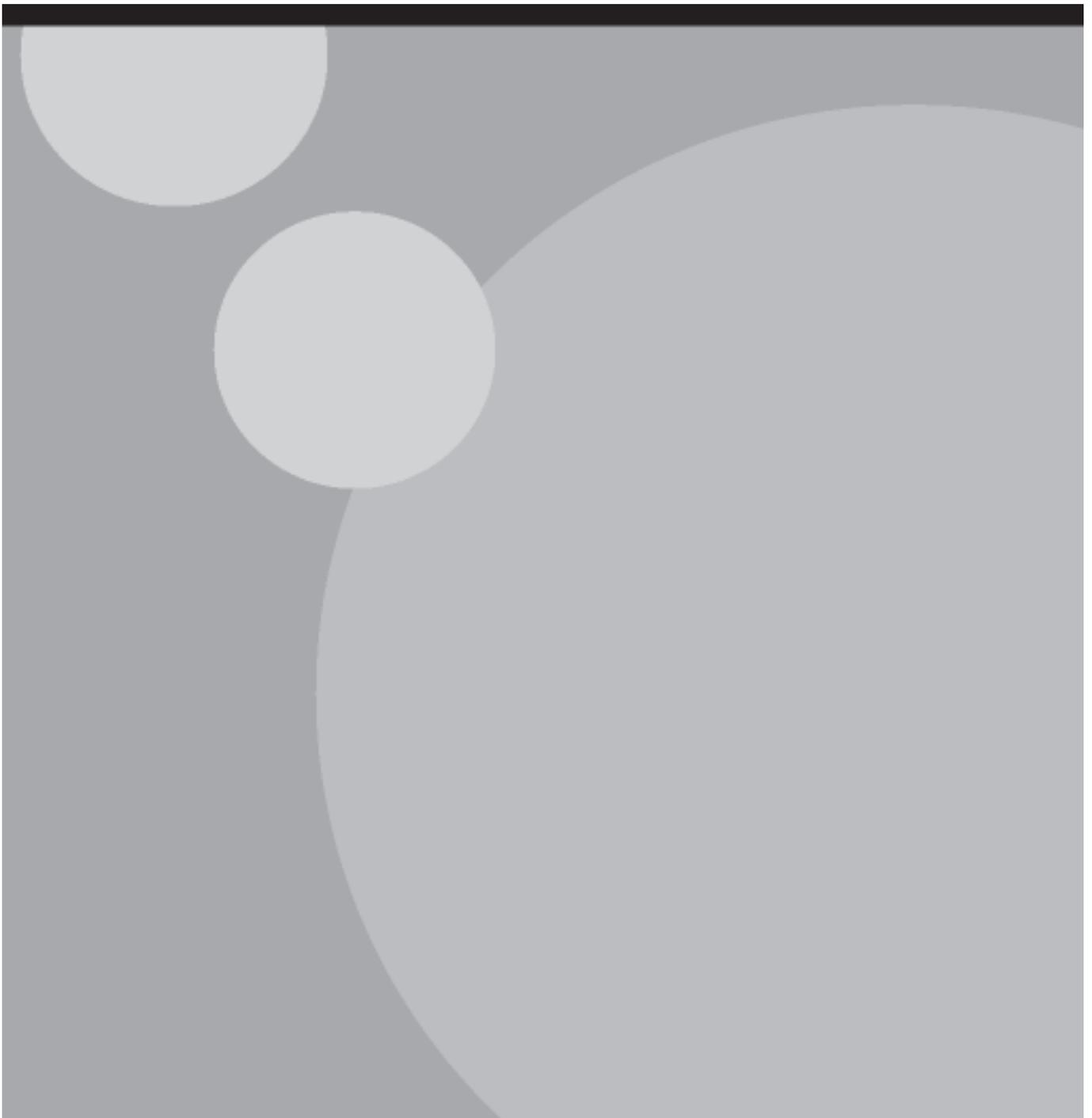


Zero Carbon for New Non-domestic Buildings: Consultation on Policy Options

Summary of responses





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Executive summary

- A.1 The Department for Communities and Local Government (DCLG) issued a consultation document, *Zero carbon for new non-domestic buildings*, on 24 November 2009. The consultation related to proposals for working towards the ambition that all new non-domestic buildings should be zero carbon from 2019, with the public sector leading the way from 2018. The consultation closed on 26 February 2010, with a total of 109 responses being received. This report provides a summary of these responses.
- A.2 The proposals described in this summary are the previous administration's policy for non-domestic zero carbon standards. These proposals are currently under review by the Coalition Government.

Overview of responses

- A.3 An overview of responses to all questions shows that:
- There was strong support for the majority of the proposals on zero carbon non-domestic buildings, with 75% or more respondents agreeing with six of the nine questions to which they could answer 'Yes'.
 - Around half of respondents were in favour of balancing on-site and off-site measures, with similar proportions supporting off-site rich and on-site rich measures. A significant proportion of developers/builders favoured the off-site rich scenario.
 - There was little support for the proposal to set a flat rate requirement above 100% regulated emissions to account for unregulated emissions and there was a mixed reaction to the package of measures and proposals for next steps.
 - Overall, there were no marked sectoral differences in views and any differences were question-dependent. However, support for some of the proposals was less strong among the energy sector.
 - The overall numbers responding to each of the 13 questions ranged between 83 and 98, with all questions attracting a response rate of 75% or more.
- A.4 A detailed analysis of responses to each of the 13 questions posed in the consultation document and any other general comments is given in Sections 2 to 7 of this report. A summary of the views expressed is given below.

Chapter 2: Energy efficiency for new non-domestic buildings

Q1. Do consultees agree that we should establish challenging energy efficiency standards for non-domestic buildings covering space heating and cooling, measured on a kWh/m²/year basis? If not, why not, and what approach to setting energy efficiency standards would you prefer?

- A.5 There was **strong support (84%) for this proposal**, particularly among developers/builders, supply chain/manufacturers and regional and local authorities, with most agreeing that tackling energy efficiency was the essential first stage in reducing carbon emissions.
- A.6 There was broad support for the use of the delivered energy metric, kWh/m²/year, for reasons of consistency with the zero carbon homes approach and familiarity among the industry, although the need to ensure consistency with international standards was stressed. There was also general support for the inclusion of standards for space heating and cooling demand, although several respondents suggested that the standards should be extended to include electrical efficiency (i.e. covering lighting, fans, pumps, etc.), as well as lifts and escalators. Most respondents that specifically commented were in favour of developing a range of standards for different building types due to the diversity of types and construction and their varying uses.

Chapter 3: Beyond energy efficiency - balancing on-site and off-site measures

Q2. Which of the three scenarios would you favour as a basis for setting on-site aggregate targets for zero carbon trajectories and why?

- A.7 **Around half of respondents (47%) were in favour of balancing on-site and off-site measures**, with similar proportions supporting off-site rich (20%) and on-site rich (23%) measures. The balanced approach was most strongly supported by developers/builders and architects, consultants and engineers, while on-site measures were most popular among regional and local authorities, interest/lobby groups and NGOs and supply chain/manufacturers. A significant proportion of developers/builders also favoured the off-site rich scenario.
- A.8 Many of those favouring the **balanced approach** agreed with the need for developers to consider on-site measures as the first priority as this was the most effective way of reducing carbon dioxide emissions, but noted that in some circumstances, on-site reductions would be difficult to achieve due to physical, locational, technological, economic or other reasons.

- A.9 Those supporting the **on-site rich** scenario did so because they considered that it offered greater certainty that carbon emissions would be reduced. Other advantages cited included better alignment with the policy on zero carbon homes (as suggested in the consultation document), less reliance on third party service providers and greater encouragement for research and innovation and the development of markets for new micro-generation technologies, which would eventually drive down costs.
- A.10 Most of those favouring the **off-site rich** scenario stressed its importance in incentivising community scale solutions and in tackling both new and existing buildings. Several also noted that non-domestic building energy use was dominated by electricity demand rather than heat and the scope for zero carbon technologies for electricity generation was severely limited in urban areas.

Q3. What views do you have on the impact of the costs of building to zero carbon standards in different sectors? How and why does sensitivity to new build costs differ between sectors?

- A.11 Several respondents expressed views on the impact of the costs of building to zero carbon standards on different sectors, particularly developers/builders, owners/occupiers and the public and voluntary sectors. It was suggested that the sensitivity of different sectors to new build costs depended on whether or not they were the occupants of a building and/or could recover any additional new build costs. Thus, the office and leisure sector, which often had a separate developer and occupier, could potentially be hardest hit by the increase in costs for new build. Similarly, Feed in Tariffs and Renewable Heat Incentives could be beneficial to occupiers but not to speculative developers who normally disposed of the building quickly post-construction. Concerns were also raised about the cost implications for the public sector in the current economic climate (see also paragraph A.29), as well for the voluntary sector and SMEs.
- A.12 In terms of building types, respondents highlighted differences in impacts and costs due to intensity of use, density of occupation, type of use and nature of the building services. Additional comments were also made in relation to offices, shopping centres and warehouses, with particular concerns being raised over the latter where cost/sq m was the critical factor rather than energy efficiency which tenants fit-out.
- A.13 Some respondents commented on the negative impacts the additional costs of building to the zero carbon standard could have on the building industry and, ultimately, on the viability of developments. Several others stressed the need for incentives to support the zero carbon policy for non-domestic buildings and the use of funding mechanisms such as Renewable heat incentives, feed in tariffs and, potentially, 'Pay As You Save'. Finally, several consultees felt that inadequate information on costs to different sectors had been provided in the consultation document to enable them comment, and stressed the need for further work to be undertaken.

Chapter 4: Off-site measures - form and timing

Q4. Do you agree that we should adopt the same measures and approaches for allowable solutions for non-domestic buildings as those for homes?

- A.14 There was **strong support (82%) for the proposal** to adopt the same measures for allowable solutions for non-domestic buildings as those for homes, particularly among developers/builders, regional and local authorities and supply chain/manufacturers. It was felt that a common approach would:
- provide consistency, clarity and simplicity for developers in considering options
 - incentivise the development of mixed-use schemes and mixed-use buildings
 - increase competition among allowable solution providers
 - allow knowledge transfer from the domestic to non-domestic building sector.
- A.15 However, it was recognised that there were significant differences between non-domestic buildings and homes, for example in their demand for heat and cooling. As a consequence, respondents felt that not all of the allowable solutions would be equally appropriate. There were particular concerns about energy efficient appliances and advanced building management systems.

Q5. Are there any extra allowable solutions that should be used specifically for non-domestic buildings?

- A.16 **Around one-third (66%) answered ‘Yes’ to this question**, with 14% answering ‘No’ and 17% indicating that they ‘Didn’t know’ if there were any extra allowable solutions that should be used specifically for non-domestic buildings. ‘Yes’ responses were highest among the building-related sectors and architects, consultants and engineers and lowest among the regional and local authorities.
- A.17 A significant number of respondents commented that the range of allowable solutions set out in the consultation document would provide insufficient flexibility and incentive to allow the zero carbon standard to be met effectively. Consequently, a large number of options were suggested. Many of these had either been proposed for homes in the December 2008 consultation or had been suggested by respondents to that consultation, and, thus, **consultees did not suggest any extra allowable solutions that should be used specifically for non-domestic buildings.**
- A.18 Measures suggested by a significant number of respondents included the following, most of which had been suggested previously:

- exports of zero carbon electricity
- retrofitting works undertaken by the developer to transform the energy efficiency of existing buildings in the 'vicinity of the development'
- off-site renewable energy generation, both near to and away from the site
- a 'Community Energy Fund' or a similar 'Carbon Offset' fund.

Q6. Do you agree with the proposal to introduce an element of allowable solutions for non-domestic buildings at 2016? What views do you have on the level at which this should be set, and the impact this will have?

A.19 **Most respondents (78%) agreed with the proposal**, with support being equally strong across all sectors. However, some consultees took the question to mean that allowable solutions would simply be available as an option for developers of non-domestic buildings, rather than, as was proposed in the consultation document, a mandatory part of regulation over and above the on-site carbon emission reductions required.

A.20 Those in favour of the early introduction of an element of allowable solutions (whether voluntary or mandatory) suggested it would:

- give industry the necessary time to prepare for their further deployment in 2019
- provide greater certainty and commercial opportunity to new providers of allowable solutions, increasing the viability of the market in the early years
- enable domestic and non-domestic developers to work together to exploit economies of scale and innovation and reflect the opportunities for non-domestic developments to contribute to community energy and heat solutions
- create market certainty for investors and developers of community scale infrastructure like heat networks when undertaken with long-term strategic energy planning
- provide a more consistent framework for mixed developments.

A.21 However, several respondents caveated their support, noting that sufficient details of the allowable solutions would need to be available in time for industry to prepare and for the market to develop and stressing that the early introduction of allowable solutions must not reduce the incentive for on-site carbon reductions. The need for compliance monitoring and enforcement was also highlighted.

- A.22 **Only 25 respondents answered the second question on the level that should be set from 2016**, of which seven agreed with the illustrative reduction of 70% given in the consultation document. There were no substantive comments on the impacts of different levels. Some felt that further work was needed before deciding on an appropriate level.

Chapter 5: Defining the zero carbon destination

Q7. Do you favour an approach of setting a flat rate requirement above 100 per cent regulated emissions to account for unregulated emissions?

- A.23 **Around one-third (63%) disagreed with the proposal** to set a flat rate requirement above 100 per cent regulated emissions to account for unregulated emissions, with 27% in agreement. Opposition was strongest among architects, consultants and engineers, supply chain/manufacturers and businesses/building occupiers.
- A.24 Some consultees who supported the proposal did so for reasons of simplicity and consistency with the zero carbon homes policy. However, several others, although agreeing with inclusion of unregulated energy in the zero carbon definition, did not actually support the use of a flat rate approach and, instead, preferred a flat rate for each different building type.
- A.25 Of those disagreeing with the proposal, some disagreed with the principle of including unregulated energy in the definition, noting that these emissions may already be covered by other policies such as the Carbon Reduction Commitment Energy Efficiency Scheme, Climate Change Agreements or the EU Emissions Trading System. Others proposed that unregulated emissions should be handled via Display Energy Certificates, Energy Performance Certificates or 'energy audits'.
- A.26 Overall, the majority of consultees supported the principle of including unregulated emissions in the definition but considered that one flat rate for all buildings could be inequitable, unfairly penalising some building types and letting others off lightly. It was also suggested that different rates for different building types would be hard for developers to calculate in buildings where the end-use was not known at the design stage, and, would also be difficult to police effectively. Although recognised as complex, an alternative approach suggested was to set target percentages for different building types or planning classes, perhaps by adjusting the existing figures within the Simplified Building Energy Model (SBEM) software or using Display Energy Certificate benchmarks.

Q8. Would you favour the 10 per cent allowance, the 20 per cent allowance or another rate? Why?

- A.27 Low proportions of respondents favoured an allowance of 10% (17%) or 20% (16%), with only developers/builders and businesses/building occupiers showing any significant support for 10% and with 40% of the energy sector on favour of 20%. Of those favouring an **allowance of 10%**, several commented that this lower figure should be used until data were available on levels of unregulated energy use in a range of building types. Developers/builders, in particular, commented that the rate needed to be set at a level that could be afforded by industry and that, as this would be a highly sensitive issue, 10% would be preferable. Some chose an **allowance of 20%** as it 'sounded about right'.
- A.28 By far the largest group of respondents (67%) selected the **'Other' option** and included those that:
- preferred an alternative flat rate allowance to cover all building types
 - opposed the principle of setting a flat rate allowance and favoured setting different rates for different building types
 - disagreed with the principle of including unregulated energy
 - suggested that further research was needed.

Chapter 6: Zero carbon for new public sector buildings

Q9. Do you agree with the overall work programme we have outlined for the public sector?

- A.29 **The majority of respondents (86%) were in favour of the programme** outlined for the public sector, with broad support across all sectors and with several commenting that the proposed early implementation deadline would:
- yield case studies
 - test the delivery mechanism for allowable solutions
 - develop skills and expertise amongst professionals in the construction industry
 - stimulate stable demand for renewable technologies and products.
- A.30 However, those in favour of the programme also highlighted **a wide variety of specific concerns and/or made suggestions** about how the proposals could be taken further. These included concerns over the 2018 implementation date, which might not allow enough time to yield positive results, and funding for the public sector in the current economic climate.

Several organisations stressed the importance of setting up strong monitoring, reporting and auditing procedures to ensure transparency and to disseminate lessons learnt from the public sector work programme. Others highlighted the need to increase local government involvement (see also paragraph A.32).

Q10. Are there other ways in which you think the public sector could usefully provide leadership for the move to zero carbon?

A.31 **A high proportion (83%) of respondents agreed** that there were other ways in which the public sector could usefully provide leadership for the move to zero carbon and provided a range of proposals, including:

- **publishing and disseminating information** on the costs and benefits of the exemplar building programme (e.g. through case studies) and the carbon performance of the public estate more generally (e.g. through the development of an energy use database)
- **developing local heat and energy networks**, with public sector buildings such as schools and libraries at their centre
- **adapting the planning system** in order to implement the zero carbon standards, including increasing its flexibility.

Q11. Do you agree that the public sector should start trialling allowable solutions from 2015?

A.32 **The majority of respondents (82%) agreed with the proposal** that the public sector should start trialling allowable solutions from 2015, with strong support across most sectors. However, a significant minority felt that trialling should start as early as possible rather than waiting until 2015. Although covered in other questions, several respondents reiterated the need for good monitoring, reporting and publication of data in order for lessons learnt in the public sector to be carried across to the private sector. Similarly, as for several other questions, there were concerns over public sector funding.

Q12. What role(s) do you think local government can play in contributing to public sector leadership on zero-carbon buildings?

A.33 Respondents made a wide range of comments on the roles that local government could play in contributing to public sector leadership on zero carbon buildings. Around one-third supported more local government involvement in the wider public sector programme, with the majority of these stressing the need to include local authorities in the exemplar building programme. A significant number of respondents also felt that local authorities should have a greater role in drawing up long-term energy strategies for their areas, and actively implementing and enforcing these. However, several respondents commented that this would require greater consistency by local authorities in implementing the planning policy framework.

- A.34 Several respondents also highlighted a gap in adequate training and skills among local authority staff to address this new agenda, in particular planning and building control staff. Various other suggestions were made on how to improve the performance of planning and building control staff.

Chapter 7: Delivery and next steps

Q13. Does this package of measures and proposals for next steps address the key delivery issues to make progress towards the zero-carbon ambitions? If not, what action is needed and by whom?

- A.35 Respondents were divided about whether the package of measures and proposals for next steps addressed the key delivery issues, with the same proportion agreeing and disagreeing (35%) and around a quarter providing comments only. Support was strongest among the energy sector, businesses/building occupiers and regional and local authorities, while supply chain/manufacturers disagreed most strongly.
- A.36 The majority of respondents had further suggestions and questions about the steps outlined. Aside from funding, other topics raised by a significant number of respondents included:
- **monitoring and enforcement** – regarded as a high priority, with several mechanisms being suggested
 - **the establishment of an industry-led delivery body akin to the domestic Zero Carbon Hub** – well-supported, with a wide range of roles being proposed
 - **types of building covered by the proposals** –including the need to address the performance of existing buildings
 - **changing the market value of high-performing buildings**
 - **clarification of the details on allowable solutions**
 - **Energy performance certificates and Display energy certificates** – the need for more information and action on energy performance certificate and display energy certificate ratings, including a proposal to make display energy certificates mandatory for all commercial buildings
 - **the SBEM assessment tool** – concerns that this is not ‘fit for purpose’ and proposals for improvement.

- A.37 Some respondents, reiterating comments to earlier questions, stressed the need to ensure that the zero carbon policy was developed within the context of the broader energy policy framework. Several others referred to the EU dimension of these proposals, with some wanting greater alignment between UK policies and those in other Member States.
- A.38 A small number of respondents raised the importance of considering embodied carbon and lifecycle assessment methodologies.
- A.39 Those respondents that did not agree with the package of measures and proposals had a raft of concerns but, as a grouping, were most likely to call for a much simpler approach.

1. Introduction

- 1.1 The Department for Communities and Local Government (DCLG) issued a consultation document, *Zero carbon for new non-domestic buildings*,¹ on 24 November 2009. The consultation related to proposals for working towards the ambition that all new non-domestic buildings should be zero carbon from 2019, with the public sector leading the way from 2018. This followed on from an earlier consultation² in December 2008, responses³ to which recognised the case for regulation. The document set out the policy principles and further modelling work and sought views on these and their implications for the viability of individual developments and sectors in the current economic climate. (The proposals apply only to England, since the Building Regulations are devolved in Scotland and Northern Ireland and will become devolved in Wales at the end of 2011.)
- 1.2 The consultation document was published on the DCLG website, with responses being invited by 26 February 2010. Respondents were encouraged to complete and return a proforma setting out the questions listed at Annex 2 to the consultation paper. During the 12-week consultation period, a number of regional stakeholder events were held to explain the proposals further and to generate discussion. The report on these events is being published alongside this document, and is available from the UK GBC website at www.ukgbc.org.
- 1.3 This analysis of the responses received has been prepared by the In House Policy Consultancy. This is an internal consultancy based in the Department for Transport, which provides a service to DCLG, the Department for Environment, Food and Rural Affairs, the Department for Energy and Climate Change and the Department for Transport.

Respondents

- 1.4 In total, 109 written responses were received to the consultation, the majority of which were by email. Respondents were asked to assign themselves to one of 20 detailed organisational-type categories identified on the response form. For the purpose of this analysis, these categories were further grouped into eight broad respondent types. The table below shows respondents by broad category in descending order of responses. Annex A provides a full list of respondents, showing both the detailed and the broad categories to which they were assigned.
- 1.5 The largest number of respondents was from regional and local government and Building Control interests (25), followed by architects, consultants and

¹ www.communities.gov.uk/publications/planningandbuilding/newnondomesticconsult

² www.communities.gov.uk/publications/planningandbuilding/zerocarbondefinition

³ www.communities.gov.uk/publications/planningandbuilding/summaryresponsezero

engineers (23), the supply chain/manufacturers (19) and developers and builders (16). No responses were received from equalities groups.

Broad respondent type	Number of respondents	Percentage (%) of total
Regional and local authorities and Building Control Bodies	25	23
Architects, consultants and engineers	23	21
Supply chain/manufacturers	19	18
Developers and builders	16	15
Energy sector	8	7
Interest/lobby groups and NGOs	8	7
Businesses and building occupiers	7	6
Property management companies	3	3
Total	109	100

Analysis of responses

1.6 The consultation document posed a total of 13 questions,⁴ which were set out in the following chapters:

- Chapter 2 - Energy efficiency for new non-domestic buildings
- Chapter 3 - Beyond energy efficiency: balancing on-site and off-site measures
- Chapter 4 - Off-site measures: form and timing
- Chapter 5 - Defining the zero carbon destination
- Chapter 6 - Zero carbon for new public sector buildings
- Chapter 7 - Delivery and next steps

1.7 A detailed analysis of responses to each of the 13 questions posed in the consultation document, and of any other general comments made, is given in the following chapters. Where responses did not correspond directly with the questions posed, but took a more general approach, these comments have been considered under the most appropriate questions or will be taken into consideration by DCLG as it develops its thinking over the coming months. The report does not attempt to summarise all of the comments made by respondents. However, all comments were considered, whether or not they appear in this report.

⁴ Several questions included several related sub-questions.

2. Energy efficiency for new non-domestic buildings

Introduction

2.1 The consultation document proposed that:

- the zero carbon homes approach of a delivered energy metric (kWh/m²/year) covering space heating and cooling will be used for non-domestic building standards
- the energy efficiency standards will be differentiated by building type
- the detail of how these standards could be applied to different non-domestic building types and the timing and potential phasing of their introduction will be worked out with stakeholders.

2.2 The consultation paper asked for views on these proposals and any alternative approaches that could be followed.

Q1. Do consultees agree that we should establish challenging energy efficiency standards for non-domestic buildings covering space heating and cooling, measured on a kWh/m²/year basis? If not, why not, and what approach to setting energy efficiency standards would you prefer?

2.3 A total of 98 (90%) of respondents answered this question, the vast majority (84%) indicating that they were in favour of establishing challenging energy efficiency standards for non-domestic buildings covering space heating and cooling, measured on a kWh/m²/year basis. Of the remainder, 13% disagreed with the proposal and 3% did not know. Support was strongest among developers/builders (93%), supply chain/manufacturers (90%) and regional and local authorities (88%).

Q1. Do consultees agree that we should establish challenging energy efficiency standards for non-domestic buildings covering space heating and cooling, measured on a kWh/m²/year basis?	Yes (%)	No (%)	Don't know (%)	Total number responding
Architects/Consultancies/Engineers	80	15	5	20
Developers/Builders	93	7	0	15
Energy Sector	57	43	0	7
Interest/lobby groups and NGOs	60	20	20	5
Property management companies	100	0	0	1
Businesses/building occupiers	83	17	0	6
Regional and local authorities/Building Control Bodies	88	12	0	25
Supply chain and manufacturers	90	5	5	19
All	84	13	3	98

- 2.4 Of those indicating that they were **in favour of the proposals**, many did so because they agreed that tackling energy efficiency was the essential first stage in reducing carbon emissions and that consistency was needed with the zero carbon homes standards.

“We welcome the principle of establishing energy efficiency standards covering space heating and cooling for new non-domestic buildings measured on a kWh/m²/year basis. Employing such an approach to measurement will ensure consistency and simplicity across all zero carbon buildings.”
[E.ON UK]

“It would seem sensible to keep the energy efficiency standard measurement for non-domestic buildings consistent with that proposed for domestic buildings.” [Berkeley Homes (Urban Renaissance) Ltd]

- 2.5 Most respondents did not cover every aspect of the proposals, although most commented on the proposed metric. Overall, most comments could be grouped into the following themes:

- metric
- definition of energy efficiency
- coverage of standards
- differentiation of standards by building type.

Metric

- 2.6 There was broad support for the use of the delivered energy metric, kWh/m²/year, for reasons of consistency with the zero carbon homes approach and familiarity among the industry, although the UK Green Building Council (UK-GBC) also stressed the need to ensure consistency with international standards such as the 'Common Carbon Metric', which measures both energy intensity (in kWh/m²/yr) and carbon intensity (in kgCO₂e/m²/yr) and has been developed by “leading organisations involved in green building such as the UN Environment Programme, SB Alliance (including BRE - BREEAM), and World Green Building Council (UK-GBC, USGBC - LEED, GBC Australia - Greenstar and DGNB - DGNB Tool)”.

“We believe it is important that we have a metric that is consistent with the zero carbon homes approach of a delivered energy metric in kWh/m²/year.”
[UK-GBC]

“We agree that kWh/m²/annum is the preferred performance indicator for energy performance of controlled elements of a building. It is an indicator that property companies are familiar with and has been accepted as the one that can be quickly verified with the least subjective variables. It is also preferred

that the adopted indicator is one that is used in existing buildings.” [Carbon Planning Ltd]

- 2.7 In terms of the metric, several respondents favoured the use of gross floor area, while Lend Lease - Europe felt that the internal net ‘lettable’ area was more appropriate.

“... the floor area should be gross floor area (GFA). This makes measurement easier and verifiable. The use of net treated area would also exclude areas such as unheated storage and underground car parks that we believe should be included.” [CIC/ CIBSE]

“The floor area should be based on the internal net lettable area and not the external floor plate, as for example, the higher levels of insulation required may reduce the available net lettable area and thus the value of the development.” [Lend Lease - Europe]

- 2.8 Unlike the majority of respondents, Arup disagreed with the use of this metric, and suggested that solar gain cooling should adopt the approach of a maximum W/linear metre of facade, while space heating should be based on a maximum heat loss per m² of facade area. Balfour Beatty plc also suggested that an elemental approach to heat gain may be useful, noting that *“excess heat is likely to result in substantial energy demand for comfort cooling in non-domestic buildings, since these tend to be occupied by people in the heat of the day.”*

“[We] agree that there should be very challenging energy efficiency standards before any consideration of using finite renewables capacity. However we disagree with the use of kWh/m²/yr as its basis. Unlike housing there are too many non-domestic buildings types where predictions would result in unintended consequences (e.g. large town centre floor area buildings surrounded on most sides by party walls). Instead the approach to energy efficiency should use a development of the current Part L ‘back stops’. They should be based on elemental performance and not an annual prediction because (unlike housing) their influence becomes too inter-related with other energy uses.” [Arup]:

Definition of energy efficiency

- 2.9 The Construction Industry Council (CIC) and the Chartered Institution of Building Services Engineers (CIBSE), in a joint response, noted that in the domestic sector, energy efficiency as a concept can be defined as primarily fabric energy efficiency plus a high performing energy efficient boiler. By contrast, in the non-domestic sector, CIC and CIBSE suggested that it could be defined differently, and suggested that the following should be reflected in the energy efficiency hierarchy triangle as follows:

- fabric energy efficiency through passive design measures and air-tightness
- installing energy efficient heating, cooling, ventilating plant and other energy using equipment, such as lifts, escalators and other fixed energy-using systems (which are not currently included in the Building Regulations)
- reducing the energy demand of those systems through appropriate advanced control systems, occupancy related controls, operator training, facilities management, maintenance and operation.

2.10 In contrast, Arup commented that energy efficiency should be considered only in terms of the passive performance of the building fabric, noting that heat recovery, and other systems that tend to use energy to save energy, are better considered as part of the overall building carbon emissions (carbon compliance).

Coverage of standards

2.11 There was general support for the inclusion of standards for space heating and cooling demand.

“The move to regulating kWh/m² of space heating and cooling demand would appear to be a sound choice. In particular, this will allow a balance to be achieved that optimises the insulation levels in the fabric of buildings with high internal heat gains.” [Balfour Beatty plc]

2.12 However, several respondents such as Halcrow Yolles and Balfour Beatty plc suggested that the standards should be extended to include electrical efficiency (i.e. covering lighting, fans, pumps, etc.), as well as lifts and escalators, although EC Harris LLP felt that there was less certainty about catering and IT energy demand.

“... we also consider it appropriate to expand on the current coverage of regulated emissions to include other energy usages which can be effectively modelled at design stage, this should include items such as external lighting, lifts and life safety systems. Catering and IT energy demand is considerable in non-domestic buildings. It is doubtful that this could be effectively included in the kWh/m²/year metric but additional minimum standards should be considered where appropriate” [EC Harris LLP]

2.13 The Royal Institution of Chartered Surveyors (RICS) felt that it was important to consider not only a floor space metric but also an occupancy level metric as part of any set of common energy standards. However, CIC/CIBSE noted that, although it had been considered by their members, they had felt that *“at present there is no robust industry standard method of measuring occupancy in an auditable way, and this potential metric is therefore very open to abuse.”*

- 2.14 In contrast to other respondents, Hilson Moran felt that there should be an overall figure for energy efficiency, as opposed to being broken down into separate targets for heating and cooling, to allow designers to be innovative and 'trade' off demand for heating and cooling.

Differentiation of standards by building type

- 2.15 Most respondents that specifically commented were in favour of developing a range of standards for different building types due to the diversity of types and construction and their varying uses.
- 2.16 However, two respondents had some reservations about building-specific standards.

“A minimum standard or best endeavours approach may be appropriate and would avoid the complexities of setting different standards for different building types.” [UK Business Council for Sustainable Energy (UKBCSE)]

“... specifying different levels of energy efficiency for different building types could impact on the commercial property market by making some building types comparatively more expensive, thus skewing development of various industries.” [Devon County Council]

- 2.17 Two respondents, Ramboll UK and Devon County Council suggested that more detailed information on the energy efficiency standards for public buildings such as schools, hospitals, prisons, etc was needed, as the modelling results in the consultation paper focused on commercial building types.

Other comments

- 2.18 UKBCSE stressed the need to ensure that energy efficiency standards were met through stronger monitoring and enforcement practices, and maintained where possible, through complementary building regulations such as the requirement for consequential improvements when undertaking renovations on buildings in the future.
- 2.19 The Institution of Structural Engineers (ISE) and RICS stressed the need to co-ordinate the policy on new buildings with that on the existing building stock.

“We recognise that this consultation relates to new buildings but we are concerned that unless there is a coordinated policy on existing building stock higher energy standards are likely to result in a slight bias against the construction of new and/or replacement stock ... and may result in an overall increase in carbon emissions (compared to a 'do nothing' scenario).” [ISE]

- 2.20 Thirteen respondents **disagreed with the proposals** and three **did not know**. Of these, the Local Government Association (LGA) highlighted the

potential problems faced by public sector buildings, a concern that was also raised by Cambridgeshire County Council:⁵

2.21 **Other comments** included:

- Efficiency standards should cover all major sources of energy demand as heating and cooling are relatively minor contributors in many buildings. [Corus Group]
- The energy efficiency standard should be set, but beyond this, developers should be free to decide how to achieve the remainder of the emission reductions through on-site, near-site or off-site measures of their own choice. [Land Securities]
- There is no need to adopt the same approach for non-domestic buildings as that proposed for zero carbon homes as these building types are very different (the Part L Regulations distinguish between domestic and non-domestic buildings) and trying to reconcile them could be counter-productive. [Scottish and Southern Energy (SSE) and Cundall]
- Given that from 2010, the England and Wales Building Regulations will have some of the tightest U-value (insulation) standards in the EU, it is now time to stop focusing on heating and concentrate on factors such as hot water provision or lighting, which now represent a higher proportion of overall emissions. [Robert Cooke]
- The focus of both the EU Energy Performance of Buildings Directive and Part L of the Building Regulations are much too narrow: both should focus on the whole-life energy/carbon impact of buildings. [Country Land and Business Association (CLA)]

2.22 EDF Energy, in a comprehensive response, recognised that there was a role for energy efficiency to reduce carbon emissions use but raised a number of issues, including:

- The zero carbon buildings policy, which is essentially a demand side measure, should not undermine efforts to decarbonise electricity.
- Setting an efficiency standard will be considerably more challenging for non-domestic buildings than for homes and, if not considered carefully, this policy may distort the market for building types towards lower cost options or encourage change of use after build without robust classification standards.

⁵ Joint response from Cambridgeshire County Council, Cambridgeshire Horizons, South Cambridgeshire District Council, NHS Cambridgeshire and Cambridgeshire Constabulary. Henceforth referred to as Cambridgeshire County Council.

- Maximising the energy efficiency of buildings will require a holistic approach. Measurement tools which provide information to encourage behaviour change should also be investigated further to understand their potential to help reduce carbon emissions and inform policy development. Zero carbon buildings policy should therefore be developed coherently with related policy to drive energy efficiency and behaviour change including: Carbon Reduction Commitment Energy Efficiency Scheme, display energy certificates and energy performance certificates, smart meters and the broader energy policy framework.

3. Beyond energy efficiency: balancing on-site and off-site measures

Introduction

- 3.1 The consultation document proposed that in addition to challenging energy efficiency standards, regulatory levels for on-site carbon abatement – or ‘carbon compliance’ - should also be set. As for zero carbon homes, the precise combination of measures used for any particular development was not specified, but it was assumed they would include:
- further energy efficiency measures beyond those selected to meet the energy efficiency standard
 - low and zero carbon generation technologies that are directly incorporated into the fabric of the building (e.g. roof-mounted solar panels)
 - low and zero carbon energy installations built within the development (e.g. development-scale combined heat and power)
 - directly connected heat or coolth, where the ‘physical connection’ can be easily demonstrated through the physical pipework (excluding electricity).
- 3.2 Three scenarios were presented as an indication of possible future directions and priorities for the zero carbon standard:
- **Off-site rich:** this prioritises the new building’s contribution to off-site measures by setting lower carbon compliance targets and increasing the use of allowable solutions and is the lower cost option.
 - **Balancing on-site and off-site:** this sets stretching on-site targets, but a lower capital cost per building than for the ‘on-site rich’ scenario, and deploys allowable solutions for the remaining emissions.
 - **On-site rich:** this sets ambitious on-site measures, pushing almost as far as is technically possible for 2019, and is intended to reflect the principle behind the approach taken for homes. This is the higher cost option.
- 3.3 Respondents were asked to select which of the three scenarios they favoured for setting on-site carbon compliance targets (**Question 2**) and their views on the impacts of the costs of building to zero carbon standards in different sectors (**Question 3**).

Q2. Which of the three scenarios would you favour as a basis for setting on-site aggregate targets for zero carbon trajectories and why?

3.4 A total of 98 (90%) respondents commented on the three scenarios, with the largest percentage (47%) being in favour of balancing on-site and off-site measures. Similar proportions of respondents favoured off-site rich measures (20%) and on-site rich measures (23%), with 10% not selecting any of the proposed scenarios but providing comments. Around a half of architects, consultants and engineers (53%) preferred balancing on-site and off-site measures. The same percentage of developers/ builders (53%) was also in favour of the balanced approach, but a significant proportion (40%) also supported off-site rich measures. On-site measures were most popular among regional and local authorities, interest/lobby groups and NGOs and supply chain/manufacturers, with around one-third of each supporting this scenario.

Q2. Which of the three scenarios would you favour as a basis for setting onsite aggregate targets for zero carbon trajectories and why?	Off-site rich (%)	Balanced (%)	On-site rich (%)	Alternative approach (%)	Total number responding
Architects/Consultancies/Engineers	21	53	11	16	19
Developers/Builders	40	53	7	0	15
Energy Sector	14	29	14	43	7
Interest/lobby groups and NGOs	17	17	33	33	6
Property management companies	0	100	0	0	1
Businesses/building occupiers	33	50	17	0	6
Regional and local authorities/Building Control Bodies	12	52	32	4	25
Supply chain and manufacturers	16	42	37	5	19
All	20	47	23	10	98

3.5 Of those favouring the **balanced approach**, many agreed with the need for developers to consider on-site measures as the first priority as this was the most effective way of reducing carbon dioxide emissions, but noted that in some circumstances, on-site reductions would be difficult to achieve due to physical, locational, technological, economic or other reasons. By balancing on-site and off-site measures, designers and builders would be provided with the necessary flexibility.

“We believe it is crucial for buildings to maximise carbon reduction on-site, however, as developers we recognise that some sites will be constrained (particularly high density urban developments) in terms of their potential for onsite technologies and therefore, an appropriate mix of onsite and offsite technologies will be required.” [Lend Lease - Europe]

“Policies should seek to encourage developers to consider the potential for on-site measures to be brought forward which directly reduce the carbon footprint of development. However, there will be circumstances where achieving on-site reductions is difficult, whether for technological or economic or other reasons, for example on listed buildings or on smaller sites, and it is

therefore appropriate that there is the flexibility to consider off-site solutions.”
[Terence O’Rourke]

“Option 2 still provides stretching on-site targets but has lower capital costs per building than option 3, which may mean that realistically it is more achievable. In addition option 2 provides the opportunity for community heat networks to be supported, whilst still recognising that these may not always be suitable solutions.” [Cambridgeshire County Council]

3.6 Other advantages of the balanced approach suggested by respondents were that:

- it is more consistent with the zero carbon homes approach, with which developers are becoming increasingly familiar⁶
- it provides greater potential for increasing energy generation from renewables
- although the costs involved are greater than those for an off-site based option they are comparable with the zero carbon homes
- it reflects the important role that buildings can play in helping to create the critical mass for community-scale sustainable infrastructure solutions.

3.7 Several respondents such as CIC/CIBSE, that preferred the balanced approach, noted that the off-site rich scenario was their least favoured option due to the risk of post-completion market failure of a project, infrastructure transmission constraints and the possibility of double counting emission reductions.

3.8 Of those favouring the **on-site rich** scenario, many did so because it offered greater certainty that carbon emissions would be reduced. Other advantages included better alignment with the policy on zero carbon homes (as suggested in the consultation document), less reliance on third party service providers and greater encouragement for research and innovation and the development of markets for new micro-generation technologies, which would eventually drive down costs.

“The on-site rich scenario is favoured as it represents the most certain scenario that the emissions reductions will be made. There is also potentially less risk of “double counting”. They are also better aligned with the policy on housing” [South West Energy and the Environment Group (SWEEDG)]

“This scenario provides the most challenging targets for the design of the building and all efforts should be made to reduce the building impact before

⁶ This view differed from that set out in the consultation document, where the on-site rich scenario was intended to reflect the approach taken for homes.

investing in offsite technologies which are difficult to assess and police and may therefore not deliver equivalent performance.” [Rockwool]

“We believe the ambition demonstrated here will help incentivise firms to research, innovate and develop markets for new micro-generation technologies (e.g. PV solar, biomass, micro-wind, and micro-CHP), which will eventually drive the costs down.” [LGA]

- 3.9 A few respondents such as Rockwool commented on the lack of ambition in the balanced approach and the need for local authority buildings to be included, an issue also raised under Questions 9 and 12.

“The 'balanced' approach to on-site carbon contribution is fairly unambitious and does not reflect the fact that the capacity for LZC technologies in many non-domestic buildings is substantially greater than for domestic buildings. Furthermore, the figure of 54% is an aggregate that takes into account that some building types will deliver a higher percentage and some lower. So, for example, if the Government demands higher standards for all public buildings, the aggregate value can be lifted significantly. In this respect, all local authority buildings should be included in this ambition – thus widening the net and enabling the target to be increased.” [Rockwool]

- 3.10 Of those favouring the **off-site rich** scenario, most stressed the important role it could have in incentivising community scale solutions and in tackling both new and existing buildings. Several also noted that non-domestic building energy use was dominated by electricity demand rather than heat and the scope for zero carbon technologies for electricity generation was severely limited in urban areas.

“The opportunities for on-site technologies are severely limited in very high density urban environments such as the City of London. This scenario provides the best option to reducing carbon emissions in such environments through its support for district heating and recognition of the role that large non-domestic buildings can play in providing anchor loads for such schemes.” [City of London]

“We would favour the off-site rich scenario on the basis that it helps to catalyse the development of off-site community schemes which can surely use scale to deliver carbon reduction per unit spend.” [Berkeley Homes (Urban Renaissance) Ltd]

“Whilst the new standard obviously concerns new non-domestic buildings, the vast majority of UK emissions arise from the existing stock. As off-site technologies may incorporate existing buildings in the future through district schemes, we believe that emphasis should be placed here.” [Balfour Beatty plc]

- 3.11 The London Borough of Southwark commented that the urban situation was quite different from more rural or suburban areas where an "on-site rich" or "balanced" approach would be more appropriate. It questioned whether “....

development control authorities could opt for off-site, balanced or on-site as appropriate for their local circumstances.”

- 3.12 Ten respondents **did not select one of the three scenarios**. RICS and UKBCSE disagreed with the proposed models, preferring a site-specific and more flexible approach. Members of the Sponge Sustainability Network (SSN) and the Construction Products Association (CPA) had differing views on the three scenarios.

“RICS does not support any of the proposed models. A framework is needed that ensures independent assessment on a site by site basis that maximises onsite aggregate targets, but not at the expense of cost effective offsite solutions. Every site is unique and solutions may also be needed to differ - depending on the nature of the site, local infrastructure and proposed land use activity.” [RICS]

- 3.13 Arup did not agree with the assessment of on-site and off-site renewable energy in the consultation and proposed an alternative approach.

“Each site is expected to generate a defined kWh/yr of renewable electricity per m² of site area. Focusing on electricity is important because with highly insulated buildings with modest hot water needs, the key issue in future is generating enough renewable electricity. The proposed metric is 50kWh/m² derived from 50% of the site area having a modest performing photo-voltaic installation. This is achievable for a dense urban site. For less dense sites alternatives like medium wind turbines would allow flexibility. It is then essential that the above be coupled to a funding mechanism which is independent of construction cost.”

- 3.14 **Other comments** made in response to this question included:

- The viability of on-site generation should be fully evaluated, and this could be done through the renewable energy feasibility studies which are referenced in the recent recast of the Energy Performance of Buildings Directive. [ICOM Energy Association]
- Providing reliable low carbon baseload electricity to meet the higher demands of non-domestic buildings will be a significant challenge, but new technologies such bio-methane injection into the gas grid could provide additional off-site capacity. [Combined Heat and Power Association. (CHPA)]
- District energy schemes operated by an energy service company need further encouragement, including further promotion and provision of guidance to industry on the schemes and how they provide a solution. [Electrical Contractors Association (ECA)]
- Although the potential to promote community based schemes (under the off-site rich option) or district or off-site renewables infrastructure (under the ‘balanced’ option) is very appealing, this is increasingly

happening through other policies and targets, and the desire to promote these areas should not overshadow the need to push building energy efficiency. [Association for the Conservation of Energy (ACE)]

- Processes are needed for the monitoring, reporting and enforcement of off-site versus on-site compliance measures. [Rockwool]

Q3. What views do you have on the impact of the costs of building to zero carbon standards in different sectors? How and why does sensitivity to new build costs differ between sectors?

- 3.15 A total of 83 (76%) of respondents provided comments on this question. Of these, several expressed views on the impact of the costs of building to zero carbon standards on **different sectors**, with most of these relating to:
- developers/builders
 - owners/occupiers
 - public sector
 - voluntary sector.
- 3.16 PG Surveyors Ltd and EC Harris LLP suggested that the sensitivity of different sectors to new build costs depended on whether or not they were the occupants of a building and/or could recover any additional new build costs. Thus, the office and leisure sector, which often had a separate developer and occupier, could potentially be hardest hit by the increase in costs for new build, which might encourage them to utilise existing building stock rather than build new. Similarly, feed in tariffs and renewable heat incentives would be beneficial to occupiers but not to speculative developers who normally disposed of the building quickly post-construction. ConstructionSkills also commented that labour costs, especially where skilled technical knowledge was in short supply, would add to the cost of building to the zero carbon standard.
- 3.17 Simons Design commented that some of the indicative costs in the consultation document may be over-estimates, noting that, *“The distribution centre sector may appear to be most impacted but from our experience it is the most advanced with voluntary improvement, and these cost increases are already being absorbed by the industry as part of competitive bidding.”*

Developers/builders

- 3.18 Countryside Properties PLC commented that the costs in the consultation document seemed low compared to their estimates but noted the difficulties in modelling costs due to large variations in location, specifications and uses. Berkeley Homes (Urban Renaissance) Ltd commented that *“the costs of zero*

carbon non-domestic buildings must be considered holistically alongside all other development costs associated with delivering these schemes”.

3.19 Other comments included:

“Many property developers will only build when they have a pre-let lease signed. They have some ability to pass on additional costs but are still working to tight development budgets. They have no concern over operational costs, and energy costs will be a small final detail in any agreement with the occupier. Speculative developers will be much more cost sensitive as the cost of capital is an issue for them during the construction and pre-let phase.” [Carbon Planning Ltd]

“The welcome introduction of tariff payments for renewable energy production is likely to have a significant impact on the cost of meeting the zero carbon standard. Developers will be able to sign over the benefit of Feed in tariffs and Renewable heat incentive payments to a third party Energy Services Company or similar, thus allowing the renewables effectively to be installed for free.” [Renewable Energy Association (REA)]

Owners/occupiers

3.20 Carbon Planning Ltd commented that for companies that could choose where to locate, any additional new build costs arising from the zero carbon standard might make them look at alternative locations or refurbishing existing assets. Examples included corporate HQ, manufacturers and call centres. In contrast, others such as supermarkets and logistic companies, which were location-sensitive and needed to be close to their customers or transport hubs, might be more interested in how technology could help them keep down construction and operational costs and thus maintain profits.

3.21 Balfour Beatty plc noted that sectors more likely to be owned or tenanted by small to medium sized organisations, such as 2* hotels, mini supermarkets and small rural offices, were not best placed to pay increased capital costs or higher initial rentals. They stressed that:

“Since other policy drivers like walkable neighbourhoods and provision of local services are usually reliant on small and medium size enterprises to occupy the buildings - which they may not be able to take on at a higher price - we believe it is crucial to find a cost effective mechanism which enables smaller non-domestic buildings created for local shops, serviced offices for home workers, etc. to be viably operated.”

Public sector

3.22 Two respondents highlighted the difficulties faced by the public sector, particularly in the current economic climate, a point raised by many other organisations in response to Question 9. In contrast, EDF Energy felt that

public sector buildings had the potential to go further in terms of energy efficiency and carbon compliance.

“In particular the public sector is already facing severe financial pressures. Building new facilities such as schools and community library and learning facilities to zero carbon standards will only add to these costs. Without central government funding to achieve zero carbon standards this will mean cutting other key facilities/services. [Cambridgeshire County Council]

“Due to the greater purchasing power and potential for innovative financing solutions in the public sector, there may be opportunities for public buildings to go further in terms of energy efficiency and carbon compliance.” [EDF Energy]

Voluntary sector

- 3.23 Two local authorities also raised concerns about the implications for the voluntary sector.

“... and how these organisations are able to achieve zero carbon buildings (e.g. church halls, scout huts, community centres, voluntary providers of early years and childcare provision), particularly with their available resources.” [Cambridgeshire County Council]

“It does not appear reasonable to impose these measures on all new builds, e.g. non profit organisations (new scout hut etc.), small businesses, as it could prove unfeasible for them to go ahead.” [Cornwall Council]

- 3.24 In terms of different **building types**, respondents highlighted differences in impacts and costs due to intensity of use, density of occupation, type of use and nature of the building services. ISE commented that the categories should be simplified to retail/hotel/office/warehouse. Additional comments were made in relation to the following specific building types:

- offices
- shopping centres
- warehouses
- other buildings.

Offices

- 3.25 Comments on the impacts and costs of building offices to zero carbon standards were made by Land Securities and the British Council for Offices (BCO).

“... we find some of the indicative costs a little surprising and not necessarily in line with our actual experiences. The large office cost in particular underestimates the likely cost premium. Unless a return can be confidently predicted developers simply will not develop.” [Land Securities]

“In the office sector, the increased costs of building to zero carbon are likely to be reflected in the cost to occupiers.” [BCO]

Shopping centres

3.26 The British Council of Shopping Centres (BCSC) commented that:

“The costs indicated in table 3.27 indicate that the cost increase for a shopping centre show a relatively low (6%) increase. However, it should be noted that this is for the 'balanced' approach. We believe that more work would be required to explore the cost viability with scenario 1 and 3.” [BCSC]

Warehouses

3.27 Several respondents commented on the impacts and costs of building warehouses to the zero carbon standard.

“The biggest sensitivity to zero carbon standard costs will be in those buildings with a fairly low build cost per square metre. Industrial buildings and large warehouses will be more sensitive to price differentials than offices and more complex buildings.” [RICS]

“Most industrial portal frame buildings e.g. warehouse and out of town retail units are speculative developments with cost/sq m the critical factor rather than energy efficiency which tenants fit-out. The building fabric costs are therefore trimmed to the limit e.g. £10/sq m extra on a roof for a better product is frequently rejected by developers. The impact costs (clause 3.27) of 17% on £745/m² = +£127 for warehouse and 30% on £320/m² = +£96 are therefore excessive unless enforced by regulations, even then they will reduce speculative developments.” [Metal Cladding and Roof Manufacturers' Association (MCRMA)]

Other building types

3.28 Comments were made by The Theatres Trust and Thames Water Property Services.

“... no measures, or even close equivalents to the build costs of cultural auditoria, are offered in the consultation document for comparison. Sensitivities naturally exist here as theatres are specialist buildings for which funding can be more restricted than in other commercial sectors.” [The Theatres Trust]

“If the zero carbon ambition were to be applied to operational buildings then the impact on the costs of constructing new operational buildings for high energy treatment processes could be significant and as such account should be taken of the specialist nature of water and wastewater infrastructure buildings when applying any zero carbon standards. [Thames Water Property Services]

3.29 There were a number of **other comments**, grouped into the following themes:

- impacts on development viability
- use of incentives
- lack of information.

Impact on development viability

3.30 Several respondents commented on the negative impacts the additional costs of building to the zero carbon standard could have on the building industry and, ultimately, on the viability of developments.

“It should be noted that an increase in cost related to low-carbon construction is likely to affect either levels of rent, developer profitability or the price paid for land in the first instance. Therefore care must be taken to ensure the additional costs incurred through this policy do not affect the viability of developments.” [CBI]

“The disparity in cost increase across the sectors appears inequitable Relative build costs should be taken into account in setting the thresholds for the different building types to avoid unintended consequences. For example, as proposed the potential relative cost increase to warehouses is far greater than for other buildings, and may result in an unnecessary high barrier to their development.” [SWEEDG]

“We believe that the aspiration of ensuring all non-domestic buildings are ‘zero carbon’ by 2019 is appropriate and critical to reducing the UK’s future carbon emissions However, our experience of both the consultation documents and events raises serious concerns about the financing of solutions. Accepting that detailed definitions can be agreed, and the technical solutions developed, this will be single most important factor to achieving the desired outcome. we are concerned that DCLG are not engaging sufficiently with the property investment community to understand their primary motivations and concerns regarding this agenda.” [Forum for the Future]

3.31 In contrast, two respondents, Merseyside Environmental Advisory Service (MEAS) and a private individual, considered that some of the additional build costs could be offset by operational cost savings.

“There is a considerable increase in cost to build to zero carbon standards. However, this should be considered alongside the expected savings on operational cost over the lifetime of the development. The impact to different sectors will vary. Some industries may be able to absorb the increase in build cost into future operational cost.” [MEAS]

- 3.32 CIC/CIBSE and Carbon Planning Ltd stressed the importance of assessing the UK commercial building construction and operational costs against those of our major international competitors to ensure that the targets set did not affect the future prosperity of the UK. They also felt that it was imperative that overseas investors were included in any future consultation.
- 3.33 Nottingham City Council commented that as well as the additional costs of building to zero carbon standards, development costs associated with flood defences and other essential infrastructure could also affect the viability of developments.

Use of incentives

- 3.34 Several respondents commented on the need for incentives to support the zero carbon policy for non-domestic buildings and the use of funding mechanisms such as Renewable heat incentives, Feed in tariffs and, potentially, ‘Pay As You Save’.

“Offset costs with funding initiatives such as Renewable heat incentives, feed in tariffs, Pay as you save and low interest loans. There should be more incentives/higher payback/shared cost for sites that can offer high levels of onsite energy generation. There should be benefits for the builder as well as the occupier as many funding schemes pay back to the occupier, who often does not incur the additional building costs.” [Gifford LLP]

“It is essential that government rationalise and simplify the variety of financial incentives to encourage early adoption of renewable energy solutions and stimulate a critical mass for markets in low to zero carbon materials, products, supply chains and technologies.” [LGA]

“We believe that there may be the potential for innovative finance mechanisms such as ‘Pay As You Save’ (where a standing charge is attached to the property which recoups the upfront capital costs of meeting higher standards through savings in energy bills) to be utilized on new non domestic buildings to help lower upfront costs, where needed (e.g. for small and medium size enterprises).” [UK-GBC]

Lack of information

- 3.35 Several consultees felt that inadequate information on costs to different sectors had been provided in the consultation document to enable them comment, and stressed the need for further work to be undertaken.

“Given the wide variations [in the carbon saving potential of different building types and associated costs] and the lack of transparency in the calculation models it is impossible to comment objectively on costs and sensitivities. Impacts will vary according to each building type and further detailed study is required to fully understand the impacts.” [Engineered Panels in Construction (EPIC)]

“As soon as the industry has clarity on the finalised list of allowable solutions, and in particular whether a Community Energy Fund will be available, then it will be able to better calculate the acceptability of potential costs. We believe that it is unhelpful that the cost assessments do not take account of the potential for other policy mechanisms, such as the Feed In Tariff to contribute towards the costs of installing onsite renewables.” [UK-GBC]

“The cost information currently provides inadequate information for businesses/occupiers to accurately establish acceptability of the potential costs of various solutions. Accurate and up-to-date information is vital for appropriate take-up of the solutions available to developers. The suggested ‘Allowable Solutions’ cost seems particularly fragile and in reality the cost of buying sufficient off-site renewable generating capacity is probably significantly more. Accurate and up-to-date information is vital for appropriate take-up of the solutions available to developers. The suggested ‘Allowable Solutions’ cost seems particularly fragile and in reality the cost of buying sufficient off-site renewable generating capacity is probably significantly more.” [RIBA]

4. Off-site measures: form and timing

Introduction

- 4.1 The consultation document noted that to achieve net zero carbon emissions on-site through energy efficiency and on-site measures could be prohibitively expensive and, for most building types and locations, would not be technically feasible. Thus, the remaining/residual emissions would need to be tackled through the deployment of off-site measures or 'allowable solutions'. It was intended to adopt a common approach for both homes and non-domestic buildings as this should provide simplicity for delivery and enforcement bodies, economies of scale for the developing allowable solutions' market and simplicity for mixed use developments.
- 4.2 The following list of allowable solutions was set out in the consultation document. A longer list of measures was proposed in the December 2008 consultation. The list below was published⁷ in the July 2009 Written Ministerial Statement as an indication of those that received greater support in responses to the consultation, but others remain under consideration.
- further carbon reductions on-site beyond the regulatory standard (increased carbon compliance)
 - energy efficient appliances meeting a high standard
 - advanced building control systems which reduce the level of energy use
 - exports of low carbon or renewable heat from the development to other developments
 - investments in low and zero carbon community heat infrastructure.
- 4.3 The consultation paper asked for views on whether:
- the same measures and approaches for allowable solutions should be used for non-domestic buildings and homes (**Question 4**)
 - there are any allowable solutions that should be used specifically for non-domestic buildings (**Question 5**)
 - an element of allowable solutions for non-domestic buildings should be introduced in 2016 (and, if so, at what level it should be set and its impact) (**Question 6**).

⁷ www.communities.gov.uk/statements/corporate/ecozerohomes

Q4. Do you agree that we should adopt the same measures and approaches for allowable solutions for non-domestic buildings as those for homes?

4.4 A total of 93 (85%) respondents commented on the proposed common approach to allowable solutions for non-domestic and domestic buildings, of which the vast majority (82%) were in favour. Of the remainder, 14% were against the proposal and 4% did not know. Support was strongest among developers/builders (100%), regional and local authorities (87%) and supply chain/manufacturers (83%). Support was less strong among architects, consultants and engineers and the energy sector, with 71% in favour of the proposal compared with 29% against.

Q4. Do you agree that we should adopt the same measures and approaches for allowable solutions for non-domestic buildings as those for homes?	Yes (%)	No (%)	Don't know (%)	Total number responding
Architects/Consultancies/Engineers	71	29	0	21
Developers/Builders	100	0	0	13
Energy Sector	71	29	0	7
Interest/lobby groups and NGOs	80	0	20	5
Property management companies	0	100	0	1
Businesses/building occupiers	80	20	0	5
Regional and local authorities/Building Control Bodies	87	4	9	23
Supply chain and manufacturers	83	11	6	18
All	82	14	4	93

4.5 The majority of consultees were **in favour of adopting a common approach** to allowable solutions as it would:

- provide consistency, clarity and simplicity for developers in considering options
- incentivise the development of mixed-use schemes and mixed-use buildings
- increase competition among allowable solution providers
- allow knowledge transfer from the domestic to non-domestic building sector.

“There is merit in this approach as it will simplify matters for developers in their consideration of options. It will also simplify implementation in mixed-use schemes and mixed-use buildings and maximise opportunities for market investment in such schemes.” [Terence O’Rourke Ltd]

“... comparable methods should be adopted in order to promote simplicity and consistency. This will enable the wider construction industry to benefit from the learning of the process involved in reducing emissions in the housing stock.” [BCSC]

- 4.6 However, it was recognised that there were significant differences between non-domestic buildings and homes, for example in their demand for heat and cooling. As a consequence, respondents felt that not all of the allowable solutions would be equally appropriate. There were particular concerns about energy efficient appliances and advanced building management systems.

“the major difference between domestic and non domestic buildings (apart from scale and density of occupation in some cases) is in the energy consumption and climate control load of the equipment within them (unregulated emissions) often resulting in cooling being the biggest load.” [Association of Consultant Architects (ACA)]

“... some of the Allowable Solutions, proposed in the zero carbon homes definition may be less suitable in the non-domestic sector, e.g. energy efficient white goods (although this could be adapted to support energy-efficient technologies, including computers) and advanced Building Management Systems, which will be fitted in many larger non-domestic buildings as standard (since all new non-domestic buildings are likely to have these installed as standard practice).” [Lend Lease - Europe]

“We are particularly concerned about the inclusion of high standard 'energy efficient appliances' within the allowable solutions, especially where they may be portable (and therefore easily removed by occupiers) or where speculative buildings are developed and fit-out is uncertain.” [Balfour Beatty plc]

- 4.7 Several consultees also noted some technologies may be more appropriate and affordable for larger scale non-domestic projects than for domestic buildings and thus, a flexible approach was needed to allow for these and for future innovative solutions.

“Upscaling what would be considered prohibitively expensive technologies in domestic buildings may be very different in non-domestic projects, and may present more opportunities in terms of allowable solutions.” [HCA]

“A flexible approach should be allowed as some technologies may lend themselves to larger scale non-domestic projects rather than or in conjunction with homes. Additionally there should be potential allowance for future innovative solutions.” [London Underground Limited/Chartered Institute of Building (CIOB)]

- 4.8 Although covered by Question 5, some consultees in favour of the proposal commented that they wanted a wider range of allowable solutions, including measures to tackle carbon emissions from existing stock.

“Greater consideration should be given to the allowance of investment in carbon reduction measures in existing stock as an allowable solution as this represents one of the most effective carbon abatement strategies in terms of £/tonne CO₂ displaced.” [EC Harris LLP]

“... a wide definition of allowable solutions should be adopted to ensure that there is flexibility in the means by which carbon emissions are reduced. Both offsite schemes and a Carbon Offset Fund have the potential to play an important role.” [Terence O’Rourke Ltd]

- 4.9 Thirteen respondents **disagreed with the intended common approach** to allowable solutions, raising many of the same concerns as those in favour such as the inclusion of energy-efficient appliances and advanced BMS and the exclusion of retrofitting of existing buildings. CIC/CIBSE included these and other concerns in their detailed response.

“In the majority of areas there is little commonality and we believe that adopting the same measures both would be inappropriate and would not maximise the potential within the non-domestic sector.” [EPIC]

“... there are concerns over the differing ways that non-domestic buildings are financed constructed and operated. There are also more opportunities for savings in non-domestic buildings and a greater flexibility in design is needed to encourage innovation.... The proposal for export of low and zero carbon heat generation is welcomed, although the uptake may be restricted by development size and location.” [CIC/CIBSE]

- 4.10 Only four respondents indicated that they **did not know whether or not to support the common approach**. Of these, comments from the UK-GBC and SWEEG on the inclusion of energy efficient appliances and advanced building management systems were very similar to many of those in favour.

- 4.11 Several consultees commented on the role of local authorities in identifying, and steering developers towards, preferred allowable solutions within their locality, a point also raised under Question 12. LGA summed up the views of several others such as E.ON UK and the British Council of Shopping Centres:

“... we would reiterate that council planners must have the flexibility to identify which allowable solutions are suitable for an area and steer developers towards projects within their locality.... This would mean investment is allocated by place, need and priority, rather than institutionally or initiative driven. [LGA]

- 4.12 In contrast, Cundall and BEAMA raised concerns about the role of local authorities.

“Be wary of using local authorities in shaping developer’s choices about allowable solutions. They are generally inconsistent across the country (e.g. % renewable targets, banning biomass, etc) and the industry needs certainty. Also, most local authorities do not have the technical expertise to provide this advice.” [Cundall]

“The role of local authorities in shaping developers' choices about allowable solutions is a concern. The choice of which "allowable solution" should be based on their performance and a clear resultant measurement in any building regulation scheme.” [BEAMA]

4.13 Several **other comments** were made in response to this question, including:

- The mechanism for delivery, accreditation and monitoring of allowable solutions should be consistent with homes. [Arup]
- The final comprehensive list of allowable solutions for homes should be published as soon as possible. [UK-GBC and others]
- A strategic overview of the development of energy policy on both supply and demand measures is needed but, in its absence, the zero carbon buildings policy should be considered in the broader policy framework such as under the Department of Energy and Climate Change's work on the Household Energy Management Strategy and the Roadmap to 2050, to avoid overlap or distortion in policy. [EDF Energy]

Q5. Are there any extra allowable solutions that should be used specifically for non-domestic buildings?

4.14 A total of 96 (88%) respondents replied to this question, with around one-third (66%) answering 'Yes', 14% answering 'No' and 17% indicating that they 'Didn't know' if there were any extra allowable solutions that should be used specifically for non-domestic buildings. 'Yes' responses were highest among the building sectors and architects, consultants and engineers (71-100%). They were lowest among the regional and local authorities (48%), which also had the highest proportion of 'Don't know' responses.

Q5. Are there any extra allowable solutions that should be used specifically for non-domestic buildings?	Yes (%)	No %	Don't know (%)	Total number responding
Architects/Consultancies/Engineers	71	10	19	21
Developers/Builders	71	14	14	14
Energy Sector	67	33	0	6
Interest/lobby groups and NGOs	60	20	20	5
Property management companies	100	0	0	2
Businesses/building occupiers	100	0	0	7
Regional and local authorities/Building Control Bodies	48	22	30	23
Supply chain and manufacturers	61	11	28	18
All	66	14	20	96

4.15 A significant number of respondents commented that the range of allowable solutions listed in the consultation document would provide insufficient flexibility and incentive to allow the zero carbon standard to be met effectively. Several energy companies also stressed the importance of future decarbonisation of the grid.

“The range of allowable solutions identified is narrower than that identified in the [December 2008] consultation paper on zero carbon and will not provide sufficient flexibility encouragement to enable zero carbon to be met in the most efficient and effective way. The focus on largely on-site based measures together with heat export and generation provides only a limited range of options to enable future targets to be met.” [Terence O’Rourke Ltd]

“... we urge DCLG to further consider a wider range of offsite solutions, and to fully utilise the benefits of a decarbonised electricity supply to reduce emissions cost effectively in the building sector. A greater array of allowable solutions therefore needs to be explored if the standard is to be met for the vast majority of developments and at an acceptable cost.” [EDF Energy]

4.16 Consequently, those agreeing that there should be extra allowable solutions for non-domestic buildings suggested a large number of options. However, many of these had either been proposed for homes in the December 2008 consultation or had been suggested by respondents to that consultation and, thus, **did not provide information on whether there were any extra allowable solutions that should be used specifically for non-domestic buildings.**

4.17 Measures suggested by more than one respondent included:

- installation of microrenewables or building integrated renewable technology on existing buildings
- installation of estate management systems – transfer data (e.g. on heating and lighting loads, air conditioning etc.) back to a central estates management location, thus facilitating greater operating efficiency and reducing carbon emissions
- exports of zero carbon electricity
- retrofitting works undertaken by the developer to transform the energy efficiency of existing buildings in the 'vicinity of the development'
- off-site renewable energy generation, both near to and away from site
- energy from waste using advanced gasification or pyrolysis techniques
- credit for Section 106 Planning Obligations paid by the developer towards 'local low and zero carbon energy infrastructure'
- Community Infrastructure Levy – provided it promotes investment into local schemes
- any investment by the developer in low and zero carbon energy infrastructure (limited to the UK and UK waters) where the benefits of ownership of that investment are passed to the purchaser of the building

- funding to establish the mechanisms for post completion compliance testing by accredited competent persons to ensure buildings meet the standards when in use.

Exports of zero carbon electricity

- 4.18 Several consultees suggested that exports of zero carbon electricity from the development to other developments should also be included in addition to the proposed low carbon or renewable heat.

“Export of zero carbon electricity to allow combined heat and power from large heat load buildings such as pools etc. and export from PV on large roof buildings such as warehouses.” [EC Harris LLP]

“Larger non-domestic buildings offer a greater potential to be net exporters of renewable energy, due to both requiring energy systems with greater capacity and the efficiencies of scale on power generation.” [Bosch Thermotechnology Ltd]

Retrofitting works undertaken by the developer

- 4.19 A significant number of consultees, particularly regional and local authorities, stressed the need to bring the existing residential and non-domestic building stock up to date to optimise energy consumption and suggested that, as proposed in the December 2008 consultation, one mechanism for this would be to include retrofitting works undertaken by the developer to transform the energy efficiency of existing buildings in the ‘vicinity of the development’ as an allowable solution.

“... we would like to see funding of energy efficiency measures in existing buildings included in the list.” [City of London]

“... ACE would support the reintroduction of retrofitting works undertaken by the developer to transform the energy efficiency of existing buildings in the vicinity of the development as an allowable solution.” [ACE]

Off-site renewable energy generation

- 4.20 There was significant support for the inclusion of off-site renewable energy generation, with mechanisms being put in place to ensure additionality.

“The inclusion of remote wind generation could also assist some companies who could locate a large wind turbine at some of their large remote locations and then use it to offset against future development. The restriction would be that the equipment must be located on a facility owned by the parent company (to prevent double selling) and the offset must be against proven rather than notional generation.” [Carbon Planning Ltd]

“Investment in off-site renewable energy generation (e.g. wind farms) through a simple government funding arrangement – i.e. developers pay for someone else to build large scale renewable energy plant off-site rather than installing inefficient systems on site without any economies of scale.” [Cundall]

- 4.21 The UK-GBC noted that it had recently convened a Task Group, in partnership with the Zero Carbon Hub, to consider the delivery of Sustainable Community Infrastructure. The sustainable community infrastructure Task Group had recommended that further investigation was needed into investment in ‘additional’ offsite renewable energy as an allowable solution, whereby a range of developers would pool payments to compensate an off-site renewable asset owner for not entering the asset into the Renewables Obligation and thereby not claim Renewables Obligations Certificates over the lifetime of the asset.

Credit for s106 Planning Obligations and the Community Infrastructure Levy

- 4.22 Lend Lease - Europe and Cambridgeshire County Council suggested including credit for s106 Planning Obligations and the Community Infrastructure Levy, both of which were proposed in the December 2008 consultation.

“Credit for s106 Planning Obligations paid by the developer towards 'local low and zero carbon energy infrastructure' (to be defined); this will need appropriate monitoring to ensure the funds are utilised in the most appropriate way. The Community Infrastructure Levy should be used as an Allowable Solution as long as it promotes investment into local schemes, e.g. community heating schemes.” [Lend lease – Europe]

“In particular, Cambridgeshire would welcome the opportunity to use Section 106 and Community Infrastructure Levy funding as an Allowable Solution. This could be used to deliver emissions reductions through a local Carbon Offset Fund.” [Cambridgeshire County Council]

- 4.23 Several **other options** were suggested including:
- Investing in biomethane gas grid production and injection assets – developer funds could be directed towards investment in biomethane production and injection assets. [E.ON UK]
 - Establishing a government accredited new green power scheme (as has been done in Australia) which is over and above any mandatory Renewables Obligation Certificate requirements. [Cundall]
 - Investing in electric vehicle infrastructure – given that many non-domestic buildings may be used for commercial purposes, this would provide support for employees wanting to travel to work in an electric

vehicle by providing investment in the necessary infrastructure.
[E.ON UK]

- Connected cooling – non-domestic buildings are likely to be more successful as net exporters of heat, but they have a commensurate demand for cooling which is a significant energy drain. [British Property Federation (BPF)]
- Controls relating to the use of artificial lighting - in unoccupied retail premises such as car showrooms, which often have a high level of lighting to illuminate displays when they are closed. [Exeter City Council Building Control]
- Contributing to funding for research and development into new energy efficient technology and materials. [Salford City Council]

4.24 As with responses to the December 2008 consultation on zero carbon homes, a significant number of consultees expressed support for a 'Community Energy Fund' or a similar 'Carbon Offset Fund'. As stated by the UK-GBC: *"This would allow developers to pay into a managed fund at a price set a margin above the cost of installing appropriate community level zero carbon technologies. This would be used to install strategic, well-planned community scale installations to achieve genuinely additional carbon savings, which could be audited by the Community Energy Fund."*

"Lend Lease also support the recently published UK-GBC and Zero Carbon Hub Report on Sustainable Community Infrastructure, which also concluded that the introduction of a 'Community Energy Fund' would be a beneficial mechanism to aggregate funds to deliver large-scale carbon reductions; in a cost-effective manner. The introduction of a Community Energy Fund could be governed at the local level through Local Development Frameworks"
[Lend Lease - Europe]

"... allowing payment into a 'Community Energy Fund' or Local Carbon Offset Fund to facilitate delivery of larger-scale low and zero carbon energy generation schemes and associated facilitating infrastructure should also be an allowable solution. This would enable projects such as a community wind farm to be built, which is otherwise too small scale to be of interest to large energy companies. It would also allow greater local flexibility and accountability in the delivery of zero carbon." [Cambridgeshire County Council]

Other comments

4.25 Several consultees stressed the need for compliance checking. This included the Construction Products Association, which suggested that instead of trying to specify allowable solutions now, it would be more useful to set out the following requirements for any allowable solution:

- a robust, auditable evidence trail allowing Building Control and other relevant regulators to check compliance – to be applied to both onsite and offsite options
- UKAS accreditation of organisations operating the off site allowable solutions
- a degree of additionality of carbon savings rather than substitution of allowable solutions funding for some other funding e.g. Carbon Emissions Reduction Target and no real extra carbon saving
- payment to allowable solution off-site providers only once the carbon saving technology has been commissioned e.g. the windmill built, the renovation of existing stock completed
- removal of any allowable solutions that cannot demonstrate their carbon saving, meaning that all allowable solutions, whether on or off site, must have monitoring designed in from the beginning.

4.26 The 14 consultees that did **not agree that any extra allowable solutions were needed for non-domestic buildings** expressed a range of views. For example, several developers and builders, in particular, stressed the need for consistency with the zero carbon homes policy, while some felt that none were needed or that further clarification was required.

“It is essential that the allowable solutions and their delivery mechanisms should be identical for both domestic and non-domestic buildings - not least to remove bureaucratic duplication, and resulting confusion on mixed use schemes.” [Crest Nicholson PLC]

4.27 Arup stressed the need to make use of the cheapest off-site renewables to minimise the costs of saving the amount of carbon necessary not just for non-domestic buildings but also for homes. They also suggested a national energy fund, as an additional alternative to local community energy funds, to administer at lowest cost the delivery sufficient off-site renewables.

4.28 British Gas, like E.ON UK, commented that the injection of biomethane to the grid should be permitted as an allowable solution for both domestic and non-domestic buildings.

4.29 A total of 19 consultees **did not know whether any extra allowable solutions were needed specifically for non-domestic buildings**. Most did not provide any comments but several of those that did noted that they could not identify any specific solutions at this stage (e.g. the LGA and the East Riding of Yorkshire Council), particularly as the definitive list had not yet been published (e.g. SIG PLC). The Mineral Products Association (MPA) concurred with the CPA’s view on defining criteria for allowable solutions, while hurleypalmerflatt supported the inclusion of additional allowable solutions for both zero carbon homes and non-domestic buildings, including

offsite renewable electricity solutions within the local authority jurisdiction and investment in low and zero carbon community cooling infrastructure.

Q6. Do you agree with the proposal to introduce an element of allowable solutions for non-domestic buildings at 2016? What views do you have on the level at which this should be set, and the impact this will have?

4.30 A total of 95 (87%) respondents replied to the first question, with the majority (78%) agreeing with the proposal to introduce an element of allowable solutions for non-domestic buildings in 2016 to coincide with their introduction for homes. Only 12% disagreed, with 10% indicating they did not know. Support for the proposal was strong among most sectors, although less so among developers/builders (64%) and the energy sector (67%).

Q6. Do you agree with the proposal to introduce an element of allowable solutions for non-domestic buildings at 2016?	Yes (%)	No (%)	Don't know (%)	Total number responding
Architects/Consultancies/Engineers	80	10	10	20
Developers/Builders	64	29	7	14
Energy Sector	67	17	17	6
Interest/lobby groups and NGOs	60	20	20	5
Property management companies	100	0	0	1
Businesses/building occupiers	83	17	0	6
Regional and local authorities/Building Control Bodies	88	0	13	24
Supply chain and manufacturers	79	11	11	19
All	78	12	10	95

4.31 Only 25 respondents answered the second question on the level that should be set from 2016, with seven agreeing with the illustrative reduction of 70% given in the consultation document.

4.32 There was **strong support for the proposal to introduce an element of allowable solutions for non-domestic buildings in 2016**, to coincide with their introduction for homes. However, it was clear from responses that some consultees took this to mean that allowable solutions would simply be available as an option for developers of non-domestic buildings, rather than (as was proposed in the consultation document) a **mandatory** part of regulation over and above the on-site carbon emission reductions required.

“The implication that this imposes an additional acceleration of the carbon mitigation standards earlier is not agreed with. Instead some temporary use of allowable solutions to meet a limited part of the carbon compliance standard would allow some flexibility as the industry progressively develops the technical and administrative skills really for 2019, at which point the ‘transition’ arrangement should disappear.” [Arup]

“The industry will need time to make necessary preparations and ground work to ensure this works smoothly when it is required in 2019. Introduce allowable

solutions with Part L 2016 as an option but with incentives to encourage developers to adopt this before it is a requirement.” [Gifford LLP]

“This will allow an understanding of the use of allowable solutions and smooth the way for their implementation in 2019.” [East Riding of Yorkshire Council]

4.33 Comments from those in favour of the early introduction of an element of allowable solutions suggested that (whether voluntary or mandatory) this would:

- give industry the necessary time to prepare for their further deployment in 2019
- provide greater certainty and commercial opportunity to new providers of allowable solutions, increasing the viability of the market in the early years
- enable domestic and non-domestic developers to work together to exploit economies of scale and innovation and reflect the opportunities for non-domestic developments to contribute to community energy and heat solutions
- create market certainty for investors and developers of community scale infrastructure like heat networks when undertaken with long-term strategic energy planning
- provide a more consistent framework for mixed developments.

“For consistency with residential development, it makes sense that targets and timescales should be in step.” [Redrow Homes]

“This will help provide certainty in the marketplace for the delivery of new technologies, products and materials, at scale. It will also help initiate the introduction of community heating schemes which are likely to provide significant carbon savings, in a cost effective manner.” [Lend Lease - Europe]

“This would stimulate the allowable solutions market to generate viable solutions and encourage a robust approach in meeting the needs of zero carbon construction. This would also simplify 'mixed-use' developments, making targets and allowable solutions more enforceable and measurable.” [Salford City Council]

4.34 Several consultees provided a caveat to their support, noting that sufficient details of the allowable solution would need to be available in time for industry to prepare and for the market to develop and stressing that the early introduction of allowable solutions must not reduce the incentive for on-site carbon reductions. The need for compliance monitoring and enforcement was also highlighted.

“Yes, providing: (1) Sufficient details of the allowable solution are available in time for the market to develop and (2) the early introduction of allowable solutions does not reduce the incentives for efficient and inclusive design of the whole envelope.” [CIC/CIBSE]

“... the introduction of allowable solutions must in no way result in the reduction of the target, for buildings built at any time, for on-site carbon reductions. Strict accreditation and careful monitoring of compliance must be put in place before any allowable solutions are introduced and ACE only agrees with the early introduction of these measures if the establishment of these controls can be illustrated in advance.” [ACE]

- 4.35 Eleven respondents **disagreed with the proposal**, of which the Home Builders’ Federation (HBF) and Crest Nicholson PLC stressed the need for consistency with house building (although this was partly the purpose of the proposed early introduction of allowable solutions). Others included the CBI and Kingspan Insulation Ltd, which were concerned about the implications for the development and funding of on-site measures, and Countryside Properties PLC, which considered that 2016 was too late.

“For consistency with house building, both sectors should be running to the same time table. This is particularly important on large mixed use developments where a district heat and power scheme might be required.” [HBF]

“Requiring a level of carbon offset earlier than 2019 may divert funds away from investment in innovation for on-site measures which will be required to meet the zero-carbon standard. It could also have a disproportionate effect on different sectors, as more will have to be spent on allowable solutions for buildings which are more difficult to improve.” [CBI]

“Builders need to get used to building tighter on site standards. Allowing allowable solutions early will distract them from the most important part of the zero carbon agenda.” [Kingspan Insulation Ltd]

- 4.36 There were few comments from the 10 respondents who **did not know whether to support the early introduction of allowable solutions** for non-domestic buildings. These included:

“Our view would be wait and see. The introduction of Feed in tariffs and the Renewable heat incentive and the ability to sign over the payments to a third party may make the use of sub 5MW renewables far more cost effective than current modelling suggests. If this is the case, then every encouragement should be given to maximise the uptake of this option before introducing allowable solutions.” [REA]

“There needs to be consideration of the onus of these changes upon developers. Consideration should be given to what Local Government can do with the support of National Government (financial & technical) to work with developers not against them.” [Cornwall Council]

“If allowable solutions are to be included for non domestic buildings at 2016 then there should be a degree of certainty as to what level of energy efficiency and carbon compliance target will be required for non domestic building.” [MEAS]

- 4.37 Only 25 respondents answered the second question on **the level that should be set from 2016**, of which seven agreed with the illustrative reduction of 70% given in the consultation document. There were no substantive comments on the impacts of different levels.

“The 70% reduction would appear give a balanced figure that is high enough to encourage creation of a significant market.” [PG Surveyors Ltd]

“A 70% reduction is going to be challenging to the industry. However, by making significant changes large results should be attained.” [Targetfollow Estates Ltd]

- 4.38 Two respondents, EDF Energy and the MCRMA did not agree with 70%, both preferring lower figures, while Saint-Gobain UK wanted a higher level.

“We do not, however, see the logic in setting a level of carbon compliance of 70%, akin to the standard for homes through mixed use of allowable solutions, at this stage until further analysis of the costs and benefits has been carried out. We believe that the carbon compliance level for non-domestic buildings should be much lower, e.g. not higher than 44%, and applied with an aggregate approach proportionate to the type and use of the building, to allow maximum flexibility in implementing the standard.” [EDF Energy]

“Given the cost illustrations in the consultation document we believe a lower starting level to promote new ideas should be used in 2016, say 40% to 50%.” [MCRMA]

“The 70% figure proposed in the consultation for 2016 represents a modest increase when compared to 54% reduction in energy offered by the 'balanced' approach. If the rate of development in the market for providing off-site solutions is to be stimulated significantly a higher 2016 target should be considered.” [Saint-Gobain UK]

- 4.39 Others commented that further work was needed before deciding on an appropriate level, with some suggesting that a lower figure initially would be the best approach and that it needed to be affordable by – and developed in consultation with – the industry.

“Further studies would be required to determine the appropriate level at which this would be set as the costs are not known at this stage.” [Hilson Moran]

“Further research needs to be done to establish appropriate levels which should be linked to the building type. However, our inclination is that the level should be low to act as 'learning' for the inevitable introduction of higher levels of allowable solutions in 2019.” [EPIC]

“With regard to the level at which this should be set, it will be important to avoid resistance within the market by enforcing too stringent targets too early. It is also important to ensure that reasonably affordable best practice is incorporated into new buildings, so the standard set for each sector in relation to on-site efficiency and renewables is appropriately challenging.” [Balfour Beatty plc]

5. Defining the zero carbon destination

Introduction

- 5.1 The consultation document proposed that, as a minimum, 100% of ‘regulated’ energy would be covered by the zero carbon standard. Regulated energy, which is covered by Part L of the Building Regulations, is defined as that used by the building fabric and fixed building services and includes internal lighting, hot water service, air conditioning and mechanical ventilation. As well as extending the definition of regulated energy, it was proposed that an element of unregulated energy (i.e. all other energy use for computers, machinery or other processes carried out in the building) should also be included in the zero carbon standard.
- 5.2 The consultation document asked for views on the proposal to introduce a flat rate requirement above 100% regulated emissions to take account of the unregulated energy use in a building, to be met through allowable solutions (**Question 7**). It also sought views on whether the allowance rate should be 10%, 20% or another level (**Question 8**).

Q7. Do you favour an approach of setting a flat rate requirement above 100 per cent regulated emissions to account for unregulated emissions?

- 5.3 A total of 95 (87%) respondents commented on the proposed approach of setting a flat rate requirement above 100 per cent regulated emissions to account for unregulated emissions, of which around one-third (63%) disagreed, 27% were in agreement and 10% did not know. Opposition was strongest among architects, consultants and engineers (80%), the supply chain/manufacturers (72%) and businesses/building occupiers (71%). Among developers/builders, there was less of a difference between those in support of the proposal (43%) and those against it (57%). A significant percentage of regional and local government respondents were also in favour (33%).

Q7 Do you favour an approach of setting a flat rate requirement above 100 per cent regulated emissions to account for unregulated emissions?	Yes (%)	No (%)	Don't know (%)	Total number responding
Architects/Consultancies/Engineers	15	80	5	20
Developers/Builders	43	57	0	14
Energy Sector	33	50	17	6
Interest/lobby groups and NGOs	40	20	40	5
Property management companies	0	0	100	1
Businesses/building occupiers	29	71	0	7
Regional and local authorities/Building Control Bodies	33	58	8	24
Supply chain and manufacturers	17	72	11	18
All	27	63	10	95

- 5.4 Some consultees who **supported the proposal** did so for reasons of simplicity and consistency with the zero carbon homes policy.

“For consistency with residential development, it makes sense that targets and timescales should be in step. This is particularly important given the potential that non-domestic buildings provide to assist in the viability of district CHP schemes likely to be required to meet the higher levels of the Code with current technology.” [Redrow Homes]

“A flat rate is appropriate as it is simpler to apply and sits well with the fact that reductions are being considered in aggregate across non-domestic buildings.” [Devon County Council]

“In our view setting a flat rate requirement is the most straightforward and pragmatic approach. We support the inclusion of an element of unregulated emissions. Given that it is proposed that these emissions will most likely be tackled through allowable solutions, this could further support the expansion of this marketplace.” [E.ON UK]

- 5.5 However, several others that agreed with the proposal, although agreeing with inclusion of unregulated energy in the zero carbon definition, did not actually support the use of a flat rate approach and, instead, preferred a flat rate by building type.

“We believe that if a flat rate of only 10 or 20% of regulated emissions for all buildings is set, this would undermine the ambition of the zero carbon policy. We would therefore favour the introduction of a larger flat rate by building type.” [UK-GBC]

“ACE agrees with the proposal to introduce a flat rate of unregulated emissions for all building types.” [ACE]

- 5.6 The majority of respondents who **disagreed with the proposal** to set a flat rate allowance did so because they either disagreed with the principle of including unregulated energy in the zero carbon definition or favoured setting rates for different building types.

Opposition to the inclusion of unregulated energy

- 5.7 Some respondents disagreed with the inclusion of unregulated energy in the definition, noting that these emissions may already be covered by the Carbon Reduction Commitment Energy Efficiency Scheme, Climate Change Agreements or the EU Emissions Trading System.

“We would question the proposal to include unregulated energy in this policy. Including process energy in the zero-carbon standard could create a complex system, and could result in double regulation, as these emissions may already be covered by the Carbon Reduction Commitment Energy Efficiency Scheme, Climate Change Agreements or the EU Emissions Trading System. Product standards are also in place to drive carbon reductions from equipment.” [CBI]

“We do not believe that this policy should seek to cover unregulated emissions, e.g. appliance/equipment use, as this will vary greatly according to the use or occupancy of the building and will be too complex to administer fairly according to the multitude of businesses requirements which are subject to change over time. Unregulated emissions are already capped by upstream and downstream policies such as the Carbon Reduction Commitment Energy Efficiency Scheme or the EU Emissions Trading System” [EDF Energy]

- 5.8 Other consultees proposed that unregulated emissions should be handled via display energy certificates, energy performance certificates or ‘energy audits’.

“Rather than specifying energy performance in the context of unregulated emissions targets, private sector occupiers could be responsible for commissioning display energy certificates to act as a benchmark of their efficiency fit-out and use of their space. Owners would be required to furnish their tenants with energy data relating to the common services, which would encourage collaboration between landlords and tenants.” [BPF]

*“Make display energy certificates mandatory across private sector buildings and link to business rates, this will cover unregulated emissions - difficult to define massive variations in unregulated emissions within the building control and energy performance certificate building definitions and time frame of building design stages - better to penalise actual energy use as part of operational business case.”
[Simons Design]*

“Any unregulated energy consumption will be difficult to control once the building is constructed and operational. The designers and Building Control professionals generally will no longer be involved in the project to monitor the success of measures built into the project. Businesses or large energy users such as university sites or large industrial complexes should perhaps be subject to compulsory ‘Energy Audits’ which cover their estates as often they would not have energy performance certificates.” [London Underground Limited]

Different rates for different building types

- 5.9 Overall, the majority of consultees supported the principle of including unregulated emissions in the definition but considered that one flat rate for all buildings could be inequitable, unfairly penalising some building types and letting others off lightly. It was also suggested that different rates for different building types would be hard for developers to calculate in buildings where the end-use was not known at the design stage, and, would also be difficult to police effectively. Although recognised as complex, an alternative approach suggested was to set target percentages for different building types or planning classes, perhaps by adjusting the existing figures within the Simplified Building Energy Model (SBEM) software or using display energy certificate benchmarks.

- 5.10 An alternative approach suggested by a significant number of consultees was to set target percentages for different building types or planning classes, perhaps by adjusting the existing figures within the Simplified Building Energy Model (SBEM) software or using display energy certificate benchmarks. It was recognised that this could be a complex exercise but, given the importance of this issue and the fundamental changes that would be necessary in the UK construction industry, further research was felt to be vital to provide the necessary data.

“A national flat rate should be applied by building type. As now being rolled out in Part L: 2010, building type should be defined predominately by building massing as well as a broad use sector component.” [Arup]

“A flat rate would unduly penalise some building types. Target % should be based on planning classes for example and perhaps even differentiate between high energy and low energy variants (e.g. a 5 hotel with leisure facilities such as spas and pools and a basic 2* hotel). Instead of the SBEM percentages which as the consultation paper admits were developed simply for heat gain calculation purposes, the display energy certificate benchmarks should be used.” [Cambridgeshire County Council]*

“The flat rate would appear to be favourable for some sectors whilst not for others and a fairer system would be to adjust the figures for different building types in the SBEM software.” [PG Surveyors Ltd]

“This places an unfair burden on some developers/users/owners and lets others off lightly. Given the importance of this issue to the UK, and the fact that the drive for zero carbon buildings will force such a fundamental change in UK construction, the complexities involved in defining unregulated energy allowances for different building types should be determined.” [Corus Group]

Other comments

- 5.11 Several respondents who disagreed with the proposal did so because the limited scope of the Building Regulations and the SBEM allowances for unregulated energy did not capture some significant unregulated emissions such as from refrigeration.

“This approach would fail to capture some well defined unregulated sources of carbon emissions that would not be controlled adequately via other policy instruments e.g. supermarket intensive use of refrigeration. If such emissions sources could be brought under control outside the Building Regulations then we would be minded to support the flat rate approach. [London Borough of Southwark]

“We believe that the definition of zero carbon proposed in this consultation is inadequate. The consultation is based on the scope of current building regulations; as such, it covers heating and cooling, internal lighting and hot water, but does not include other energy use from the day-to-day running of

the building. In the case of a store, this is a considerable omission: it does not cover, for example, the significant amount of energy used for refrigeration, tills and other IT equipment, and bakery ovens.” [Tesco]

5.12 Tesco also suggested that it might affect building design negatively:

“The distinction between ‘regulated’ and ‘unregulated’ also risks unintended consequences, where buildings are designed in such a way as to minimise ‘regulated’ emissions at the expense of ‘unregulated’ emissions.” [Tesco]

5.13 Nine consultees **did not know whether or not to support the proposal**. Of these, CIC/CIBSE commented that further work was need to establish compliance costs for different building types and to ensure that the approach did not act against other incentives such as the Carbon Reduction Commitment Energy Efficiency Commitment. A similar point was also raised by SSE, which suggested convening an industry task group to consider this in detail and report to Government in the same way as the Zero Carbon Hub has done for the domestic energy efficiency standard.⁸

Q8. Would you favour the 10 per cent allowance, the 20 per cent allowance or another rate? Why?

5.14 A total of 82 (75%) respondents commented on whether the allowance should be set at 10%, 20% or another rate, with similar proportions favouring an allowance of 10% (17%) and 20% (16%). Around one-third of respondents (67%) favoured a different rate or approach ('Other'). Only developers and builders (46%) and businesses/building occupiers (33%) showed any significant support for a 10% allowance, while 40% of the energy sector were in favour of the 20% allowance (compared to 60% specifying 'Other').

Q8. Would you favour the 10 per cent allowance, the 20 per cent allowance or another rate? Why?	10% allowance (%)	20% allowance (%)	Other rate/ approach (%)	Total number responding
Architects/Consultancies/Engineers	6	25	69	16
Developers/Builders	46	8	46	13
Energy Sector	0	40	60	5
Interest/lobby groups and NGOs	0	20	80	5
Property management companies	0	0	100	1
Businesses/building occupiers	33	0	67	3
Regional and local authorities/Building Control Bodies	13	13	74	23
Supply chain and manufacturers	19	13	69	16
All	17	16	67	82

5.15 Of those favouring an **allowance of 10%**, several commented that this lower figure should be used until data were available on levels of unregulated energy use in a range of building types.

⁸ www.zerocarbonhub.org/building.aspx?page=2

“Due to the lack of data on the energy utilisation in the unregulated area and the likely wide variations across sectors we would favour a relatively low impact minimum requirement, but with an aspirational index similar to that offered by the BREEAM system.” [ACA]

“10% flat rate, until levels of unregulated energy use have been established in a broader range of building types.” [East Riding of Yorkshire Council]

“There is insufficient information currently available on the impact. Further research and monitoring of results is necessary.” [Redrow Homes]

- 5.16 Several developers and builders, in particular, commented that the rate needed to be set at a level that could be afforded by industry and that, as this would be a highly sensitive area, 10% would be preferable.

“We would favour the 10 percent allowance on the basis that it must be set at a level that can be afforded by industry. We anticipate the high costs of zero carbon, in conjunction with other planning policy and regulatory requirements, to affect the delivery of some schemes, therefore the lower the level at which it is set, the more schemes that can be delivered.” [Berkeley Homes (Urban Renaissance) Ltd]

“10 per cent. This is going to be a highly sensitive area so a gradual slow approach would be best.” [HBF]

- 5.17 Of those favouring an **allowance of 20%**, some chose this figure as it 'sounded about right' or provided the necessary incentive to tackle unregulated emissions. Other comments included:

“If a flat rate approach is adopted, the rate should aim to cover all unregulated emissions of new buildings in aggregate. The 20% appears to represent a rough average of the SBEM data presented and should therefore be favoured over the 10% rate.” [hurleypalmerflatt]

“It is not considered by the County Council that the consultation document properly assesses what unregulated energy use of non-domestic buildings is and will be. However, in light of no other evidence, it may be pragmatic to favour the 20% rate over the 10% rate.” [Devon County Council]

- 5.18 E.ON UK, although selecting a rate of 20%, commented that the allowance was set too low and that further work was needed to evaluate the additional cost per floor space area across a range of building typologies before setting a higher rate.

“We feel that the proposed allowance is set too low. In the interests of catalysing further expansion and carbon savings obtainable via allowable solution deployment we feel that the level should be raised to a higher level.” [E.ON UK]

5.19 By far the largest group of respondents (67%) selected the **'Other' option** and included those that:

- preferred a different flat rate allowance to cover all building types
- opposed the principle of setting a flat rate allowance and favoured setting different rates for different building types
- disagreed with the principle of including unregulated energy
- suggested that further research was needed.

Different flat rate

5.20 Several respondents suggested that a different flat rate was needed, although few quoted specific levels. Three respondents felt that the proposed rates of 10% and 20% were too low, while one respondent suggested a lower level.

“At least 20% but probably 30-40% would be more appropriate. Experience tells us that unregulated energy represents a very high proportion of overall energy use.” [Halcrow Yolles]

“Given that the range of unregulated emissions as a percentage of regulated emissions for the building types modelled in the consultation document is spread between 5% and 67%, ACE calls for a higher flat rate than 20% to be established.” [ACE]

“An allowance of greater than 20% should be stated.” [SWEEG]

“Although there is a good argument to put a different requirement against different use types, in the event of technology making big improvements in that building type the result could be unfair and onerous. For that reason I favour only a small allowance across the range” [London Borough of Ealing].

Opposition to the flat rate

5.21 Several respondents simply expressed their opposition to a flat rate but did not suggest an alternative approach. This included several local authorities, such as the London Boroughs of Harrow and Wandsworth, which commented that the flat rate allowance appeared to contradict the 'polluter pays' principle.

“A flat rate is not acceptable, not fair and is not consistent with the variable rate already proposed for carbon compliance. 10% and 20% are both less than the level of true unregulated emissions and therefore not adequate for a true zero carbon aspiration.” [Cambridgeshire County Council]

“The rate should be based on a sufficiently robust evaluation of the actual unregulated emissions and not just an estimate.” [MEAS]

- 5.22 In line with the comments made under Question 7, 13 respondents proposed that **rates should be determined for different building types**, with several suggesting that further data were required.

*“This should clearly vary by building type, based on up to date benchmarks.”
[Hilson Moran]*

“It would seem an unfair system to use a flat rate for all types of buildings and as indicated above we would favour a more targeted rate for each sector that is appropriate and achievable.” [PG Surveyors Ltd]

*“... evidence from historical energy measurement data should be used to establish national averages for each building type. The building types should be as Part L: 2010 based on massing and not use/sector specific. This is then deemed to be a ‘normal use’ and exclude the BIS defined ‘process loads’.”
[Arup]*

Opposition to the inclusion of unregulated energy

- 5.23 Also in line with responses to Question 7, a number of consultees were opposed to including unregulated emission in the zero carbon definition and suggested other ways in which they should be measured such as through display energy certificates or energy audits. Several simply referred to their answers to Question 7.

“Unregulated emissions should be measured using the display energy certificate approach. Linking unregulated emissions to regulated emissions is entirely the wrong approach. This puts even more of an emphasis on the importance of regulated emissions and ignores cost-effective measures that may relate to unregulated energy use.” [Robert Cooke]

“Businesses or large energy users perhaps should be subject to compulsory ‘Energy Audits’ which cover their estates as often they would not have energy performance certificates as no building sales or leases etc, such as university sites or large industrial complexes.” [CIOB]

Further research

- 5.24 A small number of respondents commented that further research was needed before attempting to set a rate for unregulated emissions.

*“Our members feel that there is insufficient real data on which to decide the correct figure. There is a need for further detailed research, possibly based on information gained from the building energy certification programme, before we could feel confident in setting an appropriate flat rate allowance.”
[CIC/CIBSE]*

“We believe that the 10% scenario needs to be modelled and further work done before a recommendation on this could be made.” [BCSC]

6. Zero carbon for new public sector buildings

Introduction

- 6.1 The consultation document confirmed the Budget 2008 ambition that the public sector should aim to make the move to zero carbon for new buildings a year ahead of regulation, i.e. from 2018. A number of supporting workstreams were also proposed: a programme of exemplar public sector new buildings; trialling of allowable solutions in public sector building in advance of commercial buildings; developing financial mechanisms to support capital costs; and ensuring central monitoring and reporting of progress by the public sector. Finally, whilst the local government estate was not included in the Budget 2008 statement, the consultation document set out a role for local authorities to demonstrate leadership on this agenda.
- 6.2 The consultation document asked for views on:
- the overall work programme outlined for the public sector (**Question 9**)
 - whether there are other ways in which the public sector could usefully provide leadership for the move to zero carbon (**Question 10**)
 - whether the public sector should start trialling allowable solutions from 2015 (**Question 11**)
 - what role(s) local government can play in contributing to public sector leadership on zero carbon buildings (**Question 12**).

Q9. Do you agree with the overall work programme we have outlined for the public sector?

- 6.3 A total of 92 (84%) respondents submitted responses to this question. The vast majority (86%) expressed broad support for the programme outlined for the public sector. Of the remainder, 10% did not agree with the proposals and 4% did not know. There was strong support among all sectors with the exception of the supply chain/manufacturers and interest/lobby groups and NGOs (both at 67%), although the number of respondents in the latter category was low.

Q9. Do you agree with the overall work programme we have outlined for the public sector?	Yes (%)	No (%)	Don't know (%)	Total number responding
Architects/Consultancies/Engineers	79	16	5	19
Developers/Builders	100	0	0	13
Energy Sector	100	0	0	8
Interest/lobby groups and NGOs	67	17	17	6
Property management companies	100	0	0	1
Businesses/building occupiers	100	0	0	4
Regional and local authorities/Building Control Bodies	96	0	4	23
Supply chain and manufacturers	67	28	6	18
All	86	10	4	92

6.4 Of those **supporting the programme**, 33 respondents (36%) explicitly stated their support for a leading role to be taken by the public sector, with several commenting that the proposed early implementation deadline for the public sector would be beneficial in that it would:

- yield case studies
- test the delivery mechanism for allowable solutions
- develop skills and expertise amongst professionals in the construction industry
- stimulate stable demand for renewable technologies and products.

“Only a large sector of industry such as the public sector could make a difference to the wholesale adoption of zero carbon measures, in terms of... innovation and demonstrable benefits. Successful adoption by the public sector will reap the benefits and political points to encourage other in these difficult economic times.” [CIOB]

6.5 However, those in favour of the programme also highlighted a wide variety of specific concerns and/or made suggestions about how the proposals could be taken further. These can be grouped under the following themes:

- timescale for implementation
- sharing the public sector experience
- local government involvement
- scope of the proposals
- defining zero carbon
- funding.

Timescale for implementation

- 6.6 Eleven respondents felt that a public sector target of 2018 for zero-carbon new buildings (just one year prior to the general deadline) would have little impact as it would not allow enough time to yield the positive results outlined in paragraph 6.4 above, while Solarcentury described the 2018 target as ‘unambitious’.

“the impacts that public sector implementation in 2018 will have... are probably limited. One year is possibly not enough time to disseminate information. Some buildings in planning in 2019 could be completed earlier than some public sector buildings in planning in 2018... so again there may be no opportunities for learning in these cases.” [SSE]

- 6.7 This concern about lead times for public sector buildings was echoed by others such as the SSN, which feared that it takes, for example, about eight years for a new hospital to be built. It suggested addressing the problem of timescales by fast tracking some example buildings that were already testing the 2019 targets.

Sharing the public sector experience

- 6.8 Both here and in response to Questions 11 and 12, a total of around 15 organisations from a range of sectors highlighted the importance of setting up strong monitoring, reporting and auditing procedures to ensure transparency and to disseminate lessons learnt from the public sector work programme.

“We believe that information sharing around best practice and lessons learnt (both in terms of what did and didn’t work) is very important. We believe that English Partnership’s Millennium Communities Network was a useful exercise in knowledge sharing.” [Balfour Beatty plc]

“A good communications strategy will be necessary to share the findings of this programme with the private sector focussing both on what works and what didn’t work.” [BCO]

- 6.9 Particular areas where respondents wanted to see more transparency included:

- capital costs and operational data [Carbon Planning Ltd and others]
- case studies, building management system data and feedback on actual experiences [Local Authority Building Control (LABC) and others]
- information at contractual supply chain level [CIC/CIBSE]
- full details of public building designs and energy strategies [CIOB].

- 6.10 Around five respondents referred specifically to the importance of demonstration projects/exemplars to engage the public and accelerate uptake. In relation to these exemplar projects, specific suggestions were that the Government should also support demonstration projects such as supermarkets and hotels, as they *“are unlikely to be built for Government clients”* (Balfour Beatty plc) and that *“Any exemplar developments need to be very relevant to the mainstream and should avoid... being irrelevant through over zealous innovation.”* (EC Harris LLP).
- 6.11 However, SWEEG warned that targeting exemplar projects *“is often at the detriment of the remainder of ongoing projects. The funds for exemplar projects must therefore be both realistically costed and made available. It must be additional to existing funds available.”* Devon County Council echoed this view, specifically in relation to the zero carbon schools initiative to which they were already committed but which they feared was underfunded. These concerns are covered in more detail in paragraphs 6.22 to 6.25.

Local authority involvement

- 6.12 Seven respondents, including four local authorities, stressed that the public sector work programme should include local government. In response to Question 12, a further 20 organisations (including 9 local authorities) requested that the scope of the proposals should be extended to local authorities. Responsibilities advocated for local authorities included:
- licensing of local energy networks and local heat networks and identifying suitable locations for the development of these
 - adapting the planning system to meet the challenge of zero-carbon buildings
 - planning and commissioning renewable energy infrastructure including that required to underpin local energy networks, wind and biomass generators
 - making a strong local authority contribution to the exemplar building programme
 - promoting zero-carbon non-domestic buildings in the media.
- 6.13 Respondents recognised that some of these would require additional funds.
- “new technologies have a much greater cost when they are first trialled. Without the financial support there is a risk of public buildings becoming financially unviable and either not being provided or another key services having to be cut” [Cambridgeshire County Council]*
- 6.14 Several respondents supported innovative financing mechanisms including zero-carbon innovation funds. For example, Uttlesford District Council

suggested that local authority masterplanning and commissioning renewable energy infrastructure could be financed through an infrastructure levy on developers. Balfour Beatty plc pointed out that *“Examples [of local carbon funds] already exist in Milton Keynes, the North West and in some other local authority areas”* and could be extended to cover more local authority areas.

- 6.15 SWEEG also saw an important role for local government, and considered it *“likely that many local authorities may voluntarily adopt an earlier target in order to demonstrate leadership.”*

Scope of the proposals

- 6.16 Four respondents, across a range of sectors, suggested that the scope of the proposals should include existing buildings as well as new buildings.

“We recognise... the need for the public sector to address a legacy of old and inefficient building stock. How refurbishment and retrofit is addressed and funded is another way that the public sector needs to show leadership.”
[Balfour Beatty plc]

- 6.17 BSCS urged *“the Government to embed flexibility... to ensure that mixed use (public/private) developments are able to proceed.”*

Defining zero carbon

- 6.18 Two respondents commented that the proposals outlined were somewhat vague and several suggested that more detail should be provided. In particular:

“The Government’s commitment should be increased from an aspiration to something more binding.” [MPA]

“Government should specify a minimum advanced standard for all new and refurbished accommodation (following the example of the Australian Government).” [Arup]

“Measures should be taken to ensure that public sector decisions are made on a ‘whole life costs’ basis avoiding the separation of capital and operating expenditure. This would represent best value for the taxpayer and reduce emissions.” [Balfour Beatty plc]

- 6.19 BPF urged DCLG to: *“ensure consistency with the Chief Construction Adviser’s report on industry preparedness for zero-carbon development.”*
- 6.20 Several respondents suggested ways in which the Government could go further to achieve their zero carbon aim. These were:

- establishing **local heat networks** with public sector buildings acting as anchor loads (see Question 10)
- carrying out **extensive fabric testing** to provide an evidence base to underpin the zero-carbon target
- investing in **training** supported by central resources
- using **procurement and asset management** strategies to drive efficiency.

Funding

6.21 Ten respondents expressed concern that the work programme would be adversely affected by the difficult public spending climate likely to be faced by Government over the coming years. Some of these urged Government to press ahead with this work programme anyway and suggested that trialling innovative financing programmes could provide a solution. Others suggested that the programme needed to be adapted to confront the reality of these difficult budgetary times. However, in contrast, as highlighted in its response to Question 3, EDF Energy noted that *“the costs to meet the low carbon ambitions can be lower for the public sector than for commercial organisations.”*

“the new Feed in tariff and Renewable heat incentive programmes... could provide long-term revenue streams to assist in the raising of the required upfront capital associated with on-site renewables’. [SIG PLC]

“We... see an urgent imperative for the public sector to develop innovative financial models that can be replicated.” [Forum for the Future]

6.22 All local authority respondents were concerned about how the proposals would be financed. Two commented that the current proposals did not seem to consider the financial strains that would face the public sector in the short term. Four authorities, including the London Borough of Haringey, stressed that central Government grants would be needed to allow local monitoring and reporting structures to be put in place.

6.23 Only nine respondents **did not agree with the work programme** and **four did not know whether or not to support it**, with most of these having very similar concerns to those who agreed with it.

“Starting in 2018 is too late as monitoring of projects to measure their effectiveness takes at least one complete annual cycle.” [MCRMA]

“[The proposals] will undoubtedly add significantly to costs ... the increased capital and running costs are likely to add substantially to the country’s debt burden.” [Concrete Block Association (CBA)]

“What is the percentage of new build space built every year on the public estate? It will be tiny... Instead of grandstanding on something inconsequential the public sector should take the lead on non-domestic refurbishment to zero-carbon standards.” [Kingspan Insulation Ltd.]

Q10. Are there other ways in which you think the public sector could usefully provide leadership for the move to zero carbon?

6.24 A total of 90 (83%) consultees answered this question. Of these, a high proportion (83%) of respondents agreed that there were other ways in which the public sector could usefully provide leadership for the move to zero carbon and provided a range of proposals. Very few answered ‘No’ (4%) and only 12% did not know. The proportion of ‘Yes’ responses was high across most sectors, although it was slightly lower among supply chain/manufacturers, where 22% did not know.

Q10. Are there other ways in which you think the public sector could usefully provide leadership for the move to zero carbon?	Yes (%)	No (%)	Don't know (%)	Total number responding
Architects/Consultancies/Engineers	79	11	11	19
Developers/Builders	85	8	8	13
Energy Sector	83	0	17	6
Interest/lobby groups and NGOs	83	0	17	6
Property management companies	100	0	0	1
Businesses/building occupiers	100	0	0	4
Regional and local authorities/Building Control Bodies	91	0	9	23
Supply chain and manufacturers	72	6	22	18
All	83	4	12	90

6.25 **Those responding ‘Yes’** went on to outline several ways in which the public sector could provide leadership for the move to zero carbon:

- publishing and disseminating information
- providing greater transparency on the carbon performance of the public estate
- developing local heat and energy networks
- adapting the planning system.

Publishing and disseminating information

6.26 The most widely supported suggestion was that the Government should focus on publication and dissemination of information on the costs and benefits of the exemplar building programme and on the carbon performance of the public estate more generally. Three respondents advocated a strong communication strategy for the public sector in general terms.

“A good communications strategy is essential to share the lessons learned.”
[BCO]

Communicating lessons from the exemplar building programme

- 6.27 The exemplar programme attracted wide support, but suggestions for improvement included providing possibilities for interested parties to visit exemplar buildings and publishing:
- case studies and templates for a range of buildings
 - detailed costs of exemplar buildings
 - capital cost increase data as the programme is rolled out across the public sector
 - detailed post-occupancy evaluation data that should go beyond the display energy certificate ratings.
- 6.28 Most of those requesting case studies did not go into detail about the type material they would find useful, but a few did make some suggestions. For example, Cundall felt that *“small buildings located in open spaces”* would provide the most relevant case studies, while Lovelock Mitchell Architects suggested that the case studies should cover both private and public developments. Gifford LLP suggested that information should be made available on *“the design and actual costs, energy generation figures, energy consumption, the design approach and a breakdown of the hierarchy for each site.”*
- 6.29 Further comments came from British Recycled Products, which suggested that one in three buildings should be classed as ‘exemplar’, and from Exeter City Council Building Control, which supported the programme, commenting that it would:
- “... assist design teams working in the private sector with practical knowledge of technologies and techniques assisted by the Technology Strategy Board, set up to advise Government on how to remove barriers to innovation.”*

Carbon performance of the public estate

- 6.30 A number of respondents made further suggestions of ways in which the Government could demonstrate leadership by being more transparent about its own estate. Suggestions included:
- development of an energy breakdown database publicising energy consumption data profiles of public buildings [Cundall and others]
 - far greater publicity of zero-carbon implementation strategies [Arup and others]

- resolution of the large differences that exist between energy performance certificate and display energy certificate energy labelling of public sector buildings [Arup and others].

6.31 Five respondents recommended that an advisory organisation/panel should be set up at central or local government level which would have responsibility for information dissemination. Two respondents referred to the 'Zero Carbon Hub' for domestic buildings and one to the 'Energy Saving Trust' as possible models for this body.

"The formation of a body similar to the Zero Carbon Hub would be a useful step." [ECA]

Developing local heat and energy networks

6.32 Seven organisations commented that they would like to see the development of local/community heat and energy networks, with public sector buildings such as schools and libraries at the centre of these.

"residential communities... require most energy in the evening and weekends when the public facilities are closed. The public facilities can export their excess generation when not needed and this should be used to establish local energy networks providing more efficient use of generation assets. Establishing energy intranets would also assist in wider government strategies of competitive and secure energy markets." [CIC/CIBSE]

"New and refurbished public buildings could provide base loads and therefore the catalyst for heat networks. It may be that planning rules should change to require public buildings to prove that they cannot be connected to or start a heat network before being allowed to have standalone systems" [CPA]

6.33 More detailed suggestions on local authority leadership in this area are provided in response to Question 12.

Adapting the planning system

6.34 More than 30 respondents referred to the need for the planning system to be used and adapted in order to implement the zero-carbon targets. Some of these saw a wide-ranging role for planning authorities in paving the way for the achievement of the targets.

"The LGA is keen to see a measurable rise in the number of local planning authorities agreeing planning policies that set high standards not just in energy efficiency but also water, use of material resources, recycling, soil management and biodiversity. For example, energy masterplanning and energy option analysis is being undertaken by several local authorities to allow them to strategically plan for renewables, as well as allowing them to demonstrate the most appropriate renewable and energy efficient

technologies for their location and building type. This type of forward thinking must become an integral part of local government strategy and planning.”
[LGA]

“Planning regulations must accept that we are in a whole new situation in which we must accept drastic measures - and a reduction of amenity even in conservation areas.” [private individual]

- 6.35 Nine respondents referred to the need for flexibility and for the planning system to remove all barriers to zero-carbon developments in order to meet the targets set out.

“Additionally barriers such as local planning impediments need to be removed for all renewables and low and zero carbon generation up to a certain scale (being quite large). They should all get permitted development to encourage use, certainly given the timescales... Maybe national plans need to be developed that show zoned areas for renewables to enable swift construction and adoption of these carbon proposals.” [Building Control Alliance (BCA)]

“We also think that there may be scope for a relaxation in town planning rules to encourage - reduce obstacles - to combined heat and power & other such low-carbon schemes.” [BCSC]

- 6.36 There were also several suggestions for innovative ways in which the planning system could be used to encourage achievement of the zero-carbon targets including:

- a “fast track planning” option for those ready to invest right now
[private individual]
- the possibility of a “*planning requirement to contribute financially to a local district scheme that the local authority would then have an obligation to deliver within say 5 years*” [Land Securities]
- rewarding projects that demonstrate exemplar performance by granting them increased area of development at the planning stage
[Arup]
- developing “*inter-authority guidelines on energy strategy for projects which span authority borders, or where there is potential to exploit sustainable energy generation opportunities over a border.*” [Redrow Homes and SWEEDG]

- 6.37 Two respondents envisaged a clear role for planning authorities in paving the way for **allowable solutions**:

“Incorporate allowable solutions as part of planning regulations (section 106).”
[SSN]

“Be ahead of the game in incorporating allowable solutions; start planning process for suitable off-site renewables sites as part of allowable solutions for privately funded developments.” [Hilson Moran]

Funding

- 6.38 Financing of the public sector programme was again raised in response to this question, though to a lesser extent than to Question 9. Additional points made were:

“Procurement and construction costs are higher in the public sector, so we have to be wary that this does not give the wrong impression to the private sector. We have to take the lead but in doing so must not be seen just to throw money at the issue it must be done in a targeted way.” [Ministry of Justice]

“We welcome the suggestion that Government will explore options for third party financing further including options for a central innovation fund. In our view, the introduction of the feed-in tariff/renewable heat incentive guaranteeing index linked investor returns at rates ranging from 5-12% depending on technology is highly significant in terms of unlocking both private sector and public sector finance.” [Solarcentury]

“Government could provide finance for infrastructure schemes when these schemes benefit multiple users.” [Environmental Industries Commission (EIC)]

- 6.39 Only four respondents answered ‘**No**’ to this question. One provided no further comment and three went on to say that they felt the proposals were sufficient. For example, Ramboll UK commented:

“No, but we would strongly support the proposed exemplar building programme with the accompanying feedback to our industry.”

- 6.40 The majority (8 out of 11) of those that responded ‘**Don’t know**’ gave no further comments. Three went on to make brief proposals and these have been included in the analysis above.

Q11. Do you agree that the public sector should start trialling allowable solutions from 2015?

- 6.41 A total of 89 (82%) respondents answered this question, of which the vast majority (82%) agreed that the public sector should start trialling allowable solutions from 2015. There was strong support from most sectors, although supply chain/manufacturers (68%), the energy sector (67%) and interest/lobby groups and NGOs (40%) were less keen (although numbers were low in the latter category). Of the remainder, only 11% disagreed and 7% did not know.

Q11. Do you agree that the public sector should start trialling allowable solutions from 2015?	Yes (%)	No (%)	Don't know (%)	Total
	Architects/Consultancies/Engineers	89	11	0
Developers/Builders	92	8	0	13
Energy Sector	67	17	17	6
Interest/lobby groups and NGOs	40	20	40	5
Property management companies	100	0	0	1
Businesses/building occupiers	100	0	0	3
Regional and local authorities/Building Control Bodies	91	4	4	23
Supply chain and manufacturers	68	21	11	19
All	82	11	7	89

6.42 Those **in favour of the public sector trialling allowable solutions from 2015** made a number of comments, which can be grouped into the following themes:

- timing of the introduction of allowable solutions
- monitoring, reporting and disseminating data on allowable solutions
- wider energy sector framework
- funding.

Timing of the introduction of allowable solutions

6.43 Many respondents saw clear benefits in the 2015 date proposed for trialling:

“If allowable solutions are considered at an early stage, for example from 2015, through public sector trials, additional opportunities for demonstration of the solutions will encourage innovation and development through design and technology.” [EDF Energy]

6.44 However, 27 respondents felt that the public sector should trial allowable solutions as early as possible rather than wait until 2015.

“This is a good approach and will provide excellent leadership to industry. If these trials could start before 2015, so much the better.” [Corus Group]

“It is important that the public sector starts trialling allowable solutions as soon as possible, in order to ensure lessons can be learnt in advance of the full implementation of the zero carbon policy. Therefore we would favour trials starting in advance of 2015. [UK-GBC]

6.45 Three respondents felt that the 2015 start date was at odds with the target date for all new homes to be zero carbon from 2016 and the fact that homes are due to begin trialling allowable solutions in 2010 through the Code for Sustainable Homes.

“If public sector buildings are designed to be 'zero carbon' before 2015, they should be able to use the Allowable Solutions that will need to be in place from 2010 for Code Level 5 and 6 new homes.” [CPA]

Monitoring, reporting and disseminating allowable solutions data

- 6.46 Although covered in other questions, 10 respondents reiterated the need for good monitoring, reporting and publication of data in order for lessons learnt in the public sector to be carried across to the private sector. Cornwall Council on the other hand was concerned that the read-across from the public to the private sector would not be as great as hoped.

“These solutions appear to be more feasible when considering the type of buildings the public sector construct. (e.g. schools, public office complexes). The public sector also has access to funding schemes (government & PFI etc.)” [Cornwall Council]

Wider energy sector framework

- 6.47 Three respondents used this opportunity to echo concerns expressed in response to earlier questions (particularly Question 4) that allowable solutions needed to be looked at in the round alongside energy efficiency and carbon compliance.

“If allowable solutions are to be included for non domestic public buildings at 2015 then there should be a degree of certainty as to what level of energy efficiency and carbon compliance target will be required for non domestic building. This will potentially avoid the situation of having to revise the allowable solutions standards in light of energy efficiency and carbon compliance requirements in future.” [MEAS]

Funding

- 6.48 As for several other questions (including Questions 9 and 10), there were concerns over public sector funding. In particular, four local authority respondents pointed out that the trialling of allowable solutions would need to be accompanied by increased funding from central government so as to ensure that other programmes were not squeezed out.

“It is important that funds are made available for this, and there is not an unrealistic expectation that projects will be required to “achieve more with less”. [SWEEG]

- 6.49 Of the 10 respondents that **disagreed with this proposal**, two objected in principle to the idea of early trialling of allowable solutions in the public sector: Kingspan Insulation Ltd, referring to their response to Question 6, felt that

introducing allowable solutions early would distract builders from the most important issue of building to tighter on-site standards. REA commented that:

“In our view, the case for making a decision now is not proven and would advocate waiting until the full impact of policies such as Feed in tariffs and Renewable heat incentives are known.”

6.50 Six other “No” respondents advocated an earlier start date:

“In 2011 a portal should be set up to report performance on existing ‘allowable solutions’.” [East Riding of Yorkshire Council]

“This trialling work should start much earlier to coincide with that undertaken for new homes.” [Rockwool]

Q12. What role(s) do you think local government can play in contributing to public sector leadership on zero-carbon buildings?

6.51 Respondents made a wide range of comments on the roles that local government could play in contributing to public sector leadership on zero carbon buildings but also raised the issue of training and skills. Comments can be grouped under the following themes:

- local authority involvement in the public sector programme
- local authority policy framework
- energy and heat masterplanning
- funding advice
- incentives
- procurement
- training and skills.

Local authority involvement in the public sector programme

6.52 Twenty-seven respondents (30%), including eight local authorities, supported more local authority involvement in the wider public sector programme:

“Given its vital importance in extending the exemplary role as market drivers of the public sector, it is quite extraordinary that no consideration has been given to making similar requirements of local government; this is all the more surprising given the Audit Commission’s interest in pursuing this agenda.” [ACE]

- 6.53 The majority of these felt particularly strongly that local authorities should be included in the exemplar building programme.

“Commission and champion exemplar building projects.” [ACA]

“More public buildings need to be built quickly to act as exemplars of Zero Carbon, otherwise the 2018 public buildings target is going to be missed.” [CIOB]

- 6.54 Four local authorities specifically supported their taking on such a role and commented:

“Local Government can help in attracting development to their area setting clear, achievable local targets with exemplar projects in partnership with the private sector. These can iron out and remove obstacles through training of planning and building control with clear guidance as to where applications are needed and standard solutions...to fast track progress through the approvals process...” [London Borough of Ealing]

Local authority policy framework

- 6.55 Twenty-six respondents felt that local authorities should have a greater role in drawing up long-term energy strategies for their areas, and actively implementing and enforcing these. Building a stronger focus on sustainability into Local Area Plans, Local Development Frameworks and delivery through Local Strategic Partnerships were the main suggestions for strengthening existing mechanisms.

“local authorities should develop ‘Sustainability Options Plans’ identifying availability, location and type of predicted and potential supply and demand of all relevant resource flows (including water, waste and energy). Local authorities should deliver this through their Local Development Framework.” [Lend Lease – Europe]

“Embed zero carbon technology considerations into masterplans in order to influence Local Development Frameworks and section 106 negotiations.” [Devon County Council]

- 6.56 However, seven organisations called for greater consistency to be practised by local authorities in terms of implementing the planning policy framework in relation to the zero carbon agenda.

“It is imperative that local government guidelines for achieving planning permission, i.e. local implementation of Planning Policy Statement 22, is harmonised with these national proposals. There is currently a huge disparity between what constitutes a “renewable technology”, from Borough to Borough up and down the country, which makes it extremely difficult for non domestic building owners to decide what approach they should adopt to designing and building zero carbon non domestic buildings in the UK.” [Ramboll UK]

“Local planning authorities should not have the power to arbitrarily apply minimum on-site renewable targets on new buildings (e.g. 10% Merton rule). The industry needs consistency across the country.” [Cundall]

Energy and heat masterplanning

- 6.57 Fifteen respondents were keen to see a greater role for local authorities in energy and heat masterplanning.

“Local councils could be given the powers to develop heat networks in advance for housing development areas and then mandate as part of planning permission that all buildings connect to the system.” [CPA]

“The Theatres Trust believes that local government must lead on zero carbon buildings in all areas, but particularly in the identification, designation and dissemination of realised and potential heat and energy networks.” [Theatres Trust]

- 6.58 Some suggested specific ways in which this might be achieved. For example, Lend Lease - Europe advocated the *“introduction of a central government department responsible for implementation of sustainable community infrastructure (particularly community heating schemes).”* Others such as the South West Regional Development Agency (SWRDA) stressed the importance of collaborative working:

“... bringing planning, building control and key professionals / experts together to masterplan a solution for a particular development.” [SWRDA]

Funding advice

- 6.59 Four respondents favoured local authorities taking on a role in advising local developers on funding and putting the construction industry in touch with providers of finance.

“Local government can provide advice and guidance for local developers and businesses in how they can access additional funding for low and zero carbon technologies and accessing district heat networks.” [PG Surveyors Ltd]

Incentives

- 6.60 Several respondents suggested that local government could have a role in promoting and implementing innovative incentive schemes such as a reduction in business rates for fully compliant buildings (BCSC) or special exemplary council tax bands rewarding low carbon building (CIC/CIBSE). hurleypalmerflatt suggested that local authorities should have *“backstop allowable solutions funds”* where there was real scope for joint working to improve the standards of buildings.

Procurement

- 6.61 Several respondents, including London Underground Limited, SWEEG and Eurisol, felt that local government could achieve a great deal through its own procurement arrangements to encourage zero-carbon building.

Training and skills

- 6.62 Thirteen respondents highlighted a gap in adequate training and skills amongst local authority staff to address this new agenda. Training of planning and building control staff was seen as key to the achievement of the zero-carbon buildings targets.

“Crest Nicholson are not unappreciative of the challenges faced by Planning Authorities faced with the new and complex energy dimension to development. We support the need for a long-term programme of investment in the necessary skills, and the role of the Zero Carbon Hub as the focus for development.” [Crest Nicholson PLC]

“There will also be a key role for planners with regard to off-site (as well as on-site) solutions. It will be vitally important that the coordination of Building Control Bodies and planners is done effectively, and that time and resources are required to provide adequate training to those groups.” [SWEEG]

- 6.63 Various other suggestions concerning planning and building control staff included:
- bigger teams at local level to advise on building regulations
 - provision of better advice to the private sector
 - promoting greater understanding and realism amongst staff by disseminating internally lessons learned from developing zero carbon buildings
 - better commercial understanding
 - co-ordination of local government in this regard by setting up a central government department responsible for sustainable community infrastructure.
- 6.64 ConstructionSkills was keen to add to this that local government could also play a role in providing training and employment opportunities for the wider community, creating skilled workers for private sector projects.

7. Delivery and next steps

Introduction

- 7.1 The final chapter of the consultation document provided further detail on the delivery of the programme set out in the previous chapters and considered:
- scope and practical delivery – such as changes to the Building Regulations and the roles of Building Control Bodies and Planning
 - market barriers to delivery – including the use of mechanisms to increase the value of high performing buildings and the potential involvement of Energy Services Companies
 - assessment tools for zero carbon non-domestic buildings – including changes to SBEM and proposals for a ‘Code for Sustainable Buildings’
 - partnership working – including ways in which the Zero Carbon Hub model could further the zero carbon agenda for non-domestic buildings.
- 7.2 The final chapter also set out the immediate next steps:
- establishing appropriate energy efficiency standards for different building types
 - scoping and starting work on the review of SBEM, the non-domestic building assessment software
 - based on views on the carbon compliance scenarios, working up more detailed modelling on the technical and economic feasibility for different building types, leading to changes to Part L of the Building Regulations
 - working with the zero carbon homes programme on a framework for allowable solutions
 - further developing the public leadership ‘offer’.
- 7.3 Respondents were asked for their views on the package of measures and proposals for next steps.

Q13. Does this package of measures and proposals for next steps address the key delivery issues to make progress towards the zero-carbon ambitions? If not, what action is needed and by whom?

7.4 A total of 93 (85%) respondents answered this question. Respondents were divided about whether the package of measures and proposals for next steps addressed the key delivery issues, with the same proportion agreeing and disagreeing (35%). Around a quarter (23%) provided comments only and 6% did not know. Support was strongest among the energy sector (50%), businesses/building occupiers (50%) and regional and local authorities (46%). Supply chain/manufacturers disagreed most strongly (67%).

Q13. Does this package of measures and proposals for next steps address the key delivery issues?...	Yes (%)	No (%)	Don't know (%)	Comments only (%)	Total
Architects/Consultancies/Engineers	21	26	16	37	19
Developers/Builders	38	31	0	31	13
Energy Sector	50	17	0	33	6
Interest/lobby groups and NGOs	17	50	0	33	6
Property management companies	0	0	0	100	1
Businesses/building occupiers	50	17	0	33	6
Regional and local authorities/Building Control Bodies	46	29	13	13	24
Supply chain and manufacturers	33	67	0	0	18
All	35	35	6	23	93

7.5 Of those **in favour of the package of measures and proposals**, four respondents provided short responses expressing a high degree of support.

7.6 However, the majority of those that answered 'Yes', 'No or 'Don't know' or that provided comments only had further suggestions and questions about the steps outlined. These can be grouped under the following headings:

- funding and costing of the proposals
- monitoring and enforcement
- roles of Building Control and Local Planning Authorities
- role of the Zero Carbon Hub
- wider policy framework
- types of building covered by the proposals
- market value of high-performing buildings
- regulation of allowable solutions
- tools – SBEM and SAP
- alignment with approaches in other EU member states/European regulations

- Energy performance certificate and Display energy certificate ratings
- Energy Services Companies
- embodied carbon and lifecycle methodologies.

Funding and costing of the proposals

7.7 Echoing comments on previous questions, seven respondents, five of them local or regional authorities, had concerns about the cost implications of the proposals.

“Cost implications too vague... Much of the cost impact assessments are unrealistically based on taking current standard designs and simply adding enhancements...” [Arup]

“The delivery mechanism for zero standards is likely to be Building Regulations. Therefore adequate resources, both monetary and skill, will be necessary and will have to be agreed prior to delivery.” [MEAS]

Monitoring and enforcement

7.8 Fourteen respondents saw monitoring and enforcement of the proposals as a high priority.

“Scrutiny of compliance and enforcement is vital to the success of zero carbon new buildings. Consumers, business and individuals, will need greater re-assurance/ protection that the new buildings they are investing in have been properly planned built and inspected.” [LGA]

“During the recent consultation process on Building Regulations Parts L and F, serious concerns over compliance with Building Regulations were raised. Government has neither put in place nor proposed sufficient measures to address this existing under-compliance problem. ACE is therefore concerned that compliance with the zero carbon definition will suffer through a lack of monitoring and enforcement. Setting a precedent of low levels of compliance and a lack of enforcement from the early stages in this new policy will threaten its reputation, acceptability and long term efficacy.” [ACE]

7.9 Some respondents came up with specific mechanisms to assist monitoring and enforcement:

- establishing an **enforcement fund** to ensure building regulations are met; this would allow spot checks on building performance and energy efficiency and would fund some high profile prosecutions to act as a deterrent for non-compliance [RIBA]

- introducing and making mandatory an enhanced version of the 2002 **ADL log book** as a record of a building's compliance during construction, at completion and post-occupation [CIC/CIBSE]
- introducing an **auditing role** for building control [CIOB].

Roles of Building Control and Local Planning Authorities

- 7.10 Four organisations expressed views on the respective roles of Building Control and Local Planning Authorities. For example, BSCS and Balfour Beatty plc saw a need for greater partnership working between planning departments and building control, which would have responsibility for off-site energy and community system integration and policing of the regulations, respectively. RIBA stressed the need for greater definition of the different roles:

“We believe that energy performance of buildings should be left to building control, while the planning system should be used to drive a strategic local framework guided by national policy.”

- 7.11 Cornwall Council, on the other hand, advocated: *“finding one way of delivering changes to simplify the requirements i.e. just through the Building Control process.”*
- 7.12 In line with responses to Question 12, 10 organisations raised *“competence issues”* in relation to building control staff which would require *“expansion and training”* of these services in response to the proposals for further responsibility.

Role of the Zero-Carbon Hub

- 7.13 Proposals to create a body similar to the Zero Carbon Hub to co-ordinate efforts on non-domestic buildings attracted a good level of support (10 respondents in favour), particularly from the energy sector and the architects/consultancies/engineers grouping:

“UK-GBC supports the need for a delivery body along the lines of the Zero Carbon Hub in order to drive implementation and work with the government and industry to create confidence and co-ordinate delivery. UK-GBC also believes that the 2016 Task Force has provided an excellent model for engaging the industry and Government on the delivery of zero carbon homes.” [(UK-GBC]

“We believe that the Zero Carbon Hub has a critical role in facilitating this.” [E.ON UK]

7.14 Several respondents had specific suggestions for the role of the Zero Carbon Hub:

- facilitating liaison between government and industry
- day-to-day operational responsibility for facilitating the mainstream delivery of low and zero carbon non-domestic buildings
- educating industry
- enabling knowledge sharing across the industry
- testing the commercial viability of what can be achieved through real examples [Lend Lease – Europe]
- facilitating definition of the mechanism to underpin allowable solutions and confirmation of options available within them [E.ON UK]
- considering the implications for and needs of the regulatory bodies [LGA]
- starting to identify how skills can be developed and shared across the sector [LGA]
- working with industry and sector skills councils, for example on the skills implications of various future scenarios [ConstructionSkills]
- an enhanced role that covers all aspects of the Building Regulations, not just the road to zero carbon [Hilson Moran].

7.15 One respondent was concerned about the capacity of the Zero Carbon Hub to carry out the necessary analytical work:

“The big issue for us is the level set for the energy efficiency back stop - it has to be evidence based and as close to passive haus levels as possible.”
[Kingspan Insulation Ltd]

Wider policy framework

7.16 Echoing comments to previous questions (particularly Questions 4 and 11), nine respondents were concerned about what they saw in the consultation document as a proliferation of regulations and organisations involved in delivering them. As a solution to this, several felt that:

“... it is important this policy is developed within the context of the broader energy policy framework.” [EDF Energy]
“Greater detail needs to be provided about the relationship between these regulations and the carbon reduction commitment (CRC) energy efficiency scheme.” [Devon County Council]

7.17 Three respondents saw an important role for the local development frameworks in delivering zero carbon targets:

*“Each Local Authority should be required to produce a ‘Sustainability Options Plan’ as a mandatory requirement of their Local Development Framework.”
[Lend Lease – Europe]*

7.18 SWEEG felt the need for a central plan that sits above the local development framework:

“There should be a key planning document produced by Government that can be adapted by local authority planners to their regions.” [SWEEG]

Types of building covered by the proposals

7.19 Fourteen respondents commented on the types of building covered by the scope of the proposals. Of these, seven respondents felt that the proposals should cover existing buildings.

“The majority of buildings standing today will still be with us in 50 years time, and current rates of replacement of non-domestic buildings are 1-1.5% per year. This means that even if point-of-build regulation is introduced, there will continue to be a ready supply of lower-performing existing buildings, many of which have been constructed prior to the advent of the energy requirements in building regulations. The availability of poor performing but comparatively cheap existing property could potentially short circuit the intent of a zero carbon policy.” [ACE]

7.20 Other comments included:

- four local authorities, including the London Boroughs of Ealing, Haringey and Merton, suggested *“a programme of ‘building scrappage schemes’ to replace older buildings that are too hard to upgrade”*
- Cundall suggested that Government: *“focus on the biggest sectors and buildings (e.g. offices, hotels, supermarkets) and omit small scale buildings for first couple of years (e.g. petrol filling stations, 100m² office etc.)”*
- Devon County Council was concerned about *“how mixed-use buildings will be considered by the building regulations, and how the code for sustainable homes will interact with the non-domestic buildings zero carbon standards in these cases”*.

Market value of high-performing buildings

- 7.21 Six organisations included comments on the valuation of sustainable buildings in their responses. SWRDA and Cornwall Council were keen to find a “fairer system of valuing high performing buildings.” EC Harris suggested how this might be done:

“The value and benefits case including soft benefits such as reduced sickness, improved productivity and improved fuel supply security needs to be developed and clearly articulated to the market, aimed at occupiers and their property agents and valuers. Would suggest RICS would be best placed to communicate this.”

- 7.22 However, Balfour Beatty plc felt that: “Consideration needs to be given as to whether a price premium for zero carbon non-domestic buildings is acceptable or appropriate for all sectors” and ACE warned that: “Any concern over the effectiveness of the carbon emissions reduction measures built into buildings will also prevent the market from confidently beginning to integrate the value of energy efficiency of buildings into the price.”

- 7.23 RICS outlined what it was already doing on this important agenda:

“RICS has provided significant leadership in regard to sustainable valuation practices. Another area for further consideration is standardised measurement and reporting. RICS is already working with other professions, trade associations and property based organizations to gain better consistency. Government could provide support to achieve this outcome by adopting common standards as they become agreed.”

Regulation of allowable solutions

- 7.24 Nine organisations commented on the need to focus on the detail of allowable solutions:

“Government indicates that the regulatory oversight for allowable solutions has yet to be decided. We would urge the Government to set out its intentions as soon as possible, so that the regulatory pathway is clear and transparent.” [BPF]

“Further clarification on full range of allowable solutions.” [EDF Energy]

Tools – SBEM and SAP

- 7.25 Six organisations felt that SBEM and SAP tools were “not fit for purpose” and made further proposals for the improvement and refinement of these:

“Close all loopholes in SBEM software to stop consultants exploiting the rules.” [Cundall]

*“There needs to be an alignment of the calculation tools, i.e. SAP and SBEM at the earliest time to support Carbon Compliance and Allowable Solutions.”
[Lend Lease – Europe]*

*“Is there a way to make the adapted SBEM programme comparable to older versions to prevent EPCs having to be recalculated every few years?”
[Cornwall Council]*

7.26 Two organisations pointed to BREEAM as a useful tool:

“Existing BREEAM methodologies for non-domestic developments would provide a more cogent approach and are already in place. Adopting a delivery schedule based on these standards for non domestic developments would enable enforcing officers to better prepare for compliance and would also deliver the sustainable use of natural resources agenda.” [East Riding of Yorkshire Council]

Alignment with approaches in other EU member states/European regulations

7.27 Eight respondents referred to the EU dimension of these proposals. Five of these wanted to see more alignment between UK policies and those in other Member States:

“Ideas of what works and what doesn't could be taken from studying other countries' approach.” [Gifford LLP]

“We must ensure that our proposals are aligned with any EU member states that are considering similar ambitions. Duplication of effort should be avoided as it only leads to significant changes when the European Parliament starts to draft their own directives on zero and low carbon buildings, something that may follow logically out of the recast Energy Performance of Buildings Directive.” [Carbon Planning Ltd and CIC/CIBSE]

7.28 Three respondents were particularly concerned about the prospects for transposition of the Energy Performance of Buildings Directive:

“Government should avoid creation of uncertainty in transposition of the Energy Performance of Buildings Directive particularly around definition of net zero energy.” [E.ON UK]

Energy Performance Certificate and Display Energy Certificate ratings

7.29 Several respondents wanted more information and action on display energy certificate ratings. For example, four respondents wanted to see more

information on display energy certificates and energy performance certificates made publicly available.

“Data collected from commercial energy performance certificates and display energy certificates needs to be publicly available. In addition energy performance certificate and display energy certificate data should be accessible for all in the same manner that any other property based search information is. RICS would like to see such information held centrally by Government and be both cheaply and easily accessible.” [RICS]

- 7.30 Three respondents suggested that further action should be taken on display energy certificate ratings, including local authorities stepping in to provide advice on how these could be improved where they were clearly failing. Five others advocated making display energy certificates a mandatory requirement for all commercial property.

“Make display energy certificates mandatory for all non-domestic buildings greater than 500 m².” [Cundall]

Energy Services Companies

- 7.31 There was only comment on the possible role of energy services companies:

“The discussion surrounding energy services companies also appears to be slightly narrow-minded, as it is stated that they might only happen with local authority involvement, which is not necessarily true. Indeed the adoptions of energy services companies in the region have on instances been hampered as local authorities have not been allowed to enter into a contract with energy services companies” [SWEEG]

Embodied carbon and lifecycle methodologies

- 7.32 Five respondents raised the importance of considering embodied carbon and lifecycle methodologies in their responses.

“In addition to focusing on carbon in the use phase of a building, our research into sustainable schools (www.towardssustainableschools.org) shows that a holistic approach to carbon is required to meet the scale of reductions required. This includes embodied energy of materials, transport impacts and the carbon impacts of bought in products and services. These wider impacts should not be ignored in specifying, procuring and commissioning zero carbon non-domestic buildings. This represents another opportunity for local authorities to demonstrate leadership.” [Balfour Beatty plc]

“RICS strongly supports consideration of embodied carbon through supply chains as part of decisions on “in use” technology. The EU standardisation body CEN are currently developing a suite of standards to describe how to assess the life cycle impact of buildings against a range of sustainability

indicators - due for completion between 2010 and 2011 with likely further work needed.” [RICS]

- 7.33 The 33 respondents that **did not agree with the package of measures and proposals** had a raft of concerns but, as a grouping, they were also most likely to call for a different, simplified set of proposals than that set out.
“... What is needed is a simple and meaningful framework, with a target of zero carbon in the operation of a building on the basis of its energy use, and allowing flexibility for developers and users to achieve this, through any mix of energy efficiency, on-site and off-site renewables.” [Tesco]

“We believe this consultation is a missed opportunity. An overarching national policy is required to define ‘Sustainable Buildings’ with specific codes for individual building typologies. Part of this important framework would be to define building typology objectives.” [Countryside Properties plc]

- 7.34 The six respondents that **did not know whether the package of measures and proposals addressed the key delivery issues** and the 21 respondents that **did not indicate a preference** agreed with some points but not with others:

“Partially, however the next steps do not include addressing the critical fiscal issues... We support the statement in section 7.13 and have undertaken our own research to establish the cost of zero carbon....” [SWRDA]

8. General comments

8.1 Some 50 respondents submitted general comments in addition to their answers to the 13 consultation questions. Many of these summarised points made elsewhere in answer to various consultation questions, with common themes being:

- the importance of tackling the challenges of reducing carbon emissions from the existing building stock
- clarification required on precisely what buildings will be covered by the regulations, particularly major refurbishments and extensions, mixed-use buildings, historic buildings and buildings currently exempt from Building Regulations such as agricultural buildings and greenhouses
- more information on allowable solutions
- a preference for lighter touch regulation, with standards being set but greater freedom about how developers achieve them
- more research on how buildings actually perform when occupied and how improvements can best be brought about
- more modelling of the impacts of Feed in tariffs and Renewable heat incentive policies
- need for an implementation roadmap for industry
- greater ambition in reducing unregulated emissions from non-domestic buildings
- the importance of embracing current innovations i.e. smart metering, demand side management and intelligent controls.

8.2 However, there were some additional points that did not feature elsewhere in the consultation which are covered in this section. Most of these related to specific issues and were raised by one or two respondents only. One related to the consultation process and pointed out that the consultation workshops were well attended by 'greenies' but not by 'commercial' directors or equivalents, *"who tend to be more influential when it comes to corporate commitments."* [Arup]

8.3 Three respondents raised the possibility of financial incentives as a means of changing behaviour. Whilst this was raised as a general point in response to earlier questions, the specific suggestions were new:

“increased VAT on commercial energy bills, link taxation such as business rates to energy performance certificate level or make carbon trading happen more fully.” [BCA and CIOB]

“The biggest driver to greater energy efficiency would actually be an increase in energy prices. Although there are carbon reduction commitments in place for very large energy users, carbon taxation should be broadened beyond this.” [Halcrow Yolles]

Hydrofluorocarbons

- 8.4 John Lewis Partnership made a specific point about the large proportion of food retailers’ overall carbon calculation due to hydrofluorocarbons (approximately 21% in the case of John Lewis).

“Currently, these emissions are not factored into the overall Carbon Reduction Commitment calculation and we would like to understand why this is the case. We would strongly advocate the inclusion of hydrofluorocarbons within the Carbon Reduction Commitment calculation, as this would create a greater incentive on businesses to reduce their emissions.”

Fuels

- 8.5 Kingspan Insulation Ltd felt that the biggest risk post-2019 was that the non-energy efficiency measures could not be delivered without reliance on gas combined heat and power which would have drawbacks in terms of energy security and residual carbon. The company enquired whether any studies have been undertaken of what the countries heat and power requirements will be and how they will be delivered without over-reliance on gas.

Dynamic demand technology

- 8.6 The MPA urged the Government to include Dynamic Demand among the technologies appropriate to zero carbon non-domestic buildings.

“If used to control air conditioning at times of peak electricity demand (i.e. heat wave conditions) the amount of wasteful spinning capacity maintained by power stations could be significantly reduced. It could also help lower the need for future increases in spinning capacity to cope with the relatively unstable supply from wind and solar technologies.”

Discrepancy between Part L and Carbon Reduction Commitment

- 8.7 John Lewis Partnership also raised a question about the correlation between Part L of the Building Regulations and the Carbon Reduction Commitment,

expressing concern that this could be a disincentive to providing on site renewable energy generation.

“Where energy is generated on site, through the use of renewable energy technologies, Part L of the Building Regulations considers the carbon generated in this process to be a neutral impact on the overall assessment of the project, when balanced against transmission emissions through utilities providers. However, under the emerging guidance on the Carbon Reduction Commitment, the associated carbon generated through meeting renewable targets on site has a negative impact when measured within overall CO₂ emissions for Carbon Reduction Commitment purposes.”

Annex A: List of respondents by category

Organisation	Broad category assigned by DCLG	Category selected by respondent
Arup	Architects/Consultancies/Engineers	Other
Association of Consultant Architects	Architects/Consultancies/Engineers	Other
Chris Twinn	Architects/Consultancies/Engineers	Other
Construction Industry Council and CIBSE	Architects/Consultancies/Engineers	
Cundall	Architects/Consultancies/Engineers	
EC Harris LLP	Architects/Consultancies/Engineers	Commercial property management
Environmental Industries Commission (EIC)	Architects/Consultancies/Engineers	
Environmental Perspectives LLP	Architects/Consultancies/Engineers	Commercial property management
Gifford LLP	Architects/Consultancies/Engineers	Civil/structural engineer
Halcrow Yolles	Architects/Consultancies/Engineers	Other
Hilson Moran	Architects/Consultancies/Engineers	Other
hurleypalmerflatt	Architects/Consultancies/Engineers	
Institution of Structural Engineers	Architects/Consultancies/Engineers	
Lovelock Mitchell Architects	Architects/Consultancies/Engineers	Architect
Max Fordham Consulting Engineers	Architects/Consultancies/Engineers	
Oil Firing Technical Association (OFTEC)	Architects/Consultancies/Engineers	
PG Surveyors Ltd	Architects/Consultancies/Engineers	
Ramboll UK	Architects/Consultancies/Engineers	
RIBA	Architects/Consultancies/Engineers	
RICS	Architects/Consultancies/Engineers	
Robert Cooke	Architects/Consultancies/Engineers	Civil/structural engineer
Simons Design	Architects/Consultancies/Engineers	Architect
Terence O'Rourke Ltd	Architects/Consultancies/Engineers	
British Council for Offices	Businesses/building occupiers	Other
British Council of Shopping Centres	Businesses/building occupiers	Trade body or association
British Property Federation	Businesses/building occupiers	
CBI	Businesses/building occupiers	
John Lewis Partnership	Businesses/building occupiers	
Tesco	Businesses/building occupiers	
The Theatres Trust	Businesses/building occupiers	

Organisation	Broad category assigned by DCLG	Category selected by respondent
Balfour Beatty plc	Developers/Builders	Builder - main contractor
Berkeley Homes (Urban Renaissance) Ltd	Developers/Builders	Residential developer
Chartered Institute of Building	Developers/Builders	
Countryside Properties PLC	Developers/Builders	
Crest Nicholson PLC	Developers/Builders	Other
Grosvenor	Developers/Builders	Commercial developer
Home Builders Federation (HBF)	Developers/Builders	
Homes & Communities Agency	Developers/Builders	Other
Land Securities	Developers/Builders	Commercial property management
Lend Lease - Europe	Developers/Builders	Commercial developer
London Underground Limited.	Developers/Builders	Other
Ministry of Justice	Developers/Builders	Other
Redrow Homes	Developers/Builders	Residential developer
Robert Bridges	Developers/Builders	Builder - small builder
Targetfollow Estates Ltd.	Developers/Builders	
Thames Water Property Services.	Developers/Builders	
Combined Heat and Power Association	Energy Sector	
E.ON UK	Energy Sector	Other
EDF Energy	Energy Sector	
Renewable Energy Association	Energy Sector	Trade body or association
RWE npower	Energy Sector	
Scottish and Southern Energy	Energy Sector	
UK Business Council for Sustainable Energy	Energy Sector	
Private individual	Interest/lobby groups and NGOs	Householder - homeowner
Association for the Conservation of Energy	Interest/lobby groups and NGOs	Specific interest or lobby group
ConstructionSkills	Interest/lobby groups and NGOs	NGO
Country Land & Business Association (CLA)	Interest/lobby groups and NGOs	Trade body or association
Forum for the Future	Interest/lobby groups and NGOs	
Private individual	Interest/lobby groups and NGOs	
Sponge Sustainability Network.	Interest/lobby groups and NGOs	Other
UK Green Building Council	Interest/lobby groups and NGOs	Other

Organisation	Broad category assigned by DCLG	Category selected by respondent
Carbon Planning Ltd	Property management companies	Commercial property management
Central Association of Agricultural Valuers (CAAV)	Property management companies	
The UNITE Group plc	Property management companies	Residential property management
Aylesbury Vale District Council	Regional and local authorities/Building Control Bodies	Local authority - building control
Building Control Alliance	Regional and local authorities/Building Control Bodies	
Cambridgeshire County Council, Cambridgeshire Horizons, South Cambridgeshire District Council, NHS Cambridgeshire and the Cambridgeshire Constabulary.	Regional and local authorities/Building Control Bodies	
City of Lincoln Council	Regional and local authorities/Building Control Bodies	Local authority - planning
City of London	Regional and local authorities/Building Control Bodies	
Cornwall Council	Regional and local authorities/Building Control Bodies	Local authority - building control
Devon County Council	Regional and local authorities/Building Control Bodies	
East Riding of Yorkshire Council	Regional and local authorities/Building Control Bodies	Local authority - building control
Exeter City Council Building Control	Regional and local authorities/Building Control Bodies	
Local Authority Building Control	Regional and local authorities/Building Control Bodies	Local authority - building control
Local Government Association	Regional and local authorities/Building Control Bodies	Specific interest or lobby group
London Borough of Harrow	Regional and local authorities/Building Control Bodies	Local authority - building control
London Borough Ealing	Regional and local authorities/Building Control Bodies	Local authority - building control
London Borough Merton	Regional and local authorities/Building Control Bodies	Local authority - building control
London Borough of Haringey	Regional and local authorities/Building Control Bodies	Local authority - building control
London Borough of Southwark	Regional and local authorities/Building Control Bodies	Local authority – other
London Borough of Wandsworth	Regional and local authorities/Building Control Bodies	Local authority - building control
Merseyside Environmental Advisory Service	Regional and local authorities/Building Control Bodies	
Nottingham City Council	Regional and local authorities/Building Control Bodies	Local authority – planning
Salford City Council	Regional and local authorities/Building Control Bodies	Local authority – planning
South West Energy and the Environment Group (SWEEG)	Regional and local authorities/Building Control Bodies	Local authority – other
South West Regional Development Agency	Regional and local authorities/Building Control Bodies	NGO

Organisation	Broad category assigned by DCLG	Category selected by respondent
Suffolk County Council	Regional and local authorities/Building Control Bodies	Local authority – other
Trevor McIntosh	Regional and local authorities/Building Control Bodies	Local authority - building control
Uttlesford District Council	Regional and local authorities/Building Control Bodies	Local authority - building control
BEAMA	Supply chain and manufacturers	Trade body or association
Bosch Thermotechnology Ltd	Supply chain and manufacturers	Other
British Recycled Products	Supply chain and manufacturers	
Concrete Block Association	Supply chain and manufacturers	Trade body or association
Construction Products Association	Supply chain and manufacturers	Trade body or association
Corus Group	Supply chain and manufacturers	Other
Electrical Contractors Association	Supply chain and manufacturers	Trade body or association
Engineered Panels in Construction [EPIC]	Supply chain and manufacturers	Trade body or association
Eurisol (UK mineral wool insulation association)	Supply chain and manufacturers	Trade body or association
ICOM Energy Association	Supply chain and manufacturers	Trade body or association
Kingspan Insulation Ltd	Supply chain and manufacturers	Other
Knauf Insulation	Supply chain and manufacturers	Other
Metal Cladding & Roofing Manufacturers Association (MCRMA)	Supply chain and manufacturers	Trade body or association
Mineral Products Association	Supply chain and manufacturers	Trade body or association
Rockwool	Supply chain and manufacturers	Other
Saint-Gobain UK	Supply chain and manufacturers	Other
SIG PLC	Supply chain and manufacturers	Other
Solarcentury	Supply chain and manufacturers	Other