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

**2023**

**BELARUS**

**FINAL REPORT**

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## 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 Belarus'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)

Mr. Lasha AKHALAIA (Georgia)

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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. 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 ALBREKTSEN (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 Belarus, 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 Belarus was received on 15 February 2023 and thus by the deadline of 15 February. Yet the emission inventory was equivalent to the one provided in 2022 and only for the year 2020. The Informative Inventory Report was not received at the time of the review and thus not by the deadline of 15 March.

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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 Belarus in providing an inventory including a significant level of detail.

Yet, the IIR submission 2023 was not available for review in 2023. The ERT could not assess the quality in terms of completeness, accuracy, comparability and consistency.

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

- Ensure that the national system is sufficient to implement the production and the submission in time of inventories and Informative Inventory Report and to ensure the response to the questions of the reviews.
- Ensure that the agriculture emission inventory is complete.
- Ensure that also emissions of the following pollutants are included (NO<sub>x</sub> and NMVOC).
- Provide gridded data.
- Provide transparent information on recalculations.
- Ensure that the time series are consistent.

## **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>
BY-2023-3B-1	NO <sub>x</sub>	3B	Yes	Yes	R	AC <sub>1</sub> C <sub>3</sub>
<p><b>Observation</b> The ERT noted with reference to the 2018 inventory review report for Belarus that the recommendation concerning estimation of NO<sub>x</sub> emissions from 3B Manure management has not been implemented in submission 2022 (nor 2023).</p> <p><b>Recommendation</b> The ERT recommends Belarus to estimate emissions of NO<sub>x</sub> for all 3B Manure Management categories in the next submission.</p>						
ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
BY-2023-3D-1	NO <sub>x</sub>	3Da1	Yes	Indeterminate	R	AC <sub>1</sub> C <sub>3</sub>
<p><b>Observation</b> The ERT noted with reference to the 2018 inventory review report for Belarus that the recommendation concerning the inclusion of NO<sub>x</sub> emissions from N fertilizers applied to land has not been implemented in submission 2022 (nor 2023).</p> <p><b>Recommendation</b> The ERT recommends Belarus to estimate emissions of NO<sub>x</sub> from N fertilizers applied to land (3Da1) in the next submission.</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

ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
BY-2023-3D-2	HCB	3.D.f	Yes	Indeterminate	R	AC <sub>1</sub> C <sub>3</sub>

**Observation**

The ERT noted with reference to the 2018 inventory review report for Belarus that the recommendation concerning the inclusion of HCB emissions from the use of pesticides in the inventory has not been implemented in submission 2022 (nor 2023).

**Recommendation**

The ERT recommends Belarus to include HCB emissions from the use of pesticides in the inventory in its next submission.

ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
BY-2023-3D-3	NH <sub>3</sub> & NO <sub>x</sub>	3.D.2.a.2	No	Indeterminate	R	AC <sub>1</sub>

**Observation**

The ERT noted with reference to the 2018 inventory review report for Belarus that the recommendation to find out if sewage sludge is applied to land and if so to calculate emissions arising from the practice, has not been implemented in submission 2022 (nor 2023). In NFR Tables submission 2022, Belarus still reports not occurring “NO” for emissions of NH<sub>3</sub> and NO<sub>x</sub> from this source.

**Recommendation**

The ERT recommends Belarus to estimate emission of NH<sub>3</sub> and NO<sub>x</sub> from sewage sludge applied to soils (3D2a2) 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 NH<sub>3</sub>, NMVOC, NO<sub>x</sub> and PM<sub>2.5</sub> emissions.
12. Table 2 provides the findings from the ERT related to the gridded data.



**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>
BY-2023-GRID-GL-1	All	GNFR-L	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
<p><b>Observation</b> No gridded emission data were reported by Belarus.</p> <p><b>Recommendation</b> The expert review team recommends Belarus to report gridded emission 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**

13. 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.

14. The ERT did not calculate any Technical Corrections and Belarus 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. Belarus Annex I reporting template
2. Belarus Stage 2 S&A report
3. Belarus Stage 1 report 2023
4. Belarus IIR 2022
5. Repdab-Report
6. Extended checks

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

1. No response were received to the questions raised by ERT during the review.

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

The ERT did not calculate any Technical Corrections and Belarus 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_advance_version_ece_eb.air_142_add.1.pdf)  
[https://www.ceip.at/fileadmin/inhalte/ceip/00\\_pdf\\_other/2019/decision\\_2018\\_1\\_advance\\_version\\_ece\\_eb.air\\_142\\_add.1.pdf](https://www.ceip.at/fileadmin/inhalte/ceip/00_pdf_other/2019/decision_2018_1_advance_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)