2 AIR EMISSIONS

2.2 Particulate matter emissions in the healthcare sector (ENV-5)

2.2.1 Documentation sheet

Description	**Primary indicator**: A. Annual emissions of PM2.5 in human health activities (Q86), in grammes (g) per capita **Secondary indicator:** B. Annual emissions of PM2.5 in human health activities (Q86), in tonnes (t) C. Annual emissions of PM10 in human health activities (Q86), in g per capita D. Annual emissions of PM10 in human health activities (Q86), in t E. Annual emissions of PM2.5 in human health activities (Q86), as a share of total PM2.5 emissions (all NACE activities)
Rationale	Particulate matter (PM) are solid or liquid particles suspended in the air. They can penetrate the human body through the lungs, where they can cause severe illnesses such as heart and respiratory diseases and cancers [1] and are considered a leading risk factor for premature death. They are classified according to their diameter in µm. PM2.5 (PM with a diameter ≤ 2.5 µm) are responsible for 5 million death annually over the world. In 2021, PM2.5 were responsible for 5 849 deaths, accounting for 5.2% of all deaths in Belgium; they caused the loss of 93 753 years of life due to premature death [2]. PM10 (PM with a diameter ≤ 10 µm) also have important health consequences. Human activities generate a significant amount of PM (burning of fossil fuels, construction, industries, etc.).
Calculation	Done by the Federal Planning Bureau for Eurostat based on regional and national emissions inventories, an activity model and emission factors (activity data * emission factor) using NACE classification [3] **Primary indicator (A):** • Numerator: Annual PM2.5 emissions in human health activities, in g • Denominator: Population of the corresponding year (calculated as mean of population at beginning and end of year) **Indicator B:** • Numerator: Annual PM2.5 emissions in human health activities, in t • Denominator: / **Indicator C:** • Numerator: Annual PM10 emissions in human health activities, in g • Denominator: Population of the corresponding year (calculated as mean of population at beginning and end of year) **Indicator D:** • Numerator: Annual PM10 emissions in human health activities, in t • Denominator: / **Indicator E:** • Numerator: Annual PM2.5 emissions in human health activities, in t • Denominator: Annual PM2.5 emissions in total (all NACE activities), in t
Data source	Federal Planning Bureau (plan.be) and Eurostat: Air emissions accounts by NACE Rev. 2 activity (Last update of data: 28/11/2025 23:00) [4].

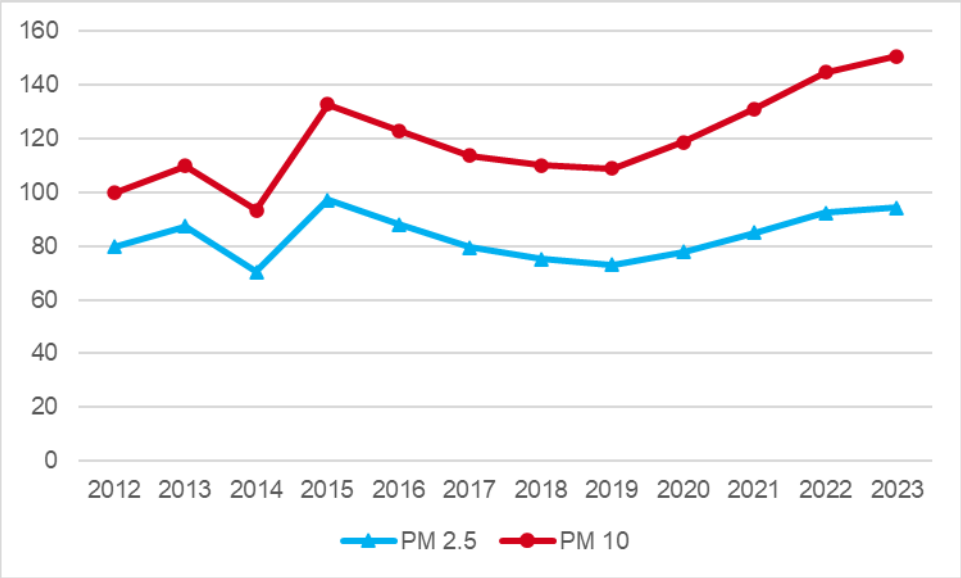
Technical definitions	Amount of PM2.5 / PM10 suspended in air (million T) per year The healthcare sector was identified via the statistical classification of economic activities in the European Community (NACE Rev. 2): Human health activities (Q86) (excluding residential care). More details on the methodology: https://ec.europa.eu/eurostat/web/environment/methodology [5]
International comparability	NACE (Statistical Classification of Economic Activities in the European Community, https://ec.europa.eu/eurostat/web/nace/overview) classification allows European comparison. However, comparability between country is not guaranteed due to differences in the allocation of road transport emissions (also impacting PM emissions) to NACE activities across countries (see also ENV-4 for more details).
Limitations	The data come from a model based on activity, not measurements. Residential care activities and social work activities without accommodation (Q87–Q88) were aggregated, making it impossible to isolate data for Q87 alone. Consequently, only human health activities (Q86) are considered as a proxy for the health care system, while residential care activities were excluded. Differences with other EU countries and jumps observed in data (in 2015 and 2021) can partly be explained by methodological factors: • Since 2021, Wallonia has applied a new and more accurate method to estimate energy consumption (more especially natural gases), based on data directly obtained from distribution network operators (as already implemented in Brussels and Flanders before 2021). Nevertheless, previous years were not retroactively modified, which can partly explain a jump in data in 2021 in Wallonia. However, the impact is reduced for PM emissions compared to GHG emissions, as they mainly depends from road transports (85%). The portion attributable to natural gas consumption only impacts the breakdown of regional emissions inventories, accounting for approximately 15% of PM emissions. • Emissions from road transport data (total quantities emitted), impacting PM emissions, are based on national/regional emissions inventories and the COPERT 5 model and allocation keys among NACE sectors vary between countries. In Belgium the allocation key is based on excise duties for Eurostat 2025 data, whereas previous estimates (e.g. 2024 data) relied on vehicle registrations. Excise duties are considered more reliable; however, this new approach appears to have an important impact for Q86 emissions: PM2.5 emissions in human health activities in Eurostat version released in 2024 are stable across the years for the 2017-2022 period while an increase is observed in the Eurostat version released in 2025. • Excise duties are calculated on a five-year basis (2010, 2015, 2020) using an “structural survey” of the National Bank of Belgium while intermediate years are based on less detailed surveys and extrapolations. As 2014 is based on an extrapolation of 2010 data, a jump in excise data is observed in 2015, which can partly explain the 2015 jump in PM2.5 emissions.
Dimension	Environmental sustainability
Supervisor	Carl Devos
Reviewers	Jehan Charlier

2.2.2 Results

BELGIUM

The PM2.5 emissions (emissions of particle matter with a diameter ≤ 2.5 µm) have increased (+18.3%) between 2012 and 2023 (see Figure 1) for human health activities (Q86), reaching 94.3 tonnes in 2023. The PM10 (emissions of particle matter with a diameter ≤ 10 µm) emissions have increased by 50.8% over the same period to reach 150.5 tonnes in 2023.

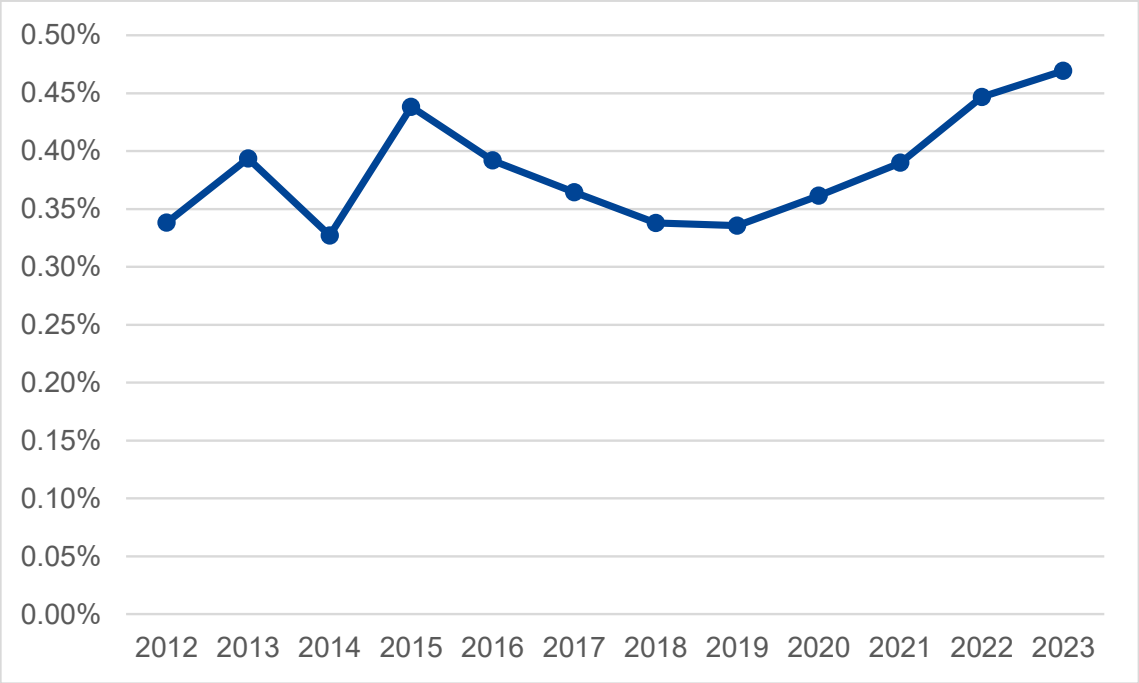
Figure 1 – PM2.5 and PM10 emissions (in tonnes) for human health activities for Belgium



Source: Federal Planning Bureau

The proportion of PM2.5 emissions in human health activities is also growing compared to the total of PM2.5 emissions in the NACE model (Figure 2): from 0.34% in 2012 to 0.47% in 2023. This can be explained by the fact that over that period, the total of PM2.5 emissions fell by 14.8% in total while it increased by 18.3% for the health activities.

Figure 2 – Evolution of the proportion of health activities (Q86) in total NACE PM2.5 emissions in Belgium



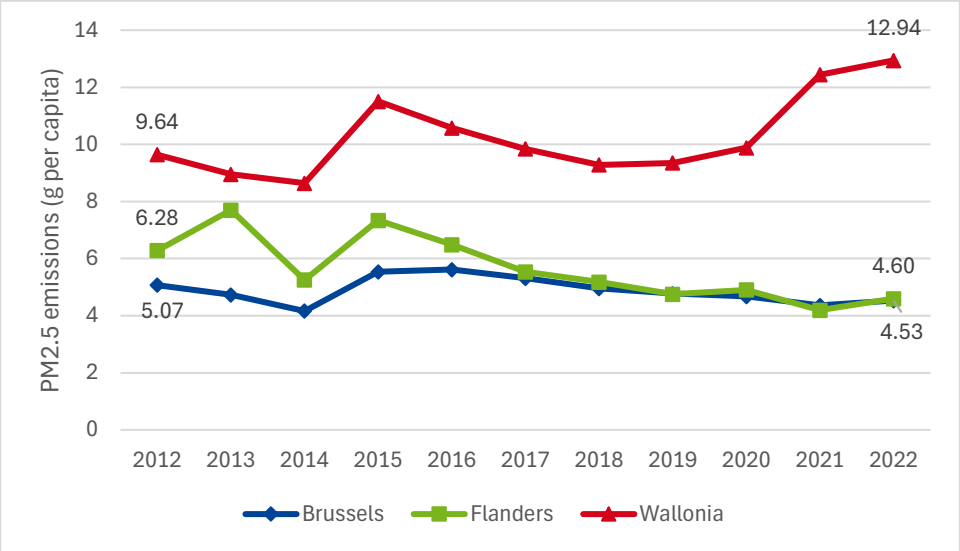
Source: Eurostat

REGIONAL COMPARISON

Wallonia's PM2.5 emissions in health activities (Q86) are higher than those of Brussels and Flanders. Over the 2012-2022 period, PM2.5 Emissions per capita in health activities have increased in Wallonia (+34.2%), especially between 2020 and 2021, while they have decreased over the period 2012-2022 in Brussels (-10.7%) and in Flanders (-26.8%) as shown in Figure 3. For the 2012-2022 evolution of PM10 emissions, Brussels (+5.2%) and Flanders (-5.9%) are almost stable while Wallonia shows a more important growth (+67.8%) (Figure 4).

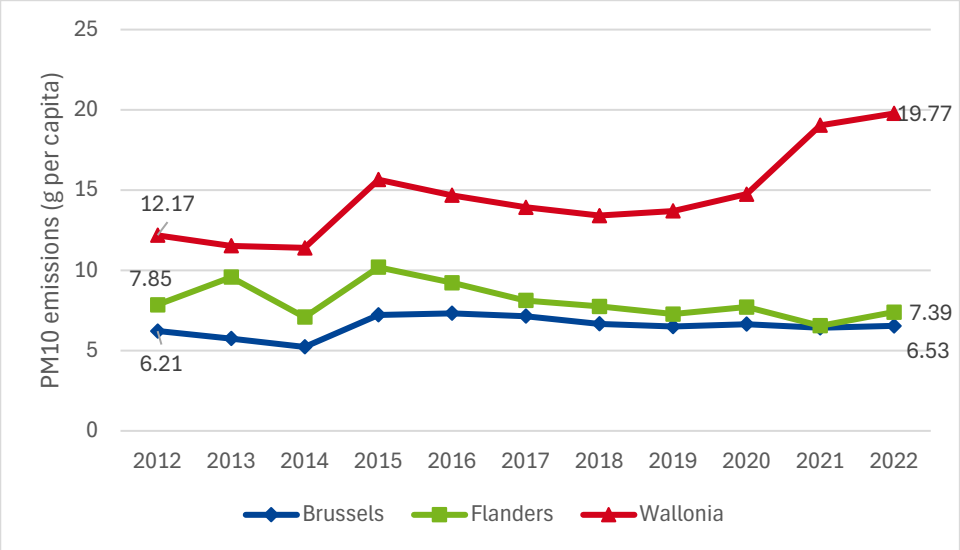
As PM emissions are mostly influenced by transports (85%), the change of methods in Wallonia to estimate the consumption of natural gas has only a limited impact. The higher impact in Wallonia is therefore not only explain by methodological factors. The higher distances could be another explanation factor.

Figure 3 – PM2.5 emissions (g per capita) for human health activities per region



Source: Federal Planning Bureau.

Figure 4 – PM10 emissions (g per capita) for human health activities per region

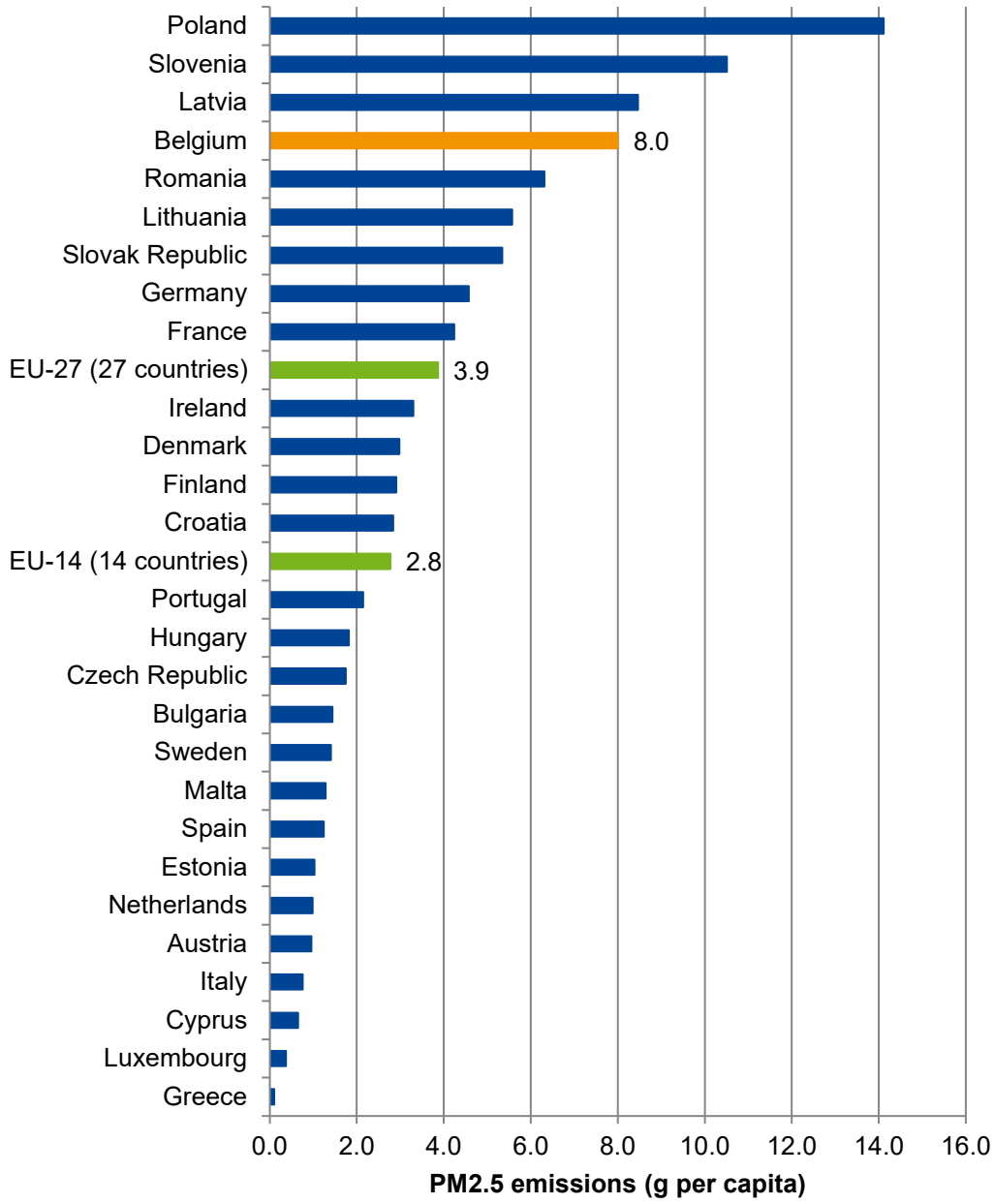


Source: Federal Planning Bureau

INTERNATIONAL COMPARISON

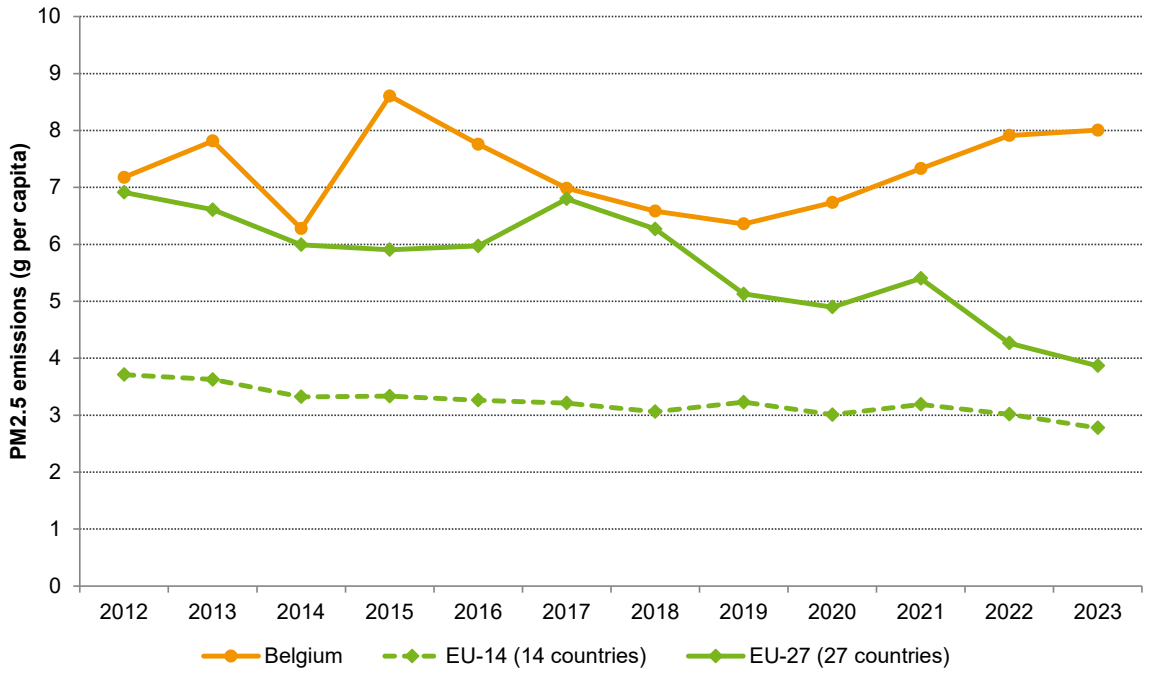
Compared to other European countries Belgium, Belgium (8.0 g per capita) emits twice as much PM2.5 as EU-27 (3.9) and almost three times as much as EU-14 (2.8) in the human health activities in 2023 (Figure 5). Over the 2012-2023 period, Belgium has increased by 11.5% its PM2.5 emissions in the health activities (Q86 of the NACE), while EU-14 decreased by 25.2% and EU-27 by 44.1% (Figure 6). However, comparison between countries should be used with caution as methodological factors can partly explain differences (see the limitations in the documentation sheet).

Figure 5 – PM2.5 emissions for human health activities: international comparison in (2023)



Source: Eurostat (air emissions accounts)

Figure 6 – PM2.5 emissions for human health activities: international comparison (2012-2023)



Source: Eurostat (air emissions accounts)

KEY POINTS

Particulate matter emissions are still growing in the heath sector in Belgium

- PM2.5 are dangerous small particles that can cause severe illness such as heart and respiratory diseases and cancers (5 million deaths per year over the world).
- The health sector was responsible for only 0.5% of total Belgian PM2.5 emissions in 2023. Expressed in tonnes, a 18.3% increase in PM2.5 emissions from the healthcare sector is observed over the 2012-2023 period (with 94.3 tonnes in 2023). By considering the increase in the population, the increase was slightly reduced (+11.5%, with 8 g per capita in 2023). Such results should nevertheless be used with caution as they are influenced by methodological factors.
- Higher PM2.5 emissions were observed in Wallonia (12.9 g, compared to 4.6 and 4.5 g per capita in Flanders and Brussels) and in this case, methodological factors are not the main explanation, other factors such as the higher distances may also have influenced the results.
- Other European countries have achieved better outcomes than Belgium, with PM2.5 emissions per capita increasing by 11.5% in Belgium over the 2012–2023 period, compared with decreases of 25% in EU-14 countries and 44% in EU-27 countries. However, cross-country comparisons should be interpreted with caution, as methodological differences may partly explain these disparities. In particular, the introduction of a new method in Belgium to allocate road transport emissions to the health sector had a substantial impact on the results (see the documentation sheet). Under the previous methodology, the trend in Belgium was more stable.

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