Committed to reaching net zero carbon by 2050

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Heidelberg Materials

Contents

Overview

Heidelberg Materials UK makes essential materials to build our future and reaching net zero carbon by 2050 is a responsibility we take very seriously.

We are committed to fulfilling our role in meeting the UK government's ambitions and Heidelberg Materials Group has signed the Business Ambition for 1.5°C Commitment and joined the UN's Race to Zero campaign.

Our route to decarbonisation has been ongoing for many years and we have made significant headway.

We have a roadmap in place, which includes a number of important areas that will help us achieve net zero.

These include:

- Increased use of alternative raw materials and alternative fuels
- Carbon capture and storage
- Fuel switching to hydrogen
- Use of reduced CO_2 products
- Improvements in plant efficiency and processes across our operations.

CO_2 emissions

reduced by 50%

since 1990

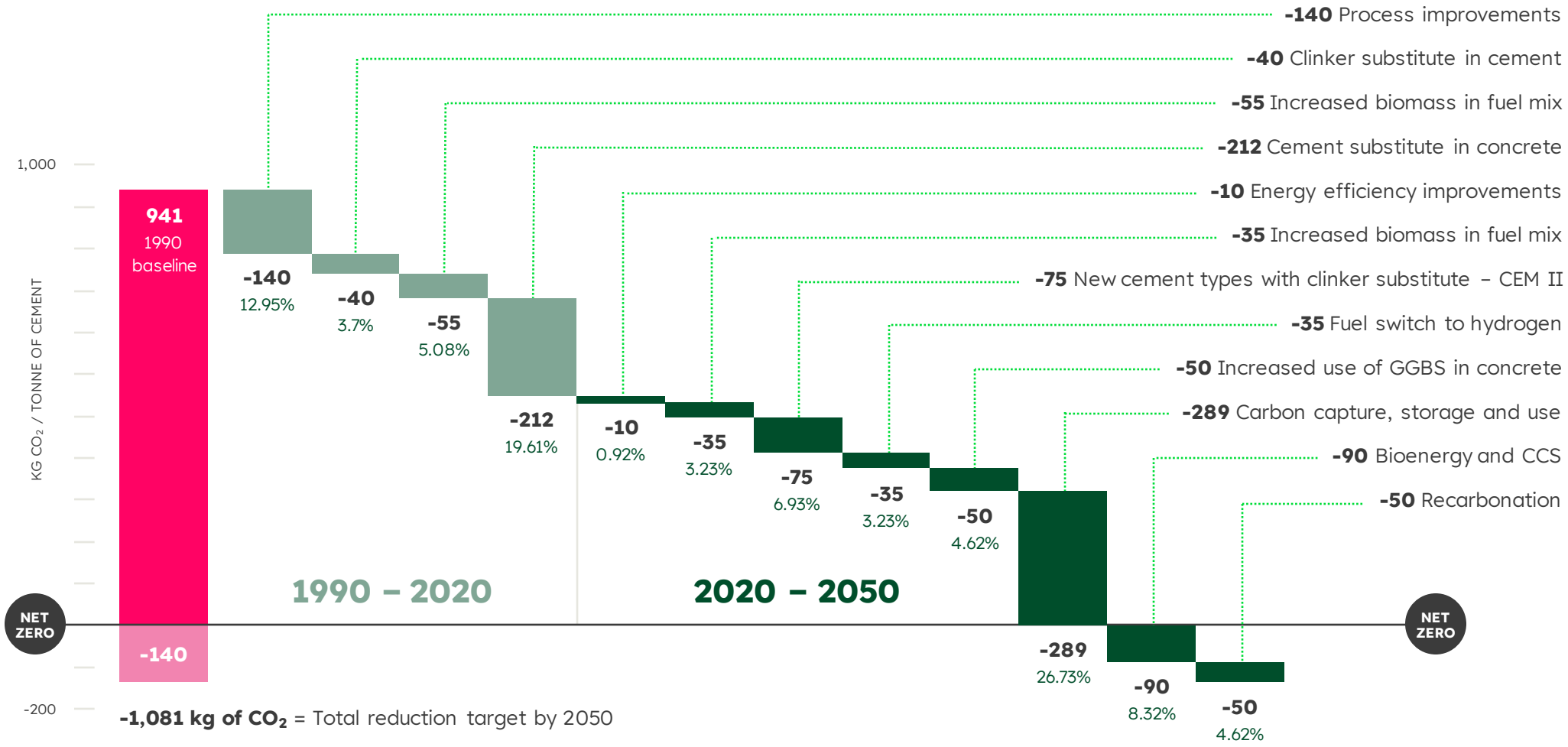
Investing

£55m by 2025

to cut CO_2 emissions by a further 15%

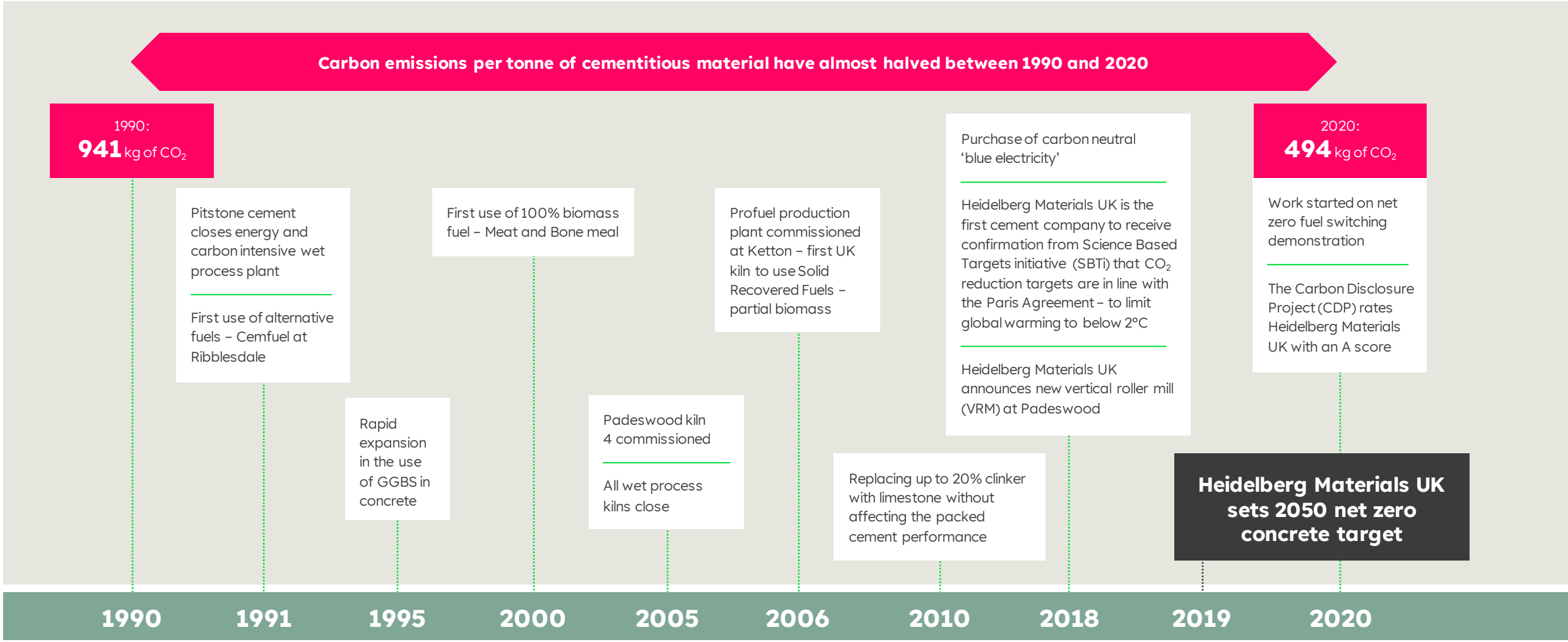
Levers to reduce CO_2 in cement and concrete production

Committed to reaching net zero carbon by 2050



-1,081 kg of CO_2 = Total reduction target by 2050

Key actions since 1990



Our actions today and what Heidelberg Materials UK has planned

Fuel switching

- Researching the potential of hydrogen to reduce carbon emissions through switching from fossil fuels on an industrial scale
- If implemented at our Ribblesdale cement works, it could save…

180,000 tonnes of CO_2 per year

Green hydrogen

- Hydrogen generated through renewable energy
- Hydrogen demonstration unit installed at our Regen GGBS plant in Port Talbot
- Aim to replace a percentage of the natural gas that powers our plants

2021

Yellow machines (mobile quarry plant) – conversion to HVO (hydrogenated vegetable oil) fuel and electrification of smaller vehicles

LGV (large goods vehicles) concrete delivery fleet – electrification transition begins

2025

Carbon capture

- In partnership with the HyNet North West consortium, Heidelberg Materials UK is aiming to create the world's first low carbon industrial cluster
- Potential to reduce emissions by 2030 at our Padeswood cement works by up to…

800,000 tonnes of CO_2 per year

H_2 fuel in larger quarry machines

LGV – H_2 in cement fleet as it is replaced

2030

Asphalt

Drying – gas and oil burner replacements/conversion to H_2 (hydrogen) fuel as UK H_2 infrastructure develops

2035

Levers for change

These six levers for change are driving projects that take us ever-closer to net zero by 2050.

- **Indirect emissions from decarbonised electricity**
- **Transport**
- **Low carbon cements and concretes**
- **Fuel switching**
- **Carbon capture, usage and storage (CCUS)**
- **Carbonation**

2050

We are involved in several industry-leading carbon reduction projects at our cement works in the UK.

This includes developing carbon capture and storage (CCS) for our Padeswood site in Mold, as part of the HyNet North West project, to make net zero cement a reality.

We have also demonstrated the use of a net zero fuel mix using hydrogen and biomass at our Ribblesdale works in Lancashire.

Across the business, additional small thermal and efficiency improvements are still possible, despite the extensive activity in this area over the last three decades, and nearly all our electricity-use is already carbon-neutral.

We will also continue to explore the potential for new technologies to enable our transport and heavy machinery to be more efficient.

Committed to 50% of van fleet and

100% of car fleet

being fully electric or hybrid by 2025

Cement

Since 1990, we have made excellent progress in reducing the CO_2 emissions associated with cement production.

This is a key focus for us as cement production is energy-intensive and the source of most of our CO_2 emissions.

Around 70% of these emissions arise from the calcination process (the chemical reactions that take place in the process to produce clinker) and we are actively developing an industry-leading carbon capture and storage project that removes these process emissions.

The remaining emissions are from the fuels used to power the kilns and we are working on projects to switch from fossil fuels to carbon neutral sources, including hydrogen.

We have also reduced emissions by using CO_2 captured from the stack at our Ketton cement works to mineralise bypass dust.

We are currently involved in several industry-leading projects, including carbon capture and storage at our Padeswood plant.

We have also demonstrated:

- The use of a net zero carbon fuel mix at Ribblesdale
- Mineralisation of our bypass dust using CO_2 captured from the stack at Ketton on a small scale.

Between 1990 and 2020, we have reduced the CO_2 emissions associated with cement production by more than 50%.

This has been achieved through a number of measures including:

- Investing to improve plant and process efficiencies.
- Switching to a zero-carbon electricity tariff.
- Installing a 13-megawatt solar farm at our Ketton cement works.
- Increasing the use of alternative lower/zero carbon fuels such as hydrogen and biomass, or fuels from waste such as liquid, paper and plastics.
- Increasing the use of lower carbon alternative materials such as Regen GGBS (ground granulated blastfurnace slag).
- Substitution of the CO_2 intensive clinker in cement by secondary cementitious materials (CEM II).

World's first

net zero fuel mix

including hydrogen in a kiln

Case study: **Carbon capture and storage (CCS)**

A UK first at a cement plant

We are partners in the HyNet North West consortium, which aims to create the world's first low carbon industrial cluster through its development of a hydrogen and CCS project.

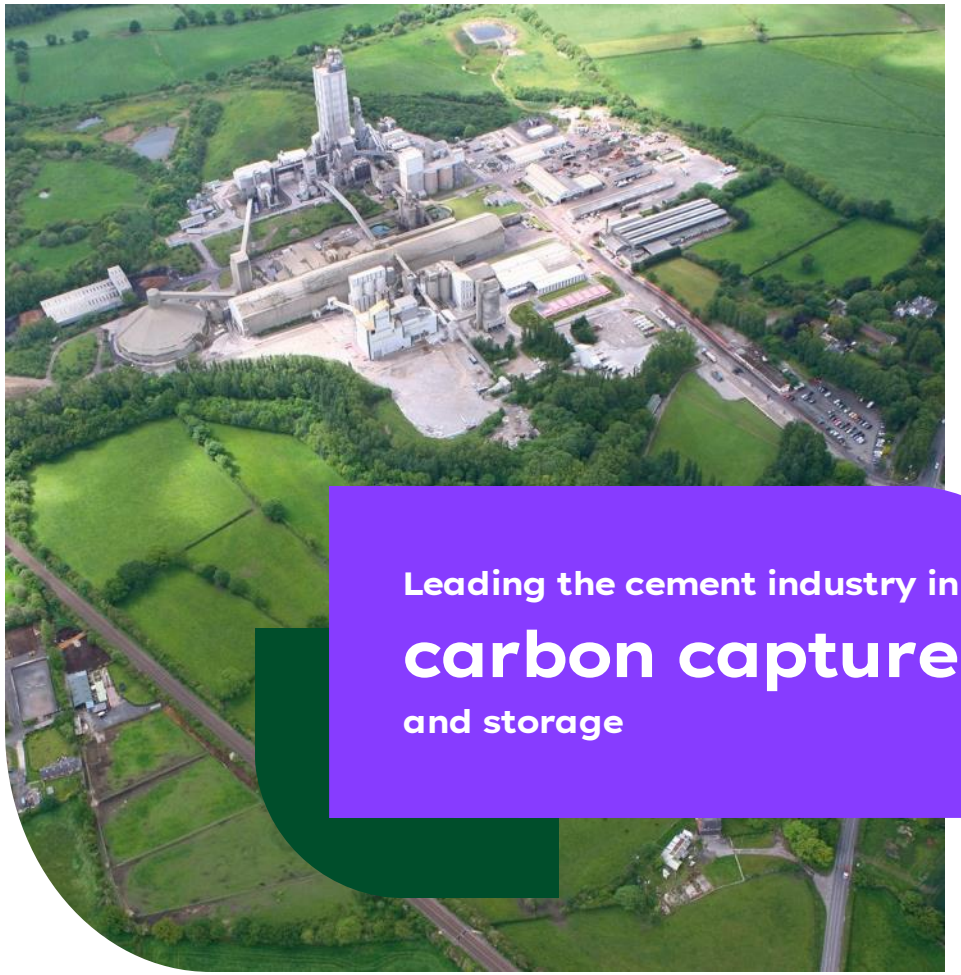
We are proposing to invest around £400 million to build an industry-leading carbon capture facility at our Padeswood cement works near Mold in north Wales.

It would capture the CO_2 produced during cement manufacture before it enters the atmosphere, transporting it via the HyNet underground pipeline and storing it safely under the seabed.

Carbon capture is a safe and proven technology that has been around for many years in other industries and is already being developed by Heidelberg Materials in Belgium, Canada and Norway.

Padeswood CCS could set the UK construction industry on a path to achieving the Government's binding net zero targets by capturing and storing 800,000 tonnes of CO_2 each year.

It would enable us to produce net zero carbon cement as early as 2027, which would represent a huge leap forward in our decarbonisation plans.



Case study: **Fuel switching to hydrogen**

World's first

net zero fuel mix

including hydrogen in a kiln

The cement kiln at our Ribblesdale cement works in Lancashire, has been successfully operated using a mix of net zero fuels as part of a world first demonstration project using hydrogen technology.

Funded by BEIS (now Department for Energy, Security and Net Zero) through Mineral Products Association, the success of the trial provides a further potential pathway contributing to net zero cement production and has the capability to be replicated across the industry and beyond, both in the UK and globally.

A green hydrogen demonstration unit has also been developed and installed at our Regen GGBS plant in Port Talbot, and cited as an example of industrial decarbonisation in the Government's net zero strategy.

Through collaboration with researchers at the Energy Safety Research Institute at Swansea University, the aim of the demonstration unit is to replace some of the natural gas used to power the plant with green hydrogen, which is considered a clean source of energy.

Case study: **Regen GGBS**

Regen GGBS (ground granulated blastfurnace slag) is a reliable and readily available replacement for some of the cement content in concrete, grout and mortar, to reduce CO_2 emissions, increase the long-term durability of structures and conserve natural resources for future generations.

GGBS is a by-product of the iron making industry and its manufacture requires less than one third of the energy and produces less than 10% of the CO_2 emissions of CEM I Portland cement (PC). GGBS does not require the quarrying of new materials and the slag used will not be disposed of as landfill.

More than a third of all ready-mixed concrete deliveries in the UK contain GGBS, which can replace a substantial part of the normal PC content – generally about 50%, but sometimes up to 95% in special applications – and can be used anywhere concrete is needed.

Regen GGBS produces

90% less CO_2 emissions

than CEM I Portland cement

Concrete

Concrete is the most widely used building material in the world. It is essential to society and a cornerstone of our built environment.

It is flexible, versatile, durable and strong, and is used in a wide variety of applications including housing, hospitals, schools, road building, wind farms, bridges and tunnels.

It also absorbs CO_2 throughout its life and is 100% recyclable, contributing significantly to the circular economy and providing materials with lower embodied carbon.

We are the largest supplier of low carbon concrete in the UK and are committed to producing net zero carbon concrete by 2050.

Our EcoCrete range reduces the CO_2 emissions associated with standard CEM I concrete by at least 30% and makes it easy to access low carbon concretes.

EcoCrete contains Regen GGBS, which reduces the embodied CO_2 in a concrete mix by around 780kg for every tonne of CEM I it replaces.

Using Regen GGBS in concrete has

saved 18 million

tonnes of CO_2 since 2000

The benefits of concrete

Availability

Easily and readily from our network of plants nationwide.

Circular economy

Concrete is long-lasting and 100% recyclable as well as being able to contain recycled/secondary aggregates and low carbon cement replacement products.

Thermal mass

Due to its ability to absorb and store heat, concrete can reduce energy requirements through passive heating/cooling.

Carbon uptake

Concrete absorbs CO_2 throughout its life. The more surface area exposed; the more it can absorb.

Strong and durable

Concrete is strong, durable and resilient, withstanding flood, fire and natural disaster, improving safety and reducing the need for maintenance and reconstruction.

Versatility

Concrete can be used throughout a structure and is suitable for a wide range of applications, allowing designers, engineers and contractors to deliver efficient and effective projects.

Concrete is an essential material

Powerline transmission:
Scotland and northern England

Powercrete heat conducting concrete reduces transmission loss in underground power cables, maximising power capacity.

Hospital:
Christie Hospital, Manchester

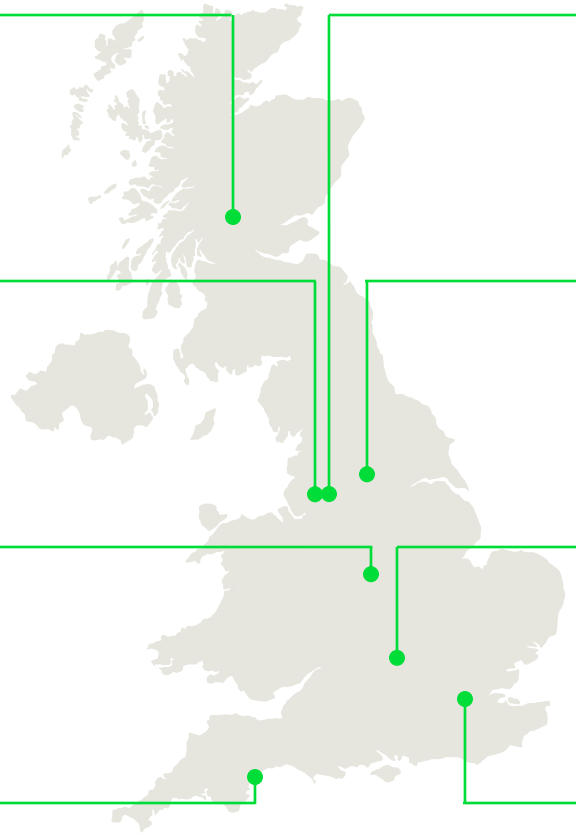
Supply of concrete containing 70% Regen GGBS to prevent thermal cracking and radiation shielding at cancer treatment facility.

Commercial:
Mercia Park, north west Leicestershire

Mobile concrete plant set up to supply 90,000m³+ of low carbon concrete to construct new employment park.

Sea wall defences:
Marine Parade, Dawlish

Use of low carbon concrete to reinforce the new sea wall as part of Network Rail's coastal protection scheme reduced the carbon impact of the concrete by two-thirds.



Residential:
Deansgate Square, Manchester

110,000m³ of high specification watertight concrete containing 70% Regen GGBS, minimises production of heat and reduces risk of thermal cracking.

Energy from Waste power station:
Ferrybridge Multifuel

Concrete supplied for 11-day continuous slipform pour plus a range of mixes for other applications at the EfW site, which will create low carbon energy.

Buildings:
Vaccine Manufacture & Innovation Centre

Help in fast-tracking the construction of the vital new building by providing concrete for the groundworks package at short-notice and under Covid-19 restrictions.

Tunnels:
Crossrail and Thames Tideway

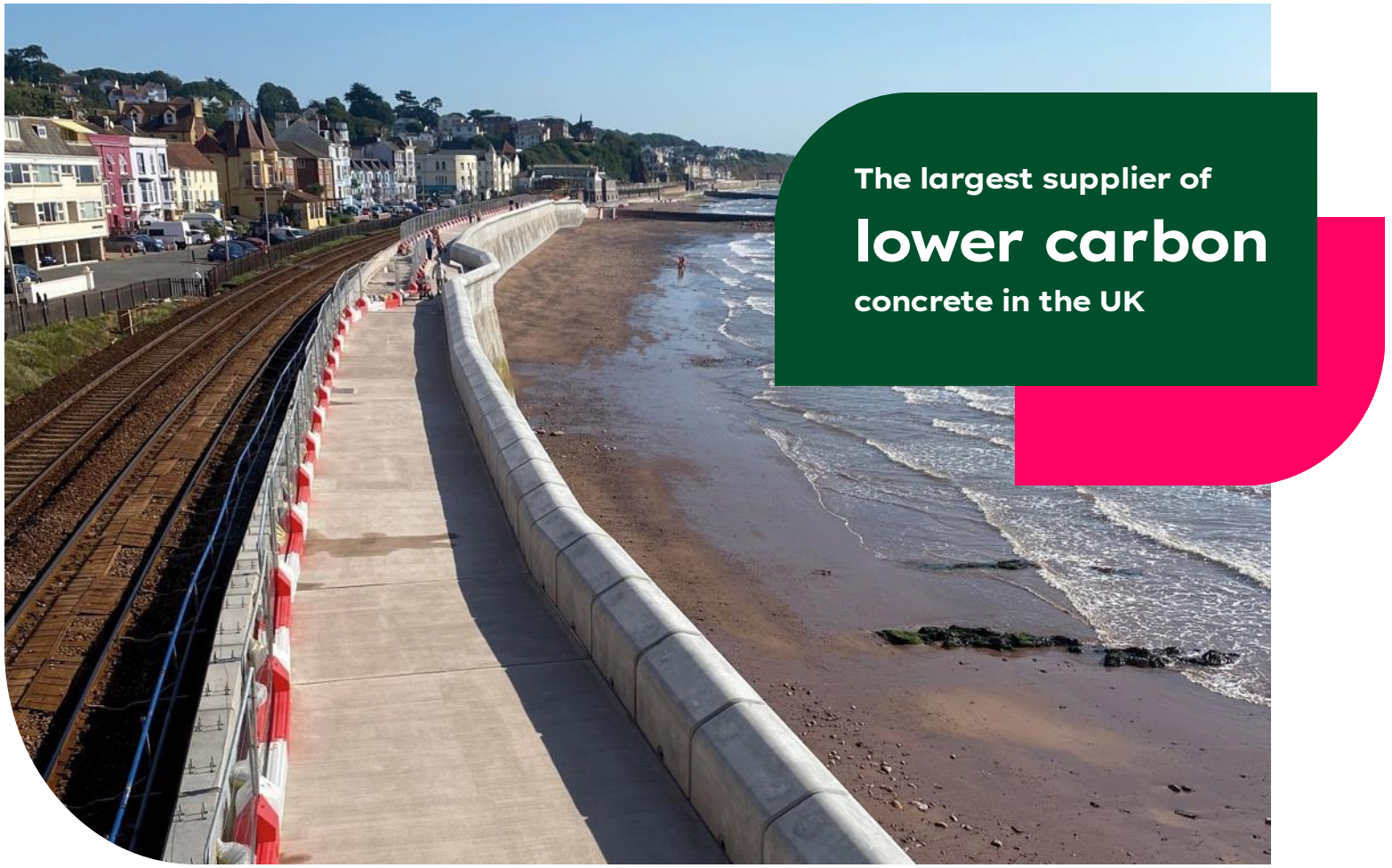
Supply of ready-mixed concrete, sprayed concrete and grouting, as well as pre-cast tunnel segments, for key national infrastructure projects.

Case study: **Lower carbon concrete**

Our lower carbon EcoCrete concrete was used at Marine Parade in Dawlish, south Devon, to reinforce the new, bigger sea wall structure as part of Network Rail's coastal protection scheme.

It is part of work carried out to improve the resilience of the railway, which is the only line into the south west.

Using EcoCrete helped contractor BAM Nuttall reduce the carbon impact of the concrete by two-thirds, which in turn helped their client, Network Rail meet its ambition of limiting the carbon footprint of the project and reduce the chances of it contributing to further climate change.




Aggregates

Aggregates – crushed rock, sand and gravel – are all essential materials used to produce concrete, build roads, buildings and other infrastructure projects.

On land we operate 47 quarries across the country and have a network of rail-connected depots to optimise logistics and minimise vehicle movements and associated CO_2 emissions between depots and the end user. Over 20% of material is transported by rail.

We also have a fleet of five marine aggregate dredgers to allow us to produce marine-dredged sand and gravel, which is becoming increasingly important due to the scarcity of land-won reserves.

As well as three newly opened rail depots, we have invested in a new, efficient dredger, and are aiming to set up a recycled aggregates depot.

Our network of rail-connected depots save

18.8 million road miles

each year, reducing CO_2 emissions

Case study: **New rail depots**

In 2021, we opened two new aggregates rail depots; in Tuebrook, near Liverpool, and West Drayton, west London.

The move was part of our strategy to improve our network of rail-connected depots and will reduce vehicle movements and associated CO_2 emissions.

Annually, the two depots are expected to handle up to 600,000 tonnes of aggregate a year between them, keeping over 27,000 lorries off the roads.

Rail depots opened in 2021 have

saved 27,000

HGV movements

Case study: **Hanson Thames dredger**

We have launched Hanson Thames, our new dredger, which forms part of our strategy to replace our ageing dredgers.

The vessel, which will operate in the North Sea and English Channel, provides increased payload and efficiency, allowing it to carry up to 7,000 tonnes of marine aggregates per trip.

Fuel consumption reduced by

8-11% per trip

due to new dredger

Asphalt and contracting

Asphalt, which is used for roads, driveways, footpaths and runways is durable and 100% recyclable.

We are one of the UK's largest suppliers and are working with National Highways to help meet its ambition for net zero road construction and maintenance by 2040.

One of the ways we can help achieve this is by investing in our asphalt plants: by replacing the burners and converting from diesel oil to gas, we have increased drying efficiency by 15%.

We can also help achieve net zero road construction and maintenance by 2040 by using our ERA warm mix asphalts.

These can help cut the CO_2 emissions associated with asphalt production by up to 15% as they are produced and laid at lower temperatures, using less energy and delivering significant carbon savings. They can also contain up to 50% recycled asphalt planings (RAP).

ERA 100 uses a micro-foaming process to reduce the temperature of the asphalt to below 100°C, cutting the carbon emissions associated with asphalt production by up to 50% while enhancing durability and improving health and safety for contractors.

ERA 140 WMAs incorporate a specialist bitumen that allows asphalt to be produced at temperatures up to 40°C lower than conventional hot mix asphalt, reducing energy use and saving an average of 2.4kg of CO_2 per tonne of asphalt.

Asphalt production CO_2 emissions can be

reduced by over 50%

using our ERA 100 WMA

Case study: **Tesco car parks**

We helped Tesco meet its sustainability targets while resurfacing its customer car parks by using our CleanAir asphalt. CleanAir reduces specific gases and particulate matter from asphalt mixtures, minimising the impact on local air quality.

It was produced using our ERA warm mix technology, which reduces the carbon emissions associated with asphalt production, providing Tesco with an innovative sustainable solution.

Case study: **Cumbria County Council**

We are trialling asphalt containing additives derived from waste plastics in a project with Cumbria County Council aimed at reducing the carbon footprint of highways schemes and providing a more resilient road network.

Part of the ADEPT (Association of Directors of Environment, Economy, Planning & Transport) SMART Places Live Labs project, the trial is using our RecyclePlast asphalt which includes Shell Bitumen's LTR (low temperature recycled).

It uses a chemically modified waste plastic to make it compatible with bitumen and enable asphalt to be produced and laid at lower temperatures.

As well as developing a beneficial use for plastic at the end of its life, the product also helps lower carbon emissions through reduced energy use during asphalt production.

Case study: **Trial of biogenic carbon reducing asphalt**

We are trialling our CarbonLock biogenic asphalt through the Dorset Highways Strategic Partnership, our long-standing agreement with Dorset Council which facilitates innovation and collaboration.

CarbonLock includes biogenic material that absorbs and 'locks in' CO_2 throughout its life, even when it's recycled. It is also produced using our ERA warm mix process, which allows the asphalt to be manufactured at a lower temperature.

As a result, CarbonLock provides at least a 25% reduction in carbon emissions compared with standard hot mix asphalt.

The low void, high bitumen content of the asphalt, coupled with the lower production temperatures, also creates a very durable materials - one that can also be laid as a single layer product, increasing efficiency and reducing disruption for road users.

Reusing 100% of old road materials saved

294,000 miles

of lorry movements

Collaboration

We can help our customers and their clients meet their own carbon reduction targets through early engagement.

We provide advice and technical support to design, develop and supply bespoke materials suitable for a project's individual requirements and offer CPD-accredited webinars to educate all stakeholders on how to specify low carbon materials.

In addition, we use the BRE LINA online tool to provide life cycle assessments and verified Environmental Product Declarations (EPDs) to allow customers to choose the lowest carbon products for their projects.

Verified EPDs are available for eight of our most popular concrete mixes as well as the UK average concrete, cement and Regen GGBS.

All aggregate, clinker, cement and Regen sources are available as materials within LINA to allow the generation of unverified EPDs for specific products on request, including the calculation of cradle to gate carbon that can be calculated for all products.

Get in touch

Visit our website for more information and to find out how we can help you with your own carbon reduction aims.

heidelbergmaterials.co.uk

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