

Precast Concrete and Masonry Sustainability Report 2024

An annual report of performance
metrics (2023 data)



Introduction

It has been 18 years since the precast and masonry Sustainability Strategy and Charter was first launched.

Since then, the precast and masonry sector has been collecting and publishing data on a wide range of sustainability indicators, demonstrating its commitment to sustainable development and environmental improvement. That capability to benchmark our performance and measure the environmental impact of our products and processes is instrumental for our ability to respond to the Climate Emergency.

Since 2019, precast and masonry product manufacturers have made substantial progress toward decarbonisation. Use of low carbon cementitious materials is currently at its highest within both, the precast and masonry sectors, since the [UK Concrete Net Zero Roadmap](#) was first launched. Member companies are investing more in renewable and green types of energy to run their factories, and wastage to landfills is at its lowest since we started collecting KPI data in 2007.

What I've also noticed this year is how widespread these green initiatives are across the industry: 23% of member companies audited in 2024 have recently launched new green and low carbon product lines, and 82% of our structural precast manufacturers used low carbon Supplementary Cementitious Materials (SCMs) on a regular basis and in significant quantities throughout 2023. Compared to 2016, SCM use in 2023 contributed to saving 75 kg CO₂e of carbon for every 1m³ of structural (reinforced) precast. This, I think, is impressive and shows how far we've gone down the road to decarbonise our products and processes. We are also seeing a significant rise in the proportion of renewable electricity used in members' sites, rising to 62.4% of all electricity consumed by the sector in 2023. There are also notable improvements in a number of other indicators such as responsible sourcing, management systems' certifications and biodiversity and site stewardship.

The performance data in this years' report has been presented to align with the areas of focus in the recently refreshed UK Concrete Industry Sustainable Construction Strategy. That is Carbon, Circular Economy, Social Outcome and Natural environment.

Work is progressing well on the development of Sector EPDs for Precast and Masonry products, reflecting the sector's continued commitment to its journey towards net zero. We look forward to further updates over the coming year, as new sector EPDs for concrete blocks, aircrete, flooring, precast cladding, and paving products are published.

Graham Sargeant, *Chairman of the Precast & Masonry Sustainability and Environment Committee (SEC)*



MPA Precast and MPA Masonry Sustainability Charter

The MPA Precast and MPA Masonry Sustainability Charter is part of the Mineral Products Association (MPA) Charter. It aims to encourage member companies of MPA Precast and Masonry to go beyond legislation and take voluntary actions to make their products and operations more sustainable. The MPA Charter addresses seven Strategic Priorities which include Resource use, Climate Change and Energy, Natural environment, Health and safety and the Built Environment. All full MPA Precast and Masonry member companies are required to undergo regular sustainability audits. The process gathers data to inform this report. The audits are carried out by a third-party environmental consultant. In 2023, 29 member companies, achieving an average score of 80.7%.

UK Concrete Sustainable Construction Strategy

Launched in 2008, the strategy aims to demonstrate the leadership and ambition of the UK Concrete industry for the delivery of a sustainable, low carbon- built environment in a socially, environmentally, and economically responsible manner. In 2024 the strategy was refreshed to focus on the sector's journey to 2030. Relevant data and information from the MPA precast and masonry sustainability charter audits feeds into in the UK Concrete Sustainability data reports and publications are informed by data collected MPA precast sustainability charter audits.

Details of the strategy, latest performance reports and more can be found here: www.sustainableconcrete.org.uk



Cover photo credit: © PACADAR, HS2 Tunnel Segments

Key Statistics

KPI data collected for 2023 covered 131 production sites, around 12.84 million tonnes of precast and masonry block. Our estimate is that this represented around 65% of UK's production in 2023. Companies reporting data employed 9,435 full time equivalent members of staff that year.

Auditing, Certification and Management Systems



- Over **89%** of precast and masonry factories' management systems certified to both ISO 9001 and ISO 14001.
- Responsible sourcing certification to BES 6001 has increased to **86%** of production.

Road to Net Zero Carbon



- Compared to 2016, savings associated with the embodied carbon of cement used in structural precast products in 2023 reached **76 kg CO₂e/m³**.
- Factory CO₂ emissions reduced by **42%** since 2010.
- Low carbon SCMs made up **21.3%** of all cements used in precast and masonry.
- **30%** of MPA Precast and MPA Masonry members have third party verified Environmental Product Declarations (EPDs).

Energy Efficiency



- Nearly **⅔** of all electricity used in members' factories came from renewable sources.
- **80.6%** of all electricity used to manufacture precast paving product in 2023 came from green renewable resources.
- On-site wind turbines, solar energy and other green energy sources generated **35.1%** of all energy used in making architectural and structural precast products.
- Overall, **17.3%** of all energy used in making precast and masonry products came from renewable sources.
- **94%** of all aerated block production is covered by ISO 50001 certified management systems.

Resources and Circularity



- Waste to landfill from precast and masonry manufacturing remains very low at around **260 grammes per tonne**.
- Over **99%** of all precast and masonry manufacturing waste is reused or recycled.
- Secondary and recycled aggregates constituted around **12%** of all aggregates used in precast and masonry factories in 2023.
- Precast and masonry factory consumed **86.2 litres** of mains water for every tonne of product, which is **7.5%** lower than in 2015.

Social Outcomes



- Almost **nine out of every 10** of our member companies made charitable donations in 2023.
- Member companies provided an average **5.5 weeks** of voluntary work for their community (per company) in 2023.
- **21.4%** of masonry and precast manufacturing sites had Biodiversity Action plans in 2023, which is almost three times higher than in the previous year.

Local Construction Materials



- Over **58%** of reinforcement used in precast concrete was sourced from mills in the UK, with another **19%** originating from steel mills in the European Union.
- The average delivery distance from factories to customers was **108.8 km** in 2023.

Performance report

Carbon

Precast and masonry producers continue to make progress in the decarbonisation of their products. In 2023 almost two thirds (62.4%) of the electricity used in the production of precast and masonry products came from renewable resources (see fig. 1). This demonstrates a dramatic shift in the type of energy use compared to 2020.

Reported factory carbon emissions rose slightly to 11.42 kg CO₂e/tonne. But this was mainly due to a change to the KPI indicator from CO₂-only to a GHG indicator to align with the UK Concrete Sustainable Construction Strategy (see fig. 2).

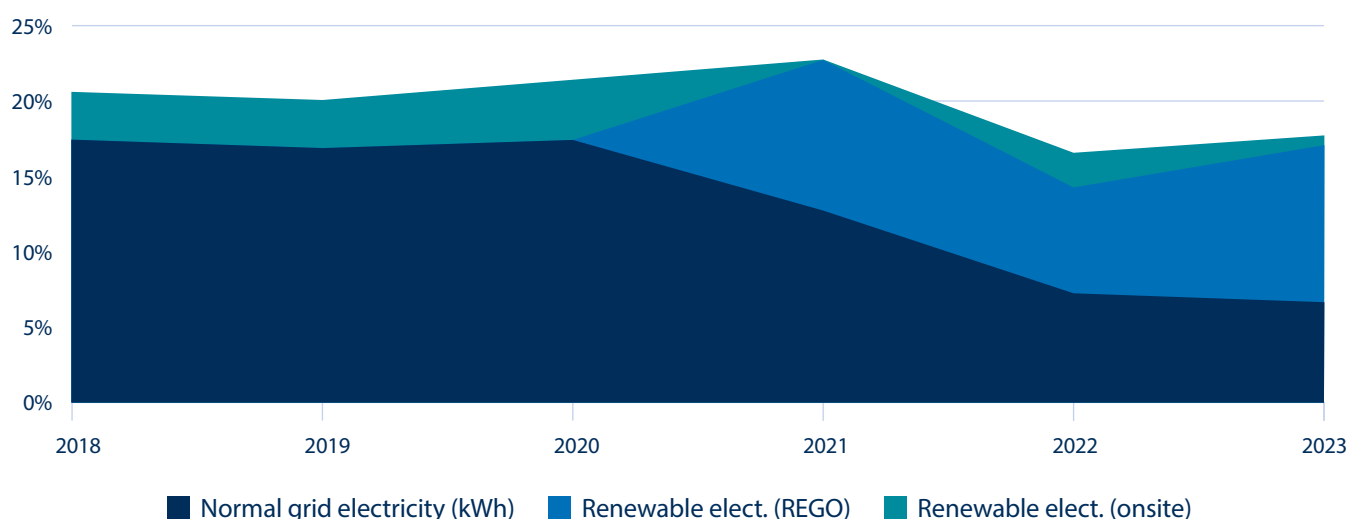
Energy consumption in precast and masonry factories has reduced to 58.21 kWh/tonne. In 2023 61.3% of all manufactured products (by weight) was produced under energy management systems certified to ISO 50001 compared to 52.6% in 2019. And sites with ISO 50001 certification rose to 44.3% in 2023 compared to 32% of sites in 2019.

The share of energy from green and renewable resources has also increased, reaching around 11% in 2023. The share of renewable source electricity used in structural and architectural precast factories remained high (>30%). The mix of energy used in precast and masonry factories in the UK has changed with new fuels and biodiesels such as Hydrogenated Vegetable Oil (HVO) being introduced.

The embodied carbon of the cementitious content in reinforced structural precast products has dropped by just over 32 kg CO₂e/t of precast compared to 2016. This is equivalent to a reduction of 76 kg CO₂e per m³ of precast*. This reduction in embodied carbon was mainly due to a rise in SCM use in manufacture and a reduction in the carbon footprint of CEM I (see fig. 4).

In 2023 the average delivery distance from factory to site was 108.8 km. The average truckload in 2023 was 21.5 tonnes. This equates to an sector average of 9.8 kg CO₂e/tonne†.

Figure 1: Contribution of normal grid electricity, renewable REGO electricity and onsite renewable electricity to total precast and masonry factory energy (Percentage of total kWh)



* This excludes precast drainage products where SCM use is unchanged at 30-35%.

† Using the IStructE's HTCEC guide transport factor (IStructE, 2025).

Figure 2: Precast & masonry factory manufacturing carbon emissions (kg CO₂e/ tonne)

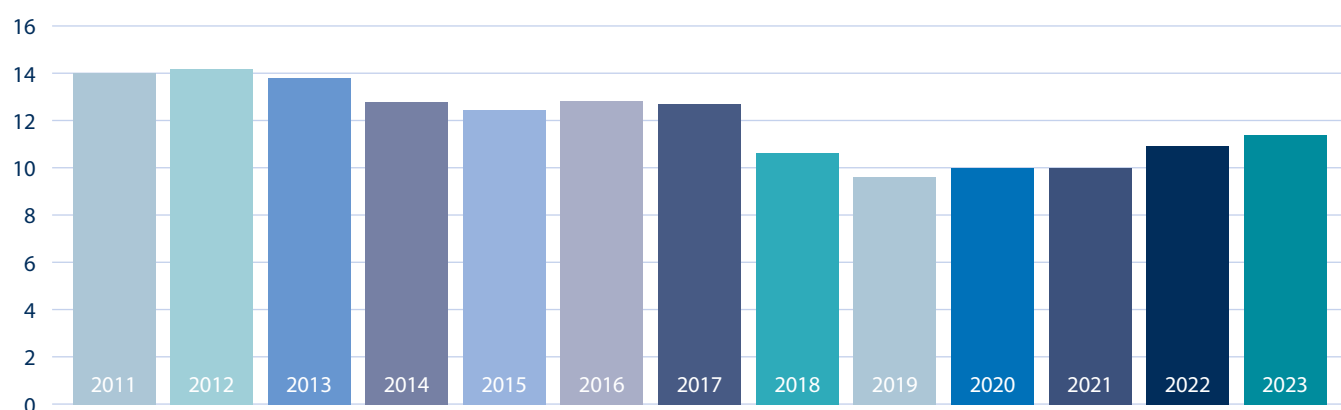
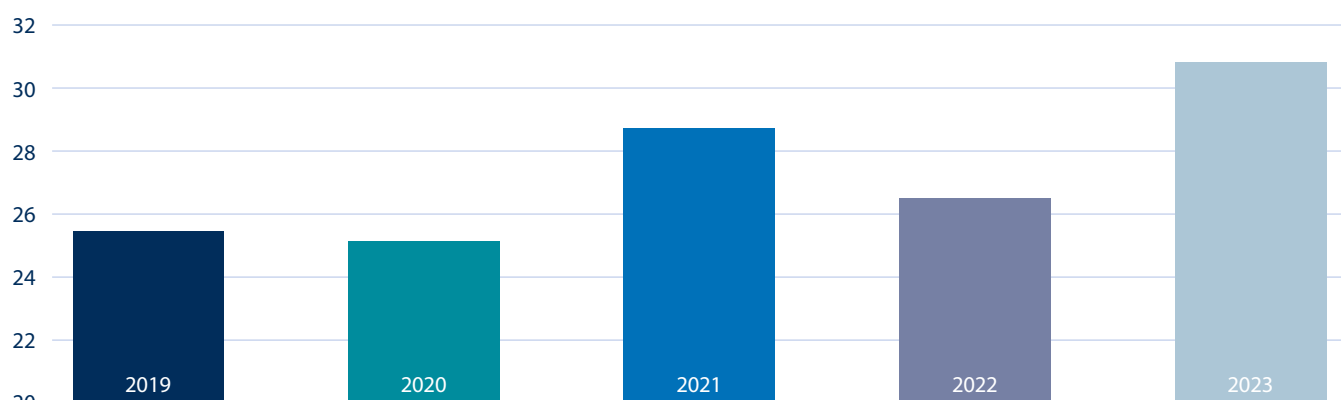
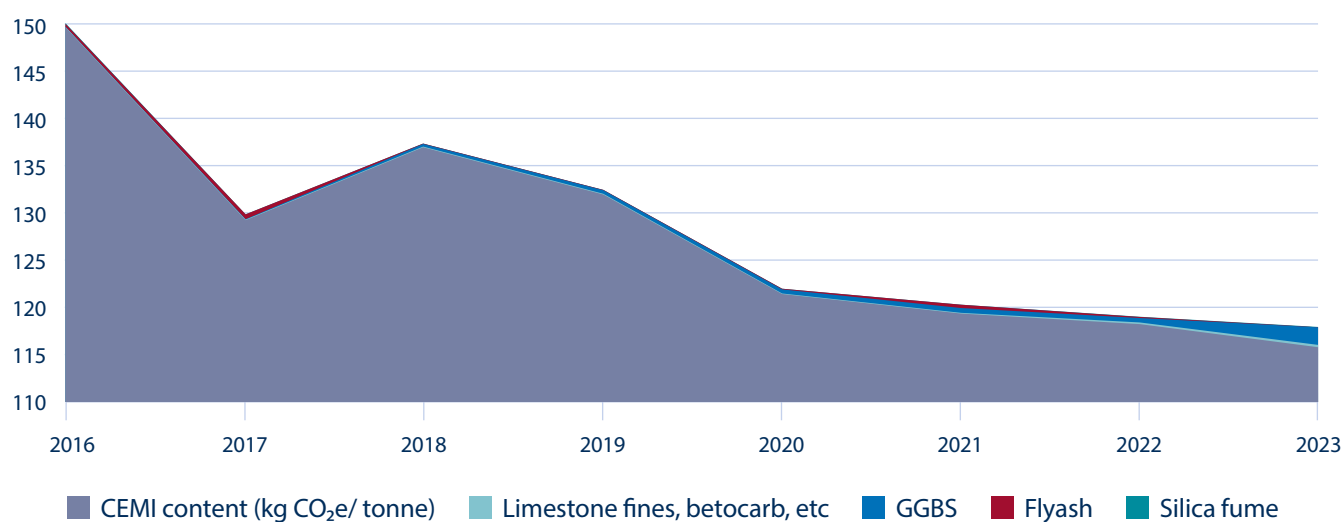


Figure 3: Low carbon SCM content per tonne of product (kg/ tonne)



The amount of low carbon cementitious materials use in masonry and precast concrete products has risen to 30.8 kg/ tonne, 23% higher than in 2019. This rise in SCM has been witnessed across all product categories, including masonry, paving, architectural, structural precast, and precast flooring.

Figure 4: GHG emissions associated with reinforced precast products' cement content (2016-2023) (kg CO₂e/ tonne)



Circular Economy

The current data reflects established, long-standing indicators that demonstrate the sector's strong performance in waste minimisation, resource efficiency and recycling.

Through the refreshed UK Concrete Sustainable Construction Strategy the precast and masonry sector is contributing to the development of a Circular Economy Action Plan for concrete. This initiative supports the broader goal of enabling greater circularity within the built environment using concrete and encouraging retention of concrete's value throughout all stages of its lifecycle.

Quality Management Systems

89.3% of the total production tonnage in 2023 was manufactured under management systems certified to ISO 9001.

Waste minimisation

Over 99% of the factory waste produced by members was either recycled or reused on, or off, the factory site. While the quantity of factory waste rose slightly from 35 kg/ tonne to **37 kg/ tonne**, less than 1% ended up in landfill. This equates to just 260 grammes of waste per tonne of manufactured product. This represents an **84%** reduction in waste to landfill since 2008.

Secondary and recycled aggregate use

Around **11.9%** of all aggregates used in precast and masonry manufacture in 2023 was from secondary and recycled origins. Most of secondary and recycled aggregates used was either reclaimed fly ash or crushed glass. Around **1.3%** of aggregates used in the manufacture of precast and masonry is recycled concrete aggregate (RCA).

Use of cementitious materials

Use of low carbon SCMs stayed high in 2023, reaching **21.3%**. Use of CEM II A-L (cement blends with limestone fines content) significantly exceeded CEM II B-V (cement blend with fly ash) by almost a 2:1 ratio. Fly ash made up to **9.5%** of all cements used by the sector in 2023, followed by limestone fines binders/ Betocarb (**5.7%**) and then GGBS (**5.1%**). Overall cementitious content per tonne rose slightly from last year to 145 kg/ tonne.

The most notable difference in terms of SCM use since 2020 has been its increased use in structural (reinforced) precast products, which is currently at a record high **23.9%** in terms of SCM replacement (*see fig. 5*).

Reinforcing steel

In 2023, around **60%** of the rebar and reinforcement used by the Sector came from UK-based mills. These mills use the Electric Arc Furnace (EAF) process, which is manufactured using high levels of recycled content with less carbon emitted compared to Blast furnace (BOF) and Direct Reuse Iron (DRI) steel manufacturing processes (*see fig. 6*).

Figure 5: Low carbon SCM content in the reinforced precast concrete sector (2018-2023) (kg/ tonne)

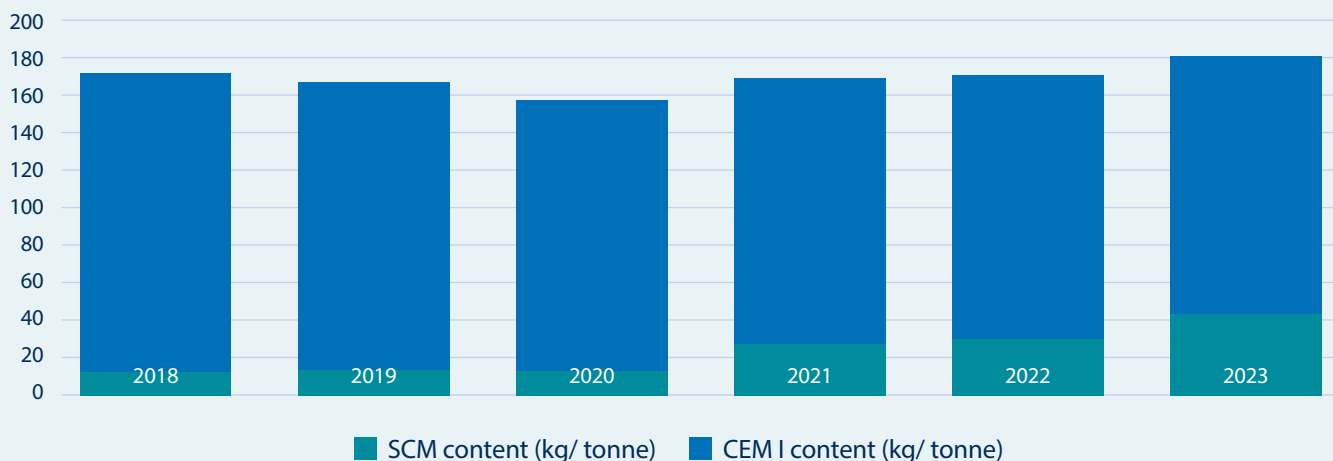
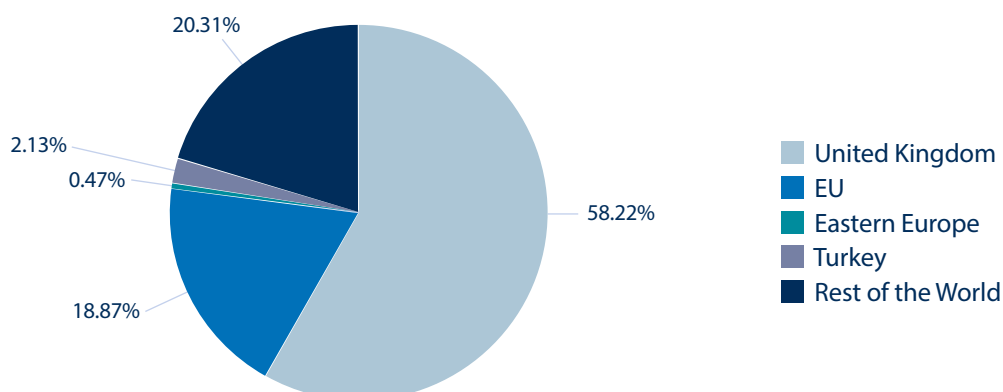


Figure 6: Country of origin for rebar and other reinforcement (2023)



Natural Environment

Objectives in this strategic priority include the protection and enhancement of biodiversity, protection and enhancement of natural capital and geodiversity where possible, and to minimise and mitigate operational environmental impacts.

MPA Precast and MPA Masonry use UKAS accredited management systems as an indicator of commitment and effort to address environmental aspects and impacts. In 2023 certification for ISO 14001 Environmental Management Systems rose to just over **90.4%** of production tonnage.

Water use: Use of groundwater has been largely unchanged during the last 10 years, at around 43.7 l/t in 2023. Mains water use rose in 2023 from 76.7 litres/t to **86.2 l/t** this is principally due to the percentage uplift in precast manufactured in 2023 compared to masonry.

Site Stewardship: The number of site specific biodiversity and geodiversity action plans in place by member companies rose dramatically in 2023 from 2.5% of sites in 2020 to **21.4%** in 2023.

Maintaining clean air and water: The industry record of zero convictions for air or water emission infractions was maintained in 2023. This record has remained in place for the previous 10 years.

Social Outcomes

The precast and masonry sectors continue their commitment to competency and training provision for their work force and are active in supporting the wider community. All MPA Masonry and MPA Precast members are committed to the MPA's health and safety strategy 'Vision Zero'.

Health Management Systems

This latest data shows that **71.7%** of precast and masonry production (in tonnes) factories has UKAS accredited Health Management Systems to EN 45001. This is a 5% improvement compared to 2018.

LTIFR rate for the precast and masonry sector was around **5.66** in 2023. This is compared to 9.8 in 2012.

Local community liaison, donations and voluntary work

In 2023, an average 5.5 weeks* of voluntary work was carried out by each company reporting.

88.1% of the member companies providing data made charitable donations, averaging **£16,122** per company. Around **30.5%** of member companies had ongoing local liaison schemes in place in 2023.

Responsible Sourcing

The production tonnage of precast concrete responsibly sourced to BES 6001, increased from 81.5% to **85.9%** in 2023

Competence and skills

94.3% of reported employees undertook formal training and were covered by development policies in 2023. Average training hours per employee were around **28.2** in 2023.

Photo credit: © Breedon

*Based on 190.5 hours of voluntary work per company (based on 35-hour working weeks).



Data for Whole Life Carbon Assessment

Generic factors, based on the sector's KPI submissions, are updated annually to support Whole Life Carbon Assessments (WLCA) for Upfront Carbon life cycle stages: A1-to-A3 (Cradle-to-Gate), A4 (transport-to-site) and A5.3 (construction waste).

This data can be used with our members' products' EPDs to develop WLCAs for buildings and infrastructure.

Year	Masonry (Aggregate blocks)				Reinforced precast concrete			
	Limestone SCMs	GGBS	Fly ash	Other	Limestone SCMs	GGBS	Fly ash	Other
2022	2.6%	12.4%	1.1%	>0.1%	13.0%	1.8%	2.6%	0.2%
2023	1.9%	1.7%	12.6%	0.1%	17.0%	6.6%	>0.1%	0.3%

Table 1: SCM replacement levels in precast/ masonry products (A1 to A3) for 2022 and 2023

Table 1 provides proportions of different SCMs used to replace CEM I for the precast and masonry sector in the UK (based on MPA Precast/ MPA Masonry data) The cement blends were included based on CEM I and SCM mix proportions within each type of blend. Cement content data for different products can be sourced from EPDs or directly from manufacturers.



Product Category	2023 (km)
Masonry (aggregate blocks)	71.1
Masonry (aircrete blocks)	125
Concrete paving	100
Concrete drainage	136
Architectural and Structural precast concrete	197.1
Precast flooring	92.7

Product Category	Wastage Rate
Masonry (aggregate blocks)	3%* – 5%*
Masonry (aerated blocks)	3%* – 5%*
Concrete drainage	≥1%†
Architectural and Structural precast concrete	≥1%†
Precast flooring	≥1%†
Ready mixed concrete	1%* - 2%*

Table 2: Transport to Site (A4) distances

Table 2 Provides delivery distances in km, for each product sector in the UK based on MPA Precast and Masonry data for 2023.

These averages are calculated by dividing the total delivery distance by the number of deliveries. Where the number of delivery tickets is known, these are used instead of deliveries. The average is then weighted based on each company's production tonnage. Tickets may be associated with multiple deliveries made in a single journey, which is common for the sector.

Table 3: Construction Wastage on site (A5)

Table 3 provides recommended Wastage Rates for different masonry and precast concrete product groups. This information is referenced to two sources: A recent study by consultants, Reusefully*, that was based on survey results from manufacturers, contractors and housebuilders, and the default factors published by RICS†.

* Adams, K; Hobbs, G (2023) Wastage rates for blocks and ready mixed concrete. Reusefully, 2023. <https://www.mpamasonry.org/MPAMasonry/media/root/assets/MPA-Wastage-Desk-Final-report-01-06-23v3.pdf>

† RICS (2023) Whole Life Carbon Assessment for the built environment professional standard. 2nd Ed. RICS, 2023.



Profile of UK Precast and Masonry

MPA Precast and MPA Masonry are part of the Mineral Products Association, the trade association for cement, concrete and aggregates. MPA publishes a “Profile of the UK Mineral Products Industry” full of useful sector data. Here, we supplement that report with additional data which is intended to inform specifiers and help them understand the profile, and the embodied carbon, of the precast and masonry sector. The Precast and Masonry sector KPIs, and data collection exercise, help monitor and record the sector’s overall consumption and materials’ use trends. This provides better understanding of the impact of future policies and market trends on the industry.

Precast and masonry product manufacturers used around **13.32 million tonnes** of raw materials in 2023. 54% of raw materials was used in manufacturing concrete block and aircrete products. 35% was used in making infrastructure, civil engineering and landscaping products, and around 11% was used in making architectural and structural precast products (see fig. 7).

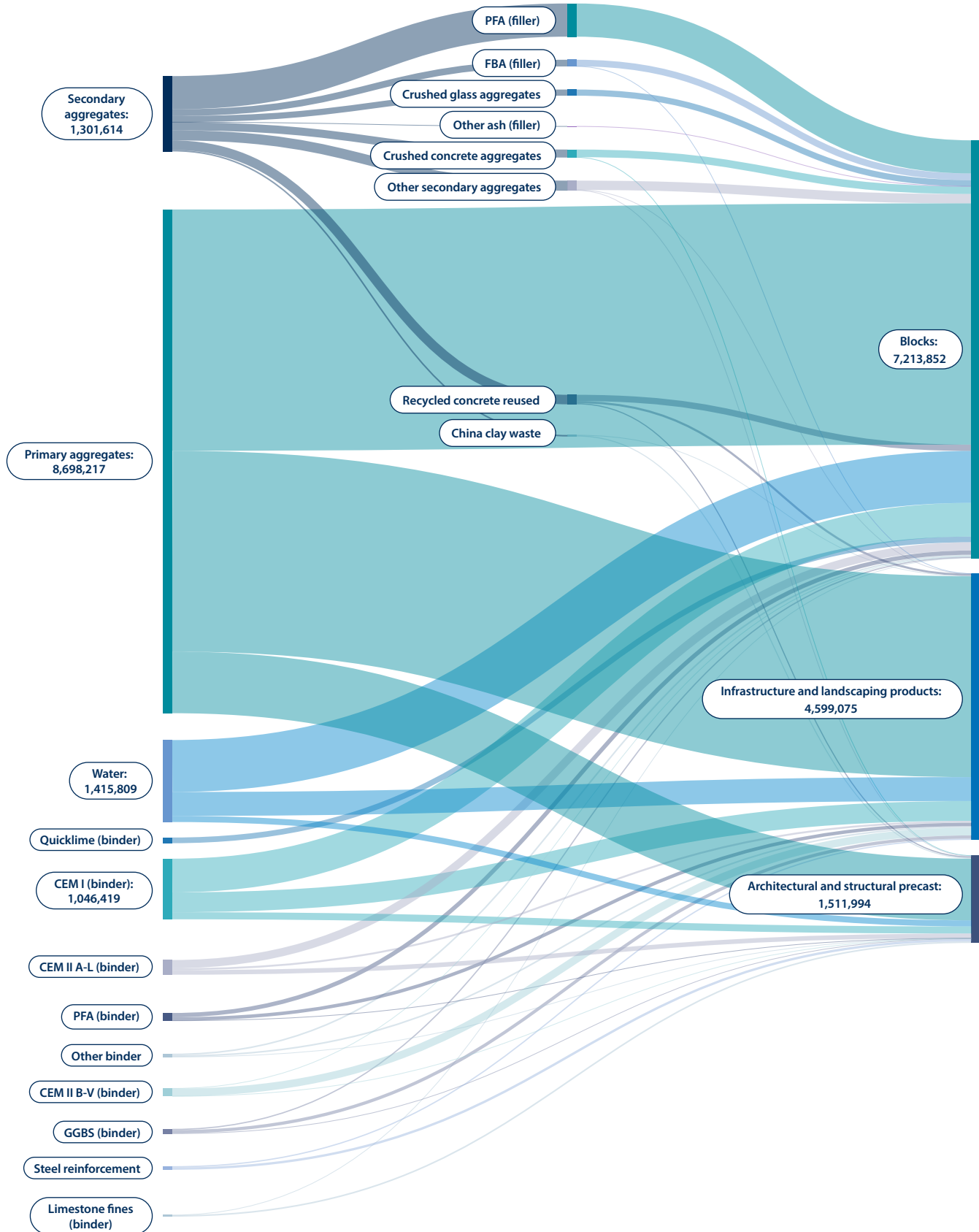
Aggregates, either primary or recycled, made up 75% of all raw materials consumed by the sector. Around 57% of cementitious binder used by the sector was reported as CEM I. But the share of CEM II A-L has risen significantly in 2023.

The embodied carbon of raw materials used (Lifecycle Module A1) in 2023 was around **1.42 million tonnes CO₂e**, which is 18% lower than the previous year. The average embodied carbon (LCA Module A1 only) was around **163 kg CO₂e/ m³** of product.

Photo credit: © Greg Holmes / Howells Architecture



Figure 7: Resource consumption from the production of UK Precast and Masonry products (tonnes), based on 2023 MPA data.



Summary Key Performance Indicators (KPIs)

This table summarises member companies' performance and progress in 2023 against the previous Precast Sustainability Charter Scheme 2012 baseline.

Strategy objective	Key Performance Indicator (KPI) Target (2012 baseline)	2012	2023
Carbon	Reducing overall fossil fuel energy (kWh/ tonne) use in production by 10%	62.7	58.21
	Reducing CO ₂ emissions for production (kg CO ₂ / tonne) by 20%	14.3	11.42*
	Production tonnage (sites) covered by ISO 50001 (energy management systems)	n/a	61.3% (44.3%)
	Companies covered by EPD declarations	n/a	30%
Circular Economy	Production tonnage (sites) covered by UKAS accredited Quality Management Systems	91.1%	89.2% (88.2%)
	Reduction of factory waste by 10% (kg/ tonne)	39.8	37.8
	Reduction of factory waste to landfill (kg/ tonne)	1.67	0.26
	Increasing the proportion of alternative cement additions (as a total of cement content) to 25%	23.4%	21.3%
	Increasing the proportion of recycled/ secondary aggregates to 25%	20.3%	12.6%
Natural Env.	Production tonnage (sites) covered by UKAS accredited Environmental Management Systems	88.9%	90.4% (88.4%)
	Sites with active Site Stewardship and biodiversity action plans	n/a	21.4%
	Environmental convictions for air and water emissions against precast manufacturing sites	0	0
	Reducing mains water consumption by 20%	82.3	86.2
Social Outcome	Increasing the proportion of employees covered by certified management systems (e.g. ISO 9001, etc)	95.6%	94.3%
	Increasing tonnage (sites) covered by H&S management systems (OHSAS 18001, ISO 45001, etc)	64.9%	71.7% (64.9%)
	Reduction of industry Lost Time Injury Frequency Rate (LTIFR)	9.8	5.66
	Maintain percentage of relevant sites with formal local liaison schemes	28.1%	30.5%

*This indicator was amended in 2023 to account for all factory energy Global Warming Potential (GWP) emissions (CO₂e) and not only CO₂ as in previous years this has contributed to the rise compared to previous years.

Note: Members of MPA Precast and MPA Masonry can use this data capture exercise and the targets set by the industry to help demonstrate conformance to the Responsible Sourcing of Materials standard (BES 6001) with regards to stakeholder engagement, etc. Third party certification auditors are welcome to contact MPA to gain confirmation that annual KPI data has been supplied.

Note: Due to technical and legal restrictions some data items can only be estimated.

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MPA Precast and MPA Masonry represent the UK precast concrete manufacturers, including aircrete and aggregate concrete blocks. We develop and disseminate best practice guidance to promote precast concrete in construction.

Web www.mpaprecast.org | www.mpamasonry.org

MPA Precast and MPA Masonry are product groups of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries. www.mineralproducts.org