Lower Carbon Concrete

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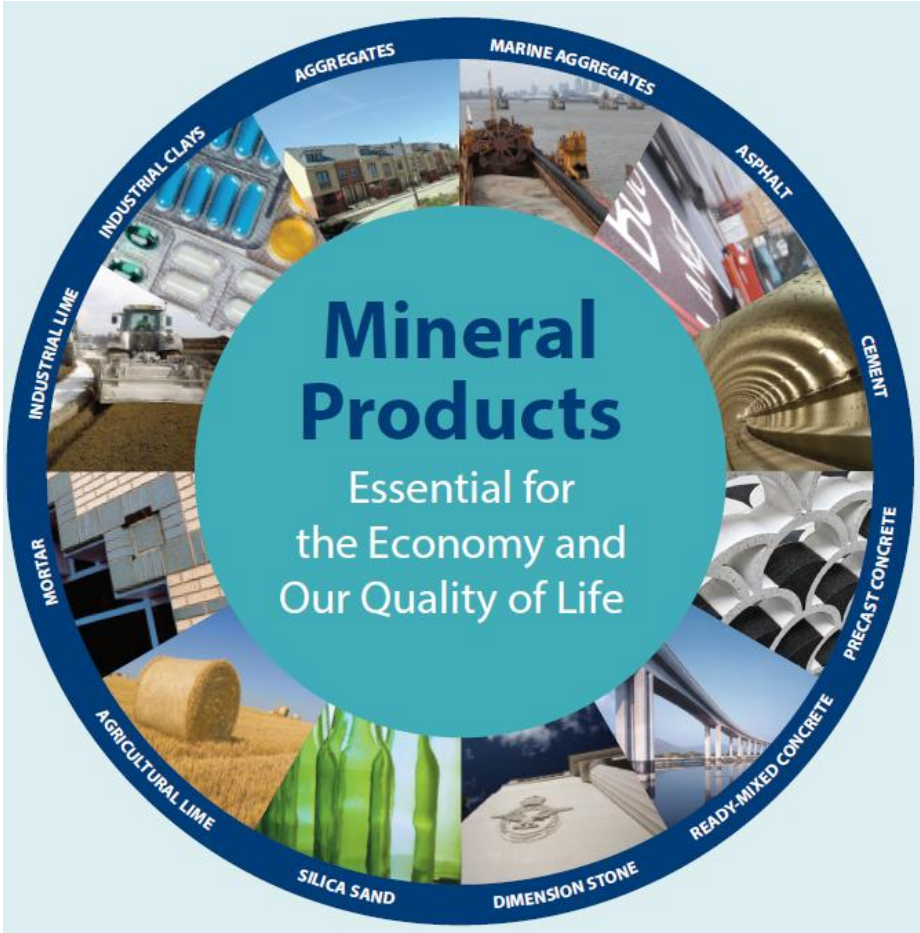
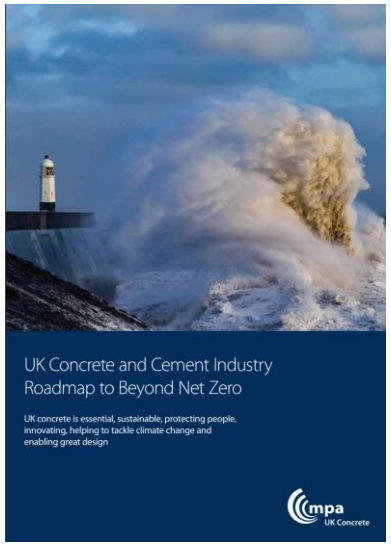
Mineral Products Association

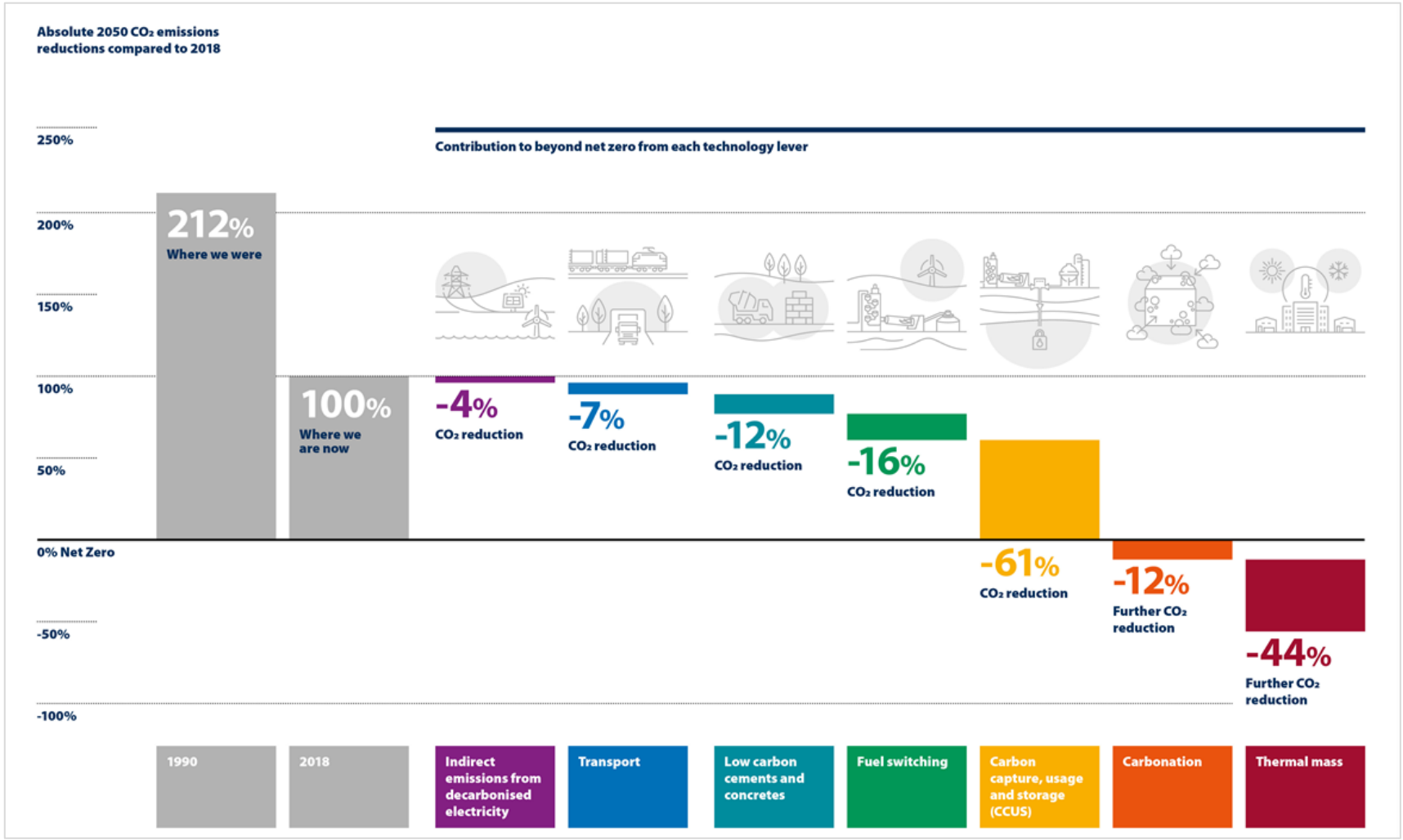
- Trade association for aggregates, asphalt, cement, concrete, dimension stone, lime, mortar & silica sand
- Growing membership of 520 companies
- 100% UK Cement and Lime production
- 90% Aggregate production
- 95% Asphalt
- Over 70% of Ready-Mixed Concrete and Precast Concrete production

https://www.mineralproducts.org/Homepage.aspx



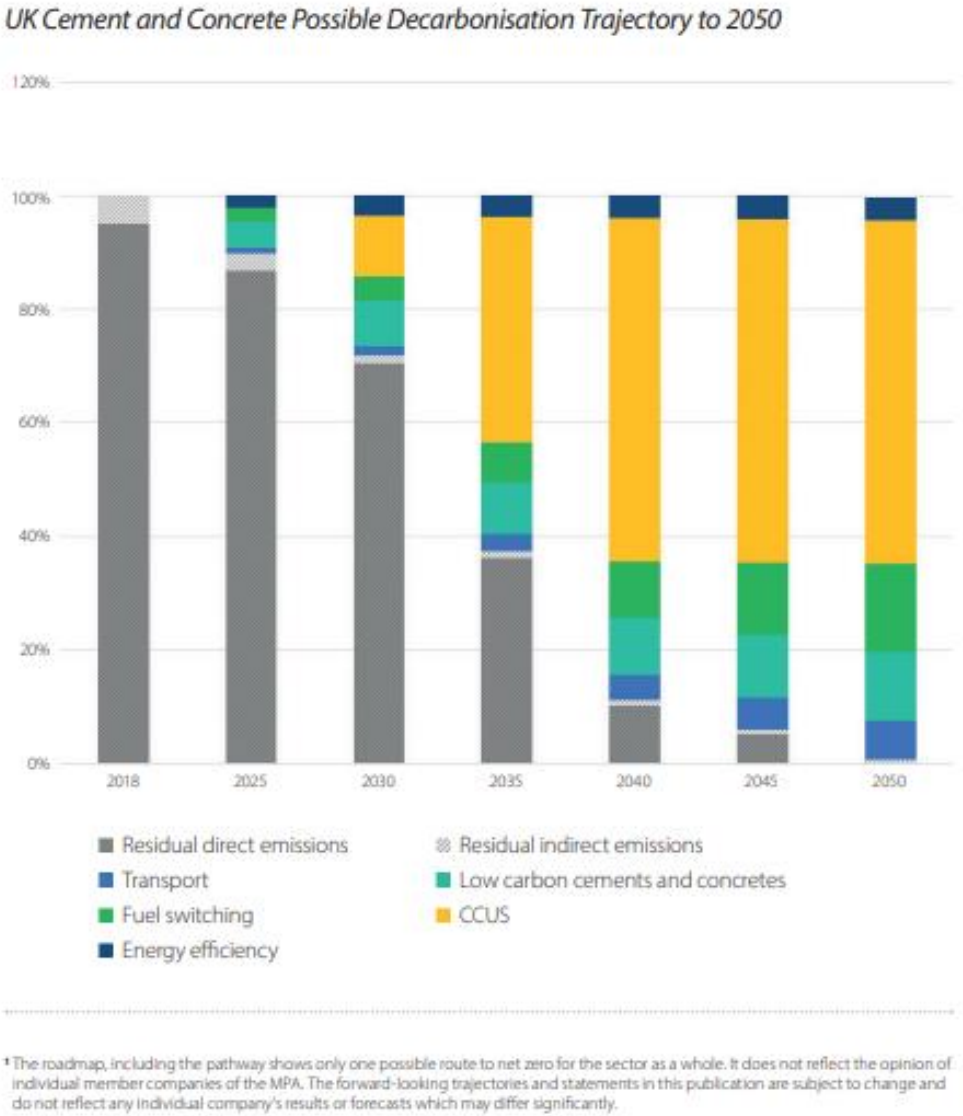
UK Concrete Construction Industry Roadmaps





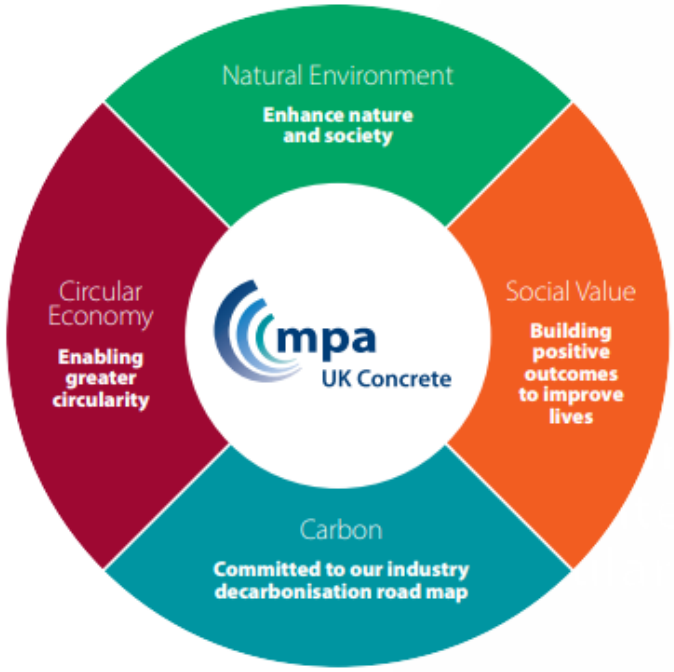
UK Concrete Possible Trajectory

- Estimate based on published information and knowledge of current Government policies.
- Aligns with levers within the roadmap
- CCUS (Carbon, Capture, Use or storage) is key to the decarbonisation of cement and concrete. This trajectory shows CCUS projects announced but in early development.
- 50% of cement net zero by 2035



* The roadmap, including the pathway shows only one possible route to net zero for the sector as a whole. It does not reflect the opinion of individual member companies of the MPA. The forward-looking trajectories and statements in this publication are subject to change and do not reflect any individual company's results or forecasts which may differ significantly.

UK Concrete Construction Industry Roadmaps

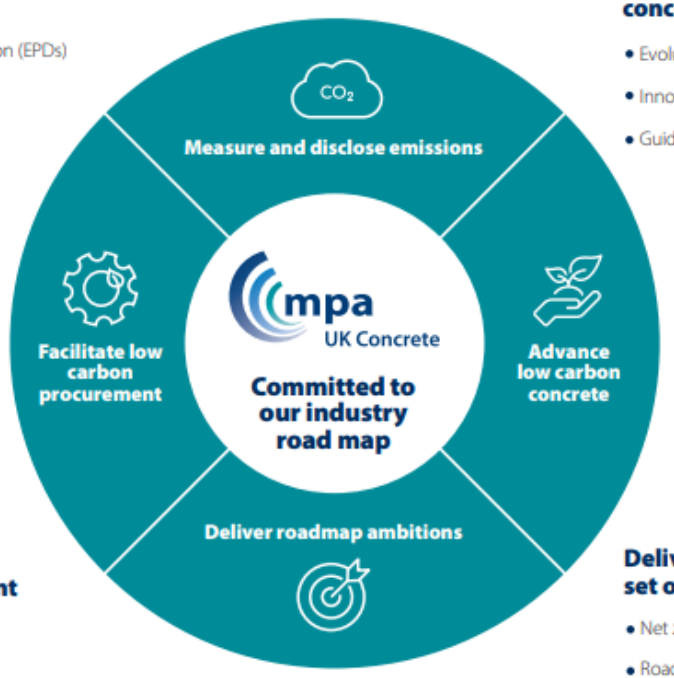


Measure and disclose GHG emissions associated with UK concrete production

- Environmental product declaration (EPDs)
- Concrete benchmarking
- Digitalisation and data sharing

Enable standards and specifications of low carbon concrete solutions

- Evolution of concrete standards
- Innovative products
- Guidance to accelerate adoption



Facilitate low carbon and resilient procurement

- Engage with value chain
- Engage with regulators
- Collaborate with sector stakeholders

Deliver the ambitions set out in the roadmap

- Net zero pathway
- Roadmap lever progress
- Policy requirements

Concrete – common constituent parts

Air 1.5%

Hydraulic binder (Cement) 10%

Water 18.5%

Fine Aggregate (sand) 25%

Coarse aggregate (crushed stone or gravel) 45%

Approx proportions of a 'typical' concrete mix

ECO_2 Cementitious binder: 252-840 kg/tonne **

ECO_2 Aggregates: 6.6 kg/tonne *

UK average ECO_2 of constituent materials *

*From Table 10 in Specifying Sustainable Concrete, The Concrete Centre, 2020

** From The Concrete Centre website https://www.concretecentre.com/Structural-design/Standards/Standards-for-concrete.aspx

Decarbonising cement and concrete

Table 2: Indicative embodied carbon (modules A1-A3) for different cements and combinations

Cement types			
Cement factory	Combined at concrete plant	Supplementary cementitious material (%)	Embodied carbon ($kgCO_2/t$)
CEM I / Portland cement	n/a	n/a	840
CEM II/A-L Portland limestone cement	CIIA-L	6-20	791-673
CEM II/A-M (S-L) Portland composite cement	CIIA-SL		
CEM II/A-V Portland fly ash cement	CIIA-V		
CEM II/B-V Portland fly ash cement	CIIB-V	21-35	693-553
CEM II/B-S Portland slag cement	CIIB-S		
CEM II/B-M (S-L) Portland composite cement	CIIB-SL		
CEM II/C-M (S-L) Portland composite cement *	CIIC-SL	36-50	569-452
CEM III/A Blast-furnace cement	CIIIA	36-65	575-362
CEM III/B Blast-furnace cement	CIIIB	66-80	355-252
CEM IV/B-V Siliceous fly ash cement	CIVB-V	36-55	545-390
CEM VI (S-L) Composite cement *	CVI-SL	51-65	459-342

* New cements

Portland cement 840 $kgCO_2$/tonne

Additions
finely-divided-inorganic constituent used in concrete in order to improve certain properties or to achieve special properties (EN 206)

Ground granulated blastfurnace slag
Fly ash
Limestone fines
Natural calcined pozzolana (calcined clay)

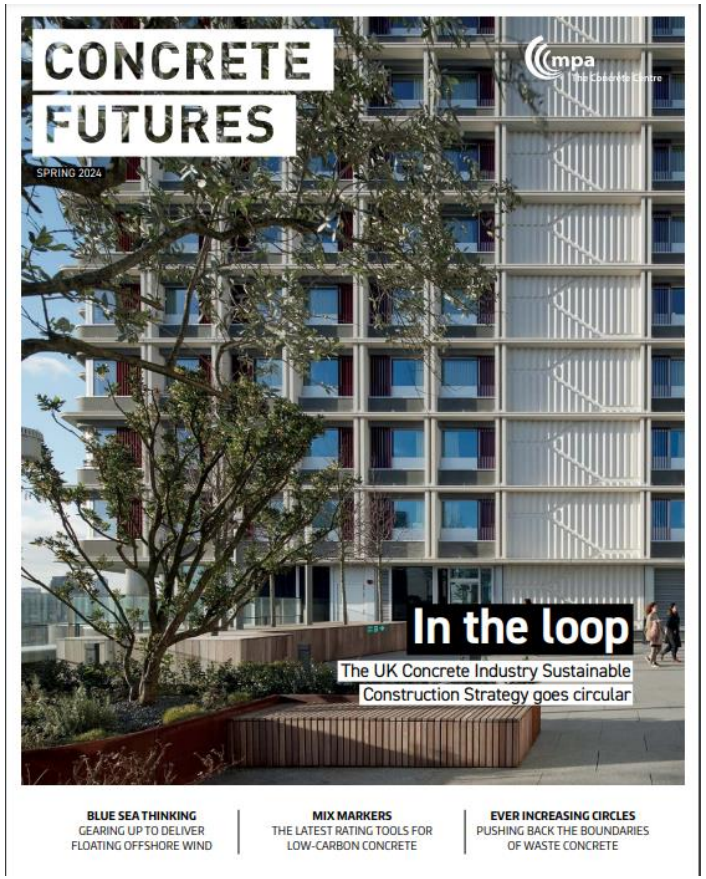
Portland cement

Binary cement

Ternary cement

https://www.concretecentre.com/Structural-design/Standards/Standards-for-concrete.aspx

Other future developments



https://www.concretecentre.com/Resources/Publications/Concrete-Futures,-2024.aspx

Supply Chain Publication

- MPA publication focussing on concrete supply chain – discussing opportunities & considerations
- Aim to be published in 2024
- Covers transport, constituent materials, carbon, social outcomes and construction considerations
- Sign up to the Concrete Centre https://www.concretecentre.com/ for free and you will receive an E-news when published.

Thank you for listening

https://www.concretecentre.com/