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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

ROMANIA

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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 fraction². The inclusion of the condensable component of PM_{2.5} emissions can have a big impact on the emission estimate for certain sources³.

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 Romania 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

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 Romania, 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 Romania was received on 15 February 2022 and thus by the deadline of 15 February, with a resubmission on 15 March 2022. The Informative Inventory Report was received on 12 March 2022 and thus by the deadline of 15 March.

RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

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

9. Romania did not respond the questions by the ERT during the review. Therefore the review results presented below are based on information available in the IIR submitted in 2022 by Romania.

10. Romania uses a Tier 2 methodology for calculating PM_{2.5} emissions for the majority of activities within '1A4bi – Residential: stationary', i.e. emissions from wood and wood waste, contributing to 95% of PM_{2.5} emissions from this category. Emission from combustion of liquid, solid and gaseous fuels are calculated based on a Tier 1 method. As category 1A4bi is a key category of PM_{2.5} emissions for Romania, the ERT recommends Romania to also develop a Tier 2 method for calculating emissions from other fuels than biomass from this category, in line with Reporting Guidelines' paragraph ²¹⁴

The activity data for fuel consumption comes from the EUROSTAT and N.I.S in the forms of the EUROSTAT ENERGY questionnaires. The ERT recommends Romania to include information regarding the mix of fuels used in the calculation of emissions as well as information on how the biomass consumption is disaggregated by type of fuel in the IIR.

11. The ERT could not conclude whether Romania includes collected wood, i.e. wood directly harvested from the forest outside formal market, in the activity data, because this information is not included in the IIR. The ERT therefore recommends that Romania document in the IIR whether or not collected wood is included in the biomass consumption. In case it is not included, the ERT recommends Romania to develop methods, e.g. surveys or studies, to complete the inventory with estimating emissions from this possibly missing part of biomass.

12. The total fuel consumption for each fuel type is stratified into different appliance types, such as boilers and stoves, in a consistent and complete manner. This is, however, not sufficiently documented in the IIR. The ERT recommends Romania to document the mix of appliances considered in the estimates, distribution of biomass consumption by appliance as well as changes in appliance fleet through the time series, and in addition to document, how this mix of appliances was defined.

13. Romania uses the EMEP/EEA Guidebook 2019 for the compilation of emissions from this category.

14. The emission factors partially include the condensable component of PM_{2.5} emissions (Table 1).

Table 1: Inclusion of condensables per fuel type

Fuel Type	Includes the condensable component of PM _{2.5} emissions
Biomass	Yes
Coal	Unclear (Guidebook 2019 – Tier 1)
Liquid	Unclear (Guidebook 2019 – Tier 1)
Gaseous	Unclear (Guidebook 2019 – Tier 1)

⁴ Reporting Guidelines paragraph 21: "For sources that are determined to be key categories in accordance with the EMEP/EEA Guidebook methodologies, Parties should make every effort to use a Tier 2 or higher (detailed) methodology, including country-specific information."

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

16. ERT did not find information in the IIR regarding proxy data used to spatially distribute PM_{2.5} emissions from small combustion, and therefore recommends the Party to include documentation of the used proxy data in the next IIR submission.

17. Improvements for future submissions are not documented in Romania's 2022 submission of the IIR.

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

18. Romania's transport sector emissions are calculated using country specific emission factors taken from COPERT version 5.5.1. 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. The IIR describes the calculation of transport emissions transparently.

The activity data is taken from the total fuel sales from the national energy balance by the National Institute for Statistics, fleet data from the Romanian Automobile Registry and max. and min. temperatures and relative humidity (needed for COPERT) by the National Institute of Meteorology. Default fuel specifications included in COPERT, such as sulphur and heavy metal contents have been taken into account for the emission estimates. All data sources are documented transparently in the IIR.

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

20. The ERT notes that the method to calculate emissions is documented transparently in the IIR. The inclusion of the condensable component of PM_{2.5} is documented transparently on p.11 in the general part of the IIR and also in the transport chapter on p.139, however, only as a reference to the 2019 EMEP/EEA Guidebook, Table 3.1. The ERT encourages Romania to add the information that COPERT emission factors include the condensable component of PM_{2.5} emissions in its next submission instead of just referring to the 2019 EMEP/EEA Guidebook.

21. The ERT acknowledges that the Party use a linear regression between the maximum emission factors (Tier 1) from 2019 EMEP/EEA Guidebook for year 1990 and the emission factors from COPERT 5 (Tier 3) for 2005 due to a lack of data for the period 1990-2004. Following, it can be assumed that the condensable component of PM_{2.5} emissions is also included in that time period due to the fact of using COPERT emission factors in the background data. The ERT encourages Romania to specify this information in the transport chapter of the next IIR submission.

22. The time series is consistent.

Romania lists no planned improvements for future submissions in the transport sector in their 2022 IIR.

LIST OF MATERIAL PROVIDED TO ERT

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

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