

**UNITED
NATIONS**

Distr.
GENERAL

CEIP/S3.RR/2022/
28/09/2022

ENGLISH ONLY

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

STAGE 3 REVIEW REPORT

BELGIUM

CONTENT

INTRODUCTION.....	3
RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY.....	5
REVISED ESTIMATES AND TECHNICAL CORRECTIONS CONSIDERED AND/OR CALCULATED BY ERT	7
LIST OF MATERIALS PROVIDED TO ERT	8
LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW	8

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 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 Belgium 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

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

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

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 Belgium, 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 Belgium was received 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. A resubmission of the emission inventory was received on 15 March 2022.

RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

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

9. Belgium uses a Tier 2 methodology for calculating PM_{2.5} emissions from '1A4bi – Residential: stationary' for all three regions (Flanders, Walloon and Brussels Capital regions). The ERT notes that source of each emission factor used could be described more transparently in the Informative Inventory Report for Flanders and for Wallonia. Specifically, the ERT recommends the Party to:

- complete the Annex3B for Flanders by adding exact references (e.g. including table numbers) to the EMEP/EEA 2019 Guidebook for each emission factor that is taken from this source;
- extend the use of this Annex3B with the appropriate appliance types and fuel types to Brussels region and Wallonia in order to improve overall transparency.

10. The activity data is based on the energy balances from Flanders and Walloon region, and the regional energy balance for Brussels Capital region.

11. The ERT notes that the activity data could be described more transparently in the Informative Inventory Report. In response to questions asked during the review, the Party outlined their difficulties to provide detailed activity data for each region. The ERT recommends that for the next submission the Party, adjust the models and tools used to allow the output of detailed activity data and provide the amount of each fuel consumed for the entire time series, and especially the distinction between biomass fuel types considered, for each of the three regions.

12. In response to a question raised during the review, the Party stated that the activity data for Flanders and Wallonia regions do include collected wood (i.e. wood directly harvested from the forest outside formal market activity) but it is unsure whether it is included for Brussels Capital region. In order to improve transparency, the ERT recommends that the Party :

- Conduct further investigation and update the wood consumption if necessary to ensure collected wood is taken into account for the Brussels capital region;
- adds in its IIR whether collected wood is taken into account or not for the next submission for each region

13. Belgium has stratified the total fuel consumption for each fuel type into different appliance types e.g. boilers, stoves, in a consistent and complete manner. The details of these split over appliance types is however not sufficiently documented in the IIR and is different for each region. In order to improve transparency, the ERT recommends that the Party adds in its IIR for the next submission for the entire time series and for each region, the amount of biomass consumed by each appliance type and for each fuel type considered.

14. Belgium uses the EMEP/EEA Guidebook 2019 for each of the three regions for the compilation of its emissions from this category. The ERT noted that it was not stated clearly in the 2022 IIR since, for Flanders or Wallonia, other sources are quoted. In order to improve transparency, the ERT recommends that the Party clarify the source of each emission factor used in its IIR for the next submission.

15. The emission factors partially include the condensable component of PM_{2.5} emissions (Table 1). The ERT recommends the Party to further investigate for each PM emission factor

whether or not condensables are included, especially for those emission factors which are not directly taken from the EMEP/EEA Guidebook.

Table 1: Inclusion of condensables per fuel type

Fuel Type	Includes the condensable component of PM_{2.5} emissions
Biomass	Yes
Coal	Partially (unknown or filterables only depending the appliance type)
Liquid	Partially (unknown or filterables only depending the appliance type)
Gaseous	Partially (unknown or filterables only depending the appliance type)

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

17. According to the 2022 IIR, the PM_{2.5} emissions from small combustion are spatially distributed using different proxy data for each region :

- For Flanders, the spatial distribution is based on energy consumption per municipality disaggregated according to the residential floor area map.
- For Brussels, the spatial distribution is based on population data.
- For Wallonia, the spatial distribution is based on energy balance of each municipality distributed on residential building area.

18. Belgium does not list any planned improvements for future submissions for the residential stationary sector in their 2022 IIR but in response to a question raised during the review; the Party listed the following planned improvements :

- Take into account a new inquiry on wood combustion for the Walloon region.
- Extend the modelling of average emission factors taking into account the information from the EPB (Energy Performance of Buildings) certificates for the rest of the residential sector for the Brussels capital region.
- Improve the composition of the stove park for the Flanders region.

The ERT commends Belgium for their improvement plans and recommends including these in the improvement plans for the next submission of the IIR, and implementing them as soon as possible.

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

19. Belgium PM transport sector emissions are calculated using 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.

20. The activity data is taken from official statistics from the Directorate Registration Vehicles for all regions of Belgium; part of Federal Public Service. The ERT recommends including a summary of vehicle fleet data in future IIR submissions.

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

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

23. The time series is consistent.

24. Belgium lists no specific planned improvements in their 2022 IIR for PM emissions from sectors 1A3bi-iv.

25. The ERT recommends implementing the following:

- In response to a question raised during the review, Belgium clarified that "other fuels" reported for 1A3bi and 1A3biii are electricity (TJ) consumed by plug-in hybrid vehicles (PHEV) diesel and gasoline personal cars and diesel hybrid buses. Battery electric vehicles (BEV) cars are not considered. These results come from "COPERT energy breakdown" and are exported directly in NFR template. The ERT recommends that Belgium include this information in the next IIR submission to improve transparency.

- In response to a question raised during the review, Belgium clarified that the gaseous fuel consumption for 1A3bii reported as "IE" is included in diesel fuel consumption for 1A3bii, because a "LDV CNG" category is not available in COPERT 5.5.1. While the ERT recognizes this shortcoming in this version of COPERT, the ERT recommends that Belgium estimate LDV CNG emissions using emission factors for passenger car CNG vehicles, which the ERT considers more appropriate than using a LDV diesel emission factor. Furthermore the ERT recommends that Belgium include a note in the IIR on the CNG fuel consumption (TJ) in LDVs explaining this issue.

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

26. 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.

27. Belgium did not provide any revised estimates and the ERT did not calculate technical corrections for Belgium.

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. Belgium IIR 2022
2. Annex_I_NFR19-BE20220315
3. Annex3B_EF_residential_sector__stationary__category_1A4bi_
4. Annex6_PM_filterable_condensable

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

5. CLRTAP Belgium Stage 3 review_response
6. Road transport_switch to COPERT v5.5.1