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**Report for the Stage 3 *ad-hoc* review of emission  
inventories submitted under the UNECE LRTAP  
Convention:**

**2023**

**Czechia**

**FINAL REPORT**

# CONTENT

INTRODUCTION .....	3
PART A: GENERAL RECOMMENDATIONS FOR THE CHAPTER AGRICULTURE.....	5
PART B: SPECIFIC RECOMMENDATIONS FOR THE SECTOR AGRICULTURE.....	5
PART C: SPECIFIC RECOMMENDATIONS FOR THE GRIDDED EMISSION DATA FOR THE SECTOR AGRICULTURE.....	8
REVISED ESTIMATES AND TECHNICAL CORRECTIONS CONSIDERED AND/OR CALCULATED BY ERT .....	10
LIST OF MATERIALS PROVIDED TO ERT.....	11
LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW .....	11
ANNEX I TECHNICAL CORRECTIONS AND REVISED ESTIMATES .....	12
ABBREVIATIONS.....	13
LIST OF REFERENCES AND SUPPORTING DOCUMENTS.....	15
STATEMENT FROM CZECHIA ON THE CONCLUSIONS PRESENTED BY THE EXPERT REVIEW TEAM.....	16

# INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is given by the UNECE document 'Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention'<sup>(1)</sup> – hereafter referred to as the 'Review Guidelines 2018'.
2. 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 and that where appropriate, ad hoc reviews could be conducted in line with the present Methods and Procedures for the In-depth (Stage 3) review.
3. 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<sub>x</sub> emissions including gridded data. While the focus was set on NH<sub>3</sub>, NMVOC and NO<sub>x</sub> emissions, also all other pollutants covered by LRTAP Convention and its protocols (i.e. SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>, plus PM<sub>10</sub> PM<sub>2.5</sub>, BC, priority HMs and POP<sub>S</sub>) have been checked for the time series years 1990 – 2021 to the extent possible. For these other pollutants especially completeness of reporting was assessed.
4. This report covers the results of the Stage 3 Review (ad hoc review) 2023 of Czechia's air emission inventory submitted under the UNECE LRTAP Convention. 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). The following team of nominated experts from the Roster of Experts performed the review.

## **Agriculture experts:**

Ms. Armine ARTENYAN (Republic of Armenia)

Ms. Ajla BASOVIC (Montenegro)

Ms. Aleksandra NESTOROVSKA-KRSTESKA (North Macedonia)

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<sup>1</sup> 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](http://www.unece.org/fileadmin/DAM/env/documents/2002/eb/air/EB%20Decisions/Decision_2018_1.pdf)

Mr. Lasha AKHALAIA (Georgia)

Mr. Hakam AL-HANBALI (Sweden)

Ms. Susana LOPEZ-APARICIO (EU/ETC(EEA))

Ms. Simone MAYER (Austria)

Ms. Andjelka RADOSAVLJEVIC (Serbia)

Ms. Kristina Tonhauzer (Slovakia)

Mr. Tim VAN DER ZEE (Netherlands)

**Experts for gridded emission data:**

Ms. Christine BRENDLE (Austria)

Mr. Christopher EVANGELIDES (United Kingdom)

Mr. Christian MIELKE (Germany)

5. Mr. Ben RICHMOND (United Kingdom), Ms. Rikke ALBREKTSSEN (Denmark), Mr. Etienne MATHIAS (France), Ms. Kristina SAARINEN (Finland) were the lead reviewers. The review was coordinated by Ms. Sabine Schindlbacher and Mr. Bernhard Ullrich (EMEP Centre on Emission Inventories and Projections - CEIP).

6. The review was performed on the basis of CLRTAP emission data officially reported by Czechia, due by 15 February 2023. The Informative Inventory Reports (IIR), reported due by 15 March 2023 under the CLRTAP, informed the review.

7. The EMEP/EEA Guidebook 2019<sup>2</sup> was used as a base for the review.

8. The emission inventory of Czechia was received on 15 February 2023 and thus by the deadline of 15 February. The Informative Inventory Report was received on 15 March 2023 and thus by the deadline of 15 March. Czechia provided a resubmission of the emission inventory, on 15 March 2023. The resubmission has been considered for the review.

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<sup>2</sup> EMEP/EEA: EMEP/EEA air pollutant emission inventory guidebook 2019, EEA Report No. 13/2019 European Environment Agency, Copenhagen. Available at: <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019> EU 2019

## **PART A: GENERAL RECOMMENDATIONS FOR THE CHAPTER AGRICULTURE**

9. The ERT recognises the level of effort undertaken by Czechia in providing an inventory including a significant level of detail.

The IIR describes the methods used for the sector agriculture transparently. The ERT considers the agriculture part of the inventory submission to be of good quality in terms of completeness and of good quality in terms of accuracy, comparability and consistency.

To improve the overall quality of the agriculture air emission inventory the ERT recommends Czechia to

- provide transparent information on recalculations for all pollutants.
- ensure that the time series are consistent and to explain significant dips and drops

## **PART B: SPECIFIC RECOMMENDATIONS FOR THE SECTOR AGRICULTURE**

10. Table 1 provides the findings from the 2023 CLRTAP Stage 3 Review including those not implemented from previous CLTRAP Stage 3 Reviews. While the focus was set on NH<sub>3</sub>, NMVOC and NO<sub>x</sub> emissions, also all other pollutants covered by the LRTAP Convention and its protocols (i.e. SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>, plus PM<sub>10</sub> PM<sub>2.5</sub>, BC, priority HMs and POP<sub>s</sub>) have been checked for the years 1990 – 2021 to the extent possible, especially regarding the completeness of reporting. The implementation of the recommendations will be followed up in a future CLRTAP inventory review.

**Table 1: Findings from the CLRTAP Stage 3 Review 2023 for the Sector Agriculture<sup>3</sup>**

ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
CZ-2023-3B4h-1	NH <sub>3</sub> , NMVOC, PM	3B4h	No		R	AC <sub>3</sub>
<p><b>Observation</b></p> <p>The ERT noticed that NO<sub>x</sub>, NMVOC and PM emissions are not estimated from the subcategory 3B4h, whereas emissions of NH<sub>3</sub> are reported as included elsewhere (IE). In addition, population size reported in NFR is equal to 0 in 1990-2019. During the review Czechia explained that the notation IE (included elsewhere) is incorrect for NH<sub>3</sub> and the correct notation key should be NE (not estimated) as with all other pollutants. Czechia expressed commitment that the error will be corrected for the entire time series in the next submission.</p> <p><b>Recommendation</b></p> <p><b>The ERT recommends Czechia to change notation keys for NH<sub>3</sub> emissions from 3B4h for entire time series as well as to use the notation key – Not Estimated (NE) - as the activity data in 1990-2019 in the next submission.</b></p>						
ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
CZ-2023-3Dc-1	NH <sub>3</sub> , PM	3B, 3D	Yes		R	AC <sub>3</sub>
<p><b>Observation</b></p> <p>The ERT noticed that the Chapter VIII.5 "Recalculations and Improvements in Agriculture" of the IIR does not include information on recalculations of some subcategories including of those which are key (PM emissions from 3Dc) or have undergone significant alteration (NH<sub>3</sub></p>						

<sup>3</sup> Note: There are four possible types of findings: R: Recommendation, TC: Technical Correction, PTC: Potential Technical Correction; RE : Revised Estimate

The findings have been assigned to one or more of the following criteria: TACCC T (Transparency), A (Accuracy), C<sub>1</sub> (Completeness), C<sub>2</sub> (Comparability), C<sub>3</sub> (Consistency) for definitions of these criteria see EMEP/EEA Guidebook 2019

emissions from 3B4gi, PM emissions from 3B2 and 3B4d). During the review Czechia provided detailed information to the ERT on the reasons of recalculations for 3B4gi, 3B2 and 3B4d.

**Recommendation**

**The ERT recommends Czechia to present complete information on recalculations which lead to significant change of the reported values in its IIR in the next submission.**

ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
CZ-2023-3Da1-1	NMVOG	3Da	No		R	AC <sub>3</sub>

**Observation**

The ERT noticed that NMVOG emissions was marked as Not Estimated (NE) for the subcategory 3Da1. Usually NMVOG is not applicable to this notable subcategory. During the review Czechia agreed on changing the notation key for NMVOG emissions from 3Da1.

**Recommendation**

**The ERT recommends Czechia to change the notation key for NMVOG emissions from 3Da1 from NE to NA in the next submission.**

ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
CZ-2023-3Dc-2	PM	3Dc	Yes		R	AC <sub>3</sub>

**Observation**

The ERT noticed that reasons for significant drop of PM emissions from 3Dc in 2003 are not described in the IIR. During the review Czechia explained that the notable interannual variation was caused by the reduction in cereal production in 2003, especially wheat, and provided activity data to the ERT.

**Recommendation**

**The ERT recommends Czechia to present the relevant explanation for the significant drop of PM emissions from 3Dc in 2003 in its IIR in the next submission.**

## **PART C: SPECIFIC RECOMMENDATIONS FOR THE GRIDDED EMISSION DATA FOR THE SECTOR AGRICULTURE**

11. For the 2023 Review of the gridded emission data the focus was set on ammonia, NMVOC, NO<sub>x</sub> and PM<sub>2.5</sub> emissions.
12. The methods used by Czechia to grid sectoral emissions are described in the IIR but the ERT recommends to add more detail on the methods used.
13. The description includes data sources that have been used for spatial distribution, but especially for the agricultures sector the ERT recommends to describe the data sources used for spatial distribution in more detail.
14. Gridded emissions reported for GNFR K\_AgriLivestock and L\_AgriOther are consistent with the corresponding NFR categories reported in Annex I.
15. Table 2 provides the findings from the ERT related to the gridded data.
16. The implementation of the recommendations will be followed up in a future CLRTAP inventory review.



**Table 2: Findings from the CLRTAP stage 3 review 2023 for gridded emissions from the sector agriculture<sup>4</sup>**

ID	Pollutants	GNFR category	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Czechia-2023-GRID-GL-1	All	GNFR-L	
<p><b>Observation</b> The expert review team notes that the description of the methodologies and assumptions used to generate the gridded data is not transparent enough.</p> <p><b>Recommendation</b> The expert review team recommends Czechia to elaborate the methods used to generate the gridded data in more detail and specifically to add more detail on the data sources used to spatially distribute the gridded data.</p>			

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<sup>4</sup> The findings have been assigned to one or more of the following criteria: TACCC T (Transparency), A (Accuracy), C<sub>1</sub> (Completeness), C<sub>2</sub> (Comparability), C<sub>3</sub> (Consistency) for definitions of these criteria see EMEP/EEA Guidebook 2019

## **REVISED ESTIMATES AND TECHNICAL CORRECTIONS CONSIDERED AND/OR CALCULATED BY ERT**

17. In the Appendix of the 'EMEP/UNECE Review Guidelines 2018'<sup>5</sup> 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 2023 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. 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.

18. The ERT did not calculate any Technical Corrections and Czechia did not provide any Revised Estimates.

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<sup>5</sup> [https://www.ceip.at/fileadmin/inhalte/ceip/3\\_review/advance\\_version\\_ece\\_eb.air\\_142\\_add.1.pdf](https://www.ceip.at/fileadmin/inhalte/ceip/3_review/advance_version_ece_eb.air_142_add.1.pdf)

## **LIST OF MATERIALS PROVIDED TO ERT**

1. Czechia Annex I reporting template
2. Czechia Stage 2 S&A report
3. Czechia Stage 1 report 2023
4. Czechia IIR 2023
5. Repdab-Report
6. Extended checks

## **LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW**

1. Responses to the question raised by ERT during the review
2. Material received from the Party during the Review
  - Activity data for 3D including crop yield data for the subcategory 3Dc –  
Excel file: “Czechia - NFR-3D - Crop Yield”

## **ANNEX I TECHNICAL CORRECTIONS AND REVISED ESTIMATES**

19. The ERT did not calculate any Technical Corrections and Czechia did not provide any Revised Estimates.

## ABBREVIATIONS

This list includes abbreviations commonly used in the Review Reports

AD	Activity data
BaP	Benzo[a]pyrene
BC	Black Carbon
C	Confidential
Cd	Cadmium
CEIP	Centre on Emission Inventories and Projections
CLRTAP	Convention on Long-range Transboundary Air Pollution – ‘the Air Convention’
CO	Carbon Monoxide
E-PRTR	European Pollutant Release and Transfer Register
EEA	European Environment Agency
EF	Emission factor
EMEP	The co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe (unofficially ‘European Monitoring and Evaluation Programme’ = EMEP)
ERC	Emission Reduction Commitment
ERT	Expert Review Team
GHG	Greenhouse gas
GIS	Geo Information System
GNFR	NFR Aggregation for Gridding and LPS
HCB	Hexachlorobenzene
Hg	Mercury
HM	Heavy metals
IEF	Implied emission factor
kt	Kilotonnes
LPS	Large Point Sources
NA	Not applicable
NE	Not Estimated
NECD	National Emission reduction Commitments Directive
NFR	Nomenclature for reporting
NH <sub>3</sub>	Ammonia
NMVOG	Non-methane volatile organic compounds
NO	Not Occuring
NO <sub>x</sub>	Nitrogen oxides
NR	Not relevant/Not Reported
PAHs	Polycyclic aromatic hydrocarbons
Pb	Lead
PCB	Polychlorinated biphenyls
PCDD/F	Polychlorinated dibenzo-p-dioxins and dibenzofurans
PM <sub>10</sub>	Fine particulate matter: particles with an aerodynamic diameter equal to or less than 10 micrometres (µm)

PM <sub>2.5</sub>	Fine particulate matter: particles with an aerodynamic diameter equal to or less than 2.5 micrometres (µm)
POPs	Persistent organic pollutants
PTC	Potential technical correction
RE	Revised estimate
SO <sub>2</sub>	Sulphur dioxide
SO <sub>x</sub>	Sulphur oxides
TC	Technical correction
TSP	Total suspended particulates

## LIST OF REFERENCES AND SUPPORTING DOCUMENTS

1. Annex I emission reporting template. Available at <https://www.ceip.at/reporting-instructions>
2. ECE/EB.AIR/111/Add.1: Decision 2012/3: Adjustments under the Gothenburg Protocol to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them  
[https://unece.org/DAM/env/documents/2013/air/ECE\\_EB.AIR\\_111\\_Add.1\\_ENG\\_DE\\_CISION\\_3.pdf](https://unece.org/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1_ENG_DE_CISION_3.pdf)
3. ECE/EB.AIR/113/Add.1: Decision 2012/12: Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them  
[https://unece.org/DAM/env/documents/2012/EB/Decision\\_2012\\_12.pdf](https://unece.org/DAM/env/documents/2012/EB/Decision_2012_12.pdf)
4. ECE/EB.AIR/125: 2014 Reporting Guidelines for Estimating and Reporting Emission Data under CLRTAP  
[https://unece.org/fileadmin/DAM/env/documents/2013/air/eb/ece.eb.air.125\\_E\\_ODS.pdf](https://unece.org/fileadmin/DAM/env/documents/2013/air/eb/ece.eb.air.125_E_ODS.pdf)
5. ECE/EB.AIR/127/Add.1: Decision 2014/1: Improving the guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them  
[https://unece.org/DAM/env/documents/2014/AIR/EB/Decision\\_2014\\_1.pdf](https://unece.org/DAM/env/documents/2014/AIR/EB/Decision_2014_1.pdf)
6. ECE/EB.AIR/130: Technical Guidance for Parties Making Adjustment Applications and for the Expert Review of Adjustment Applications, 14 April 2015  
[https://unece.org/DAM/env/documents/2014/AIR/EB/ECE\\_EB\\_AIR\\_130\\_ENG.pdf](https://unece.org/DAM/env/documents/2014/AIR/EB/ECE_EB_AIR_130_ENG.pdf)
7. [ECE/EB.AIR/142/Add.1: Decision 2018/1: Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention](https://www.ceip.at/fileadmin/inhalte/ceip/00_pdf_other/2019/decision_2018_1_advancement_version_ece_eb.air_142_add.1.pdf)  
[https://www.ceip.at/fileadmin/inhalte/ceip/00\\_pdf\\_other/2019/decision\\_2018\\_1\\_advancement\\_version\\_ece\\_eb.air\\_142\\_add.1.pdf](https://www.ceip.at/fileadmin/inhalte/ceip/00_pdf_other/2019/decision_2018_1_advancement_version_ece_eb.air_142_add.1.pdf)
8. EMEP/EEA: EMEP/EEA air pollutant emission inventory guidebook 2016, EEA Report No. 21/2016 European Environment Agency, Copenhagen. Available at: <http://www.eea.europa.eu/publications/emep-eea-guidebook-2016>
9. EMEP/EEA: EMEP/EEA air pollutant emission inventory guidebook 2019, EEA Report No. 13/2019 European Environment Agency, Copenhagen. Available at: <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019>
10. TFEIP (2022): "Inventory adjustments in the context of emission reduction commitments (ERC)" available at: [https://www.ceip.at/fileadmin/inhalte/ceip/00\\_pdf\\_other/2022/technical\\_guidance\\_for\\_erc\\_adjustments\\_issue1.1.pdf](https://www.ceip.at/fileadmin/inhalte/ceip/00_pdf_other/2022/technical_guidance_for_erc_adjustments_issue1.1.pdf)

## **STATEMENT FROM CZECHIA ON THE CONCLUSIONS PRESENTED BY THE EXPERT REVIEW TEAM**

The Czech Republic agrees with the conclusions found by the ERT during the Stage 3 ad-hoc review of emission inventories submitted under the UNECE LRTAP Convention. All recommendations arising from Table 1: Findings from the CLRTAP Stage 3 Review 2023 for the Sector Agriculture will be incorporated into the next IIR.

As part of the ARAMIS project, we work on a methodology for improving the localization of emissions from agriculture. We expect a significant improvement already in the reporting in 2025, including a detailed description of the determination of emissions in GRID.