Mineral Products
Essential for the Economy and Our Quality of Life

Profile of the UK Mineral Products Industry
2020 Edition
Welcome to our 2020 edition of Profile of the UK Mineral Products Industry.

This edition is mostly based on data up to 2018, although information for 2019 was included where available. It sheds light on the breadth of the mineral products industry, from the diversity of the products and their uses, the scale of their markets, to their environmental and sustainability attributes. Throughout this publication, our aim is to demonstrate and celebrate the essential role of minerals and mineral products as an enabling industry for others to thrive on, essential for our economy and our quality of life.

Aggregates for our railways, asphalt for our roads, mortar for our homes, concrete for our schools, hospitals and infrastructure, armour stone for our coastal defences, industrial lime for our drinking water, industrial sand for glass, and clays for ceramics, hardly touches the surface of the role minerals play in our society. The list goes on. The industry supplies the necessary raw and manufactured mineral products to support future sustainable economic growth, whilst also playing its part in the transition to a low carbon and more circular economy. It employs 81,000 people directly at over 2,000 active sites and plants, and supports an additional 3.5 million jobs throughout the supply chain.

This publication provides readers with a unique source of information on an industry that is so essential to our way of life, and yet remains too often misunderstood by the wider community. It illustrates the changing patterns in the way we produce and consume our minerals and the manufactured products derived from them. This is a valuable resource at a time when Government’s support for industry data collection and consolidation is wavering, increasingly relying on industry to fill the gaps.

I very much hope that you will enjoy this edition – and, perhaps, learn something new along the way.

Nigel Jackson
Chief Executive
Mineral Products Association
2 An essential industry

2.1 Mineral production

The Mineral Products Industry is an essential enabling sector of the UK economy, which has a broad positive impact on overall economic activity. As the largest element of the construction supply chain, a supplier of key raw materials and products to many other industries, and the largest material flow in the UK economy, a healthy domestic Mineral Products Industry is vital for the UK.

The majority of the industry’s output is used in the UK construction industry – improving our housing stock, transport networks, commercial and industrial buildings, energy and water infrastructure, schools and hospitals. Non-construction markets are also important, including many of the above sectors, as well as iron and steel manufacture, ceramics, paper, glass manufacture, agriculture and horticulture, cleaning power station emissions and food and pharmaceuticals. In 2019, there were approximately 200 million tonnes of primary aggregates produced in the UK, over twice as much as the volume of energy minerals produced (figure 2.1a).

In 2018, a total of 400 million tonnes of aggregates, industrial minerals and other manufactured mineral products were produced in Great Britain (table 2.1a).

1.4 This is over four times the total volume of energy minerals, produced in the UK. These materials are mostly used in construction and manufacturing, underpinning every activity of the economy by supplying vital raw materials at the heart of UK growth. International trade in minerals and mineral products is limited with, for instance, domestic sources supplying about 85% of the cement market. One exception is industrial lime, for which approximately 25% of total UK production was exported in 2019. A proportion of UK marine sand & gravel, dimension stone and industrial clay production are also exported.

2.1a: UK production of primary aggregates and energy minerals, 2019 (Million tonnes)
Minerals and mineral products are essential to our way of life, future economic growth and Government policy ambition.

**MARKETS**

**MINERALS**

- Limestone & Dolomite
- Igneous Rock
- Sandstone

**PRODUCTS**

- Agricultural lime
- Ball clay
- China clay
- Industrial lime
- Industrial sand

**MARKETS**

- Leisure
- Glass
- Iron & Steel
- Agriculture & horticulture
- Ceramics
- Foundries
- Paper manufacture

- Pharmaceuticals
- Emissions cleansing
- Water treatment
- Biocides
- Plastics
- Food manufacture
- Transport safety

- Medical goods & cosmetics
- Capture acidic emissions to air
- Purify water, treat wastewater & sewer sludge
- Surface disinfectant
- Remove water during manufacturing
- Sugar, feed storage
- Reflective road markings, rail braking

**MARKETS**

- Rails
- Roads
- Schools
- Water & sewage utilities
- Bridges & tunnels
- Homes

- HS2, Crossrail, Northern Powerhouse Rail
- Strategic, major and local roads
- Priority School Building Programme
- Thames Tideway, AMP7
- Great Yarmouth Tidal Power Crossing, A303 Stonehenge
- 300,000 new homes each year by 2025

- Hospitals
- Shops
- Offices
- Factories & warehouses
- Energy generation & nuclear decommissioning
- Climate change mitigation

- Health Infrastructure Plan, incl. 40 new hospitals
- Crossrail, Bankside Yards (London), Kirkstall Forge (Leeds)
- UKRRC (Coventry), Forth’s new brickworks (Leics)
- Hinckley Point C, Sellafield, Hinkley 2
- Flood & coastal protection, incl. sustainable drainage systems
2.2 Industry value

The Mineral Products Industry is defined as the extraction of mineral resources, i.e. igneous rock, limestone and dolomite, sandstone, dimension stone, sand & gravel, industrial sand, China clay and Ball clay, and their processing and manufacture into asphalt, cement, concrete (both ready-mixed and precast), industrial and agricultural lime, mortar and slag.

It also includes a share of road freight activities, as mineral producers deliver most of their materials by road, as well as some road contracting work when asphalt producers lay the asphalt themselves. Based on this definition, MPA estimates that the Mineral Products Industry directly contributed to the UK economy by generating over £5.8bn in gross value added in 2018 (figure 2.2a). The industry had a turnover of £16.3bn in 2018, and enabled a further £596.7bn turnover in industries downstream of the supply chain.

2.2a: Gross value added generated by the Mineral Products Industry and the supply chain in the UK, 2018 (£ million)

2.2b: Gross value added generated by the Mineral Products Industry in the UK, 2010-18 (£ million)

(a) This is not an official ONS Standard Industrial Classification (SIC) but reflects the range of activities covered by Mineral Products producers.
(b) Excludes real estate activities.
Source: ONS, MPA calculations.

2.3 Productivity

Whilst directly employing 81,000 people and supporting 3.5 million jobs through its supply chain in 2018, the Mineral Products Industry is also a highly productive industry: each worker produced over £71,000 in gross value added in 2018, equivalent to 1.2 times the national average (figure 2.3a).

2.3a: UK productivity by industry, 2018 (£ per worker)

- Electricity, gas, air conditioning supply: £136,344
- Mining & quarrying (incl oil & gas): £136,008
- Financial & insurance activities: £1,032,700
- Water supply, sewerage, waste: £1,029,293
- Construction: £71,532
- Manufacturing: £65,915
- Other services: £65,625
- Professional, scientific, technical services: £62,107
- National average: £59,833
- Education: £49,773
- Wholesale, retail, repair of vehicles: £49,616
- Public administration & defence: £48,857
- Other non-metallic mineral products: £44,272
- Agriculture, forestry & fishing: £41,552
- Arts, entertainment & recreation: £36,121
- Health & social work: £35,625
- Accommodation & food services: £33,554
- Basic pharmaceutical products: £30,535

2.3b: Direct Markets

- Food products: £697,720
- Leather and related products: £7,770
- Paper and paper products: £8,567
- Chemicals and chemical products: £8,770
- Basic pharmaceutical products: £8,567
- Rubber and plastic products: £8,567
- Other non-metallic mineral products: £8,567
- Basic metals: £8,567
- Water: £8,567
- Sewerage: £8,567
- Waste: £8,567
- Construction: £8,567

2.3c: Contracting and Road Freight

- Asphalt: £2,913
- Concrete, plaster and cement products: £4,985
- Dimension stone: £9,970
- Other non-metallic mineral products: £9,970
- Basic pharmaceutical products: £9,970
- Rubber and plastic products: £9,970
- Other non-metallic mineral products: £9,970
- Basic metals: £9,970
- Water: £9,970
- Sewerage: £9,970
- Waste: £9,970
- Construction: £9,970

2.3d: Extraction of Mineral Resources

- Rock (igneous rock, limestone & dolomite, sandstone): £1,316
- Sand & gravel, China clay, Ball clay: £1,200
- Concrete products for construction: £9,970
- Ready-mixed concrete & mortar: £9,970
- Concrete, plaster and cement products: £9,970
- Dimension stone: £9,970
- Asphalt: £9,970

2.3e: Minerals Products Industry, total GVA

- £5,804

2.3f: Minerals Products Industry, total Turnover

- £16,371

2.3g: Direct Markets, total GVA

- £209,970

2.3h: Direct Markets, total Turnover

- £596,729

- This is not an official ONS Standard Industrial Classification (SIC) but reflects the range of activities covered by Mineral Products producers.
- Excludes real estate activities.
- Source: ONS, MPA calculations.
3.1 Aggregates (crushed rock, sand & gravel, recycled and secondaries)\(^{(3)}\)

Within aggregates, the major supply tonnage is crushed rock, with significant contributions from sand & gravel, recycled and secondary materials. The sand & gravel supply comprises both land-won and marine dredged materials.

This broad breakdown disguises the fact that local and regional markets may be highly dependent on a particular type of source of aggregate as a consequence of the geological availability of specific resource types and/or the market demand for individual products.

Over the last 60 years, there have been some variations in the relative importance of the different sources of aggregates, with most notably the increase in the supply of recycled and secondary materials evident since the early 1990s (figure 3.1a). Total aggregate sales have been depressed since the early 1990s (figure 3.1a). Total aggregate sales were depressed since the onset of the recession in 2008, reflecting the significant decline in construction markets, but have started to recover since mid-2013. This suggests that there remains significant scope for further improvements in minerals products and construction markets.

The underlying geology of the UK determines the local availability of mineral products which are only transported long distances when necessary. However, resources are not always distributed evenly and some inter-regional movement is necessary. The South East, for example, has its own supplies of sand & gravel and recycled aggregates, but relies heavily on crushed rock brought in by rail from the East Midlands and South West and by sea from Scotland. It also requires marine dredged sand & gravel from coastal waters. Almost all (97%) of the primary aggregates consumed in London are imported by rail from the East Midlands and South West England, and marine dredged aggregates landed at Thames wharves.

In 2018, marine aggregates satisfied 22% (13.7 million tonnes) of the total construction needs for sand & gravel in Great Britain (figure 3.1b). Marine aggregates also support beach nourishment and contract fill projects in the UK and are also exported overseas for use in construction. Total production of marine sand & gravel for UK construction, exports, beach nourishment and contract fill, shows that total marine aggregates production levels have been consistently lower than the total tonnage permitted across all operators’ production licences (figure 3.1f). The difference reflects the fact that individual dredging areas can offer a variety of materials; from fine sand to coarse gravel, so multiple licence areas in each dredging region ensure that there are enough materials for each operator to supply both current and future market needs, and also provide the industry with the flexibility to respond to future changes in market demand that may occur. Multiple licences also ensure dredging areas are near to wharves that supply potential markets.

The biggest use for marine dredged aggregates is the construction market, predominantly for use in ready mixed concrete and concrete products. Aggregates are a high bulk, low cost, commodity and consequently are highly sensitive to transport distances. Where local sources of aggregates are constrained, either because resources are not geologically present or because existing sources have become depleted, alternative sources of supply have to be found. Through economies of scale, marine aggregates supplies can play an important role in the overall portfolio of construction aggregate supply by transporting large volumes (2,000 -10,000 tonnes/cargo) over considerable distances and delivering them to coastal towns and cities close to where they are needed. As an example of this, in London and the South East of England, one third of all the primary aggregates consumed in construction activity come from marine sources.

Access to markets relies on the availability of suitable infrastructure to support the import of marine aggregates and crushed rock. Without the presence of suitable, unconstrained road and railhead facilities, the balance of supply cannot be maintained. This is why such sites should be subject to safeguards policies to protect their use in accordance with the requirements set out in the National Planning Policy Framework.

\(^{(3)}\) Marine aggregate extraction does not currently occur in Scotland.

Source: The Crown Estate, MPA calculations.

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3.1a: Aggregates markets by source of supply in Great Britain, 1955-2018 (Million tonnes)

**Source:** ONS, BGS, MPA calculations.

![Graph showing aggregates markets by source of supply in Great Britain, 1955-2018](image)

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3.1b: Aggregates supply mix in Great Britain, 2018 (Million tonnes)

**Source:** ONS, BGS, MPA calculations.

![Graph showing aggregates supply mix in Great Britain, 2018](image)

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3.1c: Primary aggregates sales by region in Great Britain, 2019 (Million tonnes)

**Source:** ONS, BGS, MPA calculations.

![Graph showing primary aggregates sales by region in Great Britain, 2019](image)

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3.1d: UK primary aggregates sales, 2019 (Million tonnes)

**Source:** ONS, BGS, MPA calculations.

![Graph showing UK primary aggregates sales, 2019](image)

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3.1e: UK total: 198.8 million tonnes

**Source:** ONS, BGS, MPA calculations.

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**Notes:**
- **Recycled & secondary 71.0**
- **Land-won sand & gravel 48.9**
- **Crushed rock 117.3**

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**3.1f: Aggregates by region, 2019 (Million tonnes)**

**Source:** ONS, BGS, MPA calculations.

![Graph showing aggregates by region, 2019](image)

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\(^{(3)}\) Includes marine-dredged materials. Source: BGS, MPA Calculations.

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\(^{(a)}\) Marine aggregates extraction does not currently occur in Scotland.
Cement is the key component in producing ready-mixed concrete, precast concrete and mortar (figure 3.2a). Following a stable market in the early and mid-2000s, the economic recession saw cement sales drop by 34% between 2007 and 2009. Since 2012, markets have improved, but sales in 2019 remained 4% lower than in 2007.

Cement is made by first making cement clinker by crushing, blending and firing limestone or chalk with small amounts of other natural materials, such as clay or shale, to a temperature of 1450ºC. The first reaction is to drive off moisture and then reduce calcium carbonate (CaCO₃) from the limestone or chalk, to calcium oxide (CaO) where this calcination occurs around 950ºC. Chalk has a higher natural moisture content and hence a higher energy penalty than harder limestones. The materials then combine further at the higher temperature to produce calcium silicates, calcium aluminates and calcium aluminoferrites in nodules of clinker. As the final step in (CEM I) cement making, the clinker is ground to a powder with about 4%-5% gypsum, added to control the setting time of the end-product. Further blending occurs for the other cement types identified below.

Three main classifications of cement sold in the UK are:

- **CEM I** – made from ground cement clinker and a small percentage of gypsum to control the material’s setting time when mixed with water;
- **CEM II** – is a cement containing between 6% and 35% fly ash(1), limestone or ground granulated blast furnace slag(2);
- **CEM III** – is a cement containing between 36% and 95% ground granulated blast furnace slag.

There are a variety of cement products designed for specific end-uses:

- **Ready-mixed concrete** 54%
- **Merchant** 16%
- **Products (incl. mortar & precast)**, 24%
- Other** 5%

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- Other** 5%
### 3.3 Ready-mixed concrete

Concrete is essential for our economy and our way of life, now and in the future. New homes, schools, hospitals, workplaces, roads and railways as well as the infrastructure that provides us with clean water, sanitation and low carbon energy, all depend on concrete and creates the demand for it.

Its unique characteristics, versatility, strength, fire resistance durability and energy efficiency provides us with safe secure and comfortable homes and resilient infrastructure that can last for generations.

Concrete is a sustainably produced local material, average delivery distance is just 8 miles, and with an established national supply chain that creates jobs and supports communities throughout GB.

Demand for ready-mixed concrete is closely aligned with both construction activity and the general economy. Reflecting the general economy, there continues to be nearly three times more ready-mixed concrete supplied in London and the South East than in most other regions in Great Britain (figure 3.3b).

**3.3a:** MPA ready-mixed concrete(sales in Great Britain, 2004-19 (Million cubic metres)

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<tr>
<td>Sales</td>
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<td>20</td>
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<td>10</td>
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**3.3b:** MPA ready-mixed concrete(sales by region in Great Britain, 2019 (Million cubic metres)

- England: 19.6
- Northern Ireland: 2.8
- Wales: 0.8
- Scotland: 1.5

**3.3c:** Estimated UK ready-mixed concrete sales(s), 2019 (Million cubic metres)

- England: 19.6
- Northern Ireland: 2.8
- Wales: 0.8
- Scotland: 1.5

**3.3d:** Includes ready-mixed produced from fixed and site plants. Source: MPA.

### 3.4 Precast concrete

Precast concrete includes concrete elements of any size that are cast in a factory – from blocks to bridge beams. Precast elements are fundamental to many buildings and civil engineering projects. For instance, 80% of all new roofs are made from concrete tiles, whilst concrete and masonry provide strength, thermal mass and fire protection to 85% of new homes built over the last 30 years. The market is mainly supplied from domestic sources but figure 3.4a points to the vulnerability of this sector to international competition, as the UK has moved from a trade surplus to a trade deficit over the past decade. The UK has been a net importer of concrete products since 2009.

**3.4a:** UK concrete products trade balance, 2000-19 (£ million, current prices)

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<td>+200</td>
<td>+150</td>
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**3.4a:** Source: MPA.

### 3.5 Lime

#### 3.5a Industrial lime

Many diverse industries such as steel, chemicals, glass and construction rely heavily on industrial lime. This unique and versatile mineral is also used in the production of sugar, the treatment of contaminated land, the desulphurisation of flue gases from power stations and the purification of water for human consumption. The sector makes a positive contribution to the UK trade balance, with 25% of total industrial lime sales exported in 2019 (figure 3.5a).

**3.5a:** Industrial lime sales by end-usage in Great Britain, 2006-19 (Million tonnes)

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<td>0.6</td>
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<td>1.2</td>
<td>1.2</td>
<td>1.4</td>
<td>1.5</td>
<td>2.4</td>
<td>3.1</td>
<td>1.8</td>
<td>1.4</td>
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**Source:** British Lime Association.

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**Note:** The figures and data presented are subject to rounding and may not sum to the total due to rounding.

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*Includes ready-mixed produced from fixed and site plants. Source: MPA.

*Based on the assumption that MPA sales represent 75% of the total GB market; includes ready-mixed produced from fixed and site plants. Source: MPA.
3.5b Agricultural lime

Quarried agricultural lime remains UK agriculture’s principal tool in moderating the effects of climate change, excess soil acidity, and supplying essential calcium and calcium magnesium plant nutrient. In addition to inhibiting environments conducive to the free availability of toxic elements, agricultural lime plays a key role in protecting nature’s greatest asset, the soil, maintaining a healthy, sustainable, and productive environment essential to meeting the challenges of future food security. National survey data indicates declining soil pH levels and that twice as much agricultural lime as current applications needs to be applied to UK farmland to revert the rate of increasing soil acidity.

3.6 Asphalt

Roads are the economic and social arteries of the nation, ensuring door to door routes for delivery of goods and services. They are the primary means of access to all parts of integrated transport networks and as such, we depend upon asphalt for road construction and maintenance. This was recognised during the early days of the Covid-19 pandemic, when roadworkers were acknowledged by Government as key workers, supported by this essential material supply chain. Asphalt is produced in a network of local plants, which serve both the local and national road networks. Asphalt provides sustainable solutions as it is almost uniquely 100% reusable and recyclable back into new asphalt and utilises other recycling streams, whilst delivering cost effective, safe, comfortable and quiet road surfaces. Research and innovation are thriving to further enhance the durability and sustainable credentials of asphalt materials to support road user and owner demands. Following the recession, these markets declined very steeply in 2012, but have picked up since 2013. Asphalt sales rose 20% between 2013 and 2019, but remain 9% below the pre-recession levels in 2007 (figure 3.6a). Road improvement and maintenance schemes will be a necessary element of the UK’s Build Back Better policy.

3.7 Mortar

Mortar plays an essential role in the building and construction industries, providing the ‘glue’ that bonds bricks, blocks and stones into masonry. About 70% of mortars used in the UK come from factory-produced sources, as opposed to being mixed on site, reflecting the over-increasing demands for consistent quality building products in the development of our built environment.
3.8 Dimension stone

The UK industry for dimension stone plays an important role in ensuring that the unique local characteristics of natural stone-built areas of the UK are maintained.

In addition, there is demand from the heritage sector and from the prestige development market both at home and overseas. Annual production continues from quarries in Great Britain at about 1 million tonnes (figure 3.8a), but imports from China and India continue to impact on the overall market.

3.9 Industrial sand

As well as being used for glass manufacture, paints, plastics and foundry moulds, high purity silica sands are also used in a wide range of essential industrial applications. After declining significantly between 2006 and 2009, in light of changes in the UK heavy industry and manufacturing sector, the production of industrial sand in Great Britain stabilised at about 4 million tonnes per year until 2016, rising gradually to 4.9 million tonnes in 2017-18 (figure 3.9a).

Historical applications such as heavy industry have been replaced by more diverse applications in markets such as food manufacture, water purification, rail braking, horticulture and sports and leisure.

3.10 Slag

Slag is produced during the manufacture of iron and steel, and is processed into a variety of products, which can be used in many applications ranging from aggregates for construction products, to water treatment, soil conditioners and cementitious materials. The cementitious properties of blast furnace slag were discovered in the late 19th century and it has been widely used in cement manufacture for over 100 years.

In the UK, ground granulated blast furnace slag (GGBS) generally replaces between 20% and 80% of the normal Portland cement. Air cooled blast furnace and steel slags are used as aggregates in construction products, with the latter playing an important role as a high skid resistant surfacing aggregate in maintaining the safety of our road network. They are also used in the treatment of waste water and for soil remediation in agricultural markets.

3.11 Industrial clays

3.11a China clay

Although a small decline in the UK production of China clay has occurred in recent years, the value to the UK economy has remained constant with a small increase in the value of the export market. China clay or Kaolin has a wide range of industrial markets including ceramics, paper and specialist applications such as fillers for pharmaceuticals, paints, adhesives and animal feeds.

Critical properties are whiteness and grain size and shape, with the latter affecting other factors such as strength, plasticity and fluidity which are critical to meet a wide range of customer specifications.
3.11b Ball clay

Also known as plastic clays, Ball clays are used principally in the ceramics industry for industrial applications, including sanitaryware, tile manufacture and tableware.

Routinely blended from different clay horizons and sources, their ability to flow into moulds, their firing properties and inherent strength ensure UK Ball clays are much sought after globally for their ability to form cement-like properties when in the presence of alkalis, such as those which are present when Portland cement is mixed with water.

Although coal fired energy generation is being phased out, the historic production of CDFA significantly exceeded demand, so the surplus was mixed with water to avoid dust and then placed in designated landfill sites or lagoons. Once placed in landfill sites or lagoons, there is virtually no change in the chemistry or physical properties – even after decades of storage – and such resources are estimated to be well in excess of 100 million tonnes.

CDFA can be used as a secondary aggregate to produce autoclaved aerated blocks, or as grouts for soil stabilisation. Current research focuses on evaluating the long-term durability characteristics of CDFA when used as a supplementary cementitious material in concrete.

3.11b: Sales of Ball clay in the UK, 1998-2018 (Million tonnes)

4 Long-Term Aggregates Supply

The geological distribution of resources means that a key factor influencing the supply of aggregates is the operation of the mineral planning system. In England, the Managed Aggregates Supply System is designed to ensure a steady and adequate supply of aggregates for construction.

Figure 4a indicates permitted reserves of aggregates in England and Wales since the early 1990s. However, permitted reserve ‘replenishment rates’ are a more meaningful indicator of long-term availability of supply. If the amount of aggregates receiving planning permission equals the level of production, the replenishment rate is 100%.

The implication of long-term replenishment rates below 100% is that local shortages of supply may become apparent. Evidence from Local Aggregates Assessments and Local Plan development suggests that this is beginning to happen in parts of Yorkshire, the South West, the South East, the North West, and the West Midlands.

4a: Permitted reserves of land-won primary aggregates in England and Wales, 1993-2018 (Million tonnes)

4b: Replenishment rates in Great Britain, 2009-18

4.12 Coal Derived Fly Ash

Coal Derived Fly Ash (CDFA) is the mineral component left over after pulverised coal is burned in coal fired power stations. It typically accounts for some 10%–15% of the coal burned and is very different in terms of chemistry and physical properties to ‘incinerator’ ashes. This secondary mineral resource comprises of oxides of silica, alumina and iron encapsulated in glassy spheres. The glassy spheres have pozzolanic and iron properties, which means that they form cement-like properties when in the presence of alkalis, such as those which are present when Portland cement is mixed with water.

CDFA can be used as a secondary aggregate to produce autoclaved aerated blocks, or as grouts for soil stabilisation. Current research focuses on evaluating the long-term durability characteristics of CDFA when used as a supplementary cementitious material in concrete. Indicative consumption data for 2017 and 2018 is around 1.8 million tonnes per annum, of which 0.5 million tonnes is imported.

Coal Common near the former Eggborough Power Station, North Yorkshire could supply up to one million tonnes of fly ash per year for 25 years.
5 Industry Taxation

At the extraction stage, the annual cost of the Aggregates Levy reached £397m in 2019 (figure 5.a). More broadly, the mineral products industry is also in the scope of the UK Emissions Trading System, Climate Change Agreements linked to the UK Climate Change Levy, Streamlined Energy and Carbon Reporting and Energy Saving Opportunity Scheme, all of which are focused on carbon reduction or energy efficiency. In addition, the industry has to manage the indirect impact of measures and associated costs related to generating and supplying energy used by the industry. It is currently unknown what carbon pricing policy will be in place from 1st January 2021 when the UK exits the EU. The options include a stand-alone UK Emissions Trading System (UK ETS) or a UK ETS linked to EU ETS or a Carbon Emission Tax (CET).

Climate change and energy measures in 2019 were estimated to be around £10 per tonne of cement produced (figure 5.b). The indirect cost of policies such as carbon pricing (UK ETS or CET) and renewables policies such as contracts for difference are expected to increase further over the coming years, so that the cost to cement producers could reach £20-25 per tonne as early as 2025.

5.a: Aggregates Levy payments to Government, 2010-19 (£ million)

5.b: Estimated cost of energy and climate change measures for the UK cement industry, 2018-25 (Gross cost per tonne of cement, i.e. before any compensation is applied)

6 Environment and Sustainability

6.1 Recycling and secondary aggregates

Recycled and secondary aggregates accounted for 28% of total aggregates supply in Great Britain in 2018 (figure 6.1a). Recycled aggregates are the product of processing inert construction and demolition waste, asphalt planings and used railway ballasts into construction aggregates. Just as primary aggregates, these materials conform to European aggregate standards and national specifications, and make a significant contribution to total aggregates demand.

Secondary materials are derived from other industrial processes. This can include mineral extraction operations, such as sand and crushed rock material from ball clay and china clay production, or waste from slate production. Other sources of secondary materials include blast furnace and steel slags, incinerator bottom ash (IBA), furnace bottom ash (FBA), coal-derived fly ash (CDFA) and crushed glass sand. Collectively, these sources also contribute significantly to the total aggregates demand and are used, predominately, in the lower layers of road pavements (but increasingly in higher value road applications), but also in some concrete manufacture and a range of other construction applications.

Sales of Portland cement are supplemented by the use of other cementitious materials including ground granulated blast furnace slag (GGBS) and fly ash (figure 6.1b). These cementitious materials are supplied either as a component of blended cements or directly to concrete manufacturing facilities.

Recycled and secondary materials accounted for 28% of total aggregates supply in Great Britain in 2018 (figure 6.1a).

6.1a: Recycled and secondary materials in total aggregates sales in Great Britain, 1990-2018

6.1b: GGBS and fly ash in the UK cementitious market, 2019

6.1c: Contribution of recycled and secondary materials in total aggregates consumption across Europe in 2018

Source: BPA
6.1b: Source: BPA
6.1c: Source: BPA

(a) Includes the gross value added generated by the quarrying of rock (shale, igneous rock, limestone & dolomite, sand & gravel. Source: HMRC, MPA calculations.

(a) Includes manufactured, recycled (fixed & mobile) and aggregates re-used on site. Source: UEPG, MPA calculations.
6.2 Resource efficiency

UK sales of both aggregates and cement per capita are relatively low and amongst the lowest in comparison with the rest of Europe. Figures 6.2a and 6.2b below indicate that the use of aggregates and cement per capita is 32% and 45% respectively below the European average.

6.2a: Total aggregates production per capita, 2018 (Tonnes per capita)

6.2b: Cement consumption per capita, 2018

6.3 Carbon emissions

The extraction of minerals, processing and transport to market generate carbon emissions, although these will depend on the material considered, the method of extraction used and transport required. Based on 2016 data, WWF estimates that carbon emissions from ‘Other mining and quarrying products’ (i.e. non-energy and metals extraction) activities represented just 0.2% of total UK production emissions, and stood 46% below levels of emissions in 1990.

Cement manufacture is energy and carbon dioxide intensive but because of its unique properties only a relatively small amount is needed in concrete. The UK concrete and cement industry has a strong track record having already delivered a 53% reduction in absolute carbon dioxide emissions since 1990 – decarbonising faster than the UK economy as a whole.

UK manufacturers achieved this substantial decarbonisation through heavy investment and a progressive move toward using alternative waste-derived fuels and increasing the use of by-products and waste from other industries to substitute for clinker.

Clinker is the principal ingredient in cement. Clinker production is the main source of carbon dioxide emissions. In 2018, the sector took 43% of its kiln fuel thermal input from waste derived sources, avoiding the use of just under 500,000 tonnes of coal. In addition, cement manufacturers replaced 7% of their raw materials with waste derived alternatives. The industry is committed to building on this early action. This is why the UK concrete and cement industry prepared its roadmap in 2020 that sets out a clear pathway to reduce emissions to beyond net zero.

Other Mineral Products are also progressing on decarbonisation. For example, Warm Mix Asphalt technologies reduce production of CO2 emissions in the region of 15%, depending on the technology implemented. The full benefits rely on other influences in the specification and procurement chain. Further reductions on embodied carbon can be achieved by increasing the addition rates of recycled asphalt back in to asphalt, currently averaging around 15%. Carbon reduced products can also provide delivery efficiencies, ensuring networks are returned to service sooner, thereby reducing delays and emissions generated by traffic in congestion. High quality road construction and maintenance can further reduce emissions from vehicles through improving fuel efficiency, and for Electric Vehicles (EVs), by extending range. It has been calculated that an upgrade of one third of the entire road network of Europe by 2030 could lead to yearly savings of 14 million tonnes of vehicle-generated CO2. Creating more durable and resilient material solutions also reduces the number of maintenance interventions and, hence, carbon demand required in a road's whole life cycle.
The minerals industry is uniquely placed to contribute to delivery of national and local biodiversity targets and objectives, including net gain and nature recovery. At least 8,300 hectares of UK priority habitats have been created through the restoration of old quarries and management of land, the equivalent of eight times Richmond Park. Also, at least a further 11,000 hectares of UK priority habitats are currently planned through the restoration of sites.

Figure 6.4a shows some of the best restored sites that the public can visit, a nationwide network of quarries that have been restored for wildlife and which are accessible to the public. This map, which we are continually adding to 80 sites covering over 5,000 hectares, with a range of facilities including nature trails, viewing hides and visitor centres. Collectively they form the MPA National Nature Park.

The map displays some of the main restoration sites, a nationwide network of quarries that have been restored for wildlife and which are accessible to the public. It is available on the MPA website.

6.5 Beyond Net Zero

Government has committed to deliver net zero emissions by 2050 and the actions we all take today and over the next decades will determine whether we succeed.

The UK concrete and cement industry has a strong track record having already delivered a 53% reduction in absolute carbon dioxide emissions since 1990 – decarbonising faster than the UK economy as a whole.

The industry is committed to building on this early action and prepared a detailed and viable roadmap, the UK Concrete and Cement Industry Roadmap to Beyond Net Zero, which sets out a credible pathway to delivering net zero concrete and cement by 2050, together with recommendations about the framework, policy and cross-industry collaboration that are required.

6.6 Sustainable development reports (2019)

All MPA reports are available from: http://www.mineralproducts.org/sustainability/reports.html
7 About the MPA

Who we are

MPA is the industry trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries. The Association has become established and recognised as the sectoral organisation for the mineral products industry.

Five key aims underpin the work of the MPA, creating the high-level agenda it uses to influence Government and other key stakeholders.

We seek:
1. Economic conditions that support investment
2. Better Government support for an essential industry
3. A reasonable licence to operate
4. Proportionate legislation and regulation
5. Recognition of progress

What do we do

MPA represents the interests of MPA members and the industry with all levels of Government, regulators, other organisations and external audiences.

Key activities include:
- Improving health & safety
- Representing the sector
- Raising awareness of the sector and its contribution to the economy
- Gathering and presenting evidence and information
- Influencing policy, regulation and legislation in the UK and EU
- Protecting the industry’s licence to operate
- Safeguarding and developing markets
- Improving perceptions
- Informing on markets and economic contribution
- Influencing technical and design standards
- Influencing supply chains
- Encouraging innovation
- Promoting the use of mineral products
- Educating stakeholders to ‘Make the Link’ between mineral products and their use

The MPA vision for 2025

Member consultation has established that the industry wishes:
- To be valued as an essential and economically, socially and environmentally sustainable industry of significance to the economy and our way of life and perceived as:
  - Cohesive and well-organised, responsible and accountable
  - Creative, collaborative and outward looking
  - Professional and competent, setting high standards to retain and attract new people, reflecting UK diversity
  - Innovative, embracing the use of best available technology and sharing best practices
  - Engaging constructively and strategically with Government, regulators, local communities and other stakeholders

MPA Strategic Priorities and Objectives

The following 7 Strategic Priorities will underpin the achievement of the Vision for 2025.
### 8 MPA Members List (2020)

**MPA Associate members**

- England and Wales
  - 3M UK Plc
  - AABC Bagging Ltd
  - Ammann Equipment Ltd
  - Architecural Research Services Ltd
  - Aspen Advisory Services Ltd
  - Associated British Ports (ABP)
  - Atkins Ltd
  - Avison Young
  - Banner Contracts (Halnaby) Ltd
  - BDS Marketing Research Ltd
  - Becketts Solicitors
  - British Sugar Plc
  - Broadhead Global Limited
  - BSG Ecology
  - Burren Salmon LLP
  - Carter Jonas
  - Cathay Industries (UK) Ltd
  - Charter Ltd
  - Chesterpool Plant International Ltd
  - Chevalier Ltd
  - Citrinos UK Ltd
  - CMS Cameron McKenna Nabarro
  - 3M
  - DAVIC (Acheson + Glover)
  - HCC Group
  - PDE Consulting Ltd
  - PDE Consulting Ltd

**MPA Northern Ireland**

- Producer Members
  - AG (Acheron + Glover)
  - Alpha Quarry Products
  - Armagh City Quarries
  - B McCaffrey & Sons Ltd
  - Barrick Hill Quarries
  - Bowie McKibbin
  - Breadon Group
  - Campbell Contracts Ltd
  - Colawell Concrete Ltd
  - Colliemore Concrete Products Ltd
  - Conexpo (NI) Ltd
  - Core Aggregates
  - Craigch Concrete Products Ltd
  - Curtis Enterprises
  - Dalradian Gold Ltd
  - Douglas Acheron
  - Eccom Ireland Ltd
  - F P McCann Ltd

- Associate Members
  - Atlantic Bitumen
  - Tennants Bitumen

### 8 MPA Members List (2020)

**MPA Scotland**

- Aggregate Industries UK Ltd
  - Angle Park Sand & Gravel Co
  - Bonnar Sand & Gravel Co Ltd
  - Breedon Northern Ltd
  - Cemex UK
  - D Geeddes (Contractors) Ltd
  - Hanson Aggregates
  - Hillhouse Quarry Group Ltd
  - Laid Aggregates Ltd
  - Leiths (Scotland) Ltd
  - MacLear & Mitchell (Contractors) Ltd
  - McFadyns Contractors
  - O'H Manufacturing UK Ltd
  - Patersons of Greenoakhill Ltd
  - Pat Munro Ltd
  - Tarmac
  - Tilkicott Quarry Ltd
  - W H Malcolm

**MPA Scotland**

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  - AG (Acheron + Glover)
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  - Armagh City Quarries
  - B McCaffrey & Sons Ltd
  - Barrick Hill Quarries
  - Bowie McKibbin
  - Breadon Group
  - Campbell Contracts Ltd
  - Colawell Concrete Ltd
  - Colliemore Concrete Products Ltd
  - Conexpo (NI) Ltd
  - Core Aggregates
  - Craigch Concrete Products Ltd
  - Curtis Enterprises
  - Dalradian Gold Ltd
  - Douglas Acheron
  - Eccom Ireland Ltd
  - F P McCann Ltd

- Associate Members
  - Atlantic Bitumen
  - Tennants Bitumen

### MPA Northern Ireland

**Affiliate members**

- Adderley Ltd
  - Baker of Wel toned (NI) Ltd
  - Cemex UK

### MPA Affiliate Members

- British Association of Reinforcement
  - ArcelorMittal Kent Wire Ltd
  - BRC Limited
  - Celisa Steel (UK) Limited
  - Dentsa Manufacturing – UK
  - Eisco Europa (GB) Ltd
  - Express Reinforcements Ltd
  - Maplex Ltd
  - Outokumpu Stainless Limited
  - R-Tech
  - ROM UK Ltd
### 8 MPA Members List (2020)

**British Calcium Carbonates Federation**
- Ben Bennett Jr Ltd
- Francis Flower
- Hanson Aggregates
- Imerys Minerals Ltd
- Leith (Scotland) Ltd
- Longcliffe
- Ormyra UK Ltd
- Specially Minerals Lifford
- Tarmac Ltd

**Eurobitume UK**
- Nynas Bitumen
- Shell Bitumen
- Total Bitumen
- Puma Energy

**UK Quality Ash Association**
- Full Members
  - UK Quality Ash Association
- Affiliate Members
  - Aggregate Industries
  - Breedon Cement Ltd
  - CEEMEX
  - EPUKI
  - HSH Celcon
  - LIMAB Minerals
  - Power Minerals Ltd
  - SSE
- ST Equipment & Technology Limited
- Tarmac Cement & Lime Ltd
- Uniper UK Ltd

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- Full Members
  - Aggregate Industries
  - Breedon Cement Ltd
  - CEEMEX
  - EPUKI
- ST Equipment & Technology Limited
- Tarmac Cement & Lime Ltd
- Uniper UK Ltd

**British Precast**
- **MPA British Precast Product Groups**
  - Agcrete Products Association (APA)
  - British Precast Architectural & Structural (BPAS)
  - British Precast Drainage Association (BPDA)
  - British Precast Flooring Federation (PPF)
  - Concrete Block Association (CBA)
  - Intepave
  - Intepavy (affiliation)
  - Modern Masonry (affiliation)

**Full Members**
- ABB Precast Solutions Limited
- Aggregate Industries (UK) Limited
- Anderton Concrete
- Banagher Precast Concrete Ltd
- Barcon Systems Limited
- Beibiock Limited
- Breedon Northern Ltd
- Brett Landscaping & Building Products
- Bresco Bros (Doncaster) Limited
- Castle Construction Products Ltd
- CCP Building Products Ltd
- CEEMEX
- Charcon Construction Solutions
- Cornish Concrete Products Limited
- Craven Concrete
- Creagh Concrete Products Limited
- Cross Concrete Flooring Ltd
- Decamos UK Limited
- Delta Bloc UK Limited
- E & JV Glimmingning Limited
- Elite Precast Concrete Limited
- Evans Concrete Products/ Shay Murtagh Group
- Fortcrete Limited
- F P McCann Limited
- HHH UK Limited
- Hillhouse Quarry Group Ltd
- Ibstock plc
- Interfuse Limited
- JVR Drainage Units Limited
- Jordan Concrete Ltd
- Land Bros (Forfar) Ltd
- Longley Concrete Ltd
- Mannick
- Mansfield Sand Company (Brick Division)
- Marshalls CPM
- Marshalls plc
- Mona Precast (Anglesey) Limited
- Naylor Concrete Products Limited
- Newlay Concrete
- Patersons of Greensaahill Ltd
- Plasnor Limited
- Robelee Concrete Company Limited
- S Morris Limited
- Slender Group Construction Services Ltd
- Specialist Precast Products
- Stanton Bonna Concrete Limited
- Sterling Services Limited
- Supreme Concrete Limited
- Tarmac Building Products Ltd
- Tedcrete Limited
- Thakham Tiles Limited
- Thorp Precast Limited
- Toplight Precast
- Townscape Products Limited
- TT Concrete Products Limited
- WOL (Concrete Products) Ltd

**British Precast**
- **Associate Members**
  - Adfil Construction Fibres
  - Admolast Manufacturing Ltd
  - Arcelor Mittal Sheffield Ltd
  - B&B Attachments Ltd
  - BDS Marketing Research Ltd
  - Beresford’s Flooring Ltd
  - Beseezer Company
- Boral
- Becton Machinery Sales
- Bianchi Caseriforme SRL
- BIR
- Breidon Cement Ltd
- Builders Merchants Federation
- Cambrian Services Limited
- Canadian Precast Institute
- Caswicks Ltd
- Conn Limited
- Christeyns UK Ltd
- Chysco UK Ltd
- Clarke Consult
- Command Alcan UK Ltd
- Concrete Manufacturers Association – South Africa
- Conspre Ltd
- Construction Fixing Systems Ltd
- Construction Systems Marketing UK Ltd
- Construx
- Cordel Limited
- CPI Worldwide
- Doncaster College
- Dundee College
- Dywidag-Systems International
- E3 Recruitment
- Ecclem Ireland Ltd
- Ecocem Limited
- BVC Systems Ltd
- Bemacryl Oy
- Blemi Materials Ltd
- ERCO Europe b.v.
- Euro Accessories Limited
- Forosco International Limited
- GCP Applied Technologies Ltd
- Graceoland Fixing Ltd
- Hallen Limited
- Hanson Cement Limited
- Hickman & Love (Tadton) Ltd
- Inform UK Ltd
- Inter-Minerals
- Invisible Connections
- J & P Building Systems Limited
- Kingston University
- KIN Industries/Kriver A/S
- Lansdowne Ltd
- Lärstens Building Products
- Leading Edge Management
- Leca Denmark A/S
- Leeds Oil + Grease Co. Ltd (LOGCO)
- Longrake Spar Co Ltd
- Loughborough University
- Lytag Ltd
- Maple UK Ltd
- Mansik Industries Ltd
- Master Builders Solutions UK Ltd
- Max Frank Ltd
- Megasteel Ltd
- Mentor Training Solutions Ltd
- Mens Construction Products Ltd
- N & R Richards Associates Ltd
- National Precast Concrete Association
- Australia
- National Precast Concrete Association USA
- Net-Temps Ltd
- O&O Technology Ltd
- Olimex UK Ltd
- Panex Ltd
- PCE Limited
- Perkko UK Ltd
- Permat UK
- PFR Ltd
- Pineal Infotech Limited
- Poliomatic Oy
- Precast Concrete Structures Limited
- Precast Construction Technology Ltd
- Precast/Prestressed Concrete Institute

**Probst Handling Equipment**
- Proctor Johnson
- Progress Group
- PUK Ltd
- Reablock Ltd
- RFA-Tech Ltd
- Royce Manufacturing Ltd
- Schlick Ltd
- SSD
- Sicoma S V R
- Ska Ltd
- Simply Precast Accessories Ltd
- Spiral Precast Services Ltd
- Stursoft Ltd
- T3
- Tarmac Cement & Lime Limited
- Tarmac Trading Limited
- Trelleborg Pipe Seals
- Trimele Solutions (UK) Ltd
- UK Certification authority for Reinforcing Steels (Cares)
- University College London
- University of Brighton
- University of Dundee
- University of Nottingham
- University of Sheffield
- University of Surrey
- University of Teesside
- University of the West of England
- University of the West of Scotland
- Wincanton
- Yara UK Ltd
For further information

- Mineral Products Association: www.mineralproducts.org
- Mineral Products Association Northern Ireland: https://mpani.org
- MPA Cement: http://cement.mineralproducts.org
- British Precast: www.britishprecast.org
- British Ready-Mixed Concrete Association: www.brmca.org
- British Lime Association: www.britishlime.org
- British Marine Aggregate Producers Association: www.bmapa.org
- MPA Mortar: www.mortar.org.uk
- Agricultural Lime Association: www.aglime.org
- Silica and Moulding Sand Association: www.samsa.org.uk
- The Concrete Centre: www.concretecentre.com
- British Association of Reinforcement: www.uk-bar.org
- Asphalt Industry Alliance, MPA Asphalt in partnership with Eurobitume UK: http://wwwasphaltuk.org
- UK Quality Ash Association: http://www.ukqaa.org.uk

Data Sources


European Asphalt Pavement Association (EAPA), 2016. Road pavement industries highlight huge CO2 savings offered by maintaining and upgrading roads.


The Mineral Products Association is the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries.

For further MPA information visit www.mineralproducts.org

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