Convention on Long-range Transboundary Air Pollution

emep

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

TECHNICAL REPORT CEIP
03/2024

Review of emission data reported under the LRTAP Convention Stage 1, 2 and 3 review

Status of gridded and LPS Data

Sabine Schindlbacher
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CEIP

Inventory Review 2024

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[1] EMEP – Co-operative Programme for Monitoring and Evaluation of the Long-range Transmissions of Air Pollutants in Europe

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EXECUTIVE SUMMARY

The primary objective of the *technical review*[2] *of national inventories* is is to evaluate and assess the data submitted by Parties, with the aim of enhancing the quality of emission data and related information reported to the Convention.

This report summarizes the main findings of the annual technical review[3] (stage 1 and stage 2) of emission data, as well as the status of reporting under the Air Convention as of 1st June 2024.

Table 1 provides an overview of the submission status of 51 Parties to the Convention. The reporting year 2024 saw the highest number of reporting Parties since the inception of air emission inventory reporting under the Convention. Only two Parties did not report air emission inventory datasets. Projected emission datasets were due in 2023 and gridded and LPS datasets were due in 2021. Several of the gridded and LPS datasets as well as projected emission data are still missing, especially from the EMEP East area (see Table 1). More detailed information is provided in the Appendix.

The assessment in Table 1 refers to:

- Article 8 of the 1979 Convention on Long-range Transboundary Air Pollution, Executive Body Decision 2013/04 (ECE/EB.AIR/122/Add.1) Annex I,
- Executive Body Decision 2013/03 (ECE/EB.AIR/122/Add.1),
- Guidelines for Reporting Emissions and Projections Data under the Convention on Longrange Transboundary Air Pollution. United Nations Economic Commission for Europe (ECE/EB.AIR/GE.1/2022/20− ECE/EB.AIR/WG.1/2022/13)

[2] UNECE, 2019: EB Decision 2018/01 Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention (ECE/EB.AIR/142/Add.1)

[3] Review process: detailed information see at https://www.ceip.at/review-of-emission-inventories/review-process

Table 1: Overview on the Air Convention submission status by 1st June 2024

Country	Timeliness	Completeness	IIR	Projections**	LPS**	Gridded data**
AL	🙂	🙂	🙂	☹	☹	☹
AM	🙂	😐	😐	☹	☹	☹
AT	🙂	🙂	🙂	🙂	🙂	🙂
AZ	🙂	☹	🙂	☹	☹	☹
BA	☹	☹	☹	☹	☹	☹
BE	🙂	🙂	🙂	🙂	🙂	🙂
BG	🙂	🙂	🙂	🙂	🙂	🙂
BY	🙂	😐	🙂	☹	☹	🙂
CA*	🙂					
CH	🙂	🙂	🙂	🙂	🙂	🙂
CY	🙂	🙂	🙂	🙂	🙂	🙂
CZ	🙂	🙂	🙂	🙂	🙂	🙂
DE	🙂	🙂	🙂	🙂	🙂	🙂
DK	🙂	🙂	🙂	🙂	🙂	🙂
EE	🙂	🙂	🙂	🙂	🙂	🙂
ES	🙂	🙂	🙂	🙂	🙂	🙂
EU***	🙂	🙂	🙂	🙂	🙂	🙂
FI	🙂	🙂	🙂	🙂	🙂	🙂
FR	🙂	🙂	🙂	🙂	🙂	🙂
GB	🙂	🙂	🙂	🙂	🙂	🙂
GE	🙂	🙂	🙂	☹	🙂	☹
GR	🙂	🙂	🙂	🙂	🙂	🙂
HR	🙂	🙂	🙂	🙂	🙂	🙂
HU	😐	🙂	🙂	🙂	🙂	🙂
IE	🙂	🙂	🙂	🙂	🙂	🙂
IS	😐	🙂	🙂	🙂	🙂	🙂

Country	Timeliness	Completeness	IIR	Projections**	LPS**	Gridded data**
IT	🙂	🙂	🙂	🙂	🙂	🙂
KG	🙂	🙂	☹	☹	🙂	🙂
KZ	🙂	🙂	🙂	☹	🙂	🙂
LI	😐	😐	🙂	☹	😐	😐
LT	🙂	🙂	🙂	🙂	🙂	🙂
LU	🙂	🙂	🙂	🙂	🙂	🙂
LV	🙂	🙂	🙂	🙂	🙂	🙂
MC	🙂	🙂	🙂	🙂	🙂	🙂
MD	☹	☹	☹	☹	☹	☹
ME	🙂	🙂	🙂	☹	☹	☹
MK	🙂	🙂	🙂	☹	🙂	🙂
MT	🙂	🙂	🙂	🙂	🙂	🙂
NL	🙂	🙂	🙂	🙂	🙂	🙂
NO	🙂	🙂	🙂	🙂	🙂	🙂
PL	🙂	🙂	🙂	🙂	🙂	🙂
PT	🙂	🙂	🙂	🙂	🙂	🙂
RO	🙂	🙂	🙂	🙂	☹	☹
RS	🙂	🙂	🙂	☹	🙂	🙂
RU	🙂	☹	🙂	☹	🙂	🙂
SE	🙂	🙂	🙂	🙂	🙂	🙂
SI	🙂	🙂	🙂	🙂	🙂	🙂
SK	🙂	🙂	🙂	🙂	🙂	🙂
TR	🙂	☹	🙂	☹	☹	☹
UA	🙂	😐	🙂	☹	☹	☹
US*	🙂					

Legend to Table 1:

Timeliness: ***green*** *– submission within deadline,* ***yellow*** *– submission after deadline,* ***red*** *– no submission*
Completeness : ***green*** *– full priority + activity data all years;*
yellow *– up to ca. 80% priority (i.e. 10 of 13) (or all priority but not all years and/or no activity data);*
red *– below 80% priority*

IIR: ***green*** *– IIR submitted, structure and content correlate to the template;*
yellow *– IIR submitted, structure and content differ from the template;* ***red*** *– no IIR submitted*

Projections**: ***green*** *– min. 2025, 2030 reported in 2023 (reporting year) or 2024;* ***red*** *– no projections submitted*

Gridded and LPS data (submitted in or after 2021)**: ***green*** *– gridded data in 0.1°x0.1° for at least the years 2015 and 2019 submitted;* ***blue*** *– new gridded data for at least one year submitted,* ***red*** *– no gridded data at all submitted, empty – no obligations*

** Canada and the USA are outside the geographical scope of EMEP are therefore invited to take the Guidelines into account. They are not included in the EMEP LRT models so the reporting of LPS and gridded data is not required.*

*** 2024 was not a reporting year for Projections, gridded data and LPS, hence all Projection datasets since 2023, as well as LPS and gridded datasets since 2021 are taken into account.*

**** The EU has different reporting deadlines. EU may deliver emission and projections report by 30 April, its IIR by 30 May and its gridded data and LPS by 15 June.*

2 INTRODUCTION

This report has been prepared by the Centre on Emission Inventories and Projections (CEIP). CEIP is a data centre under the European Monitoring and Evaluation Programme (EMEP). The report reflects the progress achieved in emission reporting under the Air Convention during the 2024 reporting round.

Box 1. Reporting obligations and guidelines

At its 42nd session (Geneva, 12-16 December 2022), the Executive Body for the Air Convention adopted the 2023 Reporting Guidelines for reporting emissions and projections data under the Convention (see EB Decision 2022/1).Detailed information on reporting obligations under the Air Convention can be found on the CEIP website https://www.ceip.at/reporting-instructions.

Table 2: Reporting obligations and deadlines under Air Convention

Deadlines	Air Convention	
Emission data	15. February	annually
IIR	15. March	annually
Projections	15. March	every four years (starting year 2015)
Gridded Data	1. May	every four years (starting year 2017)
LPS information	1. May	every four years (starting year 2017)

This report summarises the main findings of the annual technical review of emission data and focuses on future challenges for improving the quality of these data reported under the Air Convention.

The review assesses the transparency, consistency, comparability, completeness and accuracy of reported data[4]. Details on the review can be found in *the Methodology Report – Review of emission data reported under the LRTAP Convention and on the CEIP website.*[5]
(https://www.ceip.at/review-of-emission-inventories/review-process).

[4] UNECE, 2022: Reporting Guidelines 2023 (ECE/EB.AIR/GE.1/2022/20– ECE/EB.AIR/WG.1/2022/13); para 43

[5] CEIP, 2024 c: https://www.ceip.at/ceip-reports

The review is structured into three stages.

- The stage 1 review assesses timeliness, completeness, format and transparency of the submission.
- The stage 2 review assesses recalculations, the share of sectors and the consistency of the time series.
- The stage 3 review is an in-depth review organised by CEIP and conducted by air emission inventory experts of the Parties of the Air Convention. The stage 3 review either analysis a certain part of all air emission inventories (e.g. emissions from the sector agriculture) submitted under the Air Convention or the complete air emission inventory of certain Parties in detail.

Findings of the stage 1 and stage 2 review on country level for the inventories submitted under the Air Convention can be found in the stage 1 and stage 2 review reports available at https://www.ceip.at/status-of-reporting-and-review-results/2024-submission

Findings of the stage 3 review are published in individual country reports at https://www.ceip.at/status-of-reporting-and-review-results/2024-submission.

All Parties to the LRTAP Convention which submitted data[6] in the *standard format* before 4th April 2024 were included in stage1 and stage 2 of the review. Resubmissions after 4th of April were not considered. Submissions of all Parties which submitted data[7] in the *standard format* before 15th April 2024 were included in stage 3 (in-depth review) of the review. The in-depth review focused on emissions from the sector industrial processes and product use - solvents with a special focus on NMVOC emissions in 2024.

This review report is structured as follows:

- In chapter 2, the results of the initial review (the stage 1) are presented, covering timeliness, completeness, format and transparency of the submission.
- Chapter 3 provides a summary of findings of the extended review (stage 2). Within that stage, differences in emissions due to recalculations, the share of sectors and the consistency of the time series were analysed. Additional checks were made which included the key categories emissions per capita, and gross national income.
- Completeness of gridded emission data and of large point sources (LPS) data are discussed in chapter 4.

[6] See details at https://www.ceip.at/status-of-reporting-and-review-results/2024-submission

[7] See details at https://www.ceip.at/status-of-reporting-and-review-results/2024-submission

- Chapter 5 gives an overview of the stage 3 in-depth review, including the main conclusions
- A table with detailed information per country on reporting in 2024 is provided in the Appendix.
- Summary information, detailed comparison of Parties and additional checks are presented interactively in the data viewers on CEIP's homepage at https://www.ceip.at/review-of-emission-inventories/technical-review-reports

Table 3: Overview of dataviewers 2024 with detailed information on country level

	Dataviewers 2024
1	Completeness
2	Recalculations
3	KCA
4	Share of sectors
5	Emissions per capita and per GDP

3 INITIAL (STAGE 1) REVIEW

Key messages

Over the last 15 years, timeliness and completeness of reporting has improved:

Timeliness: *Until 1st of June 2024, 49 Parties reported data, which is an increase of 29% compared to the number of Parties submitting in 2008 – 38 Parties submitted data in the same timeframe in the first year, in which the annual inventory review took place. Three Parties within the geographical scope of EMEP provided their submissions after the due date of 15 February 2024 (16 April for EU). No data were provided (by 1st June) by two Parties –**Bosnia and Herzegovina and the Republic of Moldova**.*

Completeness - pollutants: *Main pollutants were reported by 49 Parties in 2024 compared to 38 in 2008. Cadmium, Mercury and Lead emissions were reported by 47 Parties, additional HMs by 41, PMs by 48 and priority POPs by 46 Parties. Activity data for the year 2021 were reported by 43 Parties (see Appendix, Table 9). Black Carbon (BC) was voluntarily reported for the first time in 2015 by 28 countries. In the 2024 submission 43 Parties submitted data on BC emissions at least for the year 2021. All but one of the Parties, that submitted data, also provided an Informative Inventory Report (IIR) with their submission in 2024.*

Projections: *Parties to the 1999 Gothenburg Protocol and 2012 amended 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. (*UNECE, 2022). *2024 was not a reporting year for projections. 7 Parties submitted emission projections in 2024 (17 in 2008, 32 in 2021 (reporting year)).*

Gridded data and LPS: *2024 was not a reporting year for gridded data and LPS data. Four Parties reported gridded data until the 1st of June 2024 (35 in 2021 (reporting year)). LPS were reported by four Parties (36 in 2021 (reporting year)).*

Azerbaijan, Bosnia and Herzegovina, Kyrgyzstan and Republic of Moldova *are in particular encouraged to make efforts to improve the regularity, completeness and transparency of their reporting.*

While the quality of the data submitted by the Parties to the Air Convention has improved over the years in terms of completeness, consistency and timeliness, not all Parties provide a complete time series for emission inventory data. Hence, further improvement of submissions in the above-mentioned aspects of data quality is strongly recommended: ***Bosnia and Herzegovina and the Republic of Moldova*** *did not report any data to EMEP*

in 2024. ***Belarus, the Russian Federation and the United States[8]*** *only provided data for the current reporting year.*

Format of data: *For CEIP the use of the standardised reporting format is inevitable for efficient processing of data. All Parties submitted their inventories using the revised NFR 2019-1 templates[9].*

Transparency and Informative Inventory Reports: *Transparency means that Parties provide clear documentation (IIR) and references, and that they report emissions and activity data at a level of disaggregation, which provides sufficient understanding of how the inventory was compiled, thereby ensuring that it meets good practice requirements. Parties are strongly encouraged to submit the IIR[10]. In recent years, the number of Parties that provided an IIR along with their inventory increased. In 2024 only one Party that submitted an air emission inventory did not provide an IIR.*

Data viewer

Additional information is presented in the *dataviewer* on the *CEIP webpage.*
Link: *https://www.ceip.at/review-of-emission-inventories/technical-review-reports/rr-2024*

A current overview of the data submitted by Parties during the 2024 reporting round is available at https://www.ceip.at/status-of-reporting-and-review-results/2024-submission.

In addition, officially reported emission data can be accessed online at www.ceip.at/webdab-emission-database/reported-emissiondata.

[8] The United States are outside the geographical scope of EMEP. Parties outside the geographical scope of EMEP are only invited to take the Guidelines into account when preparing and reporting their annual submissions. (UNECE, 2022)

[9] Reporting templates can be downloaded from the CEIP website at https://www.ceip.at/reporting-instructions/annexes-to-the-2014-reporting-guidelines

[10] UNECE, 2022: Reporting Guidelines 2023 (ECE/EB.AIR/GE.1/2022/20− ECE/EB.AIR/WG.1/2022/13); para 43

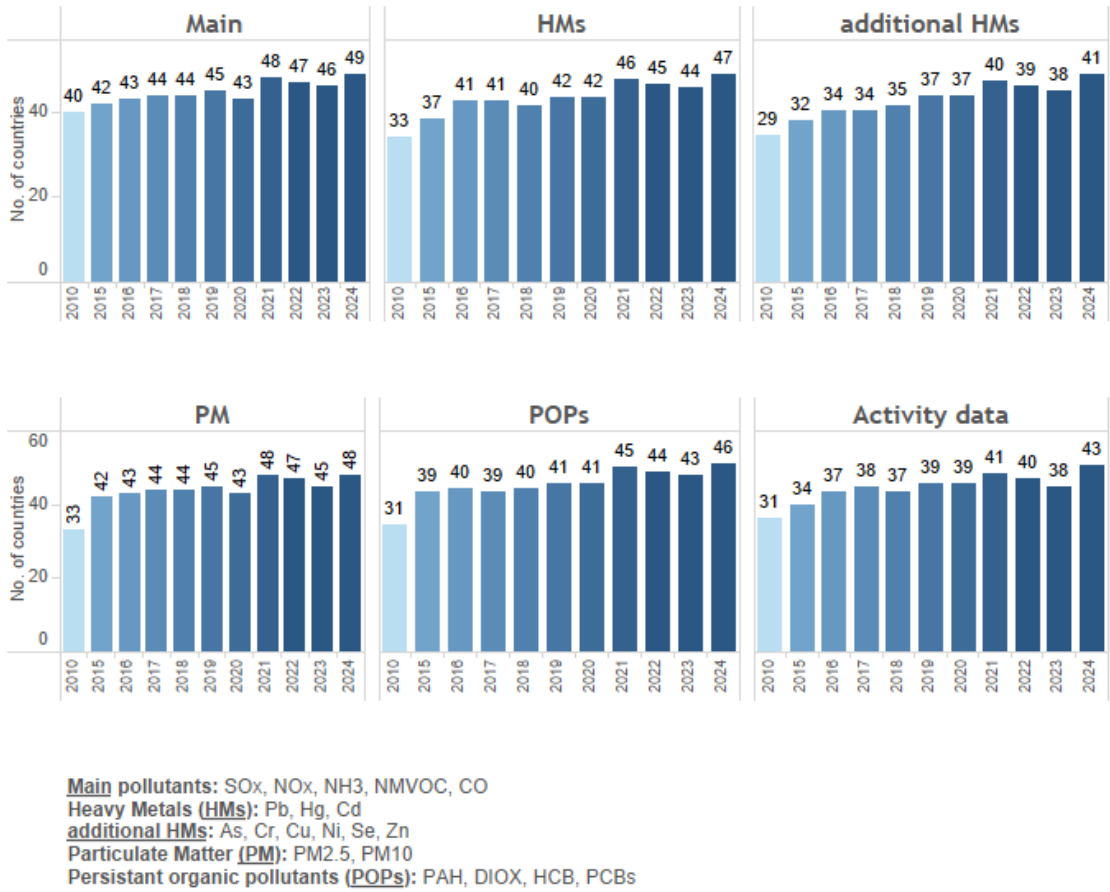


Figure 1: Number of Parties reporting various groups of pollutants at least for the respective current reporting year in the 2010 and 2015 to 2024 reporting rounds (as of 1st June for each year)

Interactive figures and tables are provided within the Dataviewer.

4 EXTENDED (STAGE 2) REVIEW

Key messages:

Recalculations *of 2005, 2010, 2015, 2020 and 2021 emission were analysed. 14 Parties reported recalculations* ***higher than 20%*** *on national total level for 2021. For the year 2021 high recalculations (above 20%) occurred most frequently for PM_{10} and TSP. Only Albania and Czechia had high recalculations (above 20%) for more than two pollutants in 2021. Common reasons for recalculations were changes in* ***activity data, methodology and emission factors****.*

Key category analysis: *Combustion processes, particularly from public electricity and heat production, road transport, and residential heating, dominate pollutant emissions in the EMEP area. A number of emission categories have been identified as key categories for both the 'EMEP East' and 'EMEP West' area country groups. In the 'EMEP East' area, public electricity and heat production is the largest source of NO_x and SO_x emissions, while road transport plays a larger role for NO_x emissions in the 'EMEP West' region, particularly for NO_x emissions from passenger cars and heavy-duty vehicles. Residential heating and dairy cattle manure management and domestic solvent use are important key categories both in the 'EMEP East' and 'EMEP West' area. NH_3 emissions are largely driven by manure management, with 'EMEP West' showing a higher contribution from manure applied to soils. Residential heating is also a major source of $PM_{2.5}$ in the 'EMEP East' and 'EMEP West' area.*

Emissions per capita *for at least one pollutant, in some cases for several pollutants, rose in 19 countries between 1990 and 2022 (2000 and 2022 for PMs) whereas* ***emissions per gross domestic product based on purchasing power parity (GDP/PPP) for at least one pollutant*** *rose for 9 Parties over the same time period. Changes were only analysed if the country reported values for 1990 (2000 for PMs) as well as for the current year.*

Data viewer

Additional information is presented in the *dataviewer* on the *CEIP webpage.*
Link: https://www.ceip.at/review-of-emission-inventories/technical-review-reports/rr2024

4.1 Consistency between PM_{10}-, $PM_{2.5}$- and BC emissions (1990-2022)

The focus on checks on consistency of reporting presented in this report is on the consistency between reported PM_{10}-, $PM_{2.5}$- and BC emissions.

Checks addressing time series consistency of reported data at sector level are provided at the CEIP website and can be accessed via the interactive data viewer http://www.ceip.at/data-viewer-2.

As $PM_{2.5}$ emissions are assumed to be a subset of PM_{10} emissions, it was checked whether the former are lower than the latter in all years for all countries.

Another basic comparison was performed to check whether reported BC emissions are lower than reported $PM_{2.5}$ emissions.

A comparison of the share of $PM_{2.5}$ in the national total of PM_{10} was made to identify differences between the submitting Parties, using the latest submission available. For the year 2021, the share of the national total of $PM_{2.5}$ in the national total of PM_{10} ranged from 17% to 92% with a median of around 60%.

Countries like *Albania, Armenia, Georgia, Luxembourg, Montenegro and Slovakia* show a $PM_{2.5}$ share above **90%** for at least one year of the timeseries. The timeseries of PM shares might indicate inconsistencies either for $PM_{2.5}$ or PM_{10} submissions. For example Armenia's shares change from quite low shares to relatively high shares within the timeseries, specifically from 2017 to 2018.

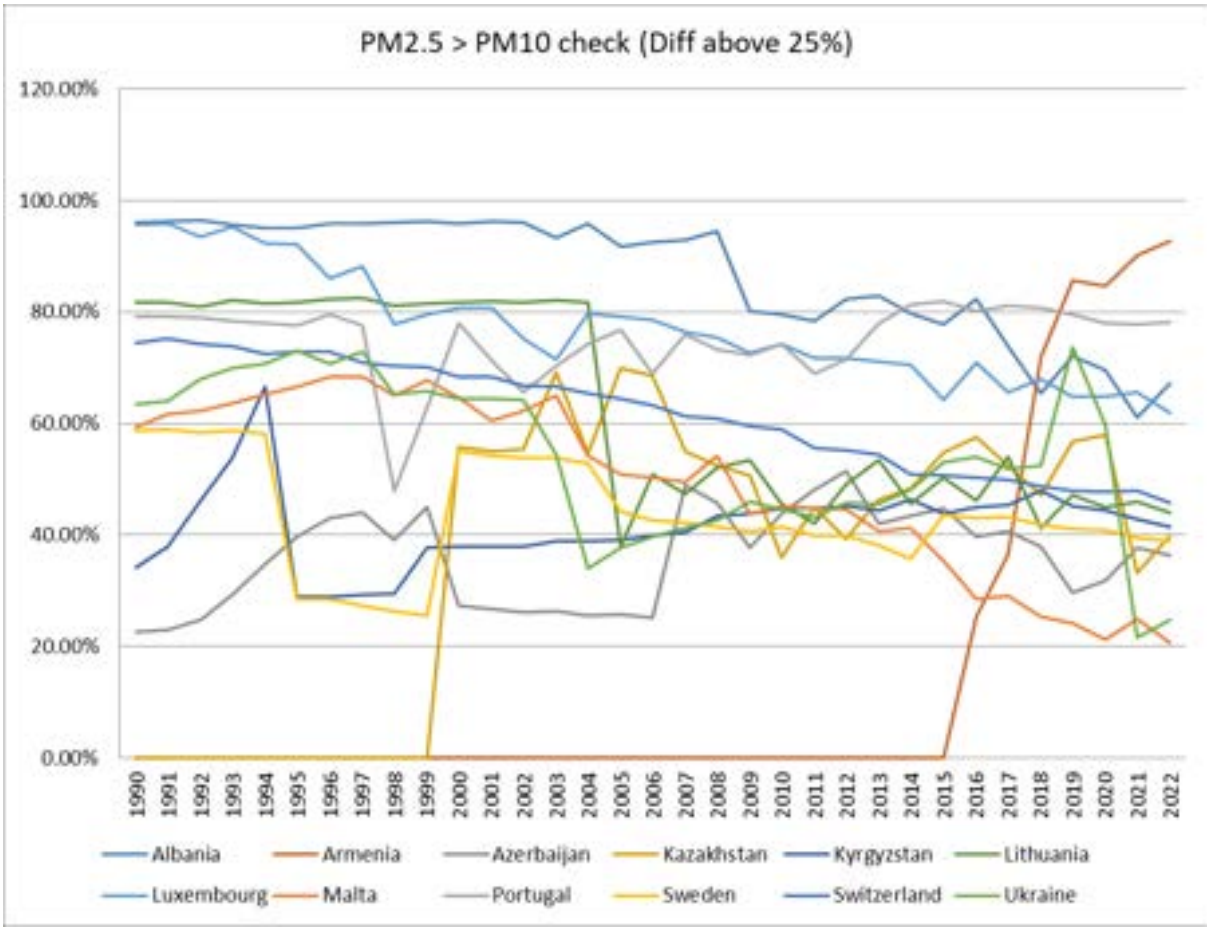


Figure 3: Share in percent of $PM_{2.5}$ national total emissions in PM_{10} national total emissions 1990-2022. Only Parties shown where differences greater than 25% occurred (difference between minimum and maximum share)

4.2 Key category analysis (KCA)

A KCA helps to identify significant sources of air pollution sources in the EMEP area and in individual countries. Key categories are those categories that cumulatively account for 80% of the total emissions of a specific pollutant. The dataviewer displays the share of key categories in total emissions for two groups of Parties: the 'EMEP West' area[11] and the 'EMEP East' area[12]. The results of the KCA for individual Parties can be downloaded from https://www.ceip.at/status-of-reporting-and-review-results/2024-submission.

NO_x

In the 'EMEP East' area, public electricity and heat production (27.40%) is the dominant source of NO_x emissions, indicating a higher contribution of this sector to air pollution compared to 'EMEP West' (12.50%).

Air emissions from road transport, in particular passenger cars (17.20%) and heavy-duty vehicles (10.50%), play a more important role in the 'EMEP West' area than in the 'EMEP East' area.

NMVOC

NMVOCs are a group of pollutants with a number of different key categories.

Residential heating makes a significant contribution to NMVOC emissions in both the 'EMEP West' and the 'EMEP East' area 13.70% and 8.10% respectively.

Also dairy cattle manure management is an important source of NMVOC emissions (8.9% 'EMEP East' and 7.70% in the 'EMEP West' area).

NMVOC emissions from the solvents sector (such as coating, degreasing and domestic solvent use) are more pronounced in the 'EMEP West' area.

SO_x

In the 'EMEP East' area, public electricity and heat production is by far the largest contributor to SO_x emissions, accounting for 61.90%, compared to 45.20% in 'EMEP West' area.

[11] Please note that for the 'EMEP West' area Bosnia and Herzegovina is not included as no data was reported.

[12] Please note that for the 'EMEP East' area the Republic of Moldova is not included as no data was reported.

Also residential heating is an important source of SO_x emissions in both the 'EMEP West' (11.10%) and 'EMEP East' (8.00%) area.

NH_3

NH_3 emissions in both regions are strongly influenced by manure management, especially from dairy cattle and non-dairy cattle. However, 'EMEP West' has a higher contribution from manure applied to soils (23.60%) compared to 'EMEP East' (9.40%).

In 'EMEP East', there is a greater diversity of NH_3 emissions sources, with relatively higher contributions from sheep and broilers.

$PM_{2.5}$ and PM_{10}

Residential heating is a major contributor to $PM_{2.5}$ emissions in both regions ('EMEP West' (57.80%) 'EMEP East' (47.50%)).

In 'EMEP East', construction and demolition activities are a much larger source of PM_{10} emissions (16.10%) compared to 'EMEP West' (6.80%).

In summary combustion processes, particularly from public electricity and heat production, road transport, and residential heating, dominate pollutant emissions in the EMEP area.

Public electricity and heat production (1A1a) is a key source for NO_x, SO_x, PMs, CO, HMs and POPs emissions. Residential heating also contributes notably to NO_x, SO_x, NMVOCs, PMs, CO, HMs and POPs emissions. Road transport is a key source of NO_x, NMVOCs, CO, PMs, BC and HMs emissions.

In addition agriculture - particularly manure management - plays a crucial role in NH_3 and NMVOC emissions.

Most of the reporting 'EMEP West' Parties submitted emission data for BC, except Austria, Liechtenstein and Luxembourg. Most of the reporting 'EMEP East Parties' submitted emission data for this pollutant for at least one year, except the Republic of Moldova, the Russian Federation and Türkiye.

4.3 Share of aggregated sectors (GNFR[13])

The share of aggregated NFR14 sectors for each pollutant and each Party was assessed to check consistency of reporting between the countries and also potentially identify outliers in reporting.

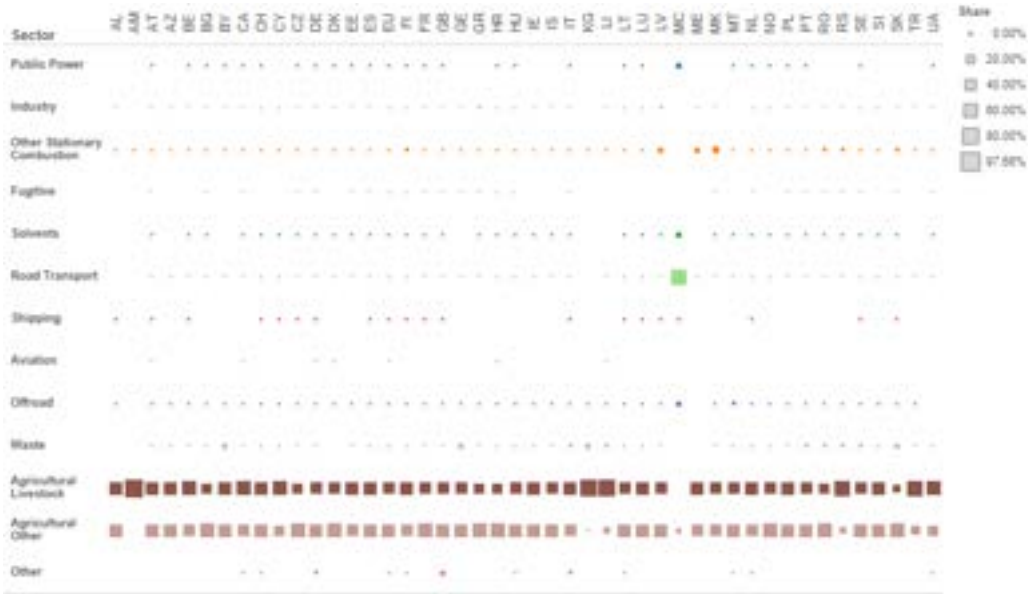


Figure 2: Comparison of the share of sectors between countries for the pollutant NH_3 in percent

Interactive figures with comparisons for other pollutants are provided within the dataviewer.

4.4 Comparability – emissions per capita, emissions per GDP

Population and GDP/PPP (gross domestic product/purchasing power parity) have been selected as indicators for the comparison with national total emissions available in standardised format for all Parties. The aim is to further elaborate the check with additional parameters that are relevant for selected key categories/pollutants.

National total emissions reported for 1990 or 2000 (for PM) and 2022 were divided by the number of inhabitants and by the total value of the GDP/PPP. The values for each Party are presented in the dataviewer. It should be noted that not all Parties

[13] The allocation of NFR14 sector codes to GNFR codes is provided in the conversion table on the CEIP homepage

submitted data for 1990 and 2022 for all analyzed pollutants, and that therefore these statistics cannot fully reflect the developments in the whole EMEP domain.

The dataviewer shows that for all assessed pollutants the highest and lowest per capita emissions per GDP/PPP emissions differ significantly from the average values (sometimes by a few orders of magnitude). A more detailed analysis of these indicators is outside the scope of this report, but the information is regularly provided to the reviewers during the checking of national inventories under the stage 3 review. Outliers might indicate differences in national economies but also errors in calculations. Low per capita and per GDP/PPP emissions in some Parties also seem to indicate incomplete national inventories, particularly with respect to PM and POPs data. More detailed information on country level is provided in the dataviewer on the CEIP webpage (https://www.ceip.at/status-of-reporting-and-review-results/2024-submission).

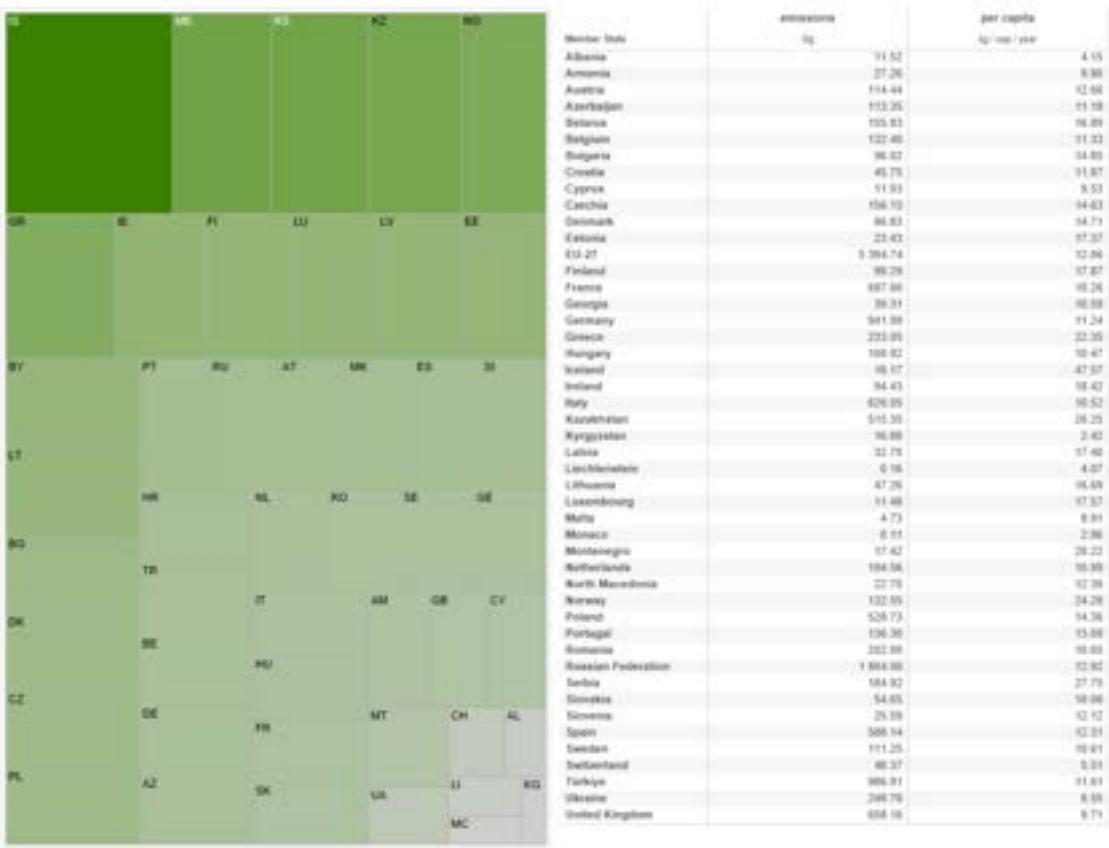
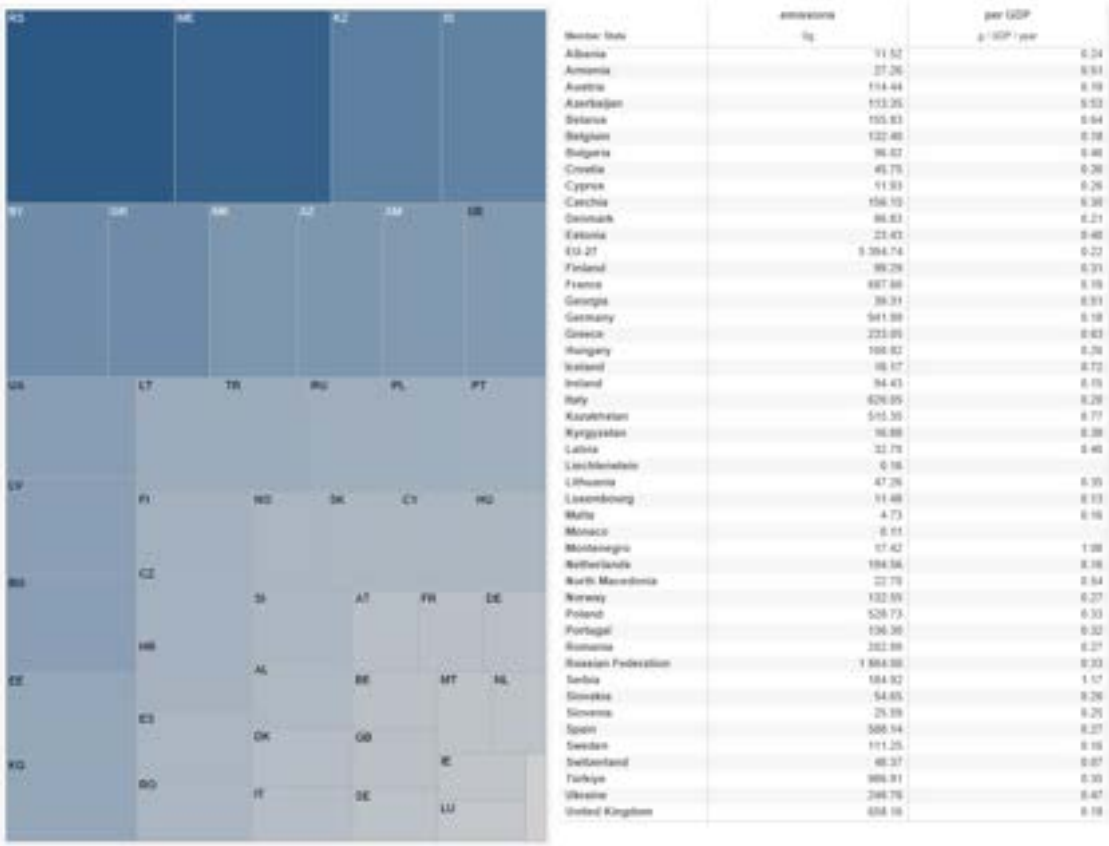


Figure 3: NO_x emissions per capita comparison for the year 2022



Member State	emissions Gg	per GDP g / GDP / year
Albania	11.52	0.24
Armenia	27.26	0.51
Austria	114.44	0.19
Azerbaijan	113.25	0.53
Belarus	155.83	0.64
Belgium	132.46	0.18
Bulgaria	96.67	0.46
Croatia	45.75	0.26
Cyprus	11.53	0.26
Czechia	156.10	0.30
Denmark	86.83	0.21
Estonia	23.43	0.48
EU-27	1 394.74	0.22
Finland	99.29	0.31
France	687.66	0.19
Georgia	39.31	0.53
Germany	941.99	0.18
Greece	233.05	0.83
Hungary	169.82	0.76
Iceland	16.17	0.72
Ireland	94.43	0.15
Italy	629.05	0.28
Kazakhstan	515.30	0.77
Kyrgyzstan	16.88	0.38
Latvia	32.79	0.46
Liechtenstein	0.16	
Lithuania	47.26	0.35
Luxembourg	11.48	0.13
Malta	4.73	0.16
Monaco	0.11	
Montenegro	17.42	1.08
Netherlands	194.56	0.18
North Macedonia	22.75	0.54
Norway	132.55	0.27
Poland	529.73	0.33
Portugal	136.30	0.32
Romania	202.89	0.27
Russian Federation	1 864.59	0.33
Serbia	184.92	1.17
Slovakia	54.65	0.28
Slovenia	25.59	0.25
Spain	588.14	0.27
Sweden	111.25	0.16
Switzerland	48.37	0.07
Türkiye	986.81	0.33
Ukraine	246.76	0.47
United Kingdom	658.16	0.19

Figure 4: NO_x emissions per GDP comparison for the year 2022

Note: The US and Canada are excluded from this graph, as well as the countries that have not provided a submission in 2024.

5 INITIAL CHECKS OF GRIDDED EMISSIONS AND LARGE POINT SOURCES

Key messages:

*In total 38 Parties provided gridded sectoral emissions in 0.1° x 0.1° (long/lat) resolution until August 2024 in this or a previous submission. This covers **almost 85% of the area** of all reporting Parties.*

Until August 2024, only four Parties reported sectoral data in the new EMEP grid resolution of 0.1° x 0.1° (long/lat) for the year 2022, but 35 Parties reported gridded sectoral data for 2019.

For about 55% of the grid cells from 48[14] Parties, data on spatially distributed emissions had to be partly or completely estimated or adjusted by CEIP.

Forty-three out of 48 Parties submitted Large Point Source (LPS) data in GNFR sector categories (in this or a previous submission).

5.1 Reporting of gridded emissions in 2024

Completeness:

Gridded data is part of the four-yearly reporting obligation and was not due in 2024.

Until August 2024, **38** of the 48 countries, which are considered part of the EMEP area, reported sectoral gridded emissions in the grid resolution of 0.1°x0.1° (long/lat).

The majority of gridded sectoral emissions in 0.1°x0.1° (long/lat) resolution have been reported for the years 2019 (35 countries) and 2015 (33 countries), (see Figure 4).

For 2016, 2017, 2018 and 2020 gridded sectoral emissions have been reported by five countries as well as for 2021 and 2022 by four countries.

Fifteen countries reported gridded emissions additionally for previous years (one country for the whole time series from 1980 to 2022; one country for the time series from 1990 to 2022; seven countries for the years 1990, 1995, 2000, 2005 and 2010; one country for the years 1990, 2000, 2005 and 2010; one country for the

[14] Without Canada, the United States of America and the EU as Party (only the individual EU Member States are considered)

years 2000, 2005 and 2010; one country for the year 2005; one country for the year 2010; and three countries for the year 2014).

No gridded sectoral data so far, neither in 0.1° x 0.1° (long/lat) nor in 50 x 50 km² PS resolution, was submitted by Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Kazakhstan, Liechtenstein, Montenegro, Moldova and Türkiye.

For Ukraine reported gridded sectoral data is available only in the old 50 x 50 km² PS resolution.

Completeness pollutants:

Until August 2024 37 Parties reported **sectoral gridded emissions for at least one year in 0.1° x 0.1° resolution** for main pollutants, particulate matter, heavy metals and persistent organic pollutants in this or a previous submission. One Party reported sectoral gridded emissions only for persistent organic pollutants.

Reported gridded sectoral data in 0.1° x 0.1° (long/lat) resolution covers almost 85% of the grid cells of all reporting Parties (see Figure 5).

More information on gridded data is available via the CEIP website at https://www.ceip.at/the-emep-grid.

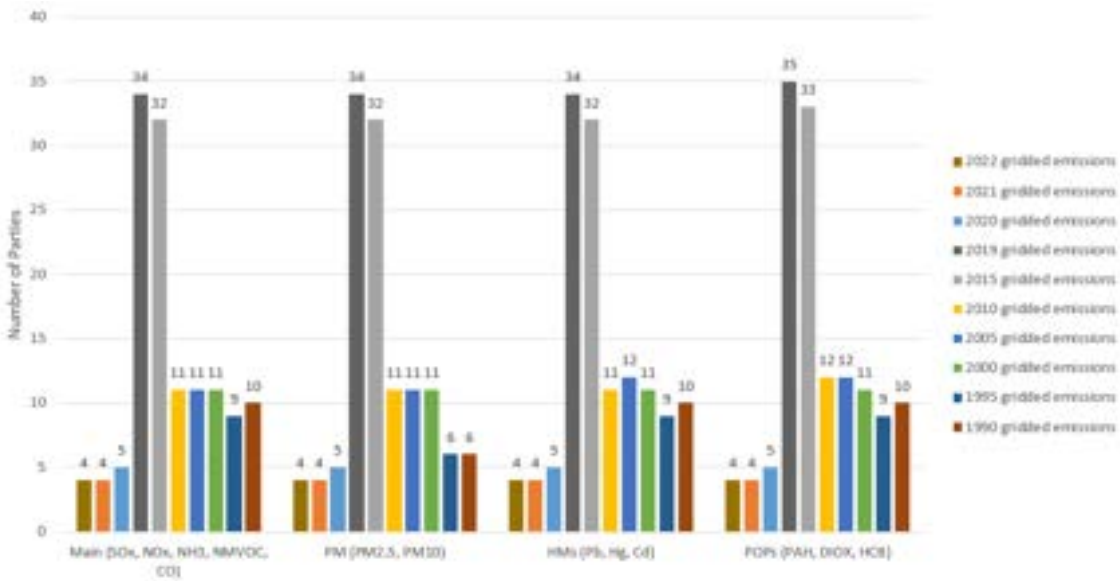


Figure 5: Total number of Parties reporting gridded sectoral data in 0.1° x 0.1° (long/lat) resolution for the years 1990, 1995, 2000, 2005, 2010, 2015, 2019, 2020, 2021 and 2022 reported to EMEP by 2024

Main pollutants (NO_X, NMVOC, SO_X, NH_3, CO) and PM ($PM_{2.5}$, PM_{10})

Priority heavy metals (Pb, Cd, Hg) and POPs (PCDD/PCDF, PAH and HCB)

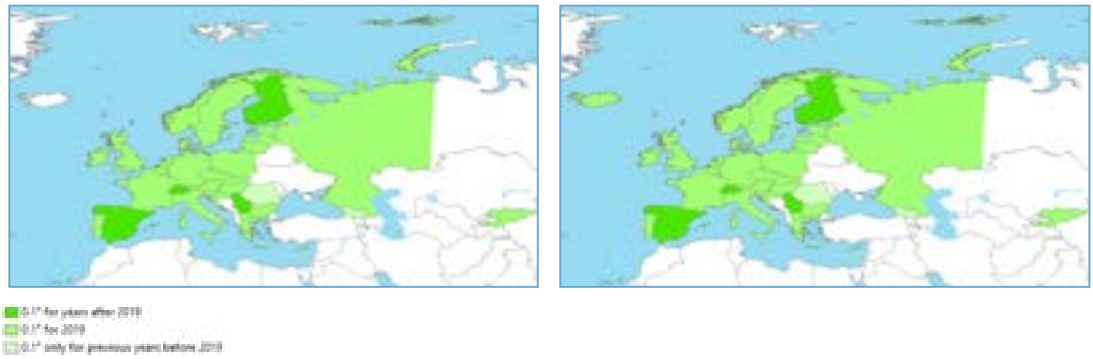


Figure 6: Visualisation of reported gridded emissions in 0.1° x 0.1° (long/lat) resolution in the EMEP area.

For *Portugal* and *Spain* the spatial disaggregation of sector 'F – Road Transport' was replaced by CAMS proxies. Reported gridded data from *Belarus, Italy, Lithuania* and *Serbia* was replaced by CAMS proxies. Reported gridded data from *Kyrgyzstan* and the *Russian Federation* was replaced by EDGAR proxies. Gridded data from Iceland was reported only for POPs, therefore gridding was done with CAMS and EDGAR proxies.

For about 55% of the grid cells from 48 reporting Parties to the LRTAP Convention[15] data on spatially distributed emissions had to be partly or completely estimated or adjusted by air pollutant emission experts in 2024. This is, either because this information was missing or because the reported data could not be used (areas with no reporting at all, like the sea areas, North Africa and areas in the extended EMEP domain are not considered here).

More detailed information on the gap-filling and gridding for emission data used in EMEP models can be found in the „EMEP Status Report 1/2024[16] and in the „Methodologies applied to the CEIP GNFR gap-filling 2024" reports.[17]

[15] Without Canada, the United States of America and the EU as Party (only the individual EU Member States are considered)

[16] EMEP, 2024: http://www.emep.int/mscw/mscw_publications.html

[17] CEIP, 2024 a, b: https://www.ceip.at/ceip-reports

5.2 Large point sources (LPS)

„Large point sources" (LPS) are defined as facilities whose combined emissions, within the limited identifiable area of the site premises, exceed certain pollutant emission thresholds[18]. LPS reporting is encouraged to include information on stack heights according to the stack height class categories as defined in the emission reporting guidelines[19]. Submitted LPS information should be consistent with the information reported for European Pollutant Release and Transfer Register (E-PRTR) facilities[20]

Until June 2023, **43** of the 48 countries, which are considered part of the EMEP area, reported LPS data in GNFR sector categories[21].

The majority of LPS data have been reported for the year 2015 (38 countries) and 2019 (35 countries). LPS data for 2010 have been reported by 28 countries, for 2005 by 14 countries, for 2000 by nine countries, for 2014 by eight countries, for 2009 and 2013 by seven countries, for 2011 and 2012 by six countries, for 2008, 2016, 2017 and 2018 by five countries, for 2007, 2020 and 2022 by four countries, for 2021 by three countries and for 2006 by two countries.

One country reported LPS data for the whole time series from 1990 to 2022, one country for the whole time series from 2007 to 2022, one country for the whole time series from 2014 to 2022 and seven countries for the years 1990, 1995, 2000, 2005 and 2010.

Five parties (Belarus, Bosnia and Herzegovina, Liechtenstein, Montenegro and the Republic of Moldova) did not report any LPS data in GNFR sector categories.

Figure 6 presents maps for main pollutants, PMs, priority heavy metals and POPs with Large Point sources reported until 2024.

[18] These thresholds have been extracted from the full list of pollutants in Regulation (EC) No. 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC (E-PRTR Regulation) and its annex II 6. See Table 1 in Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution – ECE/EB.AIR/125 (https://unece.org/DAM/env/documents/2013/air/eb/ece.eb.air.125_E_ODS.pdf)

[19] UNECE, 2022: Reporting Guidelines 2023 (ECE/EB.AIR/GE.1/2022/20– ECE/EB.AIR/WG.1/2022/13); Table 2

[20] https://ec.europa.eu/environment/industry/stationary/e-prtr/legislation.htm

[21] Other non-GNFR sector categories reported prior to 2010 are not considered.

Main pollutants (NO_X, NMVOC, SO_X, NH_3, CO)

Particulate matter ($PM_{2.5}$, PM_{10})

Priority heavy metals (Pb, Cd, Hg)

POPs (PCDD/PCDF, PAH and HCB)

Figure 7: Maps with Large Point Sources reported until 2024

6 IN-DEPTH REVIEW (STAGE 3)

The mandate and overall objectives for the emission inventory review process under the Air Convention is given by the UNECE document 'Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention'([22]) – hereafter referred to as the 'Review Guidelines 2018'.

Paragraph 7 (c) of the 'Review Guidelines 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.

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, the '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. SO_2, NOx, NMVOC, NH_3, plus PM_{10} $PM_{2.5}$, BC, priority HMs and POPS) have been checked for the time series years 1990 – 2022 to the extent possible. For these other pollutants especially completeness of reporting was assessed.

This report provides a summary of the review. Detailed results are available for each reviewed Party in the country review reports. [23]

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). 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. The expert review team assessed the transparency, accuracy, completeness, comparability and consistency[24] of the submitted inventories.

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[22] Decision 2018/1 adopted by EB: *Updated methods and procedures for the technical review of air pollutant emission Inventories reported under the Convention*. ECE/EB.AIR/142/Add.1 http://www.unece.org/fileadmin/DAM/env/documents/2002/eb/air/EB%20Decisions/Decision_2018_1.pdf

[23] https://www.ceip.at/status-of-reporting-and-review-results/2024-submission

[24] UNECE, 2022: Reporting Guidelines 2023 (ECE/EB.AIR/GE.1/2022/20− ECE/EB.AIR/WG.1/2022/13); section III, para 5 (a) to (e) for definitions.

In total the review team elaborated 423 questions and the Parties provided 384 answers to these questions. These questions and answers can result in three classes of findings – a recommendation, a technical correction or a revised estimate. Alternatively, the issue is clarified and closed without resulting in a finding. Recommendations are findings where an identified issue has not been resolved during the course of the review but which is not above the threshold of significance. The threshold of significance 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 under-estimate of emissions of more than 2% of the national total. If the expert review team concludes that emissions are being significantly under-estimated or over-estimated, the Party will be asked during the review to submit a revised estimate that addresses 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 expert review team does not accept a revised estimate provided by the Party, the expert review team may calculate a technical correction. The methods for calculating technical corrections are set up in the 'EMEP/UNECE Review Guidelines 2018' and use the EMEP/EEA Emission 'Inventory Guidebook' as a reference for methods and emission factors.

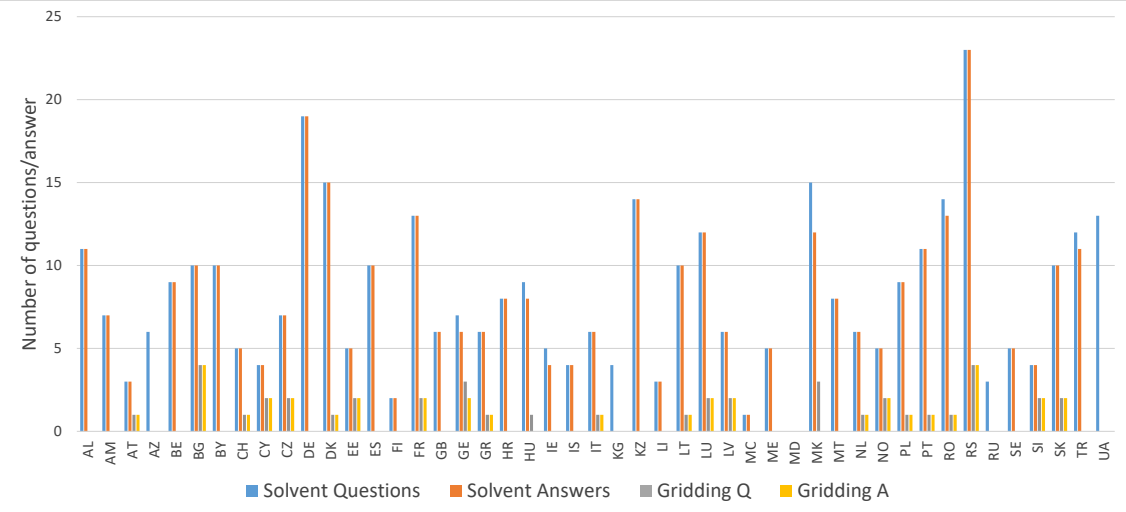

Figure 8: Number of questions and answers per reviewed Party.

In total the expert review team made 317 recommendations for inventory improvement. Five countries sent revised estimates for the sector solvents.

Findings were classified into transparency, accuracy, completeness, comparability and consistency. A finding could be assigned to several classes. Most of the findings related to transparency (176), followed by accuracy (148), completeness (83), consistency (55) and comparability (15).[25]

The expert review team issued recommendations on a variety of topics in the industrial processes and product use – solvents' sector. Recurring topics of the recommendations included:

- Use of tier 1 methods for key categories
- Intransparent description of the methods and the used activity data and emission factors in the IIR
- Inconsistencies in the time series that are not well explained in the IIR or that are not plausible
- Inconsistencies in emission factors and activity data (e.g. between NFR tables and IIR for activity data or used emission factor and referenced emission factor)
- Use of older versions of the Guidebook
- Missing or incomplete time series for certain activities
- Incorrect allocation of emissions (e.g., use of shoes, spray cans and de-icing activities)
- Incomplete reporting (not all sources e.g., adhesive tape manufacturing, textile finishing, and aircraft de-icing, use of shoes are included in the inventory)
- Missing uncertainty analysis
- Missing or unclear description and application of abatement techniques

The review identified 29 cases where a tier 1 method was used for a key category. A tier 1 method is the simplest method for estimating emissions that, usually based on the equation

"*Activity data x emission factor*". Tier 1 methodologies tend to overestimate emissions and generally do not allow to take into account the impacts of existing policies and measures. Optimally, a tier 2 or higher tier method is used for the calculation of key categories. These more sophisticated methods usually include more detail, like for example abatement measures.

[25] Note a finding can be related to several quality criteria (transparency, accuracy, completeness, comparability and consistency)

The review of gridded data found that several countries did not describe the methods used for the spatial distribution of the emissions detailed enough or at all.

Conclusion

The quality of the submitted inventories varied greatly from country to country. In general, the quality of the inventories submitted has improved in recent years. Many Parties had also implemented the recommendations of previous reviews. However, there is still a number of inventories that show problems related to completeness and accuracy and time series consistency. Improvement of transparency of the Informative Inventory Reports is an issue for the majority of the Parties. However, for many Parties only comparatively small, targeted improvements are needed. The responsiveness of Parties to the questions from the expert review team has increased significantly in recent years.

7 UNITS AND ABBREVIATIONS

7.1 Units

kg .....1 kilogram = 10^3 g (gram)

t.....1 tonne (metric) = 1 megagram (Mg) = 10^6 g

kt.....1,000 tonnes …

Mg.....1 megagram = 10^6 g = 1 tonne (t)

Gg .....1 gigagram = 10^9 g = 1 kilotonne (kt)

Tg .....1 teragram = 10^{12} g = 1 megatonne (Mt)

TJ .....1 terajoule

7.2 Abbreviations

CEIP .....EMEP Centre on Emission Inventories and Projections

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

GDP, PPP.....Gross domestic product converted to international dollars using purchasing power parity rates

HMs .....Heavy metals

IIR.....Informative inventory report

KCA .....Key category analysis

LRTAP Convention ..UNECE Convention on Long-range Transboundary Air Pollution; Air Convention

LRT.....Long Range Transport

LPS.....Large point source

Main pollutants.....NO_x, NMVOC, SO_x, NH_3 and CO

Priority HMs .....Cd, Hg and Pb

NFR .....UNECE Nomenclature For Reporting (of air pollutants)

PAHs.....Polycyclic aromatic hydrocarbons – for the purposes of emission inventories,
the following four indicator compounds shall be used: benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3_cd)pyrene;

PM.....Particulate matter – air pollutant consisting of a mixture of particles suspended in the air. These particles differ in their physical properties (such as size and shape) and chemical composition.

POPs.....Persistent organic pollutants

UNECE.....United Nations Economic Commission for Europe

As.....Arsenic

BC.....Black carbon – carbonaceous particulate matter that absorbs light

Cd.....Cadmium

CH_4.....Methane

CO.....Carbon monoxide

CO_2.....Carbon dioxide

Cr.....Chromium

Cu.....Copper

HCB.....Hexachlorobenzene – Chemical Abstracts Service (CAS) Registry Number 118-74-1

Hg.....Mercury

NH_3.....Ammonia

Ni.....Nickel

NMVOCs.....Non-methane volatile organic compounds – all organic compounds of an anthropogenic nature, other than methane, that are capable of producing photochemical oxidants by reaction with nitrogen oxides in the presence of sunlight

NO_2.....Nitrogen dioxide

NO_X.....Nitrogen oxides – means nitric oxide and nitrogen dioxide, expressed as nitrogen dioxide (NO_2);

PAHs.....Polycyclic aromatic hydrocarbons – for the purposes of emission inventories,
the following four indicator compounds shall be used: benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3_cd)pyrene;

Pb.....Lead

PCBs.....Polychlorinated biphenyls – aromatic compounds formed in such a manner that
the hydrogen atoms on the biphenyl molecule (two benzene rings bonded together by a single carbon-carbon bond) may be replaced by up to 10 chlorine atoms;

PCDD/PCDF .....Dioxins and furans – polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF), tricyclic, aromatic compounds formed by two benzene rings, connected by two oxygen atoms in PCDD and by one oxygen atom in PCDF, and the hydrogen atoms of which may be replaced by up to eight chlorine atoms;

PM_{10}.....Particulate matter, or particles with an aerodynamic diameter equal to or less
than 10 (μm);

$PM_{2.5}$ .....Particulate matter, or particles with an aerodynamic diameter equal to or less
than 2.5 micrometres (μm);

Se .....Selenium

SO_2.....Sulphur dioxide

SO_X.....Sulphur oxides – means all sulphur compounds expressed as sulphur dioxide (SO_2) (including sulphur trioxide (SO_3), sulphuric acid (H_2SO_4), and reduced sulphur compounds, such as hydrogen sulphide (H_2S), mercaptans and dimethyl sulphides, etc.);

TSP.....Total suspended particles

Zn.....Zinc

7.3 ISO Country codes

AL..... Albania
AM ..... Armenia
AT..... Austria
AZ..... Azerbaijan
BA ..... Bosnia and Herzegovina
BE..... Belgium
BG ..... Bulgaria
BY..... Belarus
CA..... Canada
CH ..... Switzerland
CY..... Cyprus
CZ..... Czechia
DE ..... Germany
DK ..... Denmark
EE ..... Estonia
ES ..... Spain
EU ..... European Union
FI ..... Finland
FR..... France
GB ..... United Kingdom
GE ..... Georgia
GR ..... Greece
HR ..... Croatia
HU..... Hungary
IE ..... Ireland
IS ..... Iceland
IT.....Italy
KG.....Kyrgyzstan
KZ .....Kazakhstan
LI.....Liechtenstein
LT.....Lithuania
LU .....Luxembourg
LV.....Latvia
MC .....Monaco
MD.....Republic of Moldova
ME .....Montenegro
MK.....North Macedonia
MT .....Malta
NL.....Netherlands
NO .....Norway
PL.....Poland
PT .....Portugal
RO.....Romania
RS .....Serbia
RU.....Russian Federation
SE.....Sweden
SI.....Slovenia
SK .....Slovakia
TR .....Türkiye
UA.....Ukraine
US .....United States of America

'EMEP West' comprises Albania, Austria, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Germany, Denmark, Estonia, European Union, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malta, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

'EMEP East' comprises Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Türkiye and Ukraine.

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APPENDIX

Status of 2024 reporting

Table 4: Status of reporting under the LRTAP Convention as of 1st June 2024.

PARTY	Submission Date EMEP	Latest re-submission	NFR template (version)	Gridded Data	LPS Data	2024 Proj.	IIR 2024
Albania	15 Feb 2024	10 May 2024	2019-1				x
Armenia	07 Feb 2024		2019-1				x
Austria	15 Feb 2024	14 Apr 2024	2019-1				x
Azerbaijan	14 Feb 2024		2019-1				
Belarus	12 Feb 2024		2019-1				x
Belgium	15 Feb 2024	15 Mar 2024	2019-1				x
Bosnia & Herzegovina							
Bulgaria	15 Feb 2024	15 Mar 2024	2019-1				x
Canada	15 Feb 2024		2019-1			x	x
Croatia	30 Jan 2024		2019-1			x	x
Cyprus	14 Feb 2024	14 Mar 2024	2019-1				x
Czechia	15 Feb 2024	14 Mar 2024	2019-1				x
Denmark	15 Feb 2024		2019-1				x
Estonia	13 Feb 2024	14 Mar 2024	2019-1				x
EU	16 Apr 2024		2019-1				x
Finland	14 Feb 2024		2019-1	x	x	x	x
France	09 Feb 2024		2019-1				x
Georgia	15 Feb 2024	07 May 2024	2019-1				x
Germany	14 Feb 2024		2019-1				x
Greece	13 Feb 2024		2019-1				x
Hungary	16 Feb 2024	19 Apr 2024	2019-1				x
Iceland	16 Feb 2024	15 Mar 2024	2019-1				x
Ireland	15 Feb 2024		2019-1			x	x
Italy	15 Feb 2024	30 Apr 2024	2019-1				x
Kazakhstan	14 Feb 2024		2019-1				x
Kyrgyzstan	14 Feb 2024		2019-1				
Latvia	15 Feb 2024	15 Mar 2024	2019-1				x
Liechtenstein	09 Apr 2024		2019-1				x
Lithuania	15 Feb 2024	13 Mar 2024	2019-1				x
Luxembourg	10 Feb 2024	28 May 2024	2019-1				x
Malta	06 Feb 2024	15 Mar 2024	2019-1				x
Monaco	13 Feb 2024		2019-1	x	x	x	x
Montenegro	15 Feb 2024	15 Apr 2024	2019-1				x

PARTY	Submission Date EMEP	Latest re-submission	NFR template (version)	Gridded Data	LPS Data	2024 Proj.	IIR 2024
North Macedonia	14 Feb 2024	04 Mar 2024	2019-1				x
Norway	05 Feb 2024		2019-1				x
Poland	12 Feb 2024		2019-1				x
Portugal	15 Feb 2024	15 Mar 2024	2019-1				x
Republic of Moldova							
Romania	14 Feb 2024	13 Mar 2024	2019-1				x
Russian Federation	12 Feb 2024		2019-1				x
Serbia	14 Feb 2024	21 Mar 2024	2019-1				x
Slovakia	15 Feb 2024	15 Mar 2024	2019-1				x
Slovenia	06 Feb 2024		2019-1				x
Spain	14 Feb 2024		2019-1	x	x		x
Sweden	16 Jan 2024		2019-1				x
Switzerland	15 Feb 2024		2019-1	x	x	x	x
the Netherlands	14 Feb 2024		2019-1				x
Türkiye	15 Feb 2024		2019-1				x
Ukraine	12 Feb 2024		2019-1				x
United Kingdom	14 Feb 2024		2019-1			x	x
USA	29 Feb 2024	22 Mar 2024	2019-1				x

Table 5: Completeness of submissions under the Air Convention as of 1st June 2024.

PARTY	SO_2, NO_X, CO, NH_3, NMVOC	Cd, Hg, Pb	additional HMs	$PM_{2.5}$, PM_{10}	TSP	BC	POPs (PAH PCDD/PCDF, HCB, PCBs)	Activity Data
Albania	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Armenia	2016 - 2022	2016-2022	2016-2022	2016 - 2022	2016 - 2022	2016 - 2022	2016 - 2022	
Austria	1990 - 2022	1990 - 2022		1990, 1995, 2000 - 2022	1990, 1995, 2000 - 2022		1990 - 2022	1990 - 2022
Azerbaijan	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Belarus	2022	2022	2022	2022	2022	2022	2022	2022
Belgium	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Bosnia & Herzegovina								
Bulgaria	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Canada	1990 - 2022	1990 - 2022		1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	
Croatia	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Cyprus	1990 - 2022	1990 - 2022	1990 - 2022	2000 - 2022	2000 - 2022	2000 - 2022	1990 - 2022	1990 - 2022
Czechia	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Denmark	1980 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1980 - 2022

PARTY	SO_2, NO_X, CO, NH_3, NMVOC	Cd, Hg, Pb	additional HMs	$PM_{2.5}$, PM_{10}	TSP	BC	POPs (PAH PCDD/PCDF, HCB, PCBs)	Activity Data
Estonia	1990 - 2022	1990 - 2022	1990 - 2022	2000 - 2022	1990 - 2022	2000 - 2022	1990 - 2022	1990 - 2022
EU	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Finland	1980 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
France	1980 – 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1980 - 2022
Georgia	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Germany	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Greece	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Hungary	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Iceland	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Ireland	1987, 1990-2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Italy	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Kazakhstan	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Kyrgyzstan	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Latvia	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Liechtenstein	1990 - 2022	1990 - 2022		1990 - 2022	1990 - 2022		1990 - 2022	
Lithuania	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Luxembourg	1990 - 2022	1990 - 2022		1990 - 2022	1990 - 2022		1990 - 2022	1990 - 2022
Malta	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Monaco	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Montenegro	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
North Macedonia	1980, 1987, 1988, 1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1980, 1987, 1988, 1990 - 2022
Norway	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Poland	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Portugal	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Republic of Moldova								
Romania	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Russian Federation	2022							2022
Serbia	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Slovakia	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Slovenia	1980 - 2022	1990 - 2022	1990 - 2022	2000 - 2022	2000 - 2022	2000 - 2022	1990 - 2022	1990 - 2022
Spain	1990 - 2022	1990 - 2022	1990 - 2022	2000 - 2022	2000 - 2022	2000 - 2022	1990 - 2022	1990 - 2022
Sweden	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	2000 - 2022	1990 - 2022	1990 - 2022
Switzerland	1980 - 2022	1980 - 2022		1980 - 2022	1980 - 2022	1980 - 2022	1980 - 2022	1980 - 2022
the Netherlands	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
Türkiye	1990 - 2022	1990 - 2022		1990 - 2022				
Ukraine	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	
United Kingdom	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022	1990 - 2022
USA	2022			2022				

Table 6: Completeness of submissions under the Air Convention as of 1st June 2024 (since 2015 reporting of Projections mandatory every 4 years, since 2017 reporting of Gridded data and LPS data mandatory every 4 years).

PARTY	Template version 2014-1,2014-2 or NFR-2019-1				Gridded	LPS Emissions
	Projections WM	Projections WaM	Activity data WM	Activity data WaM	0.1° x 0.1°	
Canada	2025, 2030, 2035		2025, 2030, 2035			
Croatia	2025, 2030, 2040, 2050	2025, 2030, 2040, 2050	2025, 2030, 2040, 2050	2025, 2030, 2040, 2050		
Finland	2025, 2030, 2040, 2050				1990, 1995, 2000, 2005, 2010, 2015, 2020, 2021, 2022	2022
Ireland	2025, 2030, 2035, 2040, 2050	2025, 2030, 2035, 2040, 2050	2025, 2030, 2035, 2040, 2050	2025, 2030, 2035, 2040, 2050		
Monaco	2025, 2030		2025, 2030	2025, 2030	2014-2022	2014-2022
Spain					1990 - 2022	1990 - 2022
Switzerland	2025, 2030, 2035, 2040, 2050		2025, 2030, 2035, 2040, 2050		1990 - 2022	2007 - 2022
United Kingdom	2025, 2030, 2035, 2040, 2050					

DATAVIEWER

The dataviewer containing five different subcategories is available on CEIP's homepage at: www.ceip.at/review-of-emission-inventories/technical-review-reports

Table 7: Overview of dataviewer content to the Inventory Report 2024

	Dataviewer 2024
1	Completeness
2	Recalculations
3	KCA
4	Share of sectors
5	Emissions per capita and per GDP

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