

# A Sustainability Strategy for the Brick Industry



Brick. Made for generations.

Ebb ▲ 2  
993



# Contents.

## ① Introduction

- 1.1 Context
- 1.2 Industry Background
- 1.3 Purpose of the Strategy
- 1.4 Further Development

## ② The Brick Industry's Contribution to Sustainability

- 2.1 Social Progress which Recognises the Needs of Everyone
- 2.2 Effective Protection of the Environment
- 2.3 Prudent Use of Natural Resources
- 2.4 Maintenance of High and Stable Levels of Economic Growth and Employment

## ③ Strategy for Continuous Improvement

- 3.1 Social Progress which Recognises the Needs of Everyone
- 3.2 Effective Protection of the Environment
- 3.3 Prudent Use of Natural Resources
- 3.4 Maintenance of High and Stable Levels of Economic Growth and Employment

# 1 Introduction

## 1.1 Context

This strategy is a direct response to the challenge issued by the Government in its Sustainable Development Strategy in 1999 encouraging Trade Associations to develop sector sustainability strategies which would:

*'...provide a framework for sectors to assess their economic, environmental and social performance; identify areas for improvement in the light of future opportunities and threats; set targets and implement action plans to bring about their improvement and then to report back on the process to stakeholders'.*

This document sets the context for future work.

The Brick Industry has a long-established commitment to environmental sustainability and a growing awareness of the importance of the concept of sustainability encompassing all current and future activity. The Industry welcomed the opportunity to develop this strategy through involvement with the Pioneers Group.

In 2000, the Brick Industry set up a working party tasked with assessing the Industry's stance on sustainability and the merits and feasibility of developing a strategy. It was decided that a strategy should be developed as a joint project between the British Ceramic Confederation and the Brick Development Association. In 2001, the sector was invited to join the Pioneers Group. Membership of this best practice forum has made a significant contribution to the development of the strategy. The working party reports directly to the Board of the BDA, and all member companies have been kept informed of progress to ensure industry wide commitment to the process.

## 1.2 Industry Background

The Brick Industry makes a significant contribution to the UK economy. The clay construction products market is around £670 million of which brick accounts for £550 million.

### Value of UK production of heavy clay construction products

	£'000
Clay Building Bricks	506,104
Clay Roofing Tiles	48,263
Clay Flooring Blocks	4,483
Clay Pipes	18,285
Other Clay Construction Products	54,542
<b>Total</b>	<b>631,677</b>

Year 2001

Source: Office for National Statistics

## Products

Products range from hand-made bricks manufactured by traditional techniques to innovative clay cladding systems. There are 1200 varieties of brick. These can be categorised either by manufacturing technique or according to use.

### Production Techniques and Brick Types

There are three techniques used to form bricks:

**Soft mud process.** A free-flowing clay mix with up to 30% moisture content is thrown into mould-boxes either by hand or machine then dried and fired. The result is a brick with a soft irregular outline and an attractive appearance.

**Extrusion process / wirecut.** Clay is forced by an auger through a lubricated die to form a continuous column of stiff clay which can be 'faced' by roll-texturing, sand-blasting and pigment spraying to produce a range of textures and other aesthetic effects. The column is cut into bricks using tightly strung steel wires, hence the alternative name 'wirecut'.

**Pressing.** Semi-dry clay is pressed into a mould box to produce a brick which is regular in size and shape with square edges. They are almost entirely confined to the manufacture of Fletton bricks from Lower Oxford clays.

Bricks are referred to as Facing (aesthetic), Engineering (strength) and Common (utility).

## Structure of the Industry

6000 people are employed directly in the manufacture of bricks, with many more in the ancillary industries. There are 30 companies that produce bricks, of which five account for 84% of production.

## Materials

The principal materials are clay, energy and water. The consumption of clay per annum is currently 8.0 million tonnes with energy consumption at 5.4 Terawatts.

### Consumption of clay by heavy clay construction products

	Thousand Tonnes	
	UK Production	of which used for heavy clay products
Common Clay and Shale	10,838	7,880
Fireclay	595	287
Non-energy minerals	306,875	
Heavy clay construction products consume less than 3% of the non-energy minerals extracted in the UK.		
Year 2000	Source: British Geological Survey	

## Energy

The heavy clay industry is energy intensive. Its annual consumption of energy is around 5.4 Terawatt hours. However, this represents less than 1.5% of total consumption by UK manufacturing industry.

Comparative figures for other energy intensive industries are:

Iron and steel	56.0 Twh
Chemicals	89.5 Twh
Metal	52.3 Twh
Food and beverage	47.4 Twh
Heavy clay	5.4 Twh
<b>Total UK manufacturing industry</b>	<b>408.8 Twh</b>

## Environmental Impacts

The impacts include clay extraction, energy consumption, atmospheric emissions and noise. These impacts are now heavily regulated but even prior to regulation the Industry had worked at reducing them by responsible operation and continuous improvement of the process.

### 1.3 Purpose of the Strategy

Sustainable development is about delivering a better quality of life for everyone, now and for generations to come. The Government has defined four key objectives, the integration of which will deliver sustainable development.

- Social progress which recognises the needs of everyone
- Effective protection of the environment
- Prudent use of natural resources
- Maintenance of high and stable levels of economic growth and employment

Sustainability requires the responsible management of all aspects of a business. To demonstrate sustainable management it is necessary to measure performance against stated objectives and to evaluate and review the performance on a regular basis. This strategy identifies the Brick Industry's contribution to the objectives of sustainable development and the ways in which it will build on its achievements.

### 1.4 Further Development

As a first step in the further development of this strategy, the industry's stakeholders and other interested parties are invited to express their view on its content and how they can work with the industry to help it achieve the strategy's objectives. The strategy will be refined at the initial annual review to take account of lessons learnt in this consultation.

## Regulation of Environmental Impacts

Area	Impacts	Enforcing Authority
Resource consumption	Energy, water, raw materials, etc.	DTI, DEFRA, Environmental Agency and / or Local Authority
Emissions to air	Acid gases, solvent vapours, dusts, gases, etc. from chimneys, vents and other sources	Environment Agency and / or Local Authority
Discharges to water	Trade effluent, compressor and cooling tower discharges, surface water run-off from roofs and yards, etc.	Environment Agency
Discharge to sewer	Trade effluent and foul water (sewage)	Water company, e.g. Severn Trent
Discharges to land	Spillages, leaks, etc.	Environment Agency and / or Local Authority
Nuisance creation	Noise, offensive odours, litter, visual impairment, etc.	Local Authority
Waste production	Handling, storage, transport and treatment / disposal of general rubbish, quarry waste, special waste, etc.	Environment Agency
Product packaging	Cardboard boxes, shrink-wrap, wooden pallets, metal and plastic strapping, etc.	Environment Agency and Trading Standards
Transport	Fleet vehicles, fork lift trucks, etc.	Local Authority

Member companies of the BDA / BCC will then be invited to adopt the strategy and commit to the measurement of their performance against its objectives.

The strategy will be reviewed annually. The report, which will be published on the BDA web-site, will assess achievements and evaluate progress made on an industry-wide basis.

## 2 The Brick Industry's Contribution to Sustainability

### 2.1 Social Progress which Recognises the Needs of Everyone

Brick plays a major role in the creation and renovation of the built environment. It is fundamental to the provision of housing and shelter. As a significant employer, the industry shapes the personal development and welfare of those who work within it. It also provides support and benefits for the local communities which are its neighbours.

#### A Positive Contribution to the Built Environment

The UK has an ongoing need for both new housing and the renovation of existing housing stock to meet the demands of demographic change. Accepted forecasts indicate that around three million homes will need to be built over the next 20 years. Consumer research shows that brick is the preferred material for house construction.

Buildings made of brick have proved to be particularly sustainable because:

- Brick fulfils 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 and alteration
- Established standards, technical specifications and characteristics ensure its reliability in service
- It is extremely durable. A brick structure, subject to minimal maintenance, will last almost indefinitely. Its longevity is an even greater advantage since its appearance is enhanced with age
- Any in-service maintenance costs are infrequent and low

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

- Its texture and colour harmonise with our natural surroundings, making it an accepted part of both urban and rural landscapes
- There is a wide variety of product of differing appearance determined by the clays used and production techniques applied
- The extent of the product range permits its use in a wide variety of styles, both by itself and in conjunction with other materials
- Choice of colour, texture and form can preserve continuity within particular locations
- The requirements of planners and architects for materials reflecting local distinctiveness and sense of place can often be met only by brick

- There is evidence to suggest that the appearance and scale of brick structures in the more traditional style may be conducive to behavioural improvement in some areas

#### Looking After the Welfare of Employees

All member companies of the BDA are party to the Ceramic Industry Health and Safety Pledge. This ten-year programme is designed to achieve defined levels of improvement in the incidence of work-related injury and ill-health. Specific targets have been set:

- 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

Accidents at work		
	Year 1999	Year 2000
Number of shop floor employees	5,874	6,083
Man days available	1,380,390	1,429,505
Number of accidents	1,959	1,890
Days lost through accidents	3,829 (0.31%)	4,261 (0.27%)

Source: BCC Accident Survey – Heavy Clay Sector

Participation by a company involves main board commitment and responsibility, and a structured approach to achieving continuous improvement measured by annual reviews using key performance indicators.

#### Training and Personnel Development

The Industry's employees are encouraged to further their personal development through:

- Training programmes provided by companies to meet the particular needs of individuals
- Sector specific packages supplied through the Refractories and Building Products Training Council and other specialist providers
- A suite of industry NVQs
- Membership of the Institute of Clay Technology and participation in its professional development activities

There is particular focus on the development of information technology skills, health and safety best practice, supervisory management and technical certification. An industry modern apprenticeship scheme is currently being prepared.

### Training and Personal Development

The Refractories and Building Products Training Council is the industry training organisation for the UK sector of industry producing refractories and building products. It will form part of the new Process and Manufacturing Sector Skills Council. The RBPTC offers a full range of NVQs for managers, operatives and technical staff, including assessor training.

The Institute of Clay Technology is the industry's professional body. The ICT 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 Institute's current programme is the development, in conjunction with the RBPTC, of a syllabus and teaching material for a foundation and an advanced technical certificate in the manufacture of clayware, which will constitute a nationally recognised professional qualification in the core subject of clay technology.

### Supporting the Neighbourhood

There are 120 brick factories in the United Kingdom providing permanent employment for 6,000 people. 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. Local liaison committees are an established means of achieving this end

### Supporting the Community

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
- Waste disposal to landfill is the least desirable environmental option. Nevertheless, the UK will continue to require some landfill facilities for the foreseeable future. Clay is accepted geologically as the best receptor. Restoration of clay quarries through landfill meets one of society's basic needs

## 2.2 Effective Protection of the Environment

The Brick Industry extracts and consumes clay. Its production process is energy intensive and gives rise to atmospheric emissions. It makes use of considerable volumes of water. This potential for environmental impact emphasises the importance of effective regulation and responsible environmental management.

### Reducing the Impact of Extraction

Research undertaken by London Economics for the DETR 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:

- The volume and rate of extraction is low compared with other minerals. Operations are often restricted to a limited number of weeks in any year. The immediate impact and rate of change is therefore unpronounced. Extraction is generally only economic where the ratio of unusable to usable material is relatively 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 BCC Environment Code on Extraction and Restoration
- Responsible management of working sites ensures that they are an environmental asset, while old workings are restored to beneficial use, adding ecological value through projects designed to increase biodiversity

### Controlling Atmospheric Emissions

The main emissions resulting from the production process are carbon gases, hydrogen fluoride and particulates. Continuous improvement in performance has been achieved through:

- A constant drive towards increased energy efficiency. The cost of energy and the need to reach targets prescribed in the industry's climate change agreement are key influences in this respect

### Climate Change

The Climate Change Levy is a tax on energy used by industry, commerce, and public sector buildings and offices.

Energy intensive industries receive a rebate of 80% of the levy in exchange for agreeing and meeting challenging energy reduction targets.

The Brick Industry has undertaken to achieve a reduction in specific energy consumption of just over 10% by 2010. Twenty-eight brick manufacturers operating 103 sites are included under the agreements.

- Regulatory control including process guidance notes prescribing limits for hydrogen fluoride and particulates emissions

### Emissions

Permitted limits for atmospheric emissions by brick manufacturers are prescribed in process guidance note **PG 3/2: The Manufacture of Heavy Clay Goods and Refractory Goods**.

The limits for existing plant are:

Hydrogen fluoride	10 mg/m <sup>3</sup> at 18% oxygen
Particulates	100 mg/m <sup>3</sup> at 18% oxygen

In addition, for new or substantially changed plant, limits are prescribed for emissions of nitrogen oxides, hydrogen chloride and sulphur oxides.

- Major capital investment in the technology required to ensure compliance

### Scrubbers

Emissions of hydrogen fluoride from kiln exhausts can be substantially reduced by dry limestone absorption.

The industry has made significant investment in this area to improve environmental performance. Installation of a scrubber costs between £250k and £500k. Estimated total industry capital expenditure to date in this area is £12.6m. Annual running costs are around £1.65m.

- Investment in research and development to achieve compliance through process modification rather than end-of-pipe solutions

### An Integrated Approach to Environmental Management

Brick factories, all of which are already subject to UK Integrated Pollution Control or Local Air Pollution Control, will become installations under the new EU integrated pollution prevention and control regime. However, 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 Industry's BREF note made by the UK industry
- The increasing numbers of Industry sites with accredited ISO 14001 or EMAS systems
- The input made by brick manufacturers into the BCC Guidance on Introducing an Environmental Management System which assists the spread of best practice throughout the industry

### Integrated Pollution Prevention and Control

The brick industry's emissions are currently regulated by the Environment Agency or local authorities, under the Environmental Protection Act.

A new regime, implementing the EC Directive on Integrated Pollution Prevention and Control, will soon replace the existing legislation. IPPC will take into account a wider range of environment impacts than the current system. Most installations in the brick industry will be subject to these controls.

Installations will also be required to demonstrate the application of Best Available Techniques to ensure a high level of environmental protection. Guidelines, known as BREF notes, will be published by the European Commission and will provide the basis for national sectoral guidance on Best Available Techniques. The UK Brick Industry is contributing fully to the development of these guidelines.

- The effective application within the Industry of techniques to reduce water use and effluent levels reflected in the Envirowise publication, 'Managing Water Use and Benchmarking in the Brick and Heavy Clay Sectors'
- The range of guidance and advisory notes on aspects of environmental management produced by other organisations in partnership with the Industry

### Guidance on Environmental Management

Advice designed to assist brick manufacturers improve their environmental performance includes:

#### Guidance on Introducing an Environmental Management System for Ceramics (BCC 2001)

This publication provides a practical guide to the introduction of a basic environmental management system. It identifies the key components of a system and illustrates their application with practical examples from the industry, and identifies sources of further support and training.

#### Managing Water Use and Benchmarking in the Brick and Heavy Clay Sectors (Envirowise 2001)

This guide provides benchmark data against which companies can compare their performance. It includes practical tips and examples showing how to achieve cost savings by reducing water use and effluent generation.

The guide covers measuring all process stages and gives advice on reducing effluent through the recovery of materials for direct re-use.

#### Extraction & Restoration: An Environmental Code for the Heavy Clay Industry (BCC 1999)

This code assists and encourages companies in the heavy clay industry to adopt practices which will publicly demonstrate their commitment to high environmental standards. The code deals with the extraction of clay from quarries and their subsequent restoration.

### 2.3 Prudent Use of Natural Resources

The Industry recognises the importance of measuring and reducing the natural resources it consumes. Equally, it is appropriate that the significance of resources consumed is evaluated over the whole life of the product.

#### Within the Production Process

The Brick Industry has set out to make the exploitation of clay as efficient as possible by:

- Sourcing materials locally. The majority of brick works have their clay stocks on site or within close proximity
- Working in conjunction with other operators such as surface mining to use clays that are a by-product of their main activity
- Minimising the waste of clay in the production process by recycling unfired clay
- Researching the use of additives that will reduce the quantity of clay required, e.g. sawdust and sewage sludge

Drying and firing the clay consumes energy. During 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 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 of the finished product is potentially an expensive operation which contributes to environmental pollution. The Industry has made efforts to reduce this pollution by:

- Preserving the availability of locally manufactured products, despite the rationalisation of production plant
- 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

#### Beyond the Factory Gate

The Brick Industry is able to monitor and control the use of resources up to the factory-gate but the benefits derived from consuming the resources are only evident when the product is in use because:

- Brick which is correctly specified, well detailed and properly

laid will give many years of maintenance-free service

- It is a material which mellows with age and at the end of the building's useful life can either be recycled as a construction material or as an aggregate

In order to ensure that brick is used correctly and that the life-cycle benefits of the material are fully understood, the Industry is engaged in:

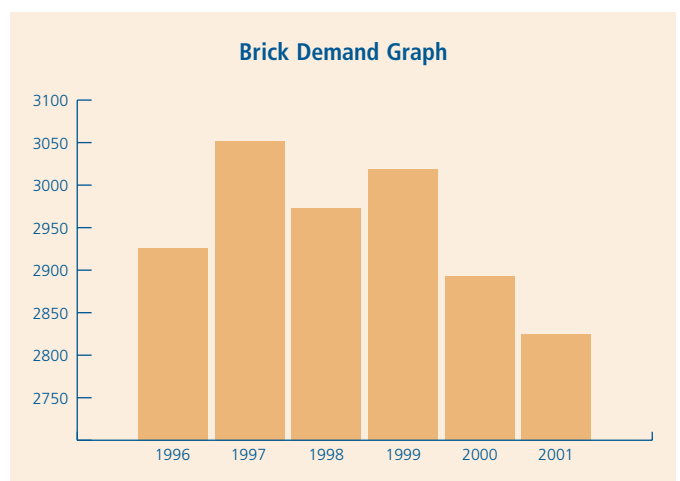
- Providing technical assistance through the BDA and its member companies
- Developing a life-cycle analysis for brick in conjunction with the Building Research Establishment
- Contributing to the production of the Green Guide to Specification

### 2.4 Maintenance of High and Stable Levels of Economic Growth and Employment

The Brick Industry manufactures a traditional product for which there is a consistent demand. Factories are sited near clay supplies, often in a rural location. Hence, the Industry is an important local employer. The Industry is also aware of the importance of innovation to create new products for a changing market.

#### Serving the Market

Demand for brick has stabilised over the past five years and is now expected to maintain its current level in the foreseeable future.



The markets served by the Industry include:

- **Housing:** 162,500 dwelling units were completed in 2001. This is a low-point in the housing market and there is political pressure to increase this figure. Innovative cladding systems using brick will be well suited to the

prefabricated housing systems which are likely to be used to satisfy the demand.

- **Commercial:** Brick remains a premier cladding material for commercial buildings. The introduction of innovative systems has the potential to increase demand.
- **Civil Engineering:** The economic and in-service performance advantages of using brick in civil engineering structures are well established and increasingly acknowledged by specifiers.
- **Repair, Maintenance and Improvement:** The flexibility and durability of brick make it particularly suitable for the renovation of buildings. The need to maintain the country's housing stock is likely to increase demand in this area.

#### National and Local Economic Significance of the Industry

- **Employment:** Brick production is concentrated in areas associated with clay resources. The majority of brickworks are in rural areas. Often they are the only employer of any significance, providing a close connection to the local economy.
- **Ancillary Industries:** There are a large number of ancillary industries associated with the Brick Industry which in total employ many more people than 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. Bricklaying itself requires a number of associated products such as damp-proof courses, brick ties and lintels.

There is a close relationship with other sectors of the Ceramic Industry through common technology and a shared commitment to testing, research and development.

The most direct link is with the construction industry. It is important for the Brick Industry to develop and maintain a keen understanding of its customers' requirements, especially now that the Egan Agenda and 'Rethinking Construction' are suggesting new patterns of work that affect the supply chain.

#### 'Re-thinking Construction'

'Re-thinking Construction' (Egan 1998) was published following concerns about the lack of co-ordination and modernisation in the construction industry. The Egan report called for radical changes and includes the challenging target of year-on-year cuts in the costs of construction whilst increasing profit and turnover. These seemingly contradictory objectives can only be achieved through massive increases in productivity. This will require tighter planning and coordination, better designs, reduced wastage of materials and much speedier and cleaner construction operations on site.

- **Investment:** The 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. The long-term nature of investment programmes reinforces the permanence of the Industry's contribution to local economies.

It is vital for the Industry to invest in innovation. This can take many forms, ranging from the development of different sizes and shapes of the basic unit, to the introduction of new products and techniques that respond to market demand. The Industry is committed to innovation in all its forms.

## 3 Strategy for Continuous Improvement

The earlier sections of this document identify the Industry's impacts, the way in which it mitigates those impacts and the positive contribution it makes to sustainable development. The following objectives have been selected from the analysis and where appropriate Key Performance Indicators (KPIs) are attached. These are designed to facilitate measurement of achievement and progress towards the common goal. Companies within the Industry can continue and increase this momentum through their own commitment to the strategy.

### 3.1 Social Progress which Recognises the Needs of Everyone

**Objective 1:** Improving the occupational health and safety of the industry's employees.

KPIs

- Percentage of employees covered by Ceramic Industry Health and Safety Pledge
- Working days lost per 100,000 hours through work-related injury

**Objective 2:** Improving employee development through relevant and useful vocational training.

KPI

- Training days provided per employee

**Objective 3:** Working with partners in the construction industry and its supply chain to adopt and develop the Egan agenda, and to improve the quality and sustainability of the built environment.

**Objective 4:** Maintaining and further developing liaison with and support for local communities.

### 3.2 Effective Protection of the Environment

**Objective 1:** Extending the application of environmental management systems to the industry's operations.

KPI

- Percentage of production capacity covered by systems accredited to ISO 14001 or EMAS

**Objective 2:** Reducing the impact of atmospheric emissions from the production process.

KPI

- Control of fluoride emissions since 1990

**Objective 3:** Minimising industry waste disposed of to landfill.

KPIs

- Waste disposal to landfill expressed as percentage of production by weight

- Materials recycled during the production process expressed as a percentage of materials used

**Objective 4:** Improving the quality of effluent discharged.

**Objective 5:** Increasing the Industry contribution to effective ecological site management.

### 3.3 Prudent Use of Natural Resources

**Objective 1:** Reducing energy consumed through improved energy efficiency.

KPI

- Energy consumed per tonne of saleable product

**Objective 2:** Reducing the volume of treated water used in the production process.

KPIs

- Water used per tonne of saleable product
- Percentage of water recycled

**Objective 3:** Increasing the proportion of the energy used in the production process which is derived from landfill gas and other renewable sources.

**Objective 4:** Improving efficiency in the use of transport

**Objective 5:** Increasing the use of secondary materials and wastes in the production process.

### 3.4 Maintenance of High and Stable Levels of Economic Growth and Employment

**Objective 1:** Maintaining and improving profitability in order to provide for continuing investment and employment.

KPIs

- Turnover
- Percentage return on sales
- Value of sales per employee

**Objective 2:** Maintaining and increasing investment in plant and machinery in order to improve manufacturing efficiency and environmental performance.

KPI

- Investment in plant and machinery over previous five years

**Objective 3:** Maintaining and increasing value added through the development of new products.



Brick Development Association  
Woodside House, Winkfield, Windsor, Berkshire SL4 2DX  
Tel: 01344 885651, [www.brick.org.uk](http://www.brick.org.uk)

