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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

## BULGARIA

# 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 on Effects 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 Bulgaria 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.

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, Jeroen Kuenen and Ben Richmond 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 Bulgaria, 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 Bulgaria was received on on 15 February 2022 and thus by the deadline of 15 February. The Informative Inventory Report was received on 15 March 2022 and thus by the deadline of 15 March. Bulgaria provided a resubmission of the inventory on 15 March 2022.

# RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

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

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

10. The activity data is collected by the National Statistical Institute. The Eurostat Energy Balance is incorporated in the inventory of sub-sector 1A4bi - Residential: stationary. The quantities of utilized fuels are used with corresponding net calorific values. The ERT notes that the description of activity data in the Informative Inventory Report is not sufficiently transparent. The ERT recommends Bulgaria to develop a plan to improve the currently used split between appliances for each fuel and to document the descriptions of the methodology including the required activity data in the next IIR submission.

11. Regarding collected wood, i.e. wood directly harvested form the forest outside formal market activity, Bulgaria explained that wood must be marked before harvesting. However, the ERT is unsure if this means all wood that is used is indeed marked. The ERT recommends Bulgaria to clarify this issue and provide additional explanation in the next IIR submission.

12. Bulgaria has stratified the total fuel consumption for each fuel type into different boilers and stoves only, based on expert judgement. There is no further explanation. This is however not sufficiently documented in the IIR, therefore the ERT recommends Bulgaria to provide descriptions in the next submission.

13. Bulgaria uses the EMEP/EEA Guidebook 2019 for the compilation of its emissions from this category, and the Tier 2 methodology therein. The emission factors in this methodology partially include the condensable component of PM2.5 emissions (Table 1). The ERT recommends the Party to further investigate for each PM emission factor whether or not condensables are included.

**Table 1: Inclusion of condensables per fuel type**

| Fuel Type | Includes the condensable component of $PM_{2.5}$ emissions |
|---|---|
| Biomass | Yes |
| Coal | Unknown (EMEP/EEA Guidebook 2019) |
| Liquid | Unknown (EMEP/EEA Guidebook 2019) |
| Gaseous | Unknown (EMEP/EEA Guidebook 2019) |

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

15. The $PM_{2.5}$ emissions from small combustion are spatially distributed using proxy data (as population density and CORINE land use classes).

16. Bulgaria does not have any planned improvements listed in the IIR for the residential combustion sector. The ERT recommends Bulgaria to take note of the recommendations from this review and to include them in the list of planned improvements.

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

17. Bulgaria PM transport sector emissions are calculated using COPERT 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.

18. The activity data is taken from official statistics and literature, gapfilled by expert judgement. Vehicle stock from 2005 to 2020 is received from the National Institute and Ministry of Internal Affairs, with expert judgement used to estimate the full time series back to 1988. Mileage was obtained from the National statistics institute or average EU15 mileage data from literature and balanced to national energy statistics. In the absence of country specific data, the driving share between urban, rural and motorway roads was taken from road statistics for Slovakia. Traffic speed was taken from a review of literature sources. For other parameters, default values provided by COPERT were used.

19. The $PM_{2.5}$ emissions from road transport exhaust include the condensable component of $PM_{2.5}$ emissions.

20. The ERT notes that the method is documented transparently in the IIR.

21. The time series is consistent.

22. Bulgaria does not list any planned improvements for PM emissions from sectors 1A3bi-iv for future submissions in their 2022 IIR.

23. The ERT recommends implementing the following improvement:

- In response to a question raised during the review process Bulgaria explained that there was an error in the IIR statement that Bulgaria do not have information on the condensable component of $PM_{2.5}$ in road transport emission factors. The ERT recommends that Bulgaria update its IIR in the next submission to state that emission factors do include the condensable component of $PM_{2.5}$.

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

24. In the Appendix of the 'EMEP/UNECE Review Guidelines 2018[4]' 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.

25. Bulgaria did not provide any revised estimates and the ERT did not calculate technical corrections for Bulgaria.

[4] 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. Bulgaria IIR 2022
2. BG_NFR_1990_2020_15.03.2022.xlsx

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

3. Responses to questions raised by the ERT during this review