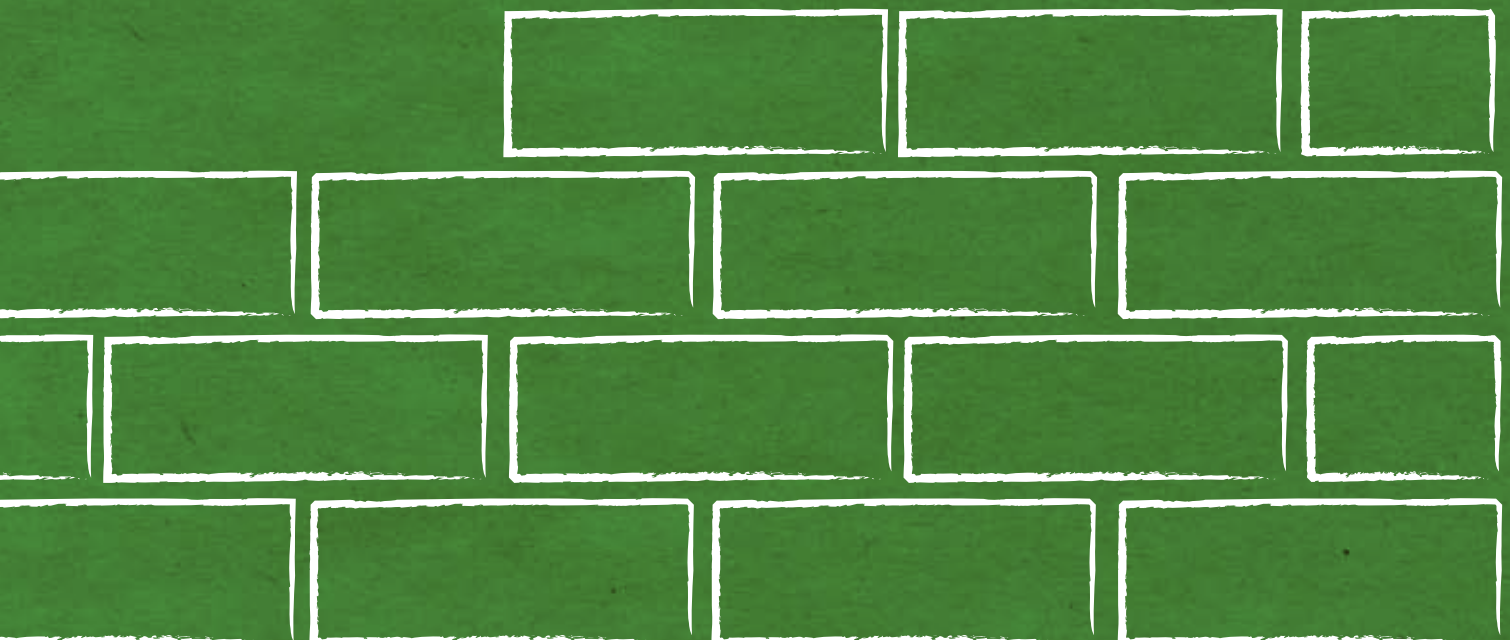


# BRICK: BUILDING A SUSTAINABLE RESOURCE FOR THE FUTURE





THE GOAL OF  
SUSTAINABILITY IS  
DEFINED AS: 'MEETING  
PRESENT NEEDS WITHOUT  
COMPROMISING THE ABILITY OF  
FUTURE GENERATIONS TO MEET  
THEIR NEEDS''

UNITED NATIONS, 1987

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Bricks have been a principal part of the UK's building materials since Roman times. With its long life, durability and resistance to the British weather it is uniquely placed to provide good enclosure and essential requirements for sustainability. Bricks can also be recycled and reused many times. With its sustainable qualities alongside its attractive appearance and limitless design possibilities, this makes brick a material for the present and for the future.

With over 84% of houses built using brick it is strategically important to the wider economy. Additionally, every £1 invested in construction generates £2.84 in economic activity with 92p of every £1 spent on construction retained in the UK. (Source: L.E.K. Consulting, October 2009. [www.lek.com](http://www.lek.com))

Recent decades have brought an increased awareness of the cost of progress and an understanding of the need to harbour resources, restrain

consumption and work towards a system that can operate effectively for generations to come. In short, a proven economic and social system that is sustainable.

Sustainability is a critical element in building these days. Already we have seen new energy performance certificates for large commercial buildings as well as housing. The government's Code for Sustainable Homes stipulates that carbon



emissions must be cut to zero by 2016. This now excludes lifestyle or plug-in appliances and only includes built fabric and services.

The Building Research Establishment's (BRE's) Green Guide (Source: [www.bre.co.uk/greenguide](http://www.bre.co.uk/greenguide)) makes clear, sustainability is not just about the use of carbon-free materials. Nor is it just about the embodied energy in production and delivery from 'cradle to gate'. It is about the total environmental impact of a product – including manufacture, use, maintenance and the ultimate reuse or recycling.

Made from a natural material, often produced and used locally – on average brick travels within an 80 mile radius from quarry to destination.

It is part of Britain's design heritage as it requires minimal maintenance and is suited to its demanding climate. Unlike most other building materials brick lasts for centuries. This durability and longevity allows its embodied energy to be dissipated over many years leading to a low carbon footprint.

As well as being effective for its acoustic performance, fire resistance qualities and thermal mass when used on the inner and outer leaf, brick also provides a thermal shield against high temperatures, which the UK may experience in the future.

Brick is the preferred cladding material for British construction as it is both economical and acceptable to most users. When asked, 93% of people wanted to live in a brick and block constructed house (Source: CBA/MMA 2010 survey). It is a fundamental part of modern building giving good appearance and allowing designers to explore new forms with a tried and tested and well understood technology.

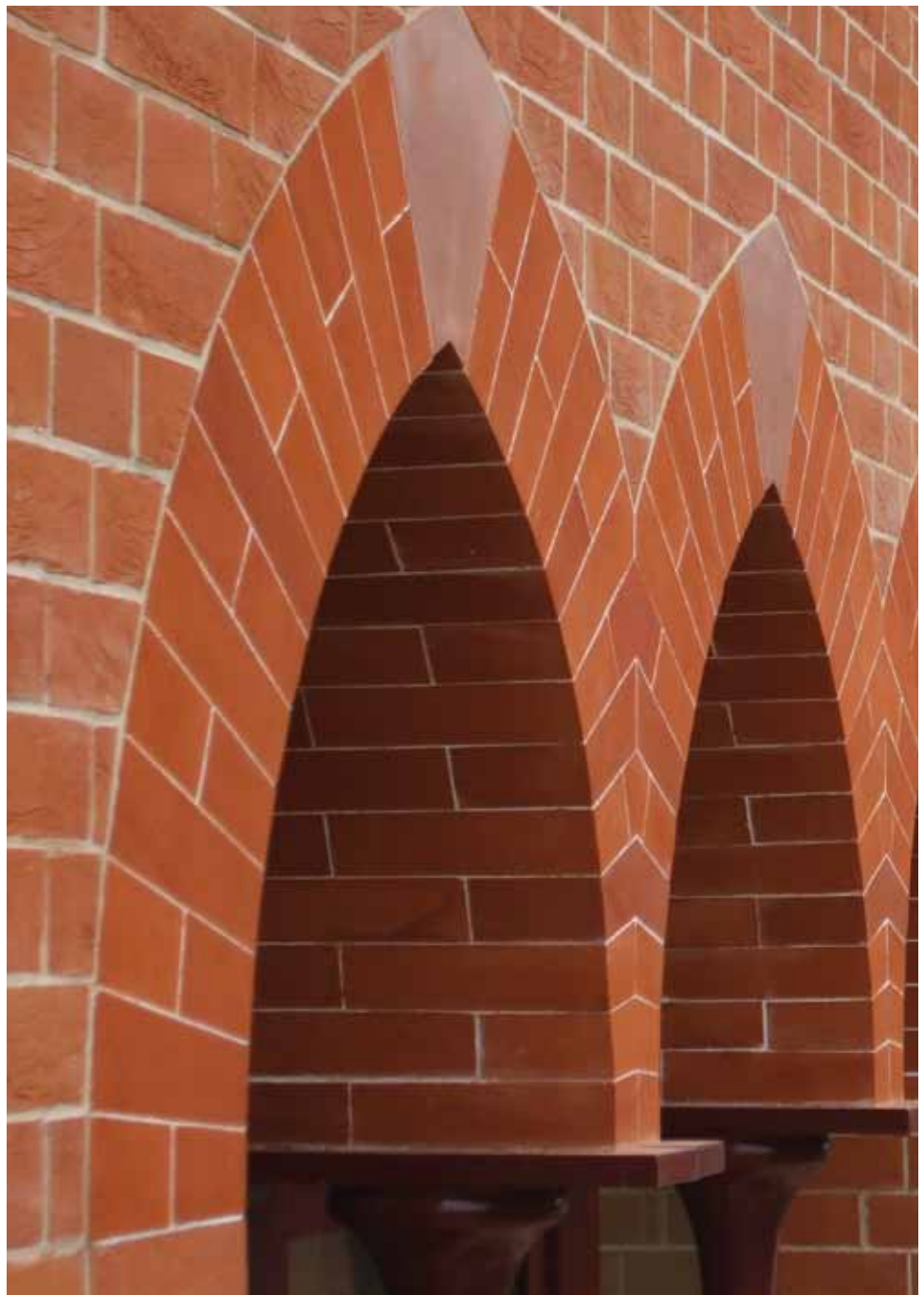
Unlike off-site fabrication, brick allows for greater flexibility for extensions, change of use and adaptations. It is a creative and innovative material available in a wide variety of colours, textures, finishes and sizes. New product developments range from thin joint mortar brickwork, clay thermal blocks to thin bricks mounted on an insulated backing.

In 2002 the clay brick industry established key performance indicators to assess its progress in matching the targets and aspirations defined in its own sustainability strategy, which focuses on carbon emissions, recycling and habitat improvement. Performance is monitored by returns submitted annually by members of the Brick Development Association.

This publication reflects the results of the industry's performance since the

publication of the strategy, based on data submitted by companies over ten years. In some cases results from previous years have been adjusted from earlier reports to ensure consistency in the basis of the data used for each indicator.

The indicators are subject to ongoing review and refinement to ensure they provide the best available measure of the industry's sustainability indicators.



St Pancras Central, Euston Road London N1. Architect: Ingram Consultancy Brickwork



# MAINTENANCE OF HIGH AND STABLE LEVELS OF ECONOMIC GROWTH AND EMPLOYMENT

The brick industry manufactures a durable product for which there is a consistent demand. Factories are usually sited near clay supplies, often in rural locations. Hence, the industry is an important local employer. Technical innovation is a priority to meet demands, for example by creating new products for a changing market.



COMPARED TO 2009, HOUSING UNITS STARTED IN 2010

UP BY 32%

[Source: Housing Building, December 2010. [www.communities.gov.uk](http://www.communities.gov.uk)]

### GROWTH AND INVESTMENT

93% of people would like their house to be built out of brick, making it the preferred material for housing. With an increase in migration to smaller households there is a requirement for more units, therefore a need to build more houses, which the brick industry is responding to.

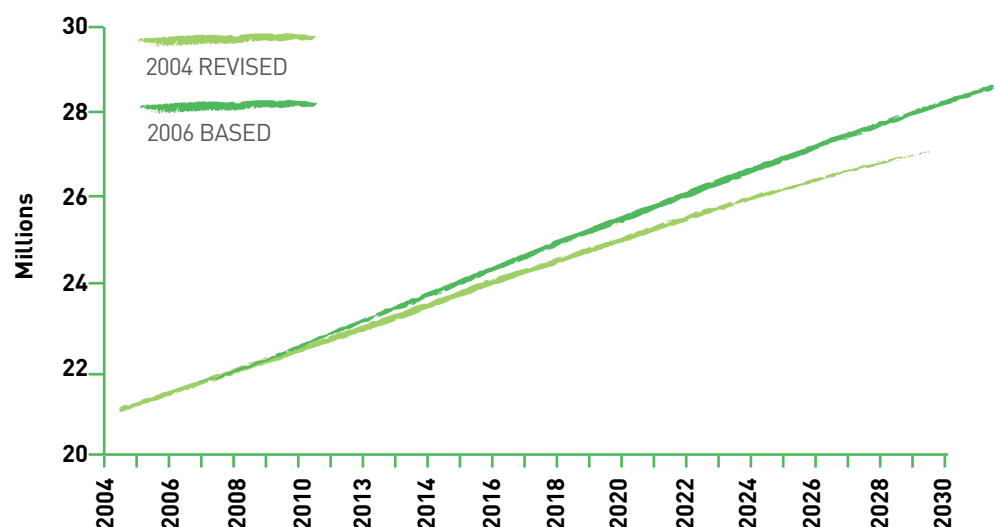
The clay brick industry has many long-established manufacturing sites. Constant re-investment is necessary to update existing plants and processes and to ensure that the industry can meet increasingly stringent legislative requirements. Whilst a sizeable proportion of investment is targeted directly at improving energy performance, any replacement or renewal of plant is also extremely likely to bring additional environmental benefit. There is a close relationship with other sectors of the ceramic industry through common



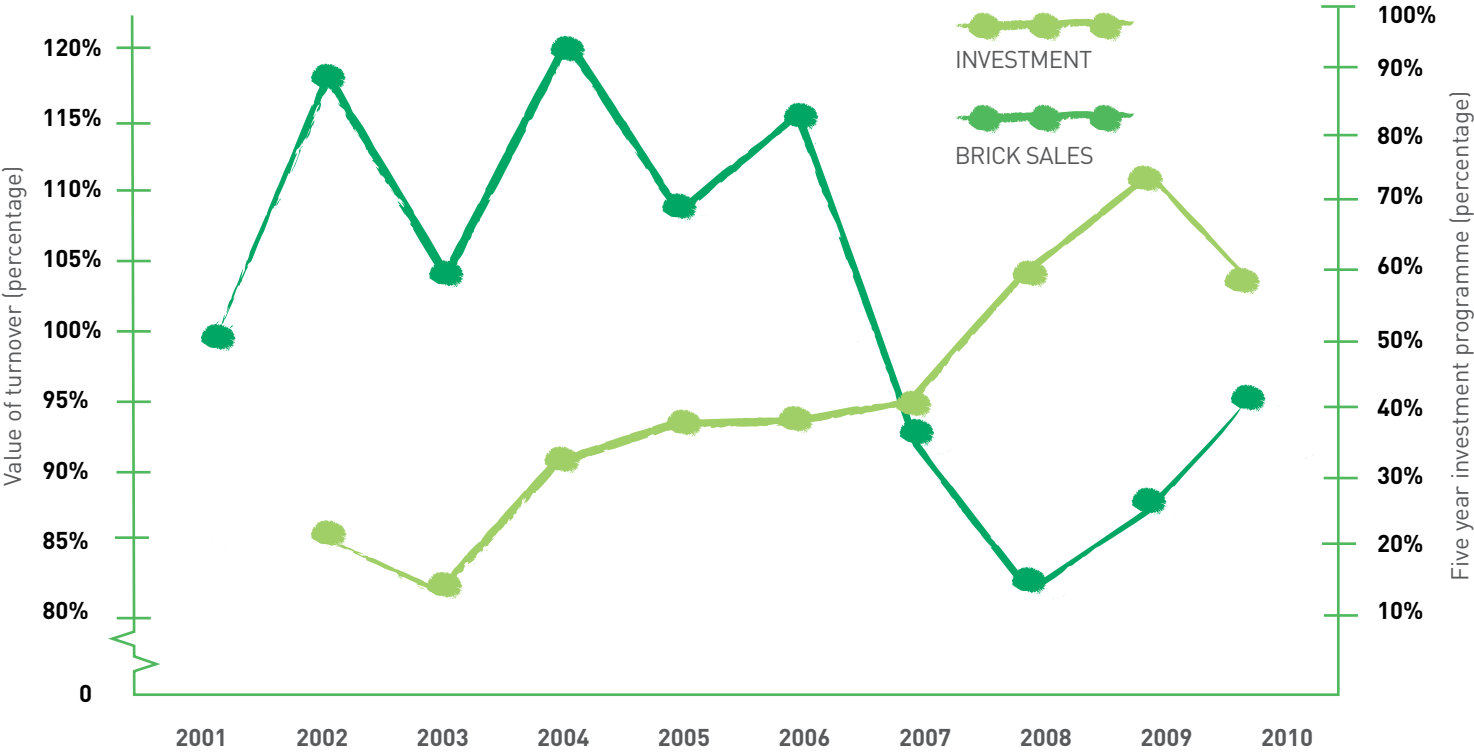
Innovative brick used on Bermondsey Island

technology and a shared commitment to testing, research and development.

### 2004 AND 2006 BASED HOUSEHOLD PROJECTIONS (ENGLAND)



TURNOVER AND INVESTMENT



Investment is constantly increasing in spite of turnover falling

The long-term nature of investment programmes reinforces the permanence of the industry’s contribution to local economies. Over the last five years the industry has invested heavily in plant and machinery. The graph above demonstrates how capital investment in the industry has been maintained.

PRODUCT VALUE

The brick industry manufactures a durable product essential for the provision and maintenance of housing and other elements of construction. It is a flexible building material that complements many other construction materials and systems.

Fired clay brick is an extremely durable material structure, subject to minimal maintenance and will last almost indefinitely. Research from Leeds Metropolitan University has demonstrated that brick structures can have a life span of 500 years or more, and well constructed brickwork can be expected to last many decades before even minor maintenance is required. Established standards, technical specifications and characteristics ensure reliability in service, hence maintenance costs are infrequent and low.

The research, ‘Whole life performance of clay masonry brickwork’ by Adrian Bown, focused on 860 traditional low-rise residential

housing and smaller commercial brick-built properties. It found that: ‘under the right circumstances clay bricks have the potential to remain serviceable for up to 650 years. This is approximately the time at which clay brickwork was first introduced to the UK from the continent.’ (Source: Mortar News, April 2009. [www.mortar.org.uk](http://www.mortar.org.uk))

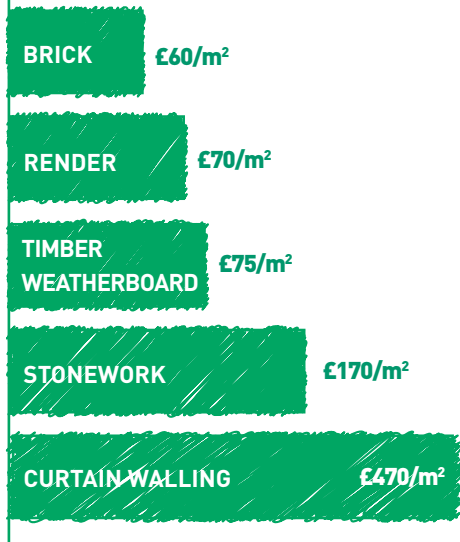
Compatible with many construction methods, both traditional and modern, brick offers an almost infinite flexibility in design and form whilst maintaining its unique rich aesthetic quality. It fulfills a variety of roles in building technology, providing physical support, security, protection from sound and fire, weather resistance, as well as an attractive appearance. The flexibility of brick makes it a particularly suitable material for building renovation, alteration and for existing buildings that require extending.

Therefore brick plays a major role in the creation and renovation of the built environment. Whilst it is fundamental to the provision of housing and shelter, it also remains a popular cladding material for commercial buildings. The introduction of innovative brick systems has the potential to further increase demand. The economic and in-service performance advantages of using

brick in civil engineering structures are well established. The flexibility and durability of brick make it particularly suitable for the renovation of buildings.

Cost, as identified by research undertaken by the Royal Institution of Chartered Surveyors (RICS), shows brickwork to be one of the most cost competitive materials available as demonstrated in the graph below. (Source: ‘The Cost of Comparative Cladding Materials’ by the RICS Building Cost Information Service (BCIS) in December 2007)

MATERIAL COST COMPARISON



Approximate figures



SUPREME WINNER OF 2010 BRICK AWARDS

PROJECT: Olympic Substation

LOCATION: London

ARCHITECT: NORD Architecture

BRICK  
AWARDS  
2010  
SUPREME  
WINNER



# MAINTAINING AND INCREASING VALUE THROUGH THE DEVELOPMENT OF NEW PRODUCTS

**It is vital for the industry to invest continually in innovation, which can take many forms, ranging from the development of different sizes, textures and shapes of the basic unit, to the introduction of new products and techniques that respond to market demand. The industry is firmly committed to innovation in all its forms and has in recent years become an example to other industries for product invention.**

Manufacturers are continually investing in research and development to meet the new challenges faced by the construction industry. This includes the requirement for thermal efficiency alongside brick's durability and longevity. With clay as the medium, developments have been made in the basic unit, and the material has been used in partnership with other manufacturers creating innovative systems.



Brick slips, either purpose made or cut from bricks, have a range of tested and durable carrier systems.

These range from ribbed extruded systems providing a ledge to take adhesive fixed slips, to factory produced panels that can be easily fixed.

In recent years prefabricated brickwork has been used for fast build systems. This has enabled new and complex design forms to mesh invisibly with traditional brickwork. Soffits and complex traditional forms can be easily achieved.

The clay industry has embraced new concepts, such as the tile brick with no mortar visible on the external face, and is amongst the leaders in the development of UK manufactured rainscreen panel systems. Smaller initiatives have included clay bat boxes and swift nesting sites within the brick format.

The Coolvault system providing clay thermal mass flooring when added to clay roofing also contributes to the complete clay solution, which the industry is striving towards.

One of the most exciting recent innovations is the clay thermal block, enabling a load bearing construction to be built with a single skin providing thermal insulation and weatherproofing, allowing internal works to proceed shortly after. The speed of build with adhesive bonding replacing mortar is a further interesting development.

The standard UK brick has a face size of 215mm x 65mm. In recent years bricks have been made in linear lengths up to 440mm and as thin as 40mm. Larger bricks are also now produced in dedicated factories in the UK with a face size of 490mm x 225mm. Designers are thus able to give a brick faced building a different appearance. The larger units and linear bricks provide a completely distinctive and modern





design combined with the durability and cost advantages of brickwork.

To reduce energy usage the industry now produces unfired bricks for the inner leaf which control humidity and which are produced with recycled clay and recovered heat from the main kiln. Unfired clay bricks are amongst the oldest human products – the industry is able to learn from history while using the latest thinking and knowledge.

Existing cavity walls continue to perform well, as a tried and trusted solution. The cavity wall has been constantly refined with improved accessories including wall ties, insulation and DPCs. Cavity walls and new advanced insulations, plus the proven energy saving benefits of thermal mass satisfy the demands of Part L and the 2016 zero carbon requirements. With advances in new insulation materials, a traditional cavity wall will carry the structure of the building and only needs a 300mm wide wall allowing good usable internal space.

#### EMPLOYMENT

The level of employment within the industry has inevitably reduced over the past three years as manufacturers have restricted working capacity to match reduced demand. Nevertheless the industry

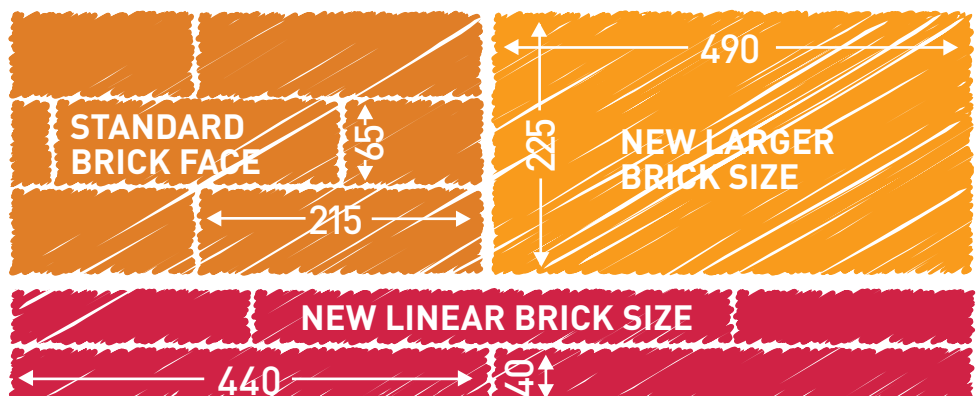
continues to provide employment for thousands of people.

Production is concentrated in areas associated with clay resources, with the majority of brickworks situated in rural areas. Often they are the only local employer of any significance, providing a close connection to the local economy. There are a large number of ancillary industries associated with the brick industry, which in total employ many more people than within the industry itself. The requirement for plant, machinery and energy is fundamental to the manufacturing process, as is transport for the distribution of the product.



Ordnance Survey Head Office  
Architect: Broadway Malyan

### INNOVATIVE NEW BRICK FACES (ALL SIZES IN MM)







# EFFECTIVE PROTECTION OF THE ENVIRONMENT

The brick industry extracts and uses clay from local quarries. Its production process is energy intensive and gives rise to emissions but the impact is declining. Water is used throughout the brick manufacturing process but companies are increasingly recycling water and recovering rainwater to reduce the environmental impact.



# A+ THE BRE ASSIGNED THE HIGHEST TO EVERY EXTERNAL WALL THAT CONTAINED BRICKWORK.

[Source: [www.bre.co.uk](http://www.bre.co.uk)]

## LOW IMPACT OF EXTRACTION

Scarcity is at the core of sustainability concerns. The US Mineral Information Institute notes that Feldspar, a rock forming mineral that weathers into clay continuously is the most abundant mineral group on earth. Feldspar accounts for one-half of the Earth's crust.

Clay, due to its characteristics floats to the surface and so is easily removed without damaging environmental effects. After extraction areas that are quarried for clay can be turned into lakes and ponds for recreational use and a consequential increase in natural wildlife habitats.



Kings Dyke Nature Reserve,  
a former clay quarry

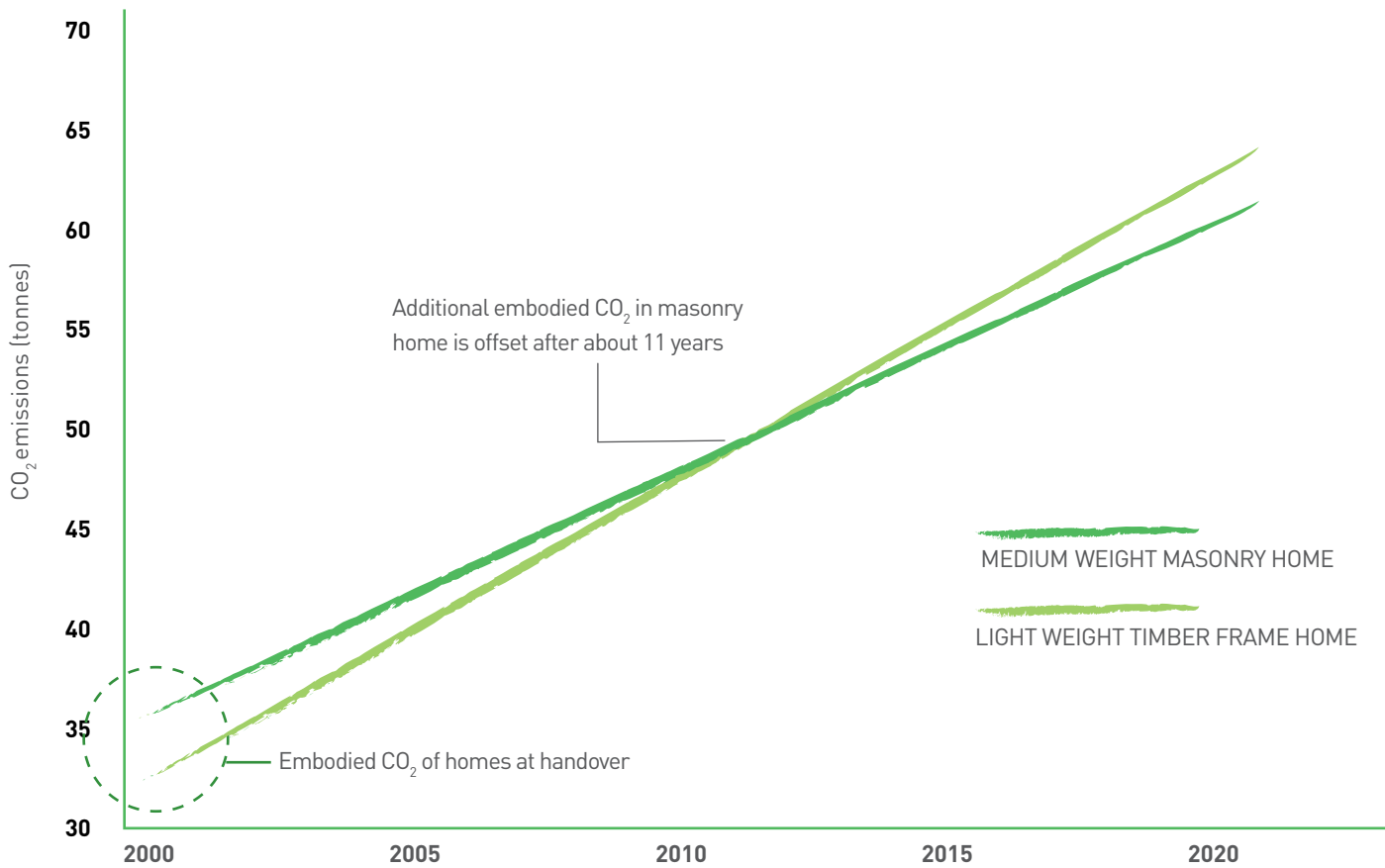
Brick pits only extract for a few weeks a year to produce a stockpile sufficient for a year's work. Extraction minimises disturbance to neighbours and the environment, being a short annual period.

Clay is generally used on the site therefore minimising transport movements.

Research undertaken by London Economics for the UK government (Source: <http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal>) in preparation for the introduction of the aggregates levy, assessed the environmental impact of clay extraction as small compared with other minerals. This is because:

- Operations are often restricted to a limited number of weeks in any year. The immediate impact and rate of change is therefore low;
- Companies have readily adopted practices ensuring compliance with the performance standards required to meet the stringent conditions demanded by planning permissions, such as those recommended in the British Ceramic Confederation (BCC) Environment Code on Extraction and Restoration ([www.ceramfed.co.uk](http://www.ceramfed.co.uk));
- Responsible management of working sites ensures that they become an environmental asset. Old quarries can be restored to beneficial use, adding ecological value through projects designed to increase biodiversity. Further details are available from BDA member company websites;
- All brick clay quarries are recognised by the Environment Agency (EA) as not producing hazardous waste defined under EU Mining Waste Directive.

EMBODIED AND IN-USE CO<sub>2</sub> EMISSIONS FROM LIGHT AND MEDIUM WEIGHT HOMES  
(NORTH/SOUTH ORIENTATION, CONTINUOUS HEATING) ARUP/TTP RESEARCH, 2006



WHAT IS AN ECOPOINT?

An Environmental Profile consists of 13 environmental measures and a BRE Ecopoints score. This compares the environmental impact of a product against a typical person. 100 Ecopoints equal the impact of one person in the UK for a year. Masonry construction using brickwork performs very well.

The aggregated activities are sub-divided (according to a formula) into these categories:

- Climate Change
- Water Extraction
- Mineral Resource Depletion
- Stratospheric Ozone Depletion (the use of ozone depleting substances)
- Human Toxicity (heavy metal substances etc within the food chain)
- Ecotoxicity to Land (impact on land-based eco-systems)
- Ecotoxicity to Fresh Water

(impact on water-based eco-systems)

- Higher Level Nuclear Waste (from electricity generation)
- Waste Disposal
- Fossil Fuel Depletion
- Eutrophication (changing the quality of water resources)
- Photochemical Ozone Creation (low level smog formation)
- Acidification (acid rain etc)

The Green Guide to Specification is part of the BRE's environmental assessment method (BREEAM), an accredited environmental rating scheme for buildings. It examines the impact of construction materials including brick used in six generic types of building – commercial, school, healthcare, retail, residential and industrial. The components are rated across 13 different criteria, such as climate change, ozone depletion, and toxicity to land. The scoring runs from A+, the best

(or having the least environmental impact), down to E, the worst (or having greatest environmental impact).

External walls containing clay masonry were all assigned the highest possible accreditation A+ in the latest BRE Green Guide to Specification.

ENVIRONMENTAL PROFILES

A standard way of assessing and certifying materials is the BRE's Environmental Profiles Certification Scheme which provides an independent assessment and certification of total environmental performance. This involves calculating the 'cradle to grave' environmental impacts of a building material, product or system during both manufacture and use, over a typical building lifetime.

The brick profile was generated from a representative selection of several factories using different materials and manufacturing methods. The cumulative



result was then adjusted to reflect the proportions of these manufacturing methodologies within the total UK brick manufacturing industry. The profile is therefore a truly accurate representation of the typical brick produced in the UK.

Data was taken initially in 1997 and again in 2005. It can be clearly seen that there has been a substantial improvement in 2005 against the previous data. In particular there have been reductions in the impacts associated with minerals resource depletion and climate change. This is the result of significant development work with the use of alternative or secondary materials. Substantial financial investments have resulted in an overall decrease in the use of energy e.g. natural gas and electricity resulting in decreased carbon dioxide emissions.

The table above shows the Ecopoint scores for bricks on a per tonne basis. For direct comparison purposes the BRE also recalculated the 1997 data with the 2005 methodology. The most recent survey also includes transport and end of life impacts

PRODUCT SPECIFICATION	1997 DATA CALCULATED TO 2007 METHODOLOGY ECOPOINTS	
	2005 DATA CALCULATED TO 2007 METHODOLOGY ECOPOINTS	
Average bricks (cradle to gate)	1.71	1.07
Transport to site	N/A	0.08
End of life disposal construction/ refurbishment/ demolition	N/A	0.21/ 0.21/ 0.21

AN INTEGRATED APPROACH TO ENVIRONMENTAL MANAGEMENT

The industry’s recognition that a responsible approach to the environment extends well beyond simple compliance, is demonstrated by:

- The major contribution to the development of the European Ceramic Industry BREF note;
- The range of guidance and advisory notes on aspects of environmental management produced by other organizations in partnership with the industry. For example, CERAM is developing a revolutionary method of calculating the water footprint of a number of construction products including clay brick products.

A BREF note is a European document of Best Available Techniques (commonly known as BAT) which is published as a reference guide. BREF is the acronym used through Europe for such guides. These provide information on sector-specific control techniques for most environmental issues and the emission levels that can be achieved.

CERTIFIED ENVIRONMENTAL RESPONSIBILITY

Other ways in which the brick industry is adapting to environmental concerns is by the adoption of certified management systems of environmental controls such as ISO 14001 and BS 8555. The UK brick industry has to have management systems in place at all sites to comply with Environmental Permitting regulations but accreditation of systems to acknowledged standards reveals the commitment of manufacturers. It is known that at least 85% of the industry output is covered by such formalised systems.



BES 6001 Responsible Sourcing of Construction Products

The brick industry is now moving towards this standard and many factories are now assessed.

The coalition Government’s increasing focus on sustainable development, many construction companies are recognising the need to prove that their buildings are built with sustainability in mind. One element of this is in the responsible sourcing of products used in their construction and the onus of proof is increasingly being passed down to the manufacturers of those construction products.

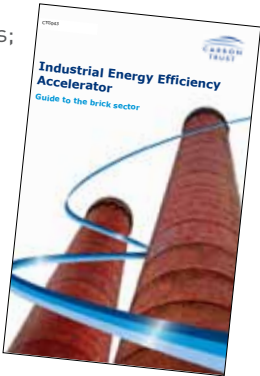
The BRE standard advises construction product manufacturers to ensure and then prove that their products have been made with constituent materials that have been responsibly sourced. The standard describes a framework for the organisational governance, supply chain management and environmental and social aspects that must be addressed in order to ensure the responsible sourcing of construction products.

Independent assessment and certification against the requirements of BES 6001 then give the organisation the ability to prove that an effective system for ensuring responsible sourcing is in position

A new BRE Environmental Standard BES 6001 on Responsible Sourcing is now available. This particular standard involves the assessment of the entire upstream supply chain for environmental, quality and health and safety performance of suppliers as well as their employment practices and ethical responsibilities to the communities at large. It also concerns the impacts of product distribution by the manufacturer. BES 6001 now covers over 70% of the entire brick industry output and more sites and companies are adopting it all the time.

The sector continues to work with the Carbon Trust to gain the following benefits; the list below is from the Carbon Trust publication: Guide to the brick sector (source: [www.carbontrust.co.uk](http://www.carbontrust.co.uk))

- An increase in the choice of energy efficiency options available
- An increase in the pace of CO<sub>2</sub> reduction
- Cost savings as a result of energy savings
- Increased revenues or reduced costs from carbon trading
- Lower dependency on fossil fuels and the supply risks expected in the future
- A rejuvenation of process development in the UK and an increase in skills within the sector.





The Lovelace Mausoleum

The Carbon Trust states in the sector guide notes ‘We identified the clay brick sector as an area which has made significant strides in **improving the energy efficiency of its operations** and would benefit from the IEEA programme to continue towards low carbon operations’.

The General Secretary of the TUC has said, “The jobs of thousands of employees are dependent upon the ability of our energy intensive industries to remain part of the UK’s economic success story”.

Tony Burke, Assistant General Secretary at Unite states, “Unite welcomes this extensive study and the importance it attributes to the role of manufacturing in delivering the low carbon economy”.

Future developments could include modifying an existing product to require less heat for its manufacture. This could include increasing perforation size, adding materials that reduce firing temperature or incorporating bio-mass within the product.

**REDUCING THE IMPACT OF ATMOSPHERIC EMISSIONS FROM THE PRODUCTION PROCESS**

All brick kilns with a thermal capacity exceeding 2 megawatts, which represent over 90% of the industry’s total output, are subject to statutory control of Hydrogen Fluoride emissions. The industry achieves full compliance with this requirement.

The table above reflects the contribution of CO<sub>2</sub> emissions per square metre of brickwork per annum attributable to brick assuming an average expected service life of 150 years. The CO<sub>2</sub> emissions comprise of direct emissions from both energy and process as reported under the EU Emissions Trading Scheme. The measures for 2008 and 2009 reverse the trend in previous years as a result of lower output levels, due to the recession, which cannot be mitigated as the majority of larger kilns cannot be operated intermittently.

The embodied carbon for brick is 0.244 tonnes per tonne of bricks (quarry to site). Using a UK typical brick weight for a typical 2 bedroom end of terrace home it is less than:

CO <sub>2</sub> EMISSION/m <sup>2</sup> OF BRICKWORK	
YEAR	TONNES CO <sub>2</sub> / m <sup>2</sup> /ANNUM
2001	0.000189
2002	0.000186
2003	0.000186
2004	0.000185
2005	0.000186
2006	0.000183
2007	0.000180
2008	0.000183
2009	0.000195
2010	0.000186



## 15kg of CO<sub>2</sub> per year over 150 years

## 22kg of CO<sub>2</sub> per year over 100 years

These calculations are based on a total floor area of 61m<sup>2</sup> for a two-storey end of terrace property (31m<sup>2</sup>/floor) as noted in the document 'Energy and CO<sub>2</sub>' by The Concrete Centre.

Assuming a floor area of 31m<sup>2</sup> (4.8m x 6.4m), a storey height of 2.5m and blockwork party wall, the net brickwork area, assuming 20% glazing, is 64m<sup>2</sup>, equalising 3840 bricks, each weighing

2.35kg, in the walls with an embodied carbon content of:  $244 \times 3840 \times 2.35/1000 = 2202\text{kg CO}_2/\text{tonne of bricks}$ .

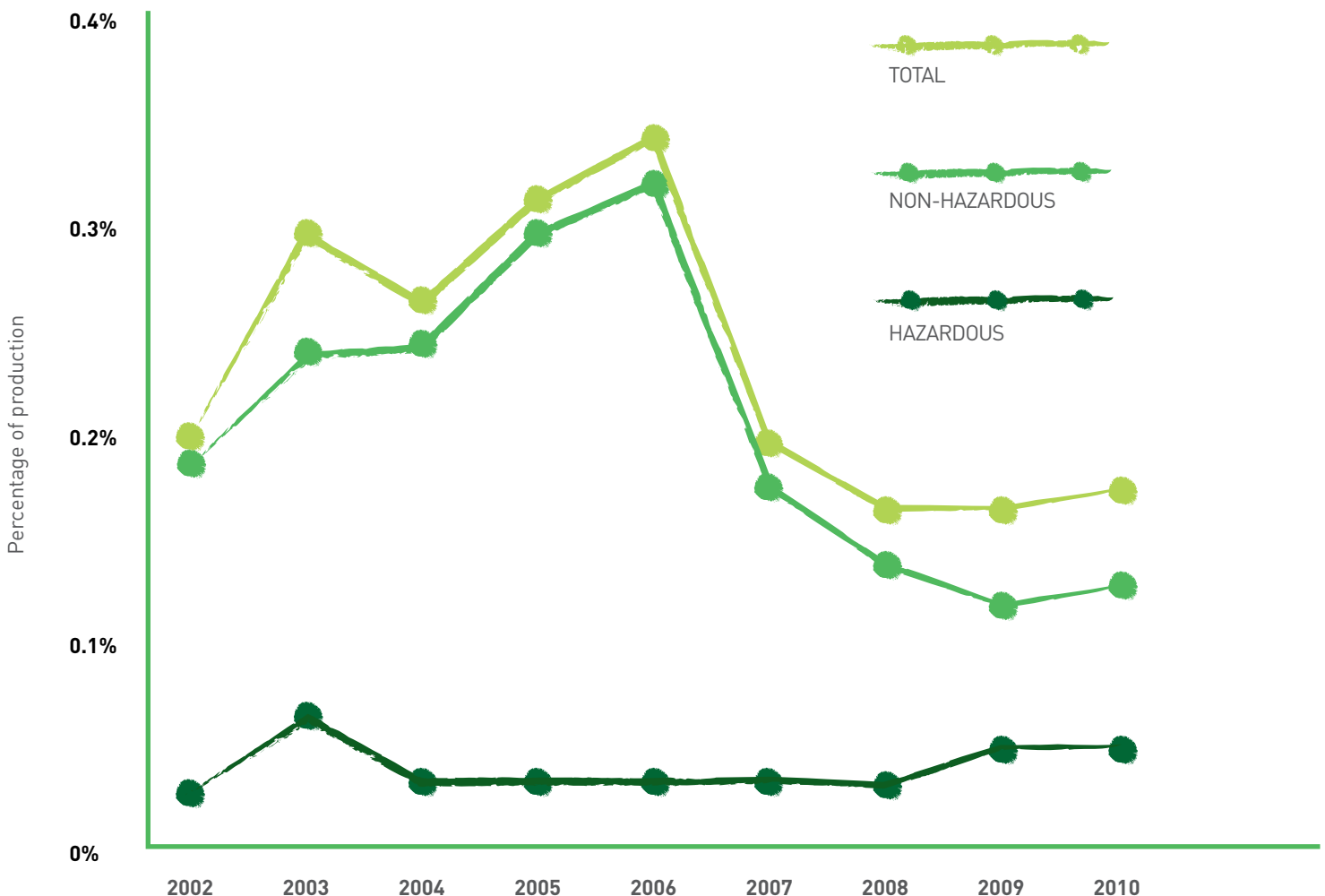
Therefore the embodied CO<sub>2</sub> for 150 years design life  $2202/150 = 15\text{kg CO}_2/\text{year}$ .

## WASTE TO LANDFILL IS BEING MINIMISED

The total waste produced by the industry has now fallen to less than 4000 tonnes per annum. The volumes disposed of to landfill are very small - in 2010 it was equivalent to only 0.16% of the weight of product produced (shown in the graph below). The reduction in non-hazardous waste produced in 2007 attributable to specific

site closures as well as other industry initiatives has been further improved. The brick industry is fully compliant with the Producer Responsibility Obligations (Packaging Waste) Regulations (PRO) on packaging waste materials. This covers packaging materials which are recycled back into the packaging chain. Modern bricks manufactured to BS EN 771-1 can be reused an infinite number of times, brick recycling centres exist throughout the country and are likely to increase in the future. Even if bricks are not reused as facing bricks they are used for soakaways, hardcore or landscaping.

## WASTE DISPOSAL TO LANDFILL AS A PERCENTAGE OF PRODUCTION BY WEIGHT



# PRUDENT USE OF NATURAL RESOURCES

The industry recognises the importance of measuring and reducing the natural resources it consumes. In measuring sustainability it is necessary to take into account a material's life-cycle performance as well as the amount of energy consumed in the manufacturing process. Brick has been around for thousands of years. With many elements of past brick buildings still standing today, brick is one of the few truly tried and tested materials known to man.

## RAW MATERIAL (CLAY) CONSUMPTION

Clay is not a scarce resource. The annual survey undertaken by CERAM measures the usage of Materials from Alternative, Recycled and Secondary Sources (MARSS) at the majority of the industry's production sites. The reduction in the percentage of total materials comprised of MARSS in 2007 and 2008 reflects variations in product mix and also the stricter classification criteria used in respect of fireclays\*.

Materials from Alternative Recycled and Secondary Sources (MARSS) are increasingly important in the manufacture of clay bricks – the current level of recycled material content is 11%, with some bricks made up of over 100% of recycled material.

The amount of MARSS material incorporated into products is approximately 100 times the weight of non-hazardous waste material sent for disposal to landfill.

### WITHIN THE PRODUCTION PROCESS

The brick industry has set out to make brick production as efficient as possible by:

Sourcing materials locally - the majority of brick works have their clay stocks on site or within close proximity;

Incorporating materials from alternative, recycled and alternative sources (MARSS);

Researching the use of additives that will reduce the quantity of clay required;

Water recycling and rainwater usage - in 2010 the industry recycled 37.4% of water used in the production process;

Putting forward planning applications for specific wind turbines;

Working in conjunction with other operators, such as fireclay, the industry uses fireclay that are a by-product of surface mining;

Minimising the waste of clay in the production process by recycling unfired clay.

### Over recent years the industry has improved its energy efficiency through:

Installing more efficient computer controlled kilns from which heat is recycled to be used in the drying process;

Undertaking energy monitoring programmes;

Advances in burner technology and the installation of variable speed motors

\* Waste and Resources Action Programme (WRAP) agreement





to match energy consumption to the task in hand;

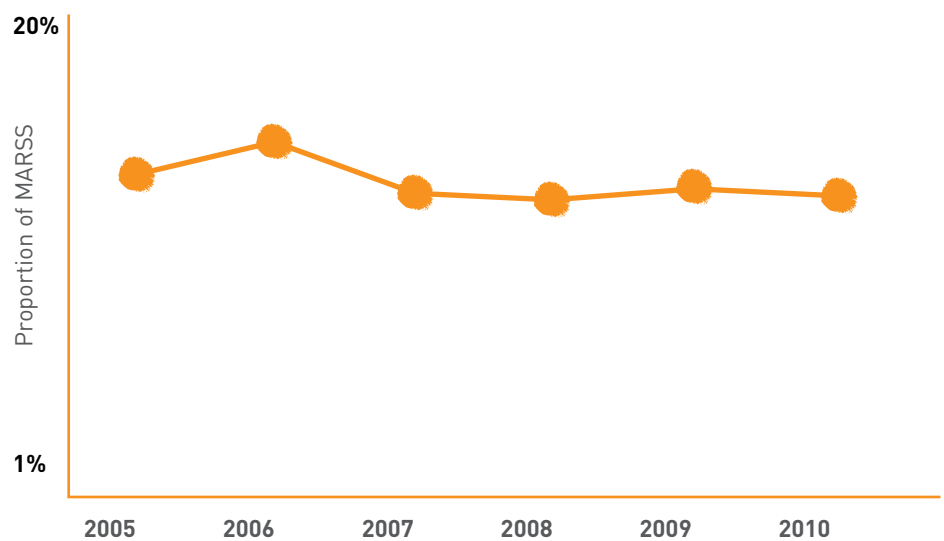
Using alternative fuels such as landfill gas from clay pits for firing product and generating energy.

**Distribution improvements have been made by:**

Arranging transport on an industry-wide basis to reduce the number of empty return journeys;

Improving the efficiency of the lorry fleet by replacement of old vehicles and careful monitoring of fuel consumption and tyre wear.

**RECYCLED CLAY PART OF INDUSTRY INITIATIVES**



BEYOND THE FACTORY GATE

The brick industry is able to monitor and control the use of resources up to the factory gate. Many of the benefits derived from consuming the resources are evident when the product is in use as:

- Brick which is correctly specified, well detailed and properly laid will give many years of maintenance-free service;
- Clay is a material which mellows with age and at the end of the building's useful life

it can either be recycled as construction material or as an aggregate or the building itself can be recycled and its use changed.

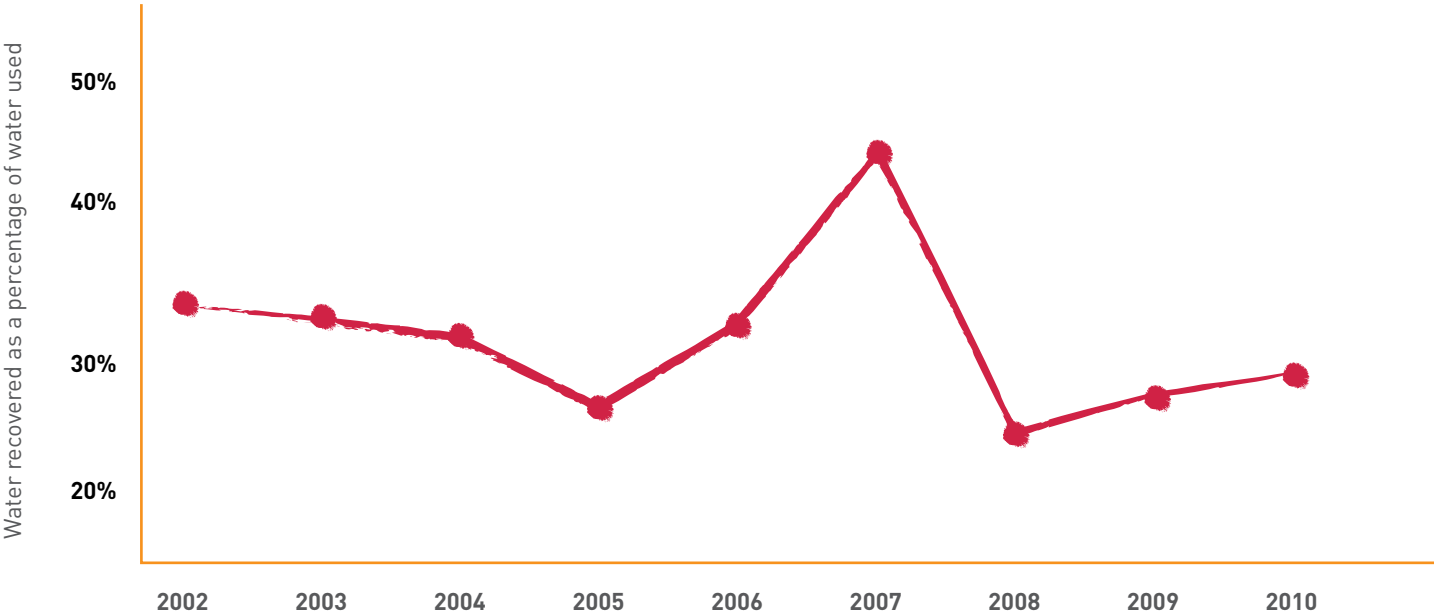
REDUCING THE VOLUME OF MAINS WATER USED IN THE PRODUCTION PROCESS

The total amount of water used by the industry and water recovered in any year depends not just on production volumes but also on rainfall levels, which affect the

moisture content of clays, as well as any changes between the proportions of soft mud and extrusion production.

The graph below shows up to 50% of the water used in the production process is recovered water. The sharp increase in 2006 and 2007 was due to the unusual demand for soft mud products. Recycling plans are accelerating.

PERCENTAGE OF RECYCLED WATER USED IN THE PRODUCTION PROCESS



REDUCING ENERGY THROUGH IMPROVED EFFICIENCY

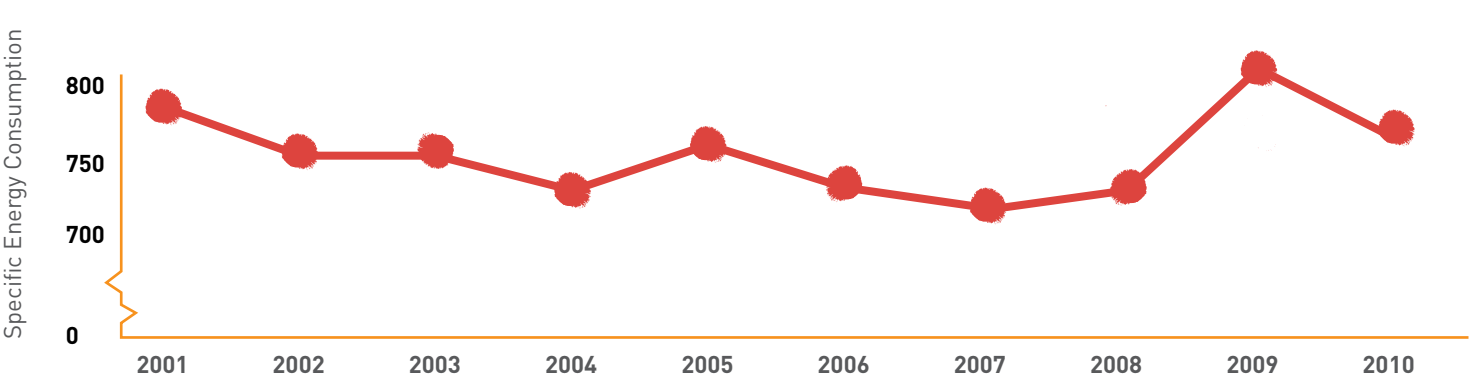
Energy comprises a major cost for the industry, and there is an on-going commitment to improving efficiency. In addition, the industry has participated in Climate Change Agreements since 2001

and is subject to the EU Emissions Trading Scheme (Source: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)). The industry has always met carbon reduction requirements.

Between 2001 and 2007 the industry achieved significant improvements in the energy consumption per tonne of products as demonstrated in the graph below.

Specific Energy Consumption (SEC) is the energy usage per tonne of product. This is how the industry measures and reports its energy consumption. Shown in the graph is the natural gas and solid fuels plus metered electricity expressed as kilowatt hours per tonne.

SPECIFIC ENERGY CONSUMPTION PER TONNE OF OUTPUT



Energy is falling, the spike in 2009 was due to intermittent working





**WORLDWIDE BRICK AWARD WINNER**  
**2008 BRICK AWARDS**

**PROJECT:** Office for SAHRC

**LOCATION:** India

**ARCHITECT:** Anagram Architects

SAHRC



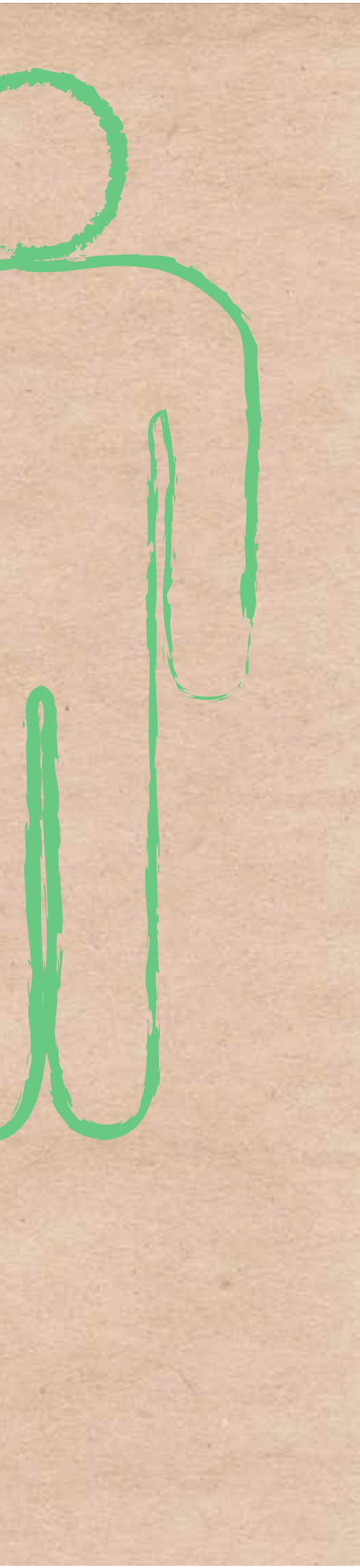


# **SOCIAL PROGRESS RECOGNISING THE NEEDS OF EVERYONE**

**“The jobs of thousands of employees are dependent upon the ability of our energy intensive industries to remain part of the UK’s economic success story.”**

**Brendan Barber, TUC General Secretary**





# 70

BRICK FACTORIES IN THE UK

PROVIDING PERMANENT  
EMPLOYMENT FOR

## THE LOCAL COMMUNITY



The acceptability of the built environment and its contribution to social progress depends to a large degree on aesthetics. Government advice and planning guidance recognizes the importance of design and appearance in producing a positive environment in which to live and work. Brick makes a significant contribution because:

The requirements of planners and architects for materials reflecting local distinctiveness and sense of place can often be met only by brick.

There are approximately 70 brick factories in the United Kingdom providing permanent employment for local people.

Choice of colour, texture and form can preserve continuity within particular locations;

There is a wide variety of product of differing appearance determined by the clays used and production techniques applied;

Available in a wide variety of styles, sizes, colours and textures both by itself and in conjunction with other materials e.g. pre-fabricated panels;



Guildford Education Campus, Surrey  
Architect: DSDHA

Its texture and colour harmonise with the existing vernacular, making it an accepted part of both urban and rural landscapes;

The industry can make a significant contribution to local communities because:

The employment it provides is long-term;

Brick factories are often located in rural areas, consequently they are a major employer in relatively small communities;

The permanence and continuity of a brick manufacturer’s operations encourages the establishment of links with local schools, colleges and other institutions to the benefit of all parties;

It is important to brick manufacturers that their operations and impacts take into account the interests of the communities in which they are located, and are accepted by them.

The industry can help its local communities by providing amenity facilities as well as employment.

Clay extraction has a temporary disruptive and adverse environmental impact. However, subsequent restoration often adds value through the provision of leisure facilities and areas dedicated to wildlife and nature conservation;

Restoration of clay pits can also provide land for agricultural and other productive uses;

Methane from landfill is used as an energy source for brick production or to generate electricity. The total environmental impact is over 20 times less damaging than that of venting methane from the landfill site.

**OCCUPATIONAL HEALTH AND SAFETY OF THE INDUSTRY’S EMPLOYEES**



All members of the Brick Development Association are formally committed to the Ceramic Industry Health and Safety Pledge, which consists of a comprehensive

programme of initiatives designed to reduce the incidence of work-related injury and ill health (Source: [www.hse.gov.uk](http://www.hse.gov.uk)). Unions were one of the initiators of this programme designed to achieve defined levels of improvement in the incidence of work-related injury and ill-health. Specific targets are:

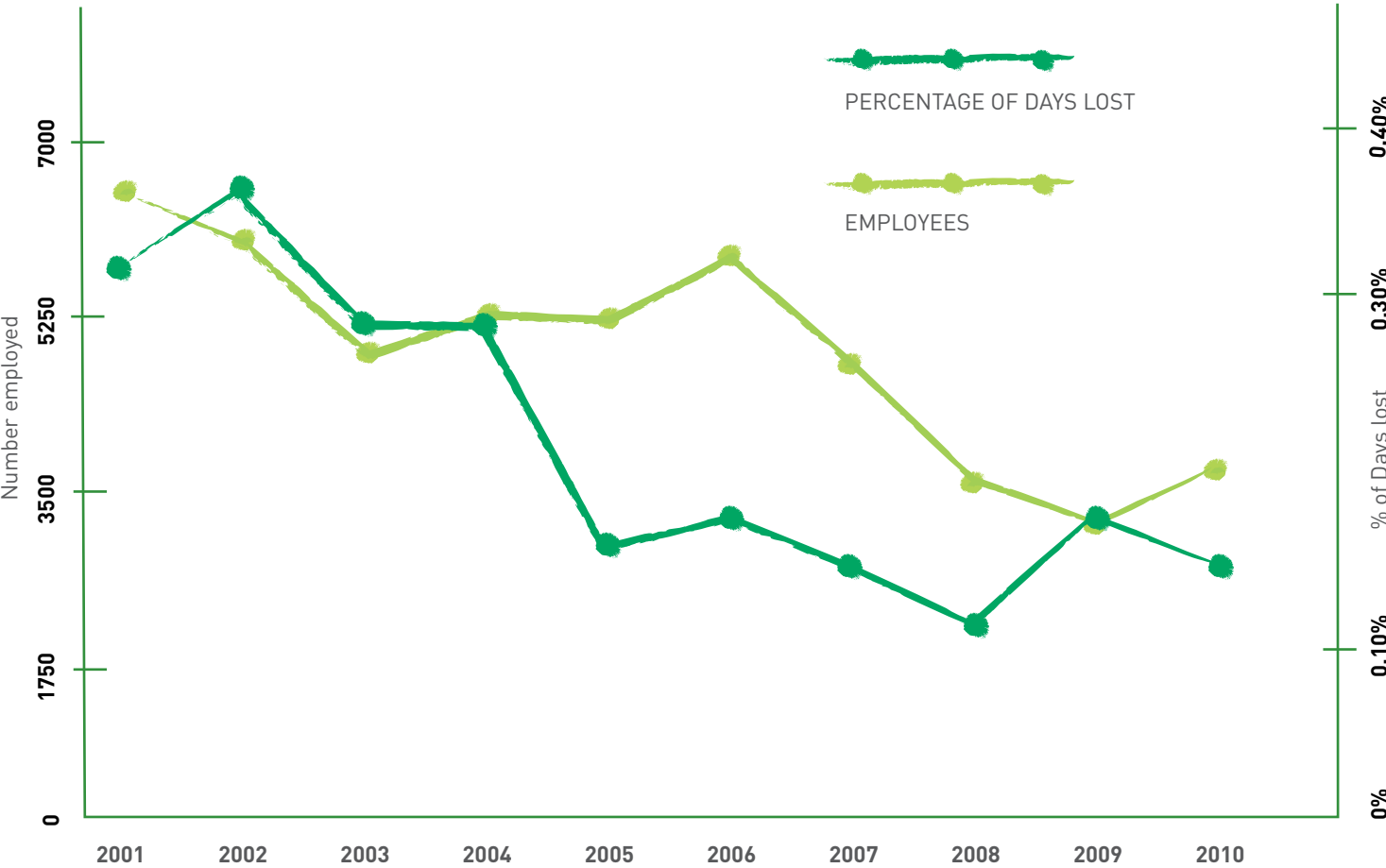
- To reduce the number of working days lost per 100,000 workers from work-related injury and ill-health;
- To reduce the incidence of fatal and major injury accidents;
- To reduce the incidence of cases of work-related ill-health.

The brick industry’s performance targets established under the first phase of the Pledge from 2001 to 2006 were surpassed by all sectors of the industry. The current targets comprise a further 30% improvement against the 2006 baseline by the end of 2012.

This information is derived from returns received from the majority of companies in the industry. The reduction in the number employed recorded is indicative of rationalisation and the impact of the severe economic downturn in the industry’s markets over the past 24 months.

Health and safety is showing a downward trend as the graph below shows.

**WORKING DAYS LOST THROUGH WORK-RELATED INJURY**



The above graph highlights the low number of days lost by employees who have experienced work-related injuries.

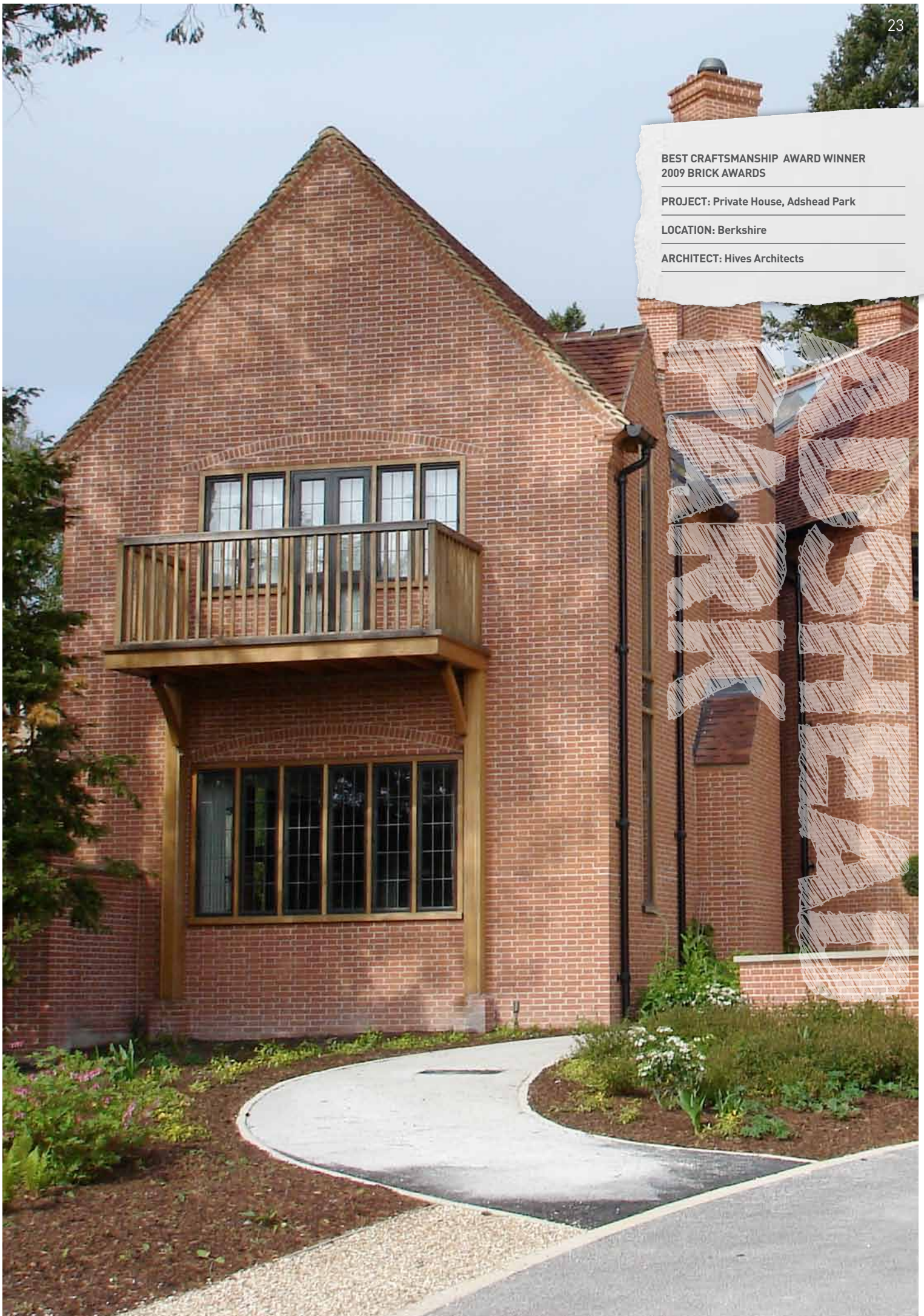


**BEST CRAFTSMANSHIP AWARD WINNER**  
**2009 BRICK AWARDS**

**PROJECT:** Private House, Adshead Park

**LOCATION:** Berkshire

**ARCHITECT:** Hives Architects





# IMPROVING EMPLOY DEVELOPMENT THR RELEVANT AND USE VOCATIONAL TRAINI

**The industry takes the training and development of its employees very seriously and encourages all its employees to further their professional development through:**

- Training programmes provided by companies to meet the particular skill needs of individuals;
- Sector specific packages supplied through the industry sector skills council (Proskills) and other specialist providers;
- A suite of industry standards;

- Membership of the International Clay Technology Association and participation in its professional development activities.

There is particular focus on the development of technology skills, health and safety best practice, supervisory management and technical certification.

The industry has invested heavily in National Examination Board in Occupational Safety and Health (NEBOSH) standards for health and safety and works with Proskills to develop training packages for trades within the industry. The industry has also been working with the University of Derby in the development of a foundation degree (Source: [www.nebosh.org.uk](http://www.nebosh.org.uk)).

## PROSKILLS BUILDING PRODUCTS BOARD OF MANAGEMENT

The Proskills Building Products Board of Management oversees the development of standards for the UK heavy clay sector. Proskills offers a full range of qualifications for managers, operatives and technical staff, including assessor training ([www.proskills.co.uk](http://www.proskills.co.uk)).

The International Clay Technology Association is the industry's professional body. The Association provides its members, through a network of regional branches, with professional development

activities including the sharing of best practice through meetings, training, education, fellowship, and well-informed communications.

A major part of the Association's current programme is the development, in conjunction with Proskills, of a syllabus and teaching material for a foundation and an advanced technical certificate in the manufacture of clayware, which will constitute a nationally recognized professional qualification in the core subject of clay technology.

The industry has traditionally maintained a stable workforce.

For many manufacturers in the brick industry the majority of their workforce has worked for them in excess of 10 years. The BDA is part of the national working group for trowel trades and heavily involved with construction skills and the development of skills modules for NVQ3 thin bed mortar modules.



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“ THERE IS PARTICULAR FOCUS  
ON THE DEVELOPMENT OF  
INFORMATION TECHNOLOGY  
SKILLS, HEALTH AND SAFETY BEST  
PRACTICE, SUPERVISORY MANAGEMENT  
AND TECHNICAL CERTIFICATION ”



## Bricks blend easily with their environment and can be used comfortably with other building materials. They are structurally stable, give thermal mass and will last for 150 years.

Brick provides an energy-efficient envelope reducing the amount of energy necessary to heat or cool the interior. Brick eliminates the need for exterior maintenance and outlasts most exterior cladding products on the market today, avoiding the energy usage involved in upkeep and replacement. Brick does not rot or fade nor is it attacked by mould or insects. The US National Institute for Standards and Technology has rated brick masonry as having at least a minimum 100-year lifespan (Source: [www.nist.gov](http://www.nist.gov)). A durable material is a sustainable material.

Brick is produced from an abundant natural material and tends to be made and delivered locally. It lasts for centuries,

it complements other building materials and can be adapted as a building changes use. It dissipates all its embodied energy over its life in the average building and offers high thermal mass. Brick requires very little maintenance and both individual units and entire brick buildings can be recycled.

As the BRE's Green Guide makes clear, sustainability is not just about the use of carbon-free materials. Nor is it just about the embodied energy accrued in its production and delivery from 'cradle to gate'. It is about the total energy consumption of a product – including that used to maintain it, once it's part of a building, and the fate of 'end-of-life' material.



Best Refurbishment and Renovation Project Winner 2010: Queen Anne's Summerhouse  
Architect: The Whitworth Co Partnership



## Glossary of terms

**BCC** The British Ceramic Confederation represents the collective interests of all sectors of the UK ceramics industry. BCC safeguards the industry's prosperity, acting on its behalf in discussions and negotiations with government and public authorities.

**BCIS** The Building Cost Information Service, part of the RICS, provides independent cost information for the built environment.

**BDA** The Brick Development Association is the central organisation which represents the interests of brick manufacturers in the UK and Ireland. The BDA is responsible for promoting the industry and providing technical guidance.

**BES 6001** The BRE (Building Research Establishment) Standard BES 6001 – Responsible Sourcing of Construction Products, has been published to enable construction product manufacturers to ensure and then prove that their products have been made with constituent materials that have been responsibly sourced. The standard describes a framework for the organizational governance, supply chain management and environmental and social aspects that must be addressed in order to ensure the responsible sourcing of construction products.

**BRE** The Building Research Establishment is an independent and impartial, research-based consultancy, testing and training organisation, offering expertise in aspects of the built environment and associated industries.

**BREF** A BREF note is a European document of Best Available Techniques (commonly known as BAT) which is published as a reference guide. BREF is the acronym used through Europe for such guides. These provide information on sector-specific control techniques for most environmental issues and the emission levels that can be achieved using state of the art techniques using both current and emerging techniques.

**BS 8555** The British Standard BS 8555 is the guide to the phased implementation of an environmental management system including the use of environmental performance evaluation.

**BS EN ISO 14001** an internationally accepted standard that sets out a framework of essential elements for putting an effective Environmental Management System (EMS) in place. The standard is designed to address the delicate balance between maintaining profitability and reducing environmental impact.

**CBA** The Concrete Block Association (CBA) is the trade body representing an industry producing around 60 million m<sup>2</sup> of dense and lightweight aggregate concrete building blocks per year. Concrete blocks continue to adhere to all relevant building regulations and are available in various strengths, weights, and surface textures. It's not surprising that they continue to be the best selling house building block in the UK, recommended by architects and specifiers as the block to use for a successful build.

**CERAM** A global expert in materials testing, analysis and consultancy, providing customised solutions to help measurably improve performance and profitability through safer, regulatory-compliant and better-engineered products.

### Ceramic Health and Safety Pledge

Consists of a comprehensive programme of initiatives designed to reduce the incidence of work-related injury and ill health.

**Coolvault** Flooring system developed and manufactured by Ibstock Brick which provides additional thermal mass in lightweight construction.

**DPC** A damp-proof course is a horizontal barrier in a wall designed to resist moisture rising through the structure by capillary action - a phenomenon known as rising damp.

**Ecopoint** If all environmental impacts of all UK activities are aggregated together over a calendar year and divided by the total population the resulting figure represents 100 Ecopoints which is the total impact of a single UK citizen.

**Green Guide to Specification** Part of the BRE's environmental assessment method (BREEAM), an accredited environmental rating scheme for buildings.

**MARSS** Materials from Alternative, Recycled and Secondary Sources.

**MMA** The Modern Masonry Alliance is a strategic coalition of interests with a common cause in developing and promoting masonry construction – the bricks, blocks, stone and lintels; the cement and mortar which bind them together; the researchers and technicians advancing the industry; the men and women who build masonry homes, buildings and structures.

**Part L** Part L of the Building Regulations imposes the requirement on building work that: Reasonable provision shall be made for the conservation of fuel and power in buildings by:

- limiting heat gains and losses through thermal elements and other parts of the building fabric and from pipes, ducts and vessels used for space heating, space cooling and hot water services;
- providing and commissioning energy efficient fixed building services with effective controls; and
- providing to the owner sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

**RICS** The Royal Institution of Chartered Surveyors is involved with knowledge and best practice, regulation, public affairs and research and economic analysis.

**SEC** Specific Energy Consumption - the energy usage per tonne of product.

**The Concrete Centre** The central development organization for the UK concrete sector, which provides material, design and construction guidance.



The Building Centre  
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London WC1E 7BT

020 7323 7030

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

FSC LOGO

