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

2023

Lithuania

FINAL REPORT

CONTENT

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'([1]) – 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_x emissions including gridded data. While the focus was set on NH_3, NMVOC and NO_x emissions, also all other pollutants covered by LRTAP Convention and its protocols (i.e. SO_2, NOx, NMVOC, NH_3, plus PM_{10} $PM_{2.5}$, BC, priority HMs and POP_S) 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 Lithuania'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)

[1] 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

Ms. Aleksandra NESTOROVSKA-KRSTESKA (North Macedonia)

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 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 Lithuania, 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[2] was used as a base for the review.

8. The emission inventory of Lithuania 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. Lithuania provided a resubmission of the emission inventory, on 8 April 2023. The resubmission has been considered for the review.]

[2] 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 Lithuania in providing an inventory including a significant level of detail.

The IIR does not describe the methods used for the sector agriculture transparently enough. The ERT considers the agriculture part of the inventory submission to be of good quality in terms of completeness and of adequate quality in terms of accuracy, comparability and consistency.

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

- provide a more detailed description of applied methodologies, data sources, choice of emission factors and activity data for all categories in the IIR.
- provide detailed description of abatement techniques and measures
- apply a Tier 2 or higher method to all key categories.
- ensure that the agriculture emission inventory is complete
- conduct a key category analysis for all pollutants
- perform and present an uncertainty analysis and use it as a tool to focus on planned improvements to the key categories.
- provide a chapter describing the methods used to generate the gridded data in the next submission of the IIR
- provide transparent information on recalculations.
- ensure that the time series are consistent
- increase the capacities of the air pollution inventory team in order to manage transparent, complete, comparable, consistent and accurate inventory within deadlines set up in the UNECE reporting Guidelines.
- provide detailed information on its QA/QC plan for its air emission inventory in future submissions.

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_3, NMVOC and NO_x emissions, also all other pollutants covered by the LRTAP Convention and its protocols (i.e. SO_2, NO_x, NMVOC, NH_3, plus PM_{10} $PM_{2.5}$, BC, priority HMs and POP_S) 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[3]

ID	Pollutants	NFR category	Key Category	Tier level	Type	$TAC_1C_2C_3$
LT-2023-3-1	NH_3, NO_x, $PM_{2.5}$ PM_{10}, NMVOC	3B, 3D	Yes		R	AC_3
Observation The ERT noticed that the IIR does not describe the major recalculations of 3B, 3Da2, 3Da3 and 3Dc for the whole time series. Renewal of 2005, 2019-2020 emission values from 3B, 3Da2a and 3Da3 are mentioned in the IIR with regard to 2022 submission in a nutshell as a result of production of the latest GHG data. During the review Lithuania explained that national estimates of N content in straw was applied for the recalculation of time series 1990-2021 but this argument is relevant only for categories related to animal husbandry and emissions of NH_3 and NO_2 from these categories. **Recommendation** **The ERT recommends that Lithuania include a detailed explanation of the methods used and the reasons for recalculations in the next submission and to allocate specific chapter on the same issues in the IIR.**						
ID	Pollutants	NFR category	Key Category	Tier level	Type	$TAC_1C_2C_3$
LT-2023-3-2	NMVOC	3B, 3D	Yes	Tier 1	R	AC_3
Observation The ERT noticed that several livestock categories of agriculture (3B1a, 3B1b, 3B4h, 3De) are key categories for NMVOC emissions but do						

[3] 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_1 (Completeness), C_2 (Comparability), C_3 (Consistency) for definitions of these criteria see EMEP/EEA Guidebook 2019

not follow a Tier 2 approach yet. The ERT notes that using a Tier 1 method is not best practice, and could result in an over and/or underestimate of emissions. During the review Lithuania explained that using tier 1 approaches is caused by limited human resources.

Recommendation

The ERT recommends Lithuania for all subcategories for which relevant activity data and parameters are available to change the reporting to a Tier 2 approach. For all other subcategories the ERT recommends to explore possibilities to obtain this data.

ID	Pollutants	NFR category	Key Category	Tier level	Type	$TAC_1C_2C_3$
LT-2023-3D-1	PM	3Dc	Yes		R	AC_1C_3

Observation

The ERT noted that PM emissions from 3Dc are estimated only from 2005. During the review Lithuania responded that relevant activity data (sown area of agricultural crops, harvested area of agricultural crops) are available and the emissions before 2005 will be calculated in the next submissions.

Recommendation

The ERT recommends Lithuania to estimate PM emissions for whole time series in the next submission

ID	Pollutants	NFR category	Key Category	Tier level	Type	$TAC_1C_2C_3$
LT-2023-3D-2		3Db	No		R	C_3

Observation

The ERT noted that activity data for 3Db is equal to 0 in NFR. The numeric value of “0” should not be used in the NFR reporting tables, neither should cells be left empty. During the review Lithuania expressed readiness to use appropriate notation key for the whole time series in the next submission.

Recommendation

The ERT recommends Lithuania to use a notation key "NA" as an activity data for 3Db for whole time series in the next submission.

ID	Pollutants	NFR category	Key Category	Tier level	Type	$TAC_1C_2C_3$
LT-2023-3F-1		3F			R	AC_3

Observation

The ERT noticed in the IIR that field burning of agricultural residues does not occur in Lithuania, however, the IIR does not include a reference to the national/international legislation banning this practice. During the review Lithuania explained that field burning of agricultural residues is prohibited by the Order of the Minister of Environment No 269 concerning the environmental protection requirements for burning of dry grass, reeds, straw and garden waste which is in force since 1999.

Recommendation

The ERT recommends Lithuania to include the relevant justification for reporting the notation key "NO" in 3F in the next submission

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

For the 2023 Review of the gridded emission data the focus was set on ammonia, NMVOC, NO_x and $PM_{2.5}$ emissions.

11. The methods used by Lithuania to spatially resolve sectoral emissions are not described transparently enough in the IIR.

12. The description does not include data sources that have been used for spatial distribution.

13. Gridded emissions reported for GNFR K_AgriLivestock and L_AgriOther are consistent with the corresponding NFR categories reported in Annex I.

14. Table 2 provides the findings from the ERT related to the gridded data.

15. 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[4]

ID	Pollutants	GNFR category	$TAC_1C_2C_3$
LT-2023-GRID-GL-1	All supplied	GNFR-K&L	T

Observation

The expert review team notes that there is a lack of transparency regarding the methods used to generate the gridded data.

Recommendation

The expert review team recommends Lithuania to provide a chapter describing the methods used to generate the gridded data in the next submission of gridded data

[4] The findings have been assigned to one or more of the following criteria: TACCC T (Transparency), A (Accuracy), C_1 (Completeness), C_2 (Comparability), C_3 (Consistency) for definitions of these criteria see EMEP/EEA Guidebook 2019

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

16. In the Appendix of the 'EMEP/UNECE Review Guidelines 2018[5]' 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 under-estimate 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.

17. The ERT did not calculate any Technical Corrections and Lithuania did not provide any Revised Estimates.

[5] 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. Lithuania Annex I reporting template
2. Lithuania Stage 2 S&A report
3. Lithuania Stage 1 report 2023
4. Lithuania 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
    - No additional information was provided by the Party either before or during the review.

ANNEX I TECHNICAL CORRECTIONS AND REVISED ESTIMATES

18. The ERT did not calculate any Technical Corrections and Lithuania 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_3	Ammonia
NMVOC	Non-methane volatile organic compounds
NO	Not Occuring
NO_x	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_{10}	Fine particulate matter: particles with an aerodynamic diameter equal to or less than 10 micrometres (μm)

$PM_{2.5}$	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_2	Sulphur dioxide
SO_x	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_DECISION_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

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

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

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

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

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