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

STAGE 3 REVIEW REPORT

LITHUANIA

CONTENT

INTRODUCTION

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'.

1. 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.

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

3. Particulate matter can exist as solid or liquid matter (the "filterable" portion) or as gases (the "condensable" portion). Condensable particulate matter is vapour phase at stack conditions, but condenses and/or reacts upon cooling and dilution upon discharge into ambient air to form solid or liquid PM. All condensable PM is assumed to be in the $PM_{2.5}$ size fraction[2]. The inclusion of the condensable component of $PM_{2.5}$ emissions can have a big impact on the emission estimate for certain sources[3].

4. This ad-hoc review has assessed $PM_{2.5}$ emission estimates with a special focus on the topic of '*condensables*' for the years 2000 to 2020.

5. This report covers the results of the stage 3 centralised review (ad hoc review) 2022 of the UNECE LRTAP Convention of Lithuania coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place between April and June 2022 and was performed as desk review with an in person meeting between 30 of May 2022 and 3 June 2022. The following team of nominated experts from the roster of experts performed the review.

Ad hoc review - condensables

1A3b Road Transport: Gudrun Stranner, Katrina Young, Magdalena Zimakowska-Laskowska, Martina Toceva and Rebecca Rose

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[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
https://unece.org/fileadmin/DAM/env/documents/2018/Air/EB/ECE_EB.AIR_142_Add.1-1902937E.pdf

[2] Condensable Particulate Matter Definition | Law Insider
[3] For more technical details please refer to the EMEP/EEA Guidebook (https://www.eea.europa.eu/publications/emep-eea-guidebook-2019) or the report 'How should condensables be included in PM emission inventories reported to EMEP/CLRTAP?' https://emep.int/publ/reports/2020/emep_mscw_technical_report_4_2020.pdf

1A4bi Residential: stationary: Aleksandra Nestorovska-Krsteska, André Amaro, Benjamin Cuniasse, Canan Esin Köksal, Damian Zasina, Laureta Dibra, Marion Pinterits, Sam Gorji and Wolfgang Schieder

6.   Kristina Saarinen and Jeroen Kuenen were the lead reviewers. The review was coordinated by Sabine Schindlbacher (EMEP Centre on Emission Inventories and Projections - CEIP).

7.   The review was performed on the basis of CLRTAP emission data officially reported by Lithuania, due by 15 February 2022 for emission inventories. The Informative Inventory Reports (IIR), reported due 15 March 2022 under the CLRTAP, informed the review.

8.   The emission inventory of Lithuania was received on 15 February 2022 and thus by the deadline of 15 February. The Informative Inventory Report was received on 16 March 2022 and thus after the deadline of 15 March.

RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

1.A.4.b.i Residential: stationary

9.   Lithuania uses a Tier 2 methodology for calculating $PM_{2.5}$ emissions from '1A4bi – Residential: stationary'.

10.   The activity data is taken from the Energy Balance. For the split of wood fuel by appliance type, data from the IIASA GAINS model and the „TSAP 16 Underlying assumptions - GAINS details" database were used. The ERT notes that the activity data is described transparently in the IIR and Annex II to the Informative Inventory Report.

11.   The activity data for Lithuania does not include collected wood, i.e. wood directly harvested from the forest outside formal market activity. The ERT recommends the Party to include collection of information on national circumstances and the establishment of data collection for the missing emissions into the inventory improvement plan, and to report on the status of the implementation in the next IIR submission.

12.   The total fuel consumption for each fuel type has been stratified into different appliance types, such as boilers and stoves, in a consistent and complete manner. For the split of fuel by combustion device type, data from the IIASA GAINS model and the „TSAP 16 Underlying assumptions - GAINS details" database were used. The basis for this split over appliance types is documented in the IIR and Annex II of the report.

13.   Lithuania use the EMEP/EEA Guidebook 2019 for the compilation of its emissions from this category.

14.   The emission factors do not include the condensable component of $PM_{2.5}$ emissions (Table 1). During the review the Party clarified that Lithuania has chosen not to include the condensable component of particulate matter for NECD compliance checking.

Table 1: Inclusion of condensables per fuel type

Fuel Type		Includes the condensable component of $PM_{2.5}$ emissions
Wood & agriwaste	Fireplaces - conventional (NOC)	No
Wood & agriwaste	Fireplaces -improved	No
Wood & agriwaste	Fireplaces - new	No
Wood & agriwaste	Stoves - conventional (NOC)	No
Wood & agriwaste	Stoves - improved	No
Wood & agriwaste	Stoves - "new"	No
Wood & agriwaste	SHM Boilers - conventional (NOC)	No
Wood & agriwaste	SHM Boilers - Improved	No
Wood & agriwaste	SHM Boilers - New	No
Wood & agriwaste	SHM Boilers - Pellet	No
Wood & agriwaste	SHA Boilers - Pellet	No
Hard Coal	SHM Boilers - conventional (NOC)	No
Hard Coal	SHM Boilers - New	No
Peat	SHM Boilers - conventional (NOC)	No
Peat	SHM Boilers - New	No
Natural gas	Cooking Stoves	No
Natural gas	SH Boilers	No
Wood & agriwaste	Fireplaces - conventional (NOC)	No
Wood & agriwaste	Fireplaces -improved	No
Wood & agriwaste	Fireplaces - new	No

15.   The ERT notes that the time series is consistent.

16.   During the review the Party clarified that $PM_{2.5}$ emissions from small combustion are spatially distributed using the population density maps. The ERT recommend Lithuania to include this information in the IIR to improve transparency.

17.   The ERT notes that no information of planned improvements for future submissions is provided in Lithuania's 2022 IIR. The ERT recommends the Party to include information on possible planned improvements to the next IIR submission.

1.A.3.b.i-iv Road transport - exhaust emissions

18.   Lithuania's transport sector emissions are calculated using country specific emission factors taken from COPERT version 5. All emission factors in COPERT are based on the Tier 3 methodology in the 2019 EMEP/EEA Guidebook. The IIR provides details of the main features of the model and describes the calculation of transport emissions transparently

19.   Activity data is taken from the national energy balance for the total fuel sales and fuel types. Traffic intensity is from information given by the national Institute of Transport, fleet data including weight and emission reduction technology from the national Registry of Transport[4], specific mileage from the Lithuanian Road Administration and a study[5].

20.   The inventory includes the condensable component of $PM_{2.5}$ emissions.

21.   The ERT notes that the method is documented transparently in the IIR, however, as no information about the inclusion of condensables is provided, the ERT recommends Lithuania to include precise information about the inclusion of condensables in the road transport chapter of the next IIR.

22.   The time series is consistent.

23.   Lithuania lists no planned improvements for future submissions in their 2022 IIR.

24.   The ERT encourages Lithuania to implement the following:

•   It is good practice to follow the recommended structure of the IIR detailed in Annex II of the 2014 Guidelines for Estimating and Reporting Emission Data, which includes an appendix with a table summarising the use of PM emission factors that include/exclude the condensable component, where available.

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[4] State-owned company called "Registra",
[5] Study funded by the European Commission – DG Environment in collaboration with KTI, Renault, E3M-Lab/NTUA, Oekopol and EnviCont.

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

25.   In the Appendix of the 'EMEP/UNECE Review Guidelines 2018[6]' it is stated that if the ERT considers that when emissions are significantly under- or overestimated, then during the review, the Party is 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 the Revised Estimates, then the ERT may calculate a "Technical Correction" in the absence of an updated emission estimate being provided by the Party itself. The threshold for significance for a technical correction for the in-depth review in 2022 was set at 2% of the national total, i.e. findings identified which result in an over- or under-estimate of emissions of more than 2% of the national total can result in a Technical Correction. The methods for calculating the Technical Corrections are set up in the "Review Guidelines 2018" and use the EMEP/EEA Emission "Inventory Guidebook" as a reference for methods and emission factors.

26.   Lithuania did not submit any revised estimates and the ERT did not calculate any technical corrections.

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[6] https://www.ceip.at/fileadmin/inhalte/ceip/3_review/advance_version_ece_eb.air_142_add.1.pdf

LIST OF MATERIAL PROVIDED TO ERT

1. Lithuania's   Stage 2 S&A report
2. Lithuania's   Stage 1 report 2022
3. Lithuania's IIR 2022
4. NFR tables submitted in 2022 by Lithuania

LIST OF ADDITIONAL MATERIAL PROVIDED BY THE COUNTRY DURING THE REVIEW

5. Responses to preliminary question raised prior to the review
6. Responses to questions raised during the review