on specific source sectors, specific pollutants such as heavy metals or persistent organic pollutants, gridded and projections data, or on other areas as requested by the Implementation Committee.

The in-depth review comprises four main phases:

1. Preparation for the review
2. Desk Review
3. Centralized Review
4. Preparation of the review reports

7.1 Preparation for the review

During the preparatory phase CEIP prepares a schedule for the review, composes the review team, prepares a checklist for the review, prepares a review report template, contacts Parties with the request to nominate contact points for the review, prepares initial checks and visualisation tools and prepares for the kick-off meeting/training meeting.

Schedule for the review: CEIP defines all major milestones.

Composition of the review team: CEIP contacts the nominated experts from the Parties and - depending on the availability of the experts- composes a review team that fulfills the needs of the current review

Preparation of a checklist: CEIP in cooperation with the lead reviewers prepares a checklist to facilitate consistency of the review and to ensure that all important topics are covered.

Finding Country Contact Points: To ensure smooth communication throughout the review CEIP contacts Parties with the request to nominate country contact points at the beginning of the review. These country contact points receive the questions from the expert review team and the draft review reports for commenting.

Initial checks: Each year a number of initial checks is performed to facilitate the work of the expert review team. The results of these checks are provided to the expert review team

Visualisation tools: Each year a set of visualisation tools is developed by CEIP. The content of the tools depends on the specific focus of the review. Typically, tools to visualize time series consistency and recalculations and tools that provide an overview of the key categories are provided.

Preparation of the review report template: Each year a review report template tailored to the focus of the review is prepared by CEIP.

Training Meeting/Kick-off Meeting: CEIP arranges a training meeting/kick-off meeting for the reviewers. After this meeting all reviewers are informed about the time schedule, the scope of the review, communication procedures during the review, available material and tools and the composition of the review teams.

7.2 Desk Review

During the desk review the sector expert check and assess the inventories that are assigned to them. They base their checks on the initial checks, the tools designed for the review and assess in detail the inventory submission and the IIR. If the need arises they prepare questions to the Parties. These questions are checked by the sector expert counter part and the lead reviewer and then sent to the country via e-mail by CEIP. Member States are usually asked to send a reply within two weeks.

7.3 Centralized Review

The ERT meets centrally for five days to finalize the review. The ERT poses follow-up questions to Parties. These follow-up questions (and in exceptional cases new questions) are checked by the sector expert counter part and the lead reviewer and then sent to the country via e-mail by CEIP. Member States are usually asked to send a reply within two days during the centralized review. Then the sector experts drafts conclusions, discuss difficult cases with lead reviewers and other sector experts and calculate technical corrections if needed and draft the review reports. The lead reviewers add to the review reports and quality control them and finalize them, optimally until the end of the centralized review.

Technical corrections and revised estimates

In the 'Review Guidelines 2018' (UNECE, 2018) it is stated that if the ERT considers that emissions are significantly under- or overestimated, the Party is during the review invited to submit 'revised estimates' that address the issue raised. Should the Party decline to do this, or should it not be possible to agree on the quantification of a revised estimate i.e. the ERT does not accept a revised estimate provided by the Party, the ERT may calculate a 'technical correction'. The threshold for significance for a technical correction for the in-depth review in 2024 was set at 2% of the national total, i.e. a finding that has been identified to result in an over- or underestimate of emissions of more than 2% of the national total. In 2025 projected emission data was reviewed and no technical corrections were calculated. The methods for calculating technical corrections are set up in the 'Review Guidelines 2018' (UNECE, 2018) and use the EMEP/EEA Emission 'Inventory Guidebook' as a reference for methods and emission factors.

Methodologies applied to the technical review of emission data Centralised in-depth review (Stage 3)

7.4 Preparation of Review Reports

After the centralized review the lead reviewers provide the finalized draft review reports to CEIP for a final quality check. CEIP then sends the draft review reports to Parties. Parties are asked to provide comments within 4 weeks. If needed sector experts are consulted to resolve the comments from Parties. The final review reports are then made publically accessible at CEIP's website¹⁹.

7.5 The key outcomes of the review are the:

Record of questions and answers which contain all questions submitted to the countries plus detailed responses from the countries

Review report which contains the public findings and recommendations

Excel files with technical corrections (not in 2025)

7.6 History of stage 3 in depth reviews of air emission inventories 2008-2022

The EMEP Steering Body approved the first schedule (2008-2013) for the centralised in-depth reviews at the 33rd session in September 2009 (see Table 7.1). The list was updated in the following years at the Steering Body meetings. The updated list is shown below (Table 7.1)

¹⁹ <https://www.ceip.at/status-of-reporting-and-review-results>

Table 7.1: History²⁰ of stage 3 in depth reviews of inventories 2008-2021

	Year	Countries
3 rd review round 2018-2021	2021	Kazakhstan, Liechtenstein, Monaco, Montenegro <i>Bosnia and Herzegovina did not provide any emission data to EMEP/CEIP yet.</i>
	2020	European Union, North Macedonia, Iceland, Kyrgyzstan, Switzerland. <i>Kazakhstan, Liechtenstein and Monaco did not submit data on time, review postponed to 2021.</i>
	2019	Albania, Georgia, Norway, Russian Federation, Serbia, Türkiye
	2018	Moldova, Armenia, Finland, Belarus, Ukraine, Azerbaijan
2 nd review round 2013-2017	2017	Albania**, Armenia*, Austria, Malta*, EU, Kazakhstan, Kyrgyzstan*, Liechtenstein*, Monaco*
	2016	Estonia, Georgia, Iceland, Luxembourg, FYR of Macedonia, Russian Federation, Serbia, Switzerland, Türkiye, United Kingdom
	2015	Azerbaijan, Belarus, Czech Rep., Ireland, Rep. of Moldova, The Netherlands, Slovakia, Slovenia and Ukraine
	2014	Belgium, Greece, Cyprus, Croatia, Denmark, Germany, Hungary, and Spain
	2013	Bulgaria, France, Italy, Latvia, Lithuania, Norway, Poland, Portugal, Romania and Sweden
1 st review round 2008-2012	2012	Albania*, Georgia*, European Community, Liechtenstein*, Malta*, Monaco*, Republic of Moldova*, Montenegro*, Serbia* and Türkiye**
	2011	Czech Republic, Belarus, Croatia, Estonia*, Greece*, Iceland, Luxembourg, The former Yugoslav Republic of Macedonia, Slovenia and Ukraine*
	2010	Austria, Cyprus, Germany, Italy, Netherlands, Romania, Russian Federation*, Slovakia, Switzerland and United Kingdom
	2009	Belgium, Bulgaria, Denmark, Finland, Hungary, Ireland, Latvia, Lithuania, Poland and Spain
	2008	France, Norway, Portugal and Sweden (voluntary)

Note:

* Party did not submit a complete emission inventory in standard format or did not submit an IIR for the last three reporting rounds

** Party did not submit neither inventory data nor an IIR for the last three reporting rounds

7.7 The Review in 2022

At its seventh joint session in September 2021 the Steering Body and the Working Group on Effects approved the plan to perform (in 2022) an in-depth review of PM_{2.5} emissions from residential heating and road transport, with a special focus on the topic of ‘condensable particulate matter’ (ad hoc review) and a follow-up review of the implementation of recommendations given as part of the review carried out in 2021. The Parties reviewed in 2021 are Kazakhstan,

²⁰ The EMEP Steering Body approved the schedule (2008-2013) for centralised in-depth reviews at its 33rd session in September 2009.

Methodologies applied to the technical review of emission data Centralised in-depth review (Stage 3)

Liechtenstein, Monaco and Montenegro. All Parties that had submitted an IIR before the start of the desk review (40 Parties in total²¹) were reviewed. In addition a follow-up review assessing the implementation of recommendations given as part of the review carried out in 2021 was performed for Kazakhstan, Liechtenstein, Monaco and Montenegro.

7.8 The Review in 2023

At its eighth joint session in September 2022, the Steering Body and the Working Group on Effects approved the plan that the in-depth review in 2023 focuses on emissions from agriculture with a special emphasis on ammonia, NMVOC and NO_x emissions including gridded data. While the focus was set on NH₃, NMVOC and NO_x emissions, also all other pollutants covered by LRTAP Convention and its Protocols (i.e. SO_x, PM₁₀, PM_{2.5}, BC, priority HMs and POPS) have been checked for the time series years 1990 – 2021 to the extent possible. For these other pollutants especially completeness of reporting was assessed. All Parties that had submitted emission data before the start of the desk review (41 Parties in total²²) were reviewed.

The review was coordinated by the EMEP Centre on Emission Inventories and Projections (CEIP) acting as Review Secretariat. The review took place between April and June 2023 and was performed as a desk review between 31 March to 5 May 2023 and an in-person meeting between 22 of May 2023 and 26 May 2023 (centralized review). Seventeen experts from fifteen Parties to the Air Convention conducted the review. Initial checks performed by CEIP and visualisation tools developed by CEIP supported the work of the expert review team.

7.9 The Review in 2024

At its ninth joint session in September 2023, the Steering Body and the Working Group on Effects approved the plan that the in-depth review in 2024 focuses on review of the sector ‘industrial processes and product use – solvents’ with a special emphasis on NMVOC emissions; including gridded data. While the focus was set on NMVOC emissions, also all other pollutants covered by Air Convention and its Protocols (i.e. SO₂, NO_x, NH₃, PM₁₀, PM_{2.5}, BC, priority HMs and POPS) have been checked for the time series years 1990 – 2022 to the extent possible. For these other

²¹ Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, the Netherlands, Türkiye, Ukraine, United Kingdom

²² Armenia, Albania, Austria, Belarus, Belgium, Bulgaria, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, the Netherlands, Türkiye, Ukraine, United Kingdom

pollutants especially completeness of reporting was assessed. All Parties that had submitted emission data before the start of the desk review (47 Parties in total²³) were reviewed.

The review was coordinated by the EMEP Centre on Emission Inventories and Projections (CEIP) acting as Review Secretariat. The review took place between April and June 2024 and was performed as a desk review between 15 April to 10 May 2024 and an in-person meeting between 3 and 7 June 2024 (centralized review). Twenty experts from seventeen Parties to the Air Convention conducted the review. Initial checks performed by CEIP and visualisation tools developed by CEIP supported the work of the expert review team.

7.10 The Review in 2025

At its ninth joint session in September 2023, the Steering Body and the Working Group on Effects approved the plan that the in-depth review in 2025 would focus on a review of projections with a clearly defined scope.

CEIP, together with the lead reviewers of the 2025 CLRTAP inventory review defined the following scope:

Submission: Projected emission data submitted since 2023 were reviewed. The most recent reporting year for projected emission data under the Air Convention was 2023.

Parties: Submissions from all Parties to the Air Convention were reviewed, provided the Party had submitted projected emission data since 2023 and had not indicated that a resubmission was forthcoming²⁴. Under the Air Convention, the submission of projected emission data has been a four-yearly reporting obligation since 2015. The most recent reporting years were 2015, 2019 and 2023.

Sectors: All NFR (Nomenclature for Reporting) categories that were included in the national total were reviewed. Priority was given to key categories.

Years: 2025 and 2030. It was noted if 2040 and 2050 were reported, however no assessment was made regarding the extent to which reported data followed TACCC criteria.

Pollutants: For each sector the review focused on the **key pollutants** that were identified for the purpose of this review as the following:

Energy: NO_x, SO_x, PM_{2.5}

²³ Armenia, Albania, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, EU, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, North Macedonia, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, the Netherlands, Türkiye, Ukraine, United Kingdom

²⁴ Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Monaco, Norway, Poland, Portugal, Romania, Slovakia, , Sweden, Switzerland, the Netherlands, United Kingdom

Methodologies applied to the technical review of emission data Centralised in-depth review
(Stage 3)

Transport: NO_x, NMVOCs, PM_{2.5}

IPPU: NMVOCs, SO_x, NO_x

Agriculture: NH₃, NMVOCs

Waste: NMVOCs, NH₃

The review was coordinated by the EMEP Centre on Emission Inventories and Projections (CEIP) acting as Review Secretariat. The review took place between March and June 2025 and was performed as a desk review between 21 March to 11 April 2025 and an in-person meeting between 5 and 9 May 2025 (centralized review). Twenty two experts from sixteen Parties to the Air Convention conducted the review. Initial checks performed by CEIP and visualisation tools developed by CEIP supported the work of the expert review team.

8 UNITS AND ABBREVIATIONS

kg	1 kilogram = 10 ³ g (gram)
t	1 tonne (metric) = 1 megagram (Mg) = 10 ⁶ g
Mg	1 megagram = 10 ⁶ g = 1 tonne (t)
TJ	1 terajoule
kPa	1 kilopascal
K	1 Kelvin
µm	1 micrometre
Cd	cadmium
CEIP	EMEP Centre on Emission Inventories and Projections
CLRTAP	Air Convention, Convention on Long Range Transboundary Air Pollution
CO	carbon monoxide
EEA	European Environment Agency
EMEP	Co-operative Programme for Monitoring and Evaluation of the Long-range Transmissions of Air Pollutants in Europe
E-PRTR	European Pollutant Release and Transfer Register
EU	European Union
GNFR	nomenclature for reporting of gridded data and LPS
HCB	hexachlorobenzene
Hg	mercury
HMs	heavy metals
IIR	informative inventory report
KC	key category
KCA	key category analysis
LRTAP Convention	UNECE Convention on Long-range Transboundary Air Pollution
LPS	large point source
Main pollutants	NO _x , NMVOCs, SO _x , NH ₃ and CO
Main HMs	Cd, Hg and Pb
NFR	UNECE nomenclature for reporting of air pollutants
NH ₃	ammonia
NMVOCs	non-methane volatile organic compounds
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
PAHs	polycyclic aromatic hydrocarbons
Pb	lead
PCDD/PCDF	dioxines and furanes
PM	particulate matter
PM ₁₀	particulate matter, with a 50 per cent efficiency cut-off at 10 µm aerodynamic diameter or less

PM _{2.5}	particulate matter, with a 50 per cent efficiency cut-off at 2.5 µm aerodynamic diameter or less
PM _{coarse}	particulate matter, the difference between PM ₁₀ and PM _{2.5}
BC	black carbon
POPs	persistent organic pollutants
SNAP	selected nomenclature for air pollution
SO _x	sulphur oxides
SO ₂	sulphur dioxide
SO ₃	sulphur trioxide
TFEIP	UNECE Task Force on Emission Inventories and Projections
TSP	total suspended particles
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change

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