



Sustainable New Homes – The Road to Zero Carbon
**Consultation on the Code for Sustainable Homes and the
Energy Efficiency standard for Zero Carbon Homes**



Sustainable New Homes – The Road to Zero Carbon
**Consultation on the Code for Sustainable Homes and the
Energy Efficiency standard for Zero Carbon Homes**

Communities and Local Government
Eland House
Bressenden Place
London
SW1E 5DU
Telephone: 030 3444 0000
Website: www.communities.gov.uk

© Crown Copyright, 2009

Copyright in the typographical arrangement rests with the Crown.

This publication, excluding logos, may be reproduced free of charge in any format or medium for research, private study or for internal circulation within an organisation. This is subject to it being reproduced accurately and not used in a misleading context. The material must be acknowledged as Crown copyright and the title of the publication specified.

Any other use of the contents of this publication would require a copyright licence. Please apply for a Click-Use Licence for core material at www.opsi.gov.uk/click-use/system/online/pLogin.asp, or by writing to the Office of Public Sector Information, Information Policy Team, Kew, Richmond, Surrey TW9 4DU

e-mail: licensing@opsi.gov.uk

If you require this publication in an alternative format please email alternativeformats@communities.gsi.gov.uk

Communities and Local Government Publications
Tel: 0300 123 1124
Fax: 0300 123 1125
Email: product@communities.gsi.gov.uk
Online via the Communities and Local Government website: www.communities.gov.uk

75% recycled

This is printed on
75% recycled paper

December 2009

Product Code: 09SH06195

ISBN: 978-1-4098-2121-2

Scope of the consultation

Topic of this consultation:	This consultation covers both policy and technical changes being considered to the Code for Sustainable Homes which include embedding the new definition of zero carbon for new homes. This asks a range of policy and technical questions on the Code and on the energy efficiency component of the zero carbon definition as well as the proposed implementation.
Scope of this consultation:	<p>This consultation aims to seek agreement to changes to the Code for Sustainable Homes in 2010 to align it with changes to Part L of the Building Regulations and the proposed approach to adopting the 2016 definition of zero carbon. Therefore the most significant changes are within the energy section of the Code. However, this consultation also puts forward our proposed changes to credit issues such as Lifetime Homes, Home Security surface water run-off and Waste as well as setting out issues that are being considered for further investigation in the future.</p> <p>It also seeks views on the energy efficiency definition to be incorporated into the definition of zero carbon homes from 2016 and whether that should be introduced into Building Regulations at an intermediate level from 2013</p>
Geographical scope:	The Code for Sustainable Homes was introduced in England but has been adopted in Wales and Northern Ireland. It is not used in Scotland.
Impact assessment:	A consultation stage impact assessment is also being published for the Code as well as an update on the zero carbon homes impact assessment, to reflect the fabric energy efficiency standard.

Basic information

To:	Those using the Code or specifying its use, including home builders, architects, home energy experts, Code assessors, Housing Associations, Local Authorities, and others with an interest in sustainable homes building.
Body/bodies responsible for the consultation:	Sustainable Buildings Division, Department for Communities and Local Government.
Duration:	15 December 2009 to 24 March 2010
Enquiries:	MonaLisa Chukwuma Tel: 0303 4441790 e-mail: MonaLisa.Chukwuma@communities.gsi.gov.uk

How to respond:	<p>Postal Address: MonaLisa Chukwuma, Sustainable Buildings Division, Department for Communities and Local Government 5/G10 Eland House, Bressenden Place, London SW1E 5DU</p> <p>email address to which written responses can be submitted: thecode@communities.gsi.gov.uk</p> <p>Online responses: http://www.communities.gov.uk/publications.planningandbuilding/futureofcodeconsultation</p>
Additional ways to become involved:	<p>There will be a number of meetings held to discuss the consultation. For meeting details contact: Kirsten Elder Tel: 01727 535686 e-mail: kirsten.elder@aecom.com.</p>
After the consultation:	<p>The responses will be published on the Code website (www.communities.gov.uk/thecode) within three months of the closing date for the consultation.</p>
Compliance with the Code of Practice on Consultation:	<p>A copy of the consultation criteria from the Code of Practice on Consultation is provided in “About this consultation” on page 7. This consultation complies with these criteria.</p>

Background

Getting to this stage:	<p>This consultation has been informed by a series of stakeholder workshops carried out as part of a 6 month review of the Code. The Zero Carbon Hub also organised a series of workshops on the proposed 2016 definition of zero carbon at which a question about the relationship with the Code was asked. Communities and Local Government also sought the views of those on the two Code advisory groups on policy and the Technical Guide. The views of the Statutory Building Regulations Advisory Committee were also sought.</p>
Previous engagement:	<p>The 2007 consultation on the Code ‘The Future of the Code: making a rating mandatory’ also sought views on whether the Code should changes in 2010 in line with changing Building Regulations and on making the Lifetime Homes element mandatory within the Code.</p>

Contents

Scope of the consultation	3
Acknowledgements	5
About this consultation	7
Summary	9
Part A: Code for Sustainable Homes	18
Section 1 What is the Code	18
Section 2 Aligning the Code with the Zero Carbon Definition	23
Section 3 Streamlining the Code	39
Section 4 Resolving Problems	53
Section 5 Technical Guide	57
Section 6 The Code and consumers	59
Part B: Energy Efficiency Definition for Zero Carbon Homes	61
Section 7 Fabric and energy efficiency standard	61
Annex A: Summary of code consultation questions	77
Annex B: List of Code Environmental Issues	82
Annex C: Lifetime Homes Standard – Revised Criteria	84

Acknowledgements

This consultation has been developed by the Department for Communities and Local Government with the input and assistance of the Code Advisory Group, Building Regulations Advisory Committee and a specialist task group convened by the Zero Carbon Hub. We are also grateful to those who took part in stakeholder events, attended technical working groups and provided feedback on their experiences of building Code homes.

About this consultation

This consultation document and consultation process have been planned to adhere to the Code of Practice on Consultation issued by the Department for Business, Innovation, and Skills and is in line with the seven consultation criteria, which are:

1. Formal consultation should take place at a stage when there is scope to influence the policy outcome;
2. Consultations should normally last for at least 12 weeks with consideration given to longer timescales where feasible and sensible;
3. Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals;
4. Consultation exercises should be designed to be accessible to, and clearly targeted at, those people the exercise is intended to reach;
5. Keeping the burden of consultation to a minimum is essential if consultations are to be effective and if consultees' buy-in to the process is to be obtained;
6. Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation;
7. Officials running consultations should seek guidance in how to run an effective consultation exercise and share what they have learned from the experience.

Representative groups are asked to give a summary of the people and organisations they represent, and where relevant who else they have consulted in reaching their conclusions when they respond.

Information provided in response to this consultation, including personal information, may be published or disclosed in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence. In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that

confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the department.

The Department for Communities and Local Government will process your personal data in accordance with DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

Individual responses will not be acknowledged unless specifically requested.

Your opinions are valuable to us. Thank you for taking the time to read this document and respond.

Are you satisfied that this consultation has followed these criteria? If not or you have any other observations about how we can improve the process please contact:

Kavian Thompson
CLG Consultation Co-ordinator
Zone 6/J10
Eland House
London SW1E 5 DU

or by e-mail to: consultationcoordinator@communities.gsi.gov.uk

Summary

The Code for Sustainable Homes and ZCH Energy efficiency consultation

1. The aim of the Code is to improve the overall sustainability of new homes by setting a single national standard for England, Wales and Northern Ireland within which the home building industry can design and construct homes to higher environmental standards, and giving new homebuyers better information about the environmental impact of their new home and its potential running costs.
2. Its focus is primarily on issues relating to climate change. The Code has a key role in helping people to cut their carbon emissions and be prepared for a future climate as well as lead a more sustainable lifestyle in general. Where regulations are in place, or planned, the Code is intended to fit consistently and coherently with these. So, specifically, it reflects the future regulatory trajectory towards zero carbon homes. And it also includes measures for reducing energy consumption, minimising and recycling waste, reducing potable water demand, reducing the risk of flooding from periods of intense rainfall and reducing the impact of flooding, reducing carbon intensive travel by providing cycle storage as well as facilities for working at home. It encourages a reduction in embodied energy through the choice of building materials as well as the energy used during the construction. In short, the Code is key in helping us to mitigate and adapt to climate change.

<ul style="list-style-type: none"> • Energy and CO₂ Emissions • Water • Materials • Surface Water Run-off • Waste 	<ul style="list-style-type: none"> • Pollution • Heath and Wellbeing • Management • Ecology
---	---

Table showing the nine Code categories

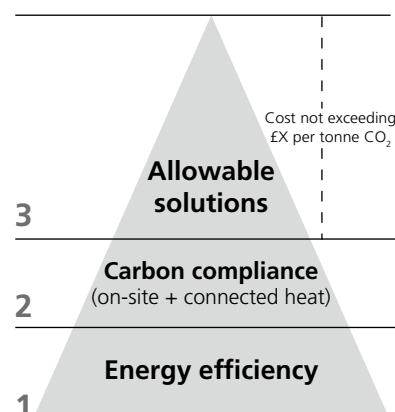
3. The Code is a voluntary standard with flexibility for developers to determine the most cost-effective mix of issues to cover to achieve any particular level, subject to a limited number of mandatory requirements. However, it is also used as a condition of funding for the Homes and Communities Agency *National Affordable Housing Programme*, on other government projects and land, and by local authorities when they want to set sustainability-based planning conditions on housing developments in their area.

4. Following the Code's introduction in 2007, nearly 2,000 post construction Code certificates were issued by the end of November 2009, with over 300,000 homes registered to be built to Code standards. It is therefore still relatively new.
5. One of the radical and unique features of the Code is that it is a tool intended to provide practical experience to support future regulatory steps to help achieve a challenging goal of zero carbon from 2016. This has been recognised by stakeholders across the piece and continues to be an important driver.
6. Thanks to the Code we have learned a considerable amount about building low and zero carbon homes in a relatively short period of time, which in turn has helped us to develop our proposals for the next regulatory step in 2010 on the way to zero carbon homes as well as the zero carbon definition for 2016. More importantly, our analysis has shown that for Code level 3, the most common level built, there has been reduction in additional costs of around 6 per cent since 2007 as builders gain experience and supply chains are established.
7. Practical experience of working with the Code is also informing the development of other aspects of sustainability policy (for example the development of surface water management proposals in the current Flood and Water Management Bill). However, it has also uncovered some issues with existing standards and the processes for assessment that we need to address to ensure it can continue to play a powerful role in supporting more cost effective sustainable housing development in future.
8. To enable the Code to continue to play a valuable role, this consultation is focused on three main aims:
 1. **aligning the Code with the latest developments in the zero carbon homes policy** – to enable it to continue to reflect the future regulatory trajectory and provide practical experience for developers and inform the development of detailed regulatory proposals for 2013 and beyond. This includes consulting on the new energy efficiency standard to be required of zero carbon homes
 2. **streamlining the standard and processes** – learning from experience to date, to ensure that the Code is focused on the issues of greatest significance and that we eliminate unnecessary bureaucracy and
 3. **resolving problems that have arisen in use** – seeking to find practical solutions to barriers that have arisen in the use of the Code so far, balancing sustainability policy aims with the practicalities of house building in the current economic climate.

Aligning the Code with the latest developments in the zero carbon homes policy

9. Climate change is the biggest challenge facing the world today. The Stern report in 2006 assessed the economic impacts of climate change and how they can be met, both in the UK and globally, and highlighted the cost to the world economy of delayed action in reducing greenhouse gases. In the UK, nearly half of our carbon emissions come from buildings – 27 per cent from homes and a further 17 per cent from other non-domestic buildings. The Government has recognised the serious global risks from climate change and has set in legislation a challenging target to reduce UK carbon emissions by 80 per cent against 1990 levels by 2050. One in three of the homes that we will be living in in 2050 will be built between now and then. So there is very significant potential for us to make a real difference to long-term emissions through the way that we build new homes over the coming years.
10. The policy statement *Building a Greener Future* in 2007 set out a target for all new homes to be zero carbon from 2016 with interim steps along the way in 2010 and 2013 through Part L of the Building Regulations. Since then, this aim has been further developed and defined, and we have consulted on the next regulatory step of a 25 per cent improvement against 2006 standards in 2010¹.
11. In July 2009, following advice from the UK Green Building Council Zero Carbon Definition task group and a public consultation on the detailed definition of zero carbon homes a three step approach to reaching the zero carbon homes standard was confirmed by the Housing Minister², based on:

- a high level of **energy efficiency** in the fabric and design of the dwelling
- **'carbon compliance'** – a minimum level of carbon reduction to be achieved from on-site technologies (including directly connected heat networks) and
- **'allowable solutions'** – a range of measures available for achieving zero carbon beyond the minimum carbon compliance requirements.



¹ *Proposed Changes to Part L and F of the Building Regulations: A consultation paper*, 18 June 2009, Department for Communities and Local Government. ISBN: 9781409815327

² Written Ministerial Statement on 16 July 2009 by John Healey MP, Minister for Housing and Planning.

Energy efficiency standard for zero carbon homes

12. The July 2009 Ministerial Statement announced the formation of a specialist task group to *“examine the energy efficiency metrics and standards which will realise our ambition of the highest practical energy efficiency level realisable in all dwelling types.”*
13. Following that statement, a task group of stakeholder experts was set up under the co-ordination of the Zero Carbon Hub. CLG is grateful to the Hub and to all involved with the task group for their work. On 24 November 2009 the task group published its report setting out recommendations³ for an energy efficiency standard based on the amount of energy used to provide space heating and cooling, per square metre of the home.
14. The Government agrees with the overall approach taken by the task group and considers that the standard it has recommended strikes the right balance between being as ambitious as possible and what is practically achievable. This consultation seeks your views on the energy efficiency standard, so as to check that there are no unintended consequences of adopting it as the minimum standard to be incorporated into all new homes (whether built to the Code or not) from 2016. It also seeks views on the transitional steps towards that standard to be incorporated into Building Regulations from 2013. And reflecting the current approach adopted in the Code for Sustainable Homes (the Code) of signposting the route to zero carbon, it proposes that the energy efficiency standard should be incorporated into the Code from 2010.

Aligning with the zero carbon definition for homes

15. The July 2009 statement also confirmed other aspects of the zero carbon definition. This clarified that it would require a 70 per cent reduction in carbon emissions against 2006 standards through a combination of energy efficiency, on-site low and zero carbon energy supply and/or connections to low carbon heat networks (‘carbon compliance’). The remaining emissions, including a calculated amount to cover the use of appliances, would be addressed through a system of ‘allowable solutions’ (including achieving further reductions on-site and a range of off-site measures).
16. This builds on previous announcements that the route to zero carbon would involve a series of regulatory steps of improvements against 2006 requirements of 25 per cent in 2010, 44 per cent in 2013 and finally to zero carbon in 2016.
17. This consultation sets out proposals for updating the alignment of the energy and carbon requirements of the Code with the zero carbon regulatory trajectory in the light of these announcements and the recent consultation on the next step up the regulatory ladder, to take place in 2010. It includes:

³ *Defining a Fabric Energy Efficiency Standard for zero carbon homes*, 24 November 2009, Report by the Zero Carbon Hub Energy Efficiency Task Group

- reflecting anticipated increases in regulatory requirements in 2010 in lower levels of the Code. The consultation on changes to Part L of the Building Regulations earlier this year set out plans for the 25 per cent increase against 2006 requirements. Currently Code levels 1, 2 and 3 require improvements of 10, 18 and 25 per cent respectively against the same baseline. While final decisions about the regulatory changes will not be made until next spring, we are proposing that the Code requirements for Code levels 1-3 are all aligned with the Part L changes as a 25 per cent improvement and
- updating the requirements at the higher levels of the Code to reflect the definition of zero carbon. We want to retain the principle that Code level 6 should reflect the zero carbon standard. So we propose to redefine it to match the requirement for at least 70 per cent carbon compliance with the remaining emissions, including appliances, addressed through allowable solutions. We are also proposing that Code level 5 should continue to be a 100 per cent improvement (ie covering all regulated energy, but excluding any allowance for appliances). So it would require at least 70 per cent carbon compliance, with the remaining 30 per cent allowable solutions.

Code Level	Current energy standard (Percentage improvement over 2006 Part L)	When change to regulations takes place	2009 Code consultation proposals (Percentage improvement over 2006 Part L)
1	10%		25%
2	18%		25%
3	25%	2010	25%
4	44%	2013	44%
5	100% regulated emissions		70% onsite + 30% allowable solutions
6	zero carbon onsite – 100% onsite plus appliances (equivalent to approximately 150% in total)	2016	“Zero Carbon Home” – 70% onsite + allowable solutions to reach zero carbon

Table showing regulatory steps to zero carbon and corresponding Code levels.

18. The current aim is that the Code should be updated to take effect from October 2010, the same timing as is intended for the changes to Part L to come into force.

Simplifying the Code

19. Since 2007 there have been a number of changes to regulations and statutory guidance linked to the Code. In addition, with just over 10000 Code certificates issued at both design and post construction stage (the majority in the last 12 months), a lot has been learned about how to build sustainable homes. This has also highlighted a number of areas where the Code may not work as well as planned.

Streamlining the standard

20. Our goal is to streamline the Code where necessary to make it easier and cheaper to build sustainable homes and to ensure it continues to focus effort on tackling climate change and reducing the impact new housing has on the environment.
21. The main changes proposed in this consultation to ensure consistency with other regulations and standards include:
 - delaying plans to make the Lifetime Homes Standard mandatory at Code level 4 in 2010, pending a fuller review of this policy. Whilst we remain committed to ensuring that the housing we build is suitable to respond to the needs of disabled or older people, we also need to recognise the challenges facing the housing industry in the short term by adopting a more proportionate and flexible approach. The 2010 review of Lifetime Homes will consider all these issues and set the direction for future action. In the meantime, the Lifetime Homes Standard will remain Mandatory at Code Level 6 and voluntary at all other levels of the Code. To help developers to adopt the standard in some circumstances where it has been shown to be impossible to meet all the external elements, we are also proposing to introduce an exemption for the criteria relating to outside access in the Lifetime Homes standard on steeply sloping or in severely constrained sites, as long as accessible steps are installed
 - ensuring that the accessibility requirements and terminology in the Code (in the waste and private space sections) align with industry standard terminology and refer to the most up to date British Standards and are consistent with the requirements of Part M of the Building Regulations
 - removing the mandatory requirement for Site Waste Management Plans in light of the regulatory requirement in England and consulting on improving the voluntary credits
 - seeking views on allowing more flexibility in cycle storage arrangements on high density sites and for instance, in specialist housing for the over 60s
 - seeking views on allowing flexibility on the home office requirements for instance, for specialist housing for the over 60s.

22. In light of changes to Part L we are also proposing to drop the redundant 'internal lighting' issue and seeking views on whether it should be replaced with a new voluntary issue to promote the provision of a device that clearly shows energy use and will hopefully drive a change in consumer behaviour. This would be similar to the devices currently provided by energy companies to existing homes under the Carbon Emissions Reduction Target.
23. We would welcome views on whether our proposals will succeed in streamlining the Code and reducing costs, as well as any other suggestions for refining the Code that recognise our priorities to tackle climate change and reduce the impact of new housing on the environment.

Streamlining the assessment process

24. In the spirit of reducing unnecessary bureaucracy and administrative costs as well as ensuring the buildability of the Code we have published, alongside this consultation document, a range of practical steps that can simplify the assessment process and in particular the evidence requirements. We have also reflected them in the accompanying draft Code Technical Guide for 2010.
25. We have also asked the Building Research Establishment to publish a guidance note to help address the confusion relating to the current surface water management requirements in the Code and potential conflicts with a range of statutory requirements such as those set down by Planning Authorities and the Environment Agency.
26. Both of these documents are available on our website: www.communities.gov.uk/thecode and take effect immediately and retrospectively for all versions of the Code.

Resolving problems that have arisen in use

27. The Flood and Water Management Bill, included in the Queen's Speech on 18 November 2009 for discussion in Parliament's 5th session, includes provisions to tackle flooding from surface water run-off. The Bill would require developers to gain the approval of a new SUDS Approving Body, located at upper tier/unitary levels, for all drainage plans for new developments and redevelopments, before construction could commence, and before connection to the sewer could be made. Central to these provisions are the proposed national Standards for SUDS, which cover requirements for the design, construction, operation and maintenance of SUDS, as well as a duty for local authorities to adopt and maintain SUDS that serve more than one property.

28. The Building Research Establishment has recently published a guidance note to address current confusion around assessment of the current mandatory requirements in the Code on managing surface water run-off, which will make the assessment process clearer and easier to understand. In addition to this, we are consulting on changes to the requirements to align with the emerging National Standards, incorporating the full range of sustainable urban drainage techniques so that developers can incorporate the most optimal solution for a specific site.
29. We are also seeking views on whether greater clarity would be achieved in the Security section if clear standards for doors and windows were set out in the Code. Currently points are awarded for implementing steps determined by local police advisors. Experience is suggesting that these can vary, as well as take up considerable time for both developers and local police. So we are proposing a standard requirement, but with additional points available for working with local police advisers, where appropriate.
30. The cost and benefits of the whole of this package of proposals has been set out in the accompanying impact assessment.

The Code and consumers

31. One of the key drivers for introducing the Code was the impact it could have on consumers, by clearly showing how the home was designed to be more sustainable. As the Code is still relatively new and there are not yet a significant number of completed Code homes, this has clearly not happened yet. However, it remains our ambition that the Code should have a positive impact in this way.
32. Since May 2008, all new homes in England need to be rated against the Code. Homes built to the Code standards achieve a rating of one star through to six stars – a truly sustainable home. The Code certificate shows the star rating together with a clear explanation of how that was achieved. All Code certificates also include the Energy Performance Certificate environmental impact rating diagram.
33. Homes that have not been assessed and are built to the standards set out in Building Regulations receive a nil rating. The aim of this policy is to raise awareness amongst consumers of the sustainability of their new home. Like the Code and Energy Performance Certificates, this policy is new and as yet, very few home buyers are likely to have had the opportunity to find out about energy efficient, sustainable homes.
34. The Zero Carbon Hub is undertaking a workstream on consumer aspects of zero carbon homes so as to help industry understand the features that would appeal to consumers and how to market zero carbon homes in a way that appeals to buyers.

35. As the number of Code homes increases in the future we will continue to work with the Energy Savings Trust, Zero Carbon Hub, house builders and consumer organisations to ensure that house buyers are fully informed and understand the importance of energy efficiency and sustainability when making a decision to purchase a home. Meantime, we are seeking views in the consultation on ways to help make the Code more accessible, visible and valuable to consumers.

Consultation documents

36. This consultation document should be read in conjunction with the draft Code technical guide and impact assessment and the impact assessment on the zero carbon definition. Part A of the consultation paper refers to changes to the Code and Part B seeks views on the energy efficiency standard for zero carbon homes. To fully understand the changes to the energy section of the Code you will need to read Part B of the consultation paper as well.

Part A: Code for Sustainable Homes

Section 1

What is the Code for Sustainable Homes?

- 37. The Code for Sustainable Homes (the Code) was introduced in England in April 2007 following extensive consultation with environmental groups and the home building and wider construction industries. It has since been adopted by Wales and Northern Ireland⁴. The Code is not operational in Scotland.
- 38. The Code is a voluntary standard designed to improve the overall sustainability of new homes by setting a single framework within which the home building industry can design and construct homes to higher environmental standards and offers a tool for developers to differentiate themselves within the market. Where it is used the Code also gives new homebuyers better information about the environmental impact of their new home and its potential running costs.
- 39. The Code complements the system of Energy Performance Certificates for new homes, which was introduced in April 2008 under the Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007.
- 40. The Code measures the sustainability of a home against nine design categories, rating the 'whole home' as a complete package. The design categories are:

Energy and CO ₂ Emissions	Pollution
Water	Health and Wellbeing
Materials	Management
Surface Water Run-off	Ecology
Waste	
- 41. Each category includes a number of issues (see Annex B) which have a potential impact on the environment. The issues can be assessed against a performance target and awarded one or more credits. They represent good or best practice, are technically feasible, and can be delivered by the building industry.

⁴ The Code does not apply in Scotland. The Welsh Assembly Government adopted the Code in May 2008, and since September 2009, any development of 5 or more dwellings in Wales must achieve Code Level 3. From 1 September 2010, all applications for any number of dwellings must achieve Code Level 3. All public sector housing in Northern Ireland has been built to Code Level 3 since April 2008.

The sustainability rating system

42. The Code uses a sustainability rating system – indicated by ‘stars’, to communicate the overall sustainability performance of a home. A home can achieve a sustainability rating from one (★) to six (★★★★★) stars depending on the extent to which it has achieved Code standards⁵. One star (★) is the entry level – mostly above the level of the Building Regulations; and six stars (★★★★★) is the highest level – reflecting exemplar development in sustainability terms.

Achieving a sustainability rating

43. The sustainability rating that a home achieves represents its overall performance across the nine Code design categories.
44. Minimum standards exist for a number of categories – these must be achieved to gain a one star sustainability rating. Energy efficiency and water efficiency categories also have minimum standards that must be achieved at every level of the Code, recognising their importance to the sustainability of any home.
45. Apart from these minimum requirements the Code is completely flexible; developers can choose which and how many standards they implement to obtain ‘credits’ under the Code in order to achieve a higher sustainability rating.
46. The table below shows the nine design categories and the degree of flexibility afforded by each.

Flexibility of the Code	
Categories	Flexibility
Energy/CO ₂ Water	Minimum standards at each level of the Code
Materials Surface water run-off Waste	Minimum standard at Code level 1
Health and wellbeing	Minimum standards only at Code level 6 for HEA4, the Lifetime Homes standard.
Pollution Management Ecology	No minimum standards

⁵ A zero star certificate is also available if the Code assessment requirements for Code level 1 are not met.

Assessing the sustainability rating

47. Assessment procedures are based on BRE's EcoHomes System which depends on a network of specifically trained and accredited independent assessors. Currently BRE and Stroma can offer training and accreditation of Code assessors.
48. Code assessors can conduct an initial design stage assessment, recommend a sustainability rating, and issue an interim Code certificate. A final Code certificate of compliance is issued after a post-completion check to verify the rating has taken place.
49. Builders whose home designs and completed work are assessed under the Code will receive a certificate showing the overall sustainability rating for the home, and a breakdown of how that rating has been achieved.

Provision of sustainability certificates in the Home Information Packs

50. Since May 2008, all new homes in England need to be rated against the Code. This mandatory requirement came into effect for all developments where a local authority received the building notice, initial notice or full plans application after 1 May 2008. Developments where a local authority had received these stages on or before 30 April 2008 are exempt. Where Building Regulations apply, compliance is necessary at all times. Homes built to the Code standards achieve a rating of one star through to six stars – a truly sustainable home. Homes that have not been assessed and are built to the standards set out in Building Regulations receive a nil rating.

Who is building Code homes?

51. The Homes and Communities Agency (and before that English Partnerships and the Housing Corporation) have been building homes on Government land to Code level 3 since April 2007 and with funding from the National Affordable Housing Programme since April 2008. In addition homes built in Ecotowns, on the Olympic legacy site, and by other parts of Government are also required to be built to Code standards. Local authorities may also, under the Planning Policy Statement 1 on planning and climate change, set sustainability-based planning conditions on housing developments in their area.

When does the Code become mandatory?

52. The Code is a voluntary standard and there are no plans to change that. As mentioned above, it is used as a condition of funding for the Homes and Communities Agency National Affordable Housing Programme, on other Government programmes or land and by local authorities when they want to set sustainability-based planning conditions on housing developments in their area.
53. The timetable for introducing higher standards of energy efficiency through Part L of the Building Regulations is a 25 per cent improvement on current (2006) standards in 2010 and 44 per cent improvement in 2013, with all homes being net zero carbon from 2016.

Why are we proposing changes to the Code?

54. A key aspect of the Code is that it signals the future regulations on zero carbon homes – a standard which will apply to all new homes from 2016. It has also given those house builders who can to go further and faster than regulations the opportunity to do so. As a result we have learned more about building low and zero carbon homes, which has helped to develop the approach to Part L of the Building Regulations for 2010 as well as the zero carbon definition for 2016. These revisions need to be reflected back into the Code if it is going to continue to smooth the transition to zero carbon new homes.
55. This consultation therefore predominantly focuses on the changes needed to the Code from 2010 **to align it with the zero carbon homes** policy, including with the revision to Part L of the Building Regulations and the zero carbon definition for 2016. In addition it seeks to **streamline the standard and processes** – learning from experience to date, to ensure that the Code is focused on the issues of greatest significance and that we eliminate unnecessary bureaucracy. Finally it looks at how to **resolve some problems that have arisen in use** – seeking to find practical solutions to barriers that have arisen in the use of the Code so far, balancing sustainability policy aims with the practicalities of house building in the current economic climate.
56. Supporting this consultation is an impact assessment setting out the costs and benefits of the proposals as well as an updated analysis of the costs of building to the current Code standards which was undertaken in early 2009. There is also an impact assessment supporting Part B on the Energy Efficiency Standard for Zero carbon homes.

57. The quoted carbon savings in the impact assessment accompanying this consultation document do not presently take account of embodied carbon. In other words, the quoted carbon savings relate to the reduction in emissions from operation of the energy efficiency and micro-generation related installations and not their manufacture, distribution or assembly.
58. It is very difficult to net out such embodied carbon because it requires second guessing the nature and origin of manufacture for such energy products, and for the products and processes which they are replacing, many years ahead. Because such carbon is excluded, it is possible that carbon savings quoted are over-estimated.

When will the next update of the Code be published?

59. Subject to the outcome of this consultation, we aim to publish the next update in summer 2010 for implementation in October 2010 alongside the revised Part L of the Building Regulations. The transitional arrangements are still being considered, however as is currently the case, when the next version is published the house builders will be able to continue to build to the version of the Code they are registered against, or will be able to register to the new version of the Code.

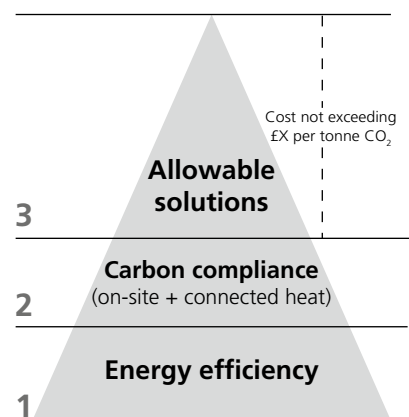
Section 2

Aligning the Code with the Zero Carbon policy

60. The policy statement *Building a Greener Future* in 2007 set out a target for all new homes to be zero carbon from 2016 with interim steps along the way in 2010 and 2013 through Part L of the Building Regulations. Since then, this aim has been further developed and defined, and we have consulted on the next regulatory step of a 25 per cent improvement against 2006 standards in 2010⁶.

61. In July 2009, following a public consultation on the detailed definition of zero carbon homes⁷ a three step approach to reaching the zero carbon homes standard was confirmed by the Housing Minister⁸, based on:

1. a high level of **energy efficiency** in the fabric and design of the dwelling
2. **'carbon compliance'** – a minimum level of carbon reduction to be achieved from on-site technologies (including directly connected heat networks) and
3. **'allowable solutions'** – a range of measures available for achieving zero carbon beyond the minimum carbon compliance requirements



62. The July 2009 statement also confirmed other aspects of the zero carbon definition. It clarified that it would require a 70 per cent reduction in carbon emissions against 2006 standards through a combination of energy efficiency, on-site low and zero carbon energy supply and/or connections to low carbon heat networks ('carbon compliance'). The remaining emissions, including a calculated amount to cover the use of appliances, would be addressed through a system of 'allowable solutions' (including achieving further reductions on-site and a range of off-site measures).

⁶ *Proposed Changes to Part L and F of the Building Regulations: A consultation paper*, 18 June 2009, Department for Communities and Local Government. ISBN: 9781409815327

⁷ *Definition of Zero Carbon Homes and Non-Domestic Buildings Consultation*, December 2009, Department for Communities and Local Government, ISBN: 9781409809340

⁸ Written Ministerial Statement on 16 July 2009 by John Healey MP, Minister for Housing and Planning.

63. On 24 November the Zero Carbon Hub published the report from the Energy Efficiency Task Group which had been established to consider the metric to be used for calculating energy efficiency as well as the level at which it should be set. This metric and levels have been incorporated into the draft Technical Guide accompanying this consultation.
64. The Government agrees with the overall approach taken by the Task Group and considers that the standard it has recommended strikes the right balance between being as ambitious as possible and what is practically achievable. Part B of this consultation seeks your views on the energy efficiency standard, so as to check that there are no unintended consequences of adopting it as the minimum standard to be incorporated into all new homes from 2016 and whether any interim step should be introduced into Building Regulations in 2013.
65. The recommendations are incorporated into our proposals for the Code and the impact can be seen in the revised issue – *ENE 2: Fabric Energy Efficiency* (previously *ENE 2: Building Fabric*) as well as the proposals for an interim step at Code level 4.
66. Part A of the consultation paper therefore seeks your views on a number of proposals to:
 1. update the Code to reflect the proposals in the consultation on changes to Part L of the Building Regulations for 2010, to ensure that lower levels of the Code at least match expected regulatory standards and
 2. update the requirements at the higher levels of the Code to reflect the definition of zero carbon

Proposals for the Energy and CO₂ emissions category

67. As both Part L and the zero carbon definition impact in different ways on the nine environmental issues in the energy and CO₂ emissions category (see box A), the proposed changes are being discussed issue by issue.

Box A: Environmental Issues in the current Energy and CO₂ emissions category

ENE1: Dwelling emission rate
 ENE2: Building fabric
 ENE3: Internal lighting
 ENE4: Drying space
 ENE5: Energy labelled white goods
 ENE6: External lighting
 ENE7: Low or Zero Carbon technologies
 ENE8: Cycle storage
 ENE9: Home office

Aligning with Part L of the Building Regulations 2010

68. The methodology adopted in the Code energy section builds on the methodology for the current Part L of the Building Regulations and uses the Government's Standard Assessment Procedure (SAP) as the tool for calculations. We propose aligning the Code with the revised Part L 2010 when finalised to ensure that lower levels of the Code at least match expected regulatory standards.

Question 1

Do you agree that the Code energy methodology should be aligned with the revised Part L 2010 when published?

Note: All references in this consultation document and the accompanying draft technical guide and impact assessment have made assumptions that the Government's preference in the Part L consultation document for a 'flat' (i.e. across the board) 25 per cent improvement will be introduced into regulations. This does not indicate the outcome of the consultation. Final decisions on the Part L changes will be made in the spring and reflected in the Code as it is finalised.

Maintaining the link with zero carbon homes policy

69. The first energy issue is *ENE1: Dwelling Emission Rate*. This issue shows the trajectory to zero carbon and sets minimum standards for each of the Code levels set against a baseline of Part L of the Building Regulations 2006. Code level 1 shows a 10 per cent improvement and levels 3, 4 and 6 are currently the 25 per cent, 44 per cent and net zero carbon steps planned for 2010, 2013 and 2016 respectively (see table 1 below).

Table 1: steps to zero carbon new homes and corresponding Code levels

Code Level	Current energy standard (Percentage improvement over 2006 Part L)	When equivalent change to regulations is due
1	10%	
2	18%	
3	25%	2010
4	44%	2013
5	100% regulated emissions	
6	zero carbon onsite (100 per cent regulated plus appliances – equivalent to approximately 150 per cent in total)	2016

70. Feedback we have had from industry suggests that this trajectory and the ability to build to these higher standards has helped focus minds and gain early experience. This was particularly evident when the review started for Part L 2010 standards. Many of those taking part in the industry working groups had experience of, or had considered, how to build to Code level 3 and therefore the proposed 2010 standard. This made the review process more straightforward and it also meant that potential issues were identified through the voluntary Code process rather than after regulations had been developed.
71. The challenge to having this link is that there has been confusion about whether the Code itself will become a regulatory standard replacing or sitting alongside Building Regulations. This was partly because of the commitment that public sector homes will build to increasing levels of the Code over time, but also because of the tendency by all parties to refer to the planned energy improvements in Building Regulations in terms of their equivalent Code levels. However, there are no proposals to make any level of the Code a minimum national regulatory requirement applicable to all housing.
72. On balance, we judge there will be greater benefit to be gained by maintaining the link by adopting the proposed regulatory definition of zero carbon in the Code at the highest level. This will enable industry to continue piloting approaches to low and

zero carbon homes through the Code and initiatives such as the Carbon Challenge. It will also mean that as we develop in more detail the approach for the 2016 regulations there should be a tried and tested basis for regulation. This approach can therefore make a real contribution to making our 2016 goal achievable in practice.

73. This approach also echoes the view expressed by the majority of those who took part in the workshops on the zero carbon definition organised by the Zero Carbon Hub early in 2009. At each session over 65 per cent and sometimes as high as 85 per cent of participants agreed that the new zero carbon definition should be incorporated into the Code. Respondents to the zero carbon consultation also endorsed this approach.
74. We therefore propose to revise the first energy category issue methodology (*ENE1: Dwelling Emission Rate*) to anticipate the new zero carbon definition, the new Part L requirements and anticipate what Code level 4 – the 44 per cent improvement – and Code level 5 will look like. The technical standards for these changes are also considered later in this document.

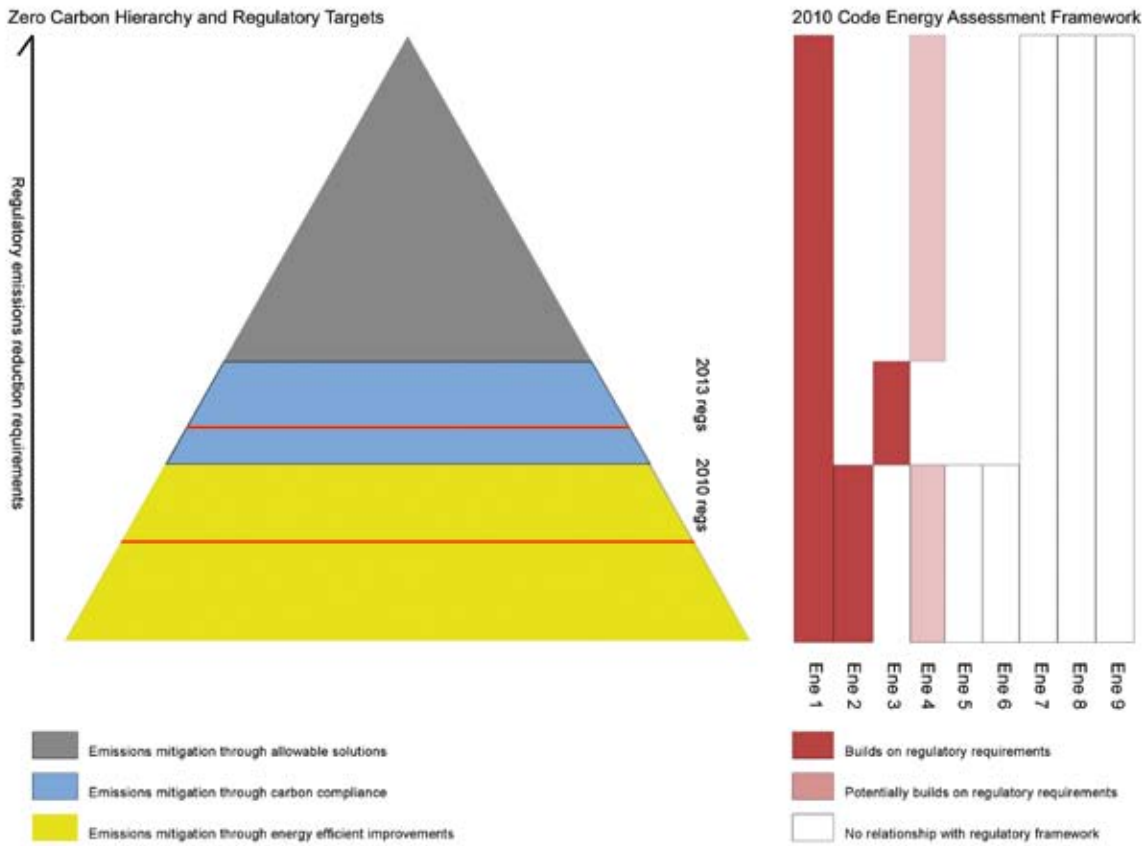
Question 2

Do you agree that in principle we should maintain the current approach whereby the energy section of the Code (ENE 1) anticipates the 2013 and 2016 changes to regulations leading to zero carbon?

Aligning the energy issues with the terms used in the zero carbon definition

75. As well as maintaining the link between regulations and the 2016 zero carbon definition in *ENE1: Dwelling Emission Rate* we also propose to revise the terminology and sequencing used in the Code energy section to better reflect the zero carbon hierarchy as well as emerging requirements from European Directives.
76. This includes renaming and renumbering two of the current energy issues *ENE2: Building Fabric* and *ENE 7: Low and Zero carbon Technologies* to *ENE2: Fabric Energy Efficiency* and *ENE3: Renewable Technologies* and renumbering the remaining energy issues.

Diagram showing how new categories would align with zero carbon hierarchy



77. Aligning the Code with the zero carbon hierarchy should help industry become familiar with future regulations including the terminology and approaches used and will reduce the need for further changes in the future. This may potentially result in an administrative cost to businesses in the short term. We are not able to quantify the costs associated with changing the energy category issue names, but on the accompanying impact assessment has assessed the one off costs of all the changes to this version of the Code being £5.8m. We would welcome your views on whether aligning the terms with the zero carbon hierarchy (where appropriate) would be beneficial or whether it would be an unnecessary change.

Table 2: Current and future titles for energy issues	
Current ENE issues	2010 ENE issues
ENE1: Dwelling Emission Rate	ENE1: Dwelling Emission Rate
ENE2: Building Fabric	ENE2: Fabric Energy Efficiency
ENE3: Internal lighting	ENE3: Renewable Technologies
ENE4: Drying Space	ENE4: Energy labelled white goods
ENE5: Energy labelled white goods	ENE5: Drying Space
ENE6: External Lighting	ENE6: External Lighting
ENE7: Low and zero carbon technologies	ENE7: Cycle storage
ENE8: Cycle storage	ENE8: Home Office
ENE9: Home Office	ENE9: Energy Display devices

Question 3

Do you agree in principle that the energy issues in the Energy category of the Code should be revised to reflect the terminology used in zero carbon hierarchy? If not, what would be your suggested approach?

Introducing ‘half’ credits into ENE1: Dwelling Emission Rate

- 78. With the current credit allocation for *ENE1: Dwelling Emission Rate*, if, for example, 29 per cent improvement is achieved, 5 credits would be awarded because it falls within the range between 25 per cent to 30 per cent. This is despite 29 per cent being nearer to the 6 credit boundary (31 per cent). This could limit energy efficiency specifications to only achieve the mandatory minimum requirements, rather than encourage developments to aim slightly higher.
- 79. We are proposing that fractions of credits, e.g. ‘half’ credits, be awarded where emissions reductions sit between defined benchmarks. For example, where a dwelling achieves a 29 per cent improvement in the dwelling emission rate (DER) over the target emission rate (TER) then 5.5 credits would be awarded rather than 5. It is considered that this will help to prevent degradation of energy efficiency specifications and reward developments going further than the mandatory minimum.
- 80. We do not anticipate any costs associated with introducing half credits.

Question 4

Do you agree that introducing half credits under *ENE1: Dwelling Emission Rate* is an effective approach to preventing degradation of specification? If not, why?

Question 5

Would it be beneficial to introduce a further breakdown of credits available in this section? If yes, what would you propose?

Allocation of credits between ENE1 and ENE2

81. Under ENE1: *Dwelling Emission Rate* credits are currently awarded on an ascending scale from 1 credit (Level 1) to 15 credits (Level 6) based on the percentage improvement achieved over Part L of the Building Regulations. See table 3 below.

Table 3: Current and proposed 2010 credit allocation for ENE1: Dwelling Emission Rate
Please note the percentage improvements for 2010 are indicative and will need to be finalised in light of Part L consultation outcome

Mandatory levels	Current percentage improvement of DER over TER over Part L 2006	Current Credits	2010 percentage improvement of DER over TER over Part L 2006	2010 Credits
Level 1	≥10	1	25	0
	≥14	2	25	0
Level 2	≥18	3	25	0
	≥22	4	25	0
Level 3	≥25	5	25	0
	≥31	6	≥31	1
			≥34	1.5
	≥37	7	≥37	2
Level 4	≥44	8	≥44	3
			≥48	3.5
	≥52	9	≥52	4
			≥56	4.5
	≥60	10	≥60	5

Table 3 (continued): Current and proposed 2010 credit allocation for ENE1: Dwelling Emission Rate
Please note the percentage improvements for 2010 are indicative and will need to be finalised in light of Part L consultation outcome

			≥65	5.5
	≥69	11	≥69	6
			≥74	6.5
	≥79	12	≥79	7
			≥84	7.5
	≥89	13	≥89	8
			≥94	8.5
Level 5	≥100 regulated emissions	14	≥100 (70% onsite + 30% allowable solutions)	9
Level 6	'Zero Carbon Home' – 100 % onsite (equivalent to approximately 150% in total)	15	"Zero Carbon Home" – 70% onsite + allowable solutions to reach zero carbon	10

Note: As stated in John Healey's July 2009 Written Ministerial Statement, the 70 per cent reduction required for carbon compliance (and shown above for Code levels 5 and 6) is based on the assumptions laid out in the December 2008 consultation document (see in particular Annex E of that document). We will consider updating the 70 per cent figure, as necessary, in light of technical changes, such as developments to the Standard Assessment Procedure to maintain the overall level of ambition and provide continued certainty to industry. In the meantime, for purposes of this consultation and supporting impact assessment, it is assumed that the carbon compliance requirements of Code levels 6 and 6 will be calculated based upon SAP 2009 methodology.

82. As can be seen from Table 3 above, *ENE 1: Dwelling Emission Rate*, currently awards 15 credits in total for achieving the different levels. This includes 5 credits for achieving Levels 1 to 3, which will be below the new 2010 Part L regulations. We propose to remove those 5 credits from ENE1 and reallocate them to *ENE2: Building Fabric* to incentivise improvements in energy efficiency.
83. The current *ENE 2: Building Fabric* awards up to 2 credits for reaching relatively demanding Heat Loss Parameters (HLP) of 1.30 and 1.10. In addition, there is a mandatory requirement at Code level 6 of reaching a HLP of 0.80. We propose to align this issue with the new energy efficiency definition in the zero carbon hierarchy (see below and Part B for more information).

84. By reallocating the credits the Code will reward those who improve the energy efficiency of the homes they build by increasing the total number of credits available from 2 to a total of 7 (see table 4 below).
85. Our impact assessment has modelled the cost of this change at £0.54m a year. It will however help industry in working towards the standards that will become mandatory in 2016.

Question 6

Do you agree with removing 5 credits from *ENE 1: Dwelling Emission Rate* and reallocating them to *ENE 2: Building Fabric* to incentivise improvements to the energy efficiency of the building?

Question 7

Do you agree with the proposed allocation of credits, as shown in the credit allocation table? If not, what would be your suggested approach?

Introducing Allowable Solutions into the Code

86. It can be seen from Table 3 above that, beyond 70 per cent carbon compliance, DER reductions required to reach Code levels 5 and 6 can be achieved through allowable solutions. Government has not yet defined what the range of allowable solutions will be. However, John Healey's Written Ministerial Statement in July 2009⁹ set out those allowable solutions that commanded broad support following the December 2008 consultation on zero carbon homes. These included:

- further carbon reductions on site beyond the regulatory standard
- energy efficient appliances meeting a high standard which are installed as fittings within the home
- advanced forms of building control system which reduce the level of energy use in the home
- exports of low carbon or renewable heat from the development to other developments
- investments in low and zero carbon community heat infrastructure
- other allowable solutions remain under consideration

⁹ www.communities.gov.uk/statements/corporate/ecozerohomes

87. Government is working to consider the practical arrangements that would be required to permit allowable solutions to be put in place and to ensure that standards are achieved in practice. Further announcements on this will be made as soon as possible. In the meantime, it should be understood that further carbon reductions on site beyond 70 per cent would count towards carbon reductions for purposes of the Code so, even in the absence of other allowable solutions, going further on-site would count. Government will also consider what interim arrangements might be needed to make allowable solutions practicable under the Code for Sustainable Homes in advance of the practical arrangements that will be needed to give effect to allowable solutions on a mass scale from 2016.

Question 8

Do you have any suggestions for mechanisms for allowable solutions that could be used in the Code in advance of the introduction of a national approach to allowable solutions?

Changing Building Fabric to Fabric Energy Efficiency

88. The first layer of the zero carbon hierarchy is energy efficiency. The statutory guidance on ways of complying with the energy efficiency and carbon requirements of the current Building Regulations also includes certain guideline minimum energy efficiency standards that should be achieved for the envelope of the building.
89. The aim of credit issue *ENE2: Building Fabric* in the current version of the Code was to future proof the energy efficiency of dwellings over their whole life by limiting heat losses across the building envelope. Currently the focus is on improvements to the thermal performance of the building envelope using the Heat Loss Parameter as calculated by the SAP methodology.
90. To align with the zero carbon hierarchy we propose changing the name of this credit issue from *ENE2: Building Fabric* to *ENE2: Fabric Energy Efficiency*. We also propose to change the focus from heat loss to space heating and cooling energy demand and by adopting the proposed new metric for the zero carbon definition of kWh/m²/year rather than continue to use 'Heat Loss Parameter' (see Part B for more information).
91. We also propose to include the levels of kWh/m²/year for the 2016 definition of zero carbon into the Code with a mandatory requirement at Code level 5 and 6 for the 2016 levels (as shown below in table 4). We intend to award 5 out of the 7 credits available for reaching this standard. We believe this provides the right balance between rewarding achievements of what is supposed to be the highest practical regulatory standard and providing further incentive for those who want to go further than the minimum regulatory level.

92. In Part B we are also consulting on whether it would be appropriate to introduce interim fabric energy efficiency requirements into regulations in 2013. Given the role the Code has of smoothing the transition to zero carbon we propose including a possible 2013 requirement for interim standards for energy efficiency at Code level 4, as shown in Table 4 below.

Table 4: showing proposed new credit allocations and the proposed mandatory requirements at Code level 4 and 6 for *ENE2: Fabric Energy Efficiency*

Energy Demand (Space heating + cooling) kWh/m ² /yr			
Apartments, Mid terrace	End terrace, Semi detached, detached	Credits	Mandatory Requirements
≤48	≤60	1	
≤45	≤55	2	
≤43	≤52	3	Level 4
≤41	≤49	4	
≤39	≤46	5	Level 5 & 6
≤35	≤42	6	
≤32	≤38	7	

93. If, as a result of the consultation on the fabric energy efficiency standard within zero carbon homes (see Part B), an alternative approach to setting the requirements for 2013 is chosen (as set out in Part B) then potentially these requirements could be introduced into *ENE1: Dwelling Emission Rate* at Code level 4, alongside the mandatory emissions reduction (44%).

Question 9
Do you agree that *ENE2: Building Fabric* be changed from its current name to *ENE2: Fabric Energy Efficiency* to reflect the zero carbon hierarchy?

Question 10
Do you agree that we should adopt the new energy efficiency metric and levels for the 2016 zero carbon definition into the Code now? If not, why not?

Question 11
Do you agree that we should adopt the new energy efficiency levels for the 2016 zero carbon definition into the Code as a mandatory requirement at Code levels 5 and 6 and award 5 credits?

Question 12

Do you agree that Code level 4 should mirror the outcome of the consultation on the energy efficiency definition (see Part B) for interim measures to be introduced into regulations in 2013?

Removing *ENE3: Internal Lighting*

94. Part L of the Building Regulations currently requires that at least 30 per cent of internal light fittings are dedicated energy efficient fittings. The Code builds on that and *ENE3: Internal Lighting* awards up to 2 credits for installing either greater than 40 per cent or greater than 70 per cent of dedicated, fixed internal energy efficient light fittings.
95. The Part L consultation for 2010 has proposed that 75 per cent of fittings are either dedicated fittings or standard fittings supplied with low energy lamps with integrated control gear. It also allows the benefits of Low Energy Lighting to be recognised in the DER calculation. We therefore propose deleting this credit issue since we consider it is no longer required in light of proposed changes to Part L as well as proposals to phase out inefficient lighting. The 2 credits would be reallocated elsewhere in the energy section.

Question 13

Do you agree that the credits for internal lighting will no longer be required once the Code is updated in 2010 and it is therefore appropriate to delete *ENE3: Internal Lighting* and reallocate the points elsewhere in the energy section?

ENE 5: Energy Labelled White Goods

96. This credit issue aims to encourage the provision or purchase of energy efficient white goods (fridges, freezers or fridge-freezers, washing machines and dishwashers, washer-dryers or tumble dryers), thus reducing the CO₂ emissions from appliance use in the dwelling.
97. One point is awarded where information is provided relating to the provision of energy efficient white goods, whereas up to two points are available where energy efficient white goods are supplied.

98. Whilst there are no proposals to change the structure of the credits, there is a proposal to change the focus on strengthening the leaflet provision where white goods are not provided. Currently the leaflet needs to describe the EU Energy Efficiency Labelling Scheme and explain clearly what the scheme is and how it works.
99. It is often the case that homes being sold 'off-plan' will provide appliances as 'optional extras' upon request. Currently there is no requirement under the Code for developers to demonstrate that any appliances offered as extras will be energy efficient and meet an energy efficient product endorsement scheme.
100. This approach supports the emerging proposals under the zero carbon homes policy that the provision of energy efficiency appliances could count towards allowable solutions.
101. It is proposed that where the leaflet is used to gain 1 credit but appliances may be offered and installed as 'optional extras', evidence must be provided to demonstrate that all applicable appliances offered by the developer meet the minimum standards for gaining credits under this issue.

Question 14

Do you agree that evidence must be provided by developers on the energy efficiency of appliances provided as optional extras if they choose to gain the credit for leaflet provision?

Changing the credits for *ENE6: External Lighting*

102. There are currently two credits available under this issue to encourage the use of energy efficient external lighting. During working groups as part of the review of the Code it was suggested that this issue had only had a limited impact on reducing carbon emissions and that the two credits are disproportionately rewarding this issue. We are therefore seeking views on whether the credits available for installing dedicated energy efficient external lighting should be reduced to one credit. The single remaining credit is gained by specifying dedicated energy efficient fittings for external space lighting, and ensuring all security lighting is designed for energy efficiency and adequately controlled. The point could be reallocated to the proposed new *ENE9: Energy Display Devices*.
103. The modelling in our impact assessment shows there is a small cost associated with this change of between £45 and £50 for each dwelling depending on the Code level being sought and mix of credits adopted. More information is available in the impact assessment.

Question 15

Do you agree that the 2 credits awarded for external lighting should be reduced to 1 credit?

Aligning the Code with carbon compliance and rewarding the installation of renewable technologies

104. The Code issue *ENE7: Low or Zero Carbon Technologies* currently awards two credits for reducing carbon emissions and atmospheric pollution by encouraging local energy generation from renewable sources. To gain credits the technologies specified and installed must be recognised by the Microgeneration Certification Scheme (or similar). The current *ENE 7: Low or Zero Carbon Technologies* category was introduced to help stimulate the market for low and zero carbon technologies as well help reduce carbon emissions from a dwelling. The EU Renewable Energy Directive 2009 encourages the promotion of renewable energy technologies through the adoption of a European target on consumption of renewable energy. The UK has a share in this renewable energy target as well as the carbon emissions reduction target. Therefore continuing to incentivise renewable technologies in the Code helps towards meeting our renewable energy targets.
105. It is therefore proposed to keep this issue, but to rename it '*ENE 3: Renewable Technologies*'.
106. To qualify for the credits in this section technologies must be recognised by the EU Renewables Directive and (as relevant):
- i) certified under the Microgeneration Certification Scheme¹⁰ (for technologies under 50kWe or 300kWth); or
 - ii) assured under the CHP Quality Assurance¹¹ (for renewable Combined heat and Power above 50kWe).
107. Other onsite renewable technologies over 50kWe or 300kWth have no certification or assurance scheme at present but it is proposed that they are still eligible.

Question 16

Do you agree that this issue is renamed from *ENE7 Low and Zero Carbon Technologies*' to *ENE3: Renewable Technologies*?

¹⁰ See <http://www.microgenerationcertification.org>

¹¹ See <http://www.chpqa.com>

Question 17

Do you agree that for technologies under 50kWe and 300kWth certification under the *Microgeneration Certification Scheme* should be a requirement for allocating credits and for all renewable CHP schemes over 50kWe assurance under the CHPQA should be a requirement for allocating credits?

Introducing credits for energy display devices

108. Under the Carbon Emissions Reduction Target programme some energy companies currently provide energy display units that can be located anywhere in the home and show how much energy is being used. There was strong support during the Code review that credits should be introduced into the Code energy category to reward developers who provide such devices in new homes. This would be independent of any smart meter programme being developed by the Department for Energy and Climate Change and could help influence residents behaviour by providing them with a clear indication of their energy use.
109. We are therefore seeking views on whether to introduce a new issue in the energy category *ENE9: Energy Display Devices*, with up to 3 credits available for providing a way for residents to clearly see, understand and monitor their energy usage – both for electricity and the energy associated with heat and hot water.
110. The first credit would be awarded for providing an accessible device to monitor electricity or primary heating fuel consumption.
111. The second credit would be awarded for providing an accessible device to monitor electricity and primary heating fuel consumption.
112. The third credit would be awarded where devices provided are capable of recording data.
113. We propose that these credits would be available in the short term until legislation for a mandatory scheme for roll-out of smart meters was introduced.

Question 18

Do you agree that a new issue should be introduced into the Code for the provision of energy display devices?

Question 19

Do you agree with the proposed credit allocation for this new issue? If not, why not?

Section 3

Streamlining the Code

114. Since 2007 there have been a number of changes to regulations and statutory guidance linked to the Code, some of which have been reflected to a certain extent in updates to the technical guide. However a comprehensive look at the Code in light of these changes was not possible until now, which is also important given current economic circumstances.
115. In addition, with just over 10,000 Code certificates issues at both design and post construction stage (the majority in the last 12 months), a lot has been learned about how to build sustainable homes including where the Code may not work as well as planned.
116. Our goal is to streamline the Code where necessary to make it easier and cheaper to build sustainable homes and while continuing to ensure it continues to focus effort on tackling climate change and reducing the impact new housing has on the environment.
117. The main changes proposed in this consultation to ensure consistency with other regulations and standards and discussed below include:
 - the Lifetime Homes Standard
 - accessibility requirements and terminology
 - site Waste Management Plans
 - cycle storage and
 - home office
118. In addition, alongside this consultation paper the Building Research Establishment have published a revised set of evidence requirements for the Code. They aim to reduce unnecessary duplication and bureaucracy whilst maintaining the robustness of the certification process. This should significantly streamline the assessment requirements and reduce the administrative burden on house builders and assessor organisations. The revised evidence requirements were developed with stakeholders and take immediate and retrospective effect. These evidence requirements do not form part of this consultation. More information is available at:
www.communities.gov.uk/thecode

Changes to Lifetime Homes

119. Lifetime Homes Standards (LHS) are set of 16 criteria, developed by stakeholders, to make homes more accessible and adaptable to people's changing circumstances. The standards are intended to ensure that homes are better able to adapt to the needs of their occupants at different stages of their life. When faced with a sudden crisis such as an incapacitating accident, injury or illness, the people living in these homes are able to make short-term adaptations to allow time to consider future needs, and longer-term adaptations should they wish to remain in their home.
120. There are compelling reasons to consider the case for action at the build stage in the light of the housing needs of disabled and older people. With increased health and welfare our lifespans are increasing and overall our population is ageing. Government projections show that over the next 30 years those aged 65 years and over will rise from 9.7 million to 16.5 million – a 70 per cent increase. The percentage increase is even more dramatic for older age groups, with those aged 85 years and over rising by 149 per cent. There is also some evidence that the undersupply of accessible homes is preventing older people moving into more suitable accommodation and this in turn is leading to under-occupation of family homes. This blocks the supply chain, reduces flexibility and movement in the market and had been helping to drive prices up.
121. The Lifetime Homes standards are in the Health and Well-being category in the Code. They were originally a voluntary element of the Code however in order to promote uptake of the standards in our 2007 consultation on the future of the Code we asked whether the Lifetime Homes Standards should become a mandatory requirement at progressively lower levels over time.
122. Many respondents were strongly supportive of this proposal; however house builders raised a number of concerns including: the four credits only being awarded for achieving all 16 Lifetime Homes standards in their entirety, that it is appropriate to apply Lifetime Home Standards to a proportion of a development not the whole development and concerns that the standard may not be suitable for all dwelling types and can be inconsistently applied. However, given the flexibility for developers to choose the Code level they build to (and hence whether to adopt Lifetime Homes), and given the expectation that the work on BSI accreditation process that was underway would improve both the uniformity of the standard and ensure it can be adapted to a wide range of dwelling types the Lifetime Homes standards become a minimum requirement for homes receiving a six star rating with the publication of the April 2008 edition of the technical guide. The intention was also established of making the Lifetime Homes standards mandatory at progressively lower levels of the Code in future ie at Code level 4 in 2010 and Code level 3 in 2013.

123. In the recent Pre-Budget Report, the Government announced its commitment that cumulative regulation should not unduly constrain house building. As one part of this commitment it also explained that it would consider in early 2010 the case for and form of regulation on Lifetime Homes standards, focussing on a proportionate approach. Any move to make LHS mandatory would not be until 2013 at the earliest.
124. This is because whilst we recognise that there are clear benefits of Building to Lifetime Homes Standards over time, the immediate costs fall on private sector house builders who need to retain flexibility in ensuring recovery of the housing market. As availability and affordability of housing are of concern to everybody, supporting a swifter recovery is of benefit to everybody.
125. Given that next year we will be conducting a wider review of how we should take forward the regulatory position on Lifetime Homes, and in the light of the current economic pressures on the housing sector and the need to support recovery, we do not propose to proceed with the move to make the standard mandatory at Code level 4 in 2010. The standard will therefore remain voluntary in the Code, except at level 6.
126. Developers will still score 4 points for adopting the Lifetime Homes Standard, but will have more flexibility in deciding how they achieve a given level of the Code. We will continue to monitor the number of Code homes that adopt the Lifetime Homes standard – currently around one third, including some private sector developments. The case for making some, or all, of the standard mandatory at lower levels of the Code will be reviewed as part of the 2010 review. Any such decision would not be implemented until 2013.
127. Further information on the costs and benefits of this policy can be found in our impact assessment.

Changes to technical guidance on Lifetime Homes Standards

128. Habinteg Housing Association, Sponsors of the Lifetime Homes Standard, have undertaken on-going work to develop the standard's supporting guidance in order to make it easier for developers to understand and adopt. As a result, and following extensive consultation with key stakeholders including house builders, architects and disabled people, Habinteg Housing Association is proposing to revise some aspects of the current guidance to improve the ease of design, compliance and construction.
129. Habinteg are publicly consulting in parallel to the Code consultation in order to gather further responses before finalising these revisions. The proposed Standards and supporting guidance are available on the Lifetime Homes website at the

following address <http://www.lifetimehomes.org.uk/consultation09>. A summary of the principle changes to the guidance supporting the 16 Lifetime homes criteria is included in Annex C of this consultation document.

Introduction of exemptions for steeply sloping sites

- 130. Feedback from some developers and designers indicates that on very steeply sloping sites where gradients prevent the possibility of a gently sloping or even ramped approach, it is not possible to meet all of the Lifetime Homes Criteria. On such sites developers are deterred from adopting the standard (as they cannot score points) even though they could meet the internal criteria and by doing so improve the accessibility and adaptability of the internal environment.
- 131. We therefore propose to introduce an exemption for the two criteria relating to outside access in the Lifetime Homes standard on steeply sloping or in severely constrained sites, as long as accessible steps are installed. We are proposing that the exemption can only apply for dwellings on plots with sloping topography that predominantly exceeds 1:12. This will be assessed on the basis of individual dwellings so only those parts of a site which are unable to meet the approach criteria can benefit from the exemption. Plot gradients must be measured between two points according to Table 5 below:

Table 5: How to measure gradients for the steeply sloping sites		
LTH criterion	Start	Finish
2	Car parking spaces or drop off points subject to criterion 1 of Lifetime Homes	The finished floor level at: a. The principle or secondary entrance (where a footpath link exists) doors to an individual dwelling. b. The main communal entrance door to a block of dwellings c. In the case of basement parking – the entrance door to the lift core
3	The start of all footpath approach routes to the dwelling taken at the plot boundary	All individual or communal entrances where a footpath link to the plot boundary exists

- 132. Further information on how this exemption will be applied in is the relevant page on the technical guide (Health and Wellbeing Category, environmental issue HEA4).
- 133. Where all other Lifetimes Homes criteria are met, this exemption will allow for three credits to be awarded instead of four. However, if an exemption is applied the dwelling cannot be marketed or classified as meeting the Lifetime Homes standard.

Question 20

Do you agree that we should postpone making the Lifetime Homes Standards (as revised) a mandatory requirement from Code level 4 upwards pending a review in 2010?

Question 21

Do you agree with our proposal to introduce an exemption on steeply sloping sites for the external Lifetime Homes requirements and award 3 out of the 4 available points?

Question 22

Do you agree with the definition of a steeply sloping site as having a predominant gradient of 1:12 or greater?

Question 23

Do you agree with the proposals for measuring gradients?

Updating the accessibility requirements in the Code

134. The Code currently has accessibility requirements in the Waste and Health and Wellbeing Categories. An accessible environment can be defined as one that a disabled person can enter and make use of independently or with help from a partner or assistant. Varying degrees of accessibility are recognised and required across both 'tradable' and 'mandatory' Code credit issues.
135. Many of the accessibility requirements within the Code currently refer to accommodating 'wheelchair users'. This limited definition and the related requirements are not in keeping with recent standards and terminology related to accessibility. We therefore propose to shift this terminology towards providing 'inclusive environments' based on existing definitions in British Standards, Lifetime Homes and CABE housing standards to ensure there are no conflicts between standards but also to better communicate the benefits of accessible design to the largest proportion of the population. In common with the intention of Lifetime Homes, the Code should set access requirements that benefit not only wheelchair users, but all people experiencing some form of disability or impairment.
136. It is proposed therefore that the technical guide is updated to ensure that the compliance criteria for meeting accessibility requirements better reflects current thinking and standards on accessibility. In summary the main proposed changes to the technical guide are as follows:

Code Issue Ref	Issue	Preferred amendment
Was 1 Was 3 Hea 3	Many of the Code requirements around ‘accessibility’ are currently centred on ‘wheelchair users’ rather than inclusive design. The Code aims to provide housing that enables independent living for the widest segment of the population. Its current emphasis on ‘wheel chair users’ is sometimes misinterpreted as an effort to deliver purpose-designed wheelchair-housing.	<p>Change access requirements to centre on ‘inclusive design’ rather than ‘wheelchair users’.</p> <ul style="list-style-type: none"> • Adjust the terminology used within the Code so as to harmonise with the inclusive design principles of Lifetime Homes. <i>[Inclusive design aims to remove the barriers that create undue effort and separation. It enables everyone to participate equally, confidently and independently in everyday activities. – The Principles of Inclusive Design.]</i> • Amend ‘Was 1’ Checklist to mirror the approach of Lifetime Homes. • Use inclusive design principles of housing in the Code to help define objectives.
Hea 3	Code’s requirement for outdoor space to be “ <i>accessible to wheelchair users with details shown/described of Low or Level thresholds in accordance with BS8300</i> ” gives the impression that providing level thresholds only, is a sufficient and effective contribution towards delivering private space that is accessible to all. This propagates the Code’s wheelchair-centric focus, leading some to question the worth of providing level thresholds to balconies on floors that can be reached only by stairs.	<p>Clarify access requirements for Hea 3.</p> <ul style="list-style-type: none"> • Clarify access requirements as meeting the applicable criteria of Checklist IDP (Checklist IDP – <i>Inclusive design principles necessary to provide access and usability to amenities recognised under Was 1, Was 3 and Hea 3.</i>) • In new Checklist IDP will replicate future Lifetime Homes exemption from requiring a level threshold at roof terraces/balconies over habitable rooms, which require a step up to increase slab thickness. BS recommendations allow for ‘partial’ balconies to be provided for wheelchair users.

Code Issue Ref	Issue	Preferred amendment
Was 1 Was 3 Hea 3	The present edition of BS8300 (BS 8300:2001) no longer gives guidance on individual dwellings.	<p>Integrate or replace references to BS 8300:2001 in the 2009 version of BS8300.</p> <ul style="list-style-type: none"> • As specific recommendations of BS8300:2009 can be used to supplement guidance on the design of dwellings where appropriate, this version of the standard should be referred to within the Code where necessary. • Wherever possible, Checklist IDP will substitute current criteria for corresponding Lifetime Homes criteria. By generating synergy between Lifetime Homes and inclusion requirements within Was 1, Was 3 and Hea 3, a single approach towards inclusive design can be integrated throughout the Code. This will consolidate standards and improve understanding. • Avoid duplication by cross-referencing definitions and inclusion requirements within Hea 3, Was 3 and Was 1 Issues.
Was 1	Was 1 Checklist needs to be updated in response to changes to BS 8300:2001 and to address concerns about applicability on steeply sloping sites and the definition of a 'direct' access route as required by Criterion 1 of Lifetime Homes.	<p>Review 'Was 1 Checklist' to ensure it continues to meet its objectives.</p> <ul style="list-style-type: none"> • Rename Was 1 Checklist to 'Checklist IDP'. • Specify the Checklist's requirements to complement the Lifetime Homes criteria so that a common approach towards providing inclusive housing is integrated across Was 1, Was 3, Hea 3 and Hea 4 Issues.

Code Issue Ref	Issue	Preferred amendment
Was 1	Access requirements currently apply between dwelling and waste storage area. Where Waste Collection Authorities are unable or unwilling to collect bins from an area other than the allocated collection point, the value of providing inclusive access to only the store (above building regulations’ standards) is disputed.	<p>No extension of the inclusive access route should be made at this update.</p> <ul style="list-style-type: none"> • The frequency at which household waste is removed from internal to external storage is greater than for moving external containers to collection point. Most Waste Collection Agencies will operate an enhanced collection service for older people or those with mobility impairments, where the pathway between storage space and collection point includes barriers such as stairs.
Was1	Code requirement for all bins to be within 30 metres of an external door to the property makes no exceptions for multi-occupancy dwellings and conflicts with Part H – (Part H requires facilities to be within 30 metres of individual entrances.)	<p>Remove this requirement from the Code.</p> <ul style="list-style-type: none"> • As compliance is sufficiently driven by Part H of the Building Regulations as well as the general expectations of home owners, removing this requirement from the Code will help to streamline Code assessments whilst avoiding the risks of duplication between separate regulatory regimes.

137. The costs associated with these changes are not likely to be significant and therefore we felt it was not proportionate to monetise them.

Question 24
 Do you agree with the proposed changes to the technical guide criteria in order to better reflect current thinking and standards on accessibility? If not, which proposals do you disagree with, and why?

Removing the mandatory requirements for Site Waste Management Plans

138. Site Waste Management Plans (SWMP) were introduced as a mandatory element of the Code prior to the introduction of regulations in England by Defra. When the regulations were introduced the Code was adjusted to raise the minimum value of a development affected from £250,000 (as required by the Code) to the statutory level of £300,000. There are no credits available for achieving the mandatory element of this category since the preparation and implementation of SWMP is a statutory requirement.
139. The Code requirements for SWMPs currently sets slightly higher standards than regulations, therefore any SWMP that has been prepared to meet the Code should also satisfy the regulatory requirement. However for some (generally the larger) house builders, particularly those with corporate waste reduction commitments in place and supporting SWMPs they have reported that the Code requires them to write additional and slightly different SWMPs when there are Code homes on a development. There have been calls for the mandatory requirements to either be strengthened or scrapped.
140. Given the statutory requirement in England to have a SWMP in place for all developments over £300,000, we propose removing the current mandatory requirement for SWMPs in the Code and that the voluntary credits be improved and an additional credit has been added to better reflect waste policy of waste minimisation and diversion from landfill to better help drive change in site waste management. This will mean that in Wales there is not a mandating or a statuting requirement for Site Waste Management Plans.
141. The two voluntary credits would be awarded for:
- a) minimising of Construction Waste. Where there is a Site Waste Management Plan (SWMP) that contains target benchmarks for resource efficiency, procedures and commitments for minimising non-hazardous waste, procedures for minimising hazardous waste and monitoring, measuring and reporting hazardous and non-hazardous site waste production there would be one credit available
 - b) diverting waste from landfill. There would be upto two credits available for having a Site Waste Management Plan (SWMP) that complies with the criteria in a) and that includes procedures and commitments to sort and divert waste from landfill as well as diverting at least 50 per cent (for one credit) or 85 per cent (for two credits) by weight or volume of non-hazardous construction waste

142. More information on the new voluntary credits for site waste management can be found in the WAS2 section of the draft 2010 technical guide.

Question 25

Do you agree that current Code requirements cause duplication for some developers who already have a corporate site waste management plan in place? If yes, please provide evidence of experiences to support your answer.

Question 26

Should the mandatory requirement for Site Waste Management Plans be removed and replaced with voluntary credits for minimising or diverting waste to landfill as set out above and in the technical guide?

Increasing the flexibility for the storage of household waste

143. The first waste category **Was 1: Storage of non-recyclable waste and recyclable household waste** aims to recognise and reward the provision of adequate internal and external storage space for non-recyclable waste and recyclable household waste. There are mandatory and voluntary elements to this issue.
144. Given the variability of frequency of waste collections by local authorities we propose to amend the calculation methodology for external space to link it to the frequency of collections by the local authority. Where a local authority does not provide the waste containers and collects fortnightly the BS5906:2005 space standards should be doubled. (We are not proposing that you can reduce the space requirements for more frequent collections). Additionally, we propose that where the local authority does not limit the volume of waste collected weekly then compliance with BS5906:2005 is required.
145. It is also proposed to allow the installation of a waste compactor on sites where space is restricted, providing the more demanding of the following are met: local authority space requirements for collection or BS5906:2005. In addition the local authority must agree to the installation, i.e. planning permission is either not required or would be granted.
146. Further information is available in the WAS1 category in the draft 2010 technical guide.

Question 27

Do you agree with the proposed methodology and requirements for dealing with doubling external space where there is a fortnightly collection? If not, what methodology/requirements do you think should be used?

Question 28

Do you agree that waste compactors should be allowed on sites where there are space restrictions for storing waste? If yes, do you agree with the proposed requirements?

Increasing the flexibility for cycle storage

147. There are currently two tradable credits available under this issue for the provision of cycle storage, depending on how many spaces per bedroom are provided. At present the following space requirements are set out in the Code technical guide:

For 1 credit:

- Studios or 1 bedroom dwellings – storage for 1 cycle for every two dwellings
- 2 and 3 bedroom dwellings – storage for 1 cycle per dwelling
- 4 bedrooms and above – storage for 2 cycles per dwelling

For 2 credits:

- Studios or 1 bedroom dwellings – storage for 1 cycle per dwelling
- 2 and 3 bedroom dwellings – storage for 2 cycles per dwelling
- 4 bedrooms and above – storage for 4 cycles per dwelling

148. There have been suggestions that this issue should be moved to the health and wellbeing category rather than remain in the energy category. However the issue is included here because it promotes sustainable transport by reducing the need for car journeys and the associated carbon emissions.

149. However it has been suggested that the storage requirement could be slightly reduced for large scale, high density developments where communal storage is provided, since these developments are already under pressure in terms of providing sufficient levels of space amenity (usually a local planning requirement). In or around London, it is unlikely that all cycle spaces would be used in these types of development since they tend to be located in urban areas with an existing public transport infrastructure. Outside of London these types of development in urban areas may have the highest potential to increase cycling.

150. Where there are opportunities for communal cycle parking, there may be potential to decrease the cycle storage standards in large scale, high density developments. However, it remains important that for every household any adult should have the opportunity to park their cycle securely to encourage take up of cycling.

Question 29

Should communal cycle storage in large scale, high density developments be reduced, remain the same or be increased? We would welcome evidence from respondents of experiences with this issue.

Question 30

If we were to rescale the communal storage requirements for certain sized developments, what threshold should be used to describe a development as 'large scale' and allow a rescaled requirement to be applied, e.g. 100 dwellings, 200 dwellings, etc.? Why do you consider this threshold to be appropriate?

151. In addition to large scale, high density developments, it has been suggested that the cycle storage requirements for certain types of development, such as specialist retirement housing, should be reduced as the use of cycles is likely to be lower than that of a standard residential development.
152. However it may be more appropriate to retain the current storage requirements but that these requirements should be flexible to allow for say storage of mobility scooters/buggies instead of cycles, as required by the dwelling occupant.

Question 31

Do you consider it appropriate to reduce the cycle storage requirement for certain types of development, such as specialist retirement housing. If so, what types of development would you consider it appropriate to apply the reduction to?

Question 32

Should the requirement for cycle storage remain for all developments but be flexible to allow for storage of mobility equipment applicable to the likely end user as well as cycles?

Increasing the flexibility for Home Offices

153. There is 1 point available for providing home office space. The aim of this credit issue is to reduce the need to commute to work by providing residents with the necessary space and services to be able to work from home.
154. As with ENE8 (cycle storage) there was debate as to whether this credit should be moved to a different category; potentially Health & Wellbeing because it could be argued that this credit refers mainly to contributing to the quality of life for the dwelling occupant(s).
155. However it was thought that provision of a home office continues to play a large enough role in achieving CO₂ savings by reducing the need to travel to work by private vehicle.
156. The role of the home office in reducing transport-related CO₂ emissions refers mainly to households that work and would usually tend to have to travel to their place of work if no alternative were available.
157. We consider it unlikely therefore that the role of the home office in reducing travel-related CO₂ emissions is applicable in some types of specialist housing such as retirement homes since most households are unlikely to be commuting to work. It is therefore proposed that the space requirement is reduced to allow for space for a desk and provision of services, but not necessarily space for a filing cabinet or bookcase, as with the current space requirements.
158. We do not propose to remove this credit entirely for specialist housing such as retirement homes since the provision of a home office contributes to the householder's quality of life and brings benefits in terms of health and wellbeing.

Question 33

Do you agree that the home office space requirement for specialist housing such as retirement homes should be reduced?

Question 34

Are there other parts of the Code you think this may apply to?

Further options for streamlining the Code

159. Most of the Code focuses on different issues that relate to climate change mitigation and adaptation (see Annex B). We believe this is appropriate prioritisation, as climate change is the greatest long-term challenge we face and the built environment has a significant role to play in tackling it.
160. However, there are a number of issues within the Code that go wider to provide a more holistic sustainable building standard, such as the Lifetime Homes Standard and acoustic requirements. These reflect the Code's current focus. While these individually all have considerable merit, we would like to consider carefully whether these should continue to be pursued through the Code. We would welcome your views on the benefits these areas bring to the Code and whether there is a strong case to remove any of them.

Question 35

Should the issues in the Code not directly related to climate change remain in the Code? What are the reasons for your answer and do you have any evidence to support them?

Section 4

Resolving problems

Surface Water Run-Off

161. The Flood and Water Management Bill, included in the Queen's Speech on 18 November 2009 for discussion in Parliament's 5th session, includes provisions to tackle flooding from surface water run-off. The Bill would require developers to gain the approval of a new SUDS Approving Body, located at upper tier/unitary levels, for all drainage plans for new developments and redevelopments, before construction could commence, and before connection to the sewer could be made. Central to these provisions are the proposed national Standards for SUDS, which cover requirements for the design, construction, operation and maintenance of SUDS, as well as a duty for local authorities to adopt and maintain SUDS that serve more than one property.
162. The Code includes a mandatory requirement to design housing developments which avoid, reduce and delay the discharge of rainfall to public sewers and watercourses. It is aligned with the requirements of *Planning Policy Guidance 25: Planning and Flood Risk*.
163. The experience gained through the Code has been informing the development of the National Standards. In particular there has been significant amount of feedback from engineers, developers and Code assessors regarding the mandatory criteria. The major areas of concern include the methods required to satisfy the 'Volume of Runoff' criteria, the difficulty on small sites to meet the 'Peak Rate of Runoff' requirement and the challenge of meeting the criteria on sites where the drainage infrastructure was built before a Code certification was required. The Building Research Establishment has recently published a guidance note to address current confusion with the mandatory requirements.
164. We are now seeking views on changes to the Code technical guide (category *SUR1: Management of Surface Water Run-off from development*).
165. We have also undertaken a fundamental review of the SUR 1 issue in light of stakeholder feedback and the developing National Standards for SUDs. This includes clarifying and amending the requirements for the volume of run-off and peak rate of run-off and introducing new criteria for designing for system failure. The criteria for water quality have also been clarified. The revised criteria are set out in the accompanying draft technical guide.

Question 36

Do you agree with the proposed changes set out in the technical guide to the assessment criteria in *SUR1: Management of Surface Water Run-off from development*? If not, why not?

Note: As mentioned above, the National Standards for SUDs are currently being developed, as a result, discussions are ongoing on this issue. Once further details are available the Code will be changed to meet the standards if necessary.

Standardising the security requirements

166. Security and safety are an essential element of a sustainable home and successful sustainable communities. Homes designed with security in mind enable people to feel safe and ensure that crime and disorder or the fear of crime does not undermine the quality of life or community cohesion. And evidence from the British Crime Survey indicates that households without basic home security are at greater risk of being burgled than other households.
167. Security is currently a voluntary part of the Code under the Management category and is based upon part two of the Secured by *Design* initiative run by the police. Gaining the security credits does not signify that premises are crime proof, rather that there has been a police risk assessment and that the premises incorporate the security measures recommended for that site
168. It is encouraging to note that around 90 per cent of homes awarded a certificate against the Code either at design stage or post construction stage so far chosen to incorporate the credits available for security.

Box B: Possible minimum security standards for doors and windows

External door sets: to be certified to: PAS 24:2007 or WCL1; or LPS 1175 Issue 7 security rating 2 or equivalent

Door locks: BS 3621 or equivalent

Windows: BS 7950: 1997 or equivalent

For doors to flats over a floor level of 4.5 meters locking mechanisms fitted in line with BS 5588 part 1, or equivalent

169. However, given that we know from the British Crime Survey that households without basic security measures in place are ten times more likely to become victims of burglary, there have been calls (from the police, insurers, and other interested parties) for security to be strengthened in the Code, with suggestions that it could be made a mandatory requirement.
170. We are not currently minded to introduce more mandatory requirements into the Code, however we do agree that introducing clear basic security requirements could be beneficial, particularly in ensuring a consistent security baseline around the country. We therefore propose splitting the current credits available in the security section and awarding one credit for achieving the minimum security standards outlined in box B.
171. Door and window security is important and we believe should be a baseline requirement. However, depending on location, design and materials used and the target customer, a wider range of security measures may be desirable. Because the police crime prevention design advisors base their advice on a risk assessment they can provide site specific advice that goes beyond the minimum.
172. We therefore believe that if basic door and window security measures are introduced, a credit should be available complying with the wider range of security requirements in '*Section 2 – Physical Security*' from *Secured by Design New Homes* and consulting the local police force at the design stage and incorporating their recommendations into the design.
173. Our impact assessment clearly shows that whilst there are benefits to the economy and society of minimising the risk of burglary, the costs are primarily on house builders. We would therefore welcome your views on this proposal, particularly whether the new voluntary credit for basic window and door locks would be adopted by house builders and therefore produce the expected benefits.
174. An alternative approach to help drive the take up of basic security standards in new homes could be to make the physical security standards a mandatory element of the Code (still with 1 credit available) or to increase the credits available for consulting a crime prevention design advisor (to 2 credits) thereby making the whole section more valuable, offsetting the additional costs.
175. We would therefore welcome your views on our proposal to introduce voluntary standards for windows and door locks or whether an alternative approach would be beneficial. We would also welcome evidence on the type of security standards currently installed into new homes and the costs associated with these.

Question 37a

Do you agree in principle that the minimum door and window security standards outlined in Box B should be introduced into the Code and awarded one credit?

Question 37b

Should an additional credit be available for consulting with the local architectural liaison officer or crime prevention design advisor and implementing their recommendations based on *Secured By Design part 2*?

Question 37c

Do you think the above options would give rise to additional construction costs? If so, please state what you think those costs would be.

Question 37d

Alternatively, to drive take up of basic physical security standards in new homes would it be necessary to make them a mandatory part of the Code?

Question 37e

Would an alternative approach of allowing two credits for consulting an architectural liaison officer or crime prevention design advisor (whilst leaving the credit for door and window locks voluntary) be a more attractive way of encouraging take up of basic security standards?

Section 5

Technical guide

176. The Code was launched in December 2006 and the first technical guide was published in April 2007. The technical guide was written to be used by Code assessors who had been trained by a Code Service Provider. However, unlike the *Ecohomes* standard it was based on, the technical guide has been made publicly available through the Department for Communities and Local Government's website. As a result it has had a much wider audience and there has been considerable feedback on the style, content and readability of the technical guide. In addition as related regulations and standards have changed it has been necessary to make some changes to improve clarify and usability of the Code. Updates were therefore published in October 2007, April 2008, October 2008 and May 2009.
177. Whilst the changes made in the technical guide were not generally considered to be fundamental to the Code it is recognised that this has made it more difficult for industry to use the Code. In future we propose to update the Code only at the same time as we make changes to the Building Regulations, that is every three years i.e. in 2013, 2016, etc. This will reduce the flexibility of the Code to respond to changes in regulations or address innovations and problems that are discovered as we learn more about building low and zero carbon sustainable homes. A reduced number of updates will however increase stability and should reduce costs on industry. We are therefore seeking views on whether it is appropriate to update the Code technical guide only in 2013 and 2016 or whether more frequent updates would be desirable.
178. We have also listened to concerns about the format and design of the technical guide. Alongside this consultation we are publishing a sample chapter of the technical guide in a redesigned format and a visual presentation of the proposed overall design. We would welcome your feedback on these design changes and any suggestions on how to improve the technical guide.

Question 38

Do you agree that the technical guide should only be updated in 2013 and 2016? If not, do you have any suggestions for how often updates should be issued (for instance annually or every 18 months)?

Question 39

Do you have any comments on the redesign of the technical guide or suggestions for improving it?

Section 6

The Code and consumers

Consumer awareness of the Code

179. One of the key drivers for introducing the Code was the impact it could have on consumers, by clearly showing how the home was designed to be more sustainable. As the Code is still relatively new and there are not yet a significant number of completed Code homes, this has clearly not happened yet. However, it remains our ambition that the Code should have a positive impact in this way.
180. Since May 2008, all new homes in England need to be rated against the Code. Homes built to the Code standards achieve a rating of one star through to six stars – a truly sustainable home. The Code certificate shows the star rating together with a clear explanation of how that was achieved. All Code certificates also include the Energy Performance Certificate environmental impact rating diagram.
181. Homes that have not been assessed and are built to the standards set out in Building Regulations receive a nil rating. The aim of this policy is to raise awareness amongst consumers of the sustainability of their new home.
182. The Zero Carbon Hub is undertaking a workstream on consumer aspects of zero carbon homes so as to help industry understand the features that would appeal to consumers and how to market zero carbon homes in a way that appeals to buyers.
183. As the number of Code homes increases in the future we will continue to work with the Zero Carbon Hub, house builders and consumer organisations to ensure that house buyers are fully informed and understand the importance of energy efficiency and sustainability when making a decision to purchase a home. Meantime, we are seeking views in the consultation on ways to help make the Code more accessible, visible and valuable to consumers.

Question 40

Do you have any experience or views on how to help make the Code more accessible, visible and valuable to consumers?

The future of the Code

184. The Code has an important role in helping to introduce new approaches to sustainability into home building. Whilst we are keen to streamline the Code we also recognise that there are other issues, particularly relating to how we mitigate and adapt to climate change that may need to be considered in the future, especially as the Code changes in light of changes to Part L of the Building Regulations. As such, and in advance of the 2013 changes to Building Regulations and the Code we will be considering what role, if any, the Code can play in:

- helping adapt to climate change
- reducing the embodied carbon of building products, alongside changes being introduced through revisions to the Construction Products Directive
- further reducing the carbon emissions from accidental fires by providing additional fire protection measures beyond that necessary for life safety.

Question 41

We would welcome your thoughts on whether these areas should be considered for the future and any evidence you may have to support those views.

PART B: ZERO CARBON HOMES AND ENERGY EFFICIENCY

Section 7

Fabric and energy efficiency standard

Purpose

185. The majority of this consultation is devoted to the Code for Sustainable Homes – a voluntary standard for assessing the overall sustainability of new homes. A key aspect of the Code is that it signals future regulations on zero carbon homes – a standard which will apply to all new homes from 2016. This section addresses the regulatory standard proposed for fabric energy efficiency that will apply to all new homes from 2016. It will therefore be of interest to all home builders (and to their supply chain), not just to those who are building homes rated under the Code for Sustainable Homes. (See Part A, section 2 and ENE2 of the technical guide for a description of how the fabric energy efficiency standard proposed in this section will be incorporated into the Code for Sustainable Homes.)

Background

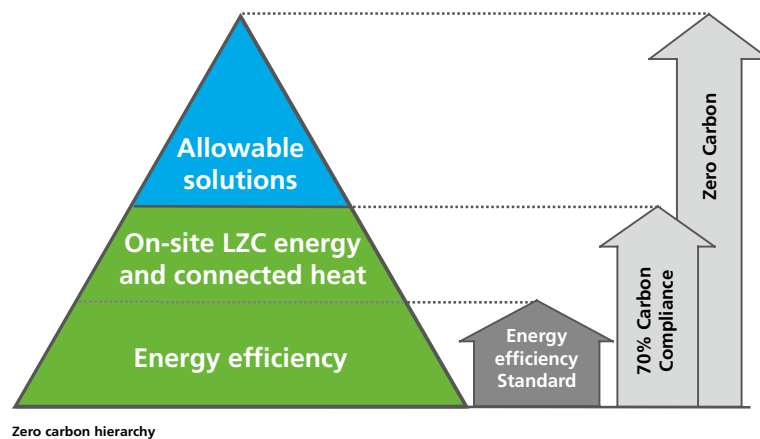
186. In July 2007, following a public consultation, CLG announced that all new homes would be zero carbon homes from 2016¹². The high-level definition put forward (and mirroring the definition used at Code level 6 in the current version of the Code) was that homes would be net zero carbon across the year, taking account of:

- all energy used in the home (including an allowance for energy used for cooking and appliances as well as the uses already covered by Part L of the Building Regulations) and
- carbon emissions associated with imported and exported energy (including from energy imported via a direct physical connection).

¹² <http://www.communities.gov.uk/publications/planningandbuilding/building-a-greener>

187. In December 2008, following advice from the UK Green Building Council Zero Carbon Definition task group, CLG consulted on the detailed definition of zero carbon homes¹³. The December 2008 consultation retained the high-level definition set out above but recognised that it would not be practical to require all of the carbon abatement to come from on-site (or directly connected) energy sources. A three step approach to reaching the zero carbon homes standard was therefore proposed, based on:

- a high level of **energy efficiency** in the fabric and design of the dwelling
- **'carbon compliance'** – a minimum level of carbon reduction to be achieved from energy efficient fabric and on-site technologies (including directly connected heat networks) and
- **'allowable solutions'** – a range of measures available for achieving zero carbon beyond the minimum carbon compliance requirements.



188. In July 2009, the Minister for Housing and Planning confirmed in a Ministerial Statement¹⁴ the approach that had been proposed in the consultation and set out some further details of the definition and the further steps that would be required in order to finalise the remaining details. In particular, he announced:

- the formation of a specialist task group to examine the energy efficiency metrics and standards which would realise our ambition of the highest practical energy efficiency level realisable in all dwelling types
- that the carbon compliance level would be a reduction of 70 per cent of regulated energy use, based on the assumptions in the December 2008 consultation, and that this would be updated, as necessary, in light of certain technical changes such as developments to the Standard Assessment Procedure energy assessment tool

¹³ <http://www.communities.gov.uk/publications/planningandbuilding/zerocarbondefinition>

¹⁴ <http://www.communities.gov.uk/statements/corporate/ecozerohomes>

- that on-site renewables installed as part of zero carbon homes would be eligible for Clean Energy Cash Back and Renewable Heat Incentives
 - that allowable solutions would cover carbon emitted from the home (after taking account of carbon compliance) for 30 years after build
 - that certain of the measures proposed as allowable solutions commanded broad support and that we would consider with stakeholders the practical arrangements that would be required to permit them to be put in place and to ensure that standards are achieved in practice and
 - the intention to set a guideline maximum price that industry would be expected to bear in implementing allowable solutions in light of further work on costs.
189. Work continues on a number of aspects of the definition of zero carbon homes, for example allowable solutions. This chapter sets out developments specifically in relation to the energy efficiency standard that will be required for zero carbon homes.

Formation of task group

190. As noted above, the July 2009 Ministerial Statement on the definition of zero carbon homes announced the formation of a specialist task group to *“examine the energy efficiency metrics and standards which will realise our ambition of the highest practical energy efficiency level realisable in all dwelling types.”*
191. Following that statement, a task group of stakeholder experts was set up under the co-ordination of the Zero Carbon Hub. CLG is grateful to the Hub and to all involved with the task group for their work.
192. To facilitate the work of the task group, CLG clarified its reasoning for including an energy efficiency standard in the zero carbon definition and the criteria which it considered relevant to deciding the *“highest practical energy efficiency level”* (these are summarised below). Government officials also participated in the task group as observers. However, it was left to the task group to decide its approach to analysing the issues and reaching its recommendations.

Rationale and criteria

193. The carbon compliance requirement for zero carbon homes (ie the level of carbon reduction to be achieved through on-site technologies and directly connected heat) has been set at a 70 per cent reduction in regulated emissions compared to current regulations (see 188 above).

194. In order to meet the carbon compliance requirement, it is likely that developers will typically build to energy efficiency standards higher than those prevailing today as well as installing low and zero carbon (LZC) energy technologies. The existence of an ambitious carbon compliance requirement means that Government should not need to rely on an energy efficiency standard alone in order to drive higher levels of energy efficiency.
195. However, even with 70 per cent carbon compliance, it cannot be taken completely for granted that developers will always choose high levels of energy efficiency. There may be situations where the on-site renewable potential and the incentives available for exploiting those renewables make using low and zero carbon technologies alone the cheapest way for the developer to satisfy the carbon compliance requirement – in locations, for example, where space and air quality are not significant constraints to biomass technologies.
196. Government considers that, owing to market failures, it would be preferable to set a minimum energy efficiency standard than to leave it entirely to the developer to decide. The reasons are the following:
- **whole life cost.** In general, energy efficiency measures will entail lower life-cycle costs than low and zero carbon technologies (fuel, maintenance, replacement). Because those cost differentials may not be fully reflected in the market price of the home, the developer might, in the absence of a minimum energy efficiency standard, choose a carbon compliance strategy which does not minimise whole life costs or take into account the implications of fuel bills for occupants
 - **robustness.** Energy efficiency measures are less dependent than low and zero carbon technologies upon the behaviour of occupants in order to realise carbon savings. For example, occupants cannot easily ‘turn off’ the insulation in an exterior wall, and (unless the wall is inadvertently damaged) will not need to service or replace that insulation in order to maintain its effectiveness. That is not equally true of low and zero carbon technologies
 - **future-proofing.** Homes are long-lived assets, and the cost of retrofitting the fabric of homes is expensive. It may therefore be appropriate to seek an energy efficiency standard which we will not regret at a later date, once the implications of long-term carbon reductions and energy security are better understood. At the same time, future-proofing also means building to a standard which we will not regret in terms of climate change adaptation (in particular overheating)
 - **energy security.** In general, reducing energy demand by a given amount should be more conducive to our energy security goals than meeting that energy demand with on-site low and zero carbon technologies. Low and zero carbon technologies may be intermittent (not generating energy when it is most needed in the home, eg solar photovoltaics) or require scarce resources (eg biomass).

Hence, all other things being equal, demand reduction should contribute to our energy security goals to a greater extent than providing equivalent on-site energy.

197. It would be possible to set the energy efficiency standard underpinning the zero carbon definition at a very high level indeed. The December 2008 consultation on the definition of zero carbon homes set out Government's ambition for a high standard and illustrated this by referring to PassivHaus and the Energy Saving Trust's Advanced Practice standard. Many responses argued that those standards were too demanding for the temperate climate in England and inappropriate as a minimum regulatory standard applicable to all dwellings.
198. Recognising those concerns, the July statement expressed the Government's ambition in terms of the "*highest practical energy efficiency level realisable in all dwelling types.*" Implicit within this phrase are a number of criteria:
- **technical achievability.** If the standard cannot be achieved, in theory and in practice, on a sufficient proportion of housing developments in order to realise our housing ambitions then it would not be practical
 - **affordable and cost-effective.** Similarly, economic and financial considerations also need to be part of a practical standard. However, those criteria need to be considered in the context of the technological progress, cost levels and economic conditions that might be expected in 2016, rather than solely those prevailing today
 - **innovation.** The standard should not be so tightly drawn as to stifle innovative approaches to improving energy efficiency
 - **workable regulatory framework.** If there were no way of confirming that the developer has designed and/or built to the prescribed standard, then it would not be a practical standard
 - **broader environmental considerations.** The need to avoid a standard which has strongly undesirable environmental implications (e.g. in terms of selection of materials)
 - **desirable and healthy homes.** It would not be acceptable to require a standard which presents known and insurmountable risks to the comfort and health of occupants, e.g. because of poor indoor air quality and/or overheating.
199. The rationale and criteria set out above were conveyed to the task group and taken into account in the task group's deliberations and recommendations.

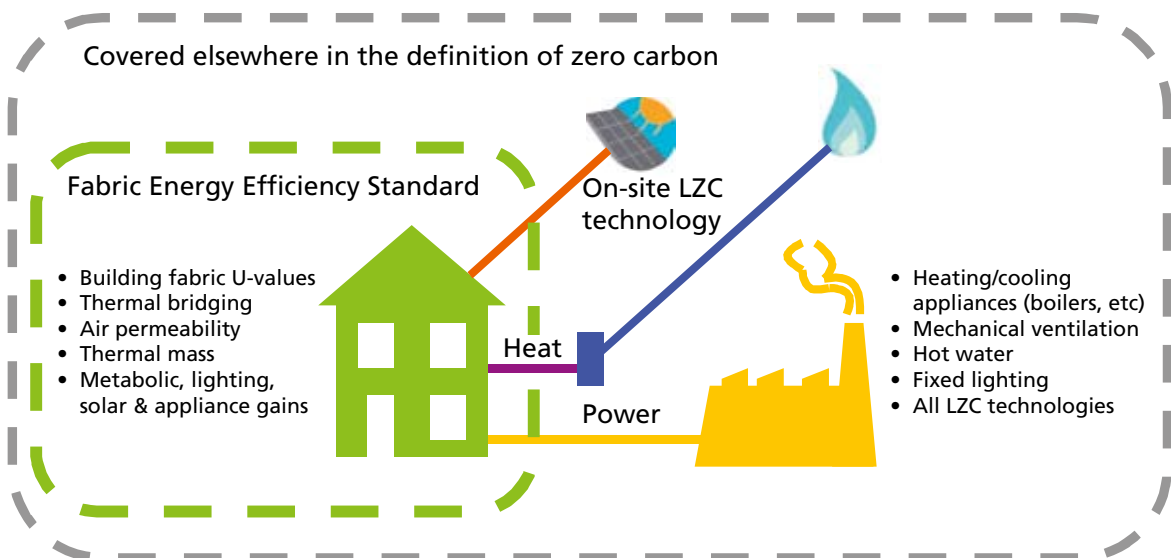
Task group analysis and recommendations

200. The following represents a short summary of the task group's analysis and recommendations. For a fuller discussion, see their report, which is available online at the Zero Carbon Hub's website¹⁵.
201. In providing its advice, the task group needed to consider, in parallel, essentially two types of issue. First, it needed to consider what should be the scope and metric of the standard – what it should cover and how it should be measured. Second, and in parallel, it needed to consider how demanding the standard should be – how far to push beyond standards prevailing today towards, for example, the PassivHaus standard.
202. For purposes of the first set of issues, the task group considered three broad scopes – one looking at dwelling energy demand only, a second which (in addition to the first) also took into account the efficiency of appliances supplying that demand (e.g. gas boilers), and the third which (in addition to the scope of the first two) also took into account the efficiency with which primary energy is converted into the energy supplying those appliances (e.g. the efficiency of the electricity generation, transmission and distribution system used to run central heating pumps).
203. The overall conclusion was that the first of these was most appropriate. The standard would take into account energy demand for space heating and cooling alone and therefore focus on the fabric of the dwelling (including passive design measures). It would not include the efficiency of appliances which provide the heating, cooling, hot water or lighting (which are in any case governed by rapidly evolving product regulations as well as the carbon compliance standard) and it would not include energy conversion efficiencies (which are taken into account in the carbon compliance standard). By limiting the scope to passive measures, designers and builders would be encouraged to create energy efficient dwellings using the elements most likely to remain in place for the duration of the home.
204. Having established the broad scope, it was necessary to consider a number of more detailed factors – notably how mechanical ventilation with heat recovery (MVHR) should be treated and how internal gains due to hot water storage and distribution should be treated. The decision was to exclude these from the scope. The treatment of MVHR in the calculation is complex, because MVHR is an appliance which both uses energy (for ventilation) and reduces net energy demand (by recovering heat from air which is expelled). Furthermore, by excluding MVHR, it would be possible to set a standard which neither (i) is so demanding that it effectively requires MVHR (so leaving builders less flexibility to decide on their preferred ventilation strategy) nor (ii) permits a low standard of fabric to be used if MVHR is incorporated. Nonetheless,

¹⁵ <http://www.zerocarbonhub.org/bui-standard01.php>

MVHR would be able to contribute to meeting the zero carbon requirement, if builders so chose, as energy savings would count towards meeting the carbon compliance standard.

205. As for hot water losses, it was noted that these had a potentially significant impact on the measured amount of space heating and cooling demand. It was considered inappropriate to set a standard which, in effect, would require different levels of energy efficiency in the fabric depending on the hot water solution adopted (making it easier, to give an extreme example, to meet the energy efficiency standard if the hot water tank were not insulated). Internal gains from hot water were therefore excluded.
206. The scope that the task group settled upon is illustrated in the diagram below¹⁶.



Task Group definition of the scope of the Fabric Energy Efficiency Standard

207. The task group considered a number of possible approaches to setting a metric. The first question they considered was whether the standard should be expressed in terms of an overall level of performance (for example the amount of energy used to meet demand) or as input standards (for example, the U-values of walls, floors and roofs). Whichever approach was taken, the detailed metric would then need to be decided.
208. It was decided that a performance-based approach was more appropriate – it would allow designers and builders to innovate in achieving an overall outcome rather than simply meeting standards for individual elements of the buildings. As to which metric would best capture the standard, the amount of kilowatt-hours per square metre of energy used for space heating and cooling per year (kWh/m²/year) was

¹⁶ The graphics in this section of the document are reproduced with the kind permission of the Zero Carbon Hub.

preferred. This was an internationally recognised approach which gave reasonably constant results across different dwelling types and did not suffer some of the downside of other metrics such as:

- heat loss parameter – a metric which is recognised in this country for capturing the overall energy efficiency of the fabric but does not take into account passive measures such as solar gains
- kWh per year – similar to the preferred metric but varies very widely depending on dwelling type and size

209. The other main task, in order to decide what should be the right level of kWh/m²/year was to decide on the right level of ambition for the minimum energy efficiency standard and what number of kWh/m²/year that would imply. This involved considering a range of illustrative fabric specifications and testing those against the criteria proposed by CLG and indeed the task group’s own judgment – how practical the different levels of ambition would be, what risks they would pose and how costly they would be relative to the energy efficiency benefits gained. The specifications considered by the task group are shown below.

		Current practice	Spec A	Spec B	Spec C-	Spec C¹⁷	Spec D¹⁸
U-Value (W/m²K)	Wall	0.28	0.25	0.18	0.15	0.15	0.1 – 0.15
	Party wall	0.5	0	0	0	0	0
	Floor	0.2	0.2	0.18	0.15	0.15	0.1 – 0.15
	Roof	0.16	0.15	0.13	0.11	0.11	0.1
	Windows	1.8 (double)	1.5 (double)	1.4 (double)	1.2 (double)	0.8 (triple)	0.8 – 1.0 (triple)
	Doors	1.6	1.4	1.2	1	1	0.8
	Air permeability (m³/hr/m²)	7	5	3	3	3	0.41 – 0.5
	Thermal bridging (W/m²K)	0.08	0.06	0.05	0.04	0.04	0.04
	Ventilation	+ ventilation strategy					

¹⁷ Specification C is broadly equivalent to the Advanced Practice Energy Efficiency standard assumed in CLG’s earlier impact assessments for the zero carbon homes definition except for a slightly higher air permeability allowance.

¹⁸ Specification D is equivalent to PassivHaus (modelled in PassivHaus Planning Package and then transferred to SAP 2009 so as to give comparable outputs).

210. The task group considered the above specifications against a range of criteria. These deliberations informed the group's recommendations both on the energy efficiency standard and on the further research required in order to mitigate potential concerns. The criteria were:

- building practices
- future-proofed construction
- buildability at mass scale
- complexity of ensuring householder health and wellbeing
- desirable homes for householders on a mass scale
- upfront build cost
- longer term maintenance and householder energy costs
- energy security
- broader environmental concerns.

211. A detailed costing exercise was undertaken for the various specifications. This analysis took into account the task group's estimates of:

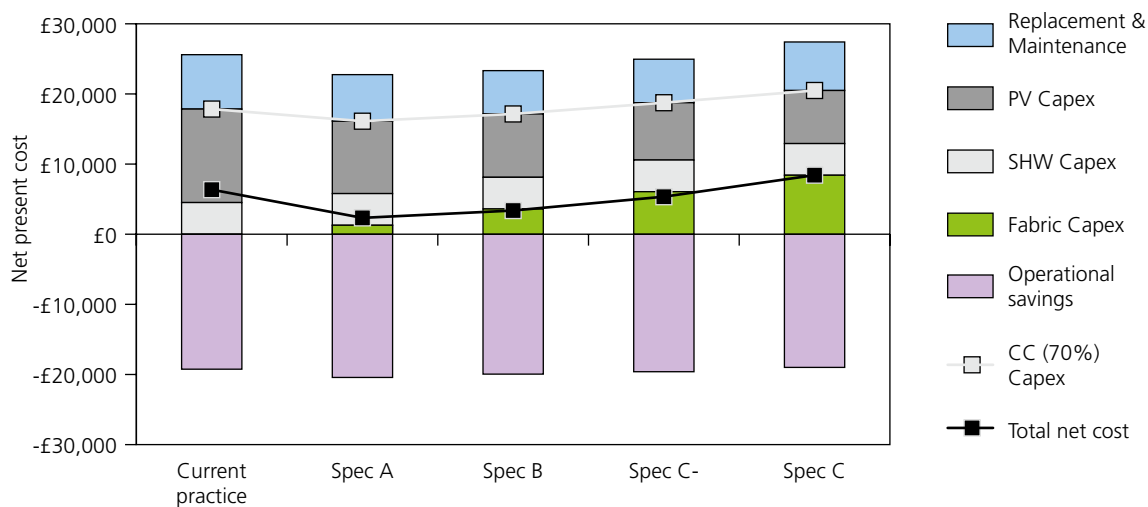
- the capital cost of constructing homes based on the above specifications
- the capital cost of reaching the 70 per cent carbon compliance level based upon the above specifications (where the greater the level of energy efficiency achieved, the lower the cost of additional low and zero carbon technologies required to achieve carbon compliance)¹⁹ and
- the whole life cost of the alternative specifications taking into account operating costs and fuel savings.

212. The task group's analysis is summarised (for a semi-detached house) below. The grey line represents the overall capital cost of reaching 70 per cent carbon compliance whereas the black line represents the net whole life cost taking account of life cycle costs and fuel savings. It can be seen that the capital cost of the fabric specifications tells only part of the story. Increasing the fabric specification beyond the baseline level A reduces the capital cost of carbon compliance and has some impact on life cycle costs and fuel savings. However, beyond a certain point the costs increase beyond the net cost of the baseline – in other words there is a point beyond which increased fabric efficiency becomes more expensive than building to today's standards²⁰. CLG's own estimates of the costs and benefits associated with different

¹⁹ The analysis of carbon compliance was based on a single low and zero carbon technology combination, namely solar hot water and solar photovoltaics. A broader range of technologies has been considered in the impact assessment accompanying this consultation.

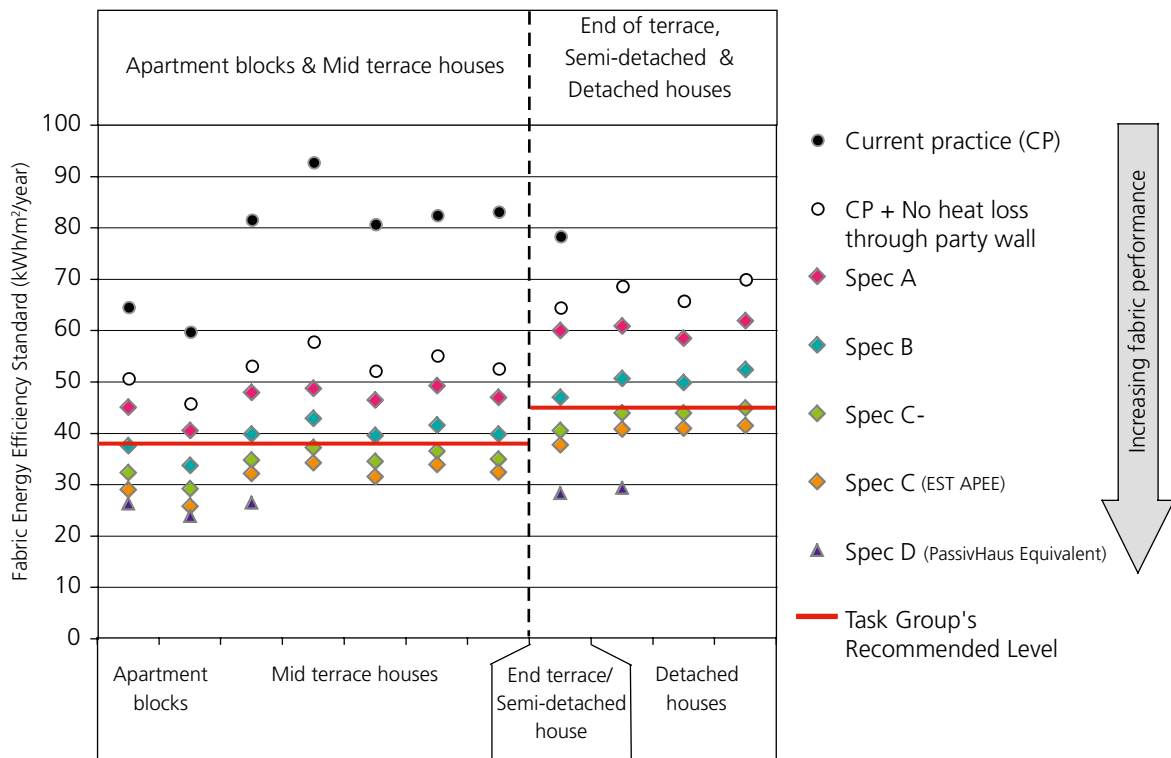
²⁰ The results are sensitive to the assumptions adopted. Some of the key assumptions made by the task group were: (i) energy prices increase by 2.5 per cent per year in real terms; (ii) no allowance is made for the impact of learning effects on costs; (iii) a discount rate of 5 per cent per year. See Annex D of the task group's report for further details: <http://www.zerocarbonhub.org/building.aspx?page=2>

fabric energy standards are presented in the impact assessment accompanying this consultation.



213. One of the questions considered by the task group was whether either of the specification or the standard expressed in kWh/m²/year should be held constant across all dwelling types. This was particularly relevant for detached homes. Detached homes have more exposed walls than other dwelling types and are therefore inherently less energy efficient for any given specification. To require all homes to have the same minimum standard, in terms of kWh/m²/year would either mean an extremely demanding standard for detached homes or a relaxed standard for other dwelling types. On the other hand, the group also noted that equalising the specification across dwelling types would mean that detached houses would be permitted to consume considerably more energy per square metre than other dwelling types. This raised potential issues of fairness.

214. Taking all of the above considerations into account, the task group needed to decide which of the specifications modelled best represented the “*highest practical level of energy efficiency*” and the number of kWh/m²/year this would equate to, for purposes of setting the standard. Their conclusion was that this should be based on specification B for all dwellings other than detached houses and a specification closer to specification C- for detached houses. This translated into a standard of 39 kWh/m²/year for apartments and mid-terraced houses and 46 kWh/m²/year for end-terrace, semi-detached and detached houses. These numbers were based on the 2009 consultation version of the Standard Assessment Procedure (SAP) and would need to be revised in future in line with any changes to SAP. The relationship between the various specifications and the level of kWh/m²/year is shown in the diagram below.



215. In summary, therefore, the key recommendations were that:

- the energy efficiency standard should be based on the energy demand for space heating and cooling within the home
- it should take into account the fabric and passive design features only, without regard to the services providing space heating, mechanical ventilation, heat recovery and cooling and without including internal gains from hot water in the energy efficiency calculation
- the standard should be expressed in kilowatt-hours of energy demand per square metre per year (kWh/m²/year)
- a different level of kWh/m²/year should apply to different dwelling types to reflect the physics of different built forms
- the standard applicable to detached homes should be based upon a slightly more challenging specification than other dwelling types
- based on the 2009 consultation version of the Standard Assessment Procedure (SAP), the energy standard applicable from 2016 should be 39 kWh/m²/year for apartments and mid-terrace houses and 46 kWh/m²/year for end-terrace, semi-detached and detached houses and
- the performance standard should be re-based, as necessary, to take account of any further revisions made to SAP so as to hold the level of ambition constant in terms of the building specifications required to achieve the standard.

216. In addition, the task group made certain further recommendations about the work needed to introduce the standards. The key recommendations were that:

- an industry working group should be created to advise on design guidance which would help industry to meet the energy performance standard
- to prepare industry for the 2016 standard, interim requirements (not necessarily a performance standard) should be introduced in 2013
- Government should consult formally on the standard and integrate it into the revised version of the Code for Sustainable Homes
- further research should be undertaken on various issues, so as to minimise the risk of unintended consequences – see below.

217. The issues on which the task group advised that further research should be undertaken were:

- further energy modelling, with more sensitivity analysis and a wider selection of dwelling types
- further financial modelling of the cost implications for carbon compliance
- Part L issues – definition of dwelling types and minimum daylight factors
- consideration of the implications of the forthcoming recast of the Energy Performance of Buildings Directive (EPBD)
- achieving good air quality in low air permeability homes with different ventilation systems
- overheating risk and mitigation
- ‘closing the gap’ between design standards and the energy efficiency standards realised in practice.

Government’s response to the task group’s recommendations

218. Government’s view is that the recommendations of the task group meet its ambition of the highest practical energy efficiency level. In particular:

- the standard, expressed as a performance-based metric measuring the performance of the fabric and passive measures in terms of energy demand, complements the carbon compliance requirement well. Such a metric was supported by the majority of respondents to the recent consultation on Part L of the Building Regulations²¹

²¹ Question 27 of the Part L consultation asked “Do you support the idea of setting energy demand limits in amendments to Part L beyond 2010?” The metric preferred by the majority of responses was delivered energy in kWh/m²/year, with some preferring to restrict this to demands for heating, cooling and lighting, ie just those issues affected by the fabric, leaving system issues to be dealt with through minimum energy efficiency standards. A key reason for this metric was that it would enable direct comparison with other energy standards, such as PassivHaus. A summary of consultation responses will be published in due course. The consultation document can be found at: <http://www.communities.gov.uk/publications/planningandbuilding/partlf2010consultation>

- the differentiation by dwelling type should allow the energy efficiency potential of all dwelling types to be realised in an equitable and cost-effective manner and
 - the levels proposed set a suitably ambitious trajectory for realising our goals for the zero carbon homes of the future.
219. For the above reasons, we are satisfied with the recommendations set out in 215 above and intend to take them forward, subject to using this consultation to check that there are no unintended consequences which have not been brought to Government's attention in the task group's report.
220. Government is also minded to support the recommendation that interim requirements should be introduced in 2013. Government is open-minded as to whether that should be based on a performance standard or a testing and monitoring programme. The former approach locks in a certain level of energy savings into homes built from 2013, provided that the standards are achieved in practice. The latter approach may or may not achieve the same level of energy savings but, by giving industry a greater understanding of how to build low energy homes, could potentially put industry on a more robust path to achieving energy savings from 2016, when the zero carbon standard comes into effect.
221. Depending on the approach taken, the 2013 requirements might take the form of:
- if a performance standard were chosen, then it might be set at a level consistent with a specification between the task group's Specifications A and B, for example 43 kWh/m²/year for apartments and mid-terrace houses and 52 kWh/m²/year for end-terrace, semi-detached and detached houses²². This is the level proposed for Code level 4 under the revisions to the Code for Sustainable Homes (see Part A, section 2)
 - if a testing and monitoring approach were chosen, then it might focus on air permeability, thermal bridging and installation quality, representing those aspects of energy efficient construction on which industry learning is most needed
 - as a further variant, the testing and monitoring approach could be supplemented by a performance standard, but at a slightly lower level, e.g. consistent with the task group's Specification A. This would ensure that developers continue to improve the fabric performance along the way towards the 2016 fabric energy efficiency standard rather than relying solely on low and zero carbon technologies (which are incentivised by Clean Energy Cash Back and Renewable Heat Incentive) and then needing to take a single large step on fabric energy efficiency in 2016.

²² As with the standard for zero carbon homes from 2016, this would need to be rebased in light of any changes to SAP.

222. Regarding the task group's further recommendations, Government:

- supports the idea of industry developing design guidance and looks forward to working with an industry working group to take this forward
- is acting on the recommendation to include the standard within the Code for Sustainable Homes and this is being taken forward within the Code (see Part A, Section 2)
- will continue to provide support for the Zero Carbon Hub and expects further modelling work to be considered as part of the Hub's forthcoming business planning activities
- acknowledges the need for research on maintaining adequate levels of daylight and for a consistent definition of dwelling type
- will work to ensure alignment between the zero carbon homes policy and the recast of the Energy Performance of Buildings Directive
- acknowledges the need for research on air permeability and ventilation, overheating and closing the gap on design versus performance and will work with the Hub to identify research programmes, whether at national or EU level, which could address such research requirements
- recognises that building regulations compliance is vital to ensure carbon savings are delivered on the ground. We believe compliance is improving as a result of earlier actions and the consultation on Part L changes for 2010 incorporates a number of proposals designed to further improve levels of compliance in buildings as actually constructed. However, improving compliance calls for more than just modifications to Part L but also changes at a procedural level in the way that industry and the building control system function. In September 2009, CLG published the *Future of Building Control Implementation Plan*²³ setting out a shared Government and industry vision as to the kind of building control system we want to see in future.

223. Further decisions will be announced as soon as possible in 2010, following responses to this consultation.

²³ <http://www.communities.gov.uk/publications/planningandbuilding/buildingcontrolimplementation>

Consultation questions

Question 42

Do you agree that the appropriate metric for the energy efficiency standard to support the regulatory definition of zero carbon homes should be based on the amount of energy demand for space heating and cooling per square metre per year? If not, why not?

Question 43

Do you agree that it is right to focus on fabric and passive energy efficiency measures within the energy efficiency standard and to capture the efficiency of heating and cooling appliances and systems, mechanical ventilation, heat recovery and gains from hot water via carbon compliance? If not, why not?

Question 44

Do you agree that it is right to differentiate the level of the fabric energy efficiency standard (expressed in kWh/m²/year) according to the type of dwelling? If not, why not?

Question 45

Do you agree that the regulatory standard applicable from 2016 should (based on consultation SAP 2009) be 39 kWh/m²/year for apartments and mid-terrace houses and 46 kWh/m²/year for semi-detached houses? If not, do you think it should be (a) more demanding – for example equivalent to the Specification C- considered by the task group or (b) less demanding – for example equivalent to the Specification A considered by the task group?

Question 46

Do you agree that the regulatory standard applicable from 2016 should (based on consultation SAP 2009) be 46 kWh/m²/year for detached houses? If not, do you think it should be (a) more demanding – for example equivalent to the Specification C considered by the task group or (b) less demanding – for example equivalent to the Specification B considered by the task group?

Question 47

Government is minded to introduce interim requirements from 2013. Do you agree? What approach would you support, bearing in mind the considerations and ideas set out in paragraphs 220–221?

Question 48

Are the proposals set out in this chapter likely to result in any seriously adverse unintended consequences that are unlikely to be addressed through the research requirements identified in paragraph 217?

Annex A:

Summary of consultation questions

Question 1: Do you agree that the Code energy methodology should be aligned with the revised Part L 2010 when published?

Question 2: Do you agree that in principle we should maintain the current approach whereby the energy section of the Code (ENE 1) anticipates the 2013 and 2016 changes to regulations leading to zero carbon?

Question 3: Do you agree in principle that the energy issues in the Energy category of the Code should be revised to reflect the terminology used in zero carbon hierarchy? If not, what would be your suggested approach?

Question 4: Do you agree that introducing half credits under *ENE1: Dwelling Emission Rate* is an effective approach to preventing degradation of specification? If not, why?

Question 5: Would it be beneficial to introduce a further breakdown of credits available in this section? If yes, what would you propose?

Question 6: Do you agree with removing 5 credits from *ENE 1: Dwelling Emission Rate* and reallocating them to *ENE 2: Building Fabric* to incentivise improvements to the energy efficiency of the building?

Question 7: Do you agree with the proposed allocation of credits, as shown in the credit allocation table? If not, what would be your suggested approach?

Question 8: Do you have any suggestions for mechanisms for allowable solutions that could be used in the Code in advance of the introduction of a national approach to allowable solutions?

Question 9: Do you agree that *ENE2: Building Fabric* be changed from its current name to *ENE2: Fabric Energy Efficiency* to reflect the zero carbon hierarchy?

Question 10: Do you agree that we should adopt the new energy efficiency metric and levels for the 2016 zero carbon definition into the Code now? If not, why not?

Question 11: Do you agree that we should adopt the new energy efficiency levels for the 2016 zero carbon definition into the Code as a mandatory requirement at Code levels 5 and 6 and award 5 credits?

Question 12: Do you agree that Code level 4 should mirror the outcome of the consultation on the energy efficiency definition (see Part B) for interim measures to be introduced into regulations in 2013 ?

Question 13: Do you agree that the credits for internal lighting will no longer be required once the Code is updated in 2010 and it is therefore appropriate to delete *ENE3: Internal Lighting* and reallocate the points elsewhere in the energy section?

Question 14: Do you agree that evidence must be provided by developers on the energy efficiency of appliances provided as optional extras if they choose to gain the credit for leaflet provision?

Question 15: Do you agree that the 2 points awarded for external lighting should be reduced to 1 point ?

Question 16: Do you agree that this issue is renamed from *ENE7 Low and Zero Carbon Technologies* to *ENE3: Renewable Technologies* to better reflect the zero carbon hierarchy?

Question 17: Do you agree that for technologies under 50kWe and 300kWth certification under the *Microgeneration Certification Scheme* should be a requirement for allocating credits and for all renewable CHP schemes over 50kWe assurance under the CHPQA should be a requirement for allocating credits?

Question 18: Do you agree that a new issue should be introduced into the Code for the provision of energy display devices?

Question 19: Do you agree with the proposed credit allocation for this new issue? If not, why not?

Question 20: Do you agree that we should postpone making the Lifetime Homes Standards (as revised) a mandatory requirement from Code level 4 upwards pending a review in 2010?

Question 21: Do you agree with our proposal to introduce an exemption on steeply sloping sites for the external Lifetime Homes requirements and award 3 out of the 4 available points?

Question 22: Do you agree with the definition of a steeply sloping site as having a predominant gradient of 1:12 or greater?

Question 23: Do you agree with the proposals for measuring gradients?

Question 24: Do you agree with the proposed changes to the technical guide criteria in order to better reflect current thinking and standards on accessibility? If not, which proposals do you disagree with, and why?

Question 25: Do you agree that current Code requirements cause duplication for some developers who already have a corporate site waste management plan in place? If yes, please provide evidence of experiences to support your answer.

Question 26: Should the mandatory requirement for Site Waste Management Plans be removed and replaced with voluntary credits for minimising or diverting waste to landfill as set out above and in the technical guide?

Question 27: Do you agree with the proposed methodology and requirements for dealing with doubling external space where there is a fortnightly collection? If not, what methodology/requirements do you think should be used?

Question 28: Do you agree that waste compactors should be allowed on sites where there are space restrictions for storing waste? If yes, do you agree with the proposed requirements?

Question 29: Should communal cycle storage in large scale, high density developments be reduced, remain the same or be increased? We would welcome evidence from respondents of experiences with this issue.

Question 30: If we were to rescale the communal storage requirements for certain sized developments, what threshold should be used to describe a development as 'large scale' and allow a rescaled requirement to be applied, e.g. 100 dwellings, 200 dwellings, etc.? Why do you consider this threshold to be appropriate?

Question 31: Do you consider it appropriate to reduce the cycle storage requirement for certain types of development, such as specialist retirement housing. If so, what types of development would you consider it appropriate to apply the reduction to?

Question 32: Should the requirement for cycle storage remain for all developments but be flexible to allow for storage of mobility equipment applicable to the likely end user as well as cycles?

Question 33: Do you agree that the home office space requirement for specialist housing such as retirement homes should be reduced?

Question 34: Are there other parts of the Code you think this may apply to?

Question 35: Should the issues in the Code not directly related to climate change remain in the Code? What are the reasons for your answer and do you have any evidence to support them?

Question 36: Do you agree with the proposed changes set out in the technical guide to the assessment criteria in *SUR1: Management of Surface Water Run-off from development*? If not, why not?

Question 37a: Do you agree in principle that the minimum door and window security standards outlined in Box B should be introduced into the Code and awarded one credit?

Question 37b: Should an additional credit be available for consulting with the local architectural liaison officer or crime prevention design advisor and implementing their recommendations based on *Secured By Design part 2*?

Question 37c: Do you think the above options would give rise to additional construction costs. If so, please state what you think those costs would be.

Question 37d: Alternatively, to drive take up of basic physical security standards in new homes would it be necessary to make them a mandatory part of the Code?

Question 37e: Would an alternative approach of allowing two credits for consulting an architectural liaison officer or crime prevention design advisor (whilst leaving the credit for door and window locks voluntary) be a more attractive way of encouraging take up of basic security standards?

Question 38: Do you agree that the technical guide should only be updated in 2013 and 2016? If not, do you have any suggestions for how often updates should be issued (for instance annually or every 18 months)?

Question 39: Do you have any comments on the redesign of the technical guide or suggestions for improving it?

Question 40: Do you have any experience or views on how to help make the Code more accessible, visible and valuable to consumers?

Question 41: We would welcome your thoughts on whether these areas should be considered for the future and any evidence you may have to support those views.

Question 42: Do you agree that the appropriate metric for the energy efficiency standard to support the regulatory definition of zero carbon homes should be based on the amount of energy demand for space heating and cooling per square metre per year? If not, why not?

Question 43: Do you agree that it is right to focus on fabric and passive energy efficiency measures within the energy efficiency standard and to capture the efficiency of heating and cooling appliances and systems, mechanical ventilation, heat recovery and gains from hot water via carbon compliance? If not, why not?

Question 44: Do you agree that it is right to differentiate the level of the fabric energy efficiency standard (expressed in kWh/m²/year) according to the type of dwelling? If not, why not?

Question 45: Do you agree that the regulatory standard applicable from 2016 should (based on consultation SAP 2009) be 39 kWh/m²/year for apartments and mid-terrace houses and 46 kWh/m²/year for semi-detached houses? If not, do you think it should be (a) more demanding – for example equivalent to the Specification C - considered by the task group or (b) less demanding – for example equivalent to the Specification A considered by the task group?

Question 46: Do you agree that the regulatory standard applicable from 2016 should (based on consultation SAP 2009) be 46 kWh/m²/year for detached houses? If not, do you think it should be (a) more demanding – for example equivalent to the Specification C considered by the task group or (b) less demanding – for example equivalent to the Specification B considered by the task group?

Question 47: Government is minded to introduce interim requirements from 2013. Do you agree? What approach would you support, bearing in mind the considerations and ideas set out in paragraphs 220–221?

Question 48: Are the proposals set out in this chapter likely to result in any seriously adverse unintended consequences that are unlikely to be addressed through the research requirements identified in paragraph 217?

Annex B:

List of Environmental Issues and their role in Climate Change mitigation and adaptation.

Category	Issue	Climate change Mitigation/adaptation
Energy & CO₂	Dwelling emission	Mitigation
	Building Fabric	Mitigation/adaptation
	Internal lighting	Mitigation
	Drying space	Mitigation
	Energy labelled white goods	Mitigation
	External lighting	Mitigation
	LZC technologies	Mitigation
	Cycle storage	Mitigation
	Home office	Mitigation
Water	Indoor water use	Adaptation (and some mitigation)
	External water use	Adaptation
Materials	Environmental impact of materials	Mitigation
	Responsible sourcing of materials – basic building elements	Mitigation
	Responsible sourcing of materials – finishing elements	Mitigation
Surface Water Run-Off	Management of surface water run-off from developments	Adaptation (and some mitigation)
	Flood risk	Adaptation
Waste	Storage of non-recyclable waste and recyclable household waste	Mitigation
	Construction waste management	Mitigation
	Composting	Mitigation

Category	Issue	Climate change <i>Mitigation/adaptation</i>
Pollution	Global warming potential of insulants	Mitigation
	NOx emissions	Mitigation
Health & Well-being	Daylighting	Mitigation
	Sound insulation	
	Private space	Adaptation
	Lifetime Homes	
Management	Home User Guide	Mitigation/adaptation
	Considerate constructors scheme	
	Construction site impacts	Mitigation (and some adaptation)
	Security	
Ecology	Ecological value of site	
	Ecological enhancement	Mitigation/adaptation
	Protection of ecological features	Mitigation/adaptation
	Change in ecological value of site	Mitigation/adaptation
	Building footprint	Mitigation

Annex C:

Lifetime Homes Standard

Revised Criteria following Technical Advisory Group discussion.

November 2009

Summary of **significant** changes from original Criteria

THE SUMMARY BELOW ONLY INCLUDES A BRIEF DESCRIPTION OF SIGNIFICANT CHANGES. THE SPECIFICATION FOR EACH OF THE CRITERION (NOT INCLUDED HERE), SHOULD BE CONSIDERED TO APPRECIATE THE DETAILED REVISED REQUIREMENTS OF EACH CRITERION.

Criterion 1 – Parking (width or widening capability)

- Criterion now split into 1a – ‘On Plot (non-communal) parking; and, 1b (Communal or shared parking).
- Where parking is communal, the Criterion now requires **one** communal parking space close to a block’s communal entrance or lift core to have a 3300mm width.

Criterion 2 – Approach to dwelling from parking

- The level or gently sloping approach to a dwelling from parking can now be to **EITHER** the front or secondary entrance (previously required to both).

Criterion 3 – Approaches to all entrances

- The revised Criterion recognises that on steep sites it may not be practicable or achievable to achieve a level or gently sloping approach to all entrances.
- This means that the only accessible approach to a dwelling on some sites will only be that required by Criterion 2 – i.e. from the car parking to any entrance. This should be a significant help on sloping sites.

Criterion 4 – Entrances

- Exemption introduced to accessible threshold requirements to balcony/roof terraces where a ‘step up’ is necessary due to an increase in slab thickness over accommodation below due to thermal insulation requirements.
- A clear opening width for communal doors is now 875mm.
- Level landings at entrances are now required

Criterion 5 – Communal Stairs and lifts

- Easy going stairs now only required on principal stair access routes.

Criterion 6 – Internal doorways and hallways

- Communal doorways now require a clear opening width of 875mm.

Criterion 7 – Circulation space

- Clarification of circulation width needed to pass furniture as 750mm.
- Kitchens now require a minimum 1200mm between unit / appliance fronts and opposite obstructions.
- Clear 750mm required to both sides and foot of bed in main bedroom.
- Other bedrooms to have clear 750mm to one side of bed.

Criteria 8 – Entrance level living space

- No significant changes.

Criterion 9 – Potential for entrance level bed-space

- No significant changes.

Criterion 10 – Entrance level WC and shower drainage

- Full side transfer space for fully accessible WC (in dwellings with 3 or more bedrooms, or on one level) is replaced with an initial requirement for this space beside the WC to only extend back 250mm from front edge of WC bowl, provided there is adaptation potential to increase the depth of this space to 700mm if & when required.

Criterion 11 – WC and bathroom walls

- Height band for potential fixing of grab rails extended from 300mm – 1500mm to 300mm – 1800mm.

Criterion 12 – Domestic stairs and potential through floor lift

- Clarification on stair width measurement enables slightly narrower stair.
- Clarification that as long as the stair can take a stair lift it will meet requirements (still subject to a width requirement – but no ‘landing’ requirements).
- Potential through floor lift route now to any bedroom or circulation space and occupation of bedroom can drop to single if lift installed, as long as a double is available elsewhere.
- No trimming for lift knock out panel required in floor unless floor is concrete.

Criterion 13 – Potential for future hoists & bedroom / bathroom relationship

- No tracking route now required between bedroom and bathroom – but bedroom and bathroom ceilings should still be capable of supporting single point hoists, or capable of simple adaptation to enable installation of single point hoists.

• Criteria 14 – Bathrooms

- The various ‘ease of access’ and ‘fully accessible’ requirements are now replaced by one set of requirements.
- The full side transfer space / ease of access side space to WC is replaced with an initial requirement for this space beside the WC to only extend back 250mm from front edge of WC bowl, provided there is adaptation potential to increase the depth of this space to 700mm if required.
- Requirements for drainage for future accessible shower (unless provided elsewhere) are clarified and detailed.

Criterion 15 – Glazing and window handle heights

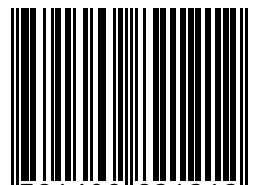
- 50mm tolerance added to 800mm cill height requirement in living room.

Criterion 16 – Location of services

- No significant changes.

ISBN: 978-1-4098-2121-2

ISBN 978-1-4098-2121-2



9 781409 821212