Welcome to our 2016 edition of The Mineral Products Industry at a Glance. Our aim in this review is to provide you with a valuable source of information on the Mineral Products Industry, documenting the changing patterns in the way we produce and consume our minerals and the manufactured products derived from them. We present a detailed analysis of the latest data for each product, and highlight the significant contribution our industry makes to the UK economy from over 2,000 active sites and plants.

I very much hope that you find this issue interesting, and I welcome your feedback.

Nigel Jackson
Chief Executive

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MPA Agenda
- Economic conditions that support investment
- Better Government support for an essential industry
- A reasonable “licence to operate”
- Proportionate legislation and regulation
- Recognition of progress
At a glance

360mt
GB production of aggregates and manufactured mineral products

£6.4bn
Gross value added of our industry

£495bn
Turnover of industries we supply

£144bn
Value of construction, our main customer

78,000
People directly employed in our industry

3.4m
Jobs supported through our supply chain

1.1: GB sales of minerals and mineral products in 2015
(unless otherwise stated)

Construction uses

<table>
<thead>
<tr>
<th>Aggregates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>of which:</td>
<td></td>
</tr>
<tr>
<td>Crushed Rock</td>
<td>225mt</td>
</tr>
<tr>
<td>Sand &amp; gravel - land won</td>
<td>104mt</td>
</tr>
<tr>
<td>Sand &amp; gravel - marine</td>
<td>46mt</td>
</tr>
<tr>
<td>Recycled &amp; secondary</td>
<td>12mt</td>
</tr>
<tr>
<td>Recycled &amp; secondary</td>
<td>63mt</td>
</tr>
</tbody>
</table>

| Cementitious (including imports) |     |
| of which:                        |     |
| Cement (including imports)       | 13mt |
| Other cementitious materials     | 11mt |
| Fly ash, GGBS                    | 2mt  |

<table>
<thead>
<tr>
<th>Ready-Mixed Concrete</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>54mt</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concrete products</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>27mt</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asphalt</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24mt</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimension Stone</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1mt</td>
<td></td>
</tr>
</tbody>
</table>

Non-construction uses

<table>
<thead>
<tr>
<th>Rock</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>of which:</td>
<td></td>
</tr>
<tr>
<td>Industrial Lime</td>
<td>15mt</td>
</tr>
<tr>
<td>Agricultural Lime (2)</td>
<td>1mt</td>
</tr>
<tr>
<td></td>
<td>2mt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industrial Sand</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4mt</td>
<td></td>
</tr>
</tbody>
</table>

(1) Converted using 2.38 tonnes per cubic metre of ready-mixed concrete.
(2) 2014.
Source: MPA, AMRI.
1.2: **Number of MPA member active sites/plants in 2016.**

Source: MPA.

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed rock quarries</td>
<td>253</td>
</tr>
<tr>
<td>Sand &amp; gravel quarries</td>
<td>260</td>
</tr>
<tr>
<td>Depots or wharves</td>
<td>113</td>
</tr>
<tr>
<td>Railheads</td>
<td>15</td>
</tr>
<tr>
<td>Recycling plants</td>
<td>94</td>
</tr>
<tr>
<td>Cement quarries and plants</td>
<td>24</td>
</tr>
<tr>
<td>Ready-mixed concrete plants</td>
<td>864</td>
</tr>
<tr>
<td>Precast concrete plants</td>
<td>61</td>
</tr>
<tr>
<td>Lime quarries and plants</td>
<td>12</td>
</tr>
<tr>
<td>Asphalt plants</td>
<td>275</td>
</tr>
<tr>
<td>Mortar plants</td>
<td>38</td>
</tr>
<tr>
<td>Dimension stone quarries</td>
<td>43</td>
</tr>
<tr>
<td>Silica sand quarries</td>
<td>18</td>
</tr>
<tr>
<td>Slag plants</td>
<td>4</td>
</tr>
</tbody>
</table>

Locations of MPA member active sites/plants, 2016

![Map of locations](image)
2 An essential industry

2.1 Mineral production

The Mineral Products Industry is a vital enabling sector of the UK economy, which has a broad impact on overall economic activity. As the largest element of the construction supply chain, a supplier of key materials to many other industries and the largest material flow in the UK economy, a healthy domestic Mineral Products Industry is essential for the UK. The majority of the industry output is used in the UK construction industry – improving our housing stock, transport networks, commercial and industrial buildings, utilities, schools and hospitals. Non-construction markets include iron and steel manufacture, glass making, agriculture, cleaning power station emissions and pharmaceuticals.

The British Geological Survey estimates that about 215 million tonnes of aggregates and other raw minerals are extracted each year from the UK. To this, the industry adds about 130 million tonnes of manufactured mineral products such as cement and asphalt, as well as over 60mt of recycled and secondary aggregates.

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.

<table>
<thead>
<tr>
<th>Resources</th>
<th>Products</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIMESTONE</td>
<td>AGGREGATES/ASPHALT</td>
<td>RAILWAYS</td>
</tr>
<tr>
<td>IGNEOUS ROCK</td>
<td>CEMENT/DIMENSION STONE</td>
<td>ROADS</td>
</tr>
<tr>
<td>SANDSTONE</td>
<td>INDUSTRIAL SAND/MORTAR</td>
<td>SCHOOLS</td>
</tr>
<tr>
<td>SAND &amp; GRAVEL (LAND WON)</td>
<td>LIME/CONCRETE PRODUCTS</td>
<td>HOMES</td>
</tr>
<tr>
<td>SAND &amp; GRAVEL (MARINE)</td>
<td>SLAG/READY-MIXED CONCRETE</td>
<td>HOSPITALS</td>
</tr>
<tr>
<td>RECYCLED AND SECONDARY</td>
<td></td>
<td>SHOPS</td>
</tr>
</tbody>
</table>

| 6 storey | Community hospital | Crossrail |
| city centre | 53,000 | 250,000 |
| office building | tonnes of concrete | concrete segments |
| 16,480 | | |
| tonnes of concrete | | |

| House | School | HS2 |
| 12 | 15,000 | 25mt |
| tonnes of mortar | tonnes of concrete | of aggregates/minerals |
| 200 | | |

6 storey city centre office building 16,480 tonnes of concrete
House 12 tonnes of mortar 200 tonnes of aggregates
Community hospital 53,000 tonnes of concrete
School 15,000 tonnes of concrete
HS2 25mt of aggregates/minerals
Crossrail 250,000 concrete segments
2.1.a: **UK production of primary minerals, 2014.** Source: BGS.

All minerals

- Coal$, 4%
- Crude oil$, 12%
- Natural gas$, 12%
- Other$, 9%
- Aggregates, limestone & silica sand11, 63%

Non-energy minerals

- Other$, 27mt
- Aggregates, limestone & silica sand11, 188mt

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2.2 **Gross Value Added (GVA)**

The Mineral Products Industry is defined as the extraction of aggregates, dimension stone, limestone and silica sand, as well as the production of asphalt, cement, concrete, 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 £6.4bn in GVA in 2014, up from £5.4bn in 2013 according to revised official statistics. This is greater than programming and broadcasting activities, or the creative industry, and is comparable to air and spacecraft. It had a turnover of £20bn and contributed to £495bn turnover in industries downstream of the supply chain.

2.2.a: **GVA of the Mineral Products Industry, 2014.** Source: MPA, ONS, ABS.

- **Constracting by Mineral Producers** £204m
- **Road Freight by Mineral Producers** £1.1bn

**Gross Value Added (GVA)**

**Resources**

- Rock (chalk, igneous rock, limestone & dolomite, sandstone) £1.5bn
- Sand & gravel £1.1bn

**Product manufacture**

- Cement £114m11
- Lime & plaster £55m
- Concrete products for construction £1.3bn
- Ready-mixed concrete/mortar £332m
- Concrete, plaster & cement products £68m
- Dimension stone £289m
- Asphalt £417m

**First use**

- Construction11 £99.5bn
- Food products £20.4bn
- Leather & related products £671m
- Paper & paper products £4.3bn
- Chemicals & chemical products £9.1bn
- Basic pharmaceutical products £13.1bn
- Rubber & plastic products £9.8bn
- Other non-metallic mineral products12 £2.3bn
- Basic metals £3.9bn
- Water £5.3bn
- Sewerage £4.7bn
- Waste £6.7bn

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1. Igneous rock, limestone & dolomite, sand & gravel, sandstone and silica sand
2. Onshore, offshore and colliery
3. Onshore and offshore
4. Deep mined, opencast and other.
5. Methane condensates, lead, gold, silver, chalk, clay & shale, slate, ball clay, barytes, chert & flint, china clay, fluor spar, gyspum, lignite, potash, salt, talc, china stone, fireclay and peat. Peat conversion factor: 0.8 tonne per cubic metre (dry peat).
6. MPA believes the ONS estimate for the cement industry’s GVA understates the industry’s actual GVA. The 2014 GVA for the cement industry is estimated by the MPA to be around £355m.
7. Excludes minerals covered by the MPA membership, which are included in the manufacturing stage of the supply chain.
8. Excludes asphalt contracting work carried out by mineral producers.
2.2.b: GVA of selected industries, 2014. Source: MPA, ONS, ABS.

(1) This is not an official ONS Standard Industrial Classification (SIC), but reflects MPA members’ activities.

2.3 Productivity

Whilst directly employing 78,000 people and supporting 3.4m jobs through its supply chain in 2014, the Mineral Products Industry is also a highly productive industry: each worker produced about £82,000 in 2014, 1.6 times more value added than the national average.

(1) This is not an official ONS Standard Industrial Classification (SIC), but reflects MPA members’ activities.


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3 Mineral product profiles

The Mineral Products Industry, represented by the MPA, comprises aggregates, asphalt, cement, ready-mixed and precast concrete, industrial sand, lime, mortar, slag, and dimension stone.

3.1 Aggregates (crushed rock, sand & gravel)

Within aggregates, the major supply tonnage is crushed rock with significant contributions from sand & gravel and recycled & 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 or source of aggregate as a consequence of the physical availability of particular resource types and/or the market demand for particular products.

3.1.a: GB primary aggregates sales by region, 2014. Source: AMRI.

3.1.b: UK primary aggregates sales, 2015. Source: AMRI, MPA, QPANI.
Over the last 60 years, there have been some variations in the relative importance of the different sources of aggregates, most notably the increase in the supply of recycled & secondary materials evident since the early 1990s. Aggregate sales have been depressed since the onset of the recession in 2008, reflecting the significant decline in construction markets, but have started to recover since mid-2013.

Nonetheless, despite increasing by 18% between 2013 and 2015 as construction activity picked up, the aggregates market remains about 20% below 2007 volumes. This suggests that there remains significant scope for further improvements in minerals products and construction markets, particularly outside London and in non-housing related construction sectors.
Marine aggregates satisfy about 20% of the construction needs for sand & gravel in England and Wales. Marine aggregates also support beach nourishment and contract fill projects in the UK and are exported overseas for use in construction. Total production of sand & gravel for UK construction, export, beach nourishment and contract fill, shows that total marine aggregates production levels have been consistently lower than the total tonnage amount permitted across all operators’ production licences. 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 any future changes in market demand that may occur. Multiple licences also ensure dredging areas are near to customers.

The biggest use for marine dredged aggregates is the construction market in the UK. Aggregates are a high bulk/low cost commodity, and consequently are highly sensitive to transport distances. Where local sources of aggregate 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 wharf and railhead facilities, the balance of supply cannot be maintained. This is why such sites should be subject to safeguard policies to protect their use, in accordance with the requirements set out in the National Planning Policy Framework.


3.1.g: Inter-regional flows of aggregates, 2009(1). Source: DCLG.

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 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. The charts above show the main inter-regional crushed rock and sand & gravel movements.

(1) MPA does not hold data on regional flows. Maps are from DCLG and can be directly downloaded.
Cement is the key component in producing ready-mixed concrete, precast concrete and mortar. 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 are still 18% lower than in 2007.

Cement is made by crushing and heating limestone or chalk with small amounts of other natural materials, such as clay or shale, in a rotating kiln to a temperature of 1450º Celsius. This chemically combines the stones into a hard substance called clinker, essentially changing calcium carbonate (CaCO₃) to calcium oxide (CaO) which then reacts with silica (SiO₂) to form calcium silicates with Ferrite and Aluminate mineral formation completing the mineralogy of the clinker complex. As well as the mineral content of the raw materials their moisture content is an important feature. Chalk has a higher moisture content than hard limestone and this tends to come with an energy penalty for the process. As the final step in (CEM I) cement making the clinker is ground to a powder with about four to five per cent 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 ash¹, limestone or blast furnace slag²;
- **CEM III** – is a cement containing between 36 and 95% blast furnace slag.

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

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¹ Fly ash is a by-product from coal fired power stations.
² Blast furnace slag is a by-product of steel production.
3.3 Ready-mixed concrete

Ready-mixed concrete is an essential building material and is therefore a reliable indicator of construction activity from home building to high-rise and infrastructure. It is readily available throughout GB where the average delivery distance is eight miles. Demand for ready-mixed concrete is closely aligned with both construction activity and the general economy, and reflecting the general economy there continues to be nearly three times more supplied in London and the South East than in most other GB regions.

3.3.a: MPA ready-mixed concrete\(^{(1)}\) sales in GB. Source: MPA.

3.3.b: MPA ready-mixed concrete\(^{(1)}\) sales by region, 2015. Source: MPA.

3.3.c: UK ready-mixed concrete\(^{(1)}\) sales, 2015. Source: MPA, QPANI.

\(^{(1)}\) Includes ready-mixed produced from fixed and site plants.

\(^{(1)}\) GB estimates are based on the assumption that MPA sales represent 75% of the total GB market. Includes fixed and site plants.
3.4 Precast concrete

Precast concrete is an essential ingredient of 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 the chart 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 last 10 years. The UK has been a net importer of concrete products since 2009.

3.5 Lime

3.5.1: 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 around 20% of industrial lime being exported.
3.5.2: 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 plant nutrient. Lime plays a key role in protecting one of nature’s greatest assets, the soil; maintaining a healthy and productive environment essential to meeting the challenges of future food security. It is estimated that twice as much agricultural lime as now needs to be applied to UK farmland to prevent soil becoming too acidic.

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.

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 uniquely 100% recyclable back into itself, whilst delivering cost effective, safe, comfortable and quiet road surfaces. Ongoing research and innovation is striving 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 markets have picked up since 2013. Asphalt sales rose 16% between 2013 and 2015, but remain well below levels seen prior to the recession.
3.6.b: MPA asphalt sales by region, 2015. Source: MPA.

3.6.c: UK(1) asphalt sales, 2015. Source: MPA.

1(1) GB estimates are based on the assumption that MPA sales represent 90% of the total GB market for asphalt.

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 ever-increasing demands for quality building products in the development of our built environment. With the financial crisis and the collapse in housing construction, mortar sales in Great Britain fell by half between 2007 and 2009. They have since started to recover, driven by the recovery in housing construction, but remain at 21% of pre-recession levels.

3.7.a: MPA mortar sales in GB. Source: MPA.
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 home and overseas. Annual production continues from GB quarries at about 1 million tonnes, but imports from China and India continue to impact on the overall market.

3.8.a: Sales of dimension stone in GB (selected years). Source: AMRI.

3.9 Industrial sand

As well as being used for glass making, 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 the light of changes in the UK heavy industry and manufacturing sectors, the production of industrial sand in GB stabilised at about 4 million tonnes per year.

3.9.a: Sales of industrial sand in GB. Source: AMRI.
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) is supplied as a separate component for concrete and is added at the concrete mixer. It generally replaces between 20 and 80 per cent 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 resistance 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 the agricultural markets.
Market performance through 2015 was generally positive, although all materials except ready-mixed concrete have seen more modest growth than in 2014. Sales volumes for ready-mixed concrete increased by 4.3% in 2015 compared to 2014, 5.8% for crushed rock, and 3.1% for sand & gravel. Boosted by strong roads spending, asphalt sales grew by 6.5% in 2015, whilst slower housing activity throughout the year led to mortar sales growth of 4.2% in 2015, after an 18% increase in sales volumes in 2014.

Looking forward, the outlook for the construction sector remains positive, albeit slower than in 2014/15. The Construction Products Association expects construction output to grow by 3% in 2016, followed by 3.5%-4% per annum until 2019. Private housing is expected to see further, albeit milder growth over the forecast period, supported by demand-boosting Government policies such as Help to Buy, including the newly-announced London Help to Buy and the Help to Buy ISA, along with the Starter Homes programme. Commercial activity is also expected to pick up, driven by construction of offices with large projects underway and planned in London, Birmingham, Manchester and some other major cities. However, infrastructure is the sector that is expected to see the biggest rise, projected to grow by 56% by 2019, with large projects planned in the roads, rail, water and energy sectors.

Based on the outlook for the general economic and construction activity, the MPA produces regular medium-term (3-year) market forecasts for construction material sales volumes in GB, including aggregates, asphalt, ready-mixed concrete and mortar. The latest update, in February 2016 (covering 2016-19), suggests that by 2019, aggregates sales are expected to be up 16% compared to 2015, 13% for ready-mixed concrete, cementitious and mortar, and up 11% for asphalt sales.

Asphalt sales in 2016 are expected to be positive, growing by about 1%, more slowly than in 2015. This softer trend reflects a combination of factors, including faster than anticipated asphalt sales volumes through 2015 and greater uncertainty about the level of spending from Highways England, notably around renewals work. In the longer term, asphalt sales are expected to grow by 4% per annum over 2017/19, when the Road Investment Strategy increases sharply. Local authorities’ road maintenance programme has recently been granted additional funding over the next 5 years (£250m in total), but this funding is not ring-fenced and local authorities’ current spending remains under pressure.

Aggregates sales are expected to grow by 3% to 4% per annum over 2016-19. Crushed rock sales will continue to be more positive than sand & gravel in the short term, reflecting continued supply constraints for sand & gravel and substitution in concrete manufacture. Based on the outlook for the general economic and construction activity, the MPA produces regular medium-term (3-year) market forecasts for construction material sales volumes in GB, including aggregates, asphalt, ready-mixed concrete and mortar. The latest update, in February 2016 (covering 2016-19), suggests that by 2019, aggregates sales are expected to be up 16% compared to 2015, 13% for ready-mixed concrete, cementitious and mortar, and up 11% for asphalt sales.

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"The outlook for the construction sector remains positive, albeit slower than in 2014/15."

The ready-mixed concrete and cementitious markets are expected to rise by 3% per annum over the forecast period, reflecting continued growth in private housing and the recovery of the commercial sector, notably outside London. On the infrastructure side, work on major projects such as Hinkley Point C and the Thames Tideway Tunnel is expected to start in the forecast period, although Crossrail tunnelling is now finished, so there will be some demand substitution between projects.

Finally, based on positive forecasts for housing starts in the next few years, mortar sales are expected to rise by 3% in 2016, slowing to 2% per annum by 2019.

Downside risks to this outlook exist. In addition to uncertainty around the timing and scale of some of the major projects, construction activity is also heavily influenced by general economic activity. Whilst the underlying UK macroeconomic fundamentals remain solid, GDP growth could easily deteriorate if global and domestic risks intensify. Downside risks include concerns about the Chinese economy, and more importantly, the general slowdown in the emerging markets. Domestically, the EU referendum and possibility for Brexit, i.e. Britain leaving the EU, has the potential to increase uncertainty for businesses and the UK economy.

"Infrastructure is the sector that is expected to see the biggest rise, projected to grow by 56% by 2019."

The ready-mixed concrete and cementitious markets are expected to rise by 3% per annum over the forecast period, reflecting
4.1: **MPA markets trends.** Source: MPA.

4.2: **Outlook for MPA markets sales volumes, 2016 - 19.** Source: MPA.
Long term aggregate supply

Subject to geological conditions, 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. The adjacent chart indicates permitted reserves of aggregates since the early 1990s.

However, replenishment rates are more meaningful statistics, as they provide information on the long term availability of supply. If the amount of aggregates receiving planning permission equals the level of production, the replenishment rate is 100%. The chart below indicates that whilst replenishment rates for crushed rock have been close to parity in recent years, sand & gravel is being replaced at a much slower pace: for every 100 tonnes of sand & gravel used, only 56 tonnes is being replaced through new planning permissions, which has resulted in significant decline in permitted reserves of sand & gravel over the last 15 years. The implication of long term replenishment rates below 100% is that shortages of supply may become apparent. Evidence from Local Aggregates Assessments and Local Plan formulation suggests that this is beginning to appear in parts of Yorkshire, the South West, the South East, the North West, and the West Midlands.

5.1: Permitted aggregates reserves in England and Wales. Source: BGS, MPA.

5.2: GB replenishment rates for sand & gravel and crushed rock. Source: MPA.
6 Taxation

The cumulative burden of environmental and planning related taxation and regulation on mineral products cuts deeply into the industry’s GVA, and the pressures are also set to increase in the coming years. The industry is in the scope of the European Union Emissions Trading Scheme (EUETS), Climate Change Agreements (CCA) linked to the UK Climate Change Levy (CCL) and the Carbon Reduction Commitment Energy Efficiency Scheme (CRC), all of which are focused on carbon reduction. In addition, the industry has to manage the indirect impact of measures and associated costs related to the costs of generating and supplying the energy used by the industry. Climate change and energy measures in 2015 were equivalent to 11% of the GVA of the cement industry, but this proportion could increase to 67% by 2020 (from £41 million to over £287 million per annum). The annual cost of the Aggregates Levy alone reached £361m in 2015.

6.1: **GVA and estimated cost of energy and climate change measures for the cement industry.** Source: MPA.

6.2: **Aggregates Levy payments to Governments.** Source: HMRC, ABS.
7 Environment and sustainability

7.1 Recycling

Recycled & secondary materials now account for 28% of the GB aggregates market.

Recycled aggregates are the product of processing inert construction and demolition waste, asphalt planings and used railway ballasts into construction aggregates. These materials conform to European Aggregate standards and/or national specifications, and make a key contribution to total aggregates supply.

Secondary materials include blast furnace and steel slags. Other secondary aggregates include incinerator bottom ash aggregate (IBAA), furnace bottom ash (FBA), china clay sands, slate and crushed glass sand, supplementing total aggregates supply and used in the lower layers of road pavements and other construction applications.

The share of recycled & secondary materials in the total GB aggregates market is one of the highest in Europe; the European average stands at about 10%.

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

7.1.a: Share of recycled & secondary materials in total GB aggregates sales. Source: AMRI, MPA.

7.1.b: Share of recycled(1) & secondary materials in total aggregates sales in 2014. Source: UEPG, AMRI, MPA.

7.1.c: GGBS & fly ash in the MPA cementitious market, 2015. Source: MPA.

(1) Includes manufactured, recycled (fixed and mobile) and aggregates re-used on site.
7.2 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. The charts below indicate that the use of aggregates and cement per capita is about 23% and 53% respectively below the European average.

7.2.a: Aggregates(1) production in Europe, tonnes per capita, 2014.
Source: UEPG.

7.2.b: Total aggregates(1) production per capita, 2014.
Source: UEPG.

7.2.c: Cement consumption per capita, 2014.
Source: ERMCO.

(1) Includes primary, manufactured, recycled (fixed and mobile) and aggregates re-used on site.
7.3 Carbon emissions

Cement manufacture is, by its nature, energy and carbon dioxide intensive. The UK industry has been a world leader in its carbon reduction drive to date, reducing direct CO₂ emissions by 30% between 1990 and 2014. UK manufacturers achieved this substantial decarbonisation through heavy investment and a progressive move toward using alternative waste-derived fuels. In 2014, the sector took 44% of its kiln fuel thermal input from waste derived sources, equivalent to leaving around 0.5 million tonnes of coal in the ground. In addition, cement manufacturers replaced almost 8% of their raw materials with waste derived alternatives.

Following the publication of the MPA Cement greenhouse gas strategy, the UK Government, with input from the cement sector, published its Industrial Decarbonisation & Energy Efficiency Roadmaps to 2050 for cement last year.

7.3.a: Carbon dioxide in cement production. Source: MPA.

7.4 MPA National Nature Park

The minerals industry is uniquely placed to contribute to delivery of national and local biodiversity targets. At least 5,200 hectares of priority habitats have been created through the restoration of old quarries and management of land, the equivalent of at least five Richmond Parks. Also, at least a further 6,000 hectares of priority habitat is currently planned through the restoration of sites.

Opposite is a map of some of the best restored sites to visit, a nationwide network of quarries that have been restored for wildlife and which are accessible to the public. This initial map, which we are continually adding to, includes 65 sites around the country covering over 4,000 hectares, with a range of facilities including nature trails, viewing hides and visitor centres. Collectively they form MPA’s National Nature Park.

You can view the map in more detail at: www.mineralproducts.org/nature_map.htm
7.5 Sustainable Development Reports

Links to Sustainable Development Reports

http://www.mineralproducts.org/sustainability/reports.html
Annually, the industry supplies £20bn worth of materials and services to our economy. Industry production represents the largest materials flow in the UK, and is also one of the largest manufacturing sectors.

### Aim of the MPA

MPA members will be recognised and valued for supplying essential materials for a sustainable future in a manner that is economically viable and socially and environmentally responsible.

### Role of the MPA

MPA is the voice of the mineral products sector and represents and promotes its members in order to:

- Secure and maintain the “licence to operate” for the safe, sustainable and responsible supply of essential mineral products from the UK;
- Raise awareness of the industry, its activities and contribution to the economy and to protect and grow its markets;
- Influence the development of technical and environmental standards and codes of practice;
- Encourage innovation and the delivery of sustainable and responsible environmental product and market solutions;
- Advocate and influence the design and product choice of members’ products;
- Maintain existing and develop new markets which are stable, ‘level’ and certain and minimise cumulative impacts;
- Educate stakeholders to ‘Make the Link’ between the sources of mineral products and their use.

### MPA members are:

- Committed to the principles of sustainable development;
- Committed to achieving TARGET ZERO & ZERO HARM and raising skill levels;
- Committed to protecting and enhancing UK biodiversity;
- Committed to reducing carbon and other industrial emissions and maximising recycling of materials and high quality restoration of land and improving resource efficiency and contributing to the ‘circular economy’;
- Committed to the sustainable use of their products by end users;
- Socially and environmentally responsible suppliers of essential materials;
- Valuable and active members of their communities particularly in rural areas;
- Able to provide a range of career opportunities and career development and respond to skills shortages;
- Innovative and share good and best practice, particularly in health and safety and sustainable development.
The Mineral Products Association (MPA) is the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries. With the recent addition of British Precast and the British Association of Reinforcement (BAR), it has a growing membership of 480 companies and is the sectoral voice for mineral products. MPA membership is made up of the vast majority of independent SME quarrying companies throughout the UK, as well as the nine major international and global companies. It covers 100% of GB cement production, 90% of aggregates production, 95% of asphalt and over 70% of ready-mixed concrete and precast concrete production. In 2015, the industry supplied £20bn worth of materials and services to the construction and other industries, with a total turnover of £495bn. Industry production represents the largest materials flow in the UK economy and is also one of the largest manufacturing sectors. For more information visit: www.mineralproducts.org

MPA producer members

England & Wales
Aggregate Industries UK Ltd
Albion Stone plc
Allen Newport Ltd
Ballast Phoenix
Bathgate Silica Sand Ltd
Bath Stone Group
Bestco Surfacing Ltd
Black Mountain / De Lank Quarry Ltd
Borough Green Sandpits Ltd
Breedon Aggregates
Bret Group
Brice Aggregates Ltd
Britannia Aggregates Ltd
Bromfield Sand & Gravel Co Ltd
Burlington Slate Ltd
Cardigan Sand & Gravel Co Ltd
Casey Group Ltd
CEMEX UK
Chambers Runfold
Colas Ltd
Cormac Solutions Ltd
Cornish Lime Company Ltd
CPI Mortars Ltd
Day Group Ltd
Deme Building Materials Ltd
Dunhouse Quarry Co
Erith Haulage Company Limited
Evrovia Roadstone
F M Conway Ltd
Ferns Group
Forest Pennant
Francis Flower
Gallagher Group Ltd
G.D. Harries & Sons Ltd
GRS Roadstone Limited
Grundon Sand & Gravel Ltd
H Sivyer (Transport) Ltd
H.H. & D.E. Drew
H Tuckwell & Sons Ltd
Hanson UK
Harleyford Aggregates Ltd
Hanco Metal Group Limited
Hills Quarry Products Limited
Holderness Aggregates Ltd
Hope Construction Materials
Hugh King & Co
Hutton Stone Co Ltd
Imerys Minerals Ltd
J & J Franks Ltd
J Clubb Ltd
J.J. Prior Limited
J Wainwright & Co Ltd
John Carr (Liverpool) Ltd
J Mould (Reading)
John William Sutherland Ltd
JPE Holdings Ltd
Kerneos Ltd
Lhoist UK Ltd
Lovell Stone Group
Mansfield Sand Co Ltd
Marchington Stone
Marshalls plc
Midland Quarry Products
Moorhouse Sand & Gravel Pits
Moreton Cullimore (Gravels) Ltd
Morris & Perry (Gurney Slade) Ltd
Myers Group
Northumberland Quarries
O’Donovan Waste Disposal Ltd
Portland Stone Firms Ltd
R Collard Ltd
R.J.D. Ltd
Rotherham Sand & Gravel Co Ltd
S Walsh and Sons
Salop Sand & Gravel Supply Co Ltd
Sea Aggregates Ltd / Euromin Ltd
Sibelco UK
Singleton Birch Ltd
Smith & Sons (Bletchington) Ltd
Springfield Farm Ltd
SRC Aggregates
SSG Quarries
Syreford Quarries
Tarmac
TJ Transport Ltd
Tradstocks Natural Stone
Trefign Quaries Ltd
Tudor Griffiths Group
United Asphalt Ltd
United Recycled Aggregates Limited
Volker Dredging Ltd
W Clifford Watts Ltd
Wildmoor Quarry Products
Woodkirk Stone

British Precast

Product groups
Aircrete Products Association
Architectural & Structural Precast Association
Box Culvert Association
British Precast Stone Association
Concrete Block Association
Concrete Pipeline Systems Association
Interlay (Affiliation)
Interpave
Modern Masonry Alliance (Affiliation)
Precast Flooring Federation

British Precast

Full members
ABM Precast Solutions Limited
Acheson & Glover Precast Limited
ACP (Concrete) Limited
Aggregate Industries (UK) Limited
Amber Precast Limited
Banagher Precast Concrete Ltd
Barcon Systems Limited
Barnetts of Buglawton
Besblock Limited
Bison Manufacturing Limited
Blanc de Bierges
Breedon Aggregates Scotland Ltd
Brett Landscaping & Building Products
Broome Bros (Doncaster) Limited
CEMEX
Charcon Construction Solutions
CCP Building Products Ltd
Collier & Henry Concrete (Floors) Limited
Cornish Concrete Products Limited
CPM Group Limited
Creagh Concrete Products Limited
Cross Concrete Flooring Ltd
Decomo UK Limited
Delta Bloc UK Limited
E & JW Glendinning Limited
Ebor Concretes Limited
Elite Precast Concrete Limited
Evans Concrete Products Limited
F P McCann Limited
Forterra Building Products Ltd
Forticrete Limited
H+H UK Limited
Hillhouse Quarry Group Ltd
Interfuse Limited
Jordan Concrete Ltd
Laird Bros (Forfar) Ltd
Lignacite (Brandon) Ltd
Litcast Limited
Longley Concrete Ltd
Marshalls plc
Milton Precast
Monag Precast (Anglesey) Limited
Naylor Concrete Products Limited
Newlay Concrete
Patersons of Greenoakhill Ltd
Plasmor Limited
Premium Concrete Products Ltd
Quinn Building Products Limited
Robeslee Concrete Company Limited
S Morris Limited
Sellite Blocks Limited
Skene Group Construction Services Ltd
Stanton Bonna Concrete Limited
Sterling Services Limited
Stocks Blocks Limited
Stowell Concrete Limited
Supreme Concrete Limited
Tarmac Building Products Ltd
Techrete Limited
Thakeham Tiles Limited
Thomas Armstrong Group
Thorp Precast Limited
Townscape Products Limited
TT Concrete Products Limited
WDL (Concrete Products) Ltd
William Rainford (Holdings) Limited

**MPA associate members**

**England & Wales**

ABB Ltd UK
Addax International Ltd
Air Products PLC
Ammann Equipment Ltd
Anglian Aggregate Bagging Co Ltd
Archaeological Research Services Ltd
Aspen Advisory Services Ltd
Babcock International Group
Banner Contracts (Halnaby) Ltd
BASF Construction Chemicals (UK) Limited
BDS Marketing Research Ltd
Berrymans Lace Mawer
Birketts Solicitors
BP Consulting
Brigade Electronics Plc
British Sugar plc
Burges Salmon LLP
Carter Jonas LLP
Cathay Pigments (UK) Ltd
Chaselet Ltd
Christeys UK Ltd
Command Akon Ltd
DB Cargo
DG Consultancy (Midlands) Ltd
David Ball Group
Davies Planning Ltd
DLA Piper UK LLP
Dustcan
EA Ltd
EIS Property
Endeco Technologies Ltd
Envireau Water
EPC-UK
ESI Limited
Finning (UK) Ltd
Firstplan
Foot Anstey LLP
Freeth Cartwright LLP
French Jones
Future Industrial Services
Gerald Eve LLP
Goldar Associates (UK) Ltd
Grace Construction Products Ltd
GV A Grimley
Hafren Water
Hargreaves (UK) Services Ltd
Hewitt Robins International Ltd
Howes Percival LLP
Huntsman Pigments
J C Bamford Excavators Ltd
Jenico Consulting Ltd
Kingsbridge Risk Solutions Ltd
KJ Services Limited
Knights Professional Services Ltd
Land & Mineral Management Ltd
Lanxess Ltd
Marubeni-Komatsu Ltd
Matthews & Son Chartered Surveyors
Mentor Training Solutions Ltd
Mineral Products Qualifications Council
Mineral Services Ltd
MXCA
Neil Beningfield & Associates Ltd
ORICA Europe Ltd
PDE Consulting Ltd
Pinsent Masons LLP
Port of Tilbury London Ltd
Prince Minerals Ltd
Procter Johnson
ProSpare Ltd
PQ Silicas UK Limited
Rema Tip Top Industry UK Ltd
Response Engineering
Rettenmaier UK Ltd
Richard Fox & Associates Ltd
Savills (L&P) Ltd
SERAC UK
Siemens
Silkstone Environmental Ltd
SLR Consulting Ltd
Speciality Minerals
Spillard Safety Systems Ltd
Stephens Scown
Stocksigns
Tata Steel
The Crown Estate
Thirings LLP
TLT Solicitors
UK Quality Ash Association
Walters Group
Whitwick Engineering
Wirtgen Limited
WYG Environment Planning Transport Ltd

**British Precast Associate members**

Adomast Manufacturing Ltd
Advantage Precast
BASF Construction Chemicals
BDS Marketing Research Ltd
Besser Company
Bianchi Casseforme SRL
BRE
C&CA Cement &Concrete Associates Ltd
Canadian Precast Institute
Carbon8 Aggregates Ltd
Caswick Ltd
Cathay Industries Ltd
Cement and Concrete Association of New Zealand
Cenin Limited
Christeys UK Ltd
Chryso UK Ltd
Concrete Manufacturers Association - South Africa

Concrete Technology Ltd
Conspare Ltd
Construction Fixing Systems Ltd
Construx BUBA
Coote Engineering Ltd
CPI Worldwide
CSM Thermomass
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Dundee College
Ecoratio Europe BV
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Elematic Oyj
Elkem Materials Ltd
Erico Europe BV (Pentair Group)
Euro Accessories Limited
Fosroc Limited
GCP Applied Technologies Ltd
Graceland Fixing Ltd
Graceland Fixing Ltd
Halfen Limited
Hanson Cement Limited
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Huntsman Pigments
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Identification Technologies Scotland Ltd
Inter-Minerals
Invisible Connections
Isedio Ltd
J & P Building Systems Limited
Kingston University
KVM Industrimaskiner A/S
Lanxess Ltd
Leading Edge Management
Leeds Oil + Grease Co. Ltd (LOGCO)
Longrake Spar Co Ltd
Loughborough University
Lytag Ltd
Martek Industries Ltd
Max Frank Ltd
MegaSteel Ltd
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Miers Construction Products ltd
Moulded Foams Ltd
N R Richards Associates Ltd
National Precast Concrete Association
Australia
National Precast Concrete Association USA
Natural Cement Distribution Ltd
Net-Temps Ltd
Parex Ltd
Patterns and Moulds Ltd
PCE Limited
Peikko UK Ltd
PERI Ltd
Precast Concrete Structures Limited
Precast Construction Technology Ltd
Precast New Zealand Incorporated
Precast/Prestressed Concrete Institute
Pressves
Probst Handling Equipment
Progress Group
Prothious Engineering Services Pvt. Ltd
PUK Ltd
Resiblock Ltd
RFA-Tech Ltd
Rocan Products Ltd
Saint Gobain Weber, Leca UK
Search Consultancy
Shuttlelift
SIKA Ltd
Simply Precast Accessories Ltd
Siproll Precast Services Ltd
Strusoft UK
T Grounds Associates
Tarmac Cement & Lime Limited
Tarmac Trading Limited
Trelleborg Pipe Seals
Trimble 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 Teeside
University of the West of England
University of the West of Scotland
Waldeck Engineering Limited
Yara UK Ltd

MPA affiliate members

MPA Scotland
NB Excludes major companies who are all members
Angle Park Sand & Gravel Co.
Bonnar Sand & Gravel Ltd
Breedon Aggregates Scotland Ltd
The Geddes Group
Hillhouse Quarry Company Ltd
Laird Aggregates Ltd
Leiths (Scotland) Ltd
Micadyns Contractors
McFadyens Contractors
O-I Manufacturing UK Ltd
Patersons of Greenoakhill Ltd
Pat Munnro (Alness) Ltd
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Tinto Sand & Gravel Ltd
W H Malcolm Ltd

QPA Northern Ireland (QPANI)

Acheson & Glover Limited
Alpha Quarry Products Ltd
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Gibson Bros.
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Irish Salt Mining & Exploration Co Ltd
Irwins Quality Aggregates
James Boyd & Sons (Carndhu) Limited
John McQuillan (Contracts) Limited
Jordan Concrete
Kilkairght Chemical Co Ltd
Lafarge Ireland Ltd
Lagan Cement Company
Lagan Cement Products Ltd
Lagan Construction Materials Ltd
Loughran Rock Industries
Macrete Ireland
Matthew Robinson & Son Concrete Products
McGaritty Brothers Ltd
Miskelly Brothers
MW Johnston & Son Ltd
Norman Emerson Group Limited
Northstone Products Limited
Omya UK Ltd
P Clarke & Sons Limited
P Keenan
Patrick Bradley Limited
Peter Fitzpatrick, Lead Quarries
Premier Cement Limited
Quinn Building Products Ltd
R J Mitten & Sons
Riddles Bros Limited
RTU Ltd
Stanley Bell & Sons Ltd Sand & Gravel
Tarmac
T H Moore (Contracts) Ltd
Tobermore Concrete
Tracey Concrete Limited
Tullyrae Quarries Limited
W & J Chambers Limited
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Whitemountain Quarries Limited
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CDE Global Ltd (Affiliate)
Cleavor Fulton Rankin Solicitors (Affiliate)
ConveyorTek (Affiliate)
Dennison Commercials Ltd (Affiliate)
Finning (Affiliate)
McLorinan Consulting Ltd (Affiliate)
Newmill Planning Consultancy Ltd (Affiliate)
Orica Blast & Quarry Surveys (Affiliate)
Quarryplan (Affiliate)
RHM Commercial LLP (Affiliate)
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SLR Consulting (Ireland) Ltd (Affiliate)
TBF Thompson (Affiliate)
Ulster Industrial Explosives Limited (Affiliate)
William Orbinson QC (Affiliate)
White Young Green (Affiliate)
Atlantic Bitumen (Associate)
Tennants Bitumen (Associate)

British Association of Reinforcement (BAR)

ArcelorMittal Kent Wire Limited
BRC Ltd
Celsa Steel (UK) Ltd
Dextra Manufacturing - UK
ERICO Europa (GB) Ltd
Express Reinforcements Ltd
Outokumpu Stainless Limited
ROM UK Ltd
RSJ Steels Ltd

Refined Bitumen Association (RBA)

Nyas Bitumen
Shell Bitumen
Total Bitumen

For further information

MPA’s constituent bodies and affiliated organisations:

Mineral Products - Mineral Products Association: www.mineralproducts.org
Mineral Products - Northern Ireland, QPANI: www.qpani.org
Cement - MPA Cement: http://cement.mineralproducts.org
Precast Concrete - British Precast: www.britishprecast.org
Ready Mixed Concrete – BRMCA: www.brmca.org
Lime - British Lime Association: www.britishlime.org
Marine Aggregates - BMAPA: www.bmapa.org
Mortar - Mortar Industry Association: www.mortar.org.uk
Agricultural Lime - ALA: www.aglime.org
Industrial Sand – SAMS: www.samsa.org.uk
The Concrete Centre: www.concretecentre.com
Reinforcing Steel - British Association of Reinforcement: www.uk-bar.org
Asphalt Industry Alliance, in partnership with Eurobitume UK: www.asphaltindustryalliance.org

Other official websites used as data sources:

Annual minerals raised inquiry survey, DCLG: www.gov.uk/government/collections/minerals
Office for National Statistics, ONS: www.ons.gov.uk/ons/index.html
Business, Innovation and Skills, BIS: www.gov.uk/government/collections/building-mat
HM Revenues & Custom: www.uktradeinfo.com/Statistics/Pages/TaxAndDutybulletins.asp
European Aggregates Association: www.uepg.eu
Eurostat: http://ec.europa.eu/eurostat/data/database
UK Minerals Forum: www.ukmineralsforum.org.uk
Construction Products Association: www.constructionproducts.org.uk
The Mineral Products Association is the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries.

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