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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**

**MALTA**

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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*'<sup>(1)</sup> – 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<sub>2.5</sub> 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<sub>2.5</sub> size fraction<sup>2</sup>. The inclusion of the condensable component of PM<sub>2.5</sub> emissions can have a big impact on the emission estimate for certain sources<sup>3</sup>.

4. This ad-hoc review has assessed PM<sub>2.5</sub> 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 Malta 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](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](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 Malta, 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 Malta was received on 14 February 2022 and thus by the deadline of 15 February, with a resubmission on 29 March 2022. The Informative Inventory Report was received on 29 March 2022 and thus after the deadline of 15 March.

## RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

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

9. Malta use a Tier 1 methodology for calculating PM<sub>2.5</sub> emissions from '1A4bi – Residential: stationary'. As category 1A4bi is a key category for PM<sub>2.5</sub> emissions for Malta (10.1% of national total emissions), the ERT recommends Malta to use at least a Tier 2 method for calculating these emissions in line with Reporting Guidelines' paragraph 21<sup>4</sup>.

10. In the NFR table (Annex I) submitted in 2022, Malta report "NA" (Not applicable) for biomass consumption for category 1A4bi. In Chapter 4.5.5 "Source-specific recalculations" of the IIR submitted in 2022, there are several references to biomass consumption in this category. After consulting the data available in the Eurostat statistics, the ERT concludes that there are strong indications that the consumption of biomass has been incorrectly reported under the column "Solid fuels" of the NFR table. The ERT recommends that Malta check the information provided in the NFR table and the IIR and correct errors in the next submission.

11. Malta has not stratified the total fuel consumption for each fuel type into different appliance types. The ERT recommends the Party to carry out studies to obtain country-specific information, especially on the type, structure and age of combustion appliances, to enable adoption of a Tier 2 method for this key source<sup>5</sup>. The ERT recommends Malta to include the new Tier 2 estimates with the related documentation of the calculation and data collection in the next submission. In case this cannot be carried out in time for the next submission, the ERT recommends Malta to put this task as a high priority item in the inventory improvement plan and to report on the progress of the improvement in the next submission.

12. In response to a question from the ERT on the method used to calculate PM<sub>2.5</sub> emissions, Malta responded that Tier 1 emission factors provided in the EMEP/EEA Guidebook 2019 are used.

13. The condensable component of PM is included in biomass EFs (Guidebook 2019) but is unclear for other fuels. In addition there is a potential error in reporting fuels (see paragraph 10 above).

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

Fuel Type	Includes the condensable component of PM <sub>2.5</sub> emissions
Biomass	Yes
Coal	Unclear (Guidebook 2019 – Tier 1)
Liquid	Unclear (Guidebook 2019 – Tier 1)
Gaseous	Unclear (Guidebook 2019 – Tier 1)

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

15. According to the information derived from the Malta's IIR report, the gridded emissions will be reported in the 2025 submission (reference year 2023). The ERT recommends Malta

<sup>4</sup> 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."

<sup>5</sup> The Tier 2 methodology suggested in the 2019 Guidebook Tables 3.36, 3.37 and 3.38 do not have specific "Appliance type split" data for Malta.

to submit the gridded emissions in line with Reporting Guidelines paragraph 28 as soon as possible.

16. Malta lists the following planned improvements for future submissions (given in the IIR):

- Identify missing data sources and methods of improvements, by reviewing the activity data required for missing sources and Tier 1 estimations (where possible),
- Strive to move to higher Tiers to have more country-specific emission estimates.

The ERT commends Malta for their improvement plans and recommends implementing them as soon as possible.

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

17. Malta's transport sector emissions are calculated using country specific emission factors taken from COPERT version 5.5. 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. The IIR describes the calculation of transport emissions transparently.

18. The activity data are taken from various statistics: total fuel sales by Eurostat, fuel specifications (sulphur and lead content) and fuel blends by the Regulator of Energy and Water Services (REWS), vehicle stock and mileage by a model developed by the Energy and Water Agency (EWA).

19. The inventory includes the condensable component of PM<sub>2.5</sub> emissions.

20. The ERT notes that the method is documented transparently in the IIR. However, no information about condensables is provided in the IIR. Therefore, the ERT recommends Malta to add information in the road transport chapter of its next IIR on whether the condensable component of particulate matter is included in the emissions, and to prepare an annex of the IIR with an overview of the inclusion of condensables. The ERT also recommends Malta to add the source of emission factors per NFR category in the road transport chapter.

21. The time series is consistent.

22. Malta list the following planned improvement for future submissions in their 2022 IIR:

- Improve the vehicle stock data for the entire time series, particularly the stock for 1990 to 2009 and have a harmonized methodology for all years, especially the LPG consumption in the road transport sector needs to be associated to vehicle stock data.
- Engage QC reviewers in the preparation process of the road transport inventory in future.

The ERT commends Malta for their improvement plans and recommends implementing them as soon as possible.

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

23. In the Appendix of the ‘EMEP/UNECE Review Guidelines 2018<sup>6</sup>’ 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.

24. Malta provided no revised estimates and the ERT did not calculate any technical corrections.

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<sup>6</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 MATERIAL PROVIDED TO ERT**

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

## **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
7. CLRTAP Review – 1A4bi.xls