



# The Concrete Industry Sustainability Performance Report

2nd Report: 2008 performance data and release of 2012 performance targets

# OUR VISION

*Our vision is that, by 2012, the UK concrete industry will be recognised as the leader in sustainable construction, by taking a dynamic role in delivering a sustainable built environment in a manner that is profitable, socially responsible and functions within environmental limits.*



## WHO WE ARE

The UK Concrete Industry is represented by the trade associations and companies who have signed up to the Concrete Industry Sustainable Construction Strategy. This strategy includes the commitment to continual improvement, measurement and reporting of performance data for the industry. The concrete industry represents nine production sectors that together provide ready-mixed concrete, precast concrete and on-site batch plants. In 2008 the UK concrete industry produced 102 million tonnes of concrete, playing a vital role in the construction of our built environment.

## OUR REPORT

In this report the concrete industry's sustainability performance in 2008 is presented. The data is based on information supplied by the aggregates, cement, chemical admixtures, fly ash, ground granulated blast furnace slag, precast and ready-mixed concrete sectors. The information is from survey responses from companies supplying an estimated 77% of concrete used in the UK.

## INTRODUCTION

**Concrete is our most widely used construction material and is essential for the sustainable development of our housing, schools, hospitals, transport networks, energy infrastructure and our built environment.**

In 2008 the UK concrete industry agreed a Concrete Industry Sustainable Construction Strategy. This pledge to sustainability objectives was signed by trade associations and companies and included the commitment to publish an annual report on the sustainability performance of the industry.

The individual sectors and companies had already established initiatives and reporting structures. The commitment to a comprehensive industry strategy and report has required coordination and further development of sector and company processes. In addition, the industry performance

indicators were developed to support the UK Government's sustainable construction strategy. In March 2009 the industry published its first Concrete Industry Sustainability Performance Report and marked the event with a launch to key stakeholders.

This second report, published in March 2010, signifies another industry milestone; the agreement to publish **performance targets**. With 12 targets published in this report and more in development, this report reflects our commitment to transparency and continual improvement. We will continue to further develop and refine the reporting framework across our industry.

We are also increasing the scope of the industry captured by the reporting. Already the British Association of Reinforcement has signed up to the strategy and future reports will include performance data from this sector.

The concrete industry is the first industry to link our sustainable construction strategy to the **responsible sourcing** standard developed by the Building Research Establishment (BRE), BES 6001 - "Framework Standard for the Responsible Sourcing of Construction Products". This demonstrates the excellent credentials of the UK concrete industry and enables designers to easily source accredited material and gain maximum credits in sustainability assessment tools such as the Code for Sustainable Homes.

The industry would like to thank those stakeholders who participated in our survey and provided feedback on our first report. The report was welcomed and the industry was commended for its achievements and commitments to sustainability. If you would like to comment on this second report please email: [sustainability@concretecentre.com](mailto:sustainability@concretecentre.com)

# CONCRETE INDUSTRY SUSTAINABLE CONSTRUCTION TARGETS

| UK GOVERNMENT 'SHARED PRIORITY'                           | SUSTAINABILITY PRINCIPLE                     | PERFORMANCE INDICATOR   | PERFORMANCE 2008           | TARGET 2012   |
|---|--|---|----------------------------|---|
| SUSTAINABLE CONSUMPTION AND PRODUCTION                    | <b>Environmental Management</b>              | percentage of production sites covered by a 'UKAS' Environmental Management System (EMS)  | 72.3%                      | <b>Increase to 85%</b>  |
|   | <b>Waste Minimisation</b>                    | kilogram of waste to landfill as a proportion of production output (in tonnes)  | 5.0kg / t                  | <b>Reduce by 15%</b>  |
|   | <b>Emissions (excluding CO<sub>2</sub>)</b>  | number of convictions for air and water emissions per annum   | 6                          | <b>Reduce to zero</b>   |
|   | <b>Stakeholder Engagement</b>                | The industry sectors have successful and wide ranging stakeholder schemes in place. An industry wide measure is being developed to aid future industry reporting. |                            |   |
|   | <b>Quality and Performance</b>               | percentage of production sites covered by a 'UKAS' certified 9001 quality management system   | 84.2%                      | <b>Increase to 90%</b>  |
| CLIMATE CHANGE AND ENERGY                                 | <b>Energy Efficiency</b>                     | kilowatts per hour of energy used in production as a proportion of production output (in tonnes)  | 132.6 kWh / t              | <b>Deliver the industry CO<sub>2</sub> target and achieve sector climate change agreement targets</b> |
|   | <b>CO<sub>2</sub> Emissions - production</b> | kilogram of CO <sub>2</sub> emissions as a proportion of production output (in tonnes) (1990 baseline is 103.1 kg CO <sub>2</sub> / t)                            | 88.1kg CO <sub>2</sub> / t | <b>Reduce by 17% from 1990 baseline</b>   |
|   | <b>CO<sub>2</sub> Emissions - transport</b>  | Data exists at a sector level. To enable combined industry reporting a common methodology is being developed.   |                            |   |
| NATURAL RESOURCE PROTECTION AND ENHANCING THE ENVIRONMENT | <b>Materials Efficiency</b>                  | material diverted from the waste-stream for use as a fuel source as a percentage of total energy use  | 17.3%                      | <b>Increase to 21%</b>  |
|   |  | percentage of additional cementitious materials (GGBS, fly ash, etc) as a proportion of total cementitious materials used   | 31.8%                      | <b>Increase to 33%</b>  |
|   |  | recycled/ secondary aggregates as a proportion of total concrete aggregates   | 5.3%                       | <b>This indicator is to be refined before a target is set</b>   |
|   | <b>Water</b>                                 | mains water consumption (in litres) as a proportion of production output (in tonnes)  | 86.1 l / t                 | <b>This indicator is to be refined before a target is set</b>   |
|   | <b>Site Stewardship and Biodiversity</b>     | percentage of relevant production sites that have site specific action plans  | 94.3%                      | <b>Increase to 100%</b>   |
| CREATING SUSTAINABLE COMMUNITIES                          | <b>Health and Safety</b>                     | reportable injuries per 100,000 direct employees per annum  | 799 per 100,000            | <b>From 2009-2014, reduce lost time incidents by 50% with an aim of zero harm.</b>                    |
|   | <b>Employment and Skills</b>                 | percentage of employees covered by 'UKAS' certified training and evaluation processes   | 84.4%                      | <b>Increase to 100%</b>   |
|   | <b>Local Community</b>                       | percentage of relevant sites that have community liaison activities   | 85.9%                      | <b>Increase to 90%</b>  |

# 1. SUSTAINABLE CONSUMPTION AND PRODUCTION



|                                 |  |
|---------------------------------|--|
| <b>Performance Indicator 1:</b> | Environmental management               |
| <b>Performance Indicator 2:</b> | Waste minimisation                     |
| <b>Performance Indicator 3:</b> | Emissions (excluding CO <sub>2</sub> ) |
| <b>Performance Indicator 4:</b> | Stakeholder engagement                 |
| <b>Performance Indicator 5:</b> | Quality and performance                |

to landfill from the production of concrete and its constituent materials is 0.28 million tonnes. Meanwhile these companies diverted over 5 million tonnes of material from the waste stream and used them instead of primary materials.

Much investment and activity has contributed to an already excellent level of performance. The industry will continue to target improvements through:

- increased use of by-products and secondary materials in the production process.
- reduction of waste to landfill, with an aim to exceed the commercial and industrial waste target published by Defra in England and Wales Waste Strategy 2007.
- working with the wider construction industry to support innovations and initiatives to help in achieving the UK Government Sustainable Construction Target of a 50% reduction in construction waste to landfill.

## WASTE MINIMISATION

Although not widely recognised, the concrete industry uses over 18 times more waste, by-products and secondary materials from other industries than the waste it sends to landfill. For the companies providing data in this report the estimated total waste

| PERFORMANCE INDICATOR  | 2008 PERFORMANCE | 2012 TARGET   |
|--|------------------|---------------|
| kilogram of waste to landfill as a proportion of production output | 5.0 kg/t         | Reduce by 15% |

## ENVIRONMENTAL MANAGEMENT

ISO 14001 gives a structure to Environmental Management Systems (EMS) that is beneficial to both environmental and business performance. Sites across the industry vary in their size and complexity from cement works to concrete batching plants. Industry coverage of 'UKAS' certified systems is 72% (or 1173 sites) and we are working to increase this coverage. By 2012 we aim to achieve an increase to 85%. Based on the number of sites in 2008 this would equate to an additional 206 sites gaining accreditation.

| PERFORMANCE INDICATOR                                | 2008 PERFORMANCE | 2012 TARGET     |
|--|------------------|-----------------|
| production sites covered by a 'UKAS' certified EMS * | 72.3%            | Increase to 85% |

\* such as ISO 14001, EMAS and for SMEs, BS 8555.

Concrete is the first material to gain responsible sourcing accreditation to BES 6001. Concrete products can achieve the highest tier of responsible sourcing in the Code for Sustainable Homes and BREEAM.

## RESPONSIBLE SOURCING

The target set by Government in its Sustainable Construction Strategy target is at least 25% of construction materials should be supplied from suppliers with Responsible sourcing certification by 2012. The concrete industry has taken significant steps to exceed this and has published Concrete Industry Guidance for the BRE Framework Standard for Responsible Sourcing (BES6001) to facilitate the early certification of a significant proportion of concrete to the responsible sourcing standard. For information on companies certified to BES 6001 visit [www.greenbooklive.com](http://www.greenbooklive.com)



## STAKEHOLDER ENGAGEMENT

The nine production sectors, which make up the concrete industry supply chain, engage with national and international stakeholders to improve the sustainability of the material and the built environment.

For example, companies and trade associations have worked with BRE to provide detailed performance data to support the production of generic product environmental profiles and Green Guide information. The concrete industry is also engaged with the construction industry to improve the sustainable performance of the supply chain and also the end product - whether a building, house, or infrastructure project.

The industry engagement in local communities is included in the **Local Community** sustainability principle, see page 11.

## QUALITY & PERFORMANCE

The majority of the concrete supply chain is certified by Quality Management Systems. The target is to increase the total number of concrete industry sites, which equates to 103 additional sites (based on 2008 figures) gaining accreditation.

The industry is also improving the coordination of research and development. The objective of this is to increase the level of innovation and the development of more sustainable products and services.

| PERFORMANCE INDICATOR   | 2008 PERFORMANCE | 2012 TARGET     |
|---|------------------|-----------------|
| percentage of production sites covered by a UKAS certified 9001 quality management system | 84.2%            | Increase to 90% |

## EMISSIONS (EXCLUDING CO<sub>2</sub>)

**The nature of emissions varies across the different sectors of the industry. Emissions are well managed by the sectors and monitored by regulatory bodies, with significant improvements being recorded. A common indicator used in monitoring emissions is convictions for non-compliance.**

| PERFORMANCE INDICATOR                                       | 2008 PERFORMANCE | 2012 TARGET    |
|---|------------------|----------------|
| number of convictions for air and water emissions per annum | 6                | Reduce to zero |

Each trade body is focused on best practice in emissions reduction. The target for 2012 is for all the sectors of the concrete industry to achieve zero convictions.

The cement sector is a key part of the concrete industry and through major investment has achieved significant environmental improvements. For example, particulate emissions have been reduced by two thirds, oxides of nitrogen have been halved and sulphur dioxide emissions are now a quarter of the 1998 level. For more information visit [www.cementindustry.co.uk](http://www.cementindustry.co.uk).

## 2. CLIMATE CHANGE AND ENERGY

*By 2012 concrete industry CO<sub>2</sub> emissions from production will be 17% lower per tonne of product than they were in 1990.*



**Performance Indicator 1:**  
**Performance Indicator 2:**  
**Performance Indicator 3:**

Energy Efficiency  
CO<sub>2</sub> Emissions - production  
CO<sub>2</sub> Emissions - transport

### ENERGY EFFICIENCY

Energy efficiency is a key element in achieving our CO<sub>2</sub> reduction target and we are committed to continually monitor and reduce energy consumption as an overall industry and achieve sector targets.

| PERFORMANCE INDICATOR   | 2008 PERFORMANCE | 2012 TARGET   |
|---|------------------|---|
| kilowatt per hour of energy used in production as a proportion of production output | 132.6 kWh/t      | Deliver the industry CO <sub>2</sub> target and achieve sector climate change agreement targets |

Different levels of energy are required to manufacture the different constituent materials of concrete. Information is published by sectors and available from the sector trade body (web addresses are listed on the back page of this report).

Both the cement and ground granulated blast furnace slag sectors have committed to voluntary climate change agreements (CCA) with government. Both sectors have exceeded their energy reduction targets. The cement sector has improved its CCA performance by 33.7% between 1990 and 2008. The ground granulated blast furnace slag sector has achieved a 19% energy reduction between 1999 and 2008.

Although not a production indicator it should be noted that the thermal performance properties of concrete as a construction material can provide considerable energy savings over the lifetime of a building. In housing for example, this operational energy saving can offset the slightly higher embodied CO<sub>2</sub> associated with concrete and masonry homes in just a decade of use. To find out more visit [www.concretecentre.com](http://www.concretecentre.com)



*Unlike other construction materials, the UK can be self-sufficient in concrete. With a local supply network concrete is the local material.*

## CO<sub>2</sub> EMISSIONS - PRODUCTION

CO<sub>2</sub> emissions from cement production make up about 85% of the total CO<sub>2</sub> emissions associated with concrete production. Through investment in new technology and use of biomass fuels, significant reductions have been achieved and there has been an estimated 14.6% decrease in CO<sub>2</sub> emissions from comparable concrete mixes between 1990 and 2008.

Our concrete industry target to reduce emissions of CO<sub>2</sub> from production is based on verifiable baseline data from the cement industry going back to 1990 (to match the UK Government's baseline).

Future improvements will be the result of action throughout the concrete supply chain, through the substitution of fossil fuels by waste-derived fuels in cement manufacturing and by the use of recycled and low carbon constituent materials (subject to their availability and maintaining product quality).

For information and useful data for carbon calculators relating to the CO<sub>2</sub> emissions associated with an 'average' tonne of concrete, which includes water and steel reinforcing bar, visit

[www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk)

| PERFORMANCE INDICATOR  | 2008 PERFORMANCE   | 2012 TARGET                      |
|--|--|----------------------------------|
| kilogram of CO <sub>2</sub> emissions as a proportion of production output | 88.1 kg CO <sub>2</sub> /t (1990 baseline figure of 103.1 kg CO <sub>2</sub> /t) | Reduce by 17% from 1990 baseline |

## CO<sub>2</sub> EMISSIONS - TRANSPORT

The local supply network for concrete means that delivery distances are short and the fuel used during haulage (and the associated CO<sub>2</sub> emissions) is minimised. The average delivery distance of ready-mixed concrete to the construction site is eight km, and just over 150 km for precast concrete products.

Data collection on transport CO<sub>2</sub> is improving by sector and during 2010 we will focus on the development of common data collection methodologies and guidelines to allow the concrete industry to report transport CO<sub>2</sub> emissions.



### 3. NATURAL RESOURCE PROTECTION AND ENHANCING THE ENVIRONMENT

**Recycled / secondary aggregates:**

The majority of recycled and secondary aggregates are used as alternatives to the use of primary aggregates in local fill and related aggregates markets. Research shows that virtually all the recycled aggregates in the waste stream are already being re-used, and have replaced around 25% of primary aggregates.

The use of recycled and secondary aggregates in concrete varies by sector and is significantly higher in the precast concrete sector. Overall, recycled aggregates account for 5.3% of the aggregates used in concrete.

The question of whether the diversion of larger volumes of recycled and secondary materials into concrete manufacture would produce a more sustainable outcome, taking into account transport, production and emissions implications, is difficult to answer in simple terms and depends upon the circumstances of individual contracts.

Generally, when transported by road, the use of recycled aggregates is only a lower carbon option when used within 10miles (or 15km) of their source. For more information visit [www.concretecentre.com](http://www.concretecentre.com)

|                                 |                                 |
|---------------------------------|---------------------------------|
| <b>Performance Indicator 1:</b> | Materials Efficiency            |
| <b>Performance Indicator 2:</b> | Water                           |
| <b>Performance Indicator 3:</b> | Site Stewardship & Biodiversity |

**MATERIALS EFFICIENCY**

The success of the concrete industry in finding ways to manage materials responsibly already provides customers with sustainable and cost effective concrete.

This process, although established, is now being reported on. This reporting will develop to reflect new solutions and opportunities for continual improvement.

**Waste as a source of fuel:** The concrete industry recycles its own process waste and also uses by-products and secondary materials from other sectors as fuel. The cement sector is able to employ the high temperature of a cement kiln to safely use combustible waste materials as a replacement for fossil fuels. The use of carbon neutral biomass also helps to reduce CO<sub>2</sub> emissions.

| PERFORMANCE INDICATOR  | 2008 PERFORMANCE | 2012 TARGET     |
|--|------------------|-----------------|
| material diverted from the waste-stream for use as a fuel source as a percentage of total energy use | 17.3%            | Increase to 21% |

**Additional cementitious materials:** Concrete manufacture uses by-products from other industries, such as fly ash from power stations and GGBS from the steel industry. These reduce demand for primary materials and also reduce the embodied CO<sub>2</sub> of concrete when used as additional cementitious materials. The industry will continue to use more additional cementitious materials where it can. To maintain product performance defined levels of these materials can be used, consequently the targeted increase is small.

| PERFORMANCE INDICATOR   | 2008 PERFORMANCE | 2012 TARGET     |
|---|------------------|-----------------|
| percentage of additional cementitious materials (GGBS, fly ash, etc) as a proportion of total cementitious materials used | 31.8%            | Increase to 33% |



## WATER

Water is an important resource and the concrete industry utilises rainwater harvesting schemes, and water recycling to reduce demand for mains water.

Water is an ingredient of concrete and a cubic metre of fresh concrete contains 140 to 190 litres of water. The use of admixtures can reduce the water content by up to 30 litres per cubic metre. 90% of ready-mixed concrete already includes water reducing admixtures.

In 2008 86.1 litres of mains water was used per tonne of concrete.

In addition to mains water use, the concrete industry is also monitoring groundwater use. The aim is to reduce the overall water use of the industry and once a benchmark has been established from consistent reporting the industry will set performance targets.

| PERFORMANCE INDICATOR      | 2008 PERFORMANCE       | 2012 TARGET  |
|----------------------------|------------------------|--|
| mains water use            | 86.1 l/t               | This indicator is to be refined before a target is set |
| controlled groundwater use | not available for 2008 |  |

## SITE STEWARDSHIP AND BIODIVERSITY

Effective site stewardship requires management of biodiversity, geodiversity and heritage. Seven hundred sites of special scientific interest (SSSI's) in the UK are current and previous sites of mineral extraction.

| PERFORMANCE INDICATOR  | 2008 PERFORMANCE | 2012 TARGET |
|--|------------------|-------------|
| percentage of relevant production sites that have site specific action plans | 94.3%            | 100%        |

*We are making a substantial contribution to biodiversity in the UK, including initiatives with Natural England and the RSPB to provide spaces for people and wildlife to enjoy.*



The aggregates sector is actively involved in site stewardship and biodiversity initiatives, including encouraging exemplar restoration projects.

The minerals industry is actively supporting the Nature After Minerals initiative of RSPB and Natural England, designed to encourage greater awareness and understanding of the opportunities for habitat creation and biodiversity; see [www.afterminerals.com](http://www.afterminerals.com). For more information on these and other heritage, restoration, biodiversity and geodiversity initiatives, please refer to the Sustainable Development Reports on the [www.mineralproducts.org](http://www.mineralproducts.org) website.



## 4. CREATING SUSTAINABLE COMMUNITIES

*We recognise that even a single injury is unacceptable. Significant progress has been made to reduce incidents, but more must be done to achieve the overall objective of zero harm.*

**Performance Indicator 1:** Health & Safety  
**Performance Indicator 2:** Employment & Skills  
**Performance Indicator 3:** Local Community

### HEALTH AND SAFETY (H&S)

There have been significant improvements in the health and safety performance of the concrete industry and associated sectors, but further progress is required. While the current H&S indicator focuses on reducing reportable injuries to employees, industry targets will increasingly be focussed on the reduction of 'Lost Time Incidents' and the overall objective of 'Zero Harm'. A number of improvement programmes are in place, developed in partnership with the Health and Safety Executive (HSE), to promote best practice.

The timeframe for the concrete industry of 2009-2014 is as agreed with the HSE.

### EMPLOYMENT AND SKILLS

**Employment:** The concrete industry is a significant employer in the UK, often supporting rural communities that have limited alternative employment opportunities.

**Skills:** The current indicator of performance in workforce skills is based on the Training & Competence section of certified Quality and Environmental Standards. This requires that relevant

skills gaps are identified for all employees, the creation of a plan to address these, and the auditing and certification of this process to ensure the training is delivered and that it is effective.

| PERFORMANCE INDICATOR                                      | 2008 PERFORMANCE | 2012 TARGET  |
|--|------------------|--|
| reportable injuries per 100,000 direct employees per year* | 799 per 100,000  | From 2009-2014, reduce lost time incidents by 50% with an aim of zero harm |

\* There were 282 reportable injuries in the UK concrete industry in 2008 (recorded by companies contributing to this report.)

| PERFORMANCE INDICATOR   | 2008 PERFORMANCE | 2012 TARGET      |
|---|------------------|------------------|
| percentage of employees covered by 'UKAS' certified training and evaluation processes | 84.4%            | Increase to 100% |

Work is also underway to develop a more specific additional indicator to measure performance in this area.



*The concrete industry contributes to the local community through measures such as employment and through training, community engagement and charitable giving.*

### LOCAL COMMUNITY

The sectors within the concrete industry are active in local communities to maintain positive relations, through formal liaison groups and community initiatives.

Although most production sites in the concrete supply chain are situated on industrial parks or are physically shielded (by geography) from local communities, the industry recognises the importance of mitigating any potentially adverse affects from, for example, transport movements and noise.

Individual sectors regularly engage with local schools to support teachers with initiatives that encourage engagement with local wildlife, health and safety issues and support science and geography classes. This activity is both fun and educational, creating an understanding of a local industry and the role the products play in their own lives.

In 2008 the cement and aggregates sectors welcomed over 20,000 visitors to its sites.

The industry will continue to promote best practice and explore additional indicators to reflect local community engagement.

| PERFORMANCE INDICATOR  | 2008 PERFORMANCE | 2012 TARGET     |
|--|------------------|-----------------|
| percentage of relevant production sites that have community liaison activities | 85.9%            | Increase to 90% |



Innovate Office, Leeds utilises the thermal mass of concrete as part of an energy efficiency strategy that has been rewarded with a BREEAM Excellent rating.

To ensure the successful implementation of the Concrete Industry Sustainable Construction Strategy the industry established the Sustainable Concrete Forum and associated Working Groups. Founder members of the Forum are:

Aggregate Industries  
Brett Group  
CEMEX  
Hanson  
Lafarge Aggregates  
Lafarge Cement  
Marshalls plc  
Tarmac  
Trent Concrete

British Precast - [www.britishprecast.org](http://www.britishprecast.org)  
Cement Admixtures Association - [www.admixtures.org.uk](http://www.admixtures.org.uk)  
Cementitious Slag Makers Association - [www.ukcsma.co.uk](http://www.ukcsma.co.uk)  
Mineral Products Association - [www.mineralproducts.org](http://www.mineralproducts.org)  
UK Quality Ash Association - [www.ukqaa.org.uk](http://www.ukqaa.org.uk)

The Sustainable Concrete Forum and its member Associations maintain records of which member companies have supplied data. In order that the process is transparent, and that those member companies supplying data may be allocated the relevant points within the BRE BES 6001 Responsible Sourcing certification scheme, records are kept of which members companies have supplied data for each performance indicator.

[www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk)

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