Communities and Local Government

Revisions to the Code for Sustainable Homes

Impact assessment

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Impact assessment

November 2010
Department for Communities and Local Government

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Title: **Revisions to the Code for Sustainable Homes**	Impact Assessment (IA)
Lead department or agency: Department for Communities and Local Government	**IA No:** 0019
Other departments or agencies:	**Date:** 11/10/2010
	Stage: Enactment
	Source of intervention: Domestic
	Type of measure: Other
	Contact for enquiries: Simon Brown

Summary: Intervention and Options

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

House-builders are only weakly incentivised to act on sustainability issues because of information and other market failures. The Code for Sustainable Homes is a voluntary framework which is intended to provide better information to home buyers on the sustainability of new housing and act as a guide to the house-building industry about future likely potential changes to the building regulations and the wider sustainability objectives of Government. It seeks to improve resource efficiency (such as energy and water use), and to promote security, health, social cohesion and adaptability to climate change. The Code will be less effective in tackling these if it is not kept up to date and is not periodically revised in the light of experience.

What are the policy objectives and the intended effects?

The current revisions to the Code aim to ensure that it remains aligned with regulations, is streamlined to ensure it is working effectively, is working to deliver the intended effects and to iron out problems that have arisen during its implementation. It is adjusting especially to take account of 2010 changes to Part L of the Building Regulations and as a result of a consultation exercise, the results of which will be published alongside this impact assessment. The effect should be to make the code more relevant to future changes to regulation, especially regarding energy efficiency standards and reduce the costs of building to Code levels.

What policy options have been considered? Please justify preferred option (further details in Evidence Base)

This enactment stage impact assessment assesses two options, although the revision process has considered a wider range of possible revision options which were assessed in the consultation stage impact assessment. The six main policy areas being proposed for change under the preferred package are energy and fabric energy efficiency, waste, internal lighting and energy display devices, security standards, surface water management, lifetime homes on steeply sloping sites. The enactment stage options assessed are:

1. Do nothing - this is the reference case of continued implementation of the Code in its current form.
2. A package of amendments to parts of the Code including all the policy areas listed above. Known as "Package H", this is the preferred option, on the basis of responses to the consultation document and the demonstration of an overall benefit in this impact assessment. The evidence base included in this impact assessment analyses each of the elements of Package H, as well as in combination.

When will the policy be reviewed to establish its impact and the extent to which the policy objectives have been achieved?	It will be reviewed Early 2011
Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?	Yes

SELECT SIGNATORY Sign-off For Enactment stage Impact Assessments:

I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) the benefits justify the costs".

Signed by the responsibleSELECT SIGNATORY:..... Date:.....

Summary: Analysis and evidence Policy package 1

Description:

A package of revisions to the Code policy (referred to in the evidence base as policy package H) measured against the reference case costs and benefits outlined in the evidence base Section 3.

Price Base Year 2010	**PV Base Year** 2010	**Time Period Years** 60	**Net Benefit (Present Value (PV)) (£m)**		
			Low: £54m	**High:** £178m	**Best Estimate: £ 108m**

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant	**Total Cost** (Present Value)
Low	£5.8m		£1.8m	**£38.3m**
High	£5.8m		£4.4m	**£104.8m**
Best Estimate	£5.8 m		£2.9m	**£67.6m**

Description and scale of key monetised costs by 'main affected groups'

Overall, the package of changes is expected to deliver a reduction of construction costs compared to the reference case. This reduction is not evenly distributed; it is related to cost reductions at a proportion of sites. Cost increases will be incurred elsewhere, amounting to around £62m, of which £38m is borne by the publicly-funded sector, plus £6m transition cost. These additional construction costs are due particularly to changes made to the energy section of the Code.

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant	**Total Benefit** (Present Value)
Low	Optional		£3.7m	**£91.9m**
High	Optional		£11.3m	**£282.9m**
Best Estimate			£7.1m	**£175.8m**

Description and scale of key monetised benefits by 'main affected groups'

On a proportion of sites where management of surface water by infiltration is not possible due to ground conditions, a large cost saving is expected to be delivered, amounting to £112m across all housing (£56m in the publicly-funded sector). Further benefits include reduced energy consumption and CO_2 saving of £34m, of which £32m is related to publicly-funded housing, and £17m for the avoided cost of meetings renewables targets. Increased adoption of lifetime homes standards and secured by design is expected to result in £12m saving. See Table 23 for details.

Other key non-monetised benefits by 'main affected groups'

The introduction of Fabric Energy Efficiency Standard as the metric for measuring fabric performance is expected to generate a learning benefit, as house-builders become familiar with the standard and devise approaches to achieving the higher levels of the standard, prior to the introduction of the energy efficiency backstop level through zero carbon homes policy. Although not rigorously evidence based, the benefit has been estimated at around £7m over the policy period.

Key assumptions/sensitivities/risks	Discount rate (%)	3.5

The cost savings that result from changes to the surface water run-off requirements of Code homes will be heavily site dependent and so the overall effect across the home-building sector is difficult to forecast. The benefits presented are based on an indicative assumption that 30 per cent of all sites are affected. Note that excluding the surface water issue, there is still anticipated to be a positive benefit from the other changes proposed. Sensitivity analysis has been undertaken around a central estimate assuming 150,000 homes pa, with 20 per cent publicly-funded and 25 per cent of private homes built to a code level. The high estimate assumes 200,000 homes pa, 25 per cent of which are publicly funded and 30 per cent of private homes built to a code level. The low estimate assumes 100,000 homes pa, 15 per cent of which are publicly-funded and 20 per cent of private homes built to a code level. See Table 27 for details.

Impact on admin burden (AB) (£m):			Impact on policy cost savings (£m):	In scope
New AB:	AB savings:	Net:	Policy cost savings:	Yes/No

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/11/2010		
Which organisation(s) will enforce the policy?					
What is the annual change in enforcement cost (£m)?					
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			Yes/No		
What is the CO_2equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** 0.06	**Non-traded:** 0.15	
Does the proposal have an impact on competition?			Yes/No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:**	**Benefits:**	
Annual cost (£m) per organisation (excl. Transition) (Constant Price)	**Micro**	**< 20**	**Small**	**Medium**	**Large**
Are any of these organisations exempt?	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy packages can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy package to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	Impact	Page ref within IA
Statutory equality duties[1] Statutory Equality Duties Impact Test guidance	Yes	63

Economic impacts		
Competition Competition Assessment Impact Test guidance	Yes	60
Small firms Small Firms Impact Test guidance	Yes	61

[1]Race, disability and gender Impact assessments are statutory requirements for relevant policies. Equality statutory requirements will be expanded 2011, once the Equality Bill comes into force. Statutory equality duties part of the Equality Bill apply to GB only. The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	62
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	62

Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	62
Human rights Human Rights Impact Test guidance	No	64
Justice system Justice Impact Test guidance	No	64
Rural proofing Rural Proofing Impact Test guidance	No	64

Sustainable development Sustainable Development Impact Test guidance	Yes	63

Evidence Base (for summary sheets) – Notes

Use this space to set out the relevant references, evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Please fill in **References** section.

References

Include the links to relevant legislation and publications, such as public impact assessment of earlier stages (e.g. Consultation, Final, Enactment).

No.	Legislation or publication
1	*Sustainable New Homes: The Road to Zero Carbon: Consultation on the Code for Sustainable Homes and the Energy Efficiency standard for Zero Carbon Homes, December 2009*
2	*Code for Sustainable Homes – Impact Assessment (Consultation Stage), December 2009*
3	
4	

+ Add another row

Evidence Base

Ensure that the information in this section provides clear evidence of the information provided in the summary pages of this form(recommended maximum of 30 pages). Complete the **Annual profile of monetised costs and benefits** (transition and recurring) below over the life of the preferred policy (use the spreadsheet attached if the period is longer than 10 years).

The spreadsheet also contains an emission changes table that you will need to fill in if your measure has an impact on greenhouse gas emissions.

Annual profile of monetised costs and benefits- (£m) constant prices

The annual profile of costs and benefits are shown for the preferred policy package in the table below. All costs and benefits are shown in 2010 prices and discounted using Treasury Green Book discount rates.

(£millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Transition costs	5.8										
Annual recurring cost		3.8	6.5	6.5	5.7	6.0	6.8	6.8	6.7	6.5	6.3
Total annual costs	5.8	3.8	6.5	6.5	5.7	6.0	6.8	6.8	6.7	6.5	6.3
Transition benefits											
Annual recurring benefits		13.4	13.24	13.08	12.91	12.82	12.41	12.02	11.64	11.28	10.9
Total annual benefits		13.4	13.2	13.1	12.9	12.8	12.4	12.0	11.6	11.3	10.9

Evidence base

Background to operation of the Code

The Code requires new homes to be assessed against nine design categories:

- Energy/CO_2
- Water
- Materials
- Surface water run-off
- Waste
- Pollution
- Health and well-being
- Management
- Ecology

Each category is further sub-divided into a number of discrete issues, for example, the Materials category consists of three issues: Mat 1 (Environmental impact), Mat 2 (Sourcing – basic elements), and Mat 3 (Sourcing – finishing elements).

The number of issues per category varies, with a sum total of issues across all categories of 34. Credits are scored against issues, with higher performance being rewarded with more credits against any particular issue, up to the maximum number of credits available for the issue.

A complete list of the issues that make up the Code (i.e. current version of the Code policy) together with the number of credits available for addressing each issue is included in Annex 1.

Certain Code issues define mandatory standards that must be achieved in order to gain a certain Code rating. Other issues are flexible, in other words a builder can choose whether or not to attempt to gain the credits for the issue. A table identifying the mandatory requirements of the Code is also included in Annex 1.

Each category has a weighting factor, which is used to translate credits into points. Some categories are more heavily weighted than others, such that credits available in some categories are more valuable than credits available in others, for example the Energy and CO_2 category is heavily weighted, whereas credits in the materials category have a low weighting.

In order to achieve a particular Code rating (1 to 6), all mandatory standards relating to that rating must be achieved and enough credits must have been gained to exceed a certain points threshold. The points thresholds (and category weighting factors) are also include in Annex 1.

Background to origin of the Code

The Code for Sustainable Homes was introduced in 2007 as a voluntary national standard to guide improvements in the sustainability of construction of new housing. The Code is currently only applicable in England, Wales and Northern Ireland.

It remains a **voluntary** decision for house-builders to build to any particular Code standard and to have the homes they build assessed against the Code. Legislation was passed in 2008 to make a rating against the Code mandatory (even if the rating was nil-rated) and for a Code

rating certificate to be included in home information packs. The requirement for a mandatory rating has since been removed by the suspension of the home information pack.

This impact assessment considers the costs and benefits of a number of proposed changes to the Code for Sustainable Homes.

Rationale for government intervention

Home-builders are currently only weakly incentivised to act on sustainability issues in the construction of new homes. The additional construction costs that result from improving the sustainability of homes fall mainly on the developer, while benefits of reduced energy costs are gained by the occupant. Currently there is also little market pull, as sustainability issues still do not tend to be among the highest priorities of the majority of home-buyers. Government intervention is required to address this market failure.

The Code for Sustainable Homes is a voluntary standard against which the sustainability of new homes can be measured. The Code provides a template for the construction of more sustainable developments and a recognisable rating system, providing better information to home-buyers, which it is hoped will generate a market demand for more sustainable homes.

The Code is also intended to act as a guide for the home building industry to future changes to Building Regulations. This allows home builders to plan in advance for future changes in regulations, in terms of design, building suitable supply chains and factoring financial implications into negotiations of land purchase prices.

As a result of changes to the Building Regulations in 2010, particularly the changes to Part L[2], certain mandatory requirements of the lower Code levels are less stringent than the minimum standards required by Regulations. Amendments to certain issues in the Code are required to maintain alignment between the Code and Building Regulations.

Government is committed to enabling all new homes to be built to zero carbon standards from 2016, to ensure that they need not add extra carbon to the atmosphere. The definition of zero carbon is being developed, but will introduce a minimum standard for fabric energy efficiency (FEES) based on that set out in the recent consultation on the Code for Sustainable Homes. In order to align the Code with emerging zero carbon policy, the potential of amending the Code's fabric efficiency rating is considered.

Policy objectives and intended effects

As stated above, the key objectives of the current review of the Code policy is to ensure that it remains up-to-date and aligned with developments in the Building Regulations. A number of further revisions to the Code are also proposed, in response to specific issues that have been raised through the consultation and experience of the Code to-date.

Following the December 2009 consultation, a number of potential revisions explored in the consultation stage impact assessment are no longer included in this final impact assessment. Specifically, the policy revisions that are not taken forward in this impact assessment are:

- *Alignment of the higher levels of the Code with zero carbon policy by introduction of the concept of carbon compliance and allowable solutions into the Code at levels 5 and 6*. For the time being it is proposed that the mandatory CO_2 reduction requirements of Code level 5 and 6 remain unchanged, this is due to ongoing work on the definition of the zero carbon policy and the minimum carbon compliance level. This is expected to be reviewed again in a later review of Code policy.

[2] See Annex 3 for summary details of relevant changes to the Building Regulations

- *Introduction of Lifetime Homes as a mandatory requirement at Code level 4*. In order to avoid placing excessive regulatory burden on house-builders, the decision to make Lifetime Homes mandatory at Code level 4 has been delayed until a full review of the impact has been performed.

This final impact assessment provides further analysis of a number of proposed policy revisions that were not assessed in detail in the consultation stage impact assessment. These include:

- *Detailed consideration of the introduction of an Energy Display Devices issue.* Increasing the uptake of energy display devices is intended to drive reduction in energy consumption by providing better information to occupants on their usage.
- *Analysis of the impact of changes to the mandatory requirements of the surface water run-off issue*. In response to issues raised by house-builders and engineers, the mandatory requirements of the surface water run-off issue of the Code, relating to mitigating the volume and peak-rate of rainwater discharge from developed sites, have been amended. This is intended to resolve current confusion regarding this issue.
- *Analysis of the impact of an exemption to certain aspects of the Lifetime Homes standard for homes built on steeply sloping plots*. House-builders have raised issues concerning the feasibility of achieving all of the Lifetime Homes principles on plots that are steeply sloping. An exemption from the external aspects of the Lifetime Homes standard is proposed for homes built on plots exceeding a certain gradient.

The preferred policy package is referred to as Policy H in this impact assessment. It includes a package of policy revisions, each of which is also assessed separately in this impact assessment (policies A, B, D, E, F and G). Details on each policy revision are given in the *Summary of policy options/packages* section. Package H offers the best combination to meet the objectives of the consultation, which was to streamline the Code, to resolve problems that have arisen during its use, and to update it in the light of changing Building Regulation requirements.

2: Impact assessment methodology

1. The purpose of this impact assessment is to understand what effect certain proposed changes to the Code will have, in terms of the costs and benefits associated with building Code homes, compared to continuing with the Code as currently defined.
2. The Code as currently defined is referred to throughout this impact assessment as the reference case and all costs and benefits associated with a changed policy package are measured relative to the reference case (the baseline).
3. This impact assessment is concerned with the extra-over cost of the policy package options explored as against this baseline. The extra-over cost of the Code is the additional build cost of a Code home, on top of the cost of building a dwelling that meets the minimum standards specified by the relevant regulations, i.e. the Building Regulations and, post-2016, zero carbon homes policy.

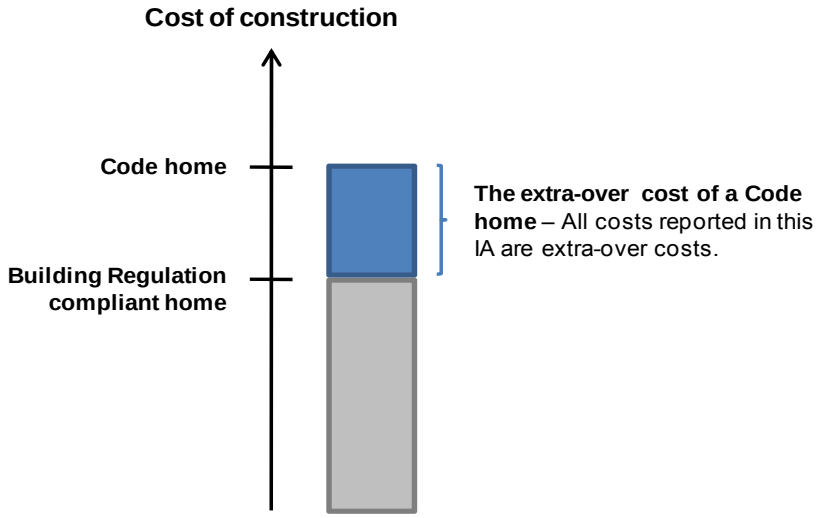

Figure1: This impact assessment is concerned with the additional cost associated with building a Code compliant home over the cost of meeting the minimum Building Regulation standards – this is the extra-over cost of the Code

4. Over the period of the policy assessment, the Building Regulations will change. In particular, Part L of the Regulations (Conservation of Fuel and Power) is being tightened by 25 per cent in 2010, with a further revision expected in 2013, as interim steps towards the introduction of the zero carbon homes policy in 2016. Specific proposals and analysis of their impacts will be addressed in separate future impact assessments. For modelling purposes only, this impact assessment assumes that changes to Part L will enforce a 25 per cent and 44 per cent reduction of Dwelling Emissions Rate (DER) in 2010 and 2013 respectively, before a 70 per cent Carbon Compliance level is introduced as part of the zero carbon standard from 2016. For the purpose of this impact assessment, it has been assumed that changes to Part L will specify a flat reduction in DER in 2010 and 2013.
5. The changes to the Building Regulations and the introduction of the zero carbon homes policy provide the baseline from which the extra-over costs of the Code are measured. As the Building Regulations change, the extra-over costs of the Code are expected to reduce. This is not because of a reduction in overall construction cost (although this may also occur, for example due to learning effects), but is because an increasing part of the construction

cost shifts to become part of the cost of complying with the regulations rather than the extra-over cost of the Code. These regulatory costs will be captured in the relevant impact assessments for the Part L changes and the zero carbon homes policy and so are not reported here.

6. The changing extra-over cost as Building Regulations are tightened is illustrated schematically in Figure 2 below.

7. In the top chart, Figure 2, the additional cost of building a Code level 4 dwelling compared to the build cost of a Part L 2006 compliant dwelling is shown. The proportion of the additional cost that is attributable to the Code (the extra-over cost) drops over time, with the introduction of more stringent Building Regulation/Zero Carbon Homes policy. The extra-over cost of the Code is shown in the lower chart.

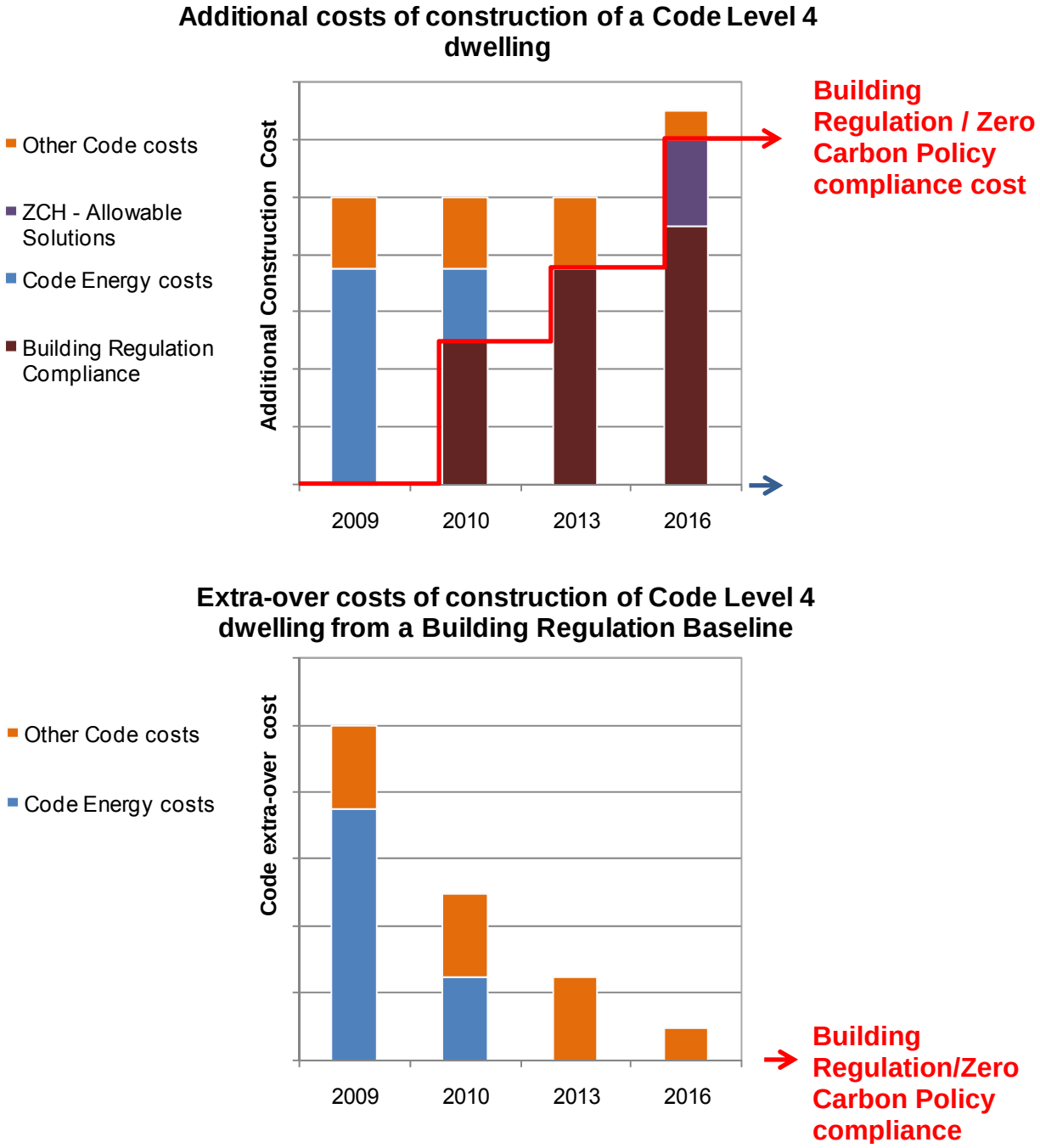

Figure 2: Effect of changing Building Regulations on extra-over cost of building to the Code

8. The changing extra-over cost relative to the Building Regulations baseline is most clearly illustrated by consideration of the changing Part L compliance costs, although there will be similar effects due to other changes in the Building Regulations, e.g. the 2010 revision of Part G of the Regulations ('Hygiene') is also part of the baseline (this limits water consumption to 125 l/p/day, including a 5 l/p/day allowance for external water consumption, which is equivalent to the Code level 1 and 2 mandatory requirement).

9. Similarly to the extra-over costs, the benefits of the Code will also be measured as additional benefits relative to a changing Building Regulations baseline.

Measuring costs and benefits of policy options/packages

10. The reference case is the continuation of the Code policy as currently defined. The costs and benefits of the reference case are measure relative to a baseline of constructing homes to meet the minimum standards required by the Building Regulations. The costs and benefits in the reference case, relative to Building Regulations, are discussed in detail in Section 3.

11. The policy revisions have an impact on the cost of building to the Code and the benefits delivered by Code homes. The costs and benefits related to each policy revision are reported relative to the reference case.

12. This is illustrated by the schematic shown in Figure 3. The extra-over costs associated with building Code homes in the reference case will change over time as the Building Regulations change and due to other factors, such as learning and technology cost reductions. A revision to the Code policy may change these extra-over costs. Similarly, a change to the Code policy may change the benefits compared to the benefits that would be delivered under the reference case. It is these differences which are reported in the cost-benefit analysis section of this impact assessment (Section 4).

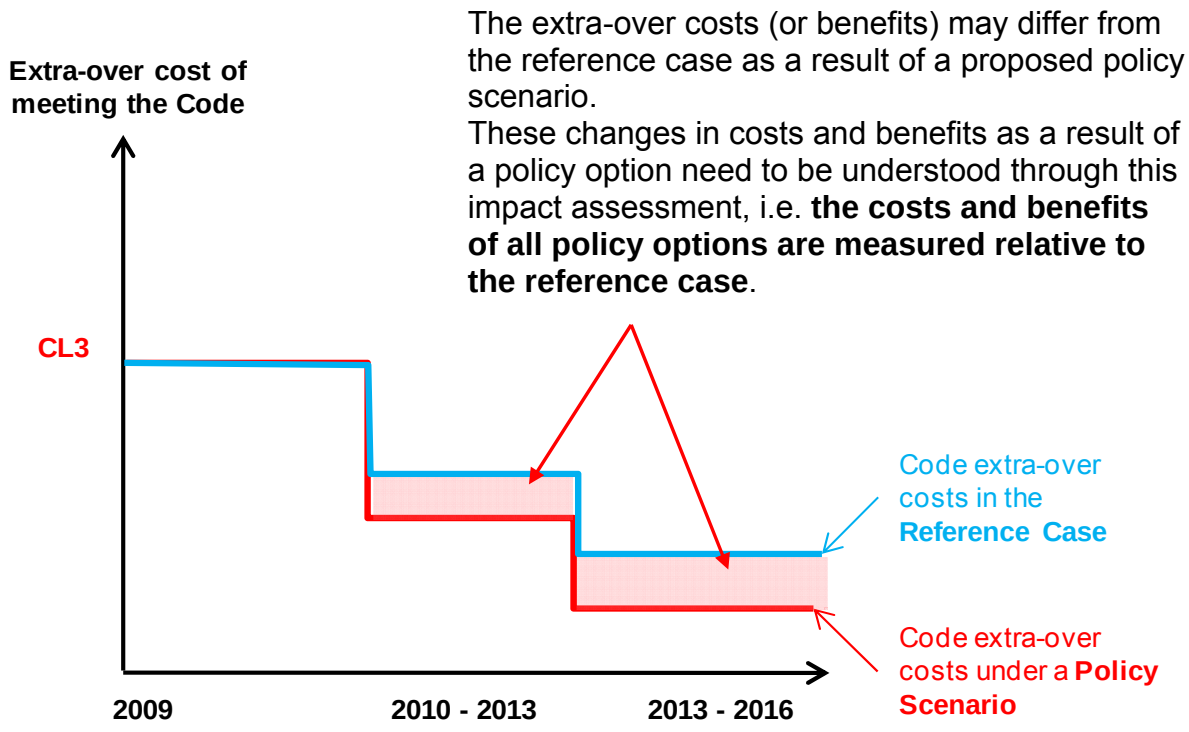

Figure 3: Diagrammatic representation of costs and benefits assessed in this impact assessment

Key assumptions

13. The major assumptions behind the analysis presented in this Impact Assessment are summarised in the table below.

Table 1: House building industry assumptions

	Assumption	**Comment**
New build rate	Assumed to be 150,000 new build homes per year, for modelling purposes only.	This is an indicative assumption for modelling purposes. Sensitivity testing to build rates of 100,000 to 200,000 units/yr
Proportion of new build HCA funded	20% of total new build.	Consistent with historical build rate. Sensitivity testing to HCA build rates of 15% to 25% / yr.
HCA funding Code level requirements	Code level 3 up to 2011 and Code level 4 thereafter.	This is an indicative assumption for modelling purposes only.
Private market Code level uptake	Assumption that private market uptake is driven by local planning policy. Two scenarios are assessed: 1. central case 2010 to 2013 – Code level 3 2013 onward – Code level 4 2. higher case 2010 to 2013 – Code level 3 2013 to 2016 – Code level 4 2016 onward – even mix of Code levels 5 and 6	Based on current trends and expectations assumes for modelling purposes that 25% of private market housing is required by planning to achieve a Code level. Sensitivity testing to assumptions of 20% and 30% private sector uptake of the Code. Note that in the higher case scenario for private sector Code uptake, around 4% of the total build of Code homes are built to each of Code level 5 and 6.
House and development types	Four house types and 12 development scenarios in line with 2008 study.	Split of new build between house types and development scenarios based on NHBC data supplied at time of consultation stage IA.

Table 2: Policy assumptions

	Assumption	Comment
Policy lifetime	2010 to 2020.	Policy assessed over 10 years, i.e. new Code homes built to 2020. Costs and benefits over whole home/technology lifetime included, e.g. 50 years dwelling lifetime.
Baseline	Code extra-over costs measured from changing Building Regulations baseline: Part L 2010 adopted as starting point. Part L changes in 2013 are assumed to involve a flat 44% improvement of DER over Part L 2006 TER. Zero carbon homes policy introduced in 2016 – minimum carbon compliance level assumed to be a 70% improvement of DER over Part L 2006 TER. Part G 2010 (regulated water consumption of 125 l/p/d) is adopted as baseline.	The carbon compliance level defined in the zero carbon homes policy is currently uncertain. A carbon compliance level of 70% is taken as the central assumption.
Other policies included	Feed-in tariff – included in the CBA.	Feed-in tariff is not a societal benefit, as it is a transfer between sectors of the economy. It should be included as a benefit to the relevant parties in the distributional analysis. The Renewable Heat Incentive has not been included in the policy assessment.
Cost of Allowable Solutions	Assumed to be £75£/tCO_2 for each tonne emitted over 30 year period.	
Technology replacement costs	In line with the consultation stage IA, technology replacement costs are not included.	Only the initial cost of installing a technology (and the subsequent costs and benefits that accrue) can be attributed directly to the Code policy.

Table 3: Technology assumptions

	Assumption	Comment
Approach to building to the Code	The cost modelling assumes that house-builders select the lowest cost approach to meeting a Code level.	
Dwelling lifetimes	Fifty years.	Consistent with Consultation stage IA.

Build of Code homes

14. The number of Code homes that are built in each year over the policy lifetime and the way that these homes are distributed across the Code levels is a key assumption in deriving the costs and benefits of the Code policy. The assumptions around numbers of Code homes are discussed in more detail below.

15. An indicative figure of 150,000 new homes per year has been chosen to represent the build-rate of new homes in England and Wales. This build rate is assumed to be constant until 2020 and 20 per cent of new homes are assumed to be built with public sector funding.

16. All publicly-funded housing has been constructed to Code level 3 since April 2008. It is assumed that the public sector continues to drive uptake of the Code, requiring all publicly-funded housing to be constructed to Code level 4 from 2011 (consistent with the proposed requirements of the National Affordable Housing Programme).[3] The requirement for Code level 4 is then assumed to continue until 2020.

17. The Code is assumed to remain voluntary in private market housing. It could be argued, therefore, that the costs on the private market home-builders are negligible, as the Code does not force them to build to a particular Code level.

18. In reality, however, the Code is increasingly being used by local planning authorities as a tool to drive increased sustainability standards in new housing through policies in their local development frameworks.

19. The extent to which planning policy will drive Code uptake in private market housing is difficult to forecast. Two potential scenarios have been considered:

Central case

Twenty-five per cent of private market housing is built to a Code level

Private market developments started prior to 2013 are built to Code level 3. Developments started after 2013 are built to Code Level 4.

higher Code level case

Twenty-five per cent of private market housing is built to a Code level

The following trajectory of Code levels has been assumed:

- Developments started before 2013 are built to Code level 3.
- Developments started between 2013 to 2016 are built to Code level 4
- Developments started after 2016 are distributed between Code levels 5 and 6.

20. The distribution of the total Code homes built over the period to 2020, between social and private sectors and between the Code levels in the central and higher case is shown in the chart below. Note that in the higher case, only a small proportion of the overall total Code homes built over the policy lifetime are assumed to be built to Code level 5 and 6 (<5 per cent of the total are built to each level). In each of the scenarios, the majority of private market Code homes are built to level 3, while Code level 4 is dominant in the social sector.

[3] See for example http://www.homesandcommunities.co.uk/carbon_challenge.

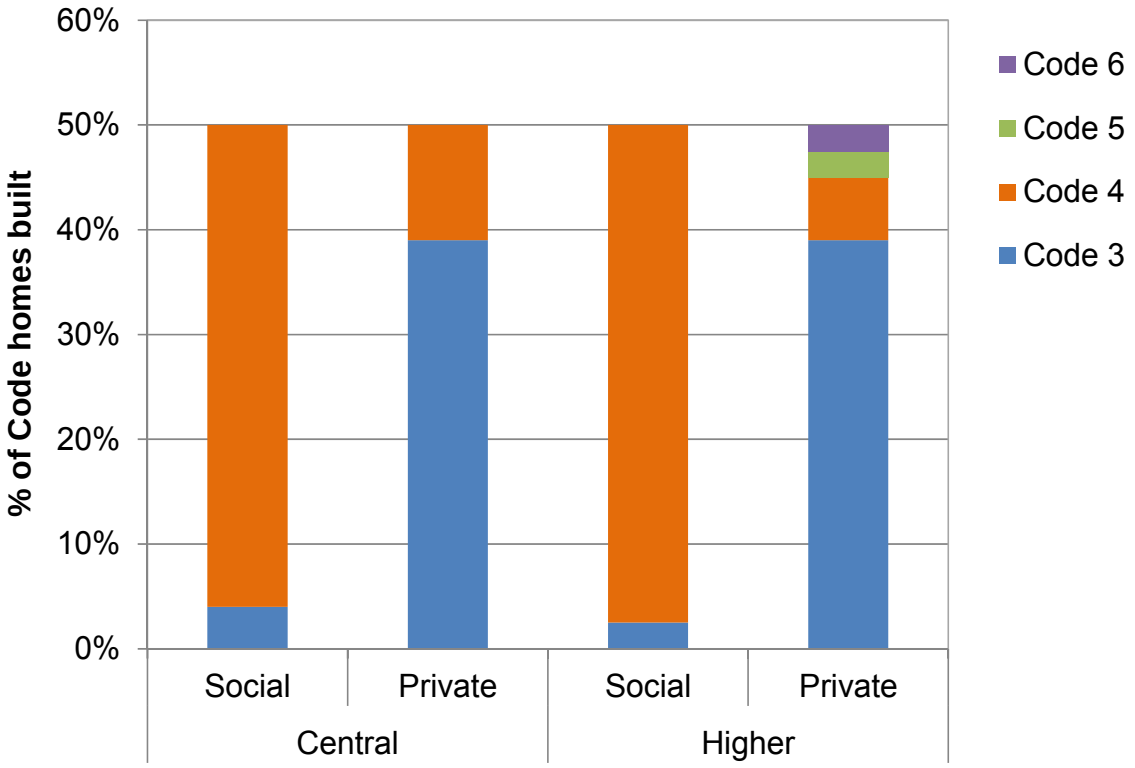

Figure 4: Split of the total number of Code homes built over the policy lifetime between the Code levels in the central and higher case scenarios for private market Code uptake.

Summary of policy options/packages

21. The table below provides a summary of the revisions to the Code policy that are assessed in this impact assessment.

22. Policy Option H – the combination of all policy revisions – is the **preferred policy option**.

Table 4: Summary of each of the individual and combined policy revisions assessed

Policy	Description	Details and notes
A	Reallocation of credits from Ene1 to Ene2 and metric change from HLP to kWh/m^2.yr.	Total number of credits in the Dwelling Emissions Rate (DER) issue (Ene1) reduced from 15 to 10, such that zero credits are awarded for meeting the DER improvement required by Part L2010. Ten credits available for achieving net zero carbon standard with respect to all regulated and unregulated emissions. The 5 credits from Ene1 are reallocated to the Building Fabric issue (Ene2) and the metric used to measure fabric improvement is changed from heat loss parameter (HLP) to kWh/m^2/yr (space heating and cooling), which is in line with the Fabric Energy Efficiency Standard (FEES) proposed as part of the zero carbon homes definition. A further change is the introduction of awarding credits against Ene1 and Ene2 on a sliding scale such that fractions of credits can be achieved (to a resolution of 0.1 credits).

B	Remove internal lighting credits and replace with Energy Display Devices.	Ene3: Internal Lighting credits removed. New issue – Energy Display Devices – added, also with two credits available. One credit for providing an energy display device showing electricity consumption data. Two credits for providing an energy display device showing electricity and primary heating fuel consumption data.
C	Package of changes to the Energy category.	Policies A and B combined.
D	Updating accessibility requirements and changes to the Waste category.	Terminology change for access requirements of Was1, Was3 and Hea3 to centre on 'inclusive design' rather than 'wheelchair users'. Amend Was1 checklist to mirror approach of Lifetime Homes and generate a single approach towards inclusive design throughout the Code. Remove requirement for bins to be within 30 metres of an external door (compliance is covered by Part H of Building Regulations). Remove the mandatory element of Was2: Construction Site Waste Management, which had stated that a site waste management plan (SWMP) must be produced. Provide 1 voluntary credit for a compliant SWMP (that meets the criteria set out on p.132 of consultation technical guide, published December 2009). Up to two further credits available for diverting waste from landfill (1 credit for diverting 50% of construction waste, 2 credits for diverting 85% from landfill).
E	Security standards.	As defined the Code awards two credits against Man4: Security for consulting an architectural liason officer (ALO) or a crime prevention and detection advisor (CPDA) and following advice to comply with 'Section 2 – Physical Security' of *Secured by Design – New Homes*. The proposed change involves splitting the two credits such that one is available for achieving certain minimum security standards (Box B of the consultation document: *Sustainable New Homes – The Road to Zero Carbon* (December 2009), p.54). Provided that the first credit is gained, the second credit is available for consulting the local police and following advice to comply with wider range of security requirements of 'Section 2 – Physical Security' from *Secured by Design New Homes*.
F	Changes to the Surface Water category.	Technical changes to Sur1: Surface Water Run-Off Management. This involves changes to the requirements for volume of run-off and peak rate run-off. Also an amendment to the criteria for water quality (one credit for ensuring that run-off at risk of pollution receives at least two levels of treatment and run-off not at risk of pollution receives at least one treatment before discharge from site).

G	Lifetime Homes exemptions on steeply sloping sites	For dwellings on plots with sloping topography that predominantly exceeds 1:12, an exemption from the requirement to meet Design Criteria 2 (access from car parking) and 3 (approach gradients) of the Lifetime Homes standard will apply, as long as accessible steps are installed. For these dwellings, a maximum of 3 credits under Hea4 will be available for complying with all other Lifetime Homes criteria.
H	Policies C, D, E, F and G combined.	Combination of policies.

3: Reference case - costs and benefits

23. The reference case is the 'do nothing' scenario, i.e. continued implementation of the Code in its current form.

24. The costs and benefits in the reference case are measured relative to a baseline of progressive tightening of the Building Regulations in 2010 and 2013 and introduction of zero carbon homes policy in 2016 (a 70 per cent carbon compliance level is assumed as part of the zero carbon policy).

25. The costs and benefits associated with the reference case are shown in Table 5 below. The lifetime of the policy is assumed to be 10 years (until 2020), i.e. new Code homes built until 2020 are included in the assessment of the costs and benefits. The cost and benefits included in the analysis are those that accrue over the appropriate asset lifetime, e.g. the lifetime of the home (in the case of fabric measures) or the technology (in the case of low carbon energy generation technologies). No account for replacement of technologies over the lifetime of the dwelling is made in either the costs or the benefits. All costs and benefits are presented as a present value, using the Green Book discount rates of 3.5 per cent up to 30 years and then 3 per cent.

Table 5: Costs and benefits in the reference case

Costs and benefits: reference case		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	410	653
Maintenance costs	21	21
Administration costs	16	33
Present value of costs	***447***	***706***

Benefits		
Reduced energy consumption	48	49
Reduced water consumption	26	52
CO_2 emissions saving - Traded	6	6
CO_2 emissions saving - Non-traded	-2	0
Present value of benefits	***78***	***107***

NPV (excluding avoided renewables)	**-369**	**-599**
Avoided renewables	57	57
NPV (including avoided renewables)	**-312**	**-542**

Note: Only the benefits related to resource savings (energy & water) and associated CO_2 savings are monetised in this table. There are significant additional benefits associated with building to Code standards that have not been monetised (see *Non energy CO_2 related costs and benefits*).

26. Under the central assumption for the uptake of the Code, the largest share of the costs associated with the Code fall on the social housing sector. This is a result of the

assumption that Code level 4 is adopted in all social housing from 2011, earlier than construction of significant numbers of Code level 4 homes is expected to occur in the private market sector.

27. In terms of benefits accruing from resource savings – reduced energy consumption, water consumption and associated CO_2 emissions – the majority of the benefits are also delivered in the social housing sector. This is also a result of the assumption that Code Level 4 homes are constructed from 2011 in the social sector, such that a significant number of homes are built to a CO_2 emissions standard that is more stringent than that required by Building Regulations.

28. Under the central assumption for uptake of the Code in the private sector, the only additional benefits from resource savings are related to a reduction in water consumption. Substantial benefits in terms of reduced energy consumption or CO_2 emissions savings will only be delivered if significant numbers of Code homes with CO_2 emissions standards in advance of those required by the Building Regulations are constructed, e.g. Code level 4 homes prior to 2013 or Code level 5 or 6 homes built prior to introduction of zero carbon homes policy.

29. Energy and carbon savings throughout this impact assessment are calculated using the June 2010 guidance on valuation of energy use and greenhouse gas emissions for appraisal and evaluation which supplements the Green Book.[4]

30. A value is put on the avoided cost of delivering the EU Climate and Energy Package target proportion of energy consumption to be delivered from renewable sources. Changes in final energy consumption in 2020 will change the absolute level of renewable energy supply that the UK is required to achieve. Reductions in energy consumption in 2020 will therefore be associated with an avoided cost of renewables. Similarly, policy measures that lead to renewable deployment in 2020 would also be associated with an avoided cost. Details can be found on page 14 of the June 2010 guidance on valuation of energy use and greenhouse gas emissions.[5]

31. The CO_2 savings associated with the construction of Code homes and the cost-effectiveness of CO_2 saving in the reference case are tabulated in Table 6 below.

Table 6: CO_2 saved in the reference case

Emissions saving		Emissions changes ($ktCO_2$) - By budget period		
		CB I - 2008-2012	CB II - 2013-2017	CB III - 2018-2022
Social housing	Traded	17	61	61
	Non-traded	-2	-2	4
All housing	Traded	17	62	62
	Non-traded	-1	5	17

32. The benefits shown in Table 5 above are largely those related to energy demand reduction and CO_2 emissions reduction in Code homes (benefits of water conservation are also included). The increased construction costs, however, reflect the full cost of building to the Code, of which costs related to the energy system are only one part.

[4] http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx

[5] http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx.

Energy and CO_2 related costs and benefits

33. In the table below, the costs related only to achieving the mandatory CO_2 reduction standard in Code homes (relative to the Part L baseline) are compared against the benefits derived from the improved energy system.

Table 7: Costs and benefits related to achieving the Code's mandatory Dwelling Emissions Rate (DER) standard, in the reference case.

Costs and benefits: reference case - energy and CO_2 related costs and benefits only		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	99	101
Present value of costs	***99***	***101***
Benefits		
Reduced energy consumption	48	49
CO_2 emissions saving - Traded	6	6
CO_2 emissions saving - Non-traded	-2	0
Present value of benefits	***52***	***55***
NPV (excluding avoided renewables)	**-47**	**-46**
Avoided renewables	57	57
NPV (including avoided renewables)	**10**	**11**

34. The improvements to the energy and CO_2 emissions standard in Code homes delivers a positive overall benefit (assuming that the value of avoided renewables is included in the analysis).

35. Under the central uptake assumption, all costs related to achieving the mandatory CO_2 emissions standards in Code homes are incurred in the social sector. This is because of the assumption that the private sector builds Code homes that have an equivalent mandatory CO_2 emissions standard to that required by Part L (i.e. Code level 3 until 2013 and Code level 4 thereafter).

Learning benefits associated with Code energy and CO_2 standards

36. One of the key intended effects of the Code policy is that it helps to prepare the house-building industry for future challenges including changes that may later be made to the Building Regulations.

37. House-builders with experience of building to Code level 3 are well-equipped for the transition to Part L 2010, as they have established a preferred approach to achieving the 25 per cent reduction of DER/TER, in terms of appropriate mix of fabric standards and low carbon technologies, and have developed efficient supply chains (improving buildability).

38. A similar learning effect is likely to ease the transition to Part L 2013 and to zero carbon homes policy in 2016.

39. This learning will translate, over time, into a financial saving, although it was difficult to obtain evidence on the extent of this learning benefit in consultation with house-builders with regard to, for instance, complying with Part L 2010.

40. To provide an indication of the potential scale of learning benefits in the absence of this evidence, an illustrative assumption that learning from the Code results in a 2 per cent reduction in house-builders' costs of meeting the 2013 and 2016 carbon compliance standards and that this learning benefit persists for a period of two years has been made (beyond this period, it is assumed that any reduction in cost of compliance results from experience of building to the regulations, rather than to the Code).

41. Based on the indicative assumption of 150,000 dwellings built per year and the modelling of extra-over costs related to meeting the 44 per cent and 70 per cent carbon compliance levels (assumed to represent Part L 2013 and 2016 respectively), the 2 per cent learning benefit translates into a financial saving of £3m (£14m associated with the Part L 2013 change and £17m associated with the 2016 change).

Non-energy/CO_2 related costs and benefits

42. Around £100m of the costs incurred in the reference case are associated with meeting the Code's mandatory CO_2 reduction standards. The remainder of the costs of the Code, shown in Figure 5, are related to gaining credits under the other Code categories.

43. The extra-over costs associated with the Code can be disaggregated by the Code category to which the costs are related, as shown in the chart below (for all Code homes built over the policy period). The Energy category costs here include the expenditure on all issues under the Energy category, not just the costs related to achieving the mandatory Dwelling Emissions Rate (DER). The categories that attract the largest investment are Surface Water Run-off, largely due to the mandatory requirement for managing rainwater discharge (discussed below), and the Energy category. Other categories that attract significant investment are Water, Health and Well-being and Ecology.

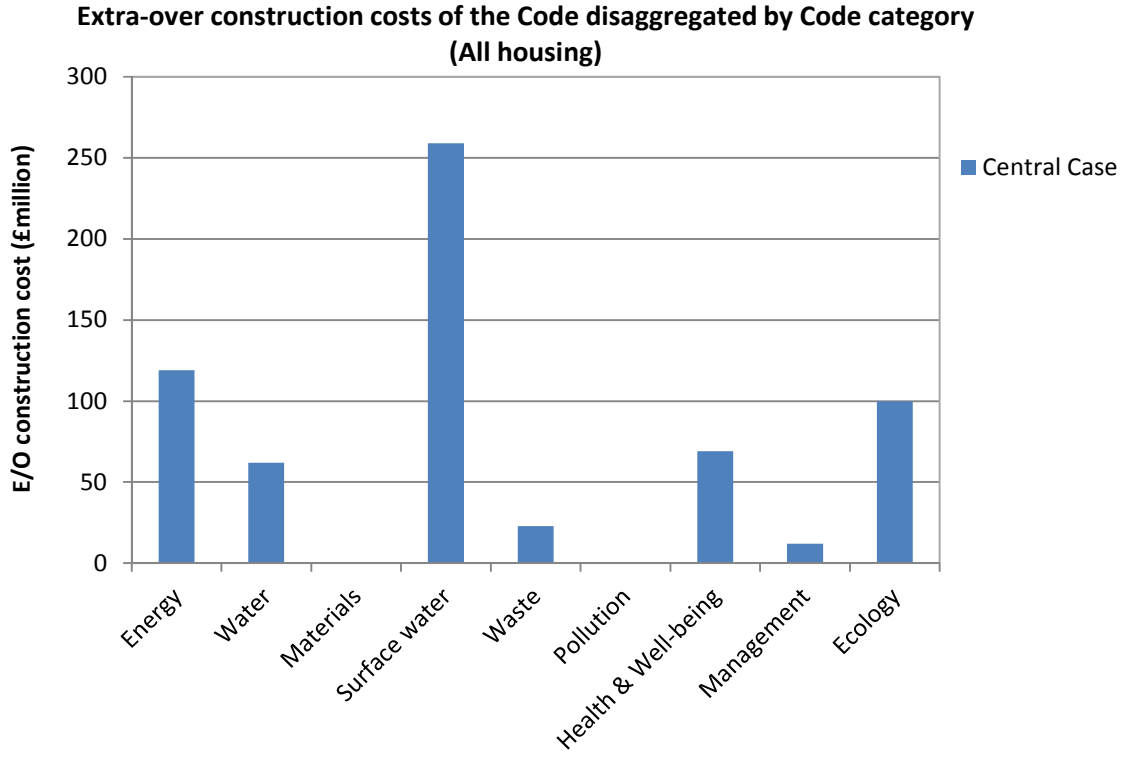

Figure 5: Disaggregation of extra-over construction costs between Code categories for the reference case (central case for Code uptake)

44. The benefits delivered by expenditure in the energy category are largely reported in Table 5. There are, however, a number of further benefits relating to expenditure on other issues under the Energy category that are not directly related to meeting the mandatory CO_2

emissions standard. For example, provision of more efficient appliances (under Ene5) will result in a reduction of unregulated electricity consumption. Encouragement of increased cycling by provision of bicycle storage (Ene8) not only has potential health benefits, but also reduces car usage for short journeys. Similarly, provision of home office space (Ene9) encourages home-working and reduces commuter journeys. These benefits have not been monetised here, but should be recognised as additional benefits delivered by the investment in the energy category in addition to those quantified in Table 5.

45. The benefits of reduced water consumption have been quantified and are included in Table 5. These include the benefits of reduction in the marginal cost of water supply and a reduction of CO_2 emissions related to the supply of domestic water. The benefits delivered by water saving are approximately equivalent to the additional costs.

46. The largest contribution to the increased construction costs resulting from the Code policy is investment required in managing surface-water run-off. The total cost in this category is forecast to be around £250m over the lifetime of the policy. The high costs due to this category derive from the mandatory requirement, at all levels of the Code, to ensure that peak-rate of run-off to water courses is no greater than that of the pre-developed site and that the additional volume of rainwater discharge from the development is entirely reduced, either by way of infiltration or by re-use of rainwater for non-potable uses within the development. The cost of achieving this mandatory requirement can be high, particularly on those sites where rainwater discharge cannot be managed by infiltration and so where rainwater harvesting systems are required to recycle rainwater on site.

47. Clearly the costs incurred in achieving this mandatory requirement are highly site specific, with no reliable data available on the prevalence of sites where rainwater harvesting or sophisticated SUDs systems are required. The costs reported here are based on an assumption that 30 per cent of sites are not suitable for management of rainwater discharge via infiltration measures alone.

48. High rates of water discharge to watercourses and sewers can result in flash-flooding and sewer flooding, potentially resulting in pollution of ground water and watercourses. The Surface Water Run-off category ensures that measures are taken within Code compliant developments to delay water discharge and alleviate pressure on watercourses and the sewer network.

49. Over 7 per cent of the land area of England and Wales is at risk of flooding, with around two million homes situated in flood risk areas. In addition to the mandatory requirement to manage water discharge, the Code also encourages development in areas that are at low risk of flooding.

50. The benefits delivered by the investment in the Surface Water Run-off management features of Code homes are difficult to quantify. The financial and social cost of flooding is estimated at between £20,000 to £30,000 per dwelling[6] and around £2.2bn is spent in the UK each year on flood defences and dealing with flood damage. As a consequence of climate change, flood risk and frequency of flooding is expected to increase over time. Research undertaken by Foresight found that if flood-management policies and protection expenditure remain unchanged, annual losses will increase.

51. The improved surface water management features of Code homes, encouragement to develop in low flood risk areas and steps to reduce pollution of water run-off from hard surfaces in new developments are part of a necessary effort to reduce the future impacts of flooding on the UK economy.

52. The Ecology category of the Code is also expected to attract substantial investment under the reference case. This objective of this category is to protect existing ecologically valuable environments, by promoting development on sites of inherently low ecological

[6] *Impact Assessment – Amendment to the Building Act to allow building regulations to require flood resilient repair*, DEFRA, January 2010

value and protecting any valuable features, and to encourage developers to invest in the enhancement of the ecology of their sites. The investment in this category will benefit home-buyers, through creation of more pleasant environments for them to live in, and help to protect the environment for future generations.

53. The Health and Well-being category is concerned with encouraging the construction of homes that are pleasant for occupants to live in, promote good health and are suited to the needs of a broad cross-section of the population, including the very young, elderly and those with disabilities or debilitating illnesses.

54. The four issues under the Health and Well-being category deal with access to daylight, sound insulation, provision of private outdoor space and Lifetime Homes. In terms of monetised benefits, the impact of Lifetime Homes is most readily quantified. The savings delivered by Lifetime Homes are explored in more detail in the discussion of Policy G, which deals with increasing the uptake of Lifetime Homes standards in certain site circumstances. The costs associated with incorporating Lifetime Homes are relatively high and, based on the modelling work, the issue is only expected to be tackled if high Code levels are being targeted (Code level 5 or 6), unless due to a specific requirement of a housing association. The higher levels of the Code are not included in the central case uptake scenario and so the investment forecast in this category are not associated with the provision of Lifetime Homes, but with the other issues under the Health and Well-being category.

55. The improvement of daylighting of homes delivers a number of benefits. Better daylighting can reduce reliance on electric lighting and lead to a reduction of electricity consumption. Better access to natural light also creates a more pleasant environment and enhances the feeling of well-being of occupants.

56. Better sound insulation improves the quality of life of occupants, by reducing disturbance from neighbouring buildings. A reduction of noise related disturbances between neighbours will also reduce the resource spent by police, public services and environmental health in investigation and resolution of domestic disputes.

57. Access to outdoor space is a further issue that delivers improved quality of life and social benefits to occupiers of Code homes. Overall, occupants of homes that promote good health and a feeling of well-being are more likely to be economically active and make a positive contribution to society.

Impact of the higher case uptake scenario

58. The reference case results presented above relate to the Central scenario for uptake of Code homes in the private sector. This is a conservative assumption that no significant numbers of Code homes are constructed to greater than level 4.

59. The sensitivity of the costs and benefits under the reference case to the higher scenario for private sector uptake has been explored. In this higher case, the build of Code homes in the social sector is unaffected. In the private sector, some build of Code homes to levels 5 and 6 is assumed in the latter part of the policy period. In this higher scenario, Code level 5 and 6 homes are only built post-2016 when it is assumed that zero carbon homes policy will be in effect, and only account for a combined 8 per cent of the total number of Code homes built over the period.

60. The reference case costs and benefits under this higher uptake scenario are presented in the table below.

Table 8: Costs and benefits in the reference case under the higher case assumption for Code uptake in the private sector

Costs and benefits: reference case under higher case uptake assumption		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	410	777
Maintenance costs	21	35
Administration costs	16	33
Present value of costs	***447***	***845***
Benefits		
Reduced energy consumption	48	55
Reduced water consumption	26	55
CO_2 emissions saving - Traded	6	9
CO_2 emissions saving - Non-traded	-2	-12
Present value of benefits	***78***	***108***
NPV (excluding avoided renewables)	**-369**	**-737**
Avoided renewables	57	50
NPV (including avoided renewables)	**-312**	**-687**

Note: Only energy, water and CO_2 saving benefits are monetised in this table. Other significant benefits delivered by building to higher levels of the Code are discussed below.

61. The costs and benefits are unchanged in the social sector, as no changes to the Code uptake assumptions have been made.

62. The costs in the private market sector have increased considerably in this case, as would be expected to result from the assumption that more homes are built to the higher levels of the Code (the additional construction costs due to the Code in the private sector under this uptake scenario amount to around £365m compared to £240m in the central case).

63. The benefits related to reduction in resource consumption have not increased as a result of building more Code homes to higher levels (apart from water supply costs, which are reduced as a consequence of the tighter water consumption limits at Code levels 5 and 6). This is a result of the assumption that the highest Code level homes, i.e. Code level 5 and 6 homes, are not built in any significant numbers until after 2016 when the zero carbon homes policy is in effect. The construction of high Code level homes does not, therefore, deliver any net benefit in terms of energy demand or CO_2 reduction relative to the baseline of construction to zero carbon homes policy (the balance of how CO_2 reduction is delivered between demand reduction, renewable energy generation and between the traded and non-traded sectors may change as a result of the difference between onsite delivery of CO_2 reduction or delivery via allowable solutions investments). Meeting the mandatory CO_2 reduction requirements of Code level 5 and 6 will result in an additional cost associated with the Code, as delivering deep onsite CO_2 reduction is more expensive than delivering CO_2 reduction through allowable solutions (at least at an assumed allowable solutions price of £75/tonne CO_2).

64. Construction of Code level 5 and 6 homes also results in higher costs associated with the non-energy categories of the Code. The breakdown of the increase in construction costs in the higher case uptake scenario between the Code categories is shown in the chart below

(for the combined social and private sectors). The central case expenditure is also shown for comparison.

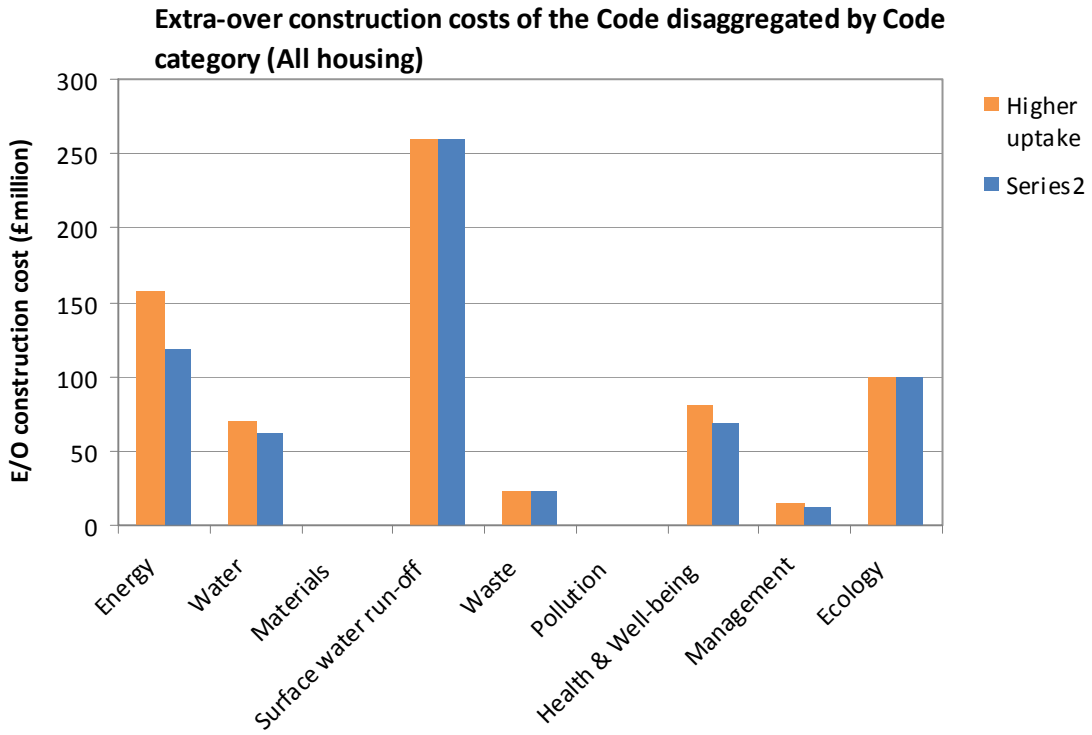

Figure 6: Disaggregation of Code costs between categories in the reference case. Comparison between central and higher uptake cases.

65. Under the assumption that a significant number of Code level 5 and 6 homes will be constructed, the Code categories that are expected to attract major additional investment are Energy, Water, Health and Well-being and, to a lesser extent, Management.

66. The increased expenditure on water saving measures is related to the mandatory requirement at Code levels 5 and 6 to limit water consumption to 80 l/p/day. To achieve this, it is assumed that either a rainwater harvesting or grey-water recycling system will be required.

67. The expenditure on the Health and Well-being category has increased by around £20m as a result of the build of higher level Code homes. Partially this relates to higher standards being achieved with regards to the daylighting and sound insulation issues, but a substantial part of this additional cost, around £13m, is due to the uptake of Lifetime Homes standards in higher Code level homes.

68. The benefits of Lifetime Homes include reduced costs for home adaptations as the needs of the occupants change, reduced requirement for residential care and for home visits. The assumptions around estimates of the benefits of Lifetime Homes are discussed in more detail in the section on Policy G (see paragraph142). Based on the forecast increase in the number of homes built to Lifetime Homes standards in the higher uptake scenario of the reference case, the benefits delivered have been estimated at £12m, very closely matching the additional cost of building to Lifetime Homes standards.

69. The investment in tackling issues under the Management category has increased by around £3m as a result of the increased uptake of higher Code level homes in this scenario. The majority of this additional cost is a result of increased adoption of Secured by Design standards.

70. Incorporating improved security features in homes delivers clear financial benefits, related to the reduction in the burglary rate. These include the value of lost and damaged property, insurance costs, policy time, criminal justice system costs and cost of providing support to victims. The assumptions behind estimates of the financial benefits of Secured by Design are discussed in the section on Policy E (see paragraph127). The benefits of increased Secured by Design uptake in the higher level scenario of the reference case have been estimated at £10m, more than compensating the additional expenditure on the issue.

4: Costs and benefits of policy options/packages

Policy option A: Reallocation of credits from Ene1 to Ene2

71. Policy A involves removal of five credits from the Dwelling Emissions Rate issue (Ene1) and reallocation to the Fabric Energy Efficiency issue (Ene2). This is in response to the introduction of Part L 2010 and will mean that no credits are awarded under Ene1 for simply achieving the CO_2 emissions reduction required by the Building Regulations whilst Part L 2010 is in force.
72. The intention of reallocating the credits to Ene2 is to create a greater incentive for prioritising improvements to the fabric of homes as a means of meeting the CO_2 reduction standard, before low carbon generation technologies are introduced.
73. Policy A also involves changing the metric used to measure fabric performance under Ene2 from heat loss parameter (HLP) to the fabric energy efficiency standard (FEES - a measure of the energy demand on a floor area basis, kWh/m^2, for space heating and cooling). A mandatory FEES is introduced at Code levels 5 and 6, which reflects the energy efficiency backstop level expected as part of zero carbon homes policy. The allocation of credits under Ene2 as a function of the FEES standard achieved is shown in the table below.

Table 9: Fabric Energy Efficiency Standards and related credits under the revised Ene2 issue

Criteria				
Dwelling Type		**Proposed Credits****	**Preferred credits****	**Mandatory Levels**
Apartment Blocks, Mid-Terrace	**End Terrace, Semi-Detached % Detached**			
Fabric Energy Efficiency kWh/m^2/year				
≤ 48	≤ 60	1	3	
≤ 45	≤ 55	2	4	
≤ 43	≤ 52	3	5	
≤ 41	≤ 49	4	6	
≤ 39	≤ 46	5	7	**Levels 5 & 6**
≤ 35	≤ 42	6	8	
≤ 32	≤ 38	7	9	
Default Cases None				

** Credits are awarded on a sliding scale. The scale is based on increments of 0.1 credits, distributed equally between the benchmarks defined in this table.

74. A modification under Policy A is the introduction of a sliding scale of credits under Ene1, rather than discrete steps linked to certain DER/TER targets as in the current Code. The sliding scale means that fractions of credits are awarded for achieving DER/TER reductions

that are between the target levels in the current Code. The sliding scale of credits awarded for Ene1 under Policy A is shown in the table below.

75. Under Policy A, a particular energy solution is likely to gain fewer credits under Ene1 and Ene2 combined than is the case under the current Code (i.e. in the reference case). This is particularly the case for energy solutions aimed at meeting Code level 4 or below (at Code level 5 and, 6 a high specification fabric will be required to meet the mandatory FEES level).

76. The intention of the policy is that home builders will improve the fabric standard, in order to recoup the credits that have been lost from the energy category as a result of the policy.

77. The response of home builders to Policy A has been forecast on the assumption that they will take the least cost approach to achieving a particular Code level. This analysis suggests that there are lower cost alternatives to gaining credits lost as a result of Policy A than improving the fabric standard of the home.

78. The overall result of the policy, therefore, is to increase the cost of constructing to the Code (as recouping credits requires investment in other measures), but without driving improvements to the fabric standards in Code homes (at least up to level 4, the mandatory FEES will ensure that a high fabric standard is adopted at Code level 5). The results of this analysis are shown in the table below:

Table 10: Costs and benefits under Policy A relative to the reference case

Costs and benefits: Policy A relative to the reference case		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	6	20
Maintenance costs	0	0
Administration costs	6	6
Present value of costs	***12***	***26***

Benefits		
Reduced energy consumption	0.3	0.6
Reduced water consumption	0.0	0.0
CO_2 emissions saving - Traded	-0.1	-0.1
CO_2 emissions saving - Non-traded	0.9	1.0
Present value of benefits	***1.0***	***1.5***

NPV (excluding avoided renewables)	**-11**	**-24**
Avoided renewables	0	-1
NPV (including avoided renewables)	**-11**	**-25**

79. As shown in the table, the additional cost incurred under Policy A is not necessarily related to an improvement in the energy efficiency standard and the energy and CO_2 benefits are therefore fairly marginal.

80. The potential impact of Policy A has also been assessed under an alternative assumption for the response of home-builders. In this case it is assumed that they seek to maintain the combined number of credits gained under Ene1 and Ene2 by improving the FEES of the homes they build.

81. The policy results under this alternative assumption are shown in the table below:

Table 11: Costs and benefits of Policy A under an assumption that house-builders favour fabric efficiency improvements to recoup credits lost as a result of reallocation of credits from Ene1 to Ene2.

Costs and benefits: Policy A relative to the reference case		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	51	67
Maintenance costs	0	0
Administration costs	6	6
Present value of costs	***57***	***73***
Benefits		
Reduced energy consumption	5.5	5.8
Reduced water consumption	0.0	0.0
CO_2 emissions saving - Traded	-0.3	-0.3
CO_2 emissions saving - Non-traded	5.2	5.3
Present value of benefits	***10.4***	***10.9***
NPV (excluding avoided renewables)	**-46**	**-62**
Avoided renewables	1	1
NPV (including avoided renewables)	**-45**	**-61**

82. In this case, the increase in construction cost is larger as improving the fabric standard is not the most cost-effective means of recouping credits. The shift to improved fabric specifications delivers greater benefit from reduced energy consumption and CO_2 emissions saving in the non-traded sector. Overall the benefits do not balance the increased construction cost and as a result, the overall net present value of the policy change has worsened.

83. Home-builders are likely to seek to *'just'* achieve the mandatory CO_2 emissions standard at any particular Code level. Assuming that Policy A does drive builders toward improved fabric standards, this is likely to be compensated by a reduction in low carbon generation capacity installed, such that the CO_2 reduction target is still *just* met. The overall benefit of the policy, in terms of energy and CO_2 reduction, is therefore likely to be limited. The benefits that do accrue are likely to be a result of the longevity of improved building fabric as a carbon reduction measure, compared to the lifetimes of low carbon generation technologies.

Learning benefits associated with introduction of the FEES into Ene2

84. The zero carbon homes policy will require a minimum level of fabric energy efficiency (FEES) of 39 and 46 kWh/m^2/year that must be met in order to comply, based on the recommendations of the Zero Carbon Hub[7]. This is being introduced as a minimum requirement at Code levels 5 and 6 (see Table 9).

85. In the same way that the Code is expected to generate a learning benefit with respect to the introduction of higher carbon compliance levels through Part L, it would be expected that the introduction of FEES into the Code will result in learning prior to the introduction of zero carbon homes and the energy efficiency backstop.

86. The same illustrative assumption on the scale of the learning effect has been made as under the reference case, i.e. a 2 per cent cost reduction for two years after the introduction of a mandatory FEES through regulation is attributable to the Code.

87. Based on these assumptions and extra-over costs for achieving a FEES of 39/46 kWh/m^2/yr, the learning benefit from Policy A has been estimated at around £7m. In the absence of clear evidence of the extent of the learning effect, this illustrative analysis of learning benefits has not been included in the total policy benefits reported in this impact assessment.

Sensitivity of Policy A to the higher scenario for private sector uptake [for information only]

88. Two scenarios have been defined for Code uptake in the private sector – a conservative assumption that there is no significant build of Code homes to levels above level 4 and an assumption that a limited but significant number of Code level 5 and 6 homes are delivered post-2016.

89. Policy A introduces a mandatory FEES that must be achieved at Code levels 5 and 6, which is consistent with the energy efficiency backstop level expected to be introduced as part of the zero carbon homes definition.

90. The costs and benefits related to Policy A are shown in the table below under the assumption of higher level uptake in the private sector.

[7] 'Defining a fabric energy efficiency standard', Zero Carbon Hub, November 2009

Table 12: Costs and benefits in Policy A assuming the higher case uptake scenario

Costs and benefits: Policy A relative to the reference case under higher case uptake assumption		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	6	55
Maintenance costs	0	0
Administration costs	6	6
Present value of costs	***12***	***61***
Benefits		
Reduced energy consumption	0	-4
Reduced water consumption	0	0
CO_2 emissions saving - Traded	0	0
CO_2 emissions saving - Non-traded	1	-2
Present value of benefits	***1***	***-6***
NPV (excluding avoided renewables)	**-11**	**-67**
Avoided renewables	0	11
NPV (including avoided renewables)	**-11**	**-56**

Policy option A – Addition of further credits to Ene2

91. Concern has been raised that Policy A as described above will result in fewer credits being awarded under the heavily weighted energy category and, as a result, increase the cost burden on developers and the public funding agencies.

92. The analysis presented above suggests that rather than improving the fabric standard in order to recoup the credits under Ene2, the lower cost approach would be to replace the lost credits by addressing other issues. The cost increase associated with policy option A is greater in the case that it is assumed that developers adopt higher fabric standards in order to maintain the number of credits gained under Ene1 and Ene2 overall.

93. A further amendment to Ene2 could be considered to equalise the number of credits gained under Policy A as gained under the reference case for a given energy solution. The simplest means of achieving this would be to add credits to Ene2, such that more credits are obtained for achieving the lower level FEES.

94. The impact of Policy A in the case that two additional credits are awarded under Ene2 (resulting in a maximum of nine credits being available) has been assessed and is the preferred options. The policy assessment has again been carried out under two assumptions for the response of home-builders – (i) a least cost approach and (ii) an assumption that a higher fabric standard is achieved.

Table 13: Cost benefit results for the preferred Policy A, in which two additional credits are made available under Ene2

Costs and benefits: Policy A, including addition of 2 further credits to Ene2, relative to the reference case	Least cost approach		Improved fabric	
	Social housing	All housing	Social housing	All housing
Policy costs	**(£million)**	**(£million)**	**(£million)**	**(£million)**
Construction costs	-6	-11	47	45
Maintenance costs	0	0	0	0
Administration costs	6	6	6	6
Present value of costs	***0***	***-5***	***53***	***50***
Benefits	0	0	0	0
Reduced energy consumption	0	0	5	6
Reduced water consumption	0	0	0	0
CO_2 emissions saving - traded	0	0	0	0
CO_2 emissions saving - Non-traded	1	1	5	5
Present value of benefits	***1***	***1***	***10***	***10***
NPV (excluding avoided renewables)	**0**	**6**	**-42**	**-40**
Avoided renewables	0	0	1	1
NPV (including avoided renewables)	**0**	**6**	**-42**	**-39**

95. The addition of two credits to Ene2 results in a reduction in Code construction costs, assuming a least cost approach to building the Code is taken. The other benefits are very marginal, as no significant changes in approach compared to the reference case is engendered in this case.

96. The incentive for house-builders to move to a higher fabric standard will be weaker in the case that additional credits are added to Ene2, as the additional credits will compensate any loss of credits without requiring a change in approach.

97. As shown in the table above, a substantial overall cost increase is still expected to result if a higher fabric standard is taken up. This cost increase falls within the social housing sector, suggesting that it is related to the build of Code level 4 homes in advance of the expected revision of Part L in 2013.

98. The improvement of fabric standard at Code level 4 would be balanced by a reduction in capacity of low carbon generation required. There are, however, certain fixed costs associated with the installation of renewables, such as PV, which means that the costs do not scale proportionally with installed capacity. As a result, the overall costs increase as the fabric package is improved.

99. It may be possible to achieve Code level 4 without requiring renewables. This would require a very high level of fabric efficiency and is likely to necessitate a Mechanical Ventilation and Heat Recovery system and so would be a relatively high cost solution (although would score highly under Ene2, particularly in the case that two additional credits are awarded under the issue).

100. Overall, the addition of two credits to Ene2 is expected to neutralise any cost increase associated with shifting credits from Ene1 to Ene2 and may result in a cost reduction. The addition of credits may weaken the incentive for developers to improve the fabric standard,

although the cost modelling suggests that developers may seek to recoup credits lost under policy A by targeting other credits, rather than improving the fabric standard.

101. Policy B, discussed below, involves introduction of a new issue concerning the installation of energy display devices (two credits available). Installing energy display devices is an issue that developers may be likely to take-up in order to regain any credits lost from Ene1 and Ene2 as a result of Policy A. Indeed, the modelling of the combined policy, i.e. Policy A and B together, does predict a greater uptake of energy display devices than is the case under Policy B alone. Again, the introduction of two further credits under Policy A may weaken the incentive for developers to address this new issue. Modelling of Policy A in combination with Policy B suggests, however, that strong take up of the energy display devices issue would still be expected at Code level 4.

102. The result of this analysis is that two additional credits will be added to Ene2 so that a total of nine credits are available.

Policy option B: Introduction of Energy Display Devices issue

103. Policy B involves a number of further changes to the Energy category. The most significant change is removal of the energy efficient internal lighting issue, assumed to be redundant due to market transformation and phasing out of less efficient bulbs, and creation of a new Energy Display Devices issue.

104. The new energy display issue will carry two credits, one for provision of a meter that displays real-time electricity consumption and two credits if the meter displays both real-time electricity and heating fuel consumption. As previously indicated, energy and carbon savings are calculated using the June 2010 guidance on valuation of energy use and greenhouse gas emissions for appraisal and evaluation which supplements the Green Book.[8]

105. The recent consultation document (*Sustainable new homes: The road to zero carbon*, December 2009), gathered views on a potential change to the Cycle Storage issue (Ene7) to reduce the capacity of storage required in large blocks of flats. In light of consultation responses a decision has been taken to leave the cycle storage capacity requirements unchanged, but to introduce a new requirement for cycle storage to be Secured by Design certified.

106. The costs and benefits associated with Policy B are tabulated below.

Table 14: Costs and benefits of policy option B relative to the reference case

Costs and benefits: Policy B relative to the reference case		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	24	41
Maintenance costs	0	0
Administration costs	6	6
Present value of costs	***30***	***47***

Benefits		
Reduced energy consumption	14.5	15.4
Reduced water consumption	0.0	0.0
CO_2 emissions saving - Traded	1.0	1.0
CO_2 emissions saving - Non-traded	3.3	3.5

[8] http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx)

Present value of benefits	***19***	***20***

NPV (excluding avoided renewables)	**-11**	**-27**
Avoided renewables	10	11
NPV (including avoided renewables)	**-1**	**-16**

Table 15: Cost-effectiveness of carbon saving under policy option B relative to the reference case

Cost-effectiveness of emissions reduction	Social housing	All housing
Traded sector (£/CO_2)	55	451
Non-traded sector (£/CO_2)	61	258

107. Policy B results in an increase in overall construction costs. This is because relatively inexpensive credits under the energy efficient lighting issue have been removed and replaced with credits for energy display devices that are more costly to achieve.
108. Based on the cost modelling work, significant uptake of the Energy Display Devices credits is expected at Code Level 4. This would suggest that other lower cost credits are being taken up to replace the Energy Efficient Lighting credits at lower Code levels.
109. The major benefit delivered under this policy is expected to be a reduction of energy consumption due to better information provided to occupants on their usage. This is difficult to predict as it is a behavioural issue, rather than a fabric or system efficiency improvement, which can be more readily quantified. The monetised energy savings, CO_2 emissions savings and value of avoided renewables tabulated above are based on forecasts of the impact of smart meters on occupant energy consumption reported in the DECC consultation on smart meter roll-out (Energy Metering: *A consultation on smart metering for electricity and gas*, DECC, December 2009).
110. Given the plans being developed within government for a mandatory roll-out of smart meters, it is arguable whether the costs and benefits of energy display devices should be included in the analysis of the Code for the whole period of the policy assessment (i.e. to 2020). In the absence of a defined schedule for smart-metering roll-out, however, all costs and benefits have been included in the assessment.
111. Improved security of cycle storage will also deliver benefits in terms of a reduction of theft and an increase in the usage of the cycle stores, as occupants feel more confident that their bikes are secure.

Policy package C: Package of amendments to the Energy category

112. The proposed changes to the Energy category of the Code are combined in Policy C.
113. The complete set of amendments modelled in this policy are as follows:

- Introduce the Fabric Energy Efficiency Standard (FEES) as the metric used to measure energy efficiency performance under issue Ene2, including mandatory FEES levels at Code levels 5 and 6.
- Maintain the alignment of Ene1 (the CO_2 emissions standard) with Part L standards by shifting 5 credits from Ene1 to Ene2 (such that no credits are awarded under Ene1 for simply meeting Part L 2010 standards).
- Two further credits are awarded under Ene2, to balance the effect of shifting credits from Ene1 to Ene2, i.e. a maximum of nine credits are available under Ene2. Introduce a sliding scale for awarding credits under Ene2, such that credits are available in increments of 0.1 credits (distributed evenly between the FEES benchmark intervals).
- Remove the existing Ene3 (energy efficiency lighting) issue and replace with a new issue – Energy Display Devices. Two credits are available under the new issue – one for a device to display real-time electricity consumption and a second credit if real-time heating fuel consumption is also displayed.
- Amend the cycle storage issue (ene8) to require cycle storage to be Secured by Design accredited.

114. The costs and benefits related to this combined policy relative to the reference case are shown in the table below.

Table 16: Costs and benefits of policy package C relative to the reference case

Costs and benefits: Policy C relative to the reference case		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	21	41
Maintenance costs	0	0
Administration costs	6	6
Present value of costs	***27***	***47***
Benefits		
Reduced energy consumption	16.5	17.9
Reduced water consumption	0.0	0.0
CO_2 emissions saving - Traded	0.9	1.0
CO_2 emissions saving - Non-traded	4.8	5.2
Present value of benefits	***22***	***24***
NPV (excluding avoided renewables)	**-5**	**-6**
Avoided renewables	11	12
NPV (including avoided renewables)	**6**	**-11**

Table 17: Cost-effectiveness of CO_2 saved under policy package C relative to the reference case

Cost-effectiveness of emissions reduction	**Social housing**	**All housing**

Traded sector (£/CO_2)	-156	355
Non-traded sector (£/CO_2)	-11	150

115. The value of energy and CO_2 saving in Policy C is greater than the sum of these savings in Policy A and B when assessed separately, due to interactions between the policies. The uptake of Energy Display Devices is expected to be more widespread at Code level 4 than in the case of Policy B alone.

116. Overall Policy C is expected to result in a small negative net present value when both sectors of the housing market are considered (in the central case scenario for uptake of the Code). When public sector housing is considered in isolation, the combination of revisions to the energy category of the Code is expected to deliver a small net benefit.

Policy option D: Changes to the Waste category

117. The main revision included under policy option D concerns the Site Waste Management issue of the Code (Was2). A collection of other minor revisions regarding accessibility of waste bins and the terminology used in relation to inclusive design issues are also included under this policy option.

118. The terminology changes from 'wheelchair users' to 'inclusive design' under this policy option have no monetised impact. Introducing a single consistent approach to inclusive design throughout the Code (e.g. under Was1, Was3, and Hea3) may lead to better understanding and a reduced administrative burden in achieving compliance. However, it has not been possible to quantify this benefit in this impact assessment.

119. By introducing a more consistent approach to inclusive design and removing duplicated requirements (such as the requisite distance of bins from external doors and a mandatory site waste management plan (SWMP)), this policy option helps to streamline the Code.

120. This policy removes the mandatory requirement for production of a SWMP and instead makes one flexible credit available for producing a plan. Two further credits are then available for diverting either 50 per cent (1 credit) or 85 per cent (2 credits) of construction waste from landfill.

121. The consultation with home-builders has revealed that generally these credits are expected to be achieved by continuing with existing practices. On this basis there are no significant costs and benefits associated with this policy revision.

Policy option E: Standardise the security standard under the management category to encourage provision of windows and doors that meet a minimum security standard.

122. This policy option assesses the impacts of revising the Security issue (Man4), such that a credit is available for providing doors and windows that meet a minimum security standard. Once these minimum secure elements have been provided, a further credit will then be available for consulting with an architectural liaison officer (ALO) or crime prevention design advisor (CPDA), following their advice and ensuring that the development complies with the requirements set out in Section 2 – Physical Security from Secured by Design – New Homes.

123. Some consideration has been given to the option of making the minimum security standard for doors and windows a mandatory issue at all Code levels. At the current time, however, the preferred approach is for this to remain as a flexible issue at all Code levels.

124. Note that the Homes and Communities Agency specify that all publicly-funded homes should meet Level 3 of the Code (and it has been assumed in this Impact Assessment that this will

advance to Level 4 from 2011) and that all credits under the Security issue should be gained. All publicly-funded homes would, in this case be required to meet minimum door and window standards and comply with the remaining aspects of Secured by Design (in line with the guidance of the ALO or CPDA). This is consistent with DCLG's current statistics on the Code, which confirm that 90 per cent of Code homes built to-date or at design stage assessment have gained or are targeting the credits under Man4: Security. The implication of this is that Policy E will not have any impact on the social housing sector.

125. The consultation with home-builders has confirmed that meeting the physical aspects of Secured by Design, as currently required by the Code in order to obtain two credits under the Man4 issue, is considered one of the more expensive elements of the Code. A cost of £500 per dwelling was commonly quoted. The intention of this policy is that by effectively splitting the credits under this issue, there will be greater incentive to provide doors and windows of minimum security standard (gaining a single credit) even if the full requirements of the physical aspects of secure by design are not met.

126. Following consultation with home-builders, the extra-over cost of providing doors and windows that meet minimum security standards has been put at £100 to £200 per unit, depending on the number of ground floor doors and windows. At this cost, points under the Man4 issue are still relatively expensive to achieve. Assuming home-builders take the least cost approach to meeting the Code, only very limited uptake of the single credit under a revised Man4 would be expected at Code level 4 (no uptake at lower Code levels). Home-builders targeting Code level 5 would be expected to target at least one credit for Man4 in the majority of development scenarios and at Code level 6, both credits under Man4 are expected to be sought in the majority of cases.

Benefits of increased security standards

127. Significant financial savings are expected to be derived from the adoption of improved security standards in Code homes. The Home Office estimates that domestic burglary costs the UK economy £ 2.9bn per year, based on a social and economic cost of the average burglary of £3,300 (note that this is based on 2005 prices. In order to mitigate the risk of overstating the benefits, we have made a cautious assumption that this is the cost of a burglary in 2010 prices).

Table 18: Estimates of the social and economic costs of domestic burglary (taken from the ABI report *Securing the Nation: The case for safer homes*)

Type of Cost	Item	Cost per burglary
Cost in anticipation	Defensive expenditure	221
	Insurance administration	177
Cost as a consequence	Physical and emotional impact	646
	Value of property stolen	846
	Property damaged /destroyed	187
	Victim services	11
	Lost output	64
Costs in response	Criminal justice costs	1,137
Less	Property recovered	22
Average Cost		**3,267**

128. The benefit to the economy of improving security in new housing has been estimated based on the following assumptions:

- A 2 per cent burglary rate across the whole domestic stock. This corresponds to around 450,000 to 600,000 domestic burglaries per year, which is consistent with recent crime figures (based on number of domestic burglaries with entry).
- A reduction of the burglary rate in those homes that are fitted with improved security features of 50 per cent (with an upper case assumption of 75 per cent).
- Fifty per cent of this reduction is assumed to be due to a reduction of opportunist burglaries and therefore a genuine reduction in overall burglary. The remaining drop in burglaries in SBD homes is assumed to be displaced to non-SBD homes, so does not represent an overall saving. An upper bound estimate that only 25 per cent of burglaries are displaced has been assessed.
- Cost of an average burglary of £3,300.

129. Due to the relatively high costs associated with the Man4 issue (compared to the cost of gaining points under alternative issues), the cost modelling suggests there will be little uptake of Secured by Design features (even the reduced requirement for minimum doors and windows standards) at Code level 4. As a result, the costs and benefits related to Policy E under the central case for private sector Code uptake are very limited.

130. Under the central case for Code uptake, the costs associated with Policy E in the private sector are an increase of around £2m. The benefit from reduced burglaries is in the range of £500k to £1.1m, depending on the assumptions regarding the efficacy of SBD features at deterring burglars and the rate of displacement to other homes in the stock. Note that these costs and benefits are based on only around 2,200 private sector Code homes being affected by the policy.

131. Under the higher case for Code uptake, the benefits from reduced burglaries in Code homes have been estimated at £3.1m to £7m, depending on assumptions regarding deterrent and displacement rates. This benefit is based on a forecast of around 16,000 additional Code homes delivered with Secured by Design features incorporated. The additional cost of the policy in the private market housing sector has been estimated at £5m.

132. The cost-benefit results for Policy E are summarised in the table below. Note that all costs and benefits of the policy are delivered in the private market sector. The benefits are based on estimated societal costs of burglary, based in 2005 prices. A correction for 2010 prices would increase the benefits somewhat (around 10 – 15 per cent uplift).

Table 19: Costs and benefits resulting from changes to the security issue of the Management category, relative to the reference case.

	central case uptake	higher case uptake
Change in construction costs	£2 m	£5 m
Benefit of SBD features (reduced burglary)	£ 0.8 m	£3 m to £7 m
NPV of Policy E	-£1m	-£2 m to +£2 m

Policy F: Alterations to the technical requirements for mitigation of surface water run-off (Sur1)

133. The existing Code contains a mandatory requirement under Sur1 (at all levels of the Code), that the volume of rainwater discharge caused by the new development should be mitigated by way of infiltration or by making rainwater available for non-potable uses within the dwellings.

134. Home-builders have argued that to meet the mandatory requirements on sites built on impermeable ground, where mitigation through infiltration alone is not feasible, compliance with this mandatory requirement has necessitated installation of a rainwater harvesting system, at significant additional cost.

135. An amendment to the mandatory aspect of Sur1 is proposed that is intended to remove the necessity for rainwater harvesting on sites that do not facilitate mitigation by means of infiltration alone. It is also proposed that an additional criterion will be added to the mandatory requirement – 'Design for system failure' – ensuring that the property will not flood in the event of failure of the local drainage system.

136. An amendment to the tradable credits for improvement of water quality is also proposed, to make one credit available for prevention of discharge from the developed site for rainfall depths up to 5mm and a further credit available for ensuring that run-off from all hard surfaces receives either one or two levels of treatment before being discharged from the site (depending on whether the run-off is at risk of pollution).

137. The implications of this policy, in terms of overall cost and benefits, are difficult to quantify as its impact will be dependent on the nature of individual sites.

138. It has been assumed in the reference case that 30 per cent of all sites are unsuitable for mitigation of rainwater discharge by infiltration, requiring rainwater harvesting systems to be installed. The costs associated with these rainwater harvestings systems amount to £210m across all Code homes built during the policy lifetime, this is split evenly between the social and private sector (assuming an equal number of homes are built in each sector under the central case). These costs are included in the reference case costs shown in Table 5.

139. Note that the cost reduction (or benefit) associated with Policy F does not equate to the avoided cost of rainwater harvesting systems. Other solutions will still be required to meet the mandatory peak and volume rate of discharge requirements of the mandatory element of Sur1 on these sites and, given that infiltration is not a suitable option, some form of SUDs system is likely to be required.

140. Based on substitution of rainwater harvesting systems with more basic SUDs systems, the benefit of reduced construction costs associated with Policy F have been estimated to range from £75m to £150m for the whole of the market, equating to £37.5m to £75m in each sector (best estimate of £ 112m overall). The estimated reductions of construction cost are tabulated below.

Table 20: Estimated range of construction cost impact related to changes to the mandatory requirement of the Surface Water Run-off issue.

Reduced construction cost	Social housing	All housing
Lower estimate	£ 37.4m	£ 74.8m
Upper estimate	£ 74.8m	£149.6m
Mid-range	**£ 56.1m**	**£ 112.2m**

141. It should also be noted that the implications of the 'Design for System Failure' criterion have not been included. Based on the recent consultation, home-builders do not yet have a clear understanding of the costs that are likely to be incurred in meeting the requirement of this new criterion. Again, this is likely to be a site specific cost.

Policy G: Exemptions to Lifetime Homes requirements for steeply sloping sites

142. The Lifetime Homes standard is intended to provide a template for the construction of homes that are more suitable for the elderly, those with disabilities and those with young children. Lifetime Homes incorporate 16 design features that improve the accessibility of the home and its future adaptability to cope with changing needs of the household, such as old age, frailty, a short or long-term disability or a debilitating illness. A number of these features have been adopted as minimum standards in Part M of the Building Regulations.
143. Among the Lifetime Homes design features are a number of requirements for provision of level access routes to the entrance of the home. A number of home-builders have raised an issue with the feasibility and costs associated with achieving Lifetimes Homes standards for dwellings on plots with a steeply sloping topography, due to the requirements for level external access routes.
144. In response to these concerns, it is proposed that an exemption from the design criteria relating to external access will be permitted for dwellings on plots that are steeply sloping. The proposal is that an exemption to Design Criteria 2 (Access from car parking) and 3 (approach gradients) will apply for dwellings on plots with sloping topography that predominantly exceeds 1:12, as long as accessible steps are installed. For these dwellings, a maximum of three credits will be available under Hea4 for complying with all other Lifetime Homes criteria (rather than the four credits normally awarded for complying with this issue).
145. The cost modelling suggests that due to relatively high costs associated with achieving Lifetime Homes standards, home-builders are unlikely to tackle the issue at Code levels below Level 5.
146. Based on DCLG statistics, however, around one third of Code homes completed to-date have been constructed to Lifetime Homes standards (which means that significant numbers of Code level 3 and 4 homes have been built to Lifetime Homes). This is likely to be because these homes have been built in the social sector, where Lifetime Homes has been demanded by the housing association, rather than specifically as a result of building to the Code.
147. Lifetime Homes credits will be more difficult and costly to achieve on sites with steep gradients than on sites that are more level. In certain cases, the costs of meeting the external access requirements will be prohibitive and it will not be feasible to achieve Lifetime Homes at all. On these sites, it would be impossible to achieve Code Level 6, as Lifetime Homes is a mandatory requirement, and more costly to achieve Code level 5, as alternatives to Lifetime Homes credits would need to be found. Based on the cost modelling work, Lifetime Homes credits are not expected to be targeted by the majority of home-builders when building to Code level 4, hence a sloping site topography would not be expected to have a significant impact on Code level 4 build costs.
148. Assuming that Lifetime Homes cannot be achieved on a particular site, the increase in the cost of complying with Code Level 5 has been estimated to range from around £300 to £900 per dwelling, depending on the dwelling type and development scenario. The additional costs relate to replacement of Lifetime Homes credits with other high cost credits such as those under Man4 'Security' and Ene8 'Cycle storage' (the costs of these issues are offset by the reduction in cost under Hea4).

149. Under Policy G, the cost of meeting Lifetime Homes standard on a steeply sloping plot becomes approximately equivalent to the cost of achieving the internal criteria for more typical plots (plus an allowance for providing appropriate access steps). An additional cost may be incurred in achieving a particular Code level, as one fewer credit is awarded under Hea4. The chart below compares the cost of achieving Code Level 5 on a typical site, on a steeply sloping site (where Lifetime Homes cannot be achieved) and on a steeply sloping site under Policy G.

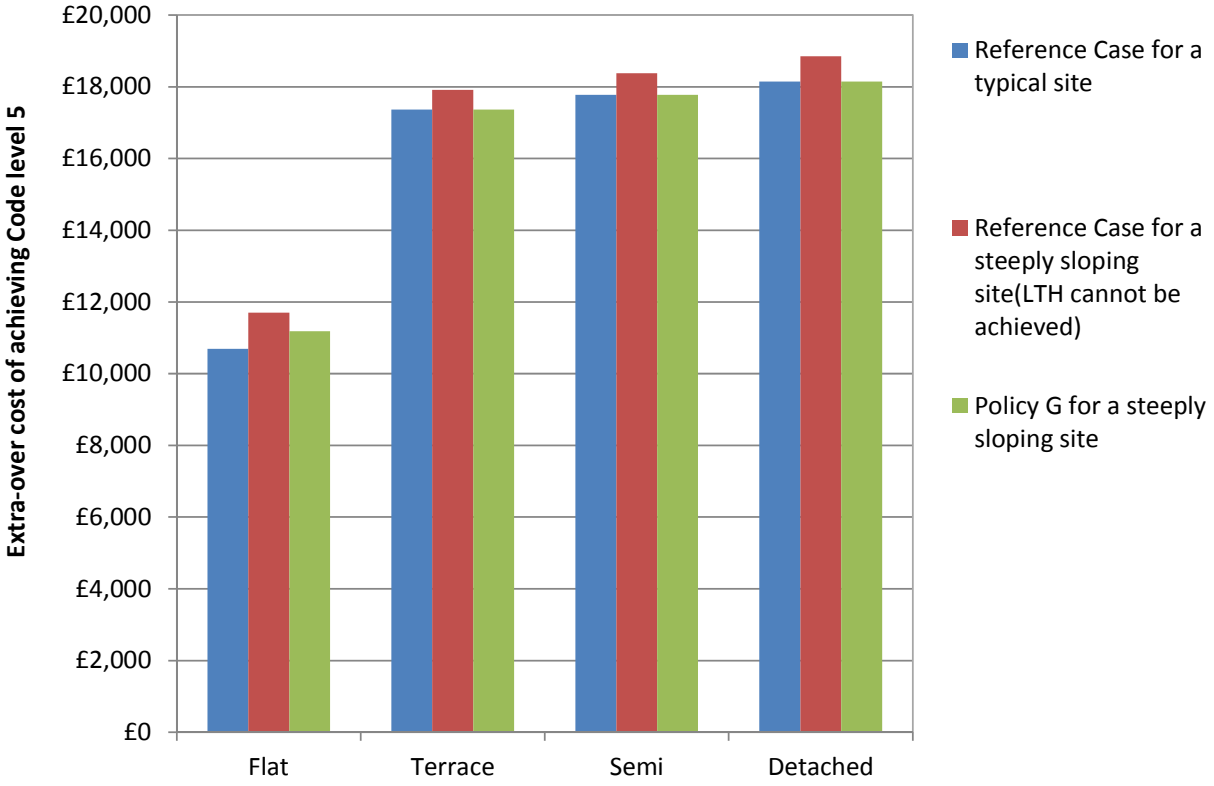

Figure 7: Comparison of typical extra-over costs to achieve Code level 5 on typical and steeply sloping sites, under the reference case and Policy G.

Benefits of increased Lifetime Homes uptake

150. Living in a Lifetime Home will improve the quality of life of the occupant should their needs change. They may be able to stay in their homes longer as they grow older and become frail, they may require less assistance or care from family members or professionals, the home should be more easily adapted to suit the needs of an occupant who incurs a disability or becomes ill. These benefits to the individuals translate into wider benefits to society, many of which can be quantified as financial savings.

151. The UK spends in excess of £ 350m each year on adapting homes for use by elderly and disabled, around 60 per cent of which is provided from public funds. This includes the funding provided by the government through the Disabled Facilities Grant, the costs incurred by housing associations, which in most cases are fully responsible for funding necessary adaptations in the homes of their tenants, and the costs incurred by the public in adapting their own homes. One of the most detailed studies into the financial benefits of building homes to Lifetime Homes standards was provided by Pieda in 1997. This analysis attempted to quantify the benefits of building all new housing from 1996 to 2026 to Lifetime Homes standards over the 60-year life of the dwellings. The cost-benefit analysis of Lifetime Homes for this impact assessment has been based on this work, up-dated to

account for the new housing projections and looking at housing constructed over the lifetime of interest of the current policy option (2010 to 2020).

152. The cost-benefit assessment has sought to quantify the financial saving derived from the following benefits of Lifetime Homes:

- **Reduced cost of adaptations** – According to the Pieda study the cost of adapting a Lifetime Home for use by a disabled person is on average approximately £1,500 (at today's prices) less than the cost of adapting a home built to current standards.
- **Delayed move to residential care** – Construction to Lifetime Homes standards should make it easier for the elderly or disabled to continue living in their own homes. For the purposes of this analysis, it has been assumed that a move to residential care will eventually become necessary. The saving is based on an average delay of one year.
- **Reduced need for temporary residential care** – Temporary residential care may be necessary due to a short-term disability or illness. Construction to Lifetime Homes standards should enable more people to stay in their homes during such periods.
- **Reduced need for home care** – The features of Lifetime Homes should enable occupants to be more independent in their own homes, reducing the need for assistance and supervision.

153. The financial savings attributed to each of these benefits are shown in Table 21. The savings are shown per dwelling, based on an assumption of the number of dwellings that will need an adaptation or number of tenants that are likely to require assistance over the lifetime of the dwellings (assumed to be 50 years). The savings tabulated are undiscounted, however in calculating the overall benefit of building to Lifetime Homes, it must be recognised that these savings accrue over the whole lifetimes of the homes (see Annex 2 for a detailed description of the assumptions made in generating these benefits).

Table 21: Quantified society benefits from building homes to Lifetime Homes standards

Cost savings associated with building new houses over the period from 2009 to 2020 to Lifetime Homes standards (savings accrue over 50-year lifetime of a home		
Nature of saving	Undiscounted saving/dwelling £	
	Private	Social
Adaptations for elderly or disabled	290	580
Delayed move to residential care	682	
Reduced need for temporary residential care	102	
Reduced need for home care	214	
Total quantified saving:	**1288**	**1579**

Costs and benefits associated with the policy

154. In order to assess the overall costs and benefits of this policy requires an estimation of how many additional homes will be built to Lifetime Homes standards as a result and the costs that will be incurred compared to the reference case.

155. Given the highly site specific nature of the problem that this policy seeks to address, the effect it will have on how many Code homes are built at each level and how many of those will incorporate Lifetime Homes standards is difficult to forecast.

156. The cost modelling work suggests that home-builders building to Code level 4 (or below) would not seek to achieve Lifetime Homes standards, as there are more cost effective routes to meeting the Code points target. At Code level 5, however, it is expected that for

a majority of dwelling types and development scenarios, home-builders will seek to achieve Lifetime Homes standards. Lifetime Homes is mandatory at Code level 6.

157. On this basis, Policy G will only have an impact on those builders that are seeking to achieve the highest levels of the Code and are developing plots on steep gradients.

158. To attempt to monetise the policy impact, a number of assumptions are required, as follows:

- Assume that 20 per cent of sites are of a gradient that would qualify for an exemption under Policy G.
- Further assume that builders would not seek to achieve Lifetime Homes standards on these sites in the reference case.
- In the higher case Code uptake scenario, 4 per cent of Code homes are built to level 5 and 4 per cent to level 6. As Code Level 6 cannot be achieved on these sites, we assume that a proportion are developed to Code level 5 instead and that a proportion of builders decide to build to Code level 4, deterred by the higher costs of achieving Code level 5 on sites where Lifetime Homes is not practical.
- This results in an overall assumption that 6 per cent of Code homes on the steeply sloping sites get built to Code level 5.

  On this basis, Policy G acts on only a very small fraction of the total number of Code homes built and therefore the costs and benefits are likely to be small. Under the assumptions on Code uptake used in this impact assessment, all costs and benefits will be related to the private market Code homes, as no Code level 5 homes are assumed to be built in the social sector.

159. Based on the assumptions above, the number of additional lifetime homes to be constructed as a result of Policy G is around 5,000. The costs and benefits are presented below:

Table 22: Costs and benefits associated with exemption from the external access requirements of lifetime homes on steeply sloping plots.

Change in construction cost	-£ 0.5 m
Benefits from additional Lifetime Homes	£1.5 m
NPV of policy	£2 m

160. Policy G is expected to result in a small decrease in the Code construction costs, as Code level 5 is less costly to achieve given the availability of Lifetime Homes credits (Hea4). The benefits derived amount to around £325 per additional home built to Lifetime Homes standards (benefits are spread over the lifetime of the home and discounted at 3.5 per cent).

161. The limited costs and benefits derive from the assumption of how many sites are affected by the policy, i.e. how many have a sufficient gradient to trigger the exemption, and the result of the cost modelling that builders will only credit Lifetime Homes at Code levels 5 and 6.

162. To-date, a significant number of Code level 3 and 4 homes have been built to LTH standards. This is assumed to be a result of housing associations specifically requiring LTH in their specifications, rather than directly a result of a Code target. The implication of developers seeking to achieve Lifetime Home standards at Code level 3 and 4 is that Policy G may result in a larger number of additional homes being built to LTH standards at lower Code levels. No additional cost is attributed to Policy G as a result of these additional homes being built to Lifetime Homes standards, as these lower Code levels

could have been achieved on these steeply sloping sites by other means at least as cost-effectively (developers are presumably deciding to take up LTH for other commercial reasons or in response to housing association specifications).

163. It is very difficult to make a meaningful estimate of how many additional Lifetime Homes would be constructed at Code levels 3 and 4 as a result of Policy G, but assuming the build of these homes is evenly distributed across the policy lifetime, the benefit associated with each additional Lifetime Home has been estimated at £350/dwelling (based on the assumptions on Lifetime Homes benefits given in Annex 2).

Policy package H: Combination of all policy options A to G

164. All of the policy revisions assessed in this impact assessment are combined in Policy H. This is the preferred policy option.

165. The costs and benefits of the combination of revisions are tabulated below, relative to the reference case.

Table 23: Costs and benefits of policy package H relative to the reference case

Costs and benefits: Policy H relative to the reference case		
	Social housing	**All housing**
Policy costs	**(£million)**	**(£million)**
Construction costs	38	62
Maintenance costs	0	0
Administration costs	6	6
Present value of costs	***44***	***68***

Benefits		
Reduced construction cost	56.1	112
Reduced energy consumption	24	26
Reduced water consumption	0	0
CO_2 emissions saving - Traded	1	1.6
CO_2 emissions saving - Non-traded	6	6.9
Lifetime Homes benefits	6	6
Improved security benefits	5	6
Present value of benefits	***99***	***159***

NPV (excluding avoided renewables)	**55**	**91**
Avoided renewables	16	17
NPV (including avoided renewables)	**71**	**108**

166. Overall the combination of all policy revisions is expected to deliver a significant positive net present value, both in the public sector and when taken across both public and private sectors.

167. A large part of the forecast benefit is related to the revision to the mandatory surface water run-off requirements under Policy F. As discussed under Policy F, the reduced requirement for rainwater harvesting systems due to this amendment has been predicted to deliver a cost saving of around £56m in the public sector and £112m in the public and private sectors combined. It should be noted that this forecasted saving is heavily

contingent on a number of assumptions regarding the number of 'impermeable' sites (i.e. those requiring rainwater harvesting systems) and the costs of SUDs systems that would be permissible under the proposed revision (the costs of these systems are uncertain, due to the highly site specific nature of the issue). There is also uncertainty around the cost implications of the additional criterion – 'Design for system failure' – that is proposed as part of the revised mandatory part of the Sur1 issue.

168. It should further be noted, however, that the overall net benefit of the package of policy revisions is robust even given the significant uncertainty in the costs and savings related to Policy F.

169. The additional CO_2 savings delivered as a result of Policy H are not expected to be very large. The major source of CO_2 saving will be the reduction of energy consumption that results from installation of energy display devices. CO_2 reductions as a result of the Policy H are tabulated below.

170. Policy H - the preferred policy option – delivers a positive financial benefit and a reduction of CO_2 emissions.

Table 24: CO_2 reduction by budget period as a result of the preferred option for revision to the Code policy

Emissions saving		Emissions changes (ktCO2) - By budget period			Emissions changes (ktCO2) - Annual forecast												
		CB I - 2008-2012	CB II - 2013-2017	CB III - 2018-2022	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Social housing	Traded	0.6	9.6	11.3	0.0	0.1	0.5	1.1	1.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	Non-traded	2.1	13.2	14.7	0.0	0.7	1.4	1.9	2.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
All housing	Traded	0.6	10.2	12.2	0.0	0.1	0.5	1.1	1.7	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Non-traded	2.2	13.9	15.7	0.0	0.7	1.5	2.0	2.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

Summary of policy impacts

171. A table summarising the costs and benefits associated with each of the individual policy revisions and the packages of policy revisions is given below.

172. The costs and benefits in policy package H, the preferred policy, are not simply the sum of the constituent individual policies. This suggests that there are some interactions when the policy revisions are combined.

173. The cost modelling suggests that as credits become more expensive to achieve in the energy category (as a result of the combination of policies A and B), adoption of lifetime homes and secure by design credits may be favourable at earlier Code levels, i.e. as part of Code level 4 solutions (in certain dwellings and development types). The unintended effect results in an increase in the overall benefits delivered in the preferred option (Policy H) compared to the individual policies.

Table 25: Summary of costs and benefits of each policy option relative to the reference case (for both housing sectors)

Policy Option	Policy Cost (£m)	PV of benefits (£million)						NPV of costs and benefits
		Reduced construction cost	Energy & water saving	CO2 abatement - ETS	CO2 abatement - non-ETS	Avoided Renewables	Other financial benefits	
Reference case	706		101	6	0	57	see below	-542
A: Reallocation of credits from Ene1 to Ene2	5.8	11.2	0.1	-0.1	0.6	0	0	6
B: Introduction of Energy Display Devices issue	47		15.4	1	3.5	11	0	-16
C: Package of revisions to the Energy category	47		17.9	1	5.2	12	0	-11.4
D: Amendments to the waste category	No significant monetised costs and benefits attributed to this policy							
E: Introduce minimum door and window security standards in Man4	7.8		0	0	0	0	0.8	-6.8
F: Revision to the technical requirements for rainwater discharge mitigation	5.8	112.2	0	0	0	0	0	106.4
G: Exemptions from LTH external access requirements for steep sites	5.8	0.5	0	0	0	0	1.5	-3.8
H: Combination of all policy revisions	68	112.2	26	1.6	6.9	17	12	108

Note: The costs in the reference case heavily outweigh the benefits. This is due to the limitations on the range of benefits that have been monetised, which includes energy saving, water saving, CO_2 reduction and avoided renewables. There are a significant number of other benefits, which are difficult to predict and have not been monetised. These include:

- Reduced flood risk and associated damage costs
- Preservation and enhancement of the ecological value of sites
- Increased recycling
- Better social cohesion and security, reducing criminal damage and police/justice system resource costs
- Homes that provide for a healthier lifestyle, improving economic output and social integration

5: Sensitivity analysis

174. A key assumption affecting the costs and benefits reported in this Impact Assessment concerns the number of homes that will be built to Code standards. This results from a combination of assumptions on the annual new build rate, the proportion of new homes that are publicly-funded and the proportion of private market housing that is built to a Code standard. The costs and benefits will then be affected by assumptions on what Code levels the homes are built to.

175. In the main analysis of costs and benefits, the sensitivity of results to two Code uptake scenarios have been considered, which differ in terms of the assumptions regarding the Code levels that private sector Code homes are built to (but not in terms of the numbers of Code homes built). In this section, the sensitivity of the results to variations in the number of public and private sector Code completions is considered.

176. An analysis of the historical new build rate and the proportion of housing that has been publicly-funded is shown below.

Table 26: Historical new build rate in England and the proportion of the market built with public funding

Year	England completions	HCA new build	% new build that is HCA
1990/91	160,030		
1991/92	155,130	15,850	10%
1992/93	142,460	38,420	27%
1993/94	147,710	41,280	28%
1994/95	157,970	45,320	29%
1995/96	154,600	49,210	32%
1996/97	146,250	33,160	23%
1997/98	149,560	27,890	19%
1998/99	140,260	26,360	19%
1999/00	141,800	22,270	16%
2000/01	133,260	19,560	15%
2001/02	129,870	19,550	15%
2002/03	137,740	18,920	14%
2003/04	143,960	20,570	14%
2004/05	155,890	22,810	15%
2005/06	163,400	26,340	16%
2006/07	167,680	28,500	17%
2007/08	168,770	34,380	20%
2008/09	134,110	35,320	26%
2009/10	113,670	n/a	n/a

177. The central case assumption is that 20 per cent of a new build rate of 150,000 homes are publicly-funded. On the basis of the historical data, high and low assumptions for the publicly-funded segment of 25 per cent and 15 per cent have been selected. High and low bounds around the percentage of the remaining private market housing that is built to a Code level have also been assumed. These High and Low Code uptake scenarios are described in the following table.

Table 27: Code uptake scenarios considered for sensitivity analysis

Code uptake scenarios	**Low Uptake**	**central case**	**High Uptake**
Annual new build rate	100,000	150,000	200,000
Proportion of new homes publicly-funded	15%	20%	25%
Proportion of private housing built to the Code	20%	25%	30%
Average number of Code homes built per year			
Public	15,000	30,000	50,000
Private	17,000	30,000	45,000

178. The costs and benefits for each policy revision discussed in Section Four are based on the central case uptake assumption (unless otherwise stated). The sensitivity of costs and benefits in the reference case to the Low and High uptake assumptions are shown in the table below.

Table 28: Sensitivity of reference case costs and benefits to assumptions on rate of Code uptake in public and private market sectors

Sensitivity of reference case costs and benefits to uptake assumptions (£million)	**Low Uptake**		**High Uptake**	
	Social	**All**	**Social**	**All**
Present value of costs	223	370	745	1134
Present value of monetised benefits (Note 1)	67	84	225	268
NPV	**-156**	**-287**	**-520**	**-865**

Note 1: The monetised benefits tabulated above describe only the benefits derived from resource savings (energy and water) and reduction of CO_2 emissions. There are many additional benefits associated with the Code that have not been monetised, as discussed in Section Three: Non-energy related costs and benefits.

179. The sensitivity of costs and benefits of the preferred policy option, i.e. Policy Option H – package of revisions, to the uptake assumption has also been assessed. The ranges of costs and benefits defined by the low and high uptake assumptions are shown in the table below.

Table 29: Sensitivity of costs and benefits related to the preferred policy option (Policy H) to assumptions regarding Code uptake

Sensitivity of preferred Policy Option costs and benefits to uptake assumptions (£million)	Low Uptake		High Uptake	
	Social	All	Social	All
Present value of costs	25	38	69	105
Present value of monetised benefits	58	92	192	283
NPV	**33**	**54**	**122**	**178**

180. A range of net present value of £54m to £178m has been forecast to result from the preferred policy option, compared to the reference case. This range relates to an estimate of between 32,000 to 95,000 homes being built to Code standard per year over the period of the assessment (i.e. Code homes built to 2020).

Sensitivity to delayed introduction of Code level 4 in publicly-funded housing

181. All policy analysis concerning the publicly-funded sector discussed in this Impact Assessment is predicated on the assumption that the Homes and Community Agency's specification for public funding will require Code level 4 from 2011. This is not a confirmed policy commitment at present.

182. The sensitivity of costs and benefits to assumptions regarding the Code level required in the publicly-funded sector has therefore been assessed.

183. In this scenario, it is assumed that the requirement for Code level 4 for publicly-funded housing is not introduced until 2013. No further increases in the Code requirement for publicly-funded housing is assumed (note that the assumptions regarding new build and public funding rates in this scenario are the same as in the central case).

184. The costs and benefits in the reference case under the assumption of delayed introduction of Code level 4 is compared in the figure below to the central scenario of Code level 4 from 2011.

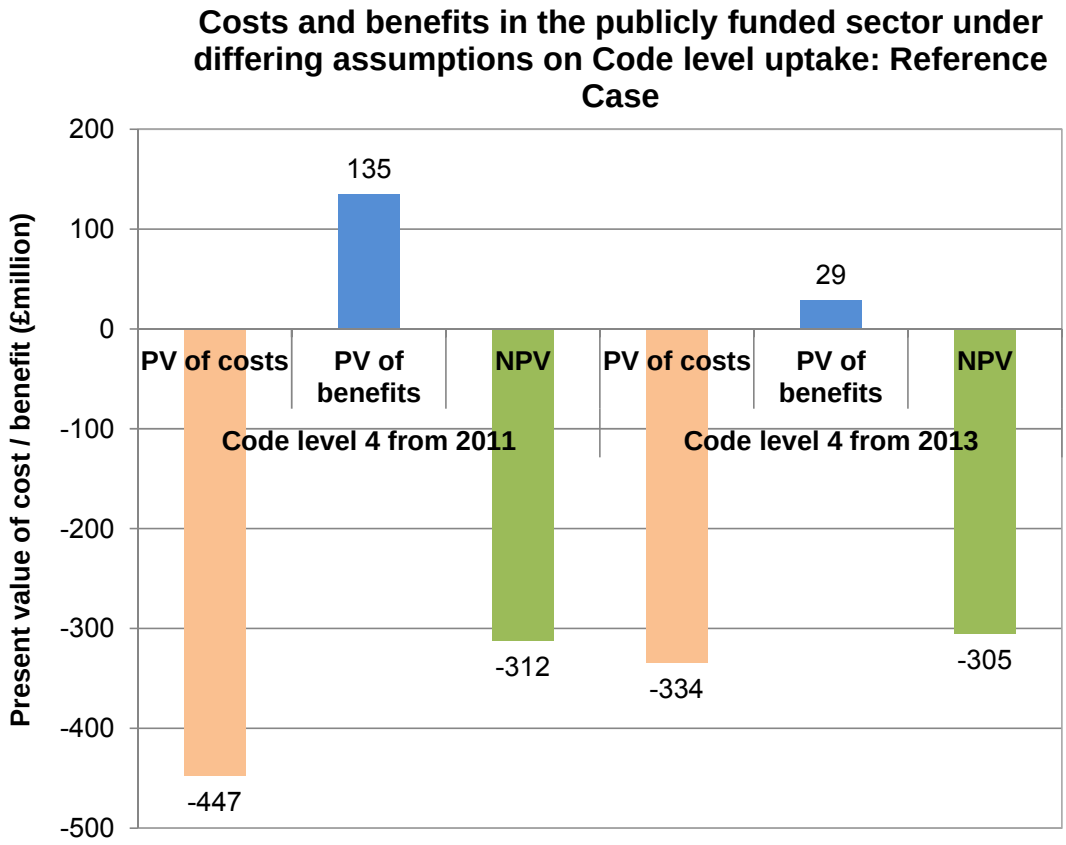

Figure 8: Impact on costs and benefits in publicly funded housing of an assumption that Code level 4 is not made a requirement of public funding until 2013. Results are shown for the reference case. Note that not all Code benefits are monetised.

185. The assumption of delayed introduction of Code level 4 has a significant impact on the Code costs in the publicly-funded sector. The benefits are also significantly reduced, as under this assumption the Code does not deliver any appreciable energy or CO2 saving, i.e. compared to the Part L baseline (the benefit shown is related to reduction of water consumption).

186. The costs shown in Figure 8 under the delayed Code level 4 scenario are therefore mainly related to other Code categories, such as Surface Water, Ecology, Management etc. The benefits related to achieving Code standards in these areas have not been monetised, but are significant.

187. The costs and benefits related to the preferred policy Option (Policy H) under the assumption of later introduction of Code level 4 in publicly-funded housing have also been assessed. The comparison of this scenario with the costs and benefits in the central case uptake scenario is shown in the figure below.

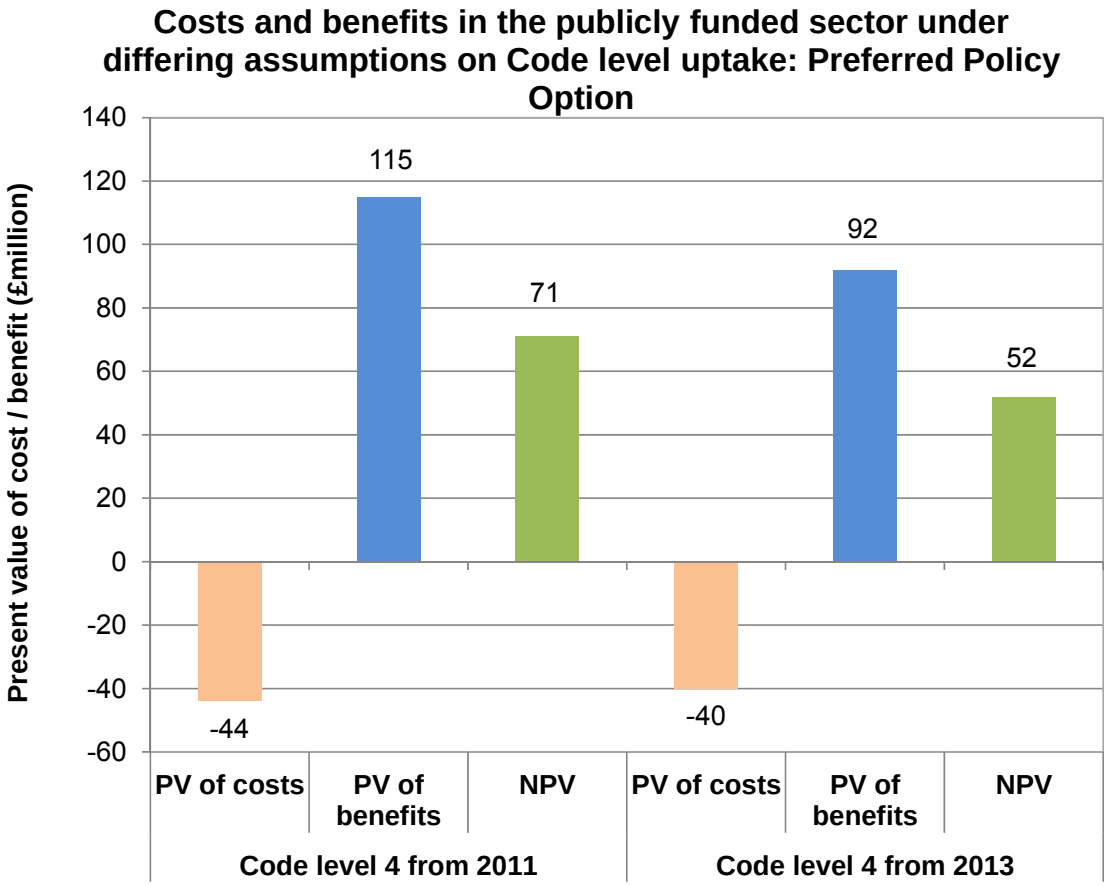

Figure 9: Impact of delayed assumption of uptake of Code level 4 in the publicly-funded sector on costs and benefits in the case of the preferred policy option (Policy Option H).

188. Under the assumption that introduction of Code level 4 is delayed in publicly-funded housing, the increase in construction costs resulting from Policy Option H and the benefits delivered are less than when it is assumed that Code level 4 will be mandated across the sector from 2011. The monetised benefits under Policy H result from energy saving due to energy display devices and increased adoption of Lifetime Homes. These measures are only expected to be adopted in significant numbers at Code level 4 and above, hence the reduction in numbers of homes built to this standard reduces the benefits.

189. A later introduction of Code level 4 in the publicly-funded sector results in a reduced net present value related to the preferred policy option. Overall, the revisions to the Code policy are still expected to deliver a positive NPV under a scenario where fewer Code level 4 homes are built.

6: Sectors and groups affected by the policy

House-builders

190. A projection of the additional construction costs associated with building homes to the standards set by the Code for Sustainable Homes is shown under the reference case (i.e. implementation of the Code as currently defined). A significant part of these costs relate to the build of publicly-funded homes, where a commitment to build all homes to certain Code levels already exists. While the Code remains a voluntary standard, the remaining additional cost incurred will depend on the uptake of the Code among the private house-building industry. In practice, this will be dictated by a combination of market forces and the actions of local planning authorities in stipulating Code levels as part of their local development frameworks. It has been assumed in this impact assessment that the impact of local planning policy will be the dominant effect. The additional costs for private sector builders shown in the reference case, around £240m, is therefore based on a forecast of how many Code homes at each Code level are built as a result of local planning policy.

191. The additional construction costs involved in building private market Code homes is likely to fall initially on the house-builders. Over time, as the Code becomes a more recognised standard among home-buyers, house-builders will potentially be able to charge a premium for homes built to a Code standard, although there is not yet evidence of this in the market. It is likely that house-builders would only be able to charge an additional cost if a financial benefit could be demonstrated to house-builders, such as reduced energy costs. As home-buyers are likely to heavily discount future savings and many of the financial savings delivered by Code homes are external to the occupier of the home, the acceptable cost premium is only ever likely to be a small contribution toward the additional construction cost.

192. As building to Code standards becomes more widespread in private market housing, it is likely that house-builders will increasingly reflect the additional costs in land purchase prices and hence pass the cost on to land-owners. This is particularly likely to be the case in areas where local planning policy stipulates that a particular Code standard be achieved. Developers that hold long-term land banks (and so land price is fixed), may attempt to offset increased construction costs by negotiating reductions to planning obligations. As with any negotiations, it is possible that the additional costs that developers seek to pass back to land values or forward via reduced planning obligations will not be borne by those parties. In the case of land values for example, at the margin, it is possible that for some sites the additional costs make the site unviable and that in turn this results in the site not coming forward for development. However the effect of the changes considered here is to reduce the costs compared to the do-nothing option and even were costs to rise, actions by local authorities to assess the cumulative impact of policies and viability before setting planning conditions should reduce the likelihood of viability problems arising.

193. The extra-over costs reported in this impact assessment include the additional capital cost of energy systems installed (fabric improvements and low carbon technologies) compared to the costs of energy systems required to meet Part L standards (where there are communal energy systems such as heat networks, the full capital cost of the network and central plant is prorated between the dwellings connected to the network). The revenues associated with sale of energy services provided by these assets have not been accounted for. In the case that the technology is installed within an individual dwelling, ownership of that technology may pass to the home-buyer on purchase of the property, in which case those revenues do not benefit the developer. In many cases however, particularly where site-wide energy systems are employed, the revenues from sale of services will be

returned to the organisation that owns the assets. Home-builders may not in many cases have any desire to take a long-term role in ownership of energy systems or to become energy suppliers, however, where there is an ongoing revenue stream, third-party organisations such as Energy Service Companies may assist in financing development of the energy system. In these cases the full capital cost of the energy system is not borne by the home-builder.

194. Where the energy system includes an eligible technology under the Clean Energy Cash back Scheme (or feed-in tariff), such as photovoltaics, there may be a substantial additional income stream. The feed-in tariff has been in operation for a relatively short period of time and there is little evidence that house-builders have factored it in to their business models. In the longer term, however, it is likely that house-builders will look to exploit feed-in tariff revenues to defray their investment in renewable electricity generating technologies. This could be through a house purchase price premium, assuming that home-buyers are sufficiently aware of the potential income from the feed-in tariff, or potentially by inviting third-party organisations to finance the purchase of the eligible equipment in return for ownership of feed-in tariff revenues.

195. The feed-in tariff revenue in the reference case is shown in the table below, in both the Central and higher case scenarios for Code uptake in the private sector.

Feed-in tariff revenue (£m)	**central case**	**higher case**
Social housing	£ 193 m	£ 193 m
Private market	£ 0 m	£ 177 m
Total	£ 193 m	£ 370 m

196. Under the central case estimate, there is no additional feed-in tariff revenue associated with private market housing, as the same energy systems are adopted as in the Part L baseline. In the higher case uptake scenario, there is a substantial feed-in tariff revenue, which derives from the installation of onsite generation systems to reach the high onsite CO_2 reduction targets (note that the additional construction cost in the private sector under the higher case uptake scenario has been estimated at £365m, although this is not all related to energy system cost).

197. The change in feed-in tariff revenues as a result of Policy Package H (the combination of policy revisions) is very small (there is a slight reduction due to a shift from low carbon generation to better fabric efficiency in response to Policy Revision A).

198. The feed-in tariff revenues are not reported as a benefit in this IA, as the feed-in tariff is a transfer and not a benefit to the economy overall.

Housing associations/Government

199. The additional construction costs associated to publicly-funded housing in the reference case is £410m. This is a large fraction of the total construction cost increase for all housing, due to the large number of Code level 4 homes assumed to be built in the social housing sector (due to the assumption that Code level 4 will be adopted in social housing from 2011).

200. The change in additional construction costs falling in the public sector due to each proposed revision to the Code is shown in the table below.

Table 30: Additional construction cost impact on public sector by policy option

Policy Option	Additional construction cost in the social sector
reference case	£ 410m
A – Reallocation of credits from Ene1 (Dwelling Emissions Rate) to Ene2 (Building Fabric) and addition of 2 further credits to Ene2.	- £ 6m
B – Add Energy Display Devices issue	+ £ 24m
C – Package of revisions to the Energy section	+ £ 21m
D – Changes to the Waste category	Negligible impact
E – Standardise requirements for minimum security standard doors and windows	No impact in public sector
F – Changes to mandatory requirement for surface water run-off mitigation	- £ 56m
G – Lifetime Homes exemption for steeply sloping sites	No impact[1]
H – Combination of all revisions (***Preferred Policy Option***)	- £ 12.1m[2]

[1] This is based on the cost modelling work that suggests that Lifetime Homes standards will not be adopted until Code level 5 (and the assumption that social housing is not built to Code levels above Level 4).
[2] This is the net of construction cost increases as a result of revisions A and B and the saving related to policy revision F.

201. The preferred policy package (Policy H) results in a saving on construction costs, estimated at £12m.

Homeowners and tenants

202. There is a range of potential benefits of Code homes that will improve the quality of life experienced by their occupants. The particular benefits enjoyed will depend on the Code level and the measures that have been selected by the home-builder to achieve Code standards. These benefits could include, for example, improved daylighting, better sound insulation, access to private outdoor space, home-office space, improved security and better access and adaptability for elderly or disabled people.

203. A clearly quantifiable benefit for residents is saving on energy bills related to the improved energy efficiency of the homes and incorporation of efficient generation technologies. As an example, this section considers the effect of going beyond mandatory minimum requirements by building Code homes in 2010.

204. Potential fuel bill savings for each dwelling type are summarised in the following figure. Note that these figures represent an upper bound as they include the full benefit of

electricity from any PV system specified to meet the mandatory requirements of Ene1: Dwelling Emission Rate.[9]

Table 31: Annual fuel bill savings and feed-in tariff revenue in the reference case relative to a Part L compliant home in 2010

Code level	Annual fuel bill saving				Feed-in tariff income			
	Flat	Terrace	Semi	Detached	Flat	Terrace	Semi	Detached
1	£0	£0	£0	£0	£0	£0	£0	£0
2	£0	£0	£0	£0	£0	£0	£0	£0
3	£0	£0	£0	£0	£0	£0	£0	£0
4	£34	£57	£50	£71	£139	£310	£310	£310
5	£69	£109	£130	£172	£279	£372	£449	£558
6	£243	£316	£415	£516	£1,054	£1,317	£1,503	£1,782

205. The feed-in tariff income tabulated above assumes that the home-owner is the sole beneficiary of the feed-in tariff income. This is an upper bound assumption. As discussed above, developers may seek to retain ownership of feed-in tariff revenues or may bring in third-party financing on the basis of the feed-in tariff. (The feed-in tariff revenues are also very high in the case of Code level 6 homes. This is due to the large capacity of photovoltaics required to meet the Code level 6 net zero carbon standard. The area required for this scale of PV system would be impractical in many development scenarios).

206. The savings on household energy bills in the case of Policy H is tabulated below. The energy bill savings have increased slightly due to the impact of energy display devices and a limited effect of shifting to higher performing fabric (and less low carbon generation) as a result of policy revision A.

Table 32: Annual fuel bill and feed-in tariff revenue under Policy H relative to a Part L compliant home in 2010

Code level	Annual fuel bill saving				Feed-in tariff income			
	Flat	Terrace	Semi	Detached	Flat	Terrace	Semi	Detached
1	£0	£0	£0	£0	£0	£0	£0	£0
2	£0	£0	£0	£0	£0	£0	£0	£0
3	£8	£11	£11	£11	£0	£0	£0	£0
4	£43	£71	£64	£85	£139	£310	£310	£310
5	£79	£126	£144	£186	£279	£372	£449	£558
6	£255	£336	£431	£532	£1,054	£1,317	£1,503	£1,782

Product suppliers

207. The proposed changes to the Code assessed in this impact assessment are expected to have a relatively limited impact on suppliers to the building industry. Some of the potential impacts are outlined below.

[9] Given that any PV system specified in the case of the flat would be a communal system (supplying a whole block of flats for example), specific arrangements would be required for all flats within the block to benefit from the electricity generated.

208. Policy option A could provide an incentive for house-builders to achieve a higher proportion of the required CO_2 emission reduction through fabric improvement. This in turn would be expected to provide additional demand for high performance insulation materials/build systems and may stimulate further innovation in this sector.

209. The removal of credits for energy efficient lighting is proposed in the context of the phasing out of non-energy efficient bulbs. This change is therefore unlikely to have any impact upon suppliers of energy efficient lighting (as it will be required by default).

210. The introduction of credits for energy display devices under policy option B could lead to increased demand for such products and thus support the market. The market growth associated with wider uptake of these devices could lead to improvements to the technology and cost reductions. However, any impacts of the Code are likely to be small relative to a mandatory roll-out of smart meters, as proposed by DECC.

211. Policy option E, which relates to security standards, will provide an incentive for suppliers of doors and windows to ensure that their products are certified to minimum security standards, so that they remain a feasible choice for builders of Code homes.

Code assessors and construction industry professionals

212. Any changes to the Code necessitate some level of re-training for those that use the Code: principally construction industry professionals and Code assessors. A one-off policy cost is included with each policy option to account for re-training. This re-training cost estimate is based on one man-day of training for 2,000 building industry professionals and five man-days for each developer organisation, at £500 per man-day. (Only one-third of small developers (<100 homes/year) are assumed to incur the re-training costs).

213. Re-training costs may be offset over the longer term by a reduced administrative burden of the Code resulting from streamlining measures. Streamlining includes measures such as removal of the requirement for a SWMP under policy option D, which is a statutory requirement for development sites in England over £300,000. Such cost benefits are difficult to quantify and have not been accounted for in this impact assessment.

7: Specific Impact Tests

Competition assessment

214. The house-building industry is the sector principally affected by any change to the Code policy.

215. As the Code remains voluntary for private market housing, the impact of changes to Code policy on private sector house-builders, including the volume house-builders and speculative builders, is expected to be limited.

216. House-builders operating primarily in the social housing sector are affected more significantly by changes to the Code, although the revisions proposed are relatively minor and are not expected to have any differential impacts across the sector that could have implications for competition between builders.

217. Any change to the Code policy results in a certain drain on house-builders' personnel resources, as staff re-train on the modified Code. This may favour larger house-builders, that are better able to commit resources. Given the nature of the policy revisions, however, this is not expected to be a significant impact.

218. There are some potential impacts on suppliers to the house-building industry as a result of the proposed changes, although these are also expected to be limited.

219. Some of the proposed changes to Code policy do have a potential impact on the approach taken by house-builders to reaching particular Code levels, which could have some impact on the supplier industries.

220. The changes to the security requirements will favour the installation of windows and doors that meet the PAS 24 minimum security standard. This may have an impact on suppliers of windows and doors that do not supply compliant products.

221. The impact of the changes to the energy category on how house-builders approach meeting the mandatory CO_2 reduction requirements (policy option A), is expected to be fairly limited. The policy revision may, however, result in some improvement in the fabric energy efficiency standards adopted in Code homes, at the expense of low carbon generation technologies. This is potentially detrimental to the low carbon technology supply chains, which are still nascent in many cases, and favours supply chains of more traditional building products, such as insulation and efficient glazing, which are typically dominated by established firms.

222. Policy B, the creation of a Code issue that awards credits for provision of energy display devices will assist in creation of a market for such products. This growth in the market is likely to be a relatively limited scale pre-cursor to the market transformation that is expected to result from mandatory roll-out of smart meters, as proposed in the DECC consultation on the issue (December 2009). Those firms active in supplying technologies to builders of Code homes may establish an early mover advantage.

Small firms impact assessment

223. Data published in the Calcutt Review of the house building industry10 indicates that in 2006 there were some 5,850 house builders active in Great Britain. However, of this number only just over 150 companies complete more than 100 dwellings per year and only just over 30 companies were responsible for more than 500 completions. Although these volume house-builders are responsible for a large segment of the market (the Calcutt Review estimates that the top 33 house-builders were responsible for a total of 116,000 completions in 2006 of a total private sector build of 140,000), this still leaves a very significant number of houses (around 25,000 based on the 2006 figures) being constructed by the thousands of small builders.

224. As noted above, any change to Code policy will require a certain amount of personnel resource to be committed to ensure staff are familiar with the changes. Where a policy revision leads to a change in approach in meeting the Code, as some of the revisions proposed here are expected to do, then further resource commitment is required, involving technical and commercial staff. The transition costs related to time spent adapting to Code revisions may have a greater impact on small builders.

225. A number of the policy revisions are expected to result in increases in construction costs related to the Code. The majority of these costs are expected to fall on publicly-funded housing, rather than private market builders, for whom the Code will remain voluntary. This is only likely to be an impact on small builders, therefore, if they were involved in a competitive tender for a social housing contract or, due to demands of the private market, there was a requirement to build Code homes to remain competitive. In general, the small builders may find it more difficult to absorb cost increases related to the Code, for example by negotiating land prices or extracting savings from suppliers, than the larger house-builders (conversely the small builders are not likely to hold land banks for which land prices are fixed).

Carbon assessment

226. The mandatory CO_2 reduction requirements at levels 3 and 4 of the Code reflect the Part L 2010 standard and the anticipated Part L 2013 standard, respectively. Code levels 5 and 6 set a higher requirement for onsite CO_2 reduction (carbon compliance) than is currently expected to be required through zero carbon homes policy.

227. The Code only delivers carbon reduction in the case where the mandatory CO_2 requirement of the Code level being built to is more stringent than that required by Building Regulations. For example, building to Code level 4 prior to the 2013 Part L change delivers a CO_2 reduction, as does building to Code levels 5 and 6 prior to 2016 and the introduction of zero carbon homes.

228. Once zero carbon homes policy is in force, building to a Code level does not deliver a CO_2 reduction, although it may have implications for how the CO_2 saving is split between the traded and non-traded sectors, i.e. the difference between achieving a higher level of onsite CO_2 emissions reduction, for example requiring substantial onsite low carbon electricity generation, and delivering CO_2 reduction through Allowable Solutions. This impact cannot be accurately predicted, as the distribution of CO_2 reduction delivered by Allowable Solutions is currently unknown (the modelling used in this work has assumed an equal split of Allowable Solutions' CO_2 reduction between traded and non-traded sectors).

[10]The Calcutt Review of housebuilding delivery, November 2007, http://www.callcuttreview.co.uk/downloads/callcuttreview_221107.pdf

229. Revisions to the Code policy are therefore only likely to result in large CO_2 emissions saving if they drive an increase in the number of higher level Code levels being built earlier, i.e. a significant increase in the number of Code homes being built with a mandatory CO_2 reduction requirement that is more stringent than the regulatory requirement. The current proposals for Code revisions are not expected to incentivise any shift toward building higher Code level homes and, as a result, the carbon savings associated with the policy revisions are expected to be small.

230. The largest impact on overall CO_2 savings is expected to result from the introduction of credits for installing energy display devices. The intention is that these devices encourage occupiers to reduce their energy consumption by improving the information available to them on their use, enabling them to be more efficient and reduce wastage. The energy savings are a result of behavioural change and so can be considered to be additional to the CO_2 reduction required to comply with the mandatory dwelling emissions rate (i.e. additional to the reduction delivered by an efficient fabric and installation of low carbon energy generation).

231. The reallocation of credits from the first issue in the Energy category, reduction of the dwelling emissions rate, to the second issue, the efficiency of the fabric, is not expected to result in a significant overall CO_2 reduction. It may, however, result in a shift in construction practices toward achieving a higher level of fabric efficiency performance and less reliance on low carbon generation. This may have some impact on the split of CO_2 saving between traded and non-traded sector, for example reducing the thermal demand at the expense of low carbon electricity generation would have the effect of shifting CO_2 reduction toward the non-traded sector. A shift toward higher fabric standard and less low carbon energy generation is also expected to result in CO_2 saving that persist for a longer period (i.e. the lifetime of the home compared to the lifetime of a generation asset).

Wider environmental issues

232. The Code addresses a range of wider environmental issues, including flood risk, water consumption, pollution (of air and watercourses), waste management and preservation and enhancement of ecological value. Although the majority of these environmental benefits have not been monetised in this Impact Assessment, the value to the economy over the lifetime of Code homes is expected to be substantial.

233. The only policy revision that has potential to directly impact environmental issues is the changes to the mandatory element of the surface water run-off issue. This revision, however, is not intended to relax the requirement for dealing with the run-off rate or quality of water discharged from developed sites, rather it is intended to be less prescriptive regarding the means that can be employed to mitigate surface water run-off impacts. The introduction of the new criteria, 'Design for System Failure', should have a positive impact on reducing flood risk and risk of pollution of watercourse from failure of drainage systems and sewers.

Health and well-being

234. The Code has a category dedicated to ensuring that Code homes provide environments that help to maintain or enhance the health and well-being of occupants. This includes providing good daylight access, reduced potential for noise disturbances, access to private outdoor space and adoption of lifetime homes principles.

235. With the exception of lifetime homes, issues in the health and well-being category are expected to be commonly addressed by house-builders when building to the Code. The benefits relating to homes that promote good health and well-being – reduced health care costs, improved economic activity, fewer social disputes etc. – as a result of the Code are expected to be significant.

236. The adoption of lifetime homes standard is expected to be more commonplace in the social housing sector, as housing associations request it as part of their specifications. As compliance with all lifetime homes principles is relatively costly and may require re-design of standard house types, the take up among private market house-builders is expected to be more limited.

237. The lifetime homes principles deal with the accessibility and functionality of homes for sectors of the population with particular needs, such as the very young, elderly, disabled or suffering from a debilitating illness. The benefits relating to adoption of lifetime homes in new housing include reduced adaptation cost, if the needs of occupants change, reduced requirement for residential care and home care costs.

238. One of the policy revisions proposed here (Policy G) specifically addresses an issue that has been raised by house-builders. This relates to the difficulty in achieving the complete lifetime homes standard in dwellings built on steeply sloping plots, due to the requirements for level access routes from car parking areas to the entrance of the home. The proposed amendment makes it possible for house-builders to gain credits for adopting the internal features of lifetime homes, while being exempt from the external requirements if the slope of the plot exceeds a certain limit.

239. This is expected to result in increased uptake of the majority of the lifetime homes standard on those sites that are built on plots that qualify for the exemption. The scale of the impact, in terms of numbers of additional homes built to incorporate these feature and the consequent economic benefits, is difficult to forecast as it is not known how many sites the exemption will apply to.

Equalities Impact

240. The Code should have a beneficial impact on all groups of people, and no negative impacts on equalities issues. Indeed one of its main functions is to go beyond current regulations to encourage improvements in the quality, utility and experience of homes on a wide range of fronts. For example, it should reduce utility bills; make it easier to access waste storage/easier to comply with local authority recycling requirements; and there may be increased daylighting. Code homes are likely to be more secure than standard homes, and are more likely to have private outdoor space.

241. The inclusion in the Code of mandatory and voluntary accessibility requirements (including for private outdoor space) should help visible and non-visible disabled people; families and older people and probably young people and children. Code homes generally include features that enhance life for all people, as well as and particular groups (eg. older people and disabled people) who are often not offered such benefits.

Sustainable development

242. The key principle of the Code for Sustainable Homes is to encourage development of new homes that provide for a good standard of living, while minimising impacts on others and preserving the environment.

243. The policy therefore makes an important contribution to sustainable development. The impact of the revisions to this contribution is likely to be minor. The revisions to the energy category (reallocation of credits from Ene1 to Ene2) may incentivise builders to place greater emphasis on achieving fabric efficiency improvements, rather than provide low

carbon generation. Improving the fabric is regarded as a more sustainable long-term option, as the lifetime of the home is usually far longer than the asset life of generating technologies.

244. As discussed above, Policy G is expected to result in an increase in the number of homes built incorporating lifetime homes standard. These home are better adapted to the needs of a wider cross-section of the public, particularly to the needs of an ageing population, and as a result require less adaptation in the future.

Human rights

245. The Code for Sustainable Homes 2010 revisions does not have any impact on human rights issues. As such, it has not been deemed necessary to provide an assessment on its effects on this area.

Justice system

246. The Code for Sustainable Homes 2010 revisions does not have any impact on the justice system. As such it has not been deemed necessary to provide an assessment on its effects on this area.

Rural proofing

247. The Code for Sustainable Homes 2010 revisions does not have any specific impact on rural people or places. As such it has not been deemed necessary to provide an assessment of its effects for the purposes of rural proofing.

Annexes

Annex 1 should be used to set out the Post Implementation Review Plan as detailed below. Further annexes may be added where the Specific Impact Tests yield information relevant to an overall understanding of policy options.

Annex 1: Post Implementation Review (PIR) Plan

A PIR should be undertaken, usually three to five years after implementation of the policy, but exceptionally a longer period may be more appropriate. A PIR should examine the extent to which the implemented regulations have achieved their objectives, assess their costs and benefits and identify whether they are having any unintended consequences. Please set out the PIR Plan as detailed below. If there is no plan to do a PIR please provide reasons below.

Basis of the review: There are two possible bases for future review. Firstly, there is a political commitment to review all Governmental standards and regulations, to facilitate deregulation and localisation. A review of the Code in this respect will commence soon after publication of the current set of amendments. Secondly, all aspects of the Code are normally kept under constant review anyway since it is a "live" document that needs to be periodically updated to ensure it keeps up with changing technologies, methods, and standards. It is likely that both types of review will go ahead, and probably combined.
Review objective: The first review type listed above will be a wider exploration of the fundamental objectives and operating parameters of the Code. The objective of the second review type will be of the usual model, where monitoring information and stakeholder views will provide input.
Review approach and rationale: The review(s) will be based on input from the Code Advisory Group, inputs from other Govt Departments, and a wide range of other interested parties. Further information will be drawn from Code monitoring research that will be commissioned, and the monitoring of national datasets on the Code.
Baseline: The "reference case" for the Code, as set out in this Impact Assessment, will provide a robust baseline.
Success criteria: Normally success can be measured in terms of the numbers and levels of Code homes being built in successive years. Data gathered by Building Research Establishment also indicates the degree of uptake of various parts of the Code (such as Secured By Design). Success would also be measured in terms of quantitative and qualitative feedback from Code Assessors, developers, and users of Code buildings.
Monitoring information arrangements: BRE (and Licensee) data from Code Assessors. Monitoring information gathered through specific CLG monitoring research. Case study research (quantitative and qualitative – including costs information) gathered through specific CLG research to be commissioned.
Reasons for not planning a PIR: N/A

Background to the Code

In order to achieve any of the Code levels from 1–6, certain mandatory requirements must be met; these are summarised below.

Mandatory issues

Issue Code	*Description*	*Code Level*						
		1	***2***	***3***	***4***	***5***	***6***	
Mat 1	***Environmental impact***[11]	At least three key elements to achieve a Green Guide rating of A+ to D						**Uncredited mandatory issues**
	Mandatory Credits	-	-	-	-	-	-	
Sur 1	***Surface water run-off***	Ensure peak rate of run-off into watercourses will not increase as a result of development						
	Mandatory Credits	-	-	-	-	-	-	
Was 1	***Waste storage***	Allocate space for waste storage in line with British Standard 5906						
	Mandatory Credits	-	-	-	-	-	-	
Was 2	***Construction waste management***	Develop and implement a site waste management plan to monitor and report on waste generated on site						
	Mandatory Credits	-	-	-	-	-	-	
Ene 1	***% improvement on TER***	10%	18%	25%	44%	100%	ZCH	**Mandatory issues**
	Mandatory Credits	1	3	5	8	14	15	
Hea 4	***Mandatory to comply with all principles of Lifetime Homes***	No	No	No	No	No	Yes	
	Mandatory Credits	-	-	-	-	-	4	
Wat 1	***Maximum internal water use (litres/person/day)***	120	120	105	105	80	80	
	Mandatory Credits	1	1	3	3	5	5	

Current Code assessment defines four mandatory issues with no associated credits. For each of these a single requirement must be met, irrespective of the Code level sought. Provided the minimum performance standards are met for each of the uncredited issues, further mandatory issues must be considered before a Code rating is granted. Minimum mandatory standards increase with Code level sought for the Ene1 and Wat1 issues (dwelling emission rate and indoor water use). The definition for zero carbon homes in the Code at Level 6 corresponds to a decrease in DER to a sufficient level to offset all predicted electricity use in the dwelling, and is calculated in accordance with the Code Technical Guide.

Credits and scoring

The overall Code level attained is based upon the Total Percentage Points Score (TPPS), subject to the mandatory requirements described above being met. The TPPS is calculated after credits are converted into points by applying environmental weighting factors. Different

[11] Key elements include: Roof, External Walls, Internal Walls, Upper and Ground Floors, Windows.

weighting factors apply for different categories, thus making credits in certain categories more valuable in terms of contribution to the overall score.

The following table summarises the Code issues, including the maximum number of credits available by issue and the weighting factors for each category.

Category	***Issue key***	***Issue title***	***Maximum credits available***	***Weighting factor (%)***	***Weighted value of each credit***
Energy / CO_2	Ene 1	Dwelling Emission Rate (DER)	15	36.4	1.26
	Ene 2	Building Fabric	2		
	Ene 3	Internal Lighting	2		
	Ene 4	Drying Space	1		
	Ene 5	Eco-labelled White Goods	2		
	Ene 6	External Lighting	2		
	Ene 7	LZC Energy Technologies	2		
	Ene 8	Cycle Storage	2		
	Ene 9	Home Office	1		
Water	Wat 1	Internal Water Consumption	5	9	1.50
	Wat 2	External Water Consumption	1		
Materials	Mat 1	Environmental Impact	15	7.2	0.30
	Mat 2	Sourcing - Basic Elements	6		
	Mat 3	Sourcing - Finishing Elements	3		
Surface Water	Sur 1	SW Run-Off Management	2	2.2	0.55
	Sur 2	Flood Risk	2		
Waste	Was 1	Waste Storage	4	6.4	0.91
	Was 2	Construction Waste Management	2		
	Was 3	Composting Facilities	1		
Pollution	Pol 1	Insulant GWP	1	2.8	0.70
	Pol 2	NO_x Emissions	3		
Health & Well-Being	Hea 1	Daylight	3	14	1.17
	Hea 2	Sound Insulation	4		
	Hea 3	Private Space	1		
	Hea 4	Lifetime Homes	4		
Management	Man 1	Home User Guide	3	10	1.11

	Man 2	Considerate Constructors Scheme	2		
	Man 3	Construction Site Impacts	2		
	Man 4	Security	2		
Ecology	Eco 1	Ecological Value of Site	1	12	1.33
	Eco 2	Ecological Enhancement	1		
	Eco 3	Protection of Ecological Features	1		
	Eco 4	Change in Ecological Value	4		
	Eco 5	Building Footprint	2		

The sum of the credits achieved in each category is divided by the total available for that category and multiplied by the category weighting factor, giving a percentage points score for the category. The TPPS is the sum of all the percentage points scores and the minimum TPPS requirement increases with Code level, as summarised below.

Figure10: Minimum total percentage points score requirement by Code level

Code Level	1	2	3	4	5	6
Minimum TPPS	36	48	57	68	84	90

Annex 2: Lifetime Homes benefits assumptions

A number of assumptions have been made in the calculation of benefits arising from increased uptake of Lifetime Homes. The key assumptions used in the assessment are tabulated below

Saving	Assumption	Comment
Saving on costs of adaptations		
% of homes adapted during lifetime	40%	Based on application of annual rate of adaptations to the new stock over 50 year life. Assumed higher rate of adaptations in social stock.
Average saving per adaptation	£1,250	Approx. based on Pieda study updated to current prices
Delayed requirement for move to residential care		
% of lifetime homes residents able to stay longer in home	25%	Based in Pieda study
Average length of delay	1 year	
Cost of residential care	£20,000	Mid-range of figures published in ODPM review of DFG (2005)
Reduction of home care costs		
% of lifetime homes residents with reduced home care need	20%	Based on Pieda
Reduced requirement	2 hours per week	Based on Pieda
Cost of home care	£10/hour	Estimate
Reduced temporary residential care		
% of lifetime homes residents avoiding residential care	10%	Based on Pieda
Average length of stay	3 weeks	Based on Pieda
Cost per week	£700/week	Estimate

Annex 3: Main changes to Building Regulations Parts L, F & J, 2010

- Adopts a flat 25 per cent improvement for every new home, treating party walls where they exist, against heat loss before counting the 25 per cent improvement but only counting secondary heating when actually provided for and allowing credit wherever low energy lighting is installed.
- Adopts an aggregate improvement for new non-domestic buildings that delivers overall improvement of 25 per cent across the build mix, on the basis of the additional variability of non-domestic buildings.
- Updates methodologies for calculating the energy performance of buildings (SAP and SBEM) including updated carbon dioxide (CO_2) emission factors published by DECC alongside the technical guidance.
- Continues with the current levels of relaxation to the compliance target for new homes that use more carbon intensive heating fuels (this relaxation to be reviewed for electric heat pumps after the DECC consultation on a proposed Renewable Heat Incentive Scheme has closed, policy agreement reached and a scheme introduced).
- Strengthens the minimum levels of energy efficiency (backstops) for building fabric and services so CO_2 targets cannot be achieved through renewables alone. This reflects the principle of reducing overall demand for energy (pending the proposed introduction of a new overall energy efficiency standard in 2013/2016).
- Introduces measures to <u>further</u> improve compliance including adding a design stage energy performance calculation and the introduction of better quality control for construction junction details.
- Strengthens energy efficiency standards when people <u>elect</u> to carry out work to existing buildings including extensions and conversions, fabric renovations, replacement windows and boilers.
- Retains current exemption for conservatories from Part L 2010 in light of concern, particularly from property owners and occupiers, over the costs and bureaucracy of removing it.
- Revises Part F ventilation standards to help avoid adverse health effects (i.e. maintain indoor air quality) from tendency to more airtight buildings arising from Part L changes.
- Introduces new Part F requirements and guidance for installation and commissioning of ventilation systems.
- Revises Part J guidance on ventilation to ensure that combustion appliances can continue to function safely in more airtight homes. The changes also remove technical disincentives to the wider use of Biomass heating systems.
- Introduces a new Part J requirement for the provision of Carbon Monoxide alarms when installing <u>all</u> solid fuel appliances.

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