

PPN 06/21 carbon reduction plan

Introduction

Heidelberg Materials UK is committed to fulfilling our share of the global responsibility to keep the rise in worldwide temperature well below 1.5°C.

Our route to decarbonisation has been ongoing for many years and we have made significant headway. We have already reduced our CO₂ emissions in the UK by 50% since 1990 and are investing £55 million by 2025 to help cut this by a further 15%.

In 2022 our parent company Heidelberg Materials Group announced new targets to accelerate our journey towards net zero carbon by 2050. By 2030, they aim to:

- Cut CO₂ emissions to 400kg per tonne of cementitious products.
- Generate 50% of gross revenue from low-carbon and circular products and solutions.
- Offer circular alternatives for half of our concrete products.

To reach net zero carbon by 2050, we are involved in a number of industry-leading carbon reduction projects. These include carbon capture and storage at our Padeswood cement plant planned to be in operation by 2028 – and a successful world first net zero carbon fuel mix trial at our Ribblesdale plant in 2021. We are trialling carbon capture technology at our Ketton cement works in 2024 and have a hydrogen demonstration project planned for our Criggon asphalt plant in 2025 – both industry leading projects.

Effective management of our CO₂ emissions is of key importance to us. Our long-term success depends on sustainable business practices and the UK executive team has given its full backing by launching a dedicated carbon working group, which includes a carbon innovation manager to ensure that continuous CO₂ emission reductions are achieved.

In September 2023 Heidelberg Materials UK achieved certification to PAS 2080 – the carbon management standard for buildings and infrastructure.

Yours sincerely,

Simon Willis

Simon Willis
Chief Executive Officer, Heidelberg Materials UK





Ribblesdale cement plant in Clitheroe, Lancashire

Carbon reduction plan

Supplier name: Heidelberg Materials UK

Publication date: 31/12/2023

Heidelberg Materials UK

Heidelberg Materials UK is a leading supplier of heavy building materials to the construction industry. We produce and sell four main product types – cement, aggregates, asphalt and ready-mixed concrete. We are part of Heidelberg Materials, one of the largest building materials manufacturers in the world – it is the global market leader in aggregates and also has leading positions in cement, concrete and other downstream activities.

Our basic raw materials are used to make added value products:

- Crushed rock and sand are mixed with bitumen to make asphalt for road surfacing.
- Sand, gravel and limestone are mixed with cement/Ground Granulated Blastfurnace Slag (GGBS) to make ready-mixed concrete.
- Aggregates and cement are put into handy sized bags for selling through builders' merchants and DIY stores.
- We operate over 300 production sites across England, Wales and Scotland including three cement plants, three GGBS plants, 80 aggregate quarries, wharves and depots, 35 asphalt plants and 170 ready-mixed concrete plants.

The vast majority of Heidelberg Material UK's CO₂ emissions are produced by our three cement plants. The production process is highly CO₂ intensive for two reasons: firstly, a chemical process takes place that produces CO₂, and secondly, large amounts of fuel are required to heat the raw materials in the kiln.

In comparison, the production of aggregates, asphalt and concrete have a much lower scope 1 CO₂ emission intensity per tonne: 3.5kg for aggregates, 25kg for asphalt and 1.0kg for concrete.

Commitment to achieving net zero

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 our parent company, Heidelberg Materials, has signed the Science Based Target Initiative's (SBTi) Business Ambition for 1.5°C and joined the UN's Race to Zero campaign.

Due to the type of our manufacturing operations, the only greenhouse gas that is relevant is CO₂ and our net zero commitments relate to CO₂ only.

We have a roadmap in place that will help us achieve net zero by 2050.

It includes improvements in plant efficiency and processes across our operations and the increased use of alternative raw materials and alternative fuels. We are also involved in several industry-leading carbon reduction projects, including carbon capture and storage (CCS) at our Padeswood cement works in north Wales as part of the HyNet North West project and demonstrating a net zero fuel mix using hydrogen at our Ribblesdale works in Lancashire. We are trialling carbon capture technology at our Ketton cement works in 2024 and have a hydrogen demonstration project planned for our Criggion asphalt plant in 2025 – both industry leading projects.

Heidelberg Materials UK has a dedicated cross-functional working group tasked with ensuring that we meet our targets. It is chaired by one of our board members.

Heidelberg Materials also has a strong track record in reducing CO₂ emissions and was awarded a place on CDP's Climate Change A-list in 2019, 2020, 2021 and 2022.

In 2020, it adopted a 'beyond 2020' strategy, with sustainability as one of six core areas, and it has committed to further reduce net CO₂ emissions and will realise its vision of carbon neutral concrete by 2050. In the UK, we have launched our 2030 commitments, which are the cornerstones of our sustainability strategy, and we are working to fulfil our share of the Heidelberg Materials target.

In addition, we also hold a number of ISO accreditations, such as ISO 14001 (environmental management) and ISO 50001 (energy management). We have also implemented the carbon management standard PAS 2080. These further demonstrate the environmental management measures we are taking.



Baseline emissions footprint

Baseline emissions are a record of the greenhouse gases produced in the past. They are the reference point to measure current and future reductions against.

Baseline year: 2016

Heidelberg Materials UK is a manufacturing business and therefore the total of our scope 1 and 2 emissions are significantly larger than our scope 3 emissions. Scope 1 and 2 emissions have been monitored, recorded and internally verified since 2010 (and also externally verified by Lucideon since 2013).

Heidelberg Materials UK has started to record and monitor scope 3 emissions to its own internal standards and reporting procedures. This process is on-going and the published scope 3 emissions for the baseline year are estimated. Heidelberg Materials UK has launched a project to improve their accuracy going forward.

Heidelberg Material's cement plants and several of our asphalt plants are subject to the UKETS regulations and their formal verified declarations are made to the Environment Agency and Natural Resources Wales on an annual basis.

The baseline year has been set to 2016 as this year is used as a basis for our carbon reduction target in line with SBTi's, the Heidelberg Materials CO₂ reduction strategy and Heidelberg Materials UK's 2030 commitments.

Baseline year emissions

Emissions	Total tonnes CO ₂ (tCO ₂ e)
Scope 1	1,986,423
Scope 2	203,049
Scope 3	456,877 (estimate)
Total emissions	2,646,349

Current emissions reporting

Reporting year: 2022

2022 year emissions

Emissions	Total tonnes CO ₂ (tCO ₂ e)
Scope 1	1,894,297
Scope 2	4,834
Scope 3	324,007 (Categories 4, 5, 6, 7 and 9)
Total emissions	2,223,138

As mentioned above, we have an on-going project to more accurately determine our scope 3 emissions. At this point, we have only calculated the CO₂ emissions from categories four, five, six, seven and nine (Procurement Policy Note (PPN) 06/21). These equate to 324,007 tonnes. We aim to also determine the CO₂ emissions of further categories one, two, three and seven that are relevant to our operations.

Emissions reduction targets

Heidelberg Materials UK reports and monitors absolute and specific CO₂ emissions. However, our CO₂ reduction targets are set on a specific per tonne basis. Setting an absolute target in the short and medium term would be misleading as CO₂ emissions are mainly driven by sales volume. Higher sales increase absolute CO₂ emissions while lower sales decrease absolute CO₂ emissions.

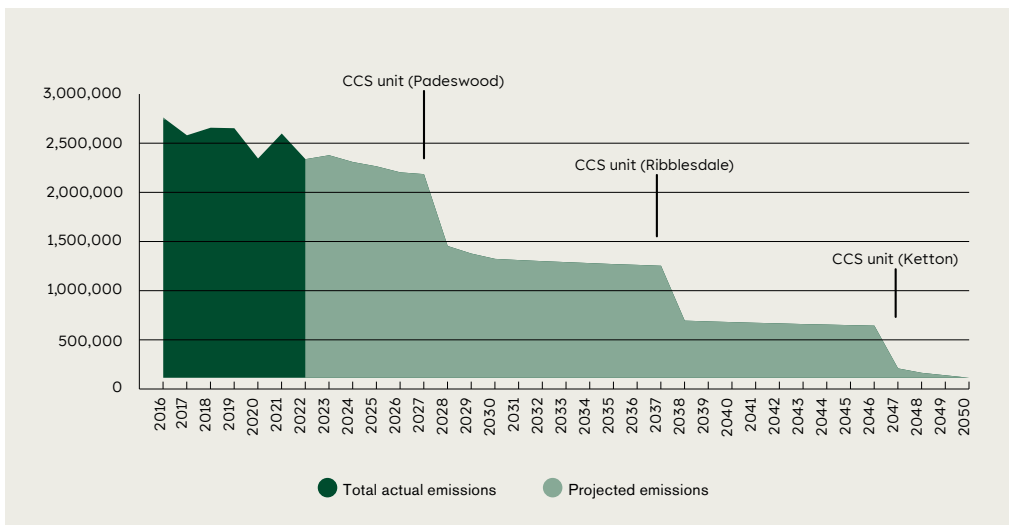
A carbon reduction target set on a specific per tonne basis is more meaningful as it better reflects the progress we are making. However, Heidelberg Materials UK has set itself the target of reaching net zero carbon by 2050 in terms of absolute and specific CO₂ emissions.

To continue our progress towards achieving net zero, we have adopted the following targets, which are also part of our 2030 commitments:

- Scope 1 emissions: 15% reduction by 2030 (baseline: 2016).
- Scope 2 emissions: 65% reduction by 2030 (baseline: 2016).
- Scope 3 emissions: 15% reduction by 2030 (baseline: 2019).
- Car and van fleet: 100% fully electric or hybrid (cars) and 50% full electric or hybrid (vans) by 2025.

The targets apply to all of our operations – cement/GGBS, aggregates, asphalt and concrete.

At the end of 2022 absolute CO₂ emissions have decreased by 16.0% - an estimated 423,211 tonnes and we predict further reductions to 2025, 2030 and to achieve net zero by 2050.



The graph shows our total CO₂ emissions from 2016 to 2022 and projected emissions from 2023 to 2050. We anticipate CO₂ emissions will drop in 2028 thanks to our investment of more than £400 million in a CCS unit at the Padeswood cement plant. Further significant reductions are expected when our two remaining cement plants will install CCS units. We anticipated that this will be around 2037 and 2047.

Carbon reduction projects

Heidelberg Materials UK has implemented a number of CO₂ emission reduction projects, which have enabled us to reduce our CO₂ emissions since 2016.

Completed projects

Electricity

Heidelberg Materials UK has reduced its scope 2 emissions by 97.0% through only using carbon neutral electricity. We signed the relevant agreement with our electricity provider in 2018. We have been unable to fully reduce CO₂ emissions from our electricity consumption as some of our sites are obliged to purchase electricity from our landlords.

Use of GGBS

Heidelberg Materials UK is the GGBS market leader in the UK. We operate plants at Port Talbot in South Wales, Purfleet in London and Teesside, in the north east and have terminals in the south west at Teignmouth and in Glasgow, Scotland.

Using GGBS as a cement alternative in concrete drastically reduces CO₂ emissions. GGBS has a significantly lower CO₂ footprint than cement because no process emissions occur and no fossil fuels are required to heat up the raw materials, which makes its use one of the most effective methods to reduce the CO₂ emissions in concrete.

Alternative fuels

The use of alternative fuels such as solvents, tyres and fuels containing biomass reduces CO₂ emissions as they are burned instead of fossil fuels, such as coal. Heidelberg Materials UK has increased the use of alternative fuels at our cement plants from 45% in 2016 to 62% in 2022, with the overall biomass content share of those fuels rising from 14% to 25%. These increases were mainly achieved by the increased use of solid recovered fuels which have a biomass content of ~50%.

Environmental Product Declarations (EPDs)

EPDs are a useful tool to provide transparency of the environmental impact of a product (e.g. a concrete mix) and to compare the impact of different product options. We offer our customers EPDs for a range of concrete mixes, cement types and asphalt mixes.

Heidelberg Materials UK is committed to reduce CO₂ emissions further and to reach net zero carbon by 2050. We have developed a net zero carbon roadmap to achieve this; and we are working on a number of projects, as outlined below.

Blackpool sea defences, Lancashire – contains Regen GGBS



On-going/future projects

Carbon capture and storage (CCS)

This involves capturing CO₂ emissions before they are released into the atmosphere and then transferring them to a storage facility, such as an exploited oil or gas field.

The technology is a key part of our roadmap to achieve net zero carbon by 2050 as it allows us to decarbonise the cement production process.

Heidelberg Materials UK is a partner in the HyNet North West consortium, which aims to create the world's first low-carbon industrial cluster by using hydrogen and CCS. HyNet will reduce regional CO₂ emissions by up to 10 million tonnes (including up to 800,000 tonnes from Heidelberg Material's Padeswood plant) every year by 2030. It is anticipated the project will reduce our total CO₂ emissions by about 30%.

In March 2023 we progressed to the due diligence and negotiation phase in our bid to install carbon capture technology through the Government's Phase-2 cluster sequencing programme. The announcement is another step towards installing carbon capture technology at the site and establishing the UK's first net zero cement works as part of the HyNet decarbonisation cluster.

Net zero fuel trial

In a successful world first trial in 2021, we demonstrated the use of a net zero fuel mix at our Ribblesdale cement plant using hydrogen technology. The carbon-neutral mix consisted of approximately 39% hydrogen, 12% meat and bone meal (MBM) and 49% glycerine.

The project was supported by the Mineral Products Association and funded by the UK government's Department for Business, Energy and Industrial Strategy (BEIS).

During the demonstration, the proportion of fuels in the kiln's main burner were gradually increased to the net zero mix. If fully implemented for the whole kiln system, nearly 180,000 tonnes of CO₂ emissions could be avoided each year at Ribblesdale alone compared to using fossil fuels, such as coal.

Hydrogen use

Heidelberg Materials UK is investigating the use of hydrogen to decarbonise our operations. We are working on several projects in parallel to drive this forward.

A hydrogen demonstration unit, which generates green hydrogen through renewable energy, has been developed and installed at our GGBS plant in Port Talbot. It aims to partially replace the natural gas used to power the plant with green hydrogen, which is a clean source of energy as it only emits water when burned. The unit produces hydrogen using renewable energy generated onsite through wind and solar. The energy is directed into an electrolyser – a water splitting device – where it separates water into hydrogen and oxygen. The hydrogen is then passed into the burner to enrich the combustion instead of natural gas.

Heidelberg Materials is also exploring how we can decarbonise the road and construction sectors. Specifically, we are investigating how hydrogen can be used as a substitute for diesel in our distribution fleet. In addition, we are exploring how hydrogen can be deployed in our asphalt and cement plants.



On-going/future projects (continued)

CEM II/A-LL

Reducing the clinker content in cement is a very effective method to reduce CO₂ emissions in cement. Currently the use of a CEM II/A-LL on its own or in combination with GGBS has only been permitted in certain applications. Therefore, a CEM I has predominately been used in the UK. However, a change in the concrete standard (BS 8500), implemented in 2023, will enable the wider use of a CEM II/A-LL cement. We are adjusting our product offering and will be adding a CEM II/A-LL with 10% limestone to reduce CO₂ emissions.

Initial trials have shown CEM II/A-LL cement has the same strength class (52.5 N) as regular CEM I and we are currently rolling it out to selected customers for further testing.

A large-scale rollout is planned and the new CEM II/A-LL is a critical milestone for Heidelberg Materials UK and our customers to reduce CO₂ emissions. Overall, we anticipate that we can achieve a CO₂ emissions reduction of up to 20,000 tonnes per year.

Partnerships

Heidelberg Materials UK is initiating new partnerships to drive our decarbonisation agenda. For example, we have signed a Memorandum of Understanding (MoU) with Shell to work together to explore opportunities that help the construction industry's transition to net zero emissions.

Six key areas have been identified for discussion under the MoU:

- Hydrogen for transport and industrial processes: investigating available options.
- Carbon capture utilisation and storage (CCUS): in cement production.
- Lower carbon fuels: as well as exploring EV solutions for construction equipment.
- Digital innovation: for example, enhancing the management of energy production, fuel consumption and operational efficiencies.
- Bitumen and asphalt technology: to provide longer life, increased recycling and lower carbon innovations.
- Renewable energy: such as onsite solar installations and battery solutions to replace diesel generators.

In addition, we will consider the possibility of collaborating in future business opportunities or new business models, which will create value and scope for further decarbonisation.

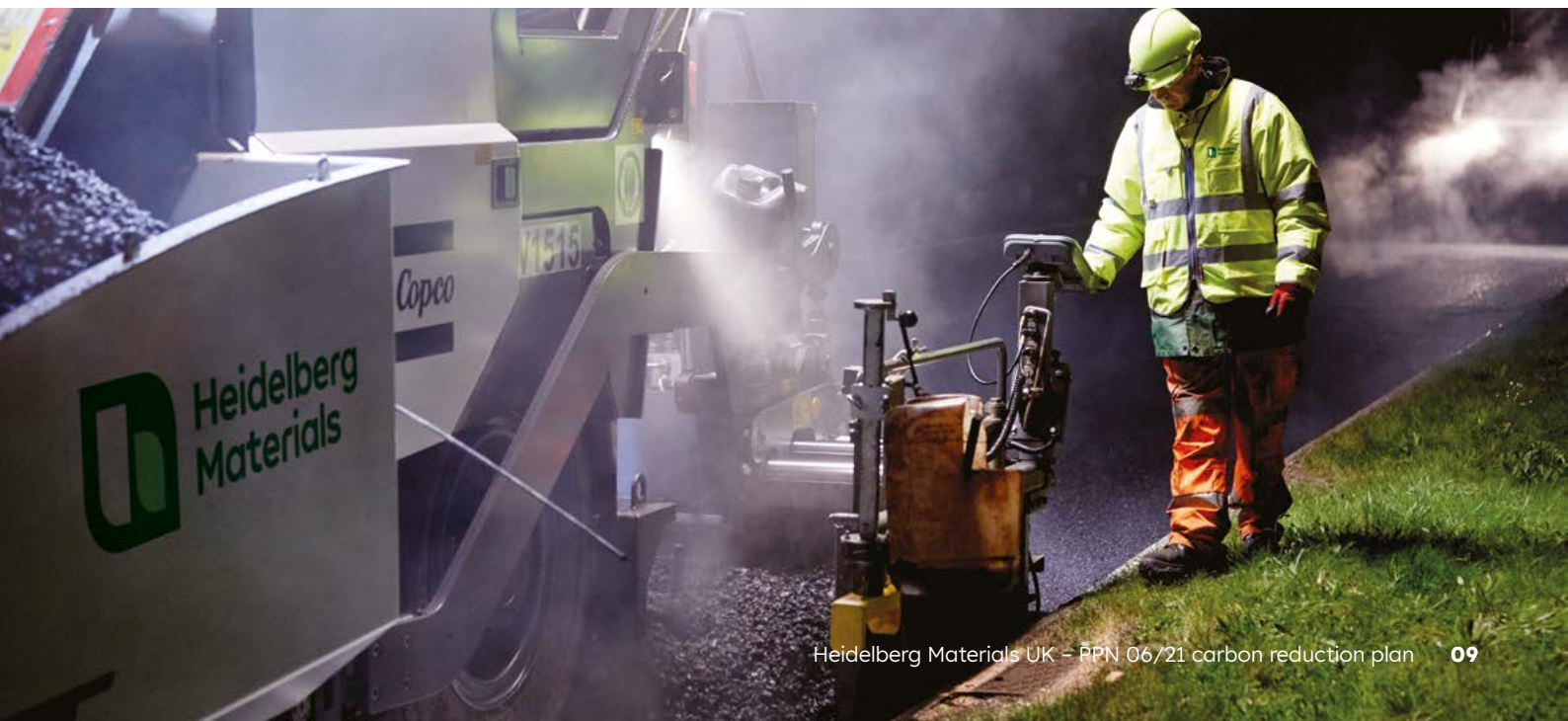


On-going/future projects (continued)

Asphalt

Current initiatives include work on:

- Fuel source: The burner is the largest CO₂ emission source in production and we are aiming to change its fuel from gas oil to natural gas to reduce CO₂ emissions by ~25%. Further reductions can be achieved by using alternative fuels, including biofuels that are CO₂ neutral.
- Asphalt mix temperature: Hot mix asphalt, produced at temperatures in excess of 160°C, is currently the default type specified in the UK. Heidelberg Materials UK is actively promoting warm mix asphalts, such as our ERA range, which are produced at a lower temperature (110-150°C) and have a lower CO₂ emission intensity of around 15%.
- Alternative fuels: Heidelberg Materials UK is exploring the use of gas-to-liquid (GTL) fuels as an alternative to diesel. They are derived from natural gas, which has a lower CO₂ intensity. They also offer improved air quality and are non-toxic, odourless, readily biodegradable and have a low hazard rating.
- Foam mix asphalt: This is currently a niche product but Heidelberg Materials UK is exploring its wider application as we believe it has the potential to reduce carbon emissions by more than 50%. Foam mix asphalt consists of a high proportion of recycled asphalt and uses foamed bitumen, resulting in cold asphalt paving.
- Funding has been secured to investigate the feasibility of using low carbon hydrogen as an alternative source of heat at our asphalt plants.
- BEIS provided almost £400,000 through the Industrial Hydrogen Accelerator programme, under the Net Zero Innovation Portfolio. The funding was awarded through the EDF UK R&D centre to the Bay Hydrogen Hub – Hydrogen4Hanson project, which will look at developing nuclear hydrogen production and investigating technologies to deliver the hydrogen to industrial sites.
- The project would underpin the development of a hydrogen hub at EDF's Heysham nuclear power station in Morecambe, Lancashire, and the use of hydrogen to decarbonise multiple Heidelberg Materials sites in the UK.
- The use of hydrogen as a fuel at asphalt sites has not yet been physically demonstrated anywhere in the world, so we will be leading the way with new technologies that have the potential to significantly cut carbon emissions across our industry.



On-going/future projects (continued)

Aggregates

Current initiatives include work on:

- **Electrification:** We aim to change the energy source for all our mobile crushing equipment from diesel to electricity over the coming years, reducing our CO₂ emissions from these sources by 100% once all equipment has been changed over.
- **Haulage:** The delivery of aggregates to our customers is normally made via truck and/or rail. Decarbonising truck deliveries is challenging as there are no viable hybrid or hydrogen truck options at present although we are investigating this technology with our fleet suppliers along with the use of biofuels. In addition, we are investing heavily in our network of rail connected quarries and depots in order to increase the amount of aggregates moved by rail, reducing vehicle movements and cutting CO₂ emissions.
- **Investment in plant efficiency and processes:** We are optimising our plant set up, including state of the art production assets, increasing digitalisation and sharing best practice to further improve energy management, carbon reduction and reduce wastage. For example, investment in a new marine aggregate dredger has provided increased payload and efficiency, reducing CO₂ emissions by about 10%.

In addition, we have been successful in gaining funding from the Industry of Future Competition run by the UK government. The program aims to support industrial sites to decarbonise at a faster rate.

We applied on behalf of our Cliffe Hill quarry, one of our largest. The allocated funds will support us in developing a decarbonisation roadmap for the quarry and for the asphalt plant onsite. It will also allow us to evaluate various carbon reduction options and test their effectiveness in a live environment.

We are hopeful the investment will not only reduce CO₂ emissions onsite but also allow us to transfer the knowledge gained to comparable sites to achieve further reductions.

We have developed a range of carbon roadmaps for each business line which can be found on our website, [heidelbergmaterials.co.uk](https://www.heidelbergmaterials.co.uk)



Declaration and sign-off

This Carbon Reduction Plan has been completed in accordance with PPN 06/21 and associated guidance and reporting standard for Carbon Reduction Plans.

Emissions have been reported and recorded in accordance with the published reporting standard for Carbon Reduction Plans and the GHG Reporting Protocol corporate standard and uses the appropriate government emission conversion factors for greenhouse gas company reporting.

Scope 1 and Scope 2 emissions have been reported in accordance with SECR requirements (emissions have been calculated according to the methodology mandated by SECR but we have expanded the scope and report on Heidelberg Materials UK's total CO₂ emissions), and the required subset of Scope 3 emissions have been reported in accordance with the published reporting standard for Carbon Reduction Plans and the Corporate Value Chain (Scope 3) Standard.

This Carbon Reduction Plan has been reviewed and signed-off by the board of directors (or equivalent management body).

Signed on behalf of the supplier:

Simon Willis

Simon Willis
Chief Executive Officer, Heidelberg Materials UK

Date: December 2023

