

REPORT

2025 SEAM industry greenhouse gas report

Abrasives industry GHG accounting report

July 2026

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1. Foreword

Transparency is essential to understanding and improving the climate impact of the European abrasives sector. SEAM publishes this annual aggregated Scope 1 and 2 footprint to establish a sector-level baseline, track performance over time, and support collective progress across its membership.

The data presented in this report was collected from participating SEAM member companies and independently consolidated by the Carbon Trust. All results are reported in aggregated form only; individual company data remains confidential and is not disclosed.

2. About SEAM and the European abrasives industry

2.1. The abrasives industry at a glance

Abrasive products are essential industrial articles used in manufacturing and maintenance processes to grind, cut, polish, finish, deburr and shape a wide range of materials. They are indispensable in precision manufacturing, helping industries achieve the dimensional accuracy, surface quality, and performance required for modern products. Abrasive products are used across industrial value chains, including metal fabrication, automotive, aerospace, construction, electronics, medical technologies, and many other manufacturing sectors. Although often unseen by end-users, abrasive products are fundamental enabling components in manufacturing processes and contribute to the production of many of the products and infrastructures that support modern society.

The Federation of European Producers of Abrasives (FEPA), founded in 1955, represents approximately 90% of European abrasive production and brings together global manufacturers and a large number of small and medium-sized enterprises.



Sustainable European Abrasives Manufacturers (SEAM) is FEPA's dedicated sustainability programme. It embodies the European abrasives industry's collective commitment to fostering a more environmentally sound and socially responsible future in the manufacturing sector. Through SEAM, participating companies collaborate to improve their environmental performance, increase transparency, and support the sector's transition towards more sustainable manufacturing.

As part of this commitment, SEAM has established an annual greenhouse gas (GHG) reporting programme to improve the understanding of the sector's climate impacts and support long-term decarbonisation efforts. This report presents the aggregated greenhouse gas emissions of participating SEAM members for the 2025 reporting year and contributes to the development of a robust sector-wide emissions baseline.

This report aims to:

- Establish a sector-level GHG emissions baseline.
- Identify the main sources of emissions across participating member companies.

- Improve understanding of emissions hotspots and future decarbonisation opportunities.
- Create a foundation for annual tracking of emissions performance and future emissions reduction initiatives.

This report is based on an anonymised dataset collected from participating member companies. To protect confidentiality, individual company data is not disclosed, and all findings are presented in aggregated form.

Alongside this public report, SEAM members receive a more detailed internal report containing further diagnostics, methodological information, and sector insights to support future decision-making and decarbonisation activities.

As this is the first reporting cycle under the current methodology, the report primarily serves as a baseline against which future progress can be measured. Over time, annual reporting will enable SEAM and its members to monitor trends, improve data quality, and better understand the effectiveness of decarbonisation actions across the sector. The methodology used to calculate and aggregate the sector-level footprint aligns with the principles of the Greenhouse Gas Protocol Corporate Standard.

2.2. Abrasives as an enabling technology

The abrasives industry provides essential applications that enable the manufacture, maintenance, and recycling of many technologies that support Europe's industrial and energy transition. Although abrasives are not climate solutions in themselves, they are critical process consumables used wherever precision cutting, grinding, polishing, surface preparation or finishing is required.

For example, the manufacture of wind turbines relies extensively on abrasive products. Abrasives are used to machine and finish steel towers, nacelles, and gearbox components to tight engineering tolerances; prepare metal surfaces before protective coatings are applied to prevent corrosion; and trim, sand and finish composite turbine blades to achieve the required aerodynamic profile. During maintenance, abrasive products are also used to remove corrosion, repair blade surfaces and extend the operational lifetime of turbines. The precision enabled by abrasive processes helps ensure aerodynamic efficiency, mechanical reliability and corrosion resistance, all of which are critical to the safe and efficient operation of wind turbines over decades of service.

Similarly, abrasives play an important role in the production of motor vehicles, batteries, semiconductors, solar panels and hydrogen technologies, where high-precision machining and surface finishing are essential to product performance and reliability. They are also widely used in recycling operations, where cutting, shredding, preparation and material recovery support the circular use of metals and other materials, and in maintenance and repair activities that help extend the service life of industrial equipment and infrastructure.

Recognising this enabling role does not reduce the importance of improving the environmental performance of abrasive manufacturing itself. Rather, it reflects the sector's dual responsibility: reducing its own carbon footprint while supplying the precision materials required by industries investing in Europe's sustainable industrial transition.

3. Reporting scope

3.1. What this report covers

- Sector-level aggregated Scope 1 and 2 emissions for SEAM member companies for the 2025 reporting year.
- Scope 3 (value chain) emissions are not in scope of this public report.

3.2. Report boundaries

Time boundary

This report covers greenhouse gas emissions from participating SEAM member companies for the 2025 reporting year.

Sector and geographic reporting boundary

The report covers the European operations of participating SEAM member companies.

A total of **19 companies**, representing **95% of SEAM membership**, participated in the 2025 reporting exercise. Collectively, these companies operate **68 manufacturing and operational sites across 14 European countries**, providing a representative picture of the European abrasives sector.¹

Primary activity data, such as fuel and electricity consumption records, were available for 29 sites. For a further nine sites, companies provided emissions data reported by emission sources, while 30 sites provided only total emissions values without a source-level breakdown. These reported emissions were incorporated into the analysis where appropriate to maximise coverage across participating sites.

The assessment follows an **operational control approach**, whereby companies account for emissions from operations over which they have operational authority.

¹ Turkey is included

Overview of the participating companies:



Scope boundary

The assessment focuses on Scope 1 and 2 emissions:

Scope 1 emissions	Scope 2 emissions
Direct emissions from sources owned or controlled by a company, such as fuel combustion, company vehicles, industrial processes, and refrigerant leakage.	Indirect emissions associated with the generation of purchased electricity, heat, or steam consumed by a company.

Scope 2 accounting approaches

Scope 2 emissions are presented using two recognised accounting approaches. This is done in line with the Greenhouse Gas Protocol, the world's most widely used standardised framework for measuring, managing, and reporting greenhouse gas emissions:

Location-based emissions reflect the average emissions intensity of the electricity grids from which electricity is consumed. This approach provides an indication of the emissions associated with the electricity available in the regions where companies operate.	Market-based emissions reflect the specific electricity purchasing choices made by companies, including renewable electricity contracts and other contractual instruments. This approach captures the impact of procurement decisions intended to reduce electricity-related emissions.
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Presenting both approaches provides a more complete picture of emissions performance and allows readers to understand both the influence of local electricity systems and the impact of company purchasing decisions.

Scope 3 emissions

Scope 3 emissions are not included within the sector footprint presented in this edition of the report.

Scope 3 emissions occur across a company's value chain and typically include emissions associated with purchased goods and services, transportation, waste management, business travel, and other upstream and downstream activities. For many manufacturing sectors, Scope 3 emissions often account for the largest share of total emissions.

While several SEAM members already calculate and report Scope 3 emissions, data maturity currently varies across the membership. Collecting robust Scope 3 data requires engagement with suppliers, customers, and other value chain partners, making it significantly more complex than Scope 1 and 2 reporting.

SEAM has therefore adopted a phased approach, establishing a robust Scope 1 and 2 baseline before progressively expanding Scope 3 reporting in future years. During 2026, member companies that have not yet begun, or are relatively early in, their Scope 3 reporting journey will receive guidance and support on data collection approaches, key data requirements, and common implementation challenges. The objective is to increase Scope 3 reporting maturity and coverage across the sector in future reporting cycles.

3.3. Base year and future reporting

The 2025 reporting year serves as the **base year** for the programme and establishes the benchmark against which future performance will be assessed.

While total (absolute) emissions remain an important measure of climate impact, they can fluctuate due to factors unrelated to decarbonisation performance, including:

- Acquisitions or divestments
- Changes in production volumes
- Market-driven growth or contraction
- Changes in organisational boundaries

For this reason, SEAM's longer-term ambition is to develop robust **emissions intensity metrics** that allow performance to be assessed on a like-for-like basis. Intensity metrics, such as emissions per unit of production, provide a more meaningful indicator of underlying decarbonisation progress and enable companies to track improvements independently of business growth.

The 2025 assessment therefore establishes the foundations for future intensity-based reporting, with further refinement expected as data maturity and reporting consistency improve across the membership.

As 2025 represents the first reporting year under the current harmonised methodology, results are not directly comparable with previous reporting exercises. Consequently, SEAM has not recognised individual companies for year-on-year emissions reductions within this edition of the report. Subject to

maintaining a consistent methodology in future reporting cycles, SEAM intends to recognise companies that achieve significant emissions reductions relative to the prior year in future editions of the report.

3.4. Emission sources included

The following emission sources are included within the scope of this assessment:



4. Sector-wide results: Scope 1 and 2 overview

This section presents the aggregated greenhouse gas emissions of participating SEAM member companies for the 2025 reporting year. It provides a high-level view of the sector's emissions profile, highlighting the relative contribution of Scope 1 and 2 emissions ahead of more detailed analysis by emissions source and geography.

4.1. Total sector emissions broken down by scope

The total greenhouse gas emissions for 2025 establish the first sector-wide baseline under a harmonised methodology.

Total Scope 1 and 2 emissions are similar under both Scope 2 reporting approaches, indicating that electricity procurement has a relatively limited impact on overall sector emissions at this stage.

Scope 1 emissions total 71,475 tCO₂e, representing the largest contribution to the sector footprint under both reporting approaches.

Scope 2 emissions total 52,269 tCO₂e on a location-based basis and 51,271 tCO₂e on a market-based basis. The relatively small difference of approximately 1,000 tCO₂e reflects a modest reduction associated with renewable electricity procurement and supplier-specific electricity reporting.

Scope 1 and 2 contribute broadly comparable shares of total emissions, with Scope 2 representing a slightly smaller proportion. This indicates that direct fuel combustion remains the primary driver of emissions across the sector, although purchased electricity also represents a significant source of emissions.

To provide broader industry context, Eurostat reports that the manufacture of other non-metallic mineral products (NACE C-23) generated approximately 154 million tCO₂e of direct greenhouse gas emissions across the EU in 2024.² This represents 22% of total direct greenhouse gas emissions across the EU in 2024 for manufacturing companies (NACE C).

While NACE C-23 category includes a wide range of industries including ones that are energy intensive (such as cement, glass, ceramics, refractories and abrasive products) and are a major contributor of direct greenhouse gas emissions in the EU, the contribution of SEAM members to this total is slim, as it represents only 0.05% of total NACE C-23 emissions.

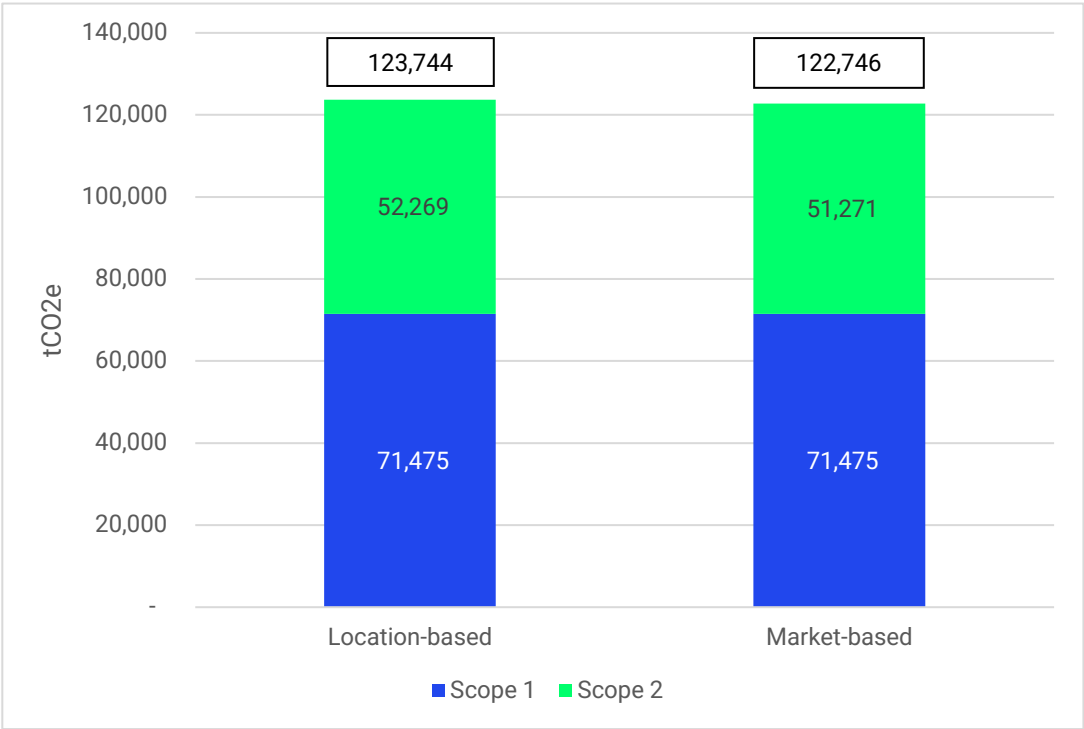


Figure 1: SEAM 2025 total Scope 1 and 2 carbon footprint (tCO₂e)

4.2. Total sector emissions broken down by scope and source

Breaking emissions down by source highlights a strong concentration in a small number of emission categories.

Scope 1 emissions are dominated by stationary combustion (67,835 tCO₂e), with all other Scope 1 sources contributing relatively small amounts. Mobile combustion (1,219 tCO₂e), process emissions (1,341 tCO₂e) and refrigerants (1,081 tCO₂e) together represent a minor share of total emissions.

Scope 2 emissions are driven primarily by purchased electricity, which totals 40,053 tCO₂e on a location-based basis and 39,055 tCO₂e on a market-based basis. Steam and purchased heat contribute an additional 12,216 tCO₂e.

² [Eurostat, 'Air emissions accounts by NACE Rev. 2 activity'](#)

Together, stationary combustion and purchased electricity account for the vast majority of emissions across the sector, with all other sources collectively representing a small proportion of the total footprint.

The difference between location-based and market-based results is driven entirely by purchased electricity, with a modest reduction under the market-based approach reflecting the impact of electricity procurement.

The results indicate that the sector’s emissions profile is concentrated in two principal sources: stationary combustion and purchased electricity. This suggests that decarbonisation of the abrasives sector will depend primarily on reducing fossil fuel use in manufacturing and operational processes, alongside continued efforts to reduce electricity-related emissions.

Within the SEAM dataset, natural gas represents the largest share of energy consumption (53%), followed by purchased electricity (34%), steam (9%) and self-generated electricity (2%), with all other energy sources collectively accounting for the remaining 2%. Similarly, Eurostat reports that, in 2023, electricity accounted for 32.6% and natural gas for 31.3% of final energy consumption across EU industry. This suggests that the sector's energy use is concentrated in the same principal energy sources as wider European industry, although participating SEAM members appear to be more reliant on natural gas. However, when considering the broader energy mix, fossil fuels account for 54% of energy consumption within the SEAM dataset compared with 48% across EU industry, indicating a broadly similar overall energy profile.³

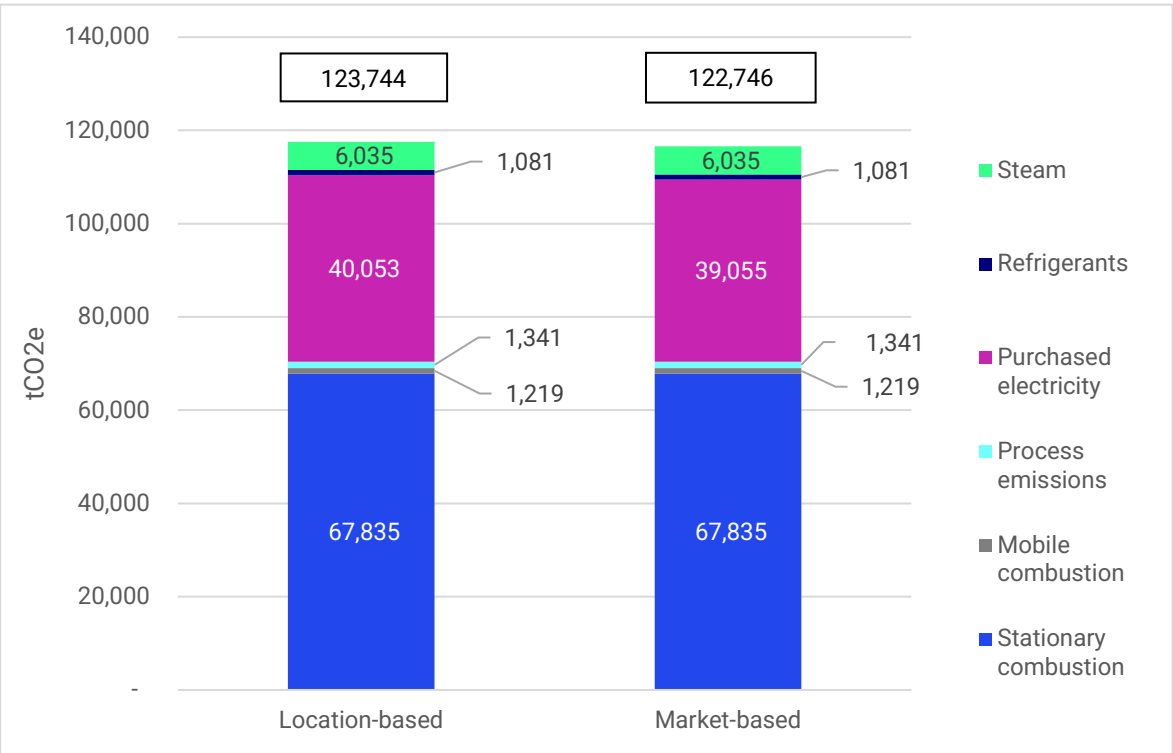


Figure 2: 2025 total carbon footprint by emissions source (tCO₂e)

³ [Eurostat, 'Energy use in the industry sector declines 5% in 2023'](#)

4.3. Electricity consumption broken down by source

Electricity consumption across the sector is split between standard grid electricity (57%) and low-carbon electricity sources (43%), comprising both purchased low-carbon electricity and on-site renewable generation.

The results indicate that a significant proportion of electricity consumption is already being supplied through low-carbon sources, although standard grid electricity remains the largest single category. This suggests that electricity procurement decisions are already contributing to emissions reduction efforts across the sector, while further opportunities remain to increase the share of low-carbon electricity consumption.

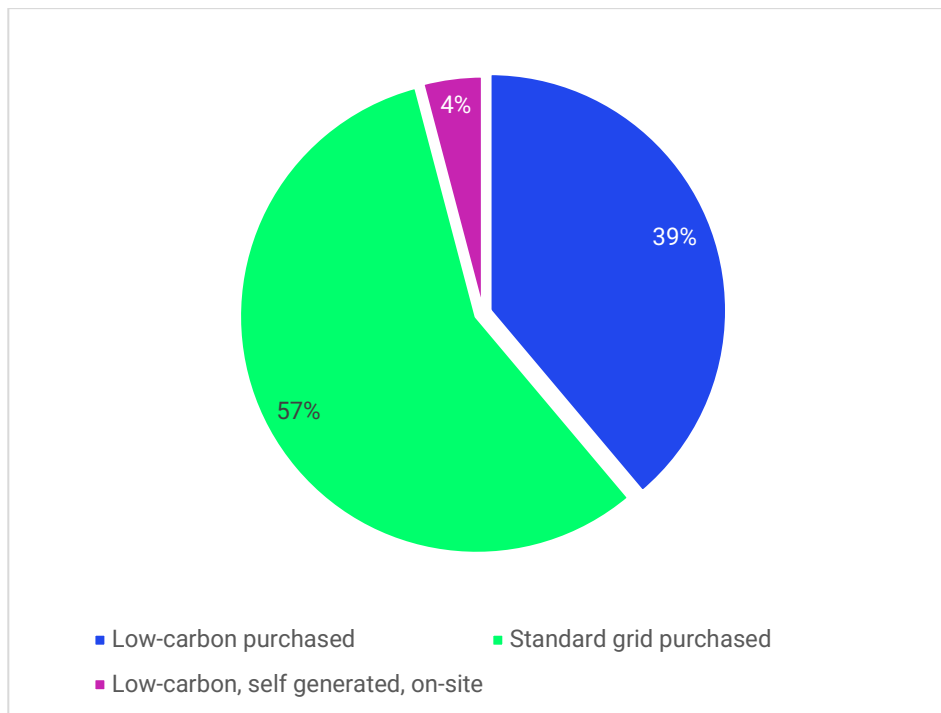


Figure 3: Electricity consumption breakdown by source (kWh)

4.4. Emissions profile by company type

This analysis distinguishes between producer-reported emissions, associated with companies that manufacture finished abrasive products, and supplier-reported emissions, associated with upstream suppliers (Tier 1) to the producer companies. It should be noted that these suppliers may also be FEPA/SEAM member companies participating in the reporting exercise, and the distinction reflects their position within the value chain rather than a separate stakeholder group. For Scope 1 and Scope 2 emissions, producer and supplier data can be aggregated without risk of double counting. However, when Scope 3 emissions are incorporated in future reporting years, producer- and supplier-reported emissions will need to be distinguished to avoid double-counting emissions that occur between participating companies within the SEAM value chain.

The results show that the sector footprint is primarily driven by producer-reported emissions, which account for approximately two-thirds of total Scope 1 and 2 emissions under both the location-based and market-based approaches. Supplier-reported emissions contribute the remaining third of the footprint.

The relative contribution of producers and suppliers remains broadly unchanged between the two Scope 2 accounting approaches. This reflects the relatively small overall difference between location-based and market-based emissions across the participating companies.

Overall, the results indicate that emissions are concentrated within companies manufacturing finished abrasive products, although upstream suppliers also represent a significant share of the sector footprint. Understanding the contribution of both groups provides useful context for future reporting and decarbonisation activities across the SEAM value chain.

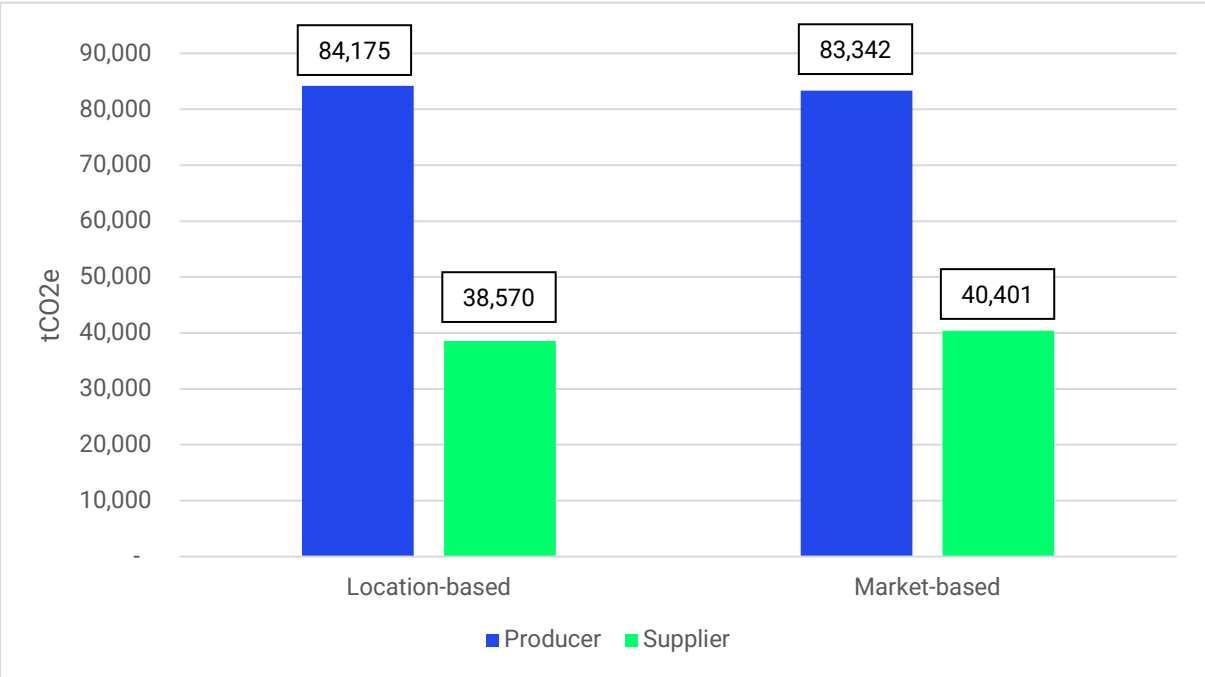


Figure 4: SEAM 2025 total Scope 1 and 2 carbon footprint by company type (tCO₂e)

4.5. Regional distribution of emissions

Emissions are distributed across a range of European countries, with contributions varying across locations. The largest reported contributions are associated with Central Europe (39,117 tCO₂e), followed by Europe (unspecified) (26,692 tCO₂e) and Western Europe (20,075 tCO₂e). Smaller contributions are reported from Southern Europe (15,646 tCO₂e), Eastern Europe (12,915 tCO₂e) and the Nordics (8,301 tCO₂e). Overall, emissions are reported across all sub-regions of Europe, reflecting the broad geographic presence of participating SEAM members. A full list of countries included within each regional grouping is provided in the Glossary.

The Europe (unspecified) category represents emissions where no specific country-level information was provided. This category does not represent a distinct geographic region but rather reflects instances in which emissions data were reported without sufficient location detail. As a result, the magnitude of this category should not be interpreted as a true regional concentration of emissions.

Excluding the Europe (unspecified) category, emissions are concentrated within a relatively small number of European regions, particularly Central and Western Europe. This suggests that national and

regional decarbonisation efforts may have differing impacts on the sector footprint depending on where participating operations are located.

Interpretation of the results should therefore take into account both the distribution of reported data and the presence of emissions allocated to Europe (unspecified), which reduces the analysis’s geographic granularity and may mask more detailed regional trends.

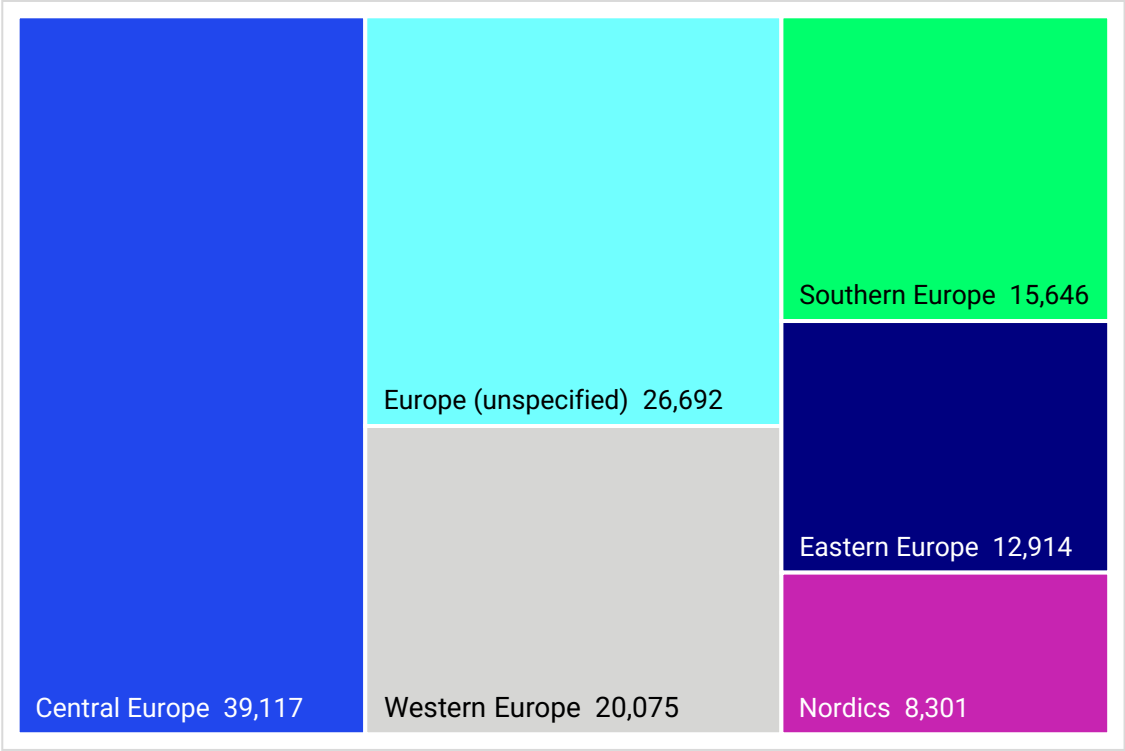


Figure 5: Absolute market-based emissions by region (tCO₂e)

5. Methodology

5.1. Standards and approach

Standards

The reporting framework is aligned with the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard,⁴ ensuring consistency with internationally recognised carbon accounting principles.

Scope

The inventory covers Scope 1 and 2 emissions only, with Scope 2 emissions reported using both location-based and market-based approaches in line with GHG Protocol Scope 2 Guidance.⁵

Calculation approach

Emissions are calculated using the standard formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Activity Data} \times \text{Emission Factor}$$

Activity data (e.g. fuel consumption, electricity use) are multiplied by relevant emission factors and converted to tonnes of CO₂ equivalent.

Emissions factors are selected by the Carbon Trust from recognised national or regional datasets, prioritising country-specific factors where available. Main emission factor sources include:

- Department for Business, Energy & Industrial Strategy/Department for Energy Security and Net Zero (BEIS/DSNZ) (Scope 1 activity data)
- International Energy Agency (IEA) (electricity, location-based)
- Association of Issuing Bodies (AIB) (electricity, market-based)

For Scope 2 emissions both the location-based and market-based approach are calculated:

- The location-based approach applies electricity grid-average emission factors for each country
- The market-based approach reflects electricity supplier-specific factors or contractual instruments where available. Where no such instruments are in place, the residual mix emission factor for the relevant market is applied, in line with the GHG Protocol Scope 2 Quality Criteria, to avoid double-counting of renewable attributes claimed by other consumers.

⁴ [Greenhouse Gas Protocol, 'The GHG Protocol: A Corporate Accounting and Reporting Standard' \(Revised Edition\)](#)

⁵ [Greenhouse Gas Protocol, 'Scope 2 Guidance'](#)

5.2. Data collection

The member companies were provided with a standardised data collection template, ensuring a consistent minimum level of information across submissions. To support flexibility and reduce the reporting burden, companies were also encouraged to submit data in their own format when existing internal systems or reporting outputs were already available.

All submitted data, regardless of format, were subsequently reviewed, standardised and harmonised to ensure consistency in units, scope definition and categorisation prior to aggregation and analysis.

5.3. Key assumptions

- Process emissions are excluded where not reported by a member and disregarded for the sector aggregation.
- Where members reported only pre-calculated emissions (no activity data), activity data was back-calculated using standard emission factors.
- Where a single aggregated Scope 1 value was provided without a fuel-type breakdown, 100% of those emissions were assumed to relate to natural gas combustion.
- Where market-based Scope 2 values were reported but location-based were missing, location-based emissions were reconstructed by applying grid-average factors to the underlying electricity volume.
- Process emissions were taken as calculated by the reporting companies for this cycle. Where data were missing, gaps were filled by proxying from comparable company-calculated values. Given the low materiality of these emissions, this approach was considered proportionate; however, it introduces uncertainty, and the calculation approaches will be reviewed and standardised before the next reporting cycle.
- Where the on-site electricity generation technology is not specified, it is assumed to be non-combustion renewable generation (e.g. solar PV or wind), which involves no on-site fuel combustion and therefore produces zero Scope 1 emissions. Combustion-based on-site generation, in particular combined heat and power (CHP/cogeneration), which is typically natural-gas-fired and would generate material Scope 1 emissions, is assumed not to be present. Site-level generation technology should be confirmed in a future reporting cycle to rule out CHP or other fossil-fuelled on-site generation.

6. Glossary, notes and anonymisation statement

6.1. Glossary

CO₂e	Carbon dioxide equivalent, the common unit used to compare different greenhouse gases.
Scope 1	Direct emissions from sources owned or controlled by the company (e.g. on-site fuel use, company vehicles).
Scope 2	Indirect emissions from the generation of purchased electricity, heat or steam.
Location-based (LB)	Scope 2 calculated using the average emissions of the grid where the electricity is consumed.
Market-based (MB)	Scope 2 calculated using the emissions of the specific electricity products that companies have contracted.
Base year	The reference year against which progress is measured (2025)
Reporting year	The year the report describes (2025).
Regions	Central Europe: Austria, Czech Republic, Germany, Slovenia, Eastern Europe: Hungary, Poland, Slovakia, Turkey Nordics: Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Sweden Southern Europe: Albania, Bosnia and Herzegovina, Croatia, Greece, Italy, Montenegro, North Macedonia, Portugal, Serbia, Spain Western Europe: Belgium, France, Ireland, Luxembourg, the Netherlands, Switzerland, United Kingdom

6.2. Notes on units and presentation

- All results are presented in tonnes of CO₂ equivalent (tCO₂e) unless otherwise stated.
- Figures may not sum due to rounding.

6.3. Anonymisation statement

- All results are aggregated at sector level. No individual SEAM member can be identified.
- Cells supported by fewer than the agreed minimum number of contributing members have been suppressed or grouped into a higher-level bucket.
- This report intentionally excludes Scope 3 emissions, member-level diagnostics, decarbonisation levers and forward-looking recommendations.



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