2 AIR EMISSIONS

2.3 Annual emissions of acidifying gas in the healthcare sector (ENV-6)

2.3.1 Documentation sheet

Description	**Primary indicator**: Annual emissions of acidifying gas in human health activities (Q86), in grammes (g) of SO_2 eq per capita **Secondary indicator:** Annual emissions of acidifying gas in human health activities (Q86), as a share of total direct acidifying gas emissions (all NACE activities)
Rationale	Acidification is an environmental problem linked to atmospheric emissions, with potential negative impacts on plant growth, animals, and the quality of soil and groundwater. The acidification index (ACID) includes the following acidifying gases: sulphur dioxide (SO_2, mainly produced by the combustion of fossil fuels), nitrogen oxides (NO_x, mainly produced by combustion in internal combustion engines and gas-fired power stations) and ammonia (NH_3, mainly produced by the use of nitrogen fertilisers and livestock farming).
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 [1] **Primary indicator:** • Numerator: Annual emissions of acidifying gas in human health activities (Q86), in grammes (g) of SO_2 eq • Denominator: Population of the corresponding year (calculated as mean of population at beginning and end of year) **Secondary indicator:** • Numerator: Annual emissions of acidifying gas in human health activities (Q86), in grammes (g) of SO_2 eq • Denominator: Annual emissions of acidifying gas in total (all NACE activities), in grammes (g) of SO_2 eq
Data source	Federal Planning Bureau (June 2025 for regional data) and Eurostat: Air emissions accounts by NACE Rev. 2 activity (Last update of data: 28/11/2025 23:00) [2]
Technical definitions	ACID index = 0,03125 * SO_2 + 0,021739 * NO_x + 0,058824 * NH_3 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 [3]
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 acidifying gas 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.

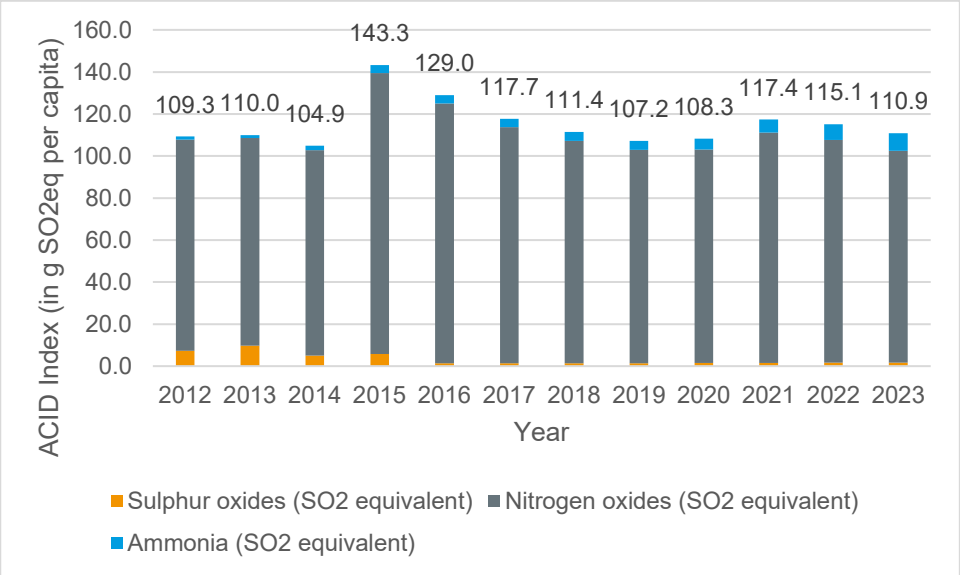
	Residential care activities and social work activities without accommodation (Q87–Q88) were aggregated, making it impossible to isolate data for Q87 alone. Consequently, only human health activities (Q86) are considered as a proxy for the health care system, while residential care activities were excluded. 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, 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 methodological change in Wallonia only affects the allocation key used to disaggregate regional emissions inventories, which represent a small share of acidifying gases compared with those originating from road transport. It should also be noted that the 2022 data for Wallonia are based on projections, as the data were not yet complete at the time of receipt (June 2025 for regional data). • Emissions from road transport data (total quantities emitted), impacting acidifying gas 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: emissions of acidifying gas in human health activities in Eurostat version released in 2024 are slowly decreasing across the years while an abrupt increase in 2015 is observed in 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 acidifying gas emissions.
Dimension	Environmental sustainability
Supervisor	Carl Devos
Reviewers	Jehan Charlier

2.3.2 Results

BELGIUM

Per capita, emissions of gases responsible in acidification in Belgium is stable for human health activities over the 2012-2023 period (+1.4%). The most important part is due to NO_x emissions. The proportion of SO_2 is decreasing over time while the proportion of NH_3 is increasing over the period (see Figure 1).

Figure 1 – ACID index for Belgium: human health activities (Q86)

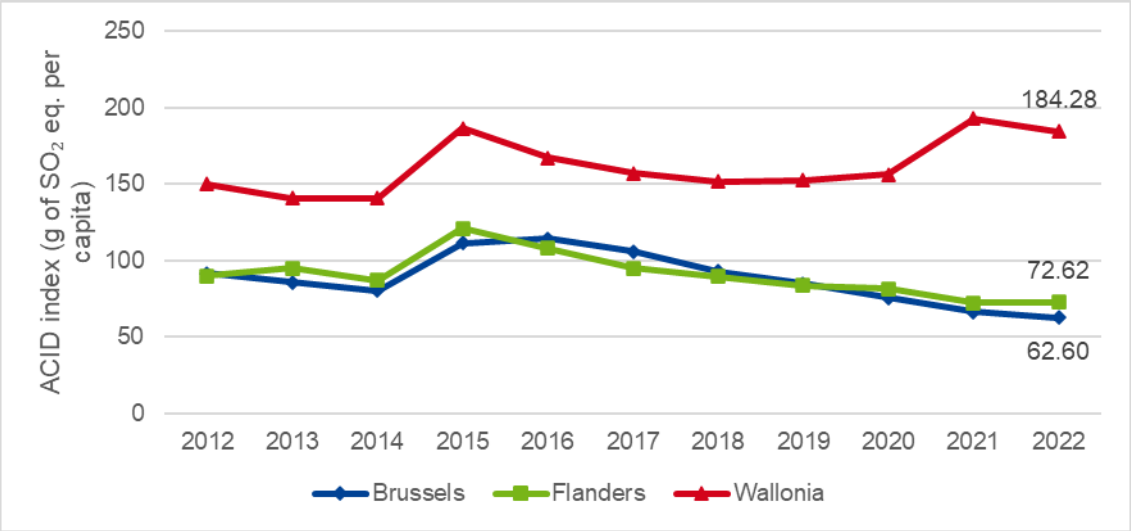


Source: Eurostat 2025

REGIONAL COMPARISON

Although the sharp increase observed in Wallonia in 2021 and 2022 can be partially attributed to methodological factors, similar to the increase observed across all regions in 2015 (see the limitations described in the documentation sheet), Wallonia consistently remains well above the other two regions throughout the period. Moreover, methods are expected more aligned between regions from 2021 onwards. More in-depth analysis is therefore required to understand the underlying causes of these differences.

Figure 2 – ACID index for human health activities (Q86) by region



Source: Federal Planning Bureau (June 2025); 2022 data in Wallonia are based on projections.

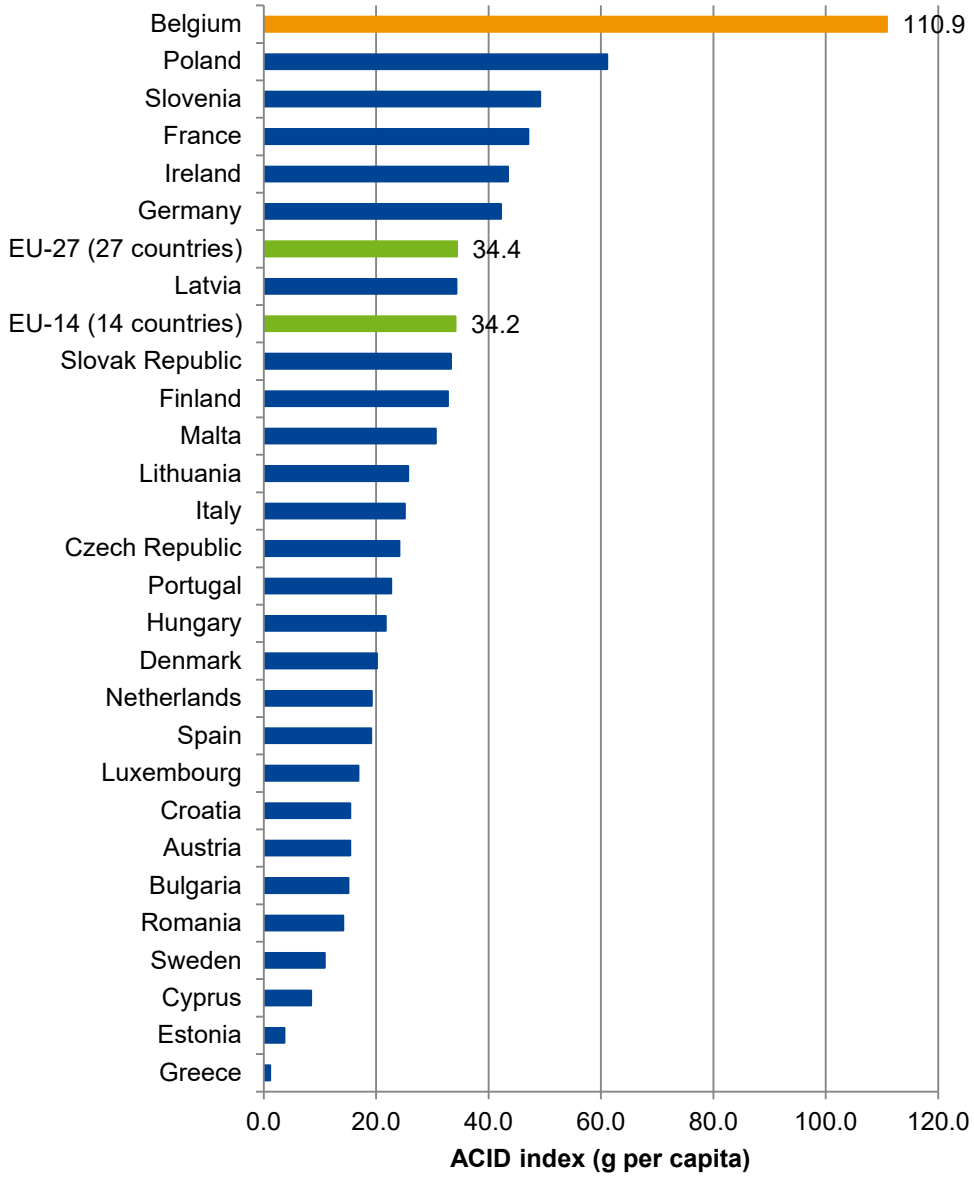
INTERNATIONAL COMPARISON

Belgium has the highest ACID index among European countries for human health activities (110.9 g per capita in 2023), which is three times the value of EU-14 countries (34.2 g per capita) and EU-27 countries (34.4 g per capita), see Figure 3.

Belgium's ACID index is getting better after a peak in 2015 (explained by methodological factors), but is stable for the 2012-2023 period (+1.4%), while European countries are almost decreasing (EU-14: -37.6% over the period, EU-27: -36.4%, see Figure 4).

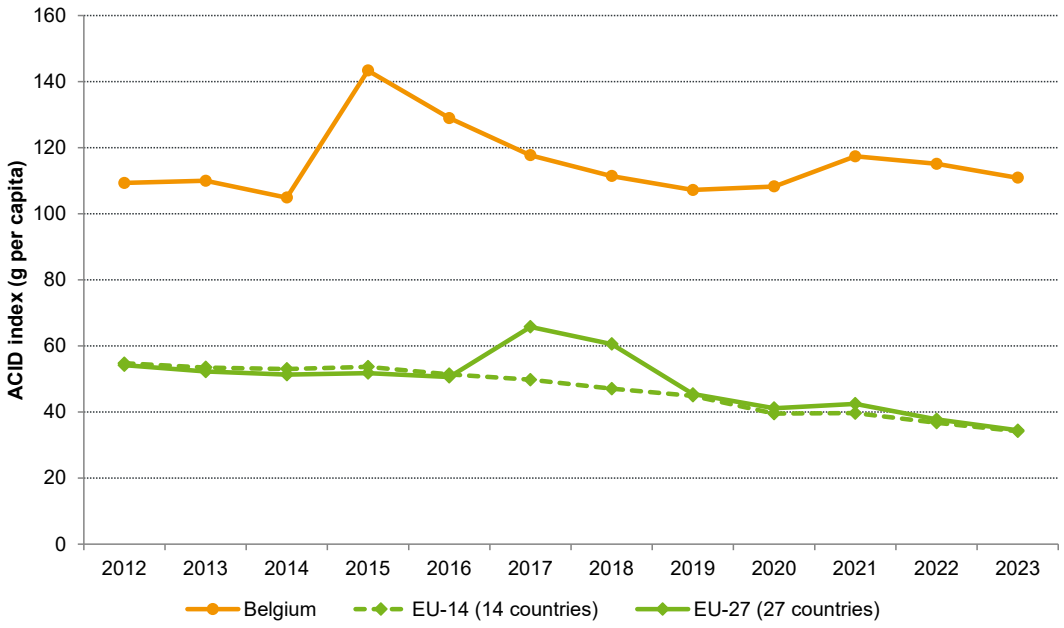
The proportion of human health activities' emissions in all NACE activities is bigger in Belgium (0.57% in 2023) than in EU-27 (0.12%) and EU-14 (0.12%) and is upwards over the 2012-2023 period for Belgium (+7.6%) while it is downwards for EU-27 (-35.3%) and EU-14 (-35.5%) (see Figure 5). The trend in all NACE activities is downwards and it is similar for Belgium (-32,7%), EU-27 (-31.4%) and EU-14 (-30.4%).

Figure 3 – Acid gas emissions in human health activities: international comparison (2023)



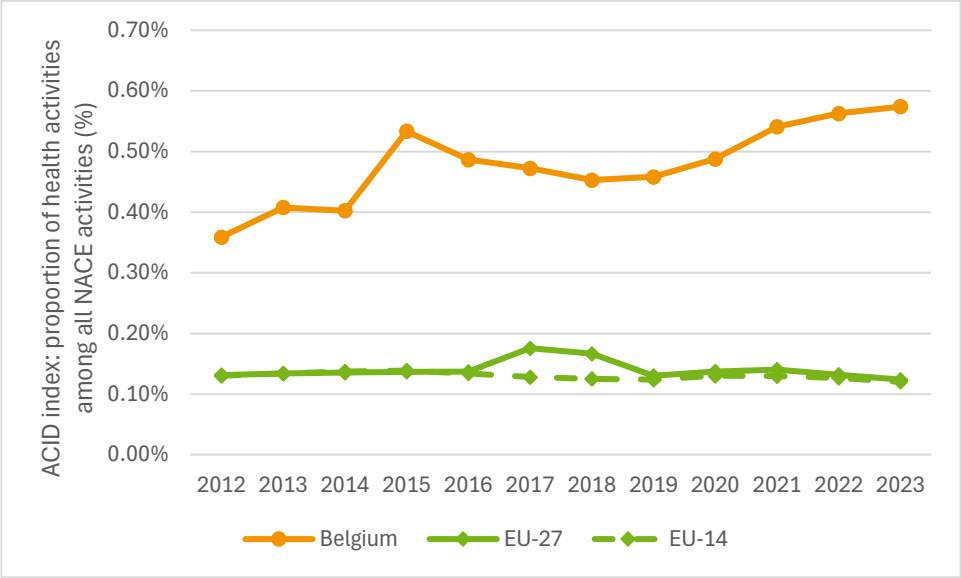
Source: Eurostat (air emissions accounts) 2025

Figure 4 – Acidifying gas emissions in human health activities: international comparison (2012-2023)



Source: Eurostat (air emissions accounts) 2025

Figure 5 – Acidifying gas emissions in human health activities, as a share of total direct acidifying gas emissions (all NACE activities): international comparison



Source: Eurostat (air emissions accounts) 2025

KEY POINTS

- Emissions of acidifying gases, measured using the ACID index, include sulphur dioxide (SO_2), nitrogen oxides (NOx), and ammonia (NH_3), expressed in SO_2 equivalents. These gases can potentially damage plant growth, animals, and the quality of soil and groundwater.
- In Belgium, emissions of acidifying gases from the healthcare sector have remained stable over time, amounting to 109.3 g SO_2 eq per capita in 2012 and 110.9 g SO_2 eq per capita in 2023 (+1.4%).
- As with other indicators on air emissions, regional differences can be observed, with higher emissions in Wallonia (184.3 g SO_2 eq per capita compared to 72.6 and 62.6 g per capita in Flanders and Brussels, respectively), requiring more in-depth analysis.
- At the European level, acidifying gas emissions from the healthcare sector in Belgium are approximately three times higher than those of the EU-27 and EU-14 averages. While Belgium shows a relatively stable trend over time, European averages display a decreasing trend between 2012 and 2023 (-37.6% for the EU-14 and -36.4% for the EU-27). Moreover, the share of human health activities in total acidifying gas emissions across all NACE activities has increased in Belgium (+8%) but declined at the European level (-35% for both the EU-14 and EU-27 averages). However, cross-country comparisons should be interpreted with caution due to methodological differences (see the documentation sheet).

REFERENCES

1. NACE Rev. 2.1 – Statistical classification of economic activities in the European Union, 2025 Edition. ISBN 978-92-68-13139-8. https://ec.europa.eu/eurostat/documents/3859598/21633320/KS-GQ-24-007-EN-N.pdf
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