



**CEMKEM**

# Paving **the way**

to a *greener future*  
for cement product  
manufacturers through  
technical support.

## Introduction

For people working in the concrete and cement industry, it's no surprise that concrete is the most widely used substance on the planet – the only thing we process more of is potable water. But this scale of production is putting considerable strain on the earth's climate and natural resources. If concrete was a country, it would be the **third biggest CO2 producer in the world** after China and India.

In 2020, concrete producers made **4bn tonnes of concrete, and emitted nearly 8% of the world's CO2** – more than 2.8bn tonnes of carbon dioxide. And these figures are growing as we develop and upgrade infrastructures, and as economies like China and India grow exponentially.

In the UK, we're facing more stringent environmental regulations, including both the European Green Deal and the UK's own drive to net zero, and increasingly eco-sensitive customers. Industry body UK Concrete also has a roadmap that takes us beyond net zero by 2050. However, with new approaches to production and manufacturing, and particularly the move to low carbon cements, hydraulic binders and concrete, we can achieve all of this, to not only contribute to a greener future, but also meet – and exceed – our business goals.

In this guide, we'll look at:

- The challenges for concrete and cement product manufacturers as they face the demand to become more environmentally conscious in complex economic times.
- Some of the techniques available to help manufacturers meet their sustainability and carbon reduction targets.
- How Cemkem's technical experts are helping companies to successfully improve not only their environmental impact – but also their bottom line.

### The scale of the environmental challenge

**China produces and consumes 60% of the world's concrete**

**14,000 miles of the US coastline is covered in concrete**

**Concrete is responsible for 9% of global carbon emissions**

**In three years (2011-13), China used more concrete than the US used in the 20th Century**

## The green revolution in concrete has started

It's clear from the figures that we have to reduce the environmental impact of concrete and cement products. Cement product manufacturers are being pushed from two sides: by end-customers who are now more likely to make purchasing decisions based on environmental factors, and through **increasing environmental legislation**, for example around the move to net zero. So it's important that our industry makes significant steps towards improving sustainability and lowering carbon emissions.

UK Concrete has developed a roadmap for concrete and related businesses to move beyond net zero by 2050 – removing more CO2 from the atmosphere than they emit each year. It's an ambitious target, particularly as the plans don't rely on carbon-offsetting or offshore emissions.

However, the roadmap is clear, with five key areas for improvement. Most of these are already being investigated by concrete and cement manufacturers, with some success, including:

- **Reducing indirect emissions through decarbonised energy.** Decarbonising the electricity grid encourages electrification of the industry, as well as technologies such as carbon capture, utilisation and storage.
- **Decarbonising transport networks.** Electrifying vehicle fleets, including drum-mixer trucks, to reduce the effect of delivering products to sites.
- **Fuel switching.** Moving to renewable energy sources for production sites. Many already double up as waste disposal locations, burning rubbish for energy to power concrete production.
- **Carbon capture, usage and storage.** Installing hardware that captures CO2 from production for reuse in other processes – though this has low adoption to date as it's expensive to retrofit.

But the area that delivers the most environmental return on investment is making the move to low carbon cements and concretes. With alternatives to traditional portland cement mixes, businesses can significantly reduce their carbon footprint, plus gain other benefits ranging from cost reductions to improved product strength or/and durability.



## For low carbon, first start with reduced-carbon cement

We've already acknowledged that the process of producing concrete has a huge environmental impact. But the carbon footprint of concrete starts way before that - many of its essential components have intensive pre-production processes of their own.

Cement, the hydraulic binding agent that holds the concrete mix together, is a massive polluter:

1. It has its own **highly energy-intensive production process** that uses large kilns which have traditionally been powered by fossil fuels.
2. CO<sub>2</sub> is a direct by-product of cement production. It's estimated that for every **one kilogramme of cement produced, one kilogramme of CO<sub>2</sub> is sent into the atmosphere.**
3. More than half of the world's cement is made in China, followed by India and Vietnam, and requires shipping to be used anywhere else in the world.

All of which means you can deliver significant reductions to your carbon emissions by reducing the amount of cement you use.

## So why aren't we low cement already?

Concrete has been produced in the same way for many decades, and the scale of its use - and importance of the projects it's used in - means it's subject to significant legislation and regulation. There's been very little appetite to make significant changes to the ingredients, formulation and process until the last few years, when new technology and ingredients opened the door to new standards.

**Significant regulatory milestones** include updates in 2021 and 2023 to:

- Incorporate the use of multi-component cements, which allow for a reduction of up to 65% in the proportion of portland cement used in a given volume, which lowers the embodied carbon.
- Allow multi-component cements to include more than one addition and have higher portland cement replacement rates, enabling alternatives to ground granulated blast furnace slag (GGBS), again reducing embodied carbon.

But despite these changes, adoption of the new specifications has been slow, for a number of reasons:

1. **A business focus on day-to-day operations.** The changes relate to a leading-edge area of industrial chemistry, and in today's austere operating environment, many businesses are prioritising instead on core business activities.
2. **A lack of in-house technical expertise needed to adapt products.** Making significant product changes brings business risk unless you have very specific technical expertise within your business, for example to reformulate cementitious products and additives and understand the impacts on the end product. In addition, it can be difficult to keep on top of all the advances in materials and alternatives, such as synthetics and biomaterials.
3. **Supply chain issues.** Some of the most common lower-carbon cement additives use by-products of other production processes that are dying out in the UK, for example steel manufacturing. Moving to a cement alternative could mean supply chain uncertainty in the future, and ultimately reliance on imports from further away, requiring extended supply chains.

## Delivering change with Cemkem - the best technical partner for cement product producers

Our customers include many of the household names in the dry mix mortar and construction industry, who choose us for our chemical products and additives, such as **Lithkem, Revokem and Kemfloor.**

But many of our customers also work with our Technical Support Service - a highly experienced, multi-skilled team of chemists, technicians and researchers. From advising clients on how to improve formulations, to researching new products based on modern, sustainable bio ingredients, the team and their well-equipped lab help customers around the world to not only reduce their carbon footprint but also minimise the wider environmental impact of their business. Find out exactly how we can help in the next section.

**Cemkem supplies, distributes and manufactures the additives and admixtures that enhance leading construction brands' products, and delivers in-house product development services.**

We are able to help provide solutions for many of the challenges that cement producers face when looking for more sustainable and environmentally friendly ways of producing. Cemkem is part of the Rakem Group, a family of companies using innovative chemistry to solve a wide range of industrial chemical challenges. We bring together technical expertise and cutting-edge equipment to help businesses exceed their expectations.



# Solving environmental challenges through technical support

The Cemkem Technical Support Service team can not only help you meet your environmental goals, but also deliver cost reductions and process improvements, amongst other benefits.

We'll help you to:

1. Adopt market-leading, environmentally friendly admixtures and additives
2. Support product portfolios and R&D to deliver environmentally friendly innovation
3. Provide access to new, unique chemistry and environmental research

## 1

### Adopt market-leading, environmentally friendly admixtures and additives

We produce a range of popular off-the-shelf products that help companies to improve their environmental footprint, and our Technical Support Service team can help you with the testing and insights you need to understand the value and impact gained from moving to them:

- **Lithkem.** Designed for use in a number of cements and binder systems, Lithkem is a range of optimised products that provide a lower carbon footprint option to using 100% lithium carbonate, a non-renewable mineral collected through very carbon-intensive mining.
- **Revokem.** A range of novel powder retarders, again, optimised to hopefully reduce the overall amount of cement used.
- **Kemfloor.** This specially formulated screed additive not only reduces the amount of water needed compared to a traditional floor screed, it also maintains strength development performance when replacing CEMI cement with CEMII in the same proportions.

We can also adapt these well-established products to create bespoke solutions that meet any specific requirements you have - the development of sustainably sourced additives and admixtures is a continual focus for our technical team.

## 2

### Support product portfolios and R&D to deliver environmentally friendly innovation

For businesses without technical support, or with in-house teams that are stretched or may not have the necessary skills and experience, our Technical Support Service can work on projects across a wide range of outcomes, including:

- **Optimising product formulations.** Helping to, for example, change the raw materials mix to improve sustainability or reduce the carbon footprint without any adverse impact.
- **Increasing product efficiency.** Not only through the use of Cemkem products, but also by adopting new manufacturing methods or alternative raw materials.
- **Developing new products.** Working to address end-customer needs for sustainable and low-impact products to the client's parameters and expectations.

Innovation is a key pillar of the Cemkem brand. We live this every day through the research projects we engage in, often with partner organisations, to help keep ahead of the latest technologies and formulations.

## 3

### Sustainability advisory and other services

Many of our customers want to improve their environmental stance but simply don't know where to start. With its technology skills and industry experience, the Cemkem Technical Support Service works with businesses from across the sector to look holistically at their carbon reduction goals, and the steps they need to achieve them.

In addition, as environmental legislation becomes more important, so does your compliance. Our experience and tools enable you to deliver on all the regulatory obligations related to your environmental projects.





# Delivering the Cemkem difference for businesses

Cemkem's Technical Support Service team works with a number of different companies, delivering the technical and manufacturing support to enable their transformational growth.



## Case study 1

### Solving a product range problem for a construction material manufacturer

As one of the UK's leading manufacturers of specialist construction materials, this business came to us for support with a new product development challenge. The company had identified an opportunity for a cementitious screed product with high performance criteria, but due to raw material and time constraints, they didn't think they could achieve that level of performance in-house in the time needed.

We analysed the raw materials to understand the formulation challenges the company had encountered and then the resulting data. This, combined with our Technical Support Service team's knowledge and experience, enabled us to develop a unique formulation for them. It was tested against the company's parameters and tweaked in our state-of-the-art labs to create a proof of concept for business approval.

The result: a product that uses the company's own raw materials, minimising costs and boosting profit margins while opening the door to a new market.



## Case study 2

### Supporting a construction material business with technical services

This construction materials business has ambitious growth goals, and originally approached Cemkem when it became clear that its in-house technical team didn't have the resources to deliver all the projects required. The company was struggling to manufacture products at a high-enough quality and had started to fall behind on order delivery.

The company wanted to improve the formulation of one of its liquid products in order to maintain forecasted production targets and comply with CLP labelling requirements, and turned to Cemkem for help. We analysed the existing formulation and identified a number of performance issues, before identifying new polymers that would solve them. We also carried out a feasibility study to show we could meet the customer's high quality standards.

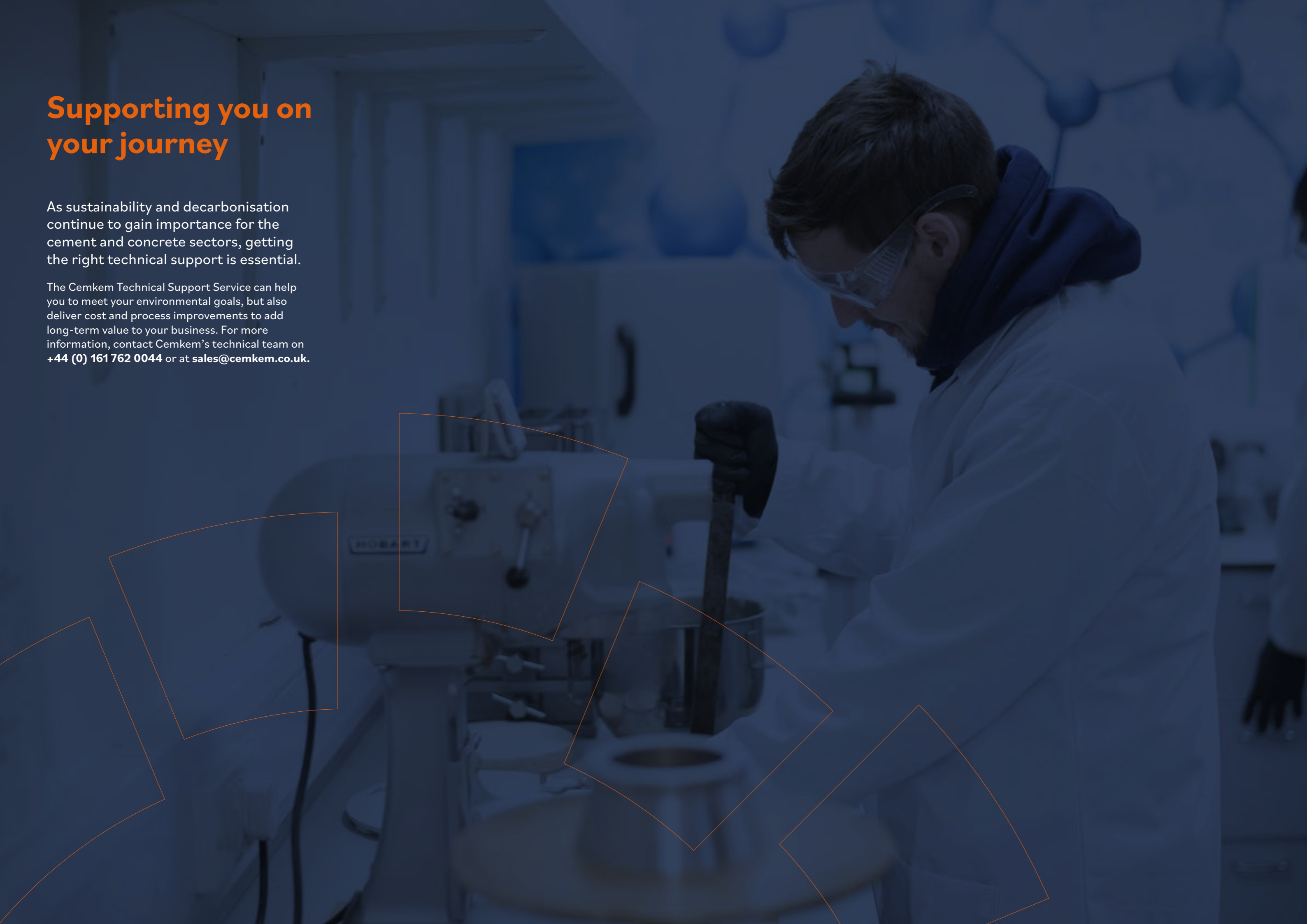
Together with additional toll manufacturing and regulatory support services, this work has enabled the company to rapidly increase its production volumes over a 12-18 month period, providing a broader and significantly more effective product range.



## Supporting you on your journey

As sustainability and decarbonisation continue to gain importance for the cement and concrete sectors, getting the right technical support is essential.

The Cemkem Technical Support Service can help you to meet your environmental goals, but also deliver cost and process improvements to add long-term value to your business. For more information, contact Cemkem's technical team on **+44 (0) 161 762 0044** or at **[sales@cemkem.co.uk](mailto:sales@cemkem.co.uk)**.





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