

## Summary: Intervention & Options

<b>Department /Agency:</b> <b>Communities &amp; Local Government</b>	<b>Title:</b> <b>Impact Assessment of Mandatory rating against the Code</b>	
<b>Stage:</b> Final	<b>Version:</b> 6 November 2007	<b>Date:</b> 6 November 2007
<b>Related Publications:</b> The future of the Code for Sustainable Homes – consultation response		

### Available to view or download at:

<http://www.communities.gov.uk/thecode>

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### What is the problem under consideration? Why is government intervention necessary?

New homes make a significant contribution to carbon dioxide emissions and climate change. They also have a wide range of other environmental impacts, for example through the materials used to construct them and the water used by the occupants. There are potential market failures because the externalities of a home's sustainability impacts are not taken into account by home builders, and because there is often a lack of information available – buyers are often unable to judge the sustainability of a new home. Intervention is necessary to tackle this.

### What are the policy objectives and the intended effects?

The Code builds on Energy Performance Certificates by providing a national framework within which house builders can improve the overall sustainability of new build homes. It provides a mechanism by which builders can be recognised for going beyond Building Regulations for energy and other aspects of sustainability. Making a rating against the Code mandatory will ensure that information is available on all new homes to allow purchasers to make more informed choices. This should encourage home builders to take account of environmental externalities in the design and construction of new homes.

### What policy options have been considered? Please justify any preferred option.

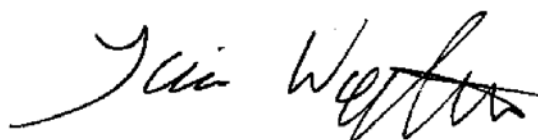
Two options were considered: do nothing (keep the Code as a voluntary standard); and introduce a mandatory rating against the Code. The do-nothing option will not have as substantial an impact on information provision as mandatory rating. The scenarios under which mandatory rating is cost effective are considered realistic. Mandatory assessment was also considered, but this would force those developers who choose not to meet Code standards (which would incur an additional cost and exceed Building Regulations standards) to spend money on an assessment to be told what they already know.

**When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects? 2010**

**Ministerial Sign-off** For select stage Impact Assessments:

***I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.***

Signed by the responsible Minister:

A handwritten signature in black ink, appearing to read "Jim Weyler". The signature is fluid and cursive, with a long horizontal stroke at the end.

**Date:** 9 November 2007

## Summary: Analysis & Evidence

<b>Policy Option:</b>		<b>Description:</b>	
<b>COSTS</b>	<b>ANNUAL COSTS</b>	Description and scale of <b>key monetised costs</b> by 'main affected groups'	
	<b>One-off</b> (Transition) <b>Yrs</b>	Capital costs of construction (assuming 2% annual reduction) and admin cost of assessment/non-assessment, borne by developers/land owners and (where consumers are willing to pay) buyers – see table 2 in main body of IA.	
	£		
	<b>Average Annual Cost</b> (excluding one-off)		
	<b>£21.18m</b>	<b>Total Cost (PV)</b>	<b>£317.7m</b>
Other <b>key non-monetised costs</b> by 'main affected groups'			
<b>BENEFITS</b>	<b>ANNUAL BENEFITS</b>	Description and scale of <b>key monetised benefits</b> by 'main affected groups'	
	<b>One-off</b> <b>Yrs</b>	Present value of economic and environmental benefits assuming 20% improvement in market efficiency (see Table 2 in main body of the IA)	
	£		
	<b>Average Annual Benefit</b> (excluding one-off)		
	<b>£51.78m</b>	<b>Total Benefit (PV)</b>	<b>£776.7</b>
Other <b>key non-monetised benefits</b> by 'main affected groups' Wider sustainability benefits e.g. reduced impact from flooding, recycling, waste management, reduced water consumption/better management etc.			
<b>Key Assumptions/Sensitivities/Risks</b> Results are sensitive to (a) speed of cost reduction over time, (b) level of administration cost, (c) lifetime in which benefits accrue, (d) market efficiency improvement achieved (i.e. % developers choosing to build to higher standards because of better information)			
<b>Price Base Year</b> 2008	<b>Time Period Years</b> 15	<b>Net Benefit Range (NPV)</b> <b>£-0.65m to £615.5m</b>	<b>NET BENEFIT (NPV Best estimate)</b> <b>£</b>

What is the geographic coverage of the policy/option?	England			
On what date will the policy be implemented?	April 2008			
Which organisation(s) will enforce the policy?	BRE/TSOs			
What is the total annual cost of enforcement for these organisations?	£0			
Does enforcement comply with Hampton principles?	Yes			
Will implementation go beyond minimum EU requirements?	No			
What is the value of the proposed offsetting measure per year?	£			
What is the value of changes in greenhouse gas emissions?	£72m (4.80m/yr)			
Will the proposal have a significant impact on competition?	Yes/No			
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A
<b>Impact on Admin Burdens Baseline</b> (2005 Prices) (Increase – Decrease)				
Increase of £0.65m		Decrease of £0		<b>Net Impact £0.65m</b>
Key:	<b>Annual costs and benefits: Constant Prices</b>			<b>(Net) Present Value</b>

## Evidence Base (for summary sheets)

### Title of Proposal

1. Assessing the costs and benefits of making a rating against the Code for Sustainable Homes mandatory from April 2008 for all new homes built in England.

### Purpose and Intended Effect of Measure

#### Objective

2. This proposal builds on the mandatory provision of Energy Performance Certificates by providing a national framework within which home builders can work to improve the sustainability performance and impact on the environment of new build homes.
3. The Code was introduced in April 2007 as a voluntary national standard. The proposal explored in this paper is to make it mandatory for all new homes to have a rating against the Code from April 2008, by making a Code certificate a compulsory document in the Home Information Pack (HIP). Where a home builder does not wish to have their home(s) assessed against the Code they will simply need to download a standard 'zero star' certificate (for inclusion in the HIP) therefore minimising the administrative burden of providing the rating.
4. This will ensure that prospective buyers of new build homes are given information about how the home they are considering buying performs against the Code. It will also allow home builders to differentiate the performance of their homes from the performance of others.
5. It is anticipated that this proposal to ensure that new homes have such a rating will increase consumer demand for more sustainable homes and encourage industry to build more sustainable homes, because consumers will place a value on improved sustainability.
6. The Code is currently only applicable in England and a mandatory rating against the Code will probably only apply in England. The powers sought in the Housing and Regeneration Bill to establish a sustainability rating (ie the Code) in law, that will exercised by the National Assembly of Wales in the future, will be subject to a separate Impact Assessment as part of the normal consultation process.

## Background

7. From April 2008, Energy Performance Certificates for new homes will ensure that every purchaser is given information about the energy efficiency of their home and practical suggestions for making it more efficient as part of the HIP. The Code builds on this by providing a framework for home builders to gain recognition for going beyond current Building Regulations on energy efficiency, and also sets standards for many other aspects of sustainability such as water, materials and ecology.
8. Because all new homes already perform very well on the EPC scale, big improvements on top of current Building Regulations don't register significantly. Conversely, the energy element of the Code is based on percentage improvements over Building Regulations so big improvements will be clearly visible to consumers.
9. The Code also provides a means of assessing the wider sustainability of a home. In addition to carbon emissions, the housing sector also creates a range of other environmental impacts, for example through inefficient use of water (which also has an indirect impact on carbon emissions used to supply, heat and treat it), generation of waste, and use of polluting materials.
10. Although great progress has been made in improving the sustainability of buildings through a range of initiatives in recent years, there is increasing recognition of the need to take more action.
11. The Building Regulations set mandatory minimum standards for building design and construction, which include health, safety and environmental considerations. These are updated regularly (approximately every five years, although energy efficiency/carbon dioxide emissions updates have been more frequent) to reflect changes in required standards and developments in technology. On their own, however, they do not cover all aspects of sustainability. They also offer no incentive for exceeding the minimum standards, no information on when minimum standards have been exceeded, offer no stimulus to innovate, and offer no mechanism through which we can increase consumer awareness and demand for more sustainable housing.
12. Homes built to the minimum standards in the Code, will have and/or will provide the facilities to encourage:
  - improved energy efficiency (and therefore lower carbon emissions)
  - reduced consumption of potable water
  - reduced surface water runoff

- reduced environmental impact of materials
- improved site waste management and adequate space for accessible waste storage.

13. They may also have, and/or provide the facilities to encourage:

- improved waste recycling provision
- improved consideration of flood risk during siting and design
- more responsibly sourced materials
- reduced pollution impact
- design features which support the health and well-being of occupants
- design features which assist in more sustainable management of the home, including amenities for disabled people
- more positive impacts on the ecological value of the site
- reduced waste from the construction process
- consideration of the surrounding community during construction
- reduced environmental impacts during construction.

14. Code levels 1-6 are represented by star ratings. Homes built to higher levels of the Code must perform progressively better across a range of criteria. Each Code level has minimum performance standards for energy and water, and all levels of the Code have fixed minimum requirements for waste and surface water run-off. All remaining credits are flexible.

15. The introduction of the Code has given the home building industry more certainty over the likely direction of travel for integrating sustainability into new homes through regulation over time. Home builders will be better able to factor sustainability measures into land purchase prices.

16. The development of the Code ñ which is based on EcoHomes ñ was overseen by a Senior Steering Group which included representatives from the home building industry and environment groups. The initial proposal to make a rating against the Code mandatory was consulted on by Government as part of the *Building a Greener Future: Towards Zero Carbon Development* consultation in December 2006. The majority of respondents (61 per cent) were in favour of introducing a mandatory rating, whilst only 8 per cent disagreed.

### Rationale for government intervention

17. The recent Stern review maintains that global warming could shrink the global economy by 20 per cent.<sup>1</sup> It states however, that if we take action now, it could cost just one per cent of global gross domestic product. The construction and occupancy of our homes generates a significant proportion of the UK's carbon dioxide emissions (27 per cent in 2004), therefore failure to act now in the new homes sector will contribute to greater costs of damage from climate change in the longer term. Whilst new build homes are a relatively small proportion of the total housing stock, if we build the homes we need, then by 2050, as much as one-third of the total housing stock will have been built between now and then.
18. However, it is vital that we also take action on other sustainability issues. Other key objectives include:
  - reducing potable water consumption
  - specifying greener and more responsibly sourced construction materials
  - providing enhanced recycling facilities
  - protecting and enhancing the ecological value of sites and building on sites of low ecological value

The Code takes issues such as these into account.

19. The Code seeks to address market failures in the sustainability of new housing. Market failure means that there is an inefficient allocation of resources. Presently, homes produce more than the socially-optimal level of carbon emissions.
20. This is due in part to informational problems in the market: households do not have sufficient information to make adequate judgement about the full costs and benefits of certain home features. Therefore by demonstrating a home has a certain environmental performance, developers will be able to command a price premium from consumers aware of energy and other savings they will make over the course of their tenure. If purchasers believe that they will also be able to command a premium upon resale, then a privately-optimal level of environmentally sustainable features will be achieved.

<sup>1</sup> [www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm)



21. The voluntary Code rating partially achieves this. By being transparent and easy to understand, it enables consumers to take into account the sustainability performance of new homes and is helping consumers develop the market for more sustainable homes. The Code rating also enable developers to distinguish their product in sustainability terms. By making the Code mandatory, awareness of the potential to access this information is raised, stimulating further demand amongst home-buyers.
22. There are also wider costs of a home's environmental impact: households only take account of the private costs of their consumption, not the additional social cost of producing carbon emissions.
23. By providing information about a home's environmental performance, the Code can help overcome cultural barriers in public acceptability, which has been an issue for some renewable technologies, such as wind<sup>2</sup>. With more information about the wider implications of their actions, it will encourage people to make more responsible choices when purchasing a home, which may begin to address negative externalities.

## Consultation

### Within government

24. When developing the Code for Sustainable Homes consultation within government on the proposed Code was undertaken by the former ODPM and continued under Communities and Local Government. Other Government Departments (and Agencies), including the Department for Environment, Food and Rural Affairs, Department for Trade and Industry, the Office of Government Commerce and the Environment Agency were also represented on the Code's Senior Steering Group (SSG).
25. During the development of the Code it was agreed that a rating against the Code should be made mandatory from April 2008, depending on the outcome of consultation as part of *Building a Greener Future*, and a further more detailed consultation (of which this IA forms a part).
26. When developing this IA other Government Departments and the SSG were invited to input and all Government departments have been consulted on the proposals.

<sup>2</sup>The Stern Review highlights the role of information policies in improving public acceptability, with examples in wind, nuclear, and hydrogen vehicles.

### Public consultation

27. Likewise, when developing the Code for Sustainable Homes, public consultation was undertaken, including with the Senior Steering Group.
28. In *Building a Greener Future: Towards Zero Carbon Development* we asked whether all new homes should be required to have a mandatory Code rating, indicating whether they have been assessed and the performance of the home against the Code. The majority of respondents (61 per cent) agreed that a rating against the Code should be made mandatory with only 8 per cent disagreeing.
29. This was followed in July 2007 by a more detailed consultation that set out how we intended to deliver a mandatory rating against the Code. There was strong support for the proposals overall with 69 per cent of respondents agreeing that we should make a rating mandatory. In addition, during the preparation of this Impact Assessment, Cyril Sweett undertook a survey of developers to improve our understanding of likely take-up of the Code and to improve the financial model used in this IA.

### Options

30. Two options have been identified:

A) Do nothing (retain the Code as a purely voluntary standard)

B) Introduce a mandatory rating against the Code for Sustainable Homes

#### *Option A – Do nothing*

31. The do nothing option is the baseline against which Option B is measured. It represents 'business as usual'. This means that if you choose to have a Code assessment then you pay for this assessment, but that if you don't choose to have an assessment no costs are incurred.

#### *Option B – Mandatory Rating against the Code*

32. Option B involves the introduction of a mandatory rating against the Code. This does not mean that a home builder has to pay for a Code assessment on every new home built; but that if they choose not to undertake an assessment they will have to make a rating available to a potential buyer, in the form of a zero star certificate or statement of non-assessment. Obtaining a zero star certificate would result in a small administrative cost being incurred. This involves an administrative cost, for the time taken to produce this certificate or statement. The worst case scenario estimate is £0.65m per annum and is essentially the additional cost to society of making Code rating mandatory. This figure is derived from an estimated £5 administration

cost for each of the 130,000 private sector homes not built to the Code/Ecohomes standards in 2006/2007.

33. The same sensitivities on cost reductions have been applied as in the 'do nothing' option, and the same principle that some home builders will adopt higher standards where there is a net benefit per dwelling (in terms of additional construction cost against ongoing benefits from lower utility bills). These assumptions are shown in the table below.

<b>Costs of achieving Code level to home builder</b>	<b>Benefits to occupier over 20 years</b>	<b>Net Present Value (Benefits – Costs) Overall and (£m)</b>	<b>Outcome</b>
A	less than A	Negative (overall cost over time)	0% of homes built adopt Code standard
B	B	Neutral	An additional 20% of homes built adopt Code standard
C	more than C	Positive (overall saving over time)	An additional 20% of homes built adopt Code standard

The key difference in this scenario is that the proportion of home builders following this behaviour is assumed to increase over and above the 'do nothing' case, as awareness of the Code will increase and buyers are able to make more informed, responsible choices and developers are better able to respond.

34. The analysis therefore does not represent what we hope or expect uptake of the Code to be when rating is mandatory, but looks instead at what scenarios are needed to justify the administration cost, and what the risks are.

#### Alternative options considered

35. An alternative option would be to make assessment against the Code mandatory. Home builders would pay for a Code assessment for every new home built, even if they only intended to build to minimum Building Regulations standards. This would mean that instead of downloading a zero star certificate for free, home builders would have to pay for an assessment before receiving a zero star certificate. This would include homes on single and smaller sites (where the assessment costs per home are likely to be higher per plot) as well as larger sites. Based on our projections of future

house building, the cost of assessment would be as much as around £56 million per year if a full assessment were undertaken, or £836 million over the whole period in present value. However, this £56 million figure could be lower if full assessments were not undertaken; for example, having determined that the mandatory energy credits cannot be achieved, the assessor does not complete the remainder of the assessment, and a 'fail' certificate is issued at a reduced cost compared with a full assessment fee.

36. Mandatory assessments are unlikely to lead to any greater market efficiency than a mandatory rating as the visible result to the consumer (i.e. a Code rating of whichever Level) is the same to the consumer. Therefore adoption of a mandatory assessment would incur significant further cost with no measurable benefits.

### **Assumptions and Uncertainties**

37. The rate of construction of new build homes aligns with our previous home building aspirations, increasing to 240,000 net annual additions by 2016.
38. 15 years of additional home building has been modelled to calculate the total net present costs and benefits. This 15-year period was chosen to provide sufficient time to reflect potential market changes whilst reducing uncertainties of forecasting too far into the future.
39. A period of 20 years has been used as the basis for the lifetime of benefits for each home built to Code standards. This figure was chosen to reflect the average lifetime of the technologies needed to meet the Code levels before they need to be replaced. Future costs and benefits have been discounted at an annual rate of 3.5 per cent.
40. All new Government funded homes and homes built on land owned by English Partnerships are required to achieve Code level 3 from April 2007, and the Housing Corporation will be building to Code level 3 from the 2008-10 bid round. Consequently the costs and benefits presented relate only to private new build, as the only part of the new build market to experience potential additional impacts as a result of the mandatory rating.
41. The baseline rate of assessments has been assumed to follow current assessment rates under EcoHomes:
- Public sector – 24,000/yr; and
  - Private sector – 3,000/yr (equivalent to two per cent of private new build).

42. A shortcoming of the earlier Partial Impact Assessment was that it was unclear what the home builder response to achieving a Code rating would be. Following consultation with a number of home builders, it is now evident that adoption of Code standards will vary significantly and that a common response is unlikely. Consequently, no further robust behavioural patterns could be determined during consultation. This analysis therefore mirrors the experience to date of the voluntary uptake of EcoHomes in the private sector. This is equivalent in our modelling, to two per cent of the market working efficiently, i.e. home builders construct to a standard that has optimum whole life performance. In this analysis this is a positive net benefit, taking into account construction costs and operational benefits.
43. A common response from home builders surveyed was that they did not believe that consumers currently value either the performance of an EcoHomes or Code property, thus demonstrating the need for greater market transparency and the need to make a rating mandatory. The impact of greater transparency in home performance is difficult to quantify and has conservatively been estimated at increasing market efficiencies by 20 per cent. Therefore the projected impact of making a rating mandatory is that greater consumer awareness of the long term benefits of the Code will result in an increase in market efficiency such that home builders construct 25 per cent of new homes to the Code standard that offers greatest Net Present Value.
44. The assumption of two per cent 'market efficiency' is low to reflect experience to date, but also our understanding that the benefits from lower utility bills do not flow to the home builder through prices, as prices are determined mostly by the second-hand market and are only likely to be influenced by developers if buyers are willing to pay a premium for more sustainable homes.
45. The model does not assume that home builders consider the social benefit of reduced carbon emissions in assessing Net Present Value, as it is unlikely that they will be compensated for this.
46. The model is sensitive to the level of administrative costs of assessment and rating against the Code. An average assessment fee of £218 is assumed, based on an average cost excluding single sites, for example built by self-builders, from whom we do not expect uptake of the Code to be high, partly due to the higher cost of assessment.

47. It is noted that BRE review their fee scales on an annual basis, and these numbers are likely to change in January 2008. Revised figures are not yet available for use in this IA and are unlikely to be available until December 2007.
48. Two man days (at a value of £280) has been assumed for gathering information by developers to feed into an assessment. Information gathering is required for each different home design specification within a development.
49. The zero star certificate will be freely available and will only have a cost in terms of the time taken to print and to make it available to a potential buyer. The conservative assumption has been made that this takes fifteen minutes for each dwelling at a cost of £20 per hour (i.e. £5 for each dwelling).
50. In monetising the carbon savings we have assumed the shadow price (social cost) of carbon dioxide to be £25 per tonne in 2007 prices.<sup>3</sup>
51. We have used a standard flat rate for energy prices over time.
52. The policy costs (costs of achieving different Code levels) are based on two reports commissioned by CLG quantifying the costs of building to different Code standards, both overall, and focussing on achieving the energy requirements.<sup>4,5</sup> These two studies built on the work undertaken by Cyril Sweett for English Partnerships and the Housing Corporation in 2006 '*Cost Review of the Draft Code for Sustainable Homes*' and were updated to take into account the April 2007 Technical Guidance which underpins the Code.
53. The costs of meeting each Code level are compared to the costs of a baseline home (a Building Regulations compliant home). Costs are presented on a per dwelling basis.
54. The analysis represents an estimate of the total costs to a contractor, including materials, plant and labour, preliminaries, overheads, contingencies, profit, and design fees. The models relate to the construction of the dwellings only. Detailed exclusions can be found within the Cyril Sweett report.

<sup>3</sup> Defra, How to use the shadow price of carbon in policy appraisal, August 2007

<sup>4</sup> CLG, *Refined and Updated Cost analysis of The Code for Sustainable Homes*, Cyril Sweett, November 2007

<sup>5</sup> CLG, *The costs and benefits of the Government's proposals to reduce the carbon footprint of new housing development*, Cyril Sweett, Faber Maunsell & Europe Economics, November 2007

55. The costings are based on a home builder with a trading turnover of 5,000 to 10,000 dwellings per annum. It should be noted that policy costs vary according to the size of the home builder (which affects purchasing power), and the size of developments undertaken (larger developments bring economies of scale).
56. Achieving Code standards, particularly higher levels of the Code, requires the adoption of emerging sustainable technologies. As demand for these technologies increases and their markets mature, it is likely that increased competition and opportunity to take advantage of economies of scale will cause the costs of these technologies to drop. Innovation may also cause policy costs to decrease in the future, as highlighted by international experience.
57. This IA therefore includes analysis of the potential costs using a number of different scenarios for reduction in the cost of technology. As a base case it assumes no fall in costs of meeting the Code over time. However, this scenario is considered to be highly unrealistic given our understanding of technology markets as outlined above. Other scenarios tested assume cost reductions of 2 per cent, 5 per cent, and 10 per cent a year.
58. The costs and benefits associated with energy efficiency improvements arising from Part L of Building Regulations revisions in 2010, 2013 and 2016 have been attributed to the *Building a Greener Future Towards Zero Carbon Development*<sup>6</sup> Impact Assessment and are therefore included in the 'do nothing' base case. Similarly, costs and benefits associated with HM Treasury's policy of allowing stamp duty and land tax exemption for zero carbon homes are not included here.
59. The benefits predominantly relate to utility bill and carbon savings for energy and water. A limited number of other benefits from other categories in the Code have also been valued where there is a robust basis for doing so.
61. We are aware that this proposal will create some additional burdens for home builders, and will look to identify compensatory simplifications prior to implementation. If you have any proposals for simplification please notify them through the Better Regulation Executive's simplification portal at <http://www.betterregulation.gov.uk>.

<sup>6</sup> [www.communities.gov.uk/index.asp?id=1505157](http://www.communities.gov.uk/index.asp?id=1505157)

62. The model does not address the potential impact of Local Authorities mandating Code compliance within local planning policy as this is not a direct outcome of this policy, which requires a mandatory Code rating (rather than Code compliance). Likewise, this IA does not consider the costs and benefits attributable to the HIP, which has been assessed in the HIP Regulatory Impact Assessment.

### **Costs and Benefits**

#### **Sectors and groups affected**

63. Many sectors of the construction industry will be affected by the introduction of a mandatory rating against the Code. In particular, it will affect large and small home builders, manufacturers of sustainable technologies/products, landowners and homebuyers. To a lesser extent it will affect estate agents.

#### **Home builders**

64. Home builders can choose whether to assess their developments against the Code and are also able to choose which Code level they aim for; therefore they decide if they are prepared to incur the associated 'administrative' costs (costs associated with assessment) and the 'policy costs' (costs associated with building more sustainably) they incur.
65. A Code assessment will still be voluntary; however home builders will have to provide the homebuyer with a clear statement (either a zero star certificate or a statement of non-assessment) at an appropriate point in the home buying process.
66. The policy costs of this would still be controlled by the home builder. They decide whether to build to the Code standards. There will be a minimal administration cost associated with producing the proposed zero-star certificate or statement of non-assessment. This standard document would be available from an appropriate website and the home builder will download and print a copy for each home they sell. It is envisaged that in the short term, the majority of developers will take this option rather than building to the higher sustainability standards of the Code and paying for an assessment.
67. In a world where consumers are becoming increasingly environmentally conscious, and demanding higher sustainability performance in their goods and services, home builders may benefit in terms of competitive differentiation by marketing their performance against the Code. Recent research by the Sponge Sustainability Network suggested that there is a correlation between beliefs about the efficacy of sustainable homes



in combating climate change and beliefs about the financial pay-off of sustainable features.<sup>7</sup> However, the evidence here is not robust enough to have made assumptions about the financial premium for sustainable homes.

#### **Race equality impact assessment**

68. A mandatory rating against the Code for Sustainable Homes should not have any impact on race equality.

#### **Human Rights impact assessment**

69. The Code does not have any impact on Human Rights.

#### **Disability impact assessment**

70. The encourages the incorporation of Lifetime Homes standards into a home and provides for a number of other accessibility features, such as providing waste storage Code standards should, over the long term, have some positive effects on residents' health but these are not likely to be large or quantifiable.

#### **Gender Impact Assessment**

71. The Code does not have any impact on Gender.

#### **Health impact assessment**

72. Building homes to Code standards should, over the long term, have some positive effects on residents' health but these are not likely to be large or quantifiable.

#### **Rural considerations**

73. There should not be any specific rural considerations associated with this policy.

#### **Breakdown of costs and benefits**

74. The policy and administration costs are predominantly consistent for both Option A and Option B. These are described in detail in Annex A.

75. The key differences for Options A and B are:

- Under Option B, where home builders choose not to be assessed against the Code they will incur an estimated administration cost of £5 per home due to the time taken to make a zero star certificate/statement of non-assessment available to a potential buyer.

<sup>7</sup> [www.spongenet.org/lifestyle/index.php?page=news&news\\_id=101](http://www.spongenet.org/lifestyle/index.php?page=news&news_id=101)

- The assumed levels of market efficiency vary – Option A is two per cent, and Option B is 22 per cent.

**Option A – Do nothing**

**Summary**

76. A number of scenarios are analysed, based on how costs of building to the Code fall over time. The model simulates a proportion of home builders basing their decisions on achieving a positive Net Present Value, i.e. constructing homes to that level of the Code that presents the optimal Net Present Value. Under a voluntary rating system this proportion is assumed to be two per cent, which is consistent with the level and standard of take-up seen under Ecohomes.
77. Under the scenarios where there is a cost reduction each year, the overall benefits increase, partly as a result of reduced construction costs and also because these reduced costs enable them to build to progressively higher Code levels whilst still achieving a net benefit. The overall net benefit to society is therefore a product of how many homes are built to different Code levels and the relative net unit costs and benefits of building to the Code. The table below summarises this:

**Table 1:** Summary costs and benefits of Option A over period 2008-2022: assuming two per cent 'market efficiency'

<b>Cost reduction scenario</b>	<b>Increased number of assessments Overall and (per annum)</b>	<b>Present Value Admin Costs (£m)</b>	<b>Present Value Policy Costs (£m)</b>	<b>Present Value Economic Benefits (£m)</b>	<b>Present Value Environmental Benefits (£m)</b>	<b>Net Present Value (Benefits – Costs) Overall and (per annum) (£m)</b>
<b>Flat costs over time</b>	42,640 (2,843 p.a.)	7.6	19.4	54.6	5.6	<b>33.2 (2.2 p.a.)</b>
<b>2% reduction a year</b>	42,640 (2,843 p.a.)	7.6	16.4	54.6	5.6	<b>36.2 (2.4 p.a.)</b>
<b>5% reduction a year</b>	42,640 (2,843 p.a.)	7.6	17.1	58.7	6.6	<b>40.6 (2.7 p.a.)</b>
<b>10% reduction a year</b>	42,640 (2,843 p.a.)	7.6	16.3	64.8	7.4	<b>48.3 (3.2 p.a.)</b>

78. The level of take up under a voluntary system, as illustrated above (at 2,800 each year on average), is consistent with Ecohomes uptake, representing about 2 per cent of private new homes built each year. The net impact is a positive benefit to the economy of around £33m over the period to 2022. This net benefit increases up to a maximum of £48m if different assumptions are made about how quickly costs fall over time.

### Option B – Introducing a mandatory rating against the Code

#### Summary

79. A number of scenarios are analysed, based on how costs of building to the Code fall over time. The model simulates a 22 per cent market efficiency, reflecting the impact of the mandatory Code rating on consumer awareness, and therefore home builder responsiveness. The table below summarises the net present value illustrated under different cost reduction scenarios:

**Table 2:** Summary costs and benefits of Option B over period 2008-2022 (net of Option A): assuming 20 per cent 'market efficiency'

Cost reduction scenario	Increased number of assessments Overall and (per annum)	Present Value Admin Costs (£m)	Present Value Policy Costs (£m)	Present Value Economic Benefits (£m)	Present Value Environmental Benefits (£m)	Net Present Value (Benefits – Costs) Overall and (per annum) (£m)
<b>Flat costs over time</b>	550,194 (36,680 p.a.)	106.2	250.4	704.6	72.0	<b>420.0 (28.0 p.a.)</b>
<b>2% reduction a year</b>	550,194 (36,680 p.a.)	106.2	211.4	704.6	72.0	<b>459.0 (30.6 p.a.)</b>
<b>5% reduction a year</b>	550,194 (36,680 p.a.)	106.2	220.2	757.0	84.7	<b>515.2 (34.3 p.a.)</b>
<b>10% reduction a year</b>	550,194 (36,680 p.a.)	106.2	210.8	836.6	95.9	<b>615.5 (41.0 p.a.)</b>

80. The level of take up under a mandatory Code rating system, at approximately 37,000 homes each year on average), represents 22 per cent of private new homes built each year. The net impact is a positive benefit to the economy of around £420m over the period to 2022. This net benefit increases up to a maximum of £616m if different assumptions are made about how quickly costs fall over time.

81. This demonstrates that the greater the market efficiency that can be achieved in relation to uptake of the Code; the greater the overall societal benefits. Therefore investment in measures to raise awareness in consumers and other key groups in the house building market (e.g. suppliers) is of societal benefit and should therefore be pursued.
82. The administration cost estimate per dwelling for homes that are zero-rated/unassessed has not been tested in practice. It is possible that developers could find efficiencies with this process, particularly for larger developments.
83. Overall, a net benefit is maximised if (a) the market works more efficiently, (b) costs fall faster than we expect over time, or (c) the Code is successful as a strong signal to buyers to value sustainability. The sensitivity analysis we have performed demonstrates the effect of (a) and (b), but the effect of (c) is not currently quantifiable and as such may be underestimated in the modelling.

#### **Small Firms' Impact Test (SFIT)**

84. A survey of small businesses was undertaken by the trade association *House Builders Association* on behalf of Communities and Local Government in early 2007 to assess the impact of making a rating against the Code for Sustainable Homes mandatory.
85. The *House Builders Association* identified a number of small firms to take part in the survey. The small firms confirmed that the proposal to make a rating against the Code mandatory will cause no additional burden to business processes and that the costs are negligible.

#### **Competition Assessment**

86. The main market affected by the introduction of a mandatory rating against the Code for Sustainable Homes will be the home building and home buying markets.
87. Increasing information in the market to raise awareness of sustainability and to compare standards across new buildings should help stimulate a more competitive market. In combination with Energy Performance Certificates it should improve transparency and awareness of wider sustainability issues and energy and water costs in buying decisions. The more that on-going costs and benefits to households can be built into buying decisions, and therefore house prices, the more developers will be incentivised to respond by building to higher efficiency and sustainability standards. Developers will build more sustainably to the point where they believe they will get an additional private return from it ie where there is a demand, or if there is a risk of losing value if do not meet minimum standard demanded by consumers.

88. At present the only assessor certification and certification body for the Code is the Building Research Establishment (BRE). BRE provide these services, on a concessionary basis, under contract to CLG. This arrangement lasts for 5 years from date of implementation and was entered into in recognition of the fact that BRE own Intellectual Property in the Code, which it has granted CLG the right to use.
89. As part of this arrangement, BRE are required to sub-license other organisations to provide any or all of the Code services which they provide, and to do so on fair commercial terms. Other organisations that want to become licensed to accredit Code assessors or to offer a certification service need to inform CLG first and then discuss with BRE the opportunities for entering into such an arrangement. It should be noted that the July consultation document on making rating against the Code mandatory for new homes talked about the need to organisations to 'seek approval' from CLG before talking to BRE. CLG's sole aim in this was to ensure that it was aware of approaches being made to BRE and it never intended to apply an approval process of its own. This has been clarified in the summary of consultation responses and final policy response.
90. We are aware that some organisations are not satisfied with the arrangement between CLG and BRE because of the perceived conflict of interest in relation to BRE's role as developer and maintainer of the Code, which could give BRE an unfair advantage in the provision of other Code services over any competitors. There were also concerns about BRE's current monopoly in relation to assessor certification and certification services.
91. The Department believes the current contract with BRE fairly reflects BRE's input into developing the Code. We do however recognise the concerns of organisations interested in offering Code services. As such the Department and BRE have put in place a number of mechanisms to mitigate the possibility of a conflict of interest arising and BRE acting anti-competitively. Firstly, as mentioned above, under the terms of our contract, BRE are required to enter into any sub-contract or sub-license on fair commercial terms. We have been working with BRE to ensure they provide sufficient material about the process and terms of sub-licensing to demonstrate that they will be complying with the requirement. Secondly, BRE are UKAS accredited for the work they carry out on the Code and the wider BREEAM family. Under the terms of this accreditation they are required to have in place measures to ensure there is no potential for conflict of interest. Thirdly, whilst developing the processes for sub-licensing Code services, BRE are actively looking at ways to avoid conflicts of interest. For example, they are required to ensure that any sub-licensee is fully competent to offer Code services. However

to avoid them gaining knowledge of competitors systems and approaches that might give them an unfair advantage, they are happy to arrange for an independent organisation such as UKAS to undertake audits and use techniques such as mystery shopping to test for compliance of systems. BRE will also ensure that any information arising from the development and maintenance process is disseminated on an equal basis to all assessors, either those certified by BRE or other organisations.

92. The Department takes very seriously the perception of conflict of interest and anti-competitive behaviour and will monitor the situation very carefully. As part of the Housing and Regeneration Bill we are also seeking powers to establish, in due course, an independent accreditation scheme for the Code.

#### **Legal Aid**

93. The Code does not have any impact on Legal Aid.

#### **Enforcement, Sanctions and Monitoring**

94. At present there is no requirement to have an enforcement mechanism or sanctions in place as adoption of the Code is voluntary. Code assessments are carried out by independent assessors who may be drawn from any relevant profession, so long as they are appropriately qualified and trained. Assessors will need to be registered with a body licensed to accredit Code assessors. Accrediting bodies will quality check assessments and enforce against their members, ultimately through the sanction of cancelling their membership.
95. However if a mandatory rating is implemented then an enforcement and sanctions regime will need to be introduced. This would be subject to legislation. Our proposals are to include the Code certificate or zero star certificate in the Home Information Pack (HIP). In our view, the most appropriate time to provide this information to potential homebuyers is early in the home buying process, when they may be making choices between different properties. This would coincide with when they are entitled to receive a copy of a Home Information Pack (HIP). The enforcement and sanctions regime will align with that for the HIP. The HIP is enforced by Trading Standards Officers based in local authorities who generally act on a complaints-only basis; they consider the presence or absence and the validity of a pack document; they are not expected to assess Code standards. This complies with the Hampton principles of risk based enforcement.

96. In addition, if the powers sought in this Bill are enacted, there would be additional enforcement required to cover instances when a new home is sold off-plan and marketing stops before a final Code certificate is issued. In these circumstances the enforcement arrangement in place would again be a complaints-only basis and complies with the Hampton principles. We will work closely with Trading Standards Officers and their representative body, LACORs to monitor the impacts of this policy both for rates of non-compliance and costs associated with enforcement and whether this imposes any additional burden on local government.
97. We will be monitoring uptake against the Code as part of data collected by the Building Research Establishment during the assessment process. We will review the policy in light of data on uptake of the Code and in light of changes to Building Regulations.

## Specific Impact Tests: Checklist

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

**Ensure that the results of any tests that impact on the cost-benefit analysis are contained within the main evidence base; other results may be annexed.**

Type of testing undertaken	Results in Evidence Base?	Results annexed?
Competition Assessment	Yes	No
Small Firms Impact Test	Yes	No
Legal Aid	Yes	No
Sustainable Development	Yes	Yes
Carbon Assessment	Yes	Yes
Other Environment	Yes	Yes
Health Impact Assessment	Yes	No
Race Equality	Yes	No
Disability Equality	Yes	No
Gender Equality	Yes	No
Human Rights	Yes	No
Rural Proofing	Yes	No



## Annexes

### Explanation of the modelling of costs and benefits

#### Basis of model

1. The model is based on the principles of market efficiency in response to Net Present Value. Net Present Value (NPV) is the summation of initial costs incurred during construction, and operational costs and benefits incurred and discounted over 20 years.
2. The market is deemed to be operating efficiently when home builders construct homes to a Code Level that maximises the NPV of the home. The model simulates different levels of market efficiency, reflecting the impact of making a Code rating mandatory on market transparency. The model assumes that the proportion that chooses to do this when the Code rating is mandatory is 20 per cent higher than when it is voluntary, as additional information improves market efficiency.
3. The model examines different scenarios based only on whether the market operates more efficiently due to increased information availability and awareness of sustainability. The true potential impact of a mandatory Code rating will be greater, if buyers also value the broader range of sustainability benefits arising from the Code, although this has not been factored into the analysis.
4. A number of scenarios are presented that analyse the impacts of construction costs decreasing over time by variable rates. This approach is consistent with economic principles of learning curves and reflects international and national experience in delivering housing at increasingly high standards.
5. The model factors in some (but not all) of the external benefits arising from Code compliance. Benefits are described later in this Annex.
6. The model utilises predictive house building numbers through to 2022, house types are segregated into detached and terraced houses and apartments. Costs and benefits have been allocated against each of these housetypes independently.
7. The model assumes that developers will continually evaluate and understand the relative costs and benefits of different options. In practice, such analysis may be undertaken on an infrequent or case/site specific basis.

## Administrative Costs

8. The key administrative costs are as follows:
  - Costs to developers of obtaining an assessment (assessor fee and time taken to prepare/provide input information to the assessment); or
  - Costs to scheme operators in running the scheme. The assessment fee borne by developers incorporates (and enables the scheme operators to recoup) all of their costs by e.g. development and delivery of training to assessors, preparation of internal assessment/QA systems, resource used to undertake the assessment itself, lodgement of Code certificates.
9. Assessment costs are incurred by each type of house in a development, with a cost ranging from £160 for each home (in a development of 100 homes with 10 home types) to £1680 for an assessment (BRE are sending through revised figures) of a single home on a site. It is not anticipated that at developers of single homes sites (often self-build) will bear the costs of assessment. We have therefore excluded them from the calculation and taken an average of £218 per home. In addition to this cost, we have added an assumed £19 per dwelling to account for time taken by developers to prepare information for the assessment. £19 assumes two man days (at a value of £280) for information gathering by developers to feed into an assessment. Information gathering is required for each different home design specification within a development.
10. Administrative costs for each assessment are identical in both option A and option B; however uptake is higher in option B, therefore the total administration cost of assessment increases.
11. The zero-star certificate/statement of non-assessment is assumed to incur an additional £5 administration cost. This assumes that it will take an average of about fifteen minutes of someone's time per home.

## Policy Costs and Benefits

### *Economic Costs*

12. The key economic costs for both options are additional capital costs of building to different levels of the Code. The costs of energy, water and other elements of the Code (both mandatory and flexible) are presented below in Table X. These are average costs and will vary depending on the dwelling type and development scenario.

**Table 1: Average additional construction costs per dwelling of Code levels 1-6 (2008 costs)**

Code Level	Energy	Water	Other (mandatory plus flexible credits)*	Total
1	£275	£0	£330	£615
2	£1,648	£0	£405	£2,206
3	£3,410	£125	£538	£4,313
4	£7,345	£125	£1,036	£9,094
5	£13,149	£2,018	£1,476	£17,734
6	£25,390	£2,018	£1,926	£30,605

\*these are indicative for flexible elements

More detailed Code compliance costs can be found in *Refined and Updated Cost analysis of The Code for Sustainable Homes*, Cyril Sweett, November 2007.

### Benefits

13. The main quantifiable economic benefits are the financial savings for households associated with reduced energy and water bills as a result of the improvements. Typical household savings range between £56-£281 per year.
14. In monetising the carbon savings we have assumed the shadow price (social cost) of carbon dioxide to be £25 per tonne in 2007 prices.<sup>8</sup>

### Energy

15. The Stern report highlighted the economic case for taking action to reduce the threat from climate change, through reducing our greenhouse gas emissions to the environment. The Code for Sustainable Homes generates carbon savings from energy efficiency, renewable energy and from the associated reduction in energy used in water processing as a result of reduced water consumption. Annual carbon savings from energy improvements range between 0.3 tonnes of CO<sub>2</sub> at Level 3 and 2.7 tonnes at Level 6. These CO<sub>2</sub> savings are generated by improvements in building performance only, further potential savings generated by e.g. fixtures and fittings are listed below. Further savings from water range between about 12 and 74 kg CO<sub>2</sub> per year. In the 2 per cent cost reduction scenario in Table 1, this equates to a total saving of around 20,000 tonnes of CO<sub>2</sub> in the period to 2022.

<sup>8</sup> Defra, *How to use the shadow price of carbon in policy appraisal*, August 2007

16. Building to the improved sustainability standards advocated within the Code will generate extensive environmental benefits in addition to reducing greenhouse gas emissions. These range from reducing waste going into landfill (through improved recycling facilities and the reduction of construction waste by introduction of site waste management plans) to more sustainable materials being used in construction (for instance sustainably sourced wood). Taking account of the ecological value of the site (for instance biodiversity) is also a key non-quantifiable benefit. Benefits are explained in more detail below.
17. In addition to the mandatory energy credit areas that require incremental improvements on Part L (i.e. improved building performance); there are a number of credits within the Code that aim to influence occupant behaviour and further reduce operational energy consumption (and consequently, greenhouse gas emissions). These behavioural credit areas include:
  - provision of facilities to dry clothes naturally
  - provision of energy efficient white goods
  - provision of secure bicycle storage
  - provision of home working facilities
  - provision of low energy internal and external lighting
18. The drying space credit encourages natural clothes drying rather than use of a tumble dryer. It has become common practice in new home building to include a place for a tumble dryer without providing a space for natural clothes drying. The average tumble dryer uses 365kWh per year<sup>9</sup>. The provision of a drying space may reduce some of this energy consumption which will help to reduce the greenhouse gas emissions arising from energy use and also reduce the occupier's energy bill.
19. The energy efficient white goods credits encourage provision by the homebuilder or purchase by the occupier of energy efficient white goods, thus reducing the energy and water consumption (and associated CO<sub>2</sub> emissions) of a home. Therefore the use of energy efficient appliances benefits both the environment and the occupier's finances.

<sup>9</sup> Oxford University Centre for the Environment, [www.eci.ox.ac.uk/research/energy/downloads/40house/chapter06.pdf](http://www.eci.ox.ac.uk/research/energy/downloads/40house/chapter06.pdf)

20. Over the past 30 years, lighting and appliance energy usage has increased at around 2% per annum<sup>10</sup>. For a typical new (Part L 2006) semi-detached home, the CO<sub>2</sub> emissions from lights and appliances comprise approximately 43% of total CO<sub>2</sub> emissions. Emissions from lights and appliances (including cookers) are now higher than both space and water heating emissions (space heating accounts for 26% of CO<sub>2</sub> emissions, water heating 22% and cooking 9%)<sup>11</sup>. Choice of appliances therefore plays an important role in reducing total CO<sub>2</sub> emissions. Where energy efficient appliances are not supplied by homebuilders, the Code also rewards the provision of information which helps the occupier select the most energy efficient and cost effective white goods.
21. The table below shows typical CO<sub>2</sub> and monetary savings incurred following the replacement of an average appliance purchased new in 1995 with an Energy Saving Recommended model of similar size and an electricity cost of 10p/kWh<sup>12</sup>.

Traditional Appliance	CO <sub>2</sub> saved per year	£ saved per year
fridge freezer	190 kg	37
washing machine	42 kg	8
dishwasher	85 kg	16

22. The majority of all car journeys are less than five miles; there is therefore an opportunity to reduce car use by encouraging cycling<sup>13</sup>. The Code encourages homebuilders to provide secure bicycle storage space, thus making cycling more convenient. Replacing a proportion of car journeys and encouraging additional recreational cycle usage would have a number of environmental, social and economic benefits. Where improved cycle storage encourages replacement of local car journeys with cycling; the environmental benefits of reduced car use include reduced consumption of fossil fuels (i.e. fuel) and associated reductions in greenhouse gas emissions, improved air quality and reduced noise pollution.
23. When provided with adequate cycle storage, occupiers are more likely to choose to cycle to work and therefore save on public and/or private transport costs. Evidence shows that 37% of adults feel that many of the short journeys they make by car could easily be undertaken by bicycle if they had a bike. Furthermore three in 10 car users say they would reduce their car use 'if there were more cycle tracks away from roads' (31%), 'if there were more cycle lanes on roads' (27%) or 'better parking facilities for cycles' (30%)<sup>14</sup>.

<sup>10</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>11</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>12</sup> [www.energysavingtrust.org.uk/energy\\_saving\\_assumptions](http://www.energysavingtrust.org.uk/energy_saving_assumptions)

<sup>13</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>14</sup> Department for Transport 2007 [www.dft.gov.uk/pgr/statistics/datatablespublications/personal/factsheets/2005/cyclefactsheet.pdf](http://www.dft.gov.uk/pgr/statistics/datatablespublications/personal/factsheets/2005/cyclefactsheet.pdf)

24. The Code also requires that bicycle storage is secure. Bicycle thieves cost the UK £113 million<sup>15</sup> a year and over 400 thousand<sup>16</sup> of the UK's 20 million bikes are stolen annually. In 2005, 52% of all bikes were taken from outside the home, for example from a garage or a shed<sup>17</sup>. These figures highlight the need for dedicated and secure cycle storage, as encouraged by The Code.
25. Another key economic benefit that could potentially be derived from the provision of additional secure bicycle storage is increased physical activity. Physical inactivity was directly responsible for three per cent of all deaths and illness in 2002. The direct cost of physical inactivity to the NHS, including inpatient stays, outpatient appointments, drugs, community care, and visits to primary care practitioners reached £1.06bn<sup>18</sup> in 2007.
26. Government health targets are that by 2020, 70% of the UK population will be doing 30 minutes of exercise a day, five days a week (150 minutes per week). Research has shown people that meet these guidelines take fewer sick days than those that don't<sup>19</sup>. Further investigation has shown that if 70% of the population exercised for 150 minutes or more each week, there would be 2.78m fewer sick days. This would save the economy £487m each year<sup>20</sup>. Facilitating increased uptakes in cycling could significantly contribute to this target.
27. Lastly, increased cycling could further benefit the UK economy by reducing reliance on imported fossil fuels for transport within the UK.
28. There are a number of recognised social benefits associated with increased cycling (as facilitated by additional provision of secure bicycle storage); most notably, these include:
- greater community integration arising from reduced time spent isolated in cars
  - improved health and therefore ability to live a better quality of life for longer
  - reduced fear of crime arising from reduced bike theft
  - reduced vehicular traffic, thus improving residents' local environment and encourage others within a community to cycle
  - increased support for local shopping facilities rather than larger retail facilities typically only accessible by car.

<sup>15</sup> [www.homeoffice.gov.uk/rds/pdfs05/hosb1105chap2.xls](http://www.homeoffice.gov.uk/rds/pdfs05/hosb1105chap2.xls)

<sup>16</sup> [www.lancs.ac.uk/socs/lucan/issues.htm](http://www.lancs.ac.uk/socs/lucan/issues.htm)

<sup>17</sup> [www.homeoffice.gov.uk/rds/pdfs05/personal\\_theft\\_0405.xls](http://www.homeoffice.gov.uk/rds/pdfs05/personal_theft_0405.xls)

<sup>18</sup> The burden of physical activity-related ill health in the UK Allender et al. *J Epidemiol Community Health*. 2007; 61: 344-348

<sup>19</sup> Deloitte and TARP, Health of the Nation report, Published 29/3/06

<sup>20</sup> Deloitte and TARP, Health of the Nation report, Published 29/3/06

29. The Code also aims to reduce the need to commute to work by encouraging homebuilders to provide an appropriate space for residents to work from home. Providing home occupiers with the option to work at home has a number of recognised environmental, social and economic benefits. The environmental benefits of increased home working are similar to those documented above, i.e. less congested private and public transport and reduced air and noise pollution. However a potential negative environmental outcome of increased home working is the additional energy expended in heating the home during the winter months. The net heating requirement is lessened where people work together in a traditional communal office space.
30. A number of the economic and social benefits associated with home working are similar to those arising from increased cycling, i.e. less congested roads, greater support for local services and facilities such as local retail, and better community integration that may in turn result a more cared for local environment and an improved quality of life. Additional benefits include reduced occurrence of and reduced costs/damages associated with daytime burglaries and savings arising from reduced expenditure on public/private commuter transport. A dedicated home office space could also be used by children for schoolwork. A potential negative impact of increased home working would be the extra cost required to heat the home all day during the winter months.
31. Installing energy efficient internal lighting generates CO<sub>2</sub> savings and a reduced electricity bill. When modelled in SAP 2005, this amounts to £15/year per home and 71 kg CO<sub>2</sub> saving per year. Energy efficient external presents further savings.

#### *Water*

32. The Code has mandatory and flexible water credits that each aim to reduce potable water use within the home. This is achieved through encouraging the use of low-water-use WCs, showers, taps and appliances, as well as wastewater recycling and rainwater harvesting.
33. The UK water industry is responsible for approximately four million tonnes of greenhouse gas emissions (CO<sub>2</sub> equivalent) every year; this is nearly one percent of the UK's total CO<sub>2</sub> emissions<sup>21</sup>. Therefore reducing national water consumption will reduce the UK's impact on global warming.

<sup>21</sup> Water UK (<http://www.water.org.uk/home/policy/climate-change/briefing-paper>)

34. In addition, much of the UK suffers from severe year round water scarcity; this is due to high population densities in areas of low surface water availability. Around London and the South East, groundwater accounts for 70% of the total water supply. Conversely, nationally two thirds of the UK's water comes from surface sources and a third from groundwater<sup>22</sup>. Over abstraction from ground and surface water is unsustainable; it has a severe impact on the surface ecosystems and can permanently damage aquifer quality. Forecast population growth will further increase potable water demand. For example, London will have an estimated 800,000 new citizens by 2015<sup>23</sup> therefore encouraging water efficiency in new homes is vital.
35. Improving potable water usage efficiency will also help to alleviate the burden placed on Victorian combined (stormwater and foulwater) sewage systems that operate in many UK towns and cities. In some areas, population growth has led to overburdening of the existing infrastructure; therefore reducing the per capita volume discharge will help to reduce the frequency of combined sewerage overflows into water courses.
36. The most notable direct economic benefit to occupants will be a reduced water bill. On average in the UK, we use 150 litres of water per person per day<sup>24</sup>; this amounts to a (cost of Average water bill). The Code advocates provision of water efficient fixtures and fittings such that daily personal consumption should not amount to more than 125 litres, representing a minimum 17% water bill saving. At Code Level 3, the daily consumption volume drops again to 105 litres, presenting a water bill saving of 30%. Occupants will also benefit from lower energy bills as they will use less hot water.
37. The economy as a whole will also benefit from increased water efficiency as the water industry is energy and chemical intensive and consumes about three percent of total energy used in the UK<sup>25</sup>. Reducing water consumption would also reduce the per capita water and sewerage treatment infrastructure required.
38. The social benefits of reducing potable water consumption will be accrued through the direct economic benefit of lower energy and water bills (and hence a higher disposable income) and improved water quality in recreational areas.

<sup>22</sup> <http://www.water.org.uk/home/resources-and-links/waterfacts/resources>

<sup>23</sup> <http://www.water.org.uk/home/resources-and-links/waterfacts/resources>

<sup>24</sup> <http://www.water.org.uk/home/resources-and-links/waterfacts/resources> (Source: Ofwat)

<sup>25</sup> Water UK (<http://www.water.org.uk/home/policy/climate-change/briefing-paper>)



## Materials

39. The production, use and disposal of building materials accounts for significant energy and resource use, both internationally and in the UK. Consequently, the Code advocates specification of materials that have a reduced environmental impact. The Green Guide to Specification, one of the Code supporting tools, provides a simple aid that enables consideration for the environmental implications of materials specifications. The Green Guide ratings are based on life cycle assessment (LCA); an approach which measures and assesses a range of environmental impacts from 'cradle to grave'. Construction details are compared on a like for like basis, as specifications that fulfil similar functions; specifications are compared over a 60-year study period<sup>26</sup>.
40. The Green Guide to Specification provides an environmental profile of the major components in home building construction specifications. The environmental profile is measured throughout a product's life, i.e. in manufacture (including impacts from virgin and recycled inputs); in use in a building (over a typical building life, including maintenance and replacement) and in demolition (the waste produced, allowing for recycling and reuse)<sup>27</sup>. The following six criteria are assessed:
- Climate change from CO<sub>2</sub> and other greenhouse gases associated with energy use
  - Ozone depletion – from gases affecting the ozone layer
  - Acidification – contribution to the formation of acid rain
  - Consumption of minerals and water
  - Emission of pollutants to air and water – including toxicity to humans and ecosystems
  - Quantity of waste sent to disposal<sup>28</sup>
41. Consequently the benefits of specifying products that score more highly in The Green Guide to Specification are numerous and cover a broad range of wider societal environmental benefits.
42. The Code has the long-term effect of creating a market for construction specifications that have a lower impact on the environment. As a result these better performing specifications generally become more economically viable, more widely available and eventually become mainstream and tried and trusted by the construction industry and occupiers.

<sup>26</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>27</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>28</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

43. The immediate social impacts of improving the selection of low environmental impact materials may not be apparent to the home owner. Some of the issues addressed may improve the home owner's health and some may improve the state of the environment for future generations of a community. For example reducing the use of materials that during their manufacturing process emit pollutants into the environment may perceptibly reduce respiratory or other illness rates, whereas reducing CO<sub>2</sub> outputs may benefit future generation by alleviating global warming.
44. The Code encourages responsible sourcing of materials. It rewards developers who source their materials from suppliers who can prove an audit trail, through a Chain of Certification (CoC) or Environmental Management System (EMS), to an environmentally sound forestry or extraction and manufacturing process. The environmental benefits to the home occupier are negligible; however the societal environmental gains are substantial. These are broadly similar to those listed above.
45. As with the environmental impact of materials credits, the responsible sourcing credit has the effect of improving the market for responsibly sourced materials. As a result these responsibly sourced materials generally become more economically viable, more widely available and eventually become standard at no extra cost to the developer and home buyer.
46. The occupier is unlikely to recognise any immediate social benefit from responsibly sourced construction materials. However they may redeem some value from knowing that their home's construction materials have been sourced responsibly (e.g. timber is responsibly sourced and FSC certified, which therefore did not contribute to the destruction of the rainforest; or ISO14001 certified concrete came from an environmentally audited processing and extraction site). Occupiers may also gain some social value knowing that their children's environment may be better off as a result of the responsible sourcing.

#### *Surface water run-off*

47. The aim of the Surface Water Run off credits is to delay water run-off from hard surfaces within housing developments to public sewers and watercourses. Excessive surface run-off can cause significant flash flooding problems to natural watercourses, rivers and municipal systems and sewer flooding is a major cause of pollution in urban areas. The environmental benefits of these credits include reducing the risk of localised flooding and watercourse pollution.

48. Floods are now on average nearly twice as frequent as they were 100 years ago; and over seven percent of the land area of England and Wales is at risk from flooding and around five million people, (i.e. two million homes) live in flood risk areas in England and Wales<sup>29</sup>. The Code encourages development in areas with low risk of flooding or where developments are to be situated in areas with a medium risk of flooding, the Code ensures that appropriate measures are taken to reduce the impact in an eventual case of flooding.
49. Flooding and flood management costs the UK around £2.2 billion each year; we currently spend around £800 million per annum on flood and coastal defences and even with the present flood defences, we experience an average of £1,400 million of damage<sup>30</sup>. Research undertaken by Foresight<sup>31</sup> found that if flood-management policies and protection expenditure remain unchanged, annual losses will increase by the 2080s. There is also the economic cost to the UK economy that results from time taken off work by home occupiers while dealing with flood damage. Although usually temporary, flooding can have a major affect on local ecosystems. Habitats can be destroyed and fauna and flora killed.
50. Flooding has a significant impact on quality of life. During flood events the elderly and infirm are at immediate risk. As was seen in the UK in the summer of 2007, as floods subside, health issues caused by sewage overflows and contamination of drinking water can become a serious concern. Flood damage can result in whole communities being forced out of their homes for long periods of time. Therefore the Code benefits home owners by rewarding developments that are at low flood risk, due to natural location, construction methods or flood barriers.

#### Waste

51. Provision of appropriate waste storage facilities is a key contributor to encouraging increased household waste recycling rates. Consequently, the Code rewards the provision of internal and external household waste recycling storage space. Recycling generates many environmental benefits, notably reduced use of virgin resources. Increased recycling also reduces the per capita volumes of waste sent to landfill, and consequently, reduces the land area allocated to landfill, which is a key concern in the more densely populated areas of the UK. The provision of dedicated refuse storage areas is also likely to reduce the occurrence of street litter.

<sup>29</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>30</sup> [www.foresight.gov.uk/Previous\\_Projects/Flood\\_and\\_Coastal\\_Defence/Reports\\_and\\_Publications/Executive\\_Summary/executive\\_summary.pdf](http://www.foresight.gov.uk/Previous_Projects/Flood_and_Coastal_Defence/Reports_and_Publications/Executive_Summary/executive_summary.pdf)

<sup>31</sup> [www.foresight.gov.uk/Previous\\_Projects/Flood\\_and\\_Coastal\\_Defence/Reports\\_and\\_Publications/Executive\\_Summary/executive\\_summary.pdf](http://www.foresight.gov.uk/Previous_Projects/Flood_and_Coastal_Defence/Reports_and_Publications/Executive_Summary/executive_summary.pdf)

52. At present UK law currently prohibits local authorities from introducing financial incentive schemes to promote recycling and reduction of waste. DEFRA is currently consulting on a strategy to lift this ban to allow local authorities to decide whether or not they wish to introduce a financial incentive recycling schemes for their area<sup>32</sup>.
53. At a national level the UK will be penalised if EU landfill diversion targets are missed. The National Audit Office estimated penalties of up to £40 million in 2010 and £205 million in 2013. The Local Government Association estimates that the latter fine would equate to around £220 per household<sup>33</sup>.
54. Increasing the proportion of household waste recycled in the UK will have the effect of making recycling more economically effective and will reduce the price of recycled raw materials.
55. The Code also specifically rewards the provision of home composting facilities in homes with gardens or where Local Authority kitchen waste collection or community composting services are available. An average household that composts all their food, garden and cardboard waste prevents emissions of 13kg of methane per year, equivalent to 280kg of carbon dioxide per year (just over one quarter of a tonne of carbon dioxide)<sup>34</sup>. In addition, encouraging composting may:
- stimulate increased consumer preference for low packaging products
  - reduce the amount of methane and other gases produced by landfills
  - reduce leachate from landfill
  - reduce transport related pollution associated with waste
  - encourage people to grow their own fruit and vegetables
56. Home owners have the potential to benefit financially if the local authorities are given the power to introduce a financial incentive recycling schemes (as mentioned above). A further financial benefit is the generation of compost that would otherwise need to be purchased.

<sup>32</sup> [www.defra.gov.uk/environment/waste/strategy/factsheets/incentives.htm](http://www.defra.gov.uk/environment/waste/strategy/factsheets/incentives.htm)

<sup>33</sup> [www.publications.parliament.uk/pa/cm200607/cmselect/cmcomloc/536/536i.pdf](http://www.publications.parliament.uk/pa/cm200607/cmselect/cmcomloc/536/536i.pdf)

<sup>34</sup> [www.cat.org.uk/information/catinfo.tmpl?command=search&db=catinfo.db&eqSKUdatareq=InfoSheet\\_CompostingForClimate](http://www.cat.org.uk/information/catinfo.tmpl?command=search&db=catinfo.db&eqSKUdatareq=InfoSheet_CompostingForClimate)

57. The Code also aims to promote improved resource efficiency during construction and demolition, and to promote the reduction in and effective management of site waste. It should be noted that Site Waste Management Plans will become a legal requirement for all construction projects over £200,000 in 2008. Over 100 million tonnes of construction and demolition waste are generated in the UK every year and an estimated 13 million tonnes of this is completely unused building materials. The introduction of compulsory Site Waste Management Plans should generate major improvements in waste management within the industry,<sup>35</sup> reducing land area allocated to landfill and reducing demand on virgin resources. Site waste management plans also have the benefit of reducing the litter associated with construction sites. However on-site waste management can have the disadvantage of requiring on-site sorting machinery or crushers/grinders and also increases the number of vehicle movements associated with a site.
58. Housing construction projects provide excellent opportunities to optimise material resource use, recycle and reuse waste arising on site. On average, between 60-80% of waste generated can be reused or recycled representing a value of up to 5% of a project's cost. Typically between 5-15% of materials brought onto site are never used<sup>36</sup>.

#### *Pollution*

59. The Code advocates specification of lower polluting products, in particular, insulants with no/low Global Warming Potential (GWP) and boilers with low nitrogen oxides (NO<sub>x</sub>) emissions. The aim of these credits is to reduce global warming from blowing agent emissions (arising from the manufacture, installation, use and disposal of foamed thermal and acoustic insulating materials) and to reduce the emission of NO<sub>x</sub> into the atmosphere from domestic boilers. NO<sub>x</sub> are emitted from the burning of fossil fuels and contribute to both acid rain and to global warming in the upper atmosphere<sup>37</sup>. In 1999 four percent of the UK's NO<sub>x</sub> emissions came from domestic boilers<sup>38</sup>. Therefore the Code pollution credits are unlikely to directly affect the well-being of an occupant, however reducing UK GWP and NO<sub>x</sub> emissions will benefit future generations by reducing the impact of climate change.

<sup>35</sup> *The Code for Sustainable Homes Technical guidance*, March 2007 Department for Communities and Local Government

<sup>36</sup> [www.wrap.org.uk/downloads/Housing\\_newsletter\\_Hi\\_res\\_080307.41566f35.pdf](http://www.wrap.org.uk/downloads/Housing_newsletter_Hi_res_080307.41566f35.pdf)

<sup>37</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>38</sup> [www.aeat.co.uk/netcen/airqual/naei/annreport/chap5\\_2.html](http://www.aeat.co.uk/netcen/airqual/naei/annreport/chap5_2.html)

60. These pollution credits were also included within EcoHomes; they effectively discourage the purchase of insulants with high GWP and inefficient boilers that produce significant NO<sub>x</sub> levels. As a result low GWP insulants and low NO<sub>x</sub> boilers have become standard in the market at little or no extra cost. An additional financial benefit of low NO<sub>x</sub> boilers to the home owner is better boiler fuel efficiency and therefore reduced fuel bills.

#### *Health and wellbeing*

61. There are a number of Code credits that aim to improve quality of life in the home through provision of good daylighting, and also to reduce the need to use energy to light the home. The eyes and brain function better in natural light therefore concentration improves. In addition to aiding eye and brain function, improved daylight also helps to reduce the occurrence of Seasonal Affective Disorder (SAD).

62. Glazed areas also produce passive solar gain, which can reduce energy costs, and reduce the need for artificial lighting<sup>39</sup>.

63. Code credits are also awarded where party walls and floors achieve higher standards of sound insulation than is required by Approved Document E of the Building Regulations. Environmental Health Officers in England and Wales received nearly 6000 noise complaints per million people in 2003/2004 from domestic premises<sup>40</sup>. This accounts for 75% of all noise complaints received. Improved sound insulation means that occupants will be disturbed less by neighbours and will therefore have a better quality of life.

64. The economic benefits arising from improved sound insulation are significant, notably:

- people with a better quality of life are more likely to be more economically active, therefore occupants are more likely to be better off financially
- less police/public sector/environmental health time and resources spent investigating and resolving neighbour noise disputes

Reduced occurrence of sound disturbances is also likely to improve social interaction with neighbours.

<sup>39</sup> [www.narm.org.uk/home/lightforlife.html](http://www.narm.org.uk/home/lightforlife.html)

<sup>40</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

65. The Code rewards developments that provide occupants with a partially private outdoor space. The benefits associated with provision of outdoor space are extensive. The key benefit is social; outdoor space provides people with a space in which they can socialise and entertain which leads to better social interaction within a community. People who spend time outside also tend to be healthier and have a better quality of life; therefore the NHS and the individual occupier will benefit financially from the provision of outside space within developments. The UK economy is also likely to benefit because occupants are generally in better health and more economically active.
66. Additional (partially) private outdoor space is also likely to be supportive of improved biodiversity through the provision of additional habitat. Open space within developments, especially within urban areas, also plays an important part in the dispersion and dilution of air borne pollutants and therefore improves air quality and reduces air pollution related health risks.
67. The Code strongly encourages the construction of homes that are accessible to everybody and can be adapted to fit the needs of future occupants. Lifetime Homes (LTH) are designed to be suitable for older people and for the vast majority of disabled people, as well as non-disabled people. The benefits associated with designing to LTH are predominantly socio-economic; however the notable environmental benefit of the LTH initiative is that because homes do not require major adaptation to accommodate an elderly or disabled person; construction waste and use of materials arising from refurbishment can be significantly reduced.
68. LTH are designed to be suitable for most disabled and older people; this means that as families grow older or a member becomes disabled, the individual and/or family is able to continue living in the same home. This strengthens the family unit and gives people, especially those who are disabled, a better quality of life. In the event that an occupier becomes less able a LTH can be adapted at much less expense than a normal home. Over £350 million a year is currently spent in England alone on adapting the homes of people who become disabled; 60 per cent of this from public funds. This figure is expected to rise significantly during the next half century as the elderly population increases.

69. A cost-benefit analysis by Pineda<sup>41</sup> has shown that the immediate costs of building all homes to LTH standards over the next 30 years would be offset against long-term savings averaging £250 per property. The adoption of the LTH standard would also reduce the burden put on the NHS, as old and disabled people are less likely to become injured because their home is adapted to facilitate their needs. The load on the NHS would also be reduced because more old and disabled people will be able to live in their own homes for longer without the need for home care or to move out for specialist care.
70. The presence of more elderly and disabled people within regular (rather than residential/care/nursing homes) developments will lead to more diverse communities and better social acceptance of the elderly and disabled. Families will also be able to live in the same home for longer and will therefore form stronger relationships with the community.
71. The Management section of the Code encourages a range of best practice processes and activities; including the provision of guidance to enable home owners/occupiers to understand and operate their home efficiently and to make the best use of local facilities.
72. Without the provision of adequate information and guidance it is likely that the home may be used inappropriately, leading to the dissatisfaction of occupants and the waste of resources. Provision of a Home User Guide may lead to a more environmentally informed population. A more informed population may purchase and operate appliances in a more environmentally conscience way, ultimately leading to reducing environmental impacts arising from household occupancy.
73. Provision of a Home User Guide should save occupants money as the guide gives information on:
  - energy and water use – this information may help the users save on utility bills
  - recycling and waste – this could save the occupier money if Local Authorities are allowed to apply incentive schemes for recycling
74. To recognise and encourage environmentally and socially responsible construction site management; the Code promotes home builder registration with the Considerate Constructors Scheme (CCS). The benefits of the CCS include:

<sup>41</sup> [www.jrf.org.uk/pressroom/releases/240297.asp](http://www.jrf.org.uk/pressroom/releases/240297.asp)



- minimised disturbance/negative impact (in terms of noise, dirt and inconvenience) caused to the immediate neighbour
- eradicated offensive behaviour and language
- improved company procedures in dealing proactively with neighbourhood and environmental issues
- recognises and rewards the constructor's commitment to raise standards of site management, safety and environmental awareness beyond statutory duties
- enforces the code of considerate practice
- deals with complaints<sup>42</sup>

75. The Code also aims to recognise and encourage active environmental management of construction site impacts. For example, in the UK during 2004 there were 180 water pollution incidents from construction and demolition sites. Environmental benefits of active site management included reduced CO<sub>2</sub> emissions, dust pollution and water usage. Improved site management also makes the immediate area a better environment to live in both in the short term.
76. Many aspects of environmental site management relate to resource efficiency. Consequently, where site management actively monitors and minimises site resource consumption (e.g. reduced transport to site, reduced site energy/water usage) the home builder/ contractor will save on site bills.
77. The Code aims to encourage developments where people feel safe and secure; where crime and disorder, or the fear of crime, does not undermine quality of life or community cohesion<sup>43</sup>. There are two safety and security elements to the Code; the first is to provide secure window and door locks; the second is to design in line with the Secure by Design Award. These factors reduce anti social behaviour and crime.
78. A report released by the Association of British Insurers<sup>44</sup> states that ensuring that all new homes achieve a Secure by Design Certificate would cost £630 per home and would yield benefits of over £1,170 per household. Over 20 years the policy would generate more than £3.2bn of savings to the economy as a whole.

<sup>42</sup> [www.lga.gov.uk/lga/planning/constructors.pdf](http://www.lga.gov.uk/lga/planning/constructors.pdf)

<sup>43</sup> CLG, *The Code for Sustainable Homes Technical guidance*, September 2007

<sup>44</sup> Association of British Insurers July 2006: *Securing the Nation – the Case for Safer Homes*, [www.abi.org.uk/BookShop/ResearchReports/Securing%20the%20Nation%20July%202006.pdf](http://www.abi.org.uk/BookShop/ResearchReports/Securing%20the%20Nation%20July%202006.pdf)

79. Lastly, the Code supports ecologically beneficial development; the primary aims being to encourage development on land that is low in ecological value, to promote the protection and enhancement of ecological features, and to reward sites that improve overall ecological value. Particular value is given to promoting native floral species diversity. Adequate native floral species diversity is integral to diverse and robust ecosystems. Diverse ecosystems are better at withstanding physical and biological stress; as a result populations remain more stable.
80. Homes that are located in an attractive setting are inherently more valuable and provision of planted areas and soft landscaped features is known to improve quality of life of occupants. The Code also presents long-term social benefits to future generations as it promotes preservation of areas and features of ecological worth.