



*Wates Living Space*

# Sustainable Improvement of the Existing Housing Stock Working Group Report April 2008

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## Introduction

While there is a great deal of emphasis on the sustainability of new build housing, with a road map set out by Government to achieve zero carbon homes by 2016, the way forward for the far larger existing stock is less clear. As the size of the existing housing stock eclipses that built each year, the working group responded by investigating practical new measures to improve sustainability in this area.

The working group concentrated on three broad areas:

- to examine the possibility of setting a sustainability standard for existing housing stock – in essence a refurbishment version of the Code for Sustainable Homes
- to look into the role of a whole life costing model when repairs, maintenance and improvement work is undertaken
- to raise the game for remaining Decent Homes programme and look at what will happen after it comes to an end.

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The views expressed in this report reflect the wide range of contributions made to the working group, but would not necessarily be shared by individual members, or their organisations.

# 1 Towards a Sustainability Standard for the Existing Housing Stock

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## 1.1 Introduction

Sub Group 1 was tasked to:

- address what measures should be taken to develop a sustainability standard for existing stock
- provide examples of practical measures that could be taken to upgrade the sustainability of dwellings against such a standard.

To achieve these goals the following issues were researched and considered:

- Who are the potential stakeholders and how might they use such a standard?
- What standards currently exist and how do they compare?
- What should a sustainability standard for existing stock address?
- How would stakeholders be made aware of / access / use it?
- What would it look like in practice?
- What are the next steps?

## 1.2 Potential Stakeholders

Without legislation or financial incentives, a proportion of the population may never be interested in or use any standards or tools. In the stakeholder table below some interest in improving environmental performance is assumed.

Stakeholder	Needs / Use
Owner Occupiers	A Strong environmental interest, desire to know: the environmental performance of their property now the best possible environmental performance of their dwelling the specific measures they could take to make the improvements B Some strong environmental interest with specific project to carry out, and desire to do it in an environmentally friendly way if affordable
Private landlords	A Desire to market environmental credentials of their stock upon change of tenant B Property requires specific work and want to know best environmental solution and associated cost implications
RSL's	A Desire to reduce fuel poverty in effected stock B Properties require specific work and want to know best environmental solution and associated cost implications C Desire to improve sustainability standard of all stock at every opportunity, and wish to be able to demonstrate to residents where possible how sustainable their property is in relation to its potential D Major refurbishment upgrade being carried out for rental / sale and desire to market property's sustainability credentials
Local Authorities	A Desire to reduce fuel poverty in effected stock B Properties require specific work and want to know best environmental solution and associated cost implications C Desire to improve sustainability standard of all stock at every opportunity, and wish to be able to demonstrate to residents where possible how sustainable their property is in relation to it's potential.
Consultants	A Want to be able to benchmark property sustainability performance
Contractors	A Desire to demonstrate the sustainability of their works execution, and price for alternative sustainability standards
Government	A Need to achieve Carbon reduction targets

These needs were identified by brainstorming within the group. It was recognized that this would need to be tested by robust market research.

The statistics of housing by tenure illustrate that any tool to improve the sustainability of the existing stock must be targeted at owner occupiers to make a significant difference.

Stakeholder	UK numbers (1000's) from DCLG statistics updated 25/09/07
Owner Occupiers	18,522
Private landlords	2,995
RSL's	2,191
Local Authorities	2,704
All dwellings	26,412

## 1.3 Current Standards

### 1.3.1 Overview

Investigating existing tools and standards revealed the lack of an obvious starting point for any stakeholder. There is certainly no single point of reference for information regarding sustainability in the built environment.

For all the stakeholders identified it would be sensible to have a universal starting point, ideally web based. Such a web site should enable users to find or follow links to their area of interest, and reference all research and development known to be ongoing in the area. There is a high probability that considerable duplication of effort is taking place with respect to developing ways to improve the sustainability standard of existing stock.

Existing standards identified and considered were

- + Code for Sustainable Homes
- + Ecohomes XB
- + Ecohomes XBC

### 1.3.2 Code For Sustainable Homes

The broadest definition of sustainability of the three standards and initial analysis suggested that in its current format:

- + 47% of the code items were 100% applicable to refurbishment of existing stock
- + Only 6% of the code items were totally inapplicable

However, it was thought that reducing the number of elements would facilitate use, particularly by owner occupiers.

### 1.3.3 Ecohomes XB

Well suited to RSL's and Local Authorities, however not readily transferable to owner occupiers and private landlords.

XB overlaps with 38% of the Code for Sustainable Homes items, and six of the twenty category items are not covered by the Code for Sustainable Homes. Three of the extra categories are management issues, and the items not covered include materials and surface water run off.

### 1.3.4 Ecohomes XBC

This develops Ecohomes XB by adding management categories regarding conservation and materials, and also features categories for materials used. While this is a definite enhancement, the management section is a significant part, indicative of targeting towards RSL's and Local Authorities.

### 1.3.4 Web Based Tools

#### 1.3.4.1 Overview

The tools described in this section are not an exhaustive list of everything available regarding dwelling sustainability and energy efficiency. The need for a web based tool was accepted by everyone in the group. This concept is

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supported in the recent Home Truths research report by The Cooperative Bank and Friends of the Earth, which suggested that there be a way of obtaining a free provisional EPC coding with reasonable accuracy.

#### 1.3.4.2 T-ZERO

This ongoing three year government funded project would appear to be the ideal platform to incorporate any new standard and has the following benefits:

- Can already accommodate several standards in parallel
- Already being linked to EPC's and Ecohomes XB
- Could be linked to other appropriate websites
- Includes cost data
- Includes carbon data

#### 1.3.4.3 Green Street

A comprehensive site that provides an overview of the key issues and provides models of what can be done for various dwelling types. The models set out two packages of improvements that can be made to meet Best Practice Standards (as required by Scheme Development Standards) and they can be exceeded. Not currently set up as an interactive tool.

#### 1.3.4.4 Scottish Building Standards Agency

A well laid out site relating various dwelling types, the measures that can be taken and the principles behind them. It is intended to give users enough information to decide what needs to be done and help them talk about sustainability issues with professional designers and tradesmen. Not currently set out as an interactive tool.

#### 1.3.4.5 National Centre For Excellence in Housing ([homein.org](http://homein.org))

Building on best practice from other sources. Project based focus under development.

#### 1.3.4.6 Planning Portal ([Planningportal.gov.uk](http://Planningportal.gov.uk))

Homes section details government targets with project focus on energy.

## 1.4 Proposed Standard

### 1.4.1 Overview

The Code for Sustainable Homes should be adapted to suit refurbishment as it offers the broadest assessment of sustainability of the standards considered. For the purposes of this document the proposed standard will be referred to as The Code for Sustainable Homes – Refurbishment (CfSH-R). To accommodate the different user needs we propose that:

1. All UK housing is classified in terms of a number of dwelling types. For each dwelling type the current base position needs to be established. This would be the zero star level. The maximum potential of each dwelling type also needs to be defined with this being given a six star rating. Users could then be given a star rating for their particular dwelling relative to the base(zero) and the maximum(6 star).
2. Users have the opportunity to assess the sustainability effect of particular project work on their dwelling via a works execution rating e.g. they could carry out a building envelope upgrade that scores 0-100% in terms of sustainability as a standalone activity
3. The CfSH-R is therefore split to address:
  - Sustainability standard of the dwelling(star rating system)
  - Sustainability standard of works execution(% rating)

As well as addressing different potential uses of the CfSH-R, this approach encourages stakeholders to improve dwellings to their maximum potential.

### 1.4.2 Scoring Credits

To incentivise people to use the CfSH-R and upgrade dwelling sustainability, government targets should be set in relation to the dwelling types base and maximum star rating.

It should be possible to use the absolute measure to put the dwelling in context in relation to other dwelling types to facilitate overall measurement.

The definition of a dwelling type's maximum potential will allow meaningful targets to be set for each stakeholder group over time which incentivise improvement. Setting a target for 4 star performance, for example over a particular time period, in this system would be both meaningful to stakeholders and consistent with Government improvement targets. If the majority of dwellings were at the base rating at the start of the assessment, progression to a 4 star rating would equate to 60% + improvement.

### 1.4.3 Applicability To Specific Elements

It was assumed that the vast majority of refurbishment work in the UK is elemental. To encourage use of the CfSH-R and associated sustainability improvements, it should enable people to have a sustainability assessment for the specific activity they are carrying out e.g. re-roofing.

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#### 1.4.4 CfSH-R Split

Splitting the CfSH-R between dwelling standard and works execution increases its flexibility and enables different stakeholders to establish specifications and responsibilities more effectively.

The dwelling standard focuses on the fundamental key issues of energy and water, and these are related to a number of standard dwelling types. Peripheral issues such as lifetime homes, recycling facilities etc. could also be included. By definition the maximum that any individual dwelling category can achieve will be the 6 star score, representing having completed all reasonable works that could be done to improve the sustainability of that dwelling type.

The works execution standard relates to the actual work undertaken and how sustainably the works are executed. For example the assessment of a particular dwelling might show that its current window u value only give a 2 star rating and that the potential of 6 stars can only be achieved if new windows are installed. The works execution section standard would then help the stakeholder to select the particular star rating required and the most sustainable method of executing this work. The window selection matrix would therefore include a range of window specifications with varying u values manufactured from different materials (this would combine Green Guide info with BFRC ratings and include cost data). Other elements in the works execution standard would relate to the disposal of waste, use of recyclable materials and project management (use of “sustainable contractors”).

An initial view of the potential split is provided in the following table of CFSH elements

Issue ID	Description	Code credits (Current)	Dwelling standard	Works execution standard
ENE 1	Improvement in DER against TER	15	y	n
ENE 2	Improvement on HLP	2	y	n
ENE 3	Percentage of energy efficient light fittings	2	y	n
ENE 4	Internal or external drying space provided	1	y	n
ENE 5	Information provided on energy efficient appliances or energy efficient appliances provided	2	n	y
ENE 6	Energy efficient external lighting	2	y	n
ENE 7	Energy provided from low or zero carbon technologies	2	y	n
ENE 8	Cycle storage	2	y	n
ENE 9	Home office work space	1	y	n
WAT 1	Internal potable water consumption	5	y	n
WAT 2	External potable water consumption	1	y	n
MAT 1	Environmental impact of materials	15	n	y
MAT 2	Responsible sourcing of materials basic building elements	6	n	y
MAT 3	Responsible sourcing of materials finishing elements	3	n	y
SUR 1	Reduction of surface water run off from site	2	y	n
SUR 2	Flood risk	2	n/a	n/a
WAS 1	Household waste storage and recycling facilities	4	y	n
WAS 2	Construction site waste management	2	n	y
WAS 3	Composting	1	y	n
POL 1	Global warming potential of insulants	1	n	y
POL 2	NO <sub>x</sub> Emissions	3	y	n
HEA 1	Daylight	3	y	n
HEA 2	Sound insulation	4	y	n
HEA 3	Private space	1	y	n
HEA 4	Lifetime Homes	4	y	n
MAN 1	Home user guide	3	n	y
MAN 2	Considerate Constructors Scheme	2	n	y
MAN 3	Construction site impacts	2	n	y
MAN 4	Security	2	y	
ECO 1	Ecological value of site	1	n/a	n/a
ECO 2	Ecological enhancement of site	1	n	y
ECO 3	Protection of ecological features	1	n	y
ECO 4	Change of ecological features	4	n	y
ECO 5	Footprint ratios	1	n/a	n/a

## 1.5 Stakeholder Awareness/Access/Use

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### 1.5.1 Awareness

There is no obvious standard or location with universal awareness among the stakeholder groups. Our initial assessment based on the representatives from each sector within the overall group, is that the Code for Sustainable Homes has been the most successfully launched and has the highest brand recognition.

It seems sensible to capitalize on this awareness and launch a parallel Code for Sustainable Homes - Refurbishment. This report does not address whether the standard should replace or run parallel with existing Ecohomes and BREEAM tools, however the group recognised potential conflicts of interest regarding ownership and stewardship of any new standard.

### 1.5.2 Access And Use

The T-Zero tool identified could readily be modified to encompass an existing stock sustainability standard as described in this document. It already includes SAP and Ecohomes XB functionality and as it is a BERR initiative we would suggest supporting its adoption and promotion as the tool for carbon / sustainability assessment of existing stock.

## 1.6 Standard In Practice

### 1.6.1 Targets

In line with the new build target for all new homes to be zero carbon by 2016, we would propose the following targets relative to CFSH-refurbishment

	2010	2020	2035	2050
<i>Public sector</i>				
Dwelling standard	3 star	4 star	6 star	6 star
Works execution	50%	75%	100%	100%
<i>Private sector</i>				
Dwelling standard	2 star	3 star	4 star	6 star
Works execution	50%	75%	100%	100%

Ambitious targets are necessary as in the Budget 2007, the Chancellor stated:

*“by the end of the next decade... where practically possible, all homes will have achieved their cost effective energy efficiency potential”.*

A key issue is what “cost effective” really means in this context. This requires further definition and action from government since carbon dioxide reduction currently has great political value to government but relatively low value to other stakeholders.

A simplistic route might be to use EPC's to deliver the energy target, however a broader sustainability tool will enable delivery of the necessary works with the minimum environmental impact. Implemented correctly and updated over time it will also encourage users to:

- take additional steps that will contribute to the national effort to exceed the reduction of 60% Carbon Dioxide Emissions by 2050
- improve standards of living
- incorporate climate change adaptation in their projects.

Key drivers in the public sector will be Government targets/legislation and finance.

In the private sector building regulations, improvement grants and property taxes will play an important role.

## 1.6.2 Example

### 1.6.2.1 Dwelling assessment

Whether considering a specific element or a whole property, the user must establish a benchmark point to work from and provide sufficient data to enable the maximum potential to be identified. For a full dwelling standard assessment minimum input would include dwelling age, type(semi/detached etc) number of bedrooms, heating type, current insulation etc. This information would be used to allocate the property into an overall dwelling type. The dwelling types could be developed to focus on the main areas of potential improvement and to reflect national housing stock. For example:-

Terrace 2 storey,2 bedroom,-pre 1919  
Terrace 2 storey,2 bedroom-1966-1976  
Terrace 2 storey,2 bedroom post 1980  
Detached House 3 bedroom-1945-1964  
Detached House 3 bedroom-1965-1980

Using a number of interfaces in relation to the users knowledge level and the information known, a calculation process would need to take place as illustrated in the table below.

Dwelling Type	Date	Current dwelling information input	Dwelling type base score-zero star	Dwelling type Potential score-six star
End Terraced, 2 storey, 2 bedroom	1966-1976	Single glazed timber windows Un-insulated cavity external walls Primary heating 70% efficiency combination boiler Gas fire secondary heat source Un-insulated roof 150 litres per person / day	35	65

Achieving a 6 star rating for this dwelling would involve taking measures that achieved a score of 65. The current base performance is the normal for this dwelling type in unaltered condition and therefore 0 star. Each star increment can then be defined between the two scores, so a 4 star rating would be achieved by a score of 55. The current and potential scores are derived from the existing Code for Sustainable Homes element scores appropriately weighted plus any additional elements thought useful.

The method to get from the current performance to the target level could involve a number of specific projects.

A particular dwelling might already have had some improvements and would therefore be assessed at a higher level than the base and consequently require less further work to achieve the 4 star level

## 1.6.2.2 Dwelling standard elements

For a full application of the CfSH-R using the current Code for Sustainable Homes elements users would have to be queried regarding the following issues:

Issue ID	Description
ENE 1	Improvement in DER against TER
ENE 2	Improvement in HLP
ENE 3	Percentage of energy efficient light fittings
ENE 4	Internal or external drying space provided
ENE 6	Energy efficient external lighting
ENE 7	Energy provided from low or zero carbon technologies
ENE 8	Cycle storage
ENE 9	Home office work space
WAT 1	Internal potable water consumption
WAT 2	External potable water consumption
SUR 1	Reduction of surface water run off from site
WAS 1	Household waste storage and recycling Facilities
WAS 3	Composting
POL 2	NOx Emissions
HEA 1	Daylight
HEA 2	Sound insulation
HEA 3	Private space
HEA 4	Lifetime Homes
MAN 4	Security

For a partial application the user would be queried regarding the works being carried out, and the system would then automatically select the applicable sections above to obtain relevant information. Further work is required to determine element applicability.

### 1.6.2.3 Dwelling standard targets and project selection

In order to achieve a 4 star rating on the property assessed previously, the following schedule of works might be specified:

	Target	Requirements
ENE 1	4star	Replacing boiler with A rated condensing boiler with an insulated thermal store Replacing windows with units that achieve an overall U Value of 0.7 Insulate loft with 300mm insulation Insulate cavities
WAT 1	4 star	Current usage 150l per person / day Target 105l per person / day Install grey water recycling system
POL 2	4 star	Replacement boiler to be class 5 (BS EN 297: 1994)

In order to make the assessment as useful as possible it would be desirable to include the financial costs and benefits of particular works. This would enable stakeholders to consider alternative methods of achieving the same outcome and to determine their own plan based on their specific circumstances. This is particularly important for owner occupiers.

### 1.6.2.4 Works execution

Users must then decide which activities they intend to execute, and they will then be queried regarding how they will deliver the works. Questions for the works execution standard would tackle the following Code for Sustainable Homes issues:

Issue ID	Description
ENE 5	Information provided on energy efficient appliances or energy efficient appliances provided
MAT 1	Environmental impact of materials
MAT 2	Responsible sourcing of materials basic building elements
MAT 3	Responsible sourcing of materials finishing elements
WAS 2	Construction site waste management
POL 1	Global Warming Potential of Insulants
MAN 1	Home user guide
MAN 2	Considerate Constructors Scheme
MAN 3	Construction site impacts
ECO 2	Ecological enhancements of site
ECO 3	Protection of ecological features
ECO 4	Change of ecological value of site

To illustrate this aspect of the CfSH-R the following example summarises a potential scoring scenario for the material selection aspects:

Element	Included in Project	Max rating	Rating selected	Works execution rating
Insulation	y	5	4	
Windows	y	6	5	
Total		11	9	81%

## 1.7 Conclusions and Recommendations

1. Stakeholder analysis and robust market research regarding their needs
2. Academically sound review of Code for Sustainable Homes by independent organizations with construction industry expertise to include:
  1. Adjustment of each item to suit refurbishment
  2. Split between dwelling standard and works execution standard
  3. Adjustment of credit system as appropriate

Consider using universities with construction industry expertise such as Loughborough, Manchester etc

3. Implementation and launch as a new standard potentially called "The Code for Sustainable Homes – Refurbishment"
4. Integration of "The Code for Sustainable Homes – Refurbishment" into the T-Zero tool. Support this project as the web based tool for dwelling sustainability.
5. Government to create and promote a web based starting point for all sustainability issues in the built environment – with information and links regarding existing standards and tools as well as ongoing research activities.
6. Consideration of what mix of coercion v incentivisation is required for each stakeholder group (linkage to Warm Homes and other similar initiatives)
7. The adjustment of measurement systems to address current weaknesses. For example the Green Guide ratings do not deal adequately with the issue of the sustainability cost of maintenance. Ratings are material content based and exclude the sustainability cost of labour.
8. Introduction of an assessment element which considers the recyclability of materials to encourage the development of resource efficient solutions. This measure should not rely on historical assessment methods as per Green Guide but should assess future savings potential.

## 1.8 References

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### Code for Sustainable Homes

<http://www.planningportal.gov.uk/england/professionals/en/1115314116927.html>

### Ecohomes XB (Need to register)

<http://www.breeam.org/extranet/loginexb.jsp>

Ecohomes XBC Sustainable refurbishment of Victorian housing - guidance, assessment method and case studies (X399); Author(s): Tim Yates ; Date: 2006; ISBN: 1-86081-936-2; Publisher: Building Research Establishment.

### T-Zero

### Home Energy Conservation Association

<http://www.ukheca.org.uk>

### National Centre for Excellence in Housing

<http://www.homein.org>

### Scottish Building Standards Agency Web Site

<http://www.sbsa.gov.uk/homeimprovements.html>

### Green Street web site

<http://www.greenstreet.org.uk/>

### Home Truths: A low-carbon strategy to reduce housing emissions by 80% by 2050

<http://www.foe.co.uk/hometruths>

### Planning Portal

<http://www.planningportal.gov.uk>

## 2 Wholelife Costing for New or Retrofit Components

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### 2.1 Introduction

Sub group 2 have been exploring the issues surrounding the development of a whole life costing model for new and retrofit components which takes sustainability into account: that is, one which is able to measure the costs of sustainable improvement and which incorporates some kind of carbon measure. Much research already exists in the field of whole life costing, and while this is welcome the group is concerned on two counts:

1. Much of the work has been based around individual building components, analysing the initial costs, their installation and on-going maintenance requirements, and although research may touch on sustainability, it has not centred on it. Nor has much of it addressed sustainable improvement in the existing housing stock in a holistic manner.
2. Without common and measurable outputs there will be less chance of success.

A whole life costing model which is centred around sustainability should be for the building as a whole (and ideally include the surrounding built environment), rather than the individual components. We therefore need to look at maintenance in the round, rather than the current artificial distinctions between reactive, cyclical and planned maintenance, the split between the various FM functions (general building, M&E etc) and the lack of synergy between new build and on-going maintenance. In many cases these distinctions drive up whole life costs and lead to waste, eg development and product selection which fail to take on-going maintenance into account.

### 2.2 Context

The UK is committed to reducing CO<sub>2</sub> emissions by 20% by 2010 and 60% by 2050, with a target to achieve zero carbon new build housing by 2016. It is estimated that one quarter of the UK's CO<sub>2</sub> emissions are from the energy used to heat, light and run homes. The refurbishment of existing stock is in most cases more sustainable than demolition and rebuilding, and a majority of our housing stock will continue to be with us over the time frame needed to reach these targets. So doing nothing is not an option. As well as playing a key role in the UK's ability to meet carbon reduction targets, higher sustainability performance standards for the existing stock will also improve the well-being and quality of life for those living and working in our homes.

## 2.3 Whole Life Costing Model

### 2.3.1 Objectives

We considered the objectives of a sustainability-centred whole life costing model:

- ✦ to be of practical use as a means of comparing maintenance and improvement options and costs/income over time
- ✦ to measure the carbon footprint of buildings as a whole over time, and as a consequence the whole of the UK's housing stock, rather than that of individual building component
- ✦ to therefore take into account all the activities involved in maintenance and improvement work: maintenance "in the round"
- ✦ to alter behaviour so that carbon usage and CO<sub>2</sub> emissions are reduced and to act as a driver for continuous improvement in sustainability standards

### 2.3.2 Complexities

This is a hugely complex area. It will be difficult to accurately record total carbon consumption during the life of an individual building. We discussed some of the complexities:

- ✦ what should be measured and costed and how to define inputs and outputs
- ✦ who would be responsible for collecting, recording, verifying and analysing the data eg very many people and organisations will be involved in maintaining and improving a building over what could be 100 years or more
- ✦ complexities and costs of relating data to particular buildings eg different contractors working on premises belonging to different owners in the course of a day/week
- ✦ Information management system and asset database issues
- ✦ how to relate volumes and costs over long time periods: carbon costs will fluctuate over time and may be marginal within overall costs
- ✦ the need to avoid adding costs and carbon input in order to record and measure.

### 2.3.3 Survey

We don't believe it is viable to calculate the carbon footprint of all on-going maintenance and refurbishment of all properties in the UK. An option would be to carry out a sample survey using some landlords and contractors based on a number of building archetypes and geographical locations. This would provide some better hard data to influence decision-making and to cost sustainability, as at present some good practice has been identified from taking products/services in isolation. Experience is revealing that it is important to take into account the impact on other areas of the sustainability agenda. Longer term contracts covering a wider range of maintenance activities should lead to reductions in the carbon footprint and whole life building costs, but these may impact on smaller contractors and local employment. We have addressed this potential issue by including local employment and materials in our assessment rating proposals.

## 2.4 Sustainability Code

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Despite the complexities, there is a growing world-wide consensus that carbon should become a new currency so that consumers and businesses are rewarded for making carbon-friendly choices. Given these complexities however, we opted to investigate whether the introduction of a Code to evaluate building owners' and contractors' carbon-friendly and sustainable behaviour would be of more use in altering behaviour and providing measurable outcomes than the development of a whole life costing model.

Our starting point was the Code for Sustainable Homes. This rates:

- energy and water efficiency
- materials
- waste
- pollution
- health & well-being
- ecology

These are all transferable to the maintenance and improvement of the existing housing stock. We also considered other activities which play a particular role in improvement:

- resident involvement
- local employment and community sustainability
- contract form, specification and evaluation
- reactive v. planned maintenance
- logistics
- relationship with development and new build
- funding and regulation

The group considers that a Code which evaluates the green credentials of what is being done to a dwelling will be a more useful measure than a gap analysis (as with Decent Homes) of the shortfall against a fixed national green standard.

Group one have developed a viable sustainability code (CfSH-R) which is fully endorsed by group 2. The assessment model developed by this group supports the above code but additionally offers a mechanism to encapsulate the code within a contractual arrangement. Our approach is to establish pre contract, construction phase and completion environmental plans in a similar process to the CDM regulations but from an environmental perspective. Method statements for reactive maintenance could also be required to set out environmental plans which meet certain criteria.

## 2.4.1 Measurement

We looked at what a sustainability assessment model might look like and provide an example for illustration purposes. This model identifies four steps which are considered key:

- Design – need for constructor involvement in the design stage
- Evaluation – award contracts on the best cost/value solutions which incorporate sustainability
- Construction phase – is the plan being implemented as anticipated
- Monitoring – are the desired objectives being achieved

The model should be simple, workable and minimise administration. As well being a pre-decision making tool, it could be used to monitor contract performance. The model is better suited to refurbishment and maintenance schemes rather than to individual private residents, where work would need bundling up or incentivising by other means. The rating would be similar to that in place for domestic appliances ie rated against a scale ranging from very energy efficient/lower running costs to not energy efficient/higher running costs. Funding is key and it is envisaged that a higher rating or positive progress would attract more money. It is a partnering approach, with performance being linked to profit.

A suitable tool for this process maybe T-Zero, the web based reference/measurement system developed by BRE. Using this evidence based reference system, appropriate judgments and decision making tools can be used to assess proposed actions within any proposal scheme or supply chain contract structure.

Sustainable Improvement In The Existing Housing Stock								
Contractual Assessment Rating Model			Assessment					
			0	1	2	3	4	5
<b>Design (Planning Phase)</b>								
ec1	Sustainable Materials					✓		
ec 2	Recovered / Recycled Materials						✓	
ec 3	Customer / Tenant Involvement choice						✓	
ec 4	Planned Maintenance Programmes						✓	
ec 5	Commercial Justification						✓	
<b>Evaluation</b>								
	Sustainability In The Contract Assessment				✓			
2	Contract Evaluation Procedure				✓			
3	Local Workforce					✓		
	Local Materials					✓		
<b>Construction Phase</b>								
n	Compliance Audit Process					✓		
n	Site Waste Management Plans					✓		
n	Reporting & Monitoring Plans							✓
<b>Monitoring</b>								
n 1	Post Inspection Reports							✓
n 2	Feedback Loop (Anticipated Vrs Actual Performance)				✓			
n 3	Customer / Tenant Satisfaction Measure / Education				✓			
<b>Total</b>	<b>48</b>	<b>Rating C3</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>15</b>	<b>20</b>	<b>5</b>
<b>Rating</b>			<b>Assessment Scoring</b>					
<b>A</b>	<b>66 - 75</b>	} <b>Range</b>	<b>0</b>	<b>No Provision</b>				
<b>B</b>	<b>56 - 65</b>		<b>1</b>	<b>Little Provision</b>				
<b>C</b>	<b>46 - 55</b>		<b>2</b>	<b>Attempt Made</b>				
<b>D</b>	<b>36 - 45</b>		<b>3</b>	<b>Good Attempt</b>				
<b>E</b>	<b>26 - 35</b>		<b>4</b>	<b>Adequate Provision</b>				
<b>None</b>	<b>Below 25</b>		<b>5</b>	<b>Full Provision</b>				

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## Rational

The model is for illustration purposes and is designed to show the concept only. It identifies the areas considered as the 4 key steps that need to be fully considered prior to a project commencing.

In simple terms they are, Design, get the design right and you are on a sound foundation, often constructor involvement is only from tender stage. Evaluation, award the contract on the best commercial viable sustainable solution. Construction phase, is the plan being implemented as anticipated. Finally, Monitoring, as the project progresses is the plan working, are we achieving the desired objectives. It could be adopted as a KLOE when appointing contractors or distributing funds.

This limitation ensures the model stays simple, workable and reduces the usual bureaucracy.

It is a pre-decision making tool and does not look at the project retrospectively as the opportunity is often lost by then.

The model is better suited to a scheme rather than individual private residents which would need bundling up or incentivisation by other means.

The rating would be similar to that of electrical appliances, A,B etc than refined dependant on the score they achieved, e.g. A1, A2 down to no rating.

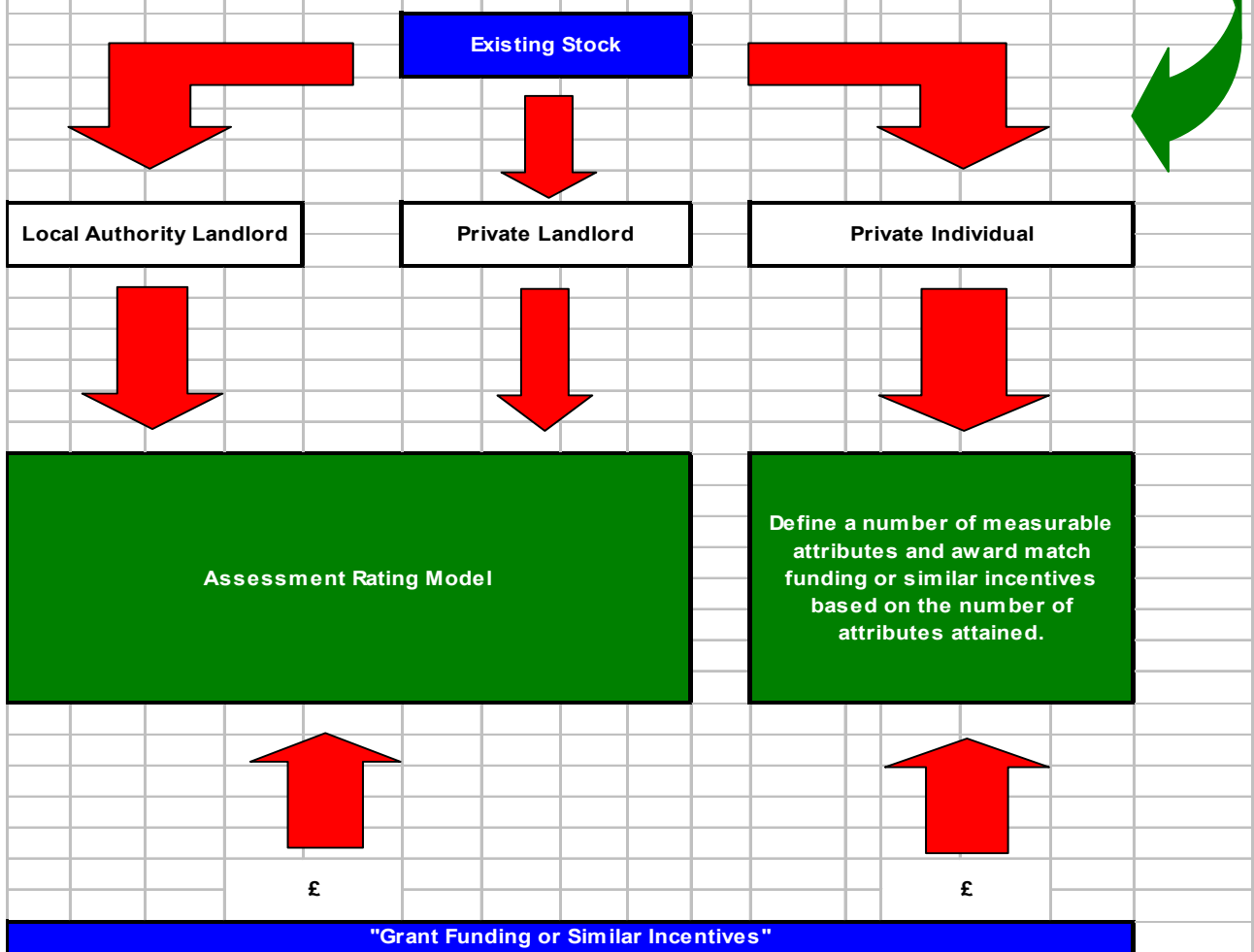
Grant funding is key and it is envisaged that a higher rating or positive progress would attract more money to deliver the project.

It is also seen as a partnering approach and would form part of any new contractual arrangements which promote long term relationships. Under achievement would hit both landlord through loss of grant money and constructor in terms of lost future works.

**Resident / Private Owner Incentives**

- 1 Tenants being part of the decision making process from inception
- 2 Evidence based approach (proof) - better information
- 3 Interest free loans offset against energy savings
- 4 Significant reduction in energy costs
- 5 Free advice service
- 6 Free home energy surveys - including what if scenario's
- 7 Free home information packs for anyone who takes up an approved scheme
- 8 Reduced rent or free whilst works on going
- 9 Reduced council tax for a period of time
- 10 Customer satisfaction information linked to original claim for improvement

We need to "tap" into the natural instinct of people to do the right thing.



## 2.5 Obstacles & Blockages

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The way the industry is currently structured presents a number of disincentives to improving sustainability. Since the Code would be implemented in order to improve performance, it's vital to identify obstacles and blockages, reward their removal and avoid creating more. Some examples:

- Organisational structure eg lack of co-ordinated decision making by development and asset management departments
- Legislation eg contract terms
- Costs of implementing sustainable activities eg higher set up/capital costs
- Timescales eg payback times may be long term
- Technology eg new components, IT
- Geographical stock profile
- People: hearts and minds

## 2.6 Good Practice/drivers For Sustainable Improvement

### 2.6.1 Maintenance Regimes

The group considered how the type of maintenance regime impacts on whole life costs and sustainable improvement.

Reactive maintenance is by definition undertaken when it is requested. This type of work is difficult to predict, either in terms of location or demand and particularly in the social housing sector, results in much duplication and waste. Current reactive maintenance operations have a very high carbon footprint in terms of journey mileage and fuel consumption. Term contracts based on SORs and/or of limited scope actively incentivise repeat journeys and increase the whole life carbon costs of buildings. The measurement of carbon usage could therefore persuade the adoption of better planned maintenance regimes and the investment in carbon-friendly products which may have a higher initial cost.

This doesn't mean that reactive maintenance will be eliminated, but the industry should be looking to optimise the proportion of spending on cyclical and planned maintenance and eradicating waste within reactive maintenance. Good practice would include:

- ✦ Investing prudently through reinvestment and planned maintenance programmes so as to maximise preventative maintenance and thereby reduce the total level of future reactive maintenance
- ✦ Creating synergy between maintenance and improvement programmes, void management, major works and development
- ✦ Working in partnership with the supply chain
- ✦ Development of more sophisticated and flexible asset management databases and IT systems for both social housing providers and contractors so that information is readily available for decision making
- ✦ Using contract forms and terms which promote sustainability, rather than work against it
- ✦ Reviewing organisational structures and budget management and accounting practices to ensure they do not act as hindrances to sustainability
- ✦ Increasing the service life of components: encourage fit for purpose design, reward good quality construction and decrease the need for on-going maintenance
- ✦ Planning the delivery of routine reactive jobs eg "batching" jobs in tighter geographical areas in order to reduce journey mileage for operatives and material supply
- ✦ Increasing the number of "first time fix" repairs: use of IT, better trained staff and operatives, better educated residents
- ✦ Involving and educating customers; reward tenants who increase service life and discourage/hold responsible those who decrease it
- ✦ Working with residents to ensure satisfactory thermal comfort standards, promote energy efficiency and contribute to the elimination of fuel poverty

It will also be necessary to review the current legislative and regulatory framework for social housing and contracts in order to identify and remove obstacles and perverse incentives.

## 2.7 Forms Of Contract

The design of contracts for maintenance and improvement works can have a major effect on achieving some of the objectives described elsewhere, such as looking at maintenance 'in the round' or minimising reactive maintenance.

The nature of contractual engagements between housing managers and service contractors, and their potential to have a beneficial effect on sustainability, can be analysed here under the following headings:

### 2.7.1 Risk Transfer

Good outsource contracts are those which maximise value in the supply chain by allocating risk to the organisation most able to deal with it. So it is with sustainability objectives.

We refer elsewhere to looking at maintenance 'in the round' and putting in place better planned maintenance regimes in order to reduce reactive maintenance. Short term single service contracts will not engage the contractor in this objective. Good contractors can play a part in bringing about trade offs between planned and reactive, and between replacement costs for whole life gain.

However, to achieve this, it is recommended that service contracts are long enough to allow the contractor to manage the risk of sustainability objectives and trade off expenditures accordingly.

### 2.7.2 Contract Scope

Contracts which do not allow the broad categories of planned and reactive maintenance to be managed together will set a climate in which reactive costs will tend to rise, thereby incorporating carbon-inefficient labour and transport activity. Combining these two work streams and closer collaboration with development/new build activity also focuses the designers and planned constructors on whole life value. A framework needs to be developed that values whole life not just from a cost and operational perspective but also from an environmental one. One method of achieving this is to measure the carbon impact of replacement cycles to determine the optimum time in terms of environmental impact.

It is therefore likely that a contract with a combined scope will present a better chance of generating a sustainable framework in which planned expenditures can be used to offset reactive costs.

### 2.7.3 Sustainability Code

We refer elsewhere to a recommendation for a Sustainability Code of good practice under which better and greener practice is recognised in a coded, measured outcome.

The characteristics of supply chain contracts can equally be a contributor to such a Code of Sustainable best practice. For example, a contract which was designed to comply with the Code might be required to do the following:

- Record the provenance of all materials added to a house
- Record the waste treatment of all materials removed
- Record the CO2 emissions of all labour and transport used

In this way targets can be set within a contract to improve these values, and those responsible for managing

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housing can have some data and objectives relating to all activity undertaken on the stock in order to be able to demonstrate carbon neutral behaviour.

### 2.7.4 Star Rating

Finally, contracts, used effectively, can achieve many desired outcomes, including sustainability goals. We have noted elsewhere that incentives can be used by all parties involved with housing, including:

- Residents and tenants
- Housing managers
- Service contractors

For this to work within the context of incentivising forms of contract, we suggest that a star rating is awarded to contracts which meet the criteria described above, in addition to the assessment model described elsewhere, and that such a code is the basis for the distribution of funding incentives. For example, higher scores, and therefore a better rating, for:

- Length of contract
- Planned and reactive combined scope
- Material sourcing and disposal code, local delivery and supply chains, etc.

This is an extension of the Audit Commission KLOE principle applied specifically to the sustainable credentials of forms of contract.

## 2.8 Logistics

Addressing the movement of labour and materials is central to a reduction in whole life costing. If the industry as a whole can implement measures to reduce transport miles and carbon fuel consumption, higher sustainability standards will be achieved.

### 2.8.1 Processes

Maintenance and refurbishment can be split into four main processes:

- manufacture of components
- material/product procurement (delivery/collection)
- labour deployment
- waste removal

There are some issues particular to the different processes, but there are common themes and objectives. A lot of good practice has already been identified and implemented via the efficiency agenda (ie to increase productivity/ gains and to reduce costs), although this hasn't necessarily been labelled as carbon friendly good practice, nor identified as reducing the whole life costs of buildings. We would therefore recommend reviewing existing good practice from these two points of view in order to inform a sustainability code. This code could draw on the Code for Sustainable Homes and Audit Commission KLOEs.

It is also necessary to identify obstacles to implementation, such as the set up costs of more efficient vehicles and sophisticated information management systems, and to work towards ridding the industry of perverse incentives, such as short term, limited- scope contracts. If the supply chain is to contribute in a meaningful way to the sustainability agenda, social housing providers will need to build it into specifications and tender evaluation.

### 2.8.2 Common objectives

We identified four principal objectives and looked at some examples of practice which reduces carbon usage:

Reduce transport distances

- Stock rationalisation by social housing providers
- Improvements in task scheduling and management, often IT led eg mobile work management
- Local employment initiatives and manufacture/sourcing of materials

Reduce the number of journeys

- Increase the service life of components
- Synergy between reactive and planned maintenance
- Increase first time fix completions
- Contract type to encourage efficient logistics
- Products/materials available when and where required

Reduce fuel consumption

- Efficient driving practices eg reducing speed from 80 - 70 mph reduces fuel consumption by 5-10 miles

- 
- per gallon  
Reducing load weight eg stop carrying unnecessary tools and materials

Increase usage of alternative fuels

- Introduction of dual fuel and hybrid technology vehicles

### 2.8.3 Waste Management

As identified in our Contractual Assessment Rating Model (CARM) Waste Management and Recycling must be an integral part of any contractual partnership.

There are two ways that partnership can significantly reduce waste.

When a contractor partners on a project, visibility into the exact quantities required can be delivered at a very early stage. This is the first step to eliminating the safety net of over-ordering materials, which are subsequently sent to landfill without being used. "The business case is clear," comments Stephen Ratcliffe, CEO of the Construction Confederation. "Having paid for materials to be delivered to sites, it makes no sense to then pay for them to be disposed of through landfill."

Working with waste management suppliers is an equally powerful tool. Research has confirmed that partnerships give waste managers stable conditions within which to invest in increasing their capacity.

Given the complexities inherent in developing a whole life costing model which captures the wider sustainability agenda, it may be sensible to investigate the collection of industry-wide data on mileage and fuel consumption. This could act as an indicator of carbon footprint measurement of buildings.

## 2.9 Support & Funding From Other Bodies

As the sustainability agenda gains momentum, there will be more and more initiatives and funding streams originating in this and other sectors, in the UK and elsewhere. The London Warm Zone, Low Carbon Buildings Programme, Energy Performance Certificates, IEE-SAVE and the like are likely to be joined by many other such initiatives.

Although much of this will be welcome, each of these bodies will have different criteria for awarding funds. This may make it more difficult to effectively measure the carbon costs of buildings over time. It is therefore important that consistent criteria are applied across all funding regimes to ensure sustainability is encouraged.

This is another argument for focussing on incorporating good practice into a Code within which to rate behaviours, rather than focussing attention on measuring what is becoming a moving target.

## 2.10 Conclusions & Recommendations

The development of a whole life costing model which takes sustainability fully into account is enormously complex. However, we believe it is possible to embed sustainable improvement in the existing housing stock by creating a climate that facilitates and rewards this. This would include longer term contracts, financial rewards (gain/pain share), education of tenants, home owners and staff working in the industry and better communication.

Sub group 2 recommends:

- Reducing the carbon usage of logistics (including stock rationalisation and the movement of labour and materials)
- Increasing the use of whole life costing disciplines is a potentially powerful tool in the pursuit of sustainable housing stock
- Housing stock in public ownership is supported by contractual supply chain structures. This network can be used productively in the pursuit of stock improvement.
- The nature of contract structures within the various supply chains is a critical factor in providing relevant incentives for action and change at all levels, including residents and tenants.
- Practical and existing measurement systems and Codes should be used wherever possible, for example the BRE T-Zero concept.
- The group has developed a Code for assessing the sustainable value of supply chain relationships. This may be used as a summary assessment or Star Rating for the efficient distribution of funds designed to achieve sustainability.

## 3 Raising the Game for Decent Homes

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### 3.1 Introduction

Sub group 3 have been looking beyond the issues of Sustainability Standards, practical measures and whole life cost models for new or retro fit components for the existing housing stock. We have been looking at the future potential for incorporating sustainable elements within the existing housing stock.

We have considered this future potential in the context of the 5 key aspects set out in the Chairman's Interim Report dated October 2007 in respect of the existing untouched housing stock:

1. The effectiveness of the Decent Homes programme in relation to the sustainability of the existing stock.
2. Identifying the untouched stock and the "opportunity" which still could be achieved if changes were made.
3. How the Decent Homes programme is not addressing the longer term sustainability issues.
4. The impact of changing climate and demographics on the existing housing stock and the potential for incorporating more flexibility.
5. The impact of a sustainable housing stock on the current drive towards developing Sustainable Communities.

We have considered each of these elements individually but have found that inevitably there are common themes and an element of interdependence which run through these aspects and we have identified these in our conclusions.

Through our research we have also been able to identify a working model which is currently being utilised in making the existing housing stock more sustainable on a borough by borough or region by region basis. We have investigated the potential to develop this model for rollout on a national basis as means to demonstrate the level of "opportunity" that exists immediately beyond Decent Homes standards within both the public and private sectors for making the existing stock more sustainable.

We have also looked beyond the Decent Homes extended target end date of 2012 to establish the scope for incorporating longer term initiatives within the existing stock to deal with changing climate, demographics and deliver greater flexibility in the housing stock to develop more Sustainable Communities.

## 3.2 The effectiveness of the Decent Homes programme in relation to the sustainability of the existing stock.

With the Decent Homes standard currently making no specific reference to or setting any targets in respect of the sustainability agenda we consider that the Decent Homes Programme has had minimal effect on the sustainability of the existing housing stock since it has been purely focused on bringing as much of the existing housing stock in line with current standards of decency.

Moreover the restricted scope of the Decent Homes standard; upgrades to kitchens, bathrooms, heating and rewires does not provide opportunity to make significant improvement upon existing facilities; it merely facilitates modernisation of these facilities.

There is no requirement within the standard to carry out regular reviews in respect of potential to incorporate new technologies. The urgency of delivering against the sustainable agenda is generating high levels of innovation and new technologies in the market place which need to be evaluated for incorporation into the existing housing stock. The standard should include therefore a requirement to provide an element of innovation or new technology within the existing housing stock as part of the overall improvements being carried out.

The requirements of the Decent Homes standard do in fact conflict in a number of ways with sustainability agendas:

- Stripping out of redundant kitchens, bathrooms and heating systems generates significant amounts of waste
- Manufacturing and transport of new components contributes significantly to CO2 emissions
- The limitations imposed by the type and condition of the existing stock are not conducive to the introduction of significant sustainable measures
- Funding is limited and price therefore drives the procurement process rather than the sustainable agenda
- Meeting housing need by providing decent accommodation takes priority over meeting the sustainable agenda which is seen as fairly low priority in the hierarchy of needs
- The standard does not address the issues of fuel poverty, affordable warmth or thermal comfort which are fundamental to the sustainability agenda

We therefore recommend that there should be a second round of improvements to the existing stock geared to a "Green Homes" standard to take the stock beyond the Decent Homes standard towards a higher level of sustainability.

### 3.3 Identifying the untouched stock and the “opportunity” which still could be achieved if changes were made

After completion of the extended Decent Homes programme in 2012 all public sector owned stock will have been upgraded to current decency standards in respect of the more visible elements such as kitchens, bathrooms, heating and rewires. Other important issues such as fuel poverty, thermal comfort and acceptable affordable warmth however will not have necessarily been addressed by the Decent Homes programme as these issues are specific to the people occupying the dwelling rather than the fabric of the dwelling itself.

Similarly with the privately owned stock by the end of the Decent Homes programme, if not before, the London boroughs and local authorities will have an accurate indication of and be required to identify the level of decency of this stock within the local authority’s area.

Key Opportunities which still could be achieved include:

- Addressing people/household issues in respect of affordable warmth, fuel poverty and thermal comfort through utilisation of the London Warm Zone Model to optimise available funding and deliver the most practical solutions to suit each situation.
- Achieving consistency across all stock - existing untouched and new stock. Achieving consistency of language across the codes (Code for Sustainable Homes, EcoHomes XS) through adoption of Group 1’s proposed standard “The Code for Sustainable Homes - Refurbishment (CfSH-R) will drive understanding of sustainable requirements and lead to material and component innovation, standardisation and best practice.
- Adoption of a “works execution” standard for all works carried out under Decent Homes Programmes as defined by Group 1 in their report ‘Towards Sustainability for Existing Housing Stock’. The works execution standard would be used to measure how sustainably the improvement works are carried out.
- Development of a robust supply chain for delivering sustainable solutions to include local labour and employment, SME and SME involvement together with a strategic approach to logistics incorporating consolidation centres nationwide.
- Expanding the remit of existing procurement clubs beyond decent homes to include sustainable materials and components.
- The opportunity not to do nothing - refurbishment of the untouched stock is far more sustainable than the demolition and new build alternative so we should be embracing the 2050 target for the existing stock.

## 3.4 How the Decent Homes Programme is not addressing the longer term sustainability issues

The requirements of the Decent Homes standard do in fact conflict in a number of ways with sustainability agendas as we have highlighted thus far in this report. Moreover in the longer term the Decent Homes programme is failing to address sustainability issues in a number of ways:

- Waste and recycling - the construction processes associated with the Decent Homes programme by their very nature generate a high volume of waste together with the rendering of redundant some white goods and appliances. There are no provisions within the standard for dealing with the long term recycling and disposal requirements arising from the programme works and this requires addressing through a “designing for recycling” initiative within both current and future programmes.
- Distribution and incorporation of Sustainable materials and components - a long term strategic approach needs to be developed for sourcing materials from sustainable sources (FSC chain of custody type model), incorporating and investing in local supply chains to mitigate the impact of carbon miles, utilising and developing logistics companies to optimise transport arrangements and mitigate CO<sub>2</sub> emissions, incorporating energy saving appliances wherever possible.
- Water conservation - will become a major consideration for the future as global warming affects our climate and water becomes an even more precious resource. Mandatory regulations are required for new sanitary ware being installed as part of Decent Homes programmes to accord with the Code for Sustainable Homes in respect of water conserving appliances. For the longer term serious consideration needs to be given to the incorporation of grey water recycling facilities within the existing housing stock. This could commence simply with the provision of water butts followed by a separate programme for the installation of dual water systems to accommodate grey water recycling.
- Assessment mechanism and funding optimisation model - one final aspect concerning longer term sustainability issues for the existing housing stock is the requirement to catalogue the existing stock with regard to energy performance and thermal comfort and to use this information to optimise available funding for future sustainable improvements. The proposed London Warm Zone Model already deals with these issues effectively borough by borough or region by region and could be rolled out on nationwide basis.

## 3.5 The impact of changing climate and demographics on the existing housing stock and the potential for incorporating more flexibility

The introduction of flexibility will be required within the existing housing stock to include future facilities beyond the Decent Homes standard together with a mechanism to review the existing housing stock at regular intervals to ensure that it remains flexible and adapts to changing climate conditions and demographics whilst still taking a realistic approach to remediation. Some of the elements which should be accommodated within this flexibility should include:

- Incorporation of facilities for renewable energy generation within the existing stock is a longer term issue that requires addressing beyond decent homes.
- More critical will be providing facilities to adequately deal with global warming issues such as cooling homes within the existing housing stock as global warming impacts on peak day and night temperatures during the summer periods. Flexibility to deal with increased flood risk resulting from global warming will also be an issue and will necessitate location of electrical sockets and other perishable components at higher levels above floor and flood levels.
- In the longer term technological advancements need to be accommodated within the existing housing stock to continue the sustainable nature of the stock. Intelligent components are currently being developed for service installations such as weather compensated and optimised heating controls for boilers to regulate ambient temperatures to agreed household comfort levels and reduce the over-use of fuel. Intelligent materials using nanotechnology are also being developed for decorations and soft furnishings to help the home passively manage temperature fluctuations without utilising fuel to do this mechanically
- The flexibility of the stock to adapt to the changing demographics of the building occupants is also an issue that requires addressing beyond Decent Homes to include facilities for frail, elderly and disabled occupants such as lever taps on sanitary ware and flexible height kitchens. Other considerations resulting from changing demographics need to include provision for multi age group and large family units from ethnic sections of the community.

## 3.6 The impact of a sustainable housing stock on the current drive towards developing Sustainable Communities

Creating Sustainable communities is about creating places where people want to live and stay. It has been recognised that alongside the challenges of making the existing stock sustainable limited scope in the stock, poor job prospects and poor services can drive down the quality of life in the neighbourhood and make it very hard for people to achieve their potential.

As a starting point the Decent Homes standard needs to be extended into the neighbourhood to bring together the physical aspects such as landscaping, lifts and security with social and economic elements in a cohesive manner to instigate sustainable community initiatives. Creating decent neighbourhoods and sustainable communities is not currently a specific requirement of the Decent Homes Standard and the creation of decent homes followed by a sustainable housing stock will not necessarily be the catalyst for creating sustainable communities alone.

Decent Homes programmes often provide a catalyst for re-establishment of active resident involvement and community stewardship via the community engagement, communication, involvement and employment initiatives being implemented by the contractors delivering these decent homes programmes. These initiatives need to be sustainable beyond completion of the decent homes and environmental works programmes.

Currently initiatives for reducing unemployment, promoting health and safety, positive self image, a sense of pride and reducing crime and vandalism are largely unfunded and administered through Local Area Agreements and Neighbourhood Strategy. A more strategic approach is required with key principles which include effective income mixing, innovative approaches to finance, intensive neighbourhood management, attracting and retaining residents and high quality public services. The need for communities to provide opportunities and incentives for all, including the most vulnerable, must underpin this long term strategic approach to creating diverse mixed tenure, mixed income communities within our existing housing stock.

These issues are endorsed by both the GLA's report on Community Land Trusts and Mutual Housing Models 2004 and the ODPM's Sustainable Communities Plan 2003 where key requirements identified include "effective engagement and participation by local people, groups and businesses, especially in planning, design and long-term stewardship of their community, and an active voluntary and community sector" as well as "a well-integrated mix of decent homes of different types and tenures to support a range of household sizes, ages and incomes".

## 3.7 Conclusions and Recommendations

Sub group 3 have been looking beyond the issues of Sustainability Standards, practical measures and whole life cost models for new or retro fit components for the existing housing stock. We have been looking at the future potential for incorporating sustainable elements within the existing housing stock and would make the following recommendations:

1. Serious consideration should be given to extending current and future Decent Homes programmes to introduce measures to deal with fuel poverty, affordable warmth and thermal comfort as part of these programmes. We would recommend that the London Warm Zone Model appended to this report be used as a model for incorporating these measures with remaining Decent Homes Programmes.
2. Generation and disposal of waste from refurbishing the existing housing stock requires addressing for the remaining Decent Homes programmes as the recycling potential for this waste has not been fully optimised. We would recommend a "designing for recycling" initiative for remaining programmes which should be carried out by the contractor when carrying out the initial scoping survey. Under the Considerate Constructors Scheme the contractor should complete environmental impact and aspect assessments for the work to be carried out and summarise these on the site waste management and recycling plan to instigate an optimised approach to recycling and disposal.
3. Material and component procurement is a major issue that requires a review within the remaining Decent Homes programmes with respect to future sustainability in the supply chain. We would recommend the use of logistics companies and distribution centres in conjunction with procurement clubs to optimise the manufacturing, procurement and delivery processes and reduce CO2 emissions and carbon miles for components used within the refurbishment of the existing housing stock.
4. There needs to be a second round Decent Homes type programme applied to the existing housing stock to develop its future sustainability potential beyond Decent Homes. We would recommend that this programme is called "The Green Homes Standard" to emphasise the sustainable nature of what is to be included in the programme. This standard should include a requirement to include an element of innovation, new technology and flexibility for adaptation within the existing housing stock to suit changing climate conditions and demographics. This new standard should be extended into the neighbourhood to bring together the physical aspects such as landscaping, lifts and security with social and economic elements in a cohesive manner to engender a sense of pride in the community and instigate sustainable community initiatives.

## 3.8 References

The Code for Sustainable Homes  
From Decent Homes to Decent Communities 2006 - DCLG  
The London Warm Zone Initiative - London Warm Zone  
The Changing Rooms Initiative - Black Country Housing Group  
Report on Community Land Trusts and Mutual Housing Models 2004 - GLA  
Sustainable Communities Plan 2003 - ODPM

