

WINTER 22/23 ISSUE 24

mineral

products today

Energy security
Next generation is all at sea



Image: BW Ideol / V. Jonchery



Mind the gap
4bn tonne demand must be met

Concrete progress
Solutions in a circular economy

Build back wetter
Quarrying creates new wetlands

WELCOME

At the start of the summer, after a solid first quarter then a slower second quarter, I wrote expressing concern at the waning confidence in the economy, whilst trying to maintain a degree of optimism for 2023.

After all, escalating inflation, rising interest rates, slower growth predictions and uncertainty overseas was already a strong indicator of the need for businesses to start preparing for 'survive' rather than 'thrive'. Subsequently, and not helped by unprecedented political turbulence, it seems we have accelerated further away from any hopes of a recovery in 2023.

Essential foundation industries like mineral products – the lifeblood for so many other parts of construction and manufacturing – are among the first to see an uptick in growth and the first to witness any slowdown. For example, the bulk of our industry's products are the first to be used in

construction as they literally form the foundations on which everything is built. The tonnage sold provides a gauge of the construction sector's economic health.

At the end of the third quarter, volumes for primary aggregates, asphalt and ready-mixed concrete were not only down on 2021, but also below 2019 levels. This suggests that an otherwise solid pipeline of future construction projects is being hindered by the unprecedented cost pressures for energy, raw materials and labour, paving the way to a wider industry slowdown. As a result we have little option but to brace ourselves for a prolonged period of uncertainty. Short term support on energy bills is, of course, welcomed. But the absence of stability and longer-term strategic thinking remains an issue.

Despite the headwinds, I know that our industry will remain resolute in meeting the need for mineral products in an ever more sustainable manner. As you will see from this edition of Mineral Products Today, we continue to deliver on our commitments to drive down carbon emissions through

investment in new technologies and in partnership with forward-thinking teams in some Government departments.



At the risk of sounding like a stuck record, our industry will be absolutely essential to the delivery of new, renewable energy infrastructure and new homes, not to mention the smart reuse of existing buildings and materials, or the restoration of wetland habitats. We're doing 'our bit' and then some.

Whilst Government cannot fix the economy overnight, I hope that policy makers will work to align planning policy with their sustainability and climate ambitions. If all those in Government were to genuinely 'make the link' to mineral products they could enable our sector – in partnership with others – to step up and deliver for the benefit of both the UK economy and the environment. That's something worth being optimistic about.

Simon Willis, Chairman, MPA

Cement and lime producers shortlisted for carbon capture funding

Three MPA members have been shortlisted for carbon capture technology funding from the Government.

Among the projects on the list from BEIS are Hanson's cement plant at Padeswood in Flintshire, and Tarmac's lime works at Tunstead in Derbyshire – both part of the HyNet North West cluster – plus Singleton Birch's lime works at Barnetby in Lincolnshire in the East Coast Cluster.

The three sites are on a shortlist that represent innovative carbon capture technologies and have the potential to accelerate the Government's net zero ambitions as well as deliver regional economic benefits.

Their selection demonstrates the credibility of the mineral products industry's long-term



decarbonisation plans, and the UK concrete and cement industry's Roadmap to Beyond Net Zero. The three projects will proceed to the due diligence stage of the 'Phase-2 Cluster Sequencing' process.

The UK's concrete, cement and lime producers have already reduced carbon by 53% since 1990 – faster than the UK economy as a whole – and carbon capture is critical to net zero delivery.

Sustainability in concrete series

The Concrete Centre recently delivered a six-week series of live webinars on sustainability.

Among the topics under the spotlight were:

- Lean and material-efficient design
- Energy efficient homes
- Carbon capture in the cement sector
- Carbon reductions within the standards
- Low carbon precast and masonry

The events and resources produced to support the themes are still available to watch or download from www.concretecentre.com

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MPA reassured by Chancellor's budget but questions remain

The MPA expressed relief at the Chancellor's decision not to cut capital spending in November's Autumn Statement, as landmark infrastructure projects were spared from cutbacks.

The commitment to maintaining capital spending in line with the Comprehensive Spending Review – and to increasing the UK's energy independence – is sensible amid difficult economic and fiscal circumstances; although ministers must now follow through on these ambitions and ensure projects are delivered.

However, MPA is concerned about the lack of further detail about the future of energy price support for businesses after

the scheme's initial period ends in March 2023. While the Government has mentioned plans for a smaller, more targeted scheme, there remains little indication as to whether energy-intensive industries such as cement and lime will be prioritised for support.

MPA is also keen to see further detail about the Chancellor's commitment to cutting overall UK energy consumption by 15% by 2030, and the potential implications of that ambition for energy-intensive industries.

Economic importance of UK minerals overlooked say MPA and CBI

The economic importance of UK-sourced essential minerals is the focus of a new strategy document launched by the CBI Minerals Group in partnership with the MPA.



The need for minerals is poorly understood by Government according to the authors who say the availability and supply of indigenous mineral resources is often taken for granted – a situation that could lead to shortages and over-reliance on imports.

The first UK Minerals Strategy was published in 2018 and this second edition addresses key issues that have evolved over the last five years including climate change, nature recovery, essentiality and replenishment.

Demand for minerals over the next 25 years has been revised upwards to around 8 billion tonnes of mainly construction and industrial minerals to be sourced primarily from indigenous resources, all of which will require delivery through private investment, supported by effective and efficient planning, and permitting.

The Strategy renews the call for Government to produce a 'statement of need' for minerals, and to ensure that the importance of minerals and their supply is properly recognised, planned, monitored and managed.

David Payne, secretary of the CBI Minerals Group and Senior Planning Advisor at the MPA said: "The importance of secure and resilient supply chains has become a major strategic issue for many sectors of the UK economy.

"While minerals supplied from indigenous sources may appear secure, continuity of supply cannot be guaranteed without new planning permissions to replenish mineral reserves and environmental permits to enable operations. This new Strategy needs to be regarded as a material consideration in the development and implementation of economic and planning policy."

Big green money

Among the guests on a recent episode of BBC Radio Five Live's Big Green Money Show was Diana Casey, Director of MPA Cement and Energy & Climate Change.

Hosted by Dragons' Den star Deborah Meaden and business journalist Felicity Hannah the show explored the challenges of climate change and what businesses are doing to address it.

As part of a show dedicated to construction, Diana was invited on to discuss the steps the UK industry has taken so far in cutting emissions as well as the opportunities that lie ahead.

Listen on BBC Sounds at www.bbc.co.uk/sounds/play/m001brly



Euro awards hat trick!

Three MPA member companies have scooped prizes in the Sustainable Development Awards hosted by UEPG which represents aggregates producers across 25 countries in Europe.

From the UK, Aggregate Industries won the UEPG quarry restoration award for their work at Ripon City Quarry in partnership with Yorkshire Wildlife Trust and Middlemarch Environmental.

Hanson won a special UEPG award for biodiversity thanks to quarry restoration work at Floodplain Forest near Milton Keynes, Buckinghamshire in partnership with The Parks Trust.

Tarmac won the UEPG health and safety best practice award for their occupational health and wellbeing learning centre at their National Skills and Safety Park at Nether Langwith Quarry, Nottinghamshire.

For more information visit: uepg.eu

CEO Viewpoint



Joining a new industry sector – even one to which I have been relatively close to as a civil engineer – was always going to be a steep learning curve.

But it's also the only time you can offer a 'fresh pair of eyes' on established practices and perceptions, an opportunity to reflect on what I've seen and heard – from the MPA team, from MPA members I've visited so far and from some of the external stakeholders on whom our licence to operate depends. These issues may be well-trodden ground for those inside the industry, but for many outside they're still not within their field of view.

The first thing that struck me is the persistent lack of awareness and appreciation, not of mineral products themselves, but of the strategic nature of the mineral resources we have on our isles. The assumption that minerals can and will continue to be supplied indefinitely seems astonishing, with only passing consideration given to the complexity of this issue by policy makers, commercial developers and contractors.

“The assumption that minerals can and will continue to be supplied indefinitely seems astonishing”

Reflecting on this it's clear that there's little capacity – or even desire – among some of our stakeholders to truly understand the whole supply chain system. Government departments and commercial enterprises are tactically focused on their relatively small link in the chain. Their priority is solving the issues that are immediate and local to them, and for which they are directly responsible.

So in the construction sector, for example, availability of materials is seen as an upstream issue unless, of course, there's an immediate, local 'shortage' that directly impacts their downstream delivery (as we saw with some materials in 2021). Industry

in general and Government in particular doesn't see it as their job to ensure there's a supply of materials. Except that, in the case of minerals, we rely upon Government to grant us our licence to operate and to ensure that the regulatory environment is conducive to their sourcing and supply. Failure to see the long-term strategic nature of mineral products has allowed incremental policy shifts over many decades that have cumulatively led to an unsupportive planning environment.

My second realisation – and forgive me for stating the obvious – is that currently there is no approved alternative to cement (and therefore concrete) – it's sourced locally, available at scale and cost-effective, and that's before we start to look at its unrivalled performance in construction. The carbon emissions remain a challenge, hence the strategic importance of the UK concrete and cement industry's roadmap to beyond net zero. There are numerous exciting areas of research and development and all have a part to play but there is no one panacea.

Having worked with process industries in recent years, I have gained a good grounding into the importance of understanding things at a molecular level, literally. Understanding what happens at that level, and the ability to scale up solutions, ultimately leads to better decisions – I am convinced that molecular understanding has the answers that will get us to net zero carbon and I will be discussing this further in the months ahead.

So I applaud the R&D work already happening and I strongly encourage more investment in this area. If we don't then there's a risk that our industry will be increasingly offshored – just like we have seen in other foundation and manufacturing sectors – and that's not good for our industry, employment, the economy or the environment.

The MPA works tirelessly to champion the sector and to build that political

understanding of the need for mineral products to deliver the Government's ambitions for infrastructure, homes and improvements to our towns and cities. After all, half the products that we make are ultimately procured by Government – that makes it all the more curious why we are at best an afterthought, exposed to the unintended consequences of policy decisions over the decades.

Against this backdrop, it's remarkable that few sectors have done as much as mineral products to address their environmental impact, from reducing carbon emissions through product and process innovations to recycling materials and making efficient use of waste resources.

“The perception of what working in this sector is all about is already outdated compared to the current-day reality”

One of the biggest and best surprises coming into this industry is the incredible work on quarry restoration and wildlife conservation, not just returning quarries back to nature but enhancing the land as we go. Borrowing the land to supply essential minerals and then returning it to a state that's better than it was before – and repeating that approach nationwide at hundreds of locations – is phenomenal. Most people outside the industry still have no idea, whilst for most people within the sector it's 'just what we do'.

And that brings me to my final observation and what I am more impressed by than anything else – the people. Wherever I have been I have met people who truly care about what they're doing.

Plant operatives and drivers, sales people and office staff, they're all justifiably proud and passionate about the role they play. You certainly can't say that about every sector of the economy and I wonder if it's related to our collective purpose in helping to deliver and maintain the fabric of society.

NATURE PHOTO COMPETITION 2023

SPREAD THE NEWS! The MPA's highly popular Nature Photo Competition is back!

Yet this also serves as a reminder of another challenge that we increasingly face – that of attracting new talent. How do we compete in what's still perceived to be an industry which, in the eyes of some, is seen as incompatible with a green, zero carbon future (despite the fact that our products are needed to get us there).

In fact, mineral products offers exceptional breadth, scope and longevity of employment and career opportunities, in built-up and rural areas, nationwide as well as internationally. I have met people at every level who enjoy rewarding jobs and careers for life. Yet, with increasing investment in technology and automation and the emergence of AI (artificial intelligence), many of the traditional manual jobs in our industry have evolved into highly-skilled technical roles, while the perception of what working in this sector is all about is already not keeping up with the current-day reality.

“Big data could even influence how the sector is perceived and give rise to new approaches to policy and regulation”

Where I sense we are behind the curve as an industry is in the use of 'big data' to elevate us to the next level in terms of productivity, efficiency, safety, sustainability and more. Understanding what big data can do for the industry is a step we are only just beginning to take. With the right focus, it can inform decision making, giving us greater capability to predict rather than simply react. It will enable us to work smarter and set out more compelling evidence-based arguments about the importance of mineral products.

Big data could even influence how the sector is perceived and give rise to new approaches to policy and regulation. So we need to balance the protection of intellectual property with the need to share good practice, and it's a journey that will require investment of time and money. But I believe that it's the route to deliver better outcomes for the mineral products sector and for society as a whole.

Jon Prichard
Chief Executive,
Mineral Products Association

Showcasing the incredible array of flora and fauna on operational sites or restored quarries the MPA Nature Photo Competition also celebrates talented amateur photographers the length and breadth of the country.

The 5th MPA Nature Photo Competition welcomes entries in two categories:

- Employees and contractors who work for MPA members
- Volunteers working on nature reserves or other sites that were once quarries

With 2,000 active mineral products operations – from quarries to downstream production plants – as well as more than 83 square kilometers of priority habitats created through quarry restoration, there's ample opportunity for outstanding images.

Entries can be photos of species (both fauna and flora) and habitats (including their landscape setting) found on operational quarries, partly or fully restored sites, or any mineral products site plant or machinery.

In previous years the standard has been very high and now – with even greater access to cost-effective high quality digital cameras – the judges are in for a treat (and some difficult decisions!).

Entrants compete for vouchers for photographic equipment as well as having their images selected for use in MPA communications.

The competition is open until 14 September 2023 and any photographs entered must have been taken between 1 January 2022

and 13 September 2023 to allow as many different types of wildlife to be captured. Winners will be announced and images showcased at the end of the year.

Entrants may submit up to five images (each between 1MB and 5MB each in size). To enter send each of your photos attached as a separate email direct to MPA at naturephotos@mineralproducts.org

Full terms and conditions are provided on the MPA website. For further information contact Rhian Geary rhian.geary@mineralproducts.org



Bittern in flight | (Cotswold Lakes Trust) Shorncliffe Nature Reserve, Gloucestershire | by Dave Soons



Otter | Kings Dyke Nature Reserve, Cambridgeshire | by George Walthew



Dead-nettle leaf beetles mating | Paxton Pits Nature Reserve, Cambridgeshire | by Ann Miles

ENERGY IS A

Energy security is back on top of the political agenda and looks set to be a hot topic for the foreseeable future. Wind power is set to play a starring role, but whatever the solution, huge volumes of mineral products will be needed and that will require joined-up Government policy.

The war in Ukraine has exposed the UK's vulnerability to energy security risks like never before, with dizzying price rises and the very real prospect of shortages through the winter months.

The uninterrupted availability of energy at an affordable price – and the huge physical infrastructure required to deliver it – must continue to be priority for Government, which at the same time needs to keep the country on track to deliver its net zero carbon commitments.

So whilst the use of fossil fuels and the building of new nuclear power stations continues to be hotly debated, a potentially much bigger, greener opportunity to generate electricity is on the horizon – quite literally. And it can only be achieved with massive volumes of aggregates and concrete.

Wind power is one of the largest sources of renewable electricity in the UK. In 2020 wind accounted for almost a quarter (24%) of our total electricity generation, with 11% from onshore wind farms and 13% generated by offshore facilities. That marks out the UK as a world leader in wind energy and it proves that domestically produced mineral products like concrete are essential for the foundations of wind turbines, onshore and offshore alike.

And although wind power is expected to continue growing, especially offshore, there are mounting pressures on accessible space for traditional 'gravity based' wind farms sat on the sea bed. That's because of the need to balance energy generation with things like commercial shipping, fishing and conservation, combined with the fact that

gravity based offshore wind turbines can only be built in sea depths of up to around 60 metres.

The solution comes in the form of floating offshore wind farms – arrays of wind turbines mounted on massive air-filled pontoons anchored to the seabed rather than fixed to it. It's a concept that's already proven in Scotland which in January 2022 awarded seabed lease rights to 17 offshore wind projects totalling a massive 25GW in capacity, more than half of which will come from floating wind farms. Meanwhile, the Celtic Sea off the South West of England and Wales is believed to have the potential to deliver 20GW of floating offshore wind, with an initial roll-out of 4GW by 2035.

“Without a holistic approach, as we accelerate the drive for floating offshore wind energy we risk ‘offshoring’ the economic and environmental benefits”

The ability to deploy this technology in deeper water means that floating wind solutions can be built much bigger than gravity based wind turbines, able to cope with rougher seas and stronger winds, therefore generating more power.

Major UK contractors are already tying up deals with the world's leading floating offshore wind energy specialists. And whilst the first commercial floating pontoons have been made of steel, developers are increasingly turning to concrete as the material of choice.

Mark Russell, MPA Executive Director for Planning, Mineral Resources and Marine Aggregates said: “Energy security is a matter of national security and the consequences of over reliance on energy imports have always been predictable and predicted. But events in Ukraine have brought into sharp focus, politically and economically, that as a country we need to become more self-sufficient and at the same time deliver on our net zero targets.

“Being an island in the North-East Atlantic which is exposed to a lot of windy weather, offshore wind is a ‘no-brainer’ and floating offshore wind is a natural next step. ‘Floating’ and ‘concrete’ are two words you might not expect to see next to each other, but the technology to create floating concrete pontoons is well-established, using locally-sourced mineral products that are less carbon intensive than the alternatives.”

In its Energy Security Strategy the Government has set out its ambition is to deliver up to 50GW of offshore wind by 2030, including up to 5GW of innovative floating wind – well over the power generated by a single nuclear power station.

That would require more than 300 wind turbines each floating on an air-filled pontoon made from more than 10,000 cubic metres of concrete. To deliver this ambition would need more than six million tonnes of aggregates and well over a million tonnes of cement – not to mention the materials required to build new manufacturing facilities to produce them and the deep water port infrastructure to float them out to sea.

The good news is that the raw materials could be sourced from within the UK, and even close to where manufacturing takes place to reduce the transport of materials and associated carbon cost. But according

ALL AT SEA

to Mark there's a disconnect between the Government's energy ambitions and the processes through the rest of the supply chain needed to realise those ambitions.

Due to their scale offshore wind projects are defined as a nationally significant infrastructure projects (NSIPs) which means that, in England and Wales, the Planning Inspectorate examines each proposal and make a recommendation to the Secretary of State for Energy and Climate Change to take the decision on whether to grant or to refuse consent.

"To accelerate its ambitions, the Government is making amendments to the Levelling-up and Regeneration Bill to take legal powers to streamline decision-making for selected NSIPs," said Mark. "This would allow the Secretary of State to nominate projects to go through this fast-track process and accelerate delivery. In the case of offshore wind the aim is to cut the planning process from around four years to 12 months.

"The technology to create floating concrete pontoons is well-established, using locally-sourced products that are less carbon intensive than the alternatives"

"Whilst the intention is laudible, in reality all this will do is shift the pinch-points and delays to elsewhere in the supply chain, including everything that needs to be in place for the supply of essential mineral products to make things like concrete. We have the capability to be self-sufficient – virtually all the components of concrete can be sourced and produced in the UK – and that benefits the economy, but under current planning policy it can take many arduous years to establish new mineral reserves, processing facilities and the downstream manufacturing plants.

"What's needed is a holistic approach – across Government departments – which considers not just the floating offshore wind infrastructure, but all the enabling elements that need to happen to support its delivery. With clear, joined-up policy large parts of the supply chain needed to deliver new floating offshore wind infrastructure could come from within the UK and it could really help to grow our economy in new ways. Without a holistic approach, as we accelerate the drive for floating offshore wind energy we inadvertently risk 'offshoring' the economic and environmental benefits!"

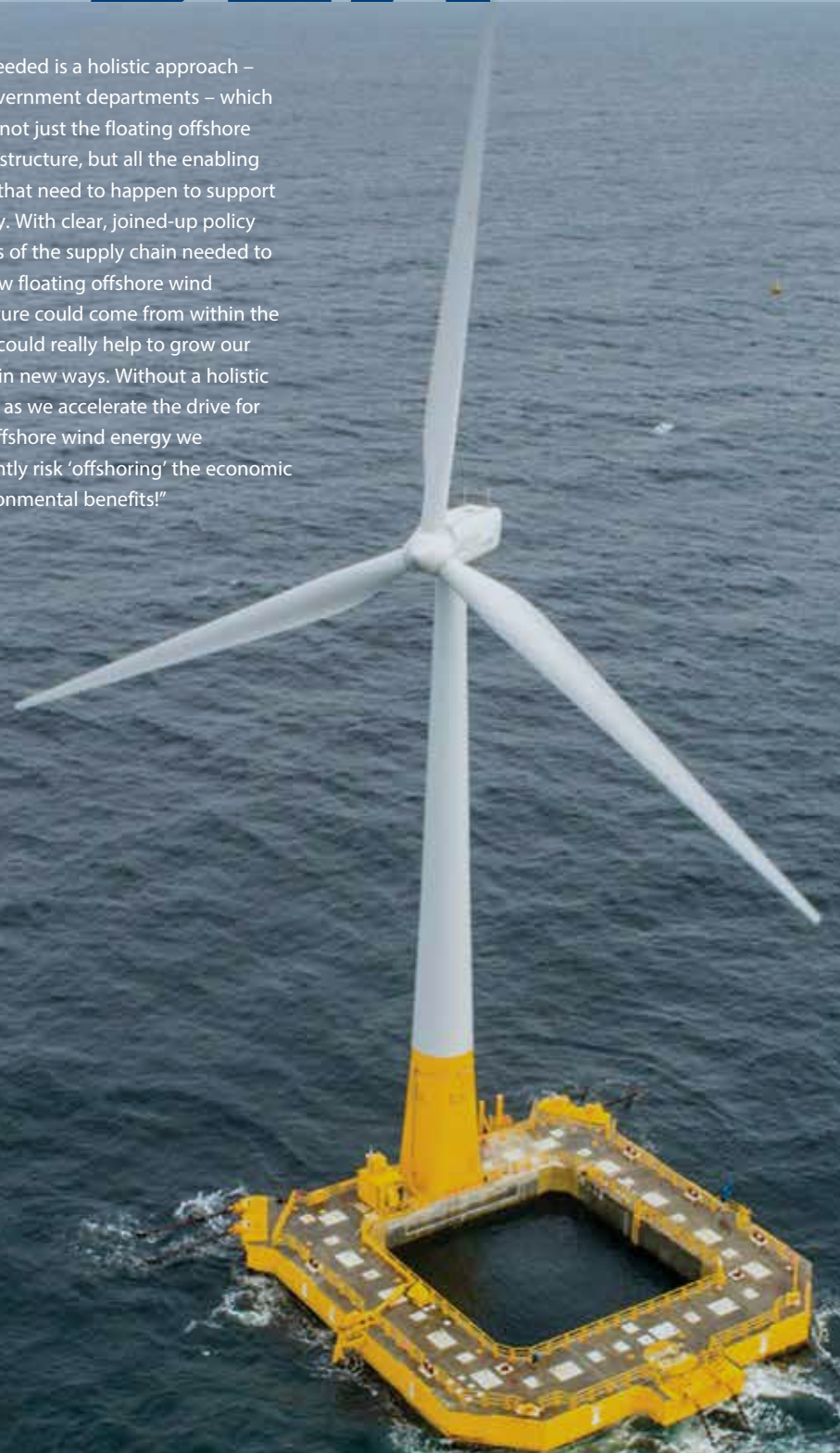


Image: BW Ideol / V. Joncheray

Mind The GAP

4bn tonne aggregates demand must be met

The continuing decrease in permitted reserves for essential primary aggregates will need to be addressed urgently to support the British economy over the next 15 years.

A new report from the MPA shows that around 4 billion tonnes of aggregates will be needed to meet Great Britain's construction needs between now and 2035.

Demand projections suggest that between 277 to 323 million tonnes of crushed rock, sand and gravel will need to be supplied each year. Cumulatively, this means that between 3.8 and 4.1 billion tonnes of aggregates will be required between 2022 and 2035, compared to a total of 3.2 billion tonnes of aggregates supplied in the previous period, between 2008 and 2021.

In recent years, around 250 million tonnes of aggregates have been used each year in Great Britain, with 28% coming from recycled and secondary sources, close to the maximum achievable and significantly higher than the majority of countries in Europe.

In 2020, when the Covid-19 pandemic prompted a historic shock to UK

construction, total aggregates demand still reached some 220 million tonnes.

The MPA's new report 'Aggregates Demand and Supply in Great Britain: Scenarios for 2035' highlights pressure points that may come to bear on some traditional sources of aggregates, through restricted availability and limited access to particular mineral resources.

"Decline in permissions for land-based sand and gravel places increasing pressures on the supply of local aggregates"

This will require the wider portfolio of domestic aggregates supply to re-balance in order to ensure a steady and adequate supply of essential minerals to support the economy is maintained. A continuing decline in permissions for land-based sand and gravel in particular is likely to place increasing pressures on the supply of local aggregates over the next 15 years.

It could mean greater dependence on larger crushed rock quarries, with more materials travelling greater distances, and increased reliance on marine sand & gravel. For the past decade, for every 100 tonnes of sand & gravel produced from permitted reserves, only 63 tonnes have been replaced through new planning permissions.

For crushed rock, the replenishment rate is a little higher at 76%, although it mostly reflects new permissions granted at a small number of sites in 2011 and 2012, which means that the ten-year replenishment rate will reduce significantly in the next two years.

In its report, the MPA also expresses caution over the contribution from recycled and secondary aggregates to construction activity. While these sources will continue to provide a valuable supply of aggregates, the limited availability of secondary and recycled resources suggests the potential for these to significantly increase will be limited. Primary aggregates are therefore expected to continue to meet over two-thirds of overall demand for the next 15 years.

The future supply of aggregates faces additional challenges related to port and transport infrastructure – rail depots and marine wharves for loading and unloading – and access to skills.

Some of these issues will also limit the scope for an increase in imported tonnages to offset constraints in domestic production, which could only happen if commercially viable and environmentally sustainable. Even assuming a doubling of currently imported aggregates tonnages to 10 million tonnes per annum by 2035, this would still represent less than 5% of the total primary aggregates supply.

“Minerals and mineral products play a foundation role in supporting the economy”

Given the foundational role that minerals and mineral products play in supporting economic activity, the MPA identifies a number of key issues that need to be addressed in order to maintain a steady and adequate supply of essential aggregates:

Future availability and supply of essential minerals cannot be assumed; it needs to be planned, monitored and managed. In particular, there is a need for greater transparency of the construction material

needs associated with nationally significant infrastructure projects and other major developments.

A more strategic, long-term approach is required to inform the Managed Aggregates Supply System (MASS) and ensure a steady and adequate supply is enabled, whether nationally, regionally or locally. This would allow both the local mineral planning system and the mineral products industry to respond in a timely manner to ensure the right materials are available in the right place and at the right time – thus ensuring the most cost-effective and sustainable supply options can be provided.

Permitted reserves of primary aggregates will need to be unlocked to ensure demand can be met, because imports, recycled and secondary materials cannot fill the anticipated gap and fulfil all the demands created by our future construction needs. Replenishment rates for sand & gravel in particular will need to increase, relying upon the industry bringing forward more planning applications and the mineral planning system responding appropriately.

MPA Director of Economic Affairs Aurelie Delannoy who authored the report said: “Minerals and mineral products are the largest material flow in the country, with 400 million tonnes of essential resources

The MPA report *Aggregates Demand and Supply in Great Britain* is available to download at mineralproducts.org > Publications > Resource-Use

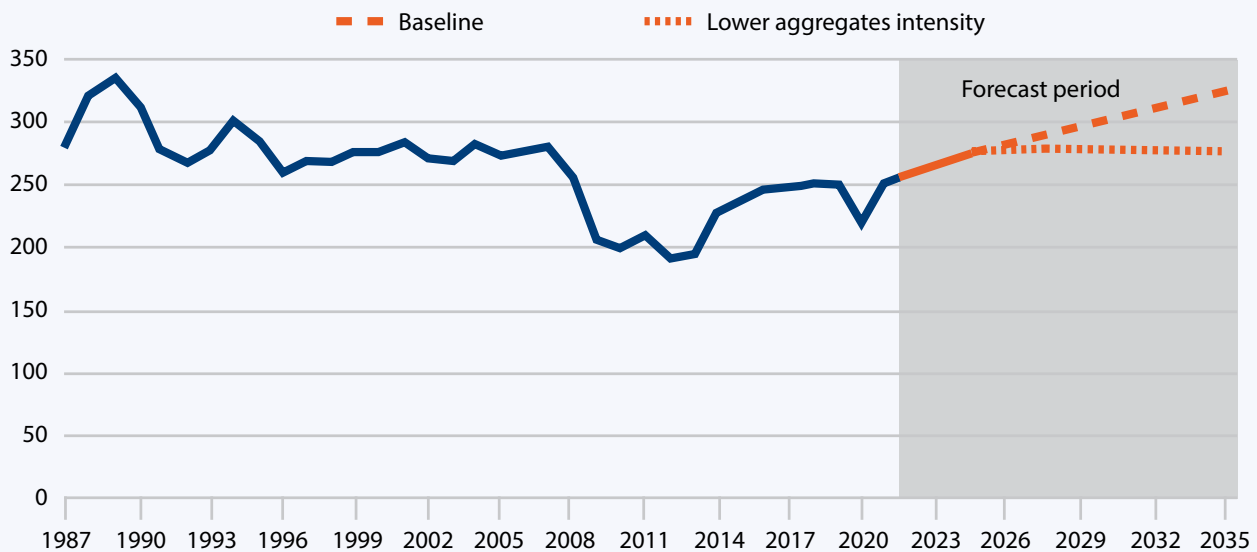


and associated products being consumed every year.

“Aggregates are by far the largest component of supply and the over-riding majority of these are derived from domestic sources – providing jobs and making a direct contribution to the economy, but also providing a foundation for wider economic activities.

“Given the role minerals play in supporting the development of better energy and water facilities and activities, improved transport networks and regeneration of our towns and cities, their ongoing availability and supply needs to be treated as a strategic issue as mineral products are self-evidently critical to national infrastructure, the economy and our quality of life.”

Total aggregates demand in Great Britain: 2022-35 projections under the baseline and lower aggregates intensity assumptions (million tonnes)



Source: Mineral Products Association.


Concrete solutions

Rapid progress is being made to decarbonise concrete and cement production across all seven 'levers' set out in the industry's roadmap to beyond net zero*. But can we improve the sustainability of the concrete that's already in use in buildings across the country?

Smart design can help to extract the maximum value from existing building structures rather than pulling them down, writes Elaine Toogood, Director of Architecture and Sustainable Design at The Concrete Centre.

There is a growing recognition that we urgently need to transform our 'take-make-dispose' economy into a circular one, in which resources are kept in use for as long as possible while maximum value is extracted. Achieving this will involve significant, sustained change in every part of society – and we need to start now.

Adapted from an article in MPA The Concrete Centre's magazine Concrete Quarterly.



The Record Store in Hayes, West London. AHMM has transformed this 1927 art deco record factory into a modern office building.

in a circular economy

In buildings there are a number of strategies designers can adopt to maximise concrete structures' potential in a circular economy, ensuring that they are fit for purpose for a world in which resource use is radically lower and no material is wasted.

Reuse and repurpose

Reusing a building structure is the most effective way to keep its materials in use for as long as possible and to extract the maximum value from them.

This may involve expanding and improving an existing building so that it can continue to perform the same function as user needs evolve. Or it might mean using the frame of a redundant building to fulfil a completely different purpose.

"Retaining the existing concrete in buildings also provides the opportunity to tap into its thermal mass and reduce operational energy use"

Doing so reduces the demand for new materials, and the embodied carbon associated with new development.

Retaining the existing concrete in buildings also provides the opportunity to tap into its thermal mass and so reduce operational energy use.

Design for reuse

New concrete structures should be designed to optimise future reuse, embedding good circular economy practice from the outset. Here, the durability of concrete is an advantage.

The inherent low maintenance requirements of a concrete structure, and its resilience to fire and the impacts of weather, mean it can remain serviceable over a long period, with the potential for multiple reuses during its lifetime.

The key to optimising this therefore lies not so much in the material itself, but rather in

the way that it is designed, with consideration of spans, loads, regular grids and generous ceiling heights helping to ensure future functionality.

Design for disassembly and reuse can also maximise the lifespan of both individual components and the building structure itself. This increases the reuse potential of the underlying structure by making it easier to upgrade it or to strip it back to facilitate an alternative use. Structural elements themselves can also be designed for disassembly, especially for buildings that have relatively short lifespans.

This approach is already being taken for many precast concrete products, such as stairs and stadium seating, fencing, barriers and paving. For example, the upper tiers of London's 2012 Olympic stadium are fully demountable so that they could be reused elsewhere in the future – a good example of the circular economy hierarchy in practice.

"Concrete can be recycled again and again in perpetuity"

Recycling concrete

When concrete does eventually reach the end of its life, it can be recycled again and again in perpetuity to provide a low-carbon resource with a range of applications.

The majority of concrete's volume/mass is aggregates, and when recycled, it effectively becomes aggregate again. Some of this makes its way back into new concrete, but most is used 'unbound' as sub-base materials, fill and hard core.

Already, over 90% of the UK's hard construction, demolition and excavation waste, of which concrete is a significant proportion, is diverted from landfill for use in construction. Almost a third of all aggregates used in the UK come from recycled or secondary sources.

Where newly quarried primary aggregate is required, the UK's geology can provide a

long-term supply of low-carbon, local, responsibly sourced materials for use in concrete. This can often prove to be the most sustainable solution, as recognised in the latest version of BREEAM New Construction, BRE's science-based sustainability framework.

Reusing by-products

These days most concrete contains some recycled material, and each of its principal constituent parts – aggregate, water, cement and reinforcement – can include recycled content.

"Almost a third of all aggregates used in the UK come from recycled or secondary sources"

Common secondary cementitious materials such as GGBS (ground granulated blast-furnace slag from steel making) and fly ash (historic deposits of ash from coal-fired power generation) are by-products of other industries.

Another example of reusing by-products is in the form of secondary aggregates. These materials, such as air-cooled blast-furnace slag and china clay waste have similar properties to primary aggregates and are commonly and increasingly used in concrete.

As a structural material, quality control and performance are understandably paramount, and technical specifications restrict the allowable percentage of recycled and secondary content according to the intended use of the concrete, its location and the durability requirements.

Around the world, there are many research projects that seek to use local waste resources in concrete – from coffee grounds and car tyres to plastics and oyster shells. With the growing emphasis on circular economy principles, further innovations will no doubt emerge.

BUILD BACK wetter

With prolonged drought conditions impacting people and wildlife, leading conservationists have called for urgent action to create more wetlands – something the quarrying industry has been delivering for decades and is uniquely placed to continue doing.

2022 has proved to be one of the driest years on record in some parts of Britain, posing major challenges for water resources and serious impacts on aquatic ecosystems, terrestrial habitats and agriculture.

And while mineral products such as aggregates and concrete will be needed to upgrade existing infrastructure and build new facilities to maintain a supply of fresh water for people, the industry's restored quarries are also playing a vital role in creating new wetlands.

Conservationists have long recognised that responsible extraction of minerals

enables the creation of wetland habitats on a scale and intricacy that no other industry can deliver.

Restoration of mineral sites – especially sand and gravel quarries – is often designed to create new lakes and ponds, reedbeds, wet grasslands and even wet woodlands. These types of landscapes support an incredible abundance of wildlife, and also enable water management and flood control.

With MPA members already working alongside wildlife charities and local authorities to create new swathes of wetland habitat, the MPA is backing the latest calls

from leading conservationists for large-scale wetland restoration to improve resilience to drought, wildfires and even flooding.

Tony Juniper CBE, Chair of Natural England said that by restoring wetlands the worst effects of climate change could be mitigated. Writing in *The Guardian* he said: "During the last 100 years, the UK has lost 90% of its wetlands. This has led to the drastic decline of wildlife and rendered the country more vulnerable to the effects of extreme conditions. Restoring some of those wetlands could deliver huge benefits.

"Wetlands can help to keep rivers flowing, even when rain is scarce, thereby protecting the living, shimmering threads that bring life to the landscape. Water standing on the land also helps recharge the aquifers that

WETLANDS CREATED*

Lakes & ponds 1,460ha

Floodplain & grazing marsh 175ha

Fen, marsh & swamp 327ha

TOTAL 1,962ha

**from restored quarries*

WETLANDS PLANNED*

Lakes & ponds 1,904ha

Floodplain & grazing marsh 106ha

Fen, marsh & swamp 1,119ha

TOTAL 3,129ha

**in quarry restoration plans*

underpin much of our public water supply. Holding more water in the environment through the restoration of wet ecosystems can reduce flood peaks and protect us from the misery of the flooding that periodically affects communities across the country."

To date quarry operators have created at least 1,962 hectares of new wetlands in Britain and are committed to delivering a further 3,129 hectares through current quarry restoration plans.

And yet the industry's track record in creating new wildlife habitats – especially wetlands – is often overlooked. That's one reason why last year the MPA celebrated 50 years of Quarries & Nature, including a

documentary film and stunning photo book showcasing the sector's remarkable contribution to habitat creation in partnership with conservation groups.

Dr Jeremy Biggs Director of the Freshwater Habitats Trust said: "Quarries restored for nature conservation are a haven for wildlife, both terrestrial and aquatic. Gravel pit lakes and ponds often have excellent water quality, which is now rare in lowland landscapes. These clean water habitats are critical, supporting many of our declining and threatened freshwater species, such as pollution-sensitive lesser-bearded stonewort and variable damselfly. Quarry sites are a very important piece of the puzzle on our mission to create a rich, diverse and healthy freshwater landscape."

"Quarries restored for nature conservation are a haven for wildlife, both terrestrial and aquatic"

Tony Juniper said: "We have many good examples across the country of really beneficial outcomes for nature that have resulted from mineral extraction. With a little bit of imagination and forethought, we can actually achieve a great deal for nature as well as extracting the resources we need for different kinds of developments."

Creating new wetlands on a landscape scale

The River Trent and Tame valleys have long presented opportunity for landscape-scale delivery of wetland. The valleys were once a wildlife paradise – a giant wetland artery running 185 miles from source in the West Midlands to the sea in Lincolnshire.

But over the past 100 years or so wetlands were drained, built on or neglected but quarrying is reversing the decline. Carefully coordinated restoration of an array of quarry sites – providing essential sand and gravel to surrounding towns – is returning this huge Midlands corridor back to its former glory, and in doing so helping to secure the future of many threatened species.

While small wetland areas are of high value for species like amphibians and dragonflies, larger sites of 100 or even 200 hectares can accommodate a full range of species. They are also more resilient to the effects of climate change, and allow management at scale.

Main image: Middleton Lakes, Staffordshire



There's mortar life!

A training centre for budding bricklayers supported by the MPA Mortar product group has been so successful that three more are set to open in the weeks ahead.

Mortar is the glue that bonds bricks and blocks together and remains the most popular way to build homes in the UK. But the intense housebuilding ambitions of recent year has caused an unprecedented demand for skilled 'brickies' at a time when many are retiring.

So in 2021 a new immersive training centre was set up in Tamworth, Staffordshire to give young people joining the building trade the opportunity to rapidly learn the variety of bricklaying skills needed by housebuilders.

Led by NHBC, the standard-setting body that provides warranty and insurance for new homes, and supported by Tamworth Borough Council and the site's operator Redrow, the Training Hub gained the backing of the MPA Mortar product group whose members CPI Euromix supply the mortars for the apprentice bricklayers.

Since its launch more than 100 new apprentices have attained NVQ Level 1 –

through a mix of theoretical and practical training at the hub and on-site experience for the trainees back with their own employers. And now three more Training Hubs are about to be opened, in Newcastle upon Tyne followed by Hull and then Cambridge in 2023.

The Training Hubs immerse apprentice bricklayers in a realistic working environment and give them the chance to build substantial structures in a purpose-built facility, equipped with classrooms, welfare and catering facilities.

“Quality and consistency are critical – that's why over 80% of UK mortars are factory-produced”

MPA Mortar Manager Mick Russell, himself a former bricklayer, said: “Bricks and mortar go hand-in-hand and so we leapt at the opportunity to support NHBC's new Training Hubs.

“I run a session all about mortar – what it is, how it's made, and so on – there's a lot more to mortar than meets the eye! Quality and consistency are critical for mortar and that's why today over 80% of the mortars used in the UK come from factory-produced sources as opposed to being mixed on site.” he said.

MPA Mortar is supplying the training hubs from on-site silos, containing dry-mix mortar that just needs water adding. “With one key difference,” added Mick, “the mortar is a lime-sand mix that can be worked with a trowel and goes off just like cement-based mortar, but it doesn't form a strong bond so the apprentices' practice structures can be broken down easily at the end of the course and reused again and again.”

However, with the increase in Modern Methods of Construction – faster ways of delivering new buildings by maximising the efficiency of material and human resources – is there still a demand for the traditional bricks and mortar approach?

“There continues to be a huge demand for mortar – with an estimated 2.5 million tonnes produced every year – and equal demand for bricklaying skills.” said Mick. “That may be affected by the ebb and flow of the economy but the strength, durability, longevity, fire resilience and aesthetic nature of brick buildings means we'll need brickies for a long time to come.”

Electric mixer features youngster's artwork

The UK's first battery electric concrete mixer featuring a hand-drawn design by an eight-year-old competition winner has been unveiled by MPA member Tarmac.

Children aged between five and 12 were invited to submit a design for the new vehicle on the themes of sustainability and construction to be featured on the vehicle's drum. A drawing by Elsie May Field, featuring a rainbow, insects, flowers and wind turbines, will now be on display as the pioneering vehicle delivers concrete across the West Midlands. Elsie May got the 'heads-up' about the competition from her dad, Daryl, a plant supervisor at Tarmac. She said: "When Daddy told me about the competition, I got my pencils out straight away and I knew that the electric truck would be good for nature so that was my inspiration for the design. When I found out I had won I was really happy – I couldn't believe it! All my family are very proud of me."

Based out of Tarmac's Washwood Heath site in Birmingham, the 'e-mixer' marks a significant milestone for both the business and the UK construction industry on the journey to net zero emissions. The truck produces zero tailpipe emissions and will be charged from renewable electricity generated by solar photovoltaic panels at the site.



Carbon capture breakthrough proven

A Lancashire cement plant operated by MPA member Hanson has become the first to demonstrate a ground-breaking carbon capture technology.



The team at Ribblesdale works in Clitheroe has proved that rapid absorption of the carbon dioxide from cement manufacture can be achieved through enforced carbonation of recycled concrete paste (RCP) within the plant's existing 'wet scrubber' system.

During the trial, 15 tonnes of industrial RCP were fed into the scrubber system which is already designed to prevent certain emissions from entering the atmosphere. The result was 100kg of CO₂ being bound within each tonne of RCP.

Sustainability director Marian Garfield said the trial was carried out with the support of the R&D team at Hanson's parent company Heidelberg Materials and marked another important milestone in their carbon capture journey.

"It confirmed the feasibility of enforced carbonation, which supports the circular economy by using waste recovered concrete fines to remove CO₂ emissions from the production process while producing a secondary material that can then be used to replace virgin limestone in cement and concrete production."

The Ribblesdale trial follows one carried out under semi-dry conditions at Heidelberg Materials' Brevik plant in Norway and underlines that the company is at the forefront of carbon capture technology to enable its path to net zero.

Sustainable slab

HS2's drive to build the world's most sustainable high speed railway shows no sign of slowing with the latest supply of low carbon concrete to the project. Capital Concrete, a London-based joint venture between MPA members Brett and Breedon, recently completed a pour of almost 300 cubic metres of its proprietary low-carbon mix for a foundation slab in Euston at HS2's flagship terminus. The product uses recycled construction materials and cementitious fly ash – waste from coal-fired power stations – to achieve a reduction of over 70% in carbon emissions compared to traditional concrete.

Cutting carbon art

BBC Energy and Environment Analyst Roger Harrabin visited MPA member Cemex to learn more about low carbon concrete. He visited a readymix plant in Manchester during the filming of a documentary exploring ways of reducing the CO₂ generated during the production of five everyday products including concrete and its active ingredient cement. As part of the programme Artist Simon Bingle was supplied with a carbon neutral mix which he used to create Concrete Truths, a sculpture which now appears alongside others in an exhibition at the Eden Project, Cornwall.

Blooming beauty

The beauty of wildflowers around a Gloucestershire town was revealed to residents and visitors after two years of work by the county's Wildlife Trust in partnership with MPA member Grundon. Seven unloved meadows around Cirencester have bloomed like never before thanks to a £25,000 project funded through the Landfill Communities Fund (LCF). The cash enabled the Trust to sow the meadows with a range of grasses and wildflowers – providing shelter and food for important pollinators including bees and many other insects – and build important infrastructure to improve public access.

When the levy breaks

It's 20 years since the Aggregates Levy was first imposed on UK quarry operators as a tax ostensibly to improve environmental performance. Standards have improved and recycling is at a maximum but that's not because of the Levy.

Introduced in 2002, the ill-conceived tax on each tonne of newly quarried aggregates (with some curious exemptions for non-construction uses) was meant to encourage efficient mineral extraction, increase the use of recycled alternatives to primary materials and provide some cash for environmental projects.

The levy, the equivalent of which does not apply to any other essential industry, was set at £1.60 per tonne which went up to £1.95 in 2008 then £2.00 a year later. Since then the MPA has managed to prevent further increases, saving the industry millions of pounds of potential financial burden. Today the tax raises around £350 million each year for the Government but how it is spent is not tracked.

"An environmental tax with no benefit for the environment"

The MPA has always argued that the premise of the levy, and the way it is applied, is flawed. "Analysis of market data shows that recycled volumes increased rapidly in the 1990s before the Aggregates Levy was applied in 2002," said MPA

Director of Economic Affairs Aurelie Delannoy, "driven in part by the introduction of the Landfill Tax in 1996.

"And pre-levy, in 2001, the supply of recycled aggregates in the UK was at 60 million tonnes, so these materials were already a commercial proposition alongside primary aggregates. The overriding constraint to more recycling is the amount of demolition work being undertaken to give rise to recyclable materials, something that tax cannot influence.

"Disappointingly, since 2002 there has been no substantive Government assessment of the impact of the Levy to test if it has met its environmental objectives. There have been general assertions about the positive impact of the levy but the evidence suggests it's an ineffective environmental measure."

In the meantime, MPA members have continued to promote the benefits of available recycled and secondary aggregates, improving the quality of recycled products and lobbying for upgrades to product standards and waste protocols to enable materials to be used more effectively.

The one environmental benefit that was built into the original legislation, the

Aggregates Levy Sustainability Fund – which channelled 10% of the income back to communities for local projects – was scrapped in 2011 and now none of the levy's income goes to the community.

The MPA has repeatedly asked the Government to reintroduce an Aggregates Levy Community Fund to help to deliver environmental benefits, 'natural capital' and nature recoverys – as well as ring-fenced funding for a creaking mineral planning system – but those calls have fallen on deaf ears.

Looking ahead things are set to become more complex since UK legislation has now devolved the Aggregates Levy to the Scottish Government which is currently consulting on its own replacement for the tax.

"MPA members have continued to promote the benefits of recycled and secondary aggregates"

Today, at least materials are taxed the same in the home nations and are able to move freely from where they are sourced to where they are needed. Should Scotland or Wales decide to take a different approach to taxing essential building materials, the imbalance could have major ramifications for the cost and flow of materials.

And that's likely to impact Government itself which directly or indirectly procures around half of all aggregates for infrastructure, new homes, development and regeneration.