

The Green Perspective

A UK construction
industry report
on sustainability

Survey 2007



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The Green Perspective

The fourth report from the Intergovernmental Panel on Climate Change (IPCC) has shown that energy use in buildings generates 33 per cent of man-made greenhouse gas emissions globally. That makes the built environment, and our building stock, a key sector for reducing CO₂.

In the UK, the Government has committed to a 26 per cent to 32 per cent reduction by 2020 and a 60 per cent reduction of CO₂ by 2050. The former Department of Trade and Industry (now replaced by the Department for Business, Enterprise & Regulatory Reform) has stated that approximately 50 per cent of the UK's total carbon dioxide emissions come from buildings.

Whilst these statistics show the scale of importance the built environment has in reducing CO₂, it would also suggest there are many opportunities for the industry to employ new and existing technologies on a much wider scale than seen before.

Almost 850 built environment professionals have taken part in this survey. The aim was to find out what they believed the issue of climate change and sustainability means for the industry, as well as how they view current and future green practices.

There is a clear message from the respondents that they recognise the significant role and responsibility the industry has to play in the solution to climate change. The increasing public and policy opinion that the built environment can make considerable and fast change to emissions is reflected by those who took part.

“...within 10 years every new home will be a zero carbon home...we will be the first country ever to make this commitment.”

Gordon Brown, Prime Minister, 2007

Purpose of study

Sustainability has become the construction industry's most important and challenging issue. With greater public demand for sustainable products, new government initiatives and targets concerning carbon emissions, as well as statistics showing that the construction and running of buildings are the biggest carbon culprits, demand on the construction industry to champion sustainability is increasing.

The Government has not only announced the aim to make all new homes carbon zero by 2016, but in July 2007 Gordon Brown pledged “a total by 2020 of three million new homes for families across the country” to be built “in environmentally friendly ways using principally brownfield land and building eco towns and villages”¹. Sustainability is not only a current buzz word in the UK's construction industry, but it is a global issue faced by business communities and governments across the world.

With this current political climate in mind the CIOB wanted to discover the opinion surrounding the practicality, implications and future of sustainability within the construction industry. The survey examined how important the issues of climate change and sustainability are for the construction industry, whilst also looking at the effectiveness of current green practices, and gauging respondents' perceptions on where they felt the largest gains could be made towards a more sustainable construction industry.

Background Research

“Green construction is quite simply better construction”

Paul King, Chief Executive, Green Building Council

The causes of global warming and climate change have until recently been a subject that divided scientific and public opinion. However in February 2007 the Intergovernmental Panel on Climate Change (IPCC)² stated that there is a greater than 90 per cent probability that the climatic changes seen around the world were caused by humans. This research is regarded as the most far-reaching and comprehensive study into climate change that has been undertaken and provides convincing evidence that humans are affecting the world's climate.

Many academics and governments are now calling for a third industrial revolution: the “green revolution”. There can be little doubt that construction, as one of the world's largest industries (worth around £1.6tn worldwide, employing 111m people³ and accounting for 10-15 per cent of GDP), will be looked upon to lead the way in a ‘green revolution’. The industry also has a great multiplier effect on the economy, with one job in construction generating two more jobs elsewhere. As much as 20 per cent of all employment may be linked to construction activities in some way. In the UK, construction is the largest industry consisting of over 250,000 firms, employing around 2.1 million people and accounting for eight per cent of GDP⁴. It is estimated that construction accounts for approximately 40 per cent of all resource consumption and produces about 40 per cent of all waste.

Public opinion has focused on the transport industries when looking to reduce carbon emissions but more recently opinion has shifted towards the carbon footprints of the buildings in which we live and work as the greatest contributor to CO₂ levels and climate change. The UK represents one per cent of the world's population and yet produces 2.3 per cent of the world's CO₂ and worldwide the fourth report from the IPCC has shown that energy use in buildings generates 33 per cent of man-made greenhouse gas emissions.

In the UK, the government has announced strict deadlines to cut carbon emissions by at least 26 per cent by 2020 and 60 per cent by 2050. To achieve these targets the construction industry must play a vital role, as buildings offer the largest single potential for energy efficiency. According to the European Commission Directorate-General for Energy and Transport, "Research shows that more than one-fifth of the present energy consumption and up to 30 to 45 metric tonnes of CO₂ per year could be saved by 2010 by applying more ambitious standards to new and refurbishing buildings - which represents a considerable contribution to meeting the Kyoto targets."⁵

With new extensive plans to reduce carbon in new builds and through refurbishment of existing buildings there is a demand on the construction industry, and others, to show that these changes to homes and buildings are not only better for the environment but can actually have financial benefits as well. As of April 2007 all zero carbon homes in the UK will be exempt from stamp duty for at least the next three years. The government has also announced plans for three million new homes by 2020 with the aim that all new homes will be carbon zero by 2016⁶. The Government stated "There is no doubt that consumer demand for low and zero carbon homes is growing. In a recent survey nearly two-thirds of people asked thought that sustainability options should be compulsory in a new home."

These changes in public and governmental attitudes have very real implications for a UK construction industry that is expected to adapt quickly and efficiently with these changes. Since the Kyoto Protocol inspired the introduction of the EU Directive on the Energy Performance of Buildings⁷, there has been widespread public concern surrounding the energy efficiency and carbon footprint of the buildings. The introduction of Energy Performance Certificates (EPC) will inform consumers about the impact that a home has on the environment. Better-rated homes should have less impact through carbon dioxide (CO₂) emissions and will save buyers money in energy bills. The idea behind the introduction of the certificates is not only to raise awareness of how to make a building more energy efficient, but is hoped will increase public demand for sustainable buildings and homes that already have a good energy performance rating.

In 2006, the Code for Sustainable Homes⁸ was launched to allow a national standard against which to compare levels of sustainable design and construction in new homes. The Code for Sustainable Homes (CSH) is likely to become mandatory in time and will be filtered into building regulations if the UK is to reach its carbon reduction targets. The CSH examines the entire build environment as well as scrutinising on insulation, electric lighting, heating systems, domestic appliances, household recycling facilities, site waste management, and composting facilities. The introduction of the CSH is a clear indication that the construction industry will be heavily affected by the Government's push to reach its carbon reduction targets.

Carbon emissions and global warming are not the only sustainable issue that the construction industry is being challenged with. It has been reported that the construction industry generates one-third of all waste in the UK. Waste in the construction process is an equally serious issue that the industry must address. The construction industry uses over 420 million tonnes of material resources each year, and it is estimated that 20 per cent of new building materials on the average site are thrown away. 109 million tonnes of construction and demolition waste is generated each year (according to Defra). The industry produces three times the waste produced by all UK households combined.

1 BBC News, Politics, In Full: Brown statement on plans, viewed 11 July 2007
http://news.bbc.co.uk/1/hi/uk_politics/6291972.stm

2 The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to assess scientific, technical and socio-economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation. The IPCC does not carry out research nor does it monitor climate related data or other relevant parameters. It bases its assessment mainly on peer-reviewed and published scientific/technical literature.

3 International Labour Organization, 2004

4 Department for Business, Enterprise and Regulatory Reform (Former DTI)

5 Legislation: COM 2002/91/EC: Directive on the Energy Performance of Buildings, viewed 12 July 2007, <http://www.managenergy.net/products/R210.htm>

6 A zero carbon home is a home that produces net zero carbon dioxide emissions over the course of a year. This takes into account all the energy used in the house - for

lighting, heating, cooling, cooking, running the television, and so on. Low and zero carbon solutions can be developed across a site, not necessarily for each individual home.

7 The principal objectives of the Directive are to promote the improvement of the energy performance of buildings within the EU through cost effective measures, and to promote the convergence of building standards towards those of member states which already have ambitious levels. The measures taken include: methodology for calculating the energy performance of buildings, application of performance standards on new and existing buildings, certification schemes for all buildings, regular inspection and assessment of boilers/heating and cooling installations.

8 The CSH will assess the sustainability of a home by awarding points in nine design categories. The nine categories are: energy and carbon dioxide, materials, ecology, pollution, health and well-being, water, surface water run-off and management. The totalled points are then translated into a star rating for the home. One star is the entry level for a sustainable home (above the minimum requirements of the 2006 Building Regulations) and six stars reflects "exemplar development" in sustainability terms.

The survey was conducted using a web-based questionnaire which respondents could access through the CIOB website (www.ciob.org).

Respondents were asked general demographic questions regarding their employment status, their company and their profession within the industry in order to explore the diversity of the sample within the construction industry.

A bulk email was sent to members of the CIOB informing them that the survey was online, but the survey was also available to the wider industry through the CIOB website.

Three open questions were included to give people the chance to express the following: what 'green' construction methods their company employs: their opinion on what project they believe to be the best example of green construction and a chance to explain what they would develop with a £1m budget for sustainability.

The sample

The sample consisted of 847 construction industry professionals, the majority of whom were company directors or managers (616 respondents). The vast majority were members of the CIOB (91.9 per cent). 86.7 per cent of respondents were either employed or self employed. 1.7 per cent of the respondents were unemployed whilst 7.4 per cent were owners or proprietors of their companies.

The respondents came from a varying sizes of organisations with 39.2 per cent of the sample working for large organisations with over 500 employees and 41.7 per cent working for companies whose annual turn over exceeded £100m annually. There were also 16.6 per cent of respondents from companies that employed less than 20 people thus representing a wide scope of organisations with varying financial limitations and manpower.

The respondents were largely from the UK (75.9 per cent), however 24.1 per cent (or 204 respondents) were based outside of the UK.

4

FINDINGS

Are you a member?

Yes (778)
No (69)

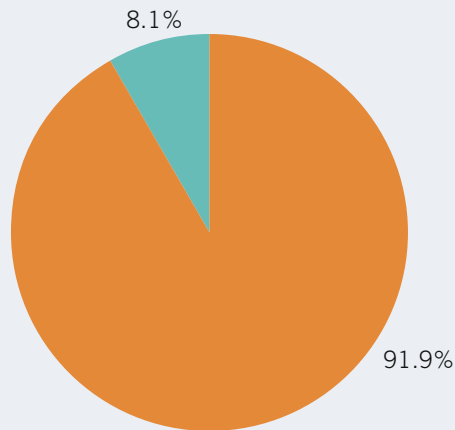


Chart 1

Are you a chartered environmentalist?

Yes (43)
No (804)

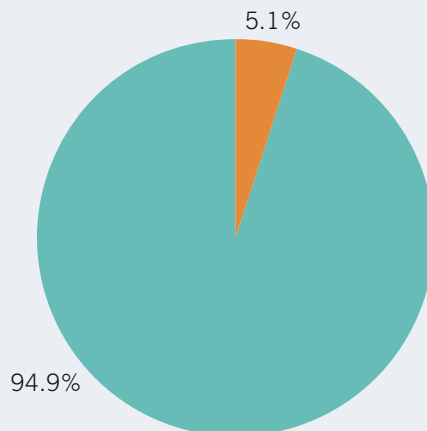


Chart 2

Note: 100 per cent of the respondents who answered yes to this question also answered yes to question 10 (Does construction have a role to play in the solution to climate change?).

What is your employment status?

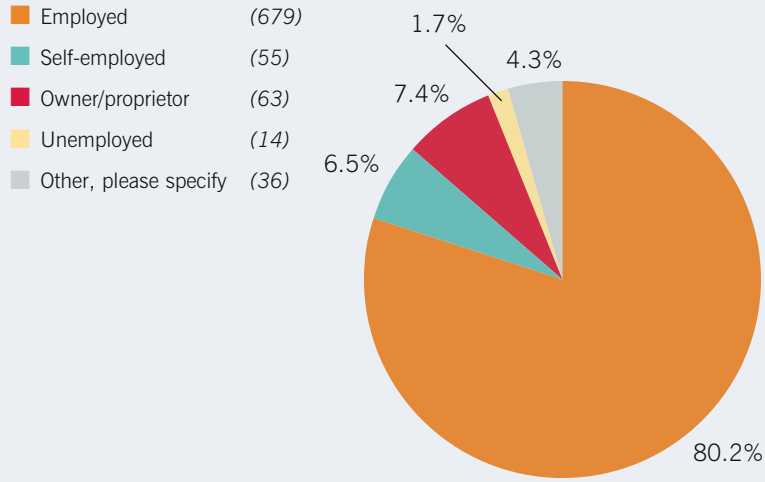


Chart 3

Which description best suits your profession?

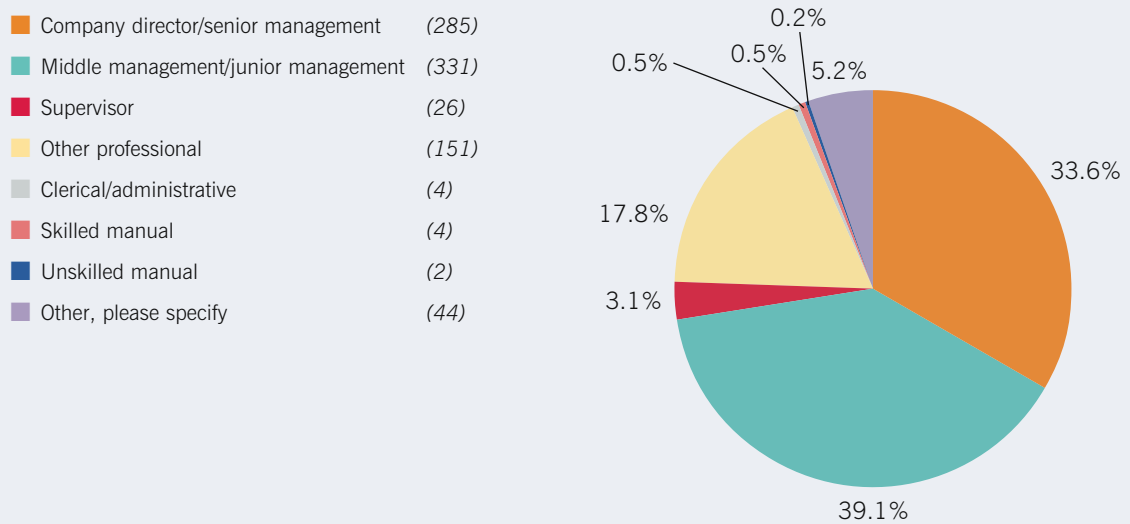


Chart 4

Which of the following sectors are you most closely involved with?

Construction	(466)
Engineering	(28)
Surveying	(81)
Architecture and design	(63)
Facilities management	(52)
Legal	(1)
Education	(31)
Consultancy	(67)
Other, please specify	(58)

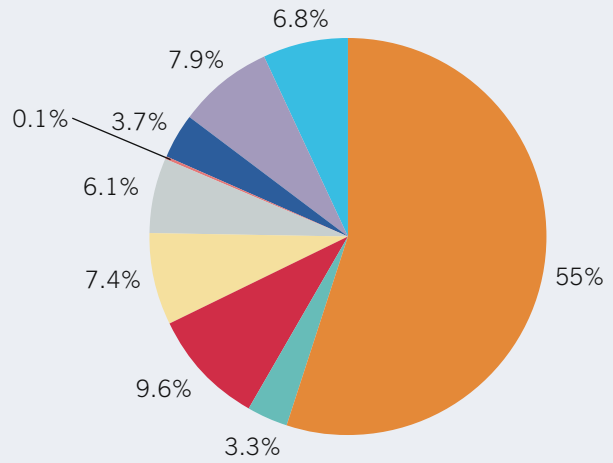


Chart 5

How many people are employed at your organisation?

Less than 20	(162)
20-50	(77)
50-100	(78)
100-200	(92)
200-500	(106)
More than 500	(332)

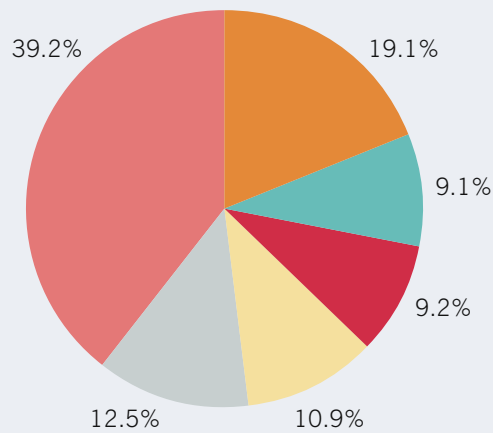


Chart 6

How much does your company turnover per annum?

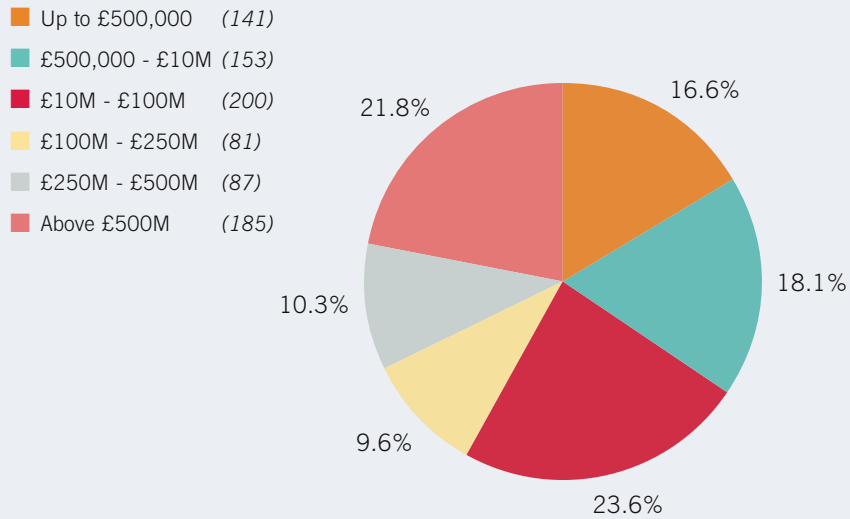


Chart 7

Where are you located?

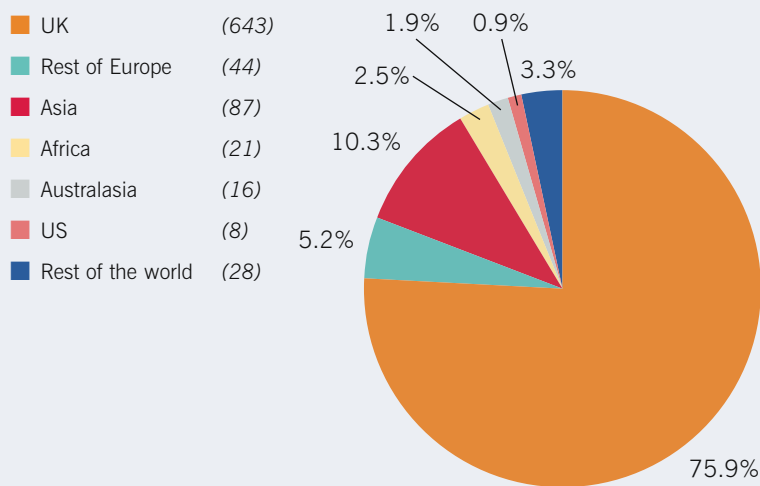


Chart 8

Note: 24.1 per cent of respondents were from outside the UK.

How important is sustainability for the construction industry?

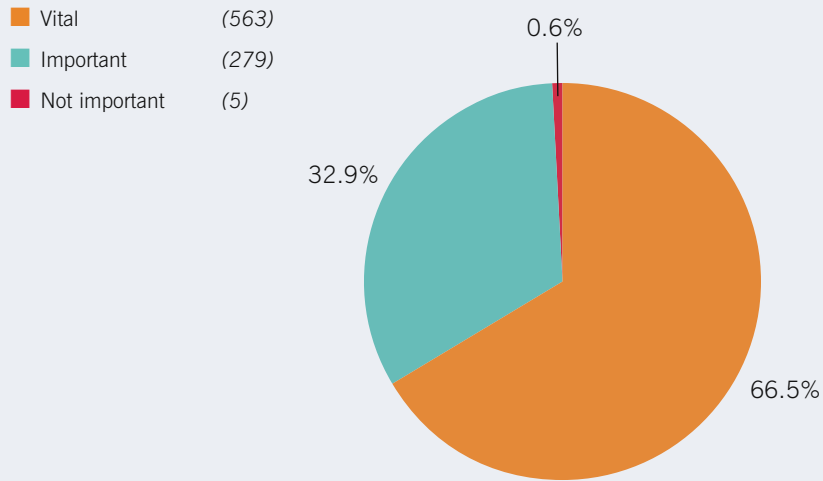


Chart 9

Note: 100 per cent of the respondents who stated that they are chartered environmentalists in question 2 believe that sustainability is either important or vital to the construction industry.

Does construction have a role to play in the solution to climate change?

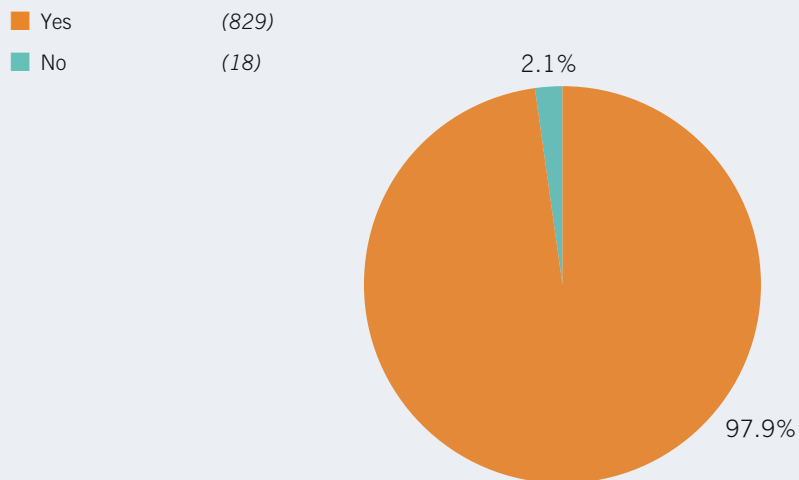


Chart 10

Note: Of the 2.1 per cent that who answered 'no' to this question, 50 per cent thought that there were no financial benefits from energy efficient buildings and 55.6 per cent said that their company did not currently employ green construction methods.

If yes, what scale of importance?

- Vital (447)
- Important (310)
- The same as any other industry (72)

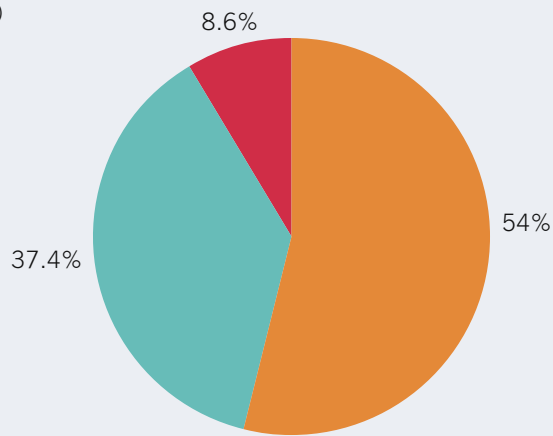


Chart 11

What element of the built environment can do most to reduce CO2? (Tick three boxes)

- Education / training providers
- Building regulations
- Research
- Planning
- Product manufacturers
- Architecture / design
- Surveying
- Construction
- Facilities management
- Demolition
- Other, please specify

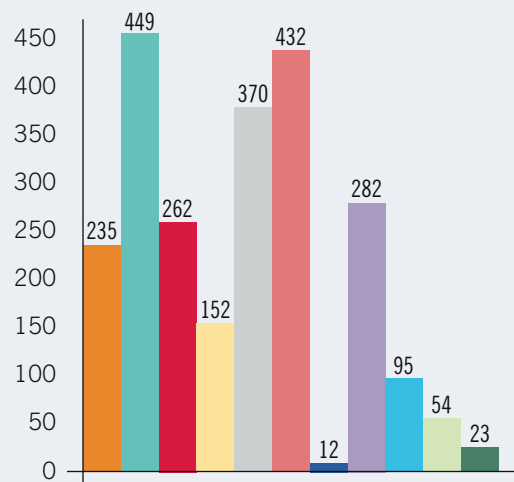


Chart 12

Which of these will give the most benefit to reducing CO2 currently? (Tick three boxes)

- Energy performance certificates
- Code for sustainable homes
- PPS22 renewable energy
- Carbon neutral building products
- Low Carbon Building Programme
- Prefabrication
- Recycled building products/materials
- Solar panels / photovoltaics
- Insulation
- Waste management
- Building regulations
- Carbon trading
- Microgeneration
- Heat pump
- Community heating programmes

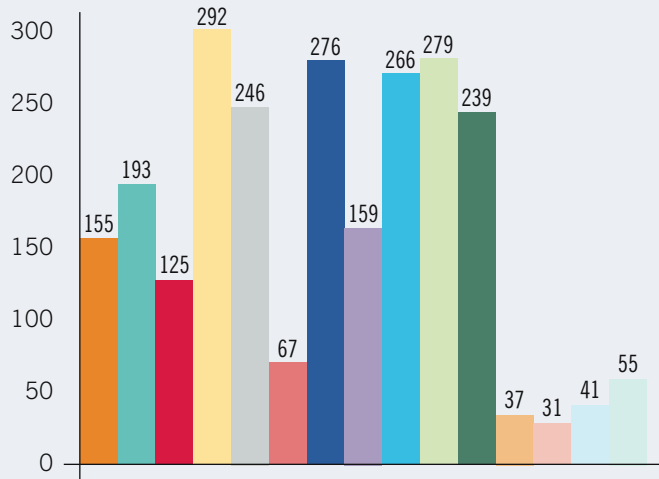


Chart 13

Which of these need the most improvement on sustainability?

- Local Authority Building Control
- Trade associations
- Government
- Professional bodies
- Education providers
- Clients
- Contractors
- End users
- Consultants
- Designers
- Planning
- Surveyors
- Other, please specify

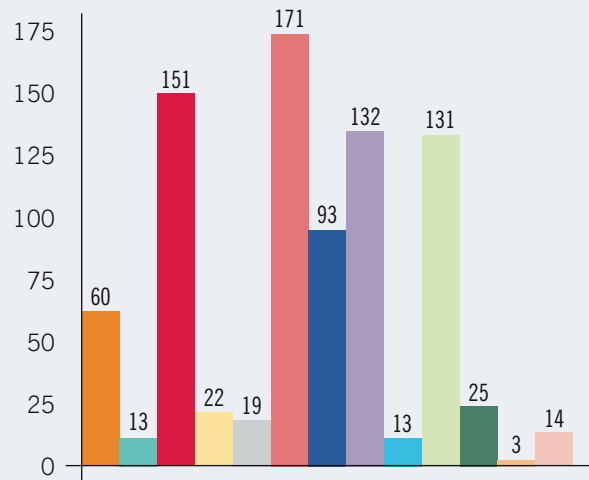


Chart 14

Which of the below contribute most to CO2?

Material / product production	(216)
Transport	(181)
Construction	(63)
Waste	(67)
Use of buildings after construction	(318)
Demolition	(2)

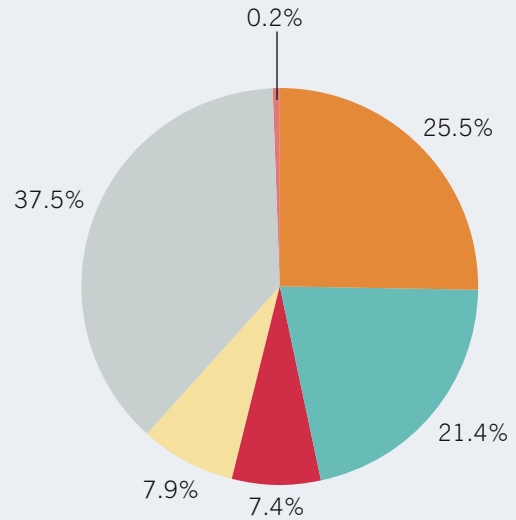


Chart 15

In the last five years has there been an increase in demand from clients for energy efficient buildings?

Yes	(618)
About the same	(180)
No	(49)

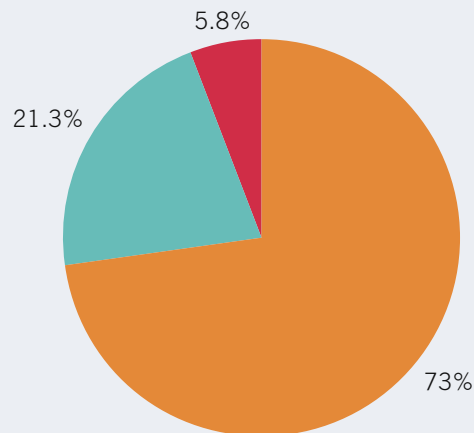


Chart 16

Note: 65.3 per cent of respondents who stated that there has not been an increase in demand from clients for energy efficient buildings also stated that their company does not currently employ 'green' construction methods.

Are there financial benefits to producing energy efficient buildings?

Note: Of the respondents that stated that there are no financial benefits to producing energy efficient buildings 92.3 per cent still believed that construction has a role to play in the solution to climate change and 84.6 per cent of them still believed that 'green' building is the future for construction.

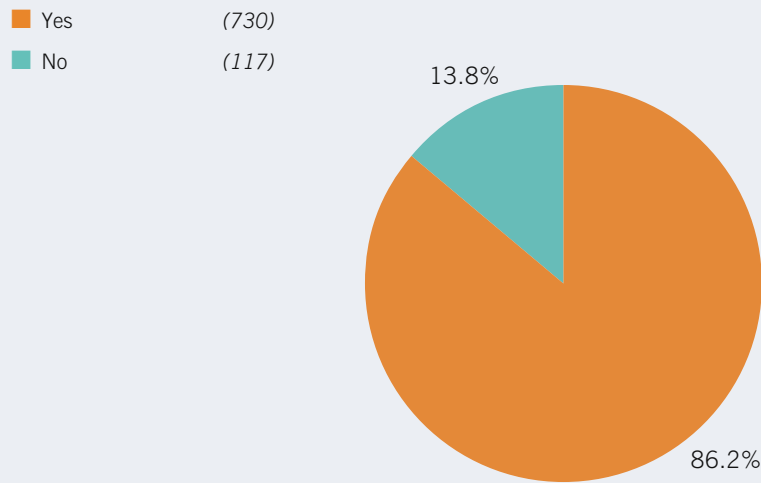


Chart 17

Is 'green' building the future for construction?

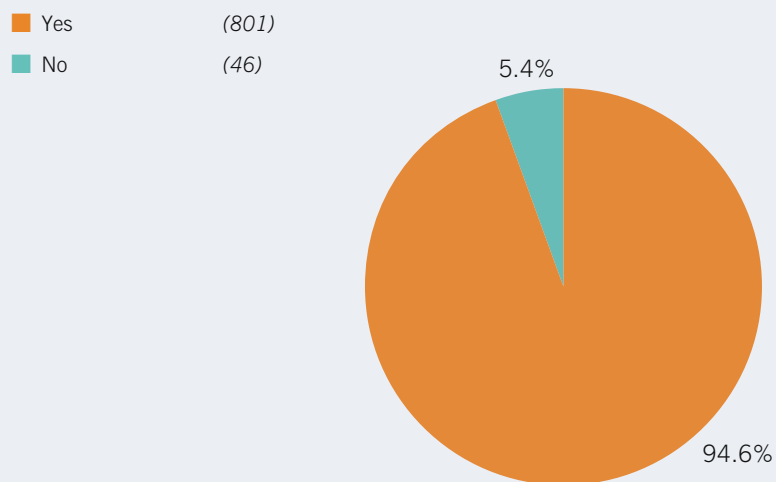


Chart 18

Do the current UK building regulations go far enough to create energy efficient buildings?

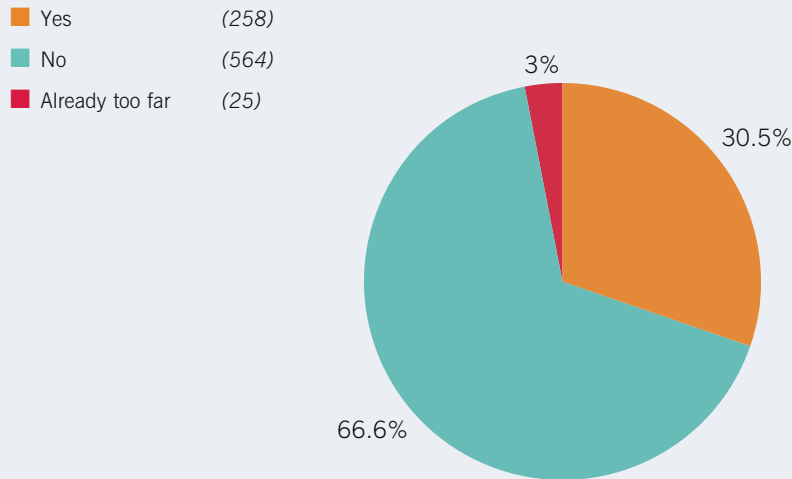


Chart 19

Note: 76 per cent of the respondents who felt that the UK building regulations go too far to create energy efficient buildings believed that the industry does not have good leadership on issues of sustainability. 56 per cent of the same respondents also stated that their companies do not currently employ 'green' construction methods.

Are they enforceable?

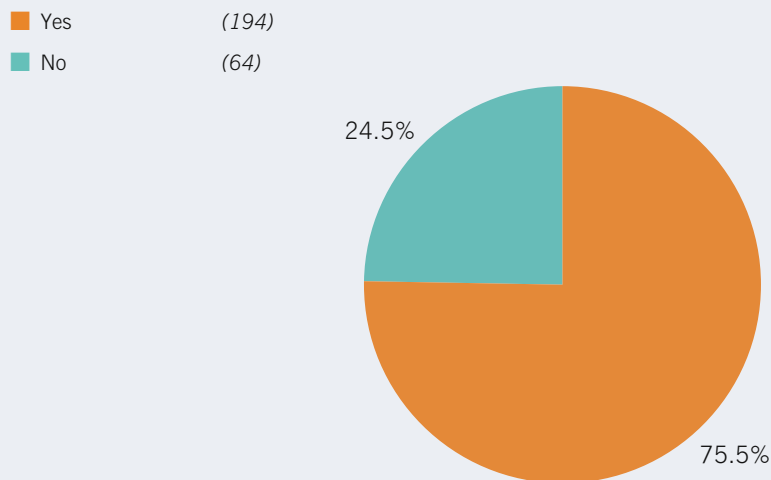


Chart 20

Is the industry currently able to produce zero carbon buildings en masse?

- Yes (103)
- No (744)

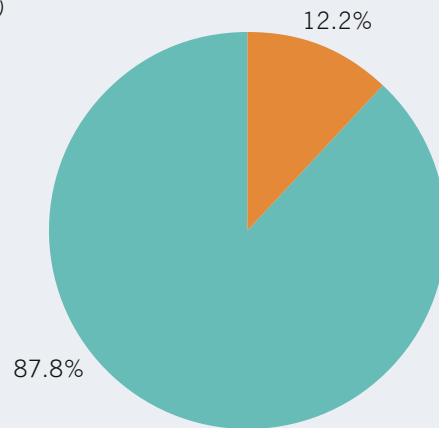
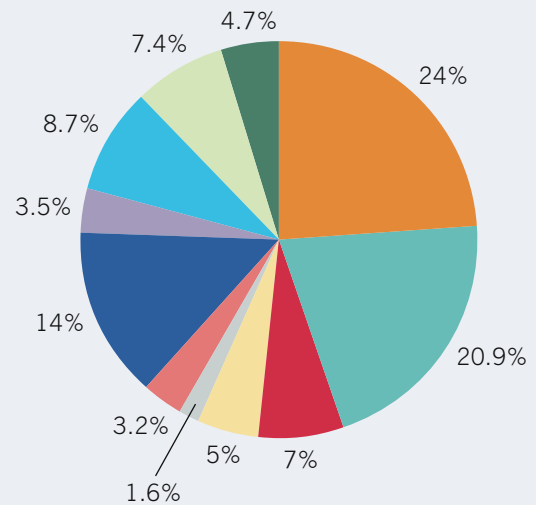


Chart 21

If 'No' why?

- No financial incentive (178)
- Not enough market (client) demand (155)
- Not enough carbon neutral building products (52)
- Poor energy efficient designs (37)
- Restrictive regulations (12)
- The governments carbon programme grants are too low (24)
- Lack of clear definition for what a zero carbon building is (104)
- Shortage of specialist skills (27)
- Lack of information on how to (65)
- Lack of leadership within the industry (55)
- Other, please specify (35)



Does your company currently employ 'green' construction methods?

Note: Of the 38.5 per cent of the respondents who claimed that their companies did not currently employ 'green' construction methods (326 people) 44.8 per cent were from companies that employed over 200 people.

Yes (521)
No (326)

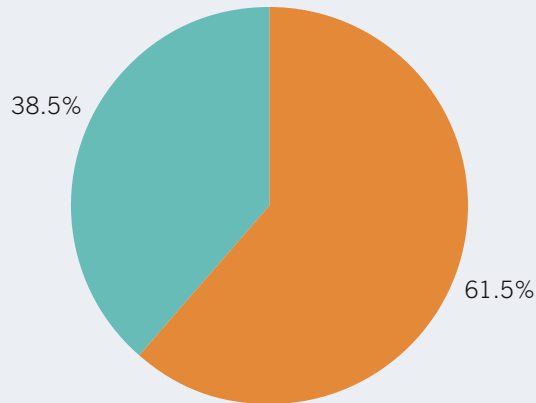


Chart 22

If Yes, how? (Top five returns)

1. Waste management
2. Through green design
3. Energy reduction, energy efficiency
4. Recycled materials and carbon neutral products
5. By setting and measuring 'green' performance totals and CO2 footprint to improve performance

If no, why? (Top five returns)

1. Cost / and not enough financial incentives
2. Insufficient client demand
3. Poor designs
4. Lack of leadership
5. Not enough 'green' technology / products

In your opinion what project is the best example of green construction? (Top five returns)

1. Bedzed
2. Don't know / unknown
3. BREEAM eco-homes
4. Eden project
5. Welsh Assembly Building (Senedd)

Where do you see the future UK investment for clean energy?

Nuclear	(297)
Renewables	(393)
Carbon capture and storage	(44)
Fossil fuels	(9)
Local energy projects	(104)

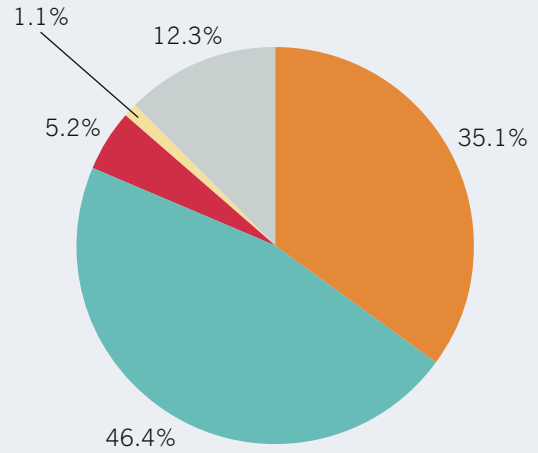


Chart 24

What energy sources should the UK develop? (Tick three boxes)

Clean coal	(99)
Gas	(45)
Nuclear	(329)
Wind	(520)
Tidal/wave	(428)
Bio fuels	(310)
Micro-generation	(128)
Solar / photovoltaics	(374)
Fusion	(120)
Other, please specify	(21)

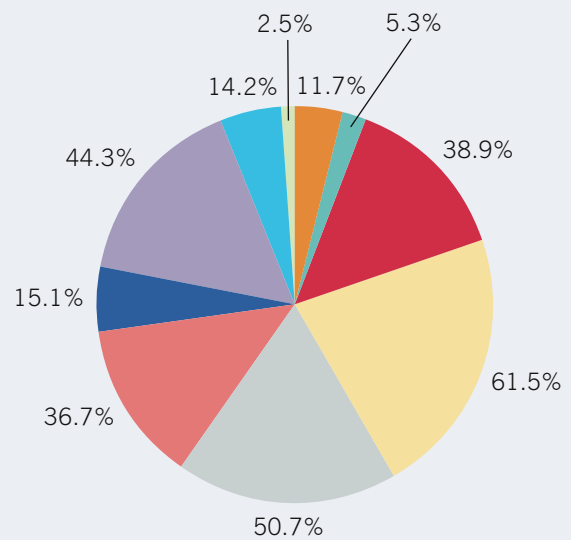


Chart 25

Does the industry have good leadership on issues of sustainability?

Yes (266)
No (581)

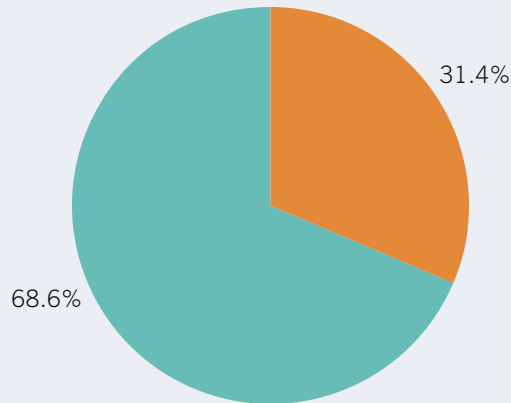


Chart 26

If you had a £1million budget for sustainability what would you develop? (Top 10 returns)

1. Education, training, CPD
2. Solar, wind and wave technologies
3. Waste management systems for industry and homes
4. Create a greater client awareness of the benefits for building green
5. Develop sustainable materials and products
6. Promotion of building 'green' and being 'green'
7. Research
8. Cleaner transport of building materials off-site and on-site
9. Technology that converts CO2
10. £1m wouldn't be enough to do something significant

There is a clear indication from the results of this research that the industry sees the value in sustainable building. However 67 per cent of respondents felt that the current UK building regulations do not go far enough to create energy efficient buildings. In addition, building regulations were seen as the most valuable way for the built environment to reduce CO₂, with the majority (75 per cent) believing that building regulations were enforceable. This would suggest that the industry would like to see a more forceful set of regulations in place to drive sustainable development and market demand. Although this survey has identified an increase in demand for sustainable products over the last five years, this increase appears not to have reached significant enough levels. The reason for this lack of widespread market appetite is seen as a shortage of client awareness and education towards the financial benefits for building green projects. And yet the industry (86 per cent of respondents) believes there are financial benefits to be had from producing energy efficient buildings.

There are some very strong statistics that stand out from this study and clearly show that awareness within the industry has been heightened in regard to environmental issues and their implications for the future of the industry: 98 per cent of respondents accept that construction has a role to play in climate change, 91.4 per cent believe that this role is either important or vital to climate change, 94.6 per cent believe that 'green' building is the future for construction, and 86.2 per cent believe that there are financial benefits to producing energy efficient buildings.

Despite the fact that majority of the respondents have strong opinions on climate change and believe that 'green' building is the future for the construction industry; 68.6 per cent believe that the industry does not have good leadership on issues of sustainability and the second most popular answer for 'What project is the best example of green construction?' was 'Don't know / unknown'.

From this we can see that there is clear concern about climate change and a desire to enforce sustainable construction but there is a lack of understanding about what is being done and what can be done to tackle these issues. The problem may lay in the fact there is still much debate among experts and political leaders concerning possible solutions and the effect that they will have in reducing climate change. What is certain is that reducing waste and carbon emissions from buildings will not only help the environment but is also profitable to businesses. From these results we can see that there is no debate to be had within the construction industry in regards to the direction that needs to be taken, but reaching these people with everyday solutions and practical changes seems to be where the 'green revolution' is falling short.

The CIOB is encouraged to see that 98 per cent of respondents believed that the construction industry had a role to play in the solution to climate change; with 54 per cent considering that the industry's participation was vital in reducing CO₂ levels. However, 14 per cent (or 104) of those who answered that they believed the industry was not currently capable of producing zero carbon buildings en masse, had voiced that it was due to a lack of a "clear definition of what a zero carbon building is". This would suggest that more can be done to communicate the technical elements that produce a zero carbon building and again would suggest that greater awareness and education is required surrounding the implementation of "green" practices.

There are a number of bodies available to offer advice and practical support to help companies implement "green" changes to their business. In response to the demand for improved education and leadership, that can be seen from the results of this research, relevant institutions will be listed in the "Recommendations" section of this study in order to raise awareness of what individuals can do to reduce their companies impact on the environment.

The CIOB regards climate change as the single most important issue to affect the built environment today, and for the foreseeable future. The construction industry's aim is to make the process of building more sustainable and at the same time produce more sustainable buildings and structures. Public awareness of sustainability and the way we use our resources, as well as the impact that consumption has on the environment, has never been higher. However throughout this survey respondents have voiced that whilst there is an increase in client demand for green developments it is not yet at significant enough levels to make widespread change.

Financial incentives and continued education of clients and end-users, as well as more challenging building regulations, were seen by many of those who took part in this survey as the best way of increasing that demand. The CIOB welcomes the UK Government's move to make all zero carbon homes exempt from stamp duty, but would like to see that widened to all new zero carbon buildings earning the same exemption. Whilst exemptions of stamp duty will help incentivise new building projects, our existing stock needs further improvement. The Institute recommends the installation of energy efficient lighting, cavity wall insulation and rainwater attenuation as ways of making existing stock more efficient, but further initiatives need to be explored. To encourage green initiatives and the employment of new technologies in both the domestic and commercial sectors, the CIOB believes that a large increase in the current level of government funding for the Low Carbon Building Programme (currently at £30m over three years) is needed.

Waste management in construction was regarded as an area that needs continued improvement, although it should be noted that many of those who took part in this survey stressed they were actively employing ways to reduce waste. Nevertheless, construction averages at 48 per cent of all waste in England and creates almost 190 million tonnes of waste a year nationally. In response the CIOB has called for all construction projects, involving more than 30 days or 500 person days of construction, to plan and implement a Site Waste Management Plan (SWMP).

This would create a level playing field within the industry, encourage more efficient use of materials and reduce waste crime. The proposed threshold also provides consistency with notified projects under the new Construction (Design and Management) Regulations thereby minimising additional red tape. The Government's increase in the Land Fill Tax should also encourage the construction industry to reduce its current output of waste and oversupply.

Whilst clear demand for stronger amendments to the building regulations is encouraging there are also organisations and schemes that can that can be pursued in order to make a difference before these enforced changes occur. The following bodies are excellent resources for further information on 'green' issues and sustainable practices.

- Building Research Establishment (BRE): www.bre.co.uk
- The Environment Agency: www.environment-agency.gov.uk
- UK Green Building Council (UK-GBC): www.ukgbc.org
- The Society for the Environment: www.socenv.org.uk
- The Carbon Trust: www.carbontrust.co.uk
- CABE: www.cabe.org.uk
- Energy Saving Trust: www.energysavingtrust.org.uk
- Envirowise: www.envirowise.gov.uk
- Low Carbon Building Programme: www.lowcarbonbuildings.org.uk
- CIRIA: www.ciria.org
- Department for Business, Enterprise and Regulatory Reform: www.berr.gov.uk

www.bre.co.uk

www.dtistats.net

www.dti.gov.u

www.defra.gov.u

www.eca.co.uk

www.environment-agency.gov.uk

www.greenregister.org

www.greenweek.co.uk

www.grida.no

www.hmrc.gov.uk

www.ipcc.ch

www.rics.org

www.sustainable-development.gov.uk

www.statistics.gov.uk

www.ukgbc.org

www.worldgbc.org



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