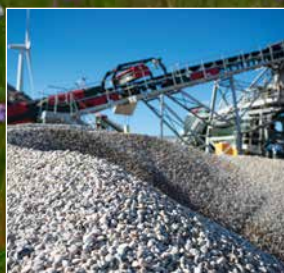


SUMMER 23 ISSUE 25

# mineral

products today

## Net negative carbon Lime industry sets out its roadmap



**Resetting the standard**  
Green light for low carbon concretes

**Recycling proficiency**  
The drive towards circularity

**Stories from the soil**  
Quarrying's role in archaeology

# WELCOME



**SUSTAINABILITY – and the development of sustainable business models within the mineral products industry – is at the heart of all**

**our discussions today. Our sector is working hard to rise to the challenges, coming up with clear definitions, credible route maps and ways to positively influence standards and policy. Turning our efforts into deliverable actions continues to present challenges that must be tackled together in partnership with the wider construction industry, the whole supply chain and Government.**

It is particularly exciting to see the leadership being shown by the MPA and its members on multiple sustainability fronts – this edition of Mineral Products Today demonstrates the

progress made in the drive towards a circular economy, increasing use of lower carbon concretes and the launch of the lime industry's net carbon roadmap. These examples build on other achievements such as biodiversity net gain through quarry restoration.

There are still challenges ahead of us but knowing this industry, and on the basis of what has been accomplished already, I am confident that we have what it takes to fully embrace circularity and decarbonisation to redefine our industry for the future.

One area of concern is the findings of the most recent Annual Local Authority Road Maintenance (ALARM) survey. Despite all the work carried out, the condition of our local roads continues to deteriorate – exacerbated by rising costs and a shortage of skills – and forcing local authorities to invest less and less. The dangers of poor roads has led to outrage among road users – as we've seen with the vast amount of media coverage generated by

ALARM – I never expected to see the survey on the front page of The Sun newspaper! However, the underlying message is clear, that if we don't invest the spiral will continue downwards.

Finally, a message to my industry colleagues about the health, safety and wellbeing of our people. This is of paramount importance, and after years of continuous improvement it saddens me that we have had a number of fatal incidents this year. More than ever our top priority is to evaluate and eliminate risk, and to empower our people to safeguard themselves and their practices. To support this, I am personally committing to spending more time on the ground – especially with HGV drivers – to understand their challenges and engage them in identifying what needs to happen to keep people safe and well. I urge all of you to make your own commitments to do the same.

Simon Willis  
Chairman, MPA

## Safety: Good practice guide available

**A WEALTH of new health and safety practices and innovations is now available for anyone to download free from SafeQuarry.com.**

The MPA's 'Sharing Good Practice 2022/23' is a fantastic compendium of the best entries from the 2022/23 MPA Health and Safety Awards and includes links to short videos of each innovation and the benefits delivered.

All parts of the industry are included – quarrying and aggregates processing, readymix and precast concrete, asphalt and contracting, and more – giving ample opportunity for operations teams to adopt good practices and adapt to their own sites.

Jon Prichard, MPA Chief Executive said: "The purpose of the guide is to help us learn from each other and to provide a resource that will help individuals to be pro-active in promoting or implementing change in their own organisation."

The entries in the Guide, together with those from previous years, can also be viewed and searched on the recently revamped [www.Safequarry.com](http://www.Safequarry.com), an important central hub of health and safety information, links, tools and videos that are relevant to the mineral products industry.



**For the latest news and views from MPA follow @mineral-products-association on LinkedIn.**

### Mineral Products Association

1st Floor, 297 Euston Road

London NW1 3AQ

Tel: 020 3978 3400

Email: [info@mineralproducts.org](mailto:info@mineralproducts.org)

Web: [www.mineralproducts.org](http://www.mineralproducts.org)

Chairman: Simon Willis

Chief Executive: Jon Prichard

### Mineral Products Today

Managing Editor: Elizabeth Clements

Director – Communications

Email: [elizabeth.clements@mineralproducts.org](mailto:elizabeth.clements@mineralproducts.org)

Editor: Andi Hodgson

Communications Consultant

Tel: 07972 533728

Email: [andi.hodgson@mineralproducts.org](mailto:andi.hodgson@mineralproducts.org)

Design and print: [www.themegroup.co.uk](http://www.themegroup.co.uk)

The views expressed in Mineral Products Today are not necessarily those of the Mineral Products Association.

Copyright: Mineral Products Association 2023

Printed on FSC paper

# MPA welcomes Govt retreat on REUL Bill

**THE GOVERNMENT'S decision to change direction on regulatory reform, altering its plans to ditch EU laws by the year-end, was welcomed by the MPA.**

The proposed Retained EU Law (REUL) Bill would have caused fresh uncertainty for British businesses, serving as a distraction from meaningful regulatory reform, according to the MPA.

In May 2023 the Department for Business and Trade announced that the REUL Bill would be amended to take out its 'sunset clause' which would have automatically revoked all EU-derived regulations at the end of the year unless explicitly retained or amended by the Government.

MPA had expressed concerns that the sunset clause would have caused a new wave of disruption for producers of mineral products in areas like health, safety and environmental protection.

It would have risked diverting attention in Whitehall away from effective, meaningful reforms and instead focused attention on reviewing the wording of EU-derived

regulations which businesses have no desire to see changed.

Robert McIlveen, MPA Director of Public Affairs, said: "We are pleased the Government has listened to MPA and other industry groups, and moved to take out the most disruptive and counter-productive parts of the Retained EU Law Bill."

"Our industry particularly values the EU-derived regulatory frameworks for health and safety, and environmental protection, so we are especially relieved to have more certainty about the future of these regulations."

"While the amended Bill is by no means perfect, removing the sunset clause reduces the uncertainty caused by the Bill, and will allow Government to focus on meaningful regulatory reform, rather than needlessly reviewing the text of EU-derived regulations that are well-regarded by businesses in our sector and others."

## Decade of under-replenishment risks supply squeeze

**THE DEMAND for construction aggregates has outstripped new permitted reserves for ten years running, placing unprecedented pressure on future availability.**

The Annual Mineral Planning Survey (AMPS) for 2022, based on data from MPA members, reports a chronic failure to replenish rock, sand and gravel reserves at anywhere near the same rate as the materials are being used in British construction.

As long as consumption continues to exceed replenishment through new mineral planning consents, the reserve-base upon which the mineral products sector is so dependent will continue to diminish, with serious consequences for the delivery of energy infrastructure, transport improvements and new homes.

The AMPS report highlights that the ten-year average replenishment rates, which compare the tonnages for new permissions against extraction and sales, stand at just 52% for crushed rock. This means that for every 100 tonnes of rock sold, just 52 tonnes of new

permissions are granted. The same rate for sand and gravel sales over the past decade is 63%.

At a regional level, the picture is even more concerning, with counties that traditionally have been responsible for large exports to other regions of Britain seeing some of the fastest declining reserves over a ten-year period.

There were 49 planning applications in 2021 – mostly extensions to existing sites – but only seven determinations for sand and gravel extraction (and just three approvals) plus two approvals for crushed rock quarries.

And over the past ten years, 38% of all new permissions issued were for sites that had not been allocated in a mineral plan, suggesting the system is failing to plan, manage and monitor this strategic resource.

Aurelie Delannoy, MPA Director of Economic Affairs, who led the survey said: "While businesses and policymakers alike are facing short-term economic and political uncertainty, we should not lose sight of the scale of mineral products demand we are facing to fulfill our sustainable growth ambitions. With

more than two-thirds of overall aggregates demand for the next 15 years expected to be supplied from newly quarried materials, the decline in permitted reserves will need reversing as part of a strategic, long-term approach to mineral planning."

Mark Russell, MPA Executive Director of Planning and Mineral Resources, said: "Britain is fortunate to have an abundance of mineral resources enabling the country to be self-sufficient, yet the under-replenishment of the reserve base for future construction aggregates has become unsustainable.

"These resources are of strategic importance to the economy. The fact that reserves continue to decline should ring alarm bells given the essential role these minerals play in underpinning and enabling the delivery of Government ambitions around net zero, green recovery and levelling up.

"The continued decline in aggregate reserves, nationally and regionally, is a stark reminder that the steady and adequate supply of these essential minerals cannot be assumed."

## Minerals planning as essential as minerals themselves

The essentiality of both minerals and minerals planners was a recurring theme at the year's Minerals Planning Conference, hosted by MPA and the Royal Town Planning Institute (RTPI).

Over 300 delegates attended the June event, entitled 'Minerals Planning at a Crossroads', to hear from a range of expert speakers about the challenges facing minerals planning and how these may be met.

Common themes were the essentiality of all minerals for the economy and society, a planning system that enables need to be met sustainably, and the importance of the

role of minerals planners, coupled with how to train and attract people into the profession.

Mark Russell, MPA Executive Director for Planning and Mineral Resources said: "Mineral planning plays a crucial role supporting the delivery of Government ambitions around housing and green growth.

"Minerals supply has been dominated by concerns around the availability of 'critical' minerals like lithium, cobalt and nickel, but we must not lose sight of the fact that delivering a steady and adequate supply of 'essential' minerals for UK construction and manufacturing involves many of the same issues."

## Marine economy

The British Marine Aggregates Producers Association (BMAPA) was among the UK sectors represented at the recent Seabed User & Developer Group (SUDG) parliamentary reception.

The event was aimed at highlighting the breadth and scale of UK marine industries that are vital to the UK's prosperity – as well as marine aggregates that

includes renewable energy, oil and gas, ports, subsea cables, recreational boating and carbon capture & storage (CCS).

Collectively employing more than 900,000 people, these industries play a key role in areas like energy security, delivery of net zero carbon, levelling up of coastal economies, securing logistics and supply chains, telecommunications and connectivity.

## Infrastructure review overdue

The MPA has welcomed news that an urgent review of national planning policy for major projects is to be carried out.

Chancellor Jeremy Hunt asked the National Infrastructure Commission (NIC) to identify how the planning system could create greater certainty for infrastructure stakeholders – including the supply chain – ahead of an action plan on the UK's Nationally Significant Infrastructure Projects (NSIPs).

MPA has made repeated calls for greater clarity on planning and delivery of infrastructure projects to give its members certainty to invest in sites, equipment and people to ensure an adequate supply of aggregates, concrete, asphalt and other mineral products that make all construction possible.

At the same time, local mineral planning authorities need greater visibility of the construction material demands of infrastructure projects.

## Call for concrete action

MPA was one of the organisations participating in the recent Global Cement & Concrete Association leaders conference, with CEOs from across the concrete and cement industry worldwide gathering to collaborate on the transition to net zero carbon.

Guests were honoured to be joined

by United Nations General Secretary António Guterres who acknowledged the essential role concrete plays in society and supported the call for maximum action to reach net zero.

The UK's concrete and cement industry has reduced carbon emissions by more than 50% since 1990 and has a detailed and viable roadmap to go beyond net zero by 2050.



**AS AN INDUSTRY we work hard to supply mineral products for housing and regeneration, improving transport infrastructure, flood defences and energy security – all critical end uses.**

To deliver this, the operational standards to which we hold ourselves to account are recognised as being among the best in the world. So one would hope that society might appreciate the production of these essential materials, and that Government – who are, after all, the largest consumer of mineral products – would ensure that access to them was fairly straightforward.

That's not to say the minerals industry wants an easy ride, but for too long there's been inexorable friction in the systems that we have to engage with, whether that's planning, environmental regulation or product specification. As Government has continued to thin out in the post-Covid era the inertia companies face is only getting worse. Important systems that MPA members rely upon have become dysfunctional, with diminishing resources struggling to keep them going or, in some cases, eliminated altogether.

The message I'm hearing loudly from producers, is that systems are becoming increasingly fractured, exacerbating policy conflicts between different parts of national and local Government.

This inevitably adds delay and cost to the already complex processes required to secure and retain our 'licence to operate'.

For example, refusing a planning application for a new quarry doesn't make the demand go away, it just displaces the future supply, putting extra pressure on others to meet that demand, in turn accelerating the consumption of already permitted reserves. The irony is that the UK is blessed with an abundance of high-quality mineral resources to meet the

# CEO Viewpoint

needs of society, which deliver social and economic benefits while assuring our potential to supply.

This friction, and the uncertainty it creates, is one of the key reasons why mineral replenishment rates are at an all-time low. Despite the widespread existence of Local Authority Mineral Plans, the planning and permitting system is hindering access to replacement reserves without any regard for how forecast demand can be met.

*“Important systems that MPA members rely upon have become dysfunctional”*

But it doesn't have to be like this. No industrial or societal system operates in isolation; we are all dependent on other systems to play our part, whether we like it or not. What's critical is that systems are synthesised as far as possible to make things work efficiently, creating an integrated 'system of systems'.

This requires collective awareness amongst all system 'owners' of the role and importance of other systems and how they work together. Understanding the bigger picture would help to ensure that resources are applied at the right point to the right systems, enabling better decisions to be made to engineer change on the big issues that affect us all. The more harmonious the interface between systems, the more efficiently things can be driven forwards to ring the changes.

One example is MPA's support – along with 80 other organisations – in a new global initiative, Our Shared Understanding: a circular economy in the built environment, launched at the World Circular Economy Forum in June. This is about enabling people and nature to flourish within our planet's capacity, to provide resources and minimise wastes.

Our Shared Understanding calls on all parts of the built environment sector to pull together and accelerate towards a circular economy, which will be increasingly demanded by society and rightly so. It recognises the need for responsible

sourcing and consumption of essential materials, maximising their value through use and reuse, and working with nature to restore and enhance biodiversity – activities that our sector already does and, in many cases, leads the way in.

Achieving circularity will require better integration of the numerous different systems, not least because today's global economic model supports a whole host of unsustainable systems that result in the limits of our finite planet being exceeded. Recognition that something needs to change is growing so the transition to a circular economy, to minimise use of virgin resources, is both necessary and inevitable.

However, there is evidence of insufficient understanding of systems, resulting in flawed decisions being taken that are short-termist and convenient, serving to avoid or exacerbate the big issues rather than address them. We see this in the mineral products sector. – What the industry achieves every day is remarkable but frictions in other systems overshadow our ability to deliver.

Despite this relative gloom, I maintain that a circular economy in the built environment presents tremendous opportunity for our sector. Britain's mineral products industry has long embraced the recovery of wastes to produce recycled aggregates and use of industrial by-products to make secondary aggregates. This part of our system is close to the maximum achievable today, with recycled and secondary materials accounting for almost one third of all construction aggregates consumed – ranking Britain above every other major European economy in aggregate recycling.

And whilst a material like concrete can be recycled again and again, the most effective way to sustain its use – and maximise value – is by promoting its long service life through the reuse of existing concrete structures, thereby encouraging greater take up of concrete as the material of choice for new resilient and versatile future structures. That would help to ease the long-term demand for new materials

and reduce the embodied carbon associated with new builds.

The construction industry has started the circularity journey, and it can and will go further in delivering a circular economy – through innovations and understanding materials at a molecular level and applying that knowledge at scale. It's really coming home to me now that the route to greater circularity is with better molecular understanding.

Even small changes at a molecular level can make a massive difference when they are scaled up and applied to the hundreds of millions of tonnes of mineral products made and consumed each year.

Needless to say, we are reliant on many other systems to make the transition. Frankly, today we don't know yet what there is to unpack in this space and although the work across the sector to date is impressive, we're going to need more bright minds coming into our industry with fresh thinking (not to mention investors with ambition for change).

*“Now is the time to be educating the next generation to effect the changes”*

For this to happen we rely on the education system which itself needs to adapt to place issues like circularity at the core. Given that 25% of the country's workforce retires every ten years, now is the time to be educating the next generation to effect the changes - we have no time to lose.

And so we come full circle – every system relies on every other system – and it is critical for policy-makers to understand which systems truly underpin the economy and society – such as where raw materials come from and what they are used for. If we can align our collective understanding around issues of circularity through Our Shared Understanding then there's room for optimism that other systems in Government and industry can synchronize too.

Jon Prichard  
Chief Executive

# Lime Roadmap

## *Britain's lime producers plot a route to net negative carbon emissions*

**Of all mineral products, lime is the most versatile and it's vital to most of life's essentials. Now, Britain's lime producers have come together to launch an ambitious plan to accelerate decarbonisation and deliver 'net negative' carbon emissions by 2040.**

MPA LIME, which represents Britain's producers of lime, has launched a groundbreaking 'Net Negative' 2040 Roadmap which explains how the sector can go beyond net zero a decade ahead of the UK's overall 2050 target. The sector proposes to deploy technologies such as fuel switching and carbon capture as well as recognition of lime's natural carbon-absorbing properties.

The sector's two main products – high calcium quicklime and dolomitic lime (dolime) – are extremely versatile and vital to numerous everyday essentials from the manufacture of metals, glass, plastics and building materials to the purification of drinking water, treatment of sewage, control of air pollution, animal welfare and production of many food staples including eggs, sugar and dairy products.

Used around the world for millennia, lime is made by heating quarried limestone or chalk to above 900 degrees centigrade to trigger a chemical reaction known as calcination. Around two thirds of the industry's carbon dioxide emissions arise from calcination with most of the remainder resulting from fuel combustion.

Since 2005, action and investment in the best available technology by British lime

producers has already resulted in a reduction in absolute carbon emissions of around 25%. Now, the industry's net negative roadmap identifies further technologies and infrastructure to fully decarbonise British lime production as well as outlining the enabling actions required by Government and other industries in the supply chain.

In addition, international research confirms that around one third of the carbon dioxide from lime production is naturally reabsorbed from the atmosphere back into lime products – a process known as carbonation – and this is yet to be recognised in carbon accounting methodologies.

Combining the industry proposed developments with the enabling action by Government and the natural effects of carbonation, means the production of British lime could become net negative by 2040, and make a positive and ongoing contribution to addressing climate change.

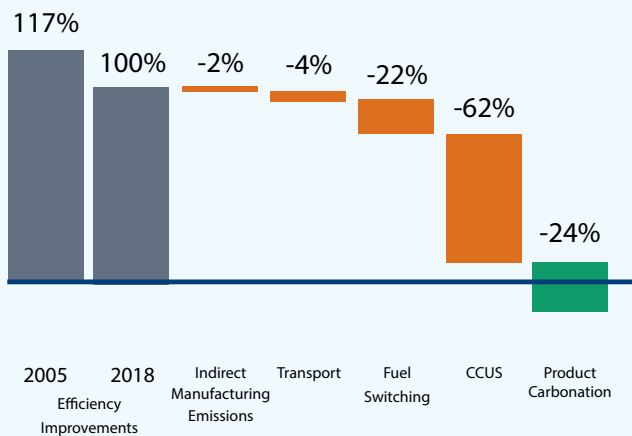
Richard Stansfield, Chair of the MPA Lime management committee said: "The British lime and dolime industry has already achieved remarkable progress in both business commitment and tangible actions to decarbonise and play it's part in tackling

climate change. The publication of our Net Negative 2040 Roadmap is a milestone on the journey and serves to communicate, as well as incentivise, the changes that are essential for the future. The pace of change must accelerate and we are jointly committed to ensuring that it does. Importantly, we can't achieve this alone. Reaching and exceeding net zero will also require some key enabling action by Government and others."



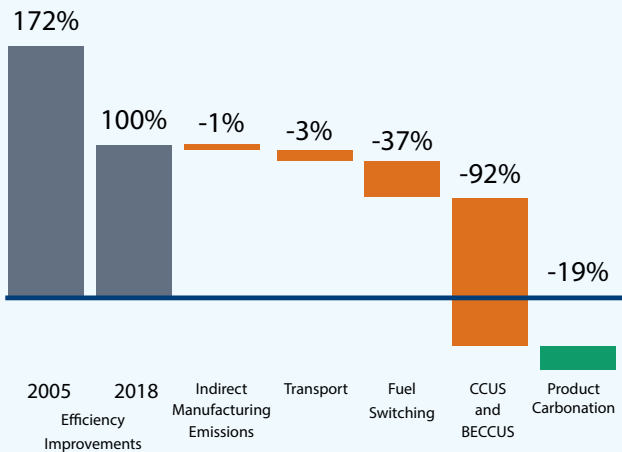
# Lime Decarbonisation

Waterfall chart of decarbonisation actions



# Dolime Decarbonisation

Waterfall chart of decarbonisation actions



**MPA Lime Net Negative 2040 Plan:** These ‘waterfall’ charts show the contribution of each of the decarbonisation levers from historic baseline emissions in 2005 to a reference point in 2018, with each of the levers expressed as a percentage reduction of the 2018 reference.

Some of the levers are happening now and are not yet accounted for (eg carbonation), some are relevant to early action (indirect emissions) and others can’t be deployed to their full potential right now due to the need for enabling action (fuel switching and CCUS). This is just one of the possible scenarios to deliver net zero production and net negative outcome.

The MPA Lime Net Negative 2040 Plan shows how lime production could be decarbonised by 2040 through the deployment of five key levers:

- 1. Product carbonation** – exposure of lime to the atmosphere permanently absorbs some calcination emissions
- 2. Fuel switching** – away from fossil fuels to low or zero carbon alternatives like hydrogen or waste biomass
- 3. Carbon capture** – a fundamental requirement that will account for more than half of production emissions
- 4. Reduction** of the indirect emissions from electricity use
- 5. Reduction** of emissions from transport of materials.

Mike Haynes, Director of MPA Lime said: “Each lever will contribute to decarbonisation – many initiatives are happening already or will come on stream this decade – and in combination they will deliver a dramatic carbon reduction to reach zero by 2040. In addition, the combination of using biomass fuels with carbon capture and lime product

carbonation will result in removal of 250,000 tonnes of atmospheric carbon dioxide every year, making the sector net negative overall.

Other levers, especially indirect emissions and transportation, require broader collaboration and enabling action by Government and other industries.”

Ruth Herbert, Chief Executive of The Carbon Capture and Storage Association said: “It’s fantastic to see such a vital industry as lime setting out its own net zero roadmap. The roadmap is clear that there is no option to decarbonise the lime industry without the installation of carbon capture utilisation and storage (CCUS).

“It’s clear that demand for CCUS from UK industries is very high – with this roadmap alone planning for all 5 sites to access CCUS clusters by 2038. This reinforces our message to the government that they need to urgently set out a national deployment plan for CCUS, indicating how and when sites like these can have access to CO<sub>2</sub> infrastructure.”

**Examples of enabling action by Government and other industries in the supply chain could include:**

- **Carbon accounting** to ensure that net zero is not met by simply closing British manufacturing sites and importing goods instead

- Regulation that provides long-term visibility on decarbonisation policies and delivers **cost competitive clean electricity**
- **Infrastructure** that supplies green hydrogen to lime production sites and can transport captured carbon dioxide to storage or use
- **Financial support** that attracts investment to UK sites for the deployment of decarbonisation technologies
- and **maintaining competitiveness** to ensure British lime producers can continue to supply the UK and compete in international markets.

Mike Haynes continued: “Getting this enabling action right will allow the British lime industry to provide the whole of the UK and beyond, with net zero products that are essential to our everyday lives whilst removing more carbon dioxide from the atmosphere than it emits. The British lime industry is committed to addressing the challenges of climate change and we now have a credible roadmap to get us there.”

**The MPA Lime Net Negative 2040 Roadmap can be downloaded at [www.mpalime.org](http://www.mpalime.org)**

**FUEL SWITCHING:** A Government funded project in Britain led by MPA has demonstrated that hydrogen has excellent potential to replace natural gas for lime manufacture. The world first project provided greater understanding of key aspects including how to distribute energy across the kiln to ensure no impact on lime qualities.

The results of the project will enable the sector to accelerate a switch to hydrogen when secure and cost-effective supplies can be accessed. Alternatives to hydrogen include the use of biomethane and MPA Lime member Singleton Birch has partnered with Origen Power to develop a new kiln which uses oxy-fuel technology, fuelled with biomethane from on-site production, as a route to zero carbon lime production.

**This new technology combines fuel switching with carbon capture and the first zero carbon lime is set to be produced from a pilot kiln in 2023.**



**CARBON CAPTURE:** MPA Lime members are already actively involved in the development of carbon capture utilisation and storage (CCUS):

- Singleton Birch manufacture quicklime within the East Coast Cluster. The Zero Carbon Humber Cluster is a 'Track 1' cluster with ambitions to decarbonise the region by 2040. Singleton Birch aim to have kilns connected to CCUS by 2035 and to be running on hydrogen fuel by 2040.
- Tarmac and Lhoist both manufacture quicklime in the heart of Derbyshire, near Buxton. Five cement and lime plants across Derbyshire, Staffordshire and Cheshire, owned by Tarmac, Breedon, Lhoist and Aggregate Industries, together with Lostock Sustainable Energy Plant (LSEP) in Cheshire, have come together with Progressive Energy to form Peak Cluster. The project is closely associated with the North West Hynet cluster (another Track 1 cluster). The goal is for Peak Cluster to be operational by 2030 and in addition Tarmac and Lhoist should be running on hydrogen fuel by 2040.
- Lhoist also run the only dolime facility in the UK, and one of a handful in Europe. Reliant on solid fuels, early decarbonisation will come through efficiency gains and the use of biomass fuels. If this plant connects to a carbon capture cluster it will deliver 'BECCUS' – Bioenergy Carbon Capture, Utilisation and Storage. By using biomass fuels and capturing the resulting emissions, dolime production will be actively removing atmospheric CO<sub>2</sub>.

## About MPA Lime:

MPA Lime has three full members – Lhoist UK, Singleton Birch and Tarmac – which between them produce more than 1 million tonnes of industrial lime sold in the UK each year, as well as exporting specialist products overseas. In addition, there are three company Associate Members – British Sugar, Specialty Minerals and Tata Steel Europe – which produce industrial lime for their own product manufacturing. Each year the UK lime industry makes a GVA (gross value added) contribution to the economy of £55 million and is a critical supplier of products to a vast array of UK

industry sectors that have an estimated combined turnover in excess of £200 billion.

## For further information visit [www.mpalime.org](http://www.mpalime.org)

There are two types of lime made in the UK – high calcium lime (quicklime, hydrated or slaked lime) and dolomitic lime (known as dolime) – and both are essential products for a vast array of uses:

- Manufacturing: iron and steel, as well as non-ferrous metals like aluminium, zinc and copper, and glass, paper, plastics, rubber and pharmaceuticals.
- Food and drink: purification of drinking water, production of sugar, dairy products and baking to fruit farming, fish farming and soil improvement.
- Sanitation: neutralisation of sewage and industrial effluents, absorption of gas emissions from power generation and animal welfare.
- Construction: mortars, renders and plasters, insulating building blocks, fire resistant boards, soil stabilisation in infrastructure, asphalt modification, and specialist heritage applications.



# Resetting the STANDARD

A long-awaited update to the British Standard for concrete BS8500 is set to herald a transformation in the availability and specification of low carbon concretes.

FOR DECADES the UK concrete industry has added supplementary cementitious materials to Portland cement to influence the performance of the concrete mix and lower its embodied carbon.

By-products such as ground granulated blast-furnace slag (GGBS) from steel manufacturing, fly ash (PFA) from coal-fired power generation and limestone fines from aggregate processing are each added to cement. But not in combination, until now, that is.

Because although the UK has traditionally used just one secondary component, extensive research by the MPA has shown the benefits of 'multi-component' blends, particularly when limestone powder is used together with GGBS, fly ash or calcined clay.

These new blends can be used in nearly all applications – which means their implementation can significantly reduce the embodied carbon of most of the concrete specified in the UK.

It has been calculated that the embodied carbon of a cement-GGBS-limestone blend could be up to 60% lower than that

of Portland cement which today represents 79% of all the cement manufactured in the UK. If multi-component cements were deployed to their full potential, this would reduce direct emissions from cement production by over 4 million tonnes of carbon dioxide annually.

This, supported by proven use of multi-component cements and concretes in other countries, has informed the long-awaited forthcoming update to BS 8500, the British Standard for the specification of concrete, which will be published in November this year.

As well as introducing a wider range of low-carbon mixes available to designers, specifiers and contractors, the revised standard will also help to accelerate their adoption in construction. And that's important because the UK construction industry has a reputation for being conservative, so adapting to changes in the specification of something as essential and ubiquitous as concrete could be a challenge.

So ahead of the revised standard, the UK concrete industry is embarking on a

campaign to explain the new low-carbon mixes and how they can be specified, with the aim of raising market awareness and driving sustained change.

Innovation in concrete mix design is part of the UK concrete and cement industry's Roadmap to Beyond Net Zero. Launched in 2020, the roadmap sets out an achievable decarbonisation route using seven levers including fuel switching, carbon capture, and carbonation.

Claire Ackerman, MPA's Executive Director for Concrete said: "Replacing a proportion of cement content with lower carbon, supplementary cementitious materials, is one of the technologies playing a part in the transition to net-zero, while more permanent solutions, such as carbon capture are developed.

"The incoming revision to BS8500 will allow specifiers to call on a new generation of low-carbon mixes based on the UK's abundant supply of limestone. These multi-component blends have the potential to be delivered at scale, to become the default option for almost all of the concrete poured in the UK. The introduction of such mixes may be just one of many small steps that will take us to net-zero and beyond, but it is a welcome example of what real, sustainable change looks like."

*Main Image: The precast soffits at Farringdon Elizabeth Line Station in London contain 50% GGBS. The Crossrail project also required a minimum of 50% cement replacement for in-situ concrete, but achieved up to 72% where curing times allowed.*

# CIRCULARITY IN ACTION

**Recycling of waste materials to produce construction aggregate is by far Britain's biggest recycling success by volume. Yet most of the country's demand must still be met by newly-quarried material.**

TWENTY-EIGHT per cent of Britain's construction aggregates – essential materials for housing, public buildings, infrastructure and commercial development – comes from recycled and secondary sources according to a new MPA report.

Demonstrating 'circularity in action' the study puts the spotlight on Britain's biggest recycling success story – recovering construction waste to produce recycled aggregates, and processing a range of industrial by-products into secondary aggregates.

The MPA says that total recycled and secondary materials accounted for nearly 70 million tonnes of the 253 million tonnes of construction aggregates supplied in Great Britain in 2021, a testament to the industry's continued commitment to making the best use of available materials as part of the circular economy.

This also places Britain among the leading recyclers of construction materials in Europe, well ahead of other major economies, with only Belgium using more recycled materials as a percentage of total demand.

Recycled sources of aggregates, around 63 million tonnes of which were produced in 2021, mainly come from Construction, Demolition & Excavation Wastes (CDEW) such as crushed concrete and brick, old rail ballast and material dug out from groundworks.

Construction activity in built-up areas and on brownfield sites inevitably involves demolition of existing structures, generating waste materials which are crushed, screened (or sieved) and sometimes washed to be reused as aggregates. In addition, during road maintenance work, the asphalt surface is planed off and can be processed for re-use in new road surfacing.

Evidence shows that all construction and demolition wastes that are recovered and recycled as aggregates are being used in accordance with technical and safety standards. However, the report notes that their contribution to total aggregates supply is ultimately limited by the volume of demolition activity that takes place.

Meanwhile, secondary sources of aggregates, which accounted for the remaining 7 million tonnes in 2021, are

derived from industrial or extractive processes including the production of china clay, slate and chalk, plus glass reprocessing, mining spoil, incinerator ash, and slag from iron and steel production.

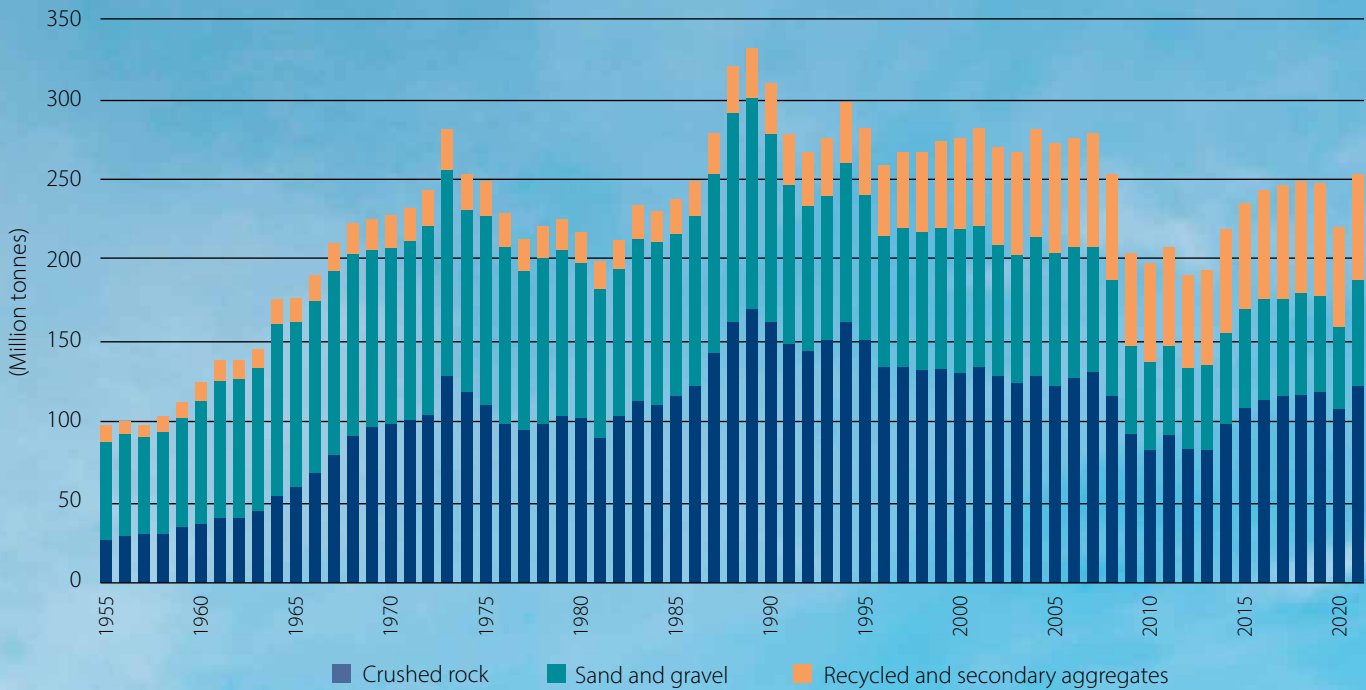
However, concerns have been expressed about the general paucity of regularly collected and compiled national statistics in both recycled and secondary aggregates. Whilst the MPA report attempts to address the data gap with the best information available, there is a clear need for more data to be made available through official Government sources

This is particularly important given the challenges ahead with regards to circularity, sustainability and decarbonising all sectors of the economy to meet Net Zero target by 2050, and the need to set out more compelling evidence-based policy instruments.

Aurelie Delannoy, MPA Director of Economic Affairs who authored the report said: "Heavy-side construction materials producers have become adept at making efficient use of available resources, producing recycled and secondary aggregates that meet stringent requirements for use across different construction sectors.



**Total aggregates supply in Great Britain, 1955-2021 (ONS, BGS, MPA calculations)**



“Together with the restoration of quarries to beneficial after use – principally nature conservation – our industry is delivering sustainable environmental products whilst others just talk a good game.”

“The absence of regular data monitoring of material arisings and their use make it challenging to track the industry’s continuing progress and can fuel wider misunderstandings of the industry’s role in construction, both in terms of primary

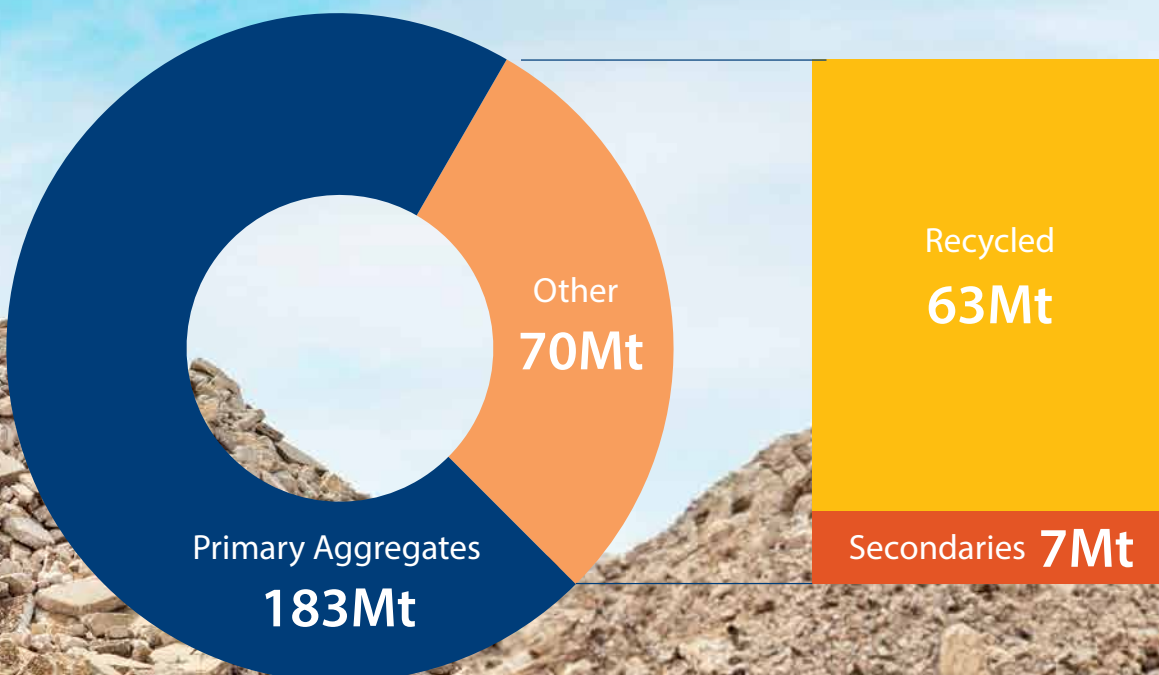
resource needs and the potential for greater use of materials that are either recycled or from secondary sources as part of the sector’s contribution towards green growth.”

Mark Russell, Executive Director at MPA said: “The contribution of recycled and secondary aggregates to total supply is an outstanding circular economy story that supports the UK’s green industrial revolution, the delivery of Government infrastructure and housing ambition, and the resilience of the UK

construction supply chain by promoting a diverse source of supply.”

“Aggregates producers are recycling all available materials, and have been for many years, to meet our construction needs as efficiently and sustainably as possible. However, it is important to stress that primary aggregates are still needed to meet over 70% of total demand, a situation which will continue for the long term.”

**Estimates of total aggregates supply (Million tonnes) in Great Britain, 2021 (MPA calculations)**



# STORIES FROM THE SOIL

**Mineral extraction is one of the few ways large parcels of land can be surveyed for evidence of our ancestors and natural history. And quarrying companies invest heavily to facilitate archaeology and preserve heritage assets. But is the industry reaping the benefits of its efforts?**

THERE ARE MANY added benefits of quarrying besides the supply of essential materials, whether that's the contribution to rural economies or the huge gains for biodiversity through quarry restoration.

But one important aspect of the industry that's overlooked more than most is the protection of heritage assets and the work the industry does in partnership with archaeologists and palaeontologists to ensure that land earmarked for quarrying is properly examined for evidence of past life.

"Quarrying creates one of the few opportunities for archaeologists to explore large areas of land to learn more about the activities of our ancestors," explained Mark North, the MPA's Director of Planning.

"Each year the industry spends millions of pounds on archaeological excavations ahead of proposed quarry developments, as well as helping to preserve existing heritage assets located on their landholdings, but a lot of this work goes 'under the radar' and it makes the historic environment very much a poor relation."

That's a view shared by Clive Waddington, Managing Director of Archaeological Research Services (ARS), who has worked on more than 50 mineral extraction archaeological sites in the past 20 years and is a lead author on mineral and archaeology guidance documents.

"Over the years quarrying has really helped to expand our understanding of some key historical periods, especially things like neolithic settlements where remains don't preserve well and are notoriously difficult to find," said Clive. "Without mineral extraction we would still have many black holes in our knowledge of the lives of our ancestors. Of course, there's still a lot more we've yet to learn as well!"

Clive recognises that commissioning archaeology can be a huge expense for minerals companies and can cause delays to production programmes, but in his experience quarry operators invariably want any field work to be done properly and thoroughly, as well as efficiently.

"We find that minerals companies are good to work with – and I'm afraid I can't say that about some other types of development," he continued. "As custodians of the land for years to come we find quarry teams take their responsibilities very seriously. They always try to accommodate the archaeologists working on the ground, going the extra mile to support excavations, and are keen find out what we're learning from field work."

"I think the positive relationship we have with quarry companies reflects the fact that we're from the same mould – we're interested in what's beneath the ground and we speak the same language," continued Clive. "When commissioning evaluation works in advance of planning applications, site teams tend to go beyond their statutory duties to help us to understand what the archaeology might be telling us."

***"Over the years quarrying has really helped to expand our understanding of some key historical periods"***

Because initial archaeological studies must be commissioned and carried out as part of the environmental assessment process – during the preparation of a planning application and well in advance of actual mineral extraction – this can create difficulties for the industry.

"One of the challenges with archaeology is that work has to happen right at the start, compounding the fact that it can be one of the more expensive and potentially time-consuming environmental studies," said Mark North.



## Thornborough Henges, North Yorkshire

Previously within Tarmac's Nosterfield Quarry landholding, Thornborough Henges was gifted to Historic England and English Heritage, with parts of the wider site gifted by Lightwater Quarries, also a member of MPA. Archaeological work suggests the Neolithic henges were probably built for ceremonies and rituals and the area was also likely used as a trading centre.

Described as 'the Stonehenge of the North', the site consists of three giant circular earthworks, each more than 200m in diameter, in a north-south line. Dating from between 3500 and 2500 BC, the henges are of outstanding national significance. The earthworks are comparable with Salisbury Plain in south-west England.

"By its very nature archaeologists don't know what they might find until archaeological assessments are complete, which can take a long time and brings a great degree of uncertainty for businesses in terms of costs and timescales.

"The up-front expense of conventional archaeology in particular – such as geophysics, trenching and painstaking fieldwork – can easily run into six figures as well as months of delays. These costs are not usually outweighed by the benefits of the discoveries and yet such techniques are still favoured by many authorities as the way to learn what's happening beneath the surface."

However, new technologies are giving rise to fresh approaches to archaeology and the MPA has been working with organisations such as English Heritage, FAME (Federation of Archaeological Managers and Employers), ClfA (Chartered Institute for Archaeologists) and ALGAO (Association of Local Government Archaeological Officers) to challenge the efficacy of traditional trenching.

"Trenching is a 'blunt instrument' that's really only meant as a way to help define the boundaries of an archaeological site," continues Mark. "At best, trenching can only cover about 5% of a typical area of interest, so as a means of discovering important evidence and artefacts it's ineffective and doesn't represent good value for the financial outlay or the time and effort involved."

Thankfully, archaeological service providers like ARS have started to introduce innovative techniques to enhance the value of archaeological work making it both more efficient and effective – smarter and quicker ways to learn a lot more than traditional geophysics and trenching can reveal.

***"As custodians of the land for years to come we find quarry teams take their responsibilities seriously"***

Part of a holistic 'landscape prospection' service, these include high-resolution LiDAR which can pick out subtle features not visible at ground level, multispectral photography which can 'see' a wider spectrum than standard camera, and landscape scale geochemical surveys that can be done on-site, along with geoaerological mapping to help identify which types of technology to use.

Clive explained further: "These technologies can be applied in combination and adapted to each particular site, but they require quarry operators, authorities and regulators to understand them and be willing to give them a go consistently.

***"Being a quarry manager must be one of the most interesting and diverse jobs there is"***

"At the moment there is huge variation in the way the various stakeholders approach archaeological investigations on quarries, and we would like to see greater consistency, as I'm sure the industry would too.

"What needs to happen is that Historic England's Advice Note 13 on Mineral Extraction and Archaeology should go further in providing guidance on the availability of modern techniques to reduce the need for blanket evaluation trenching. The emphasis should be on question-led investigations, rather than digging trenches for the sake of it. And there's more good news, because the use of new technologies can also give rise to useful data for other environmental assessments relating to surface water, groundwater, soils and geology.

"Working together mineral producers and archaeologists already have a lot to be proud of and widespread application of new technologies could position the sector as a world leader in not just in archaeological but other environmental investigations – that would really be worth celebrating.

# STORIES FROM THE SOIL

*“There’s always a lot of interest in archaeology at quarries - it can be a real ice-breaker between operators and local communities”*

And according to Clive, archaeology itself has the capacity to address some of the broader issues faced by the quarry industry: “There’s always a lot of local interest in archaeology at quarries - and I’ve seen that

it can be a real ice-breaker between operators and local communities.

“We have many great experiences especially where we work with operators to involve local communities in archaeological digs. Archaeology represents an opportunity for the minerals industry to maximise the value of discoveries by showcasing the responsible approach it takes to protect and learn from our heritage in the ground.

“Besides archaeology that gives communities an opportunity to learn about where building materials come from, how they are extracted, processed, delivered and used, and the lengths operators go to in order to protect the environment, recycle materials and enhance nature. To oversee all of these subjects must make being a quarry manager one of the most interesting and diverse jobs out there!”



Photo: Wessex Archaeology

## Elizabethan Ship, Kent

In April 2022, a team from MPA member CEMEX uncovered the remains of a rare Elizabethan-era ship at a quarry on the Dungeness headland. Marine archaeologists from Wessex Archaeology were contacted to study the remains which were found some 300 metres inland where the coastline once was. Recognising the significance of this extraordinary vessel, Kent County Council enlisted the support of Historic England.

Very few English-built 16th-century boats survive, making this a rare discovery from a fascinating period in the history of seafaring. Over 100 timbers from the ship’s hull were recovered, with analysis confirming it was made of English oak with a design similar to the Mary Rose. The story of the ship featured on the BBC’s Digging for Britain in January 2023.



Photo: Sally Hollingworth

## Mammoth Graveyard, Wiltshire

A 200,000 year old mammoth graveyard was found at a MPA member Hills Quarry Products in the Cotswold Water Park area near Swindon. Fossil hunters Sally and Neville Hollingworth made the initial discovery in 2017, which then led to further excavation of the site by a DigVentures team of archaeologists, geologists and palaeontologists.

Laboratory dating of soil samples suggests the site dates back to around 215,000 years ago, a time deep in the Ice Ages that we know very little about. The find, the biggest of its kind for almost 20 years, also drew the attention of Sir David Attenborough who presented the BBC documentary broadcast at the end of 2022 called ‘Attenborough and the Mammoth Graveyard’ covering this significant and unique find.



## Farmstead after farmstead, Bedfordshire

Excavations across almost 50 hectares at MPA member Breedon’s Black Cat Quarry beside the River Great Ouse in Bedfordshire uncovered evidence of human activity spanning the prehistoric, Roman and early medieval periods. The oldest significant discovery was a Beaker/Early Bronze Age settlement which radiocarbon dating placed at around 4,000 years ago.

The archaeological work revealed evidence from the Upper Palaeolithic period and the boom in the market garden economy of the region from the 18th century onwards. Farmsteads dated to the Early Bronze Age and Roman periods were revealed, along with an Iron Age shrine, a Roman cemetery and the possible site of a Viking Great Army camp noted in the Anglo-Saxon Chronicle.

## Low carbon mix at Chelsea Flower Show

**ONE OF the gardens at this year's RHS Chelsea Flower Show used Capital Concrete's low carbon mix.**

The Savills Garden was aimed at showcasing the importance of sustainable practices in each aspect of its creation. On their search for more sustainable building materials, garden designers Landform chose concrete with low embodied carbon.



## Let it glow!

**VISIBILITY and safety were top priorities on a section of a popular countryside walk linking two villages in County Durham.**

Tarmac was approached by Durham County Council to find a way to improve visibility on a national cycling network route in South Hetton – used by runners, walkers and cyclists as well as commuters and families – without the need for additional lighting.

The solution was a glow-in-the-dark surface, achieved by applying 6mm bioluminescent chippings by hand before the asphalt was compacted by roller, to create an attractive, durable, flat and more visible multi-user route to help wayfinding at night.

## Carbon capture

**MPA MEMBERS Breedon and Lhoist have secured grants from the Government's Industrial Energy Transformation Fund (IETF) to help them explore the feasibility of carbon capture and storage (CCS) as part of their net zero plans.**

The announcement follows recent news that Hanson and Tarmac passed due diligence under the Government's Industrial Carbon Capture (ICC) scheme, bringing them a step closer to installing carbon capture technology.

CCS is an essential part of the cement and lime industry's decarbonisation journey and understanding the feasibility of building a CCS plant is a key milestone.

## Scottish stone beside the seaside

**A STRETCH of the Somerset coastline has gained extra protection from the sea thanks to granite from Scotland.**

Aggregate Industries supplied more than 13,000 tonnes of giant armourstone rocks, each weighing between 3 and 6 tonnes – from Glensanda Quarry in Western Scotland to a beach near Minehead.

Three shipments of 4,500 tonnes of granite were transported to an offshore anchorage position before being transferred by sea barge to Blue Anchor Beach.

## Recycling research

**CEMEX is running trials that use pioneering techniques to enable up to 100% recycled materials to be used in new concrete products.**

Conducted in partnership with independent researchers at the Manufacturing Technology Centre and leading graphene supplier First Graphene, the trials have applied innovative production processes to optimise the use of recycled materials.

Mike Higgins, National Technical Manager for UK R&D at Cemex said: "Reusing recycled products in our materials where possible not only reduces waste, it helps to replenish our aggregates reserves and protects our business into the long-term."

## Floodplain restoration wins award

**RESTORATION and conservation work at Barton quarry in Staffordshire has helped the Transforming the Trent Valley scheme to gain a national award.**

Staffordshire Wildlife Trust and the Environment Agency have been working with multiple project partners, including quarry operators Hanson, to carry out more than 100 river and floodplain projects through the Trent river system over the past 25 years.

The work – which includes the creation by Hanson of a large area of wetlands within floodplain woodland – won the 2023 UK River Prize catchment-scale award, presented by the River Restoration Centre, which celebrates the achievements of those working to restore our rivers and catchments.

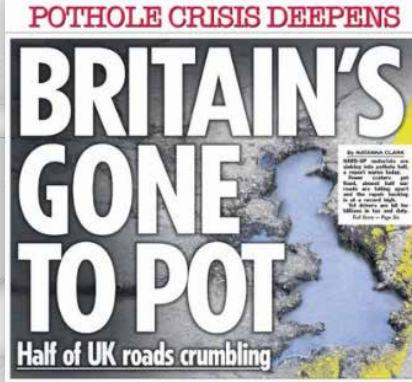
## Hydrogen power for china clay

**TWO MPA members in Devon will be soon supplied with green hydrogen as part of a new agreement with energy pioneers Carlton Power.**

Industrial minerals producers Imerys and Sibelco plan to cut their greenhouse gas emissions by making the transition away from fossil fuels to hydrogen from Carlton's Langage 10MW green energy plant near Plymouth, the first of its kind in the South West.

Sibelco's Cornwood site and Imerys' Lee Moor site produce kaolin (china clay) – mainly for tiles and ceramics – and both are within five miles of Carlton's 10MW Langage green energy hub. They will receive hydrogen via an underground pipeline.

## Britain's pothole plague laid bare



Shortfall in pothole repair budgets hits new high, research shows

Pothole crisis as roads will take 11 YEARS and £14billion to repair

Councils need £14bn and 11 years to fix 'international embarrassment' of England's pothole pandemic

Pothole misery deepens as roads resurfaced 'every 116 years'

Councils' pothole repair budgets short by record £1.3 billion, research shows

# GOING POTTY!

No MPA campaign captures the public's attention like the Annual Local Authority Road Maintenance (ALARM) survey and 2023 saw the 28th report grab more headlines than ever.

THIS YEAR'S ALARM survey makes for bleak reading, with worsening carriageway conditions and mounting costs spelling evermore misery for road users. Little wonder that its findings were covered in virtually every national news outlet.

Published earlier this year by the Asphalt Industry Alliance – a partnership between the MPA and Eurobitume UK – ALARM reports local road funding and conditions based on information provided directly by those responsible for its maintenance.

ALARM 2023 highlighted that almost half of local roads in England and Wales were deteriorating to the point of needing to be rebuilt within the next 15 years. Yet local authority highway teams only got around two-thirds of what they needed to stop further deterioration in 2022, with more than £14 billion now needed to fix the backlog of repairs.

Despite a small increase in overall highway maintenance budgets, less is being spent on the carriageway itself and rising costs due to inflationary pressures mean

engineers have reported being forced to postpone or cancel road schemes to make savings. On average local roads are only resurfaced once every 116 years.

The data shows that in the last year, the gap between what local authorities received and what they said they would have needed to keep roads to their own target conditions and prevent further decline is now **£1.30 billion – a jump of more than 20%** on last year's figure and the highest amount reported in 28 years of successive ALARM surveys.

*"Potholes and the condition of our local roads remain key issues for the public."*

The cost of fixing the backlog of carriageway repairs is reported to have increased by a further 11% on last year's record figure to a **new high of £14.02 billion** – the equivalent of £68,000 per mile of local road in England and Wales – and would take 11 years to complete.

Rick Green, AIA Chair, said: "Highway engineers can only do so much with the resources they are given and should be applauded for the steps they take to keep roads safe. Potholes and the condition of our local roads remain key issues for the public. The Chancellor went some way to recognising this in his Spring Budget. But the additional £200m one-off payment for local roads in England, while welcome, is just not enough.

"We all appreciate that there are difficult choices to make with demands and pressures on the public purse coming from every area, but not investing in local road maintenance only leads to worsening conditions, which impact on other local public services, a rising bill to fix the problem and more road user complaints."

"To really improve conditions and create a safe, resilient and sustainable network, what's needed is a longer-term funding horizon from central government with more highway budget ring-fencing. This would help local authority engineers to plan effectively and implement more efficient works to protect and enhance the resilience of the local road network."