

# **Developer Strategies for Sustainable Development in the UK: Redevelopment versus Refurbishment and the Sustainable Communities Plan**

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**Key words:** sustainability, housing, and construction

## **SUMMARY**

The UK development industry has remained positive in its attitude towards sustainability with, for instance, housebuilding on brownfield land no longer the preserve of specialists. According to previous research undertaken at The College of Estate Management in 2005, developers are also more willing to employ new techniques. Greater use is being made of modern methods of construction, such as structural insulated panels and timber framing alongside the implementation of environmental quality standards, namely EcoHomes, Standard Assessment Procedure (SAP) Ratings and the UK Sustainable Building Codes. However, construction firms generate more than 70 million tonnes of waste each year and up to 80% of this waste could be reusable. This represents a massive opportunity for the industry to develop new strategies for sustainability. Whilst the concept of sustainable construction and sustainable development is widely acknowledged and accepted in UK public policy, the fundamental challenge is establishing a reasonable and reliable measure of these objectives in order to support decision-making strategies for developers. Furthermore, without a quantitative framework, progress with sustainable construction is likely to be jeopardised. The establishment of a suitable set of indicators should allow policy makers and practitioners to understand better the balance that has to be achieved between social, economic and environmental benefit.

The debate contained within this paper, which has focused on redevelopment versus refurbishment, would suggest that a greater level of certainty is required in decision-making processes, especially when assessing individual sites for development potential. This paper analysed results from a survey sent to over 3,000 house builders, architects and professional advisors carried out in 2006, to establish current strategies to meet the objectives of the UK sustainable development agenda. Survey respondents were also given the opportunity to make recommendations to improve the reliability of the assessment process. This paper assesses available methodologies for comparing the relative sustainability of new build housing versus refurbishment. The main objective is to recommend methods that can be used effectively at the feasibility stage to assess a scheme's environmental performance and to add value to other commercially available decision-making toolkits (for instance, BREEAM standards and the EcoHomes ratings). These findings therefore have important ramifications for UK regeneration policy related to the government's Housing Market Renewal programme, as well as the wider UK Sustainable Communities Plan.

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## **1. INTRODUCTION**

Whilst the UK has a well-established approach to sustainable development, the construction industry has been criticised, largely due to the energy-intensive nature of the industry. Residential property contributes 27% of carbon emissions and its construction places a substantial burden on timber and water resources (Entec, 2004). It is anticipated that up to 25% of these emissions could be saved cost-effectively (Department of the Environment, 1997). Further, in terms of waste management, UK construction firms generate more than 70 million tonnes of waste each year and according to the BRE (Building Research Establishment) up to 80% of this waste could be reused. Together with the government's current drive towards increasing the sustainability concept within residential development, this represents a massive opportunity for the industry to develop new strategies for sustainability. Firms should begin to ensure that every stage of the construction process is monitored in order to improve working practice, particularly the reduction in wastage through reuse of materials.

However, it would appear that the construction industry lacks a full appreciation of sustainable practices, particularly because of the absence of a suitable set of workable indicators for projects and residential developments to be assessed. Many practitioners are unclear on exact definitions of 'sustainable development', its potential benefits and a general lack of cooperation amongst stakeholders has also impeded progress (Waters, 2006; Dixon *et al.* 2005a). Recent research published at The College of Estate Management has already indicated that several barriers exist that are currently restricting progress towards sustainable practices, and these include a lack of fiscal incentives, poorly defined planning goals and building regulations and prohibitive costs associated with achieving the desired high environmental standards (Dixon *et al.* 2005b). In addition, Waters (2006) explains that at present consumers appear to be unwilling to pay more for 'eco-property' and this has restricted progress in innovative techniques applied within the sector.

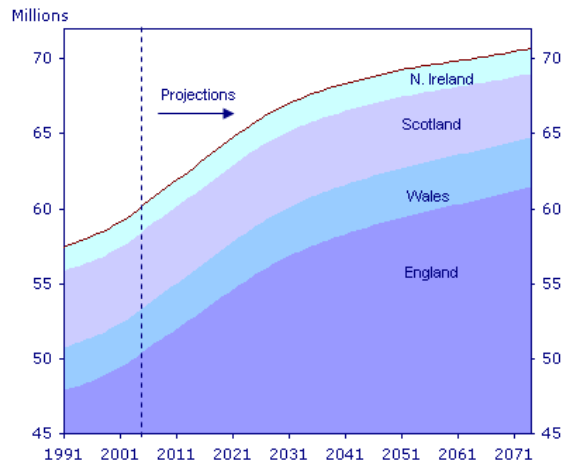
In order to address some of these issues, this paper examines:

- The background and policy context to sustainable construction in the UK;
- Development pressures in achieving sustainable targets, using the example of the redevelopment and refurbishment debate; and
- How the UK development industry is responding to the challenge of integrating sustainability into their working practice, particularly in terms of the monitoring process.

## 2. BACKGROUND AND POLICY CONTEXT

### 2.1 The UK Sustainability Agenda

The UK political agenda has centred on the need for sustainable development, particularly over the last thirty years where the global significance of related issues such as tackling climate change has been considered paramount, as demonstrated through the signing of the Kyoto protocol. National government through its climate change strategy aims to reduce UK carbon emissions by 20% by 2010 (over 1990 levels) and recognises that the residential sector has a large part to play in the development of the UK sustainable agenda, given that 27% of UK carbon emissions are produced by the construction, maintenance and use of residential property. According to the department of Communities and Local Government (CLG), the number of households in England is also projected to increase from 20.9 million in 2003 to 25.7 million by 2026, an annual growth of 209,000. Furthermore, with the population in the UK expected to reach 7 million by 2030 (see Figure 1), the UK development industry must set realistic targets and establish sustainable working practices to reduce the current exponential trend of CO<sub>2</sub> emissions.



**Figure 1** Estimated population growth in UK (1991-2071)

With an increased demand for new housing, there is also the conflicting demands of environmental preservation. The reuse of former industrial land has become the main focus of the UK development industry. The Government target (under PPG 3) is to provide 60% of new housing on previously used urban land (including the conversion of existing buildings) and statistics suggest a willingness to develop brownfield sites to this end (CLG, 2006; Office of National Statistics, 2005; Dixon *et al.* 2005). However, a key challenge for the development industry is further complicated by the development pressures related to the release of this land, higher density developments and housing shortages. In terms of residential development, the UK Government's sustainable development agenda is based on the concept of meeting four concurrent objectives (DETR, 2000):

- social progress which meets the needs of everyone;
- effective protection of the environment;
- prudent use of natural resources; and,
- maintenance of high and stable levels of economic growth and employment.

The CLG recognises that a sustainable community should comprise:

*. . . places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all. (ODPM, 2003a)*

To meet future growth and achieve such sustainable communities, the UK government launched the Sustainable Communities Plan (SCP) in February 2003, being a long-term strategy for delivering sustainable communities in both urban and rural areas (ODPM, 2003a). This strategy combines both new build (within identified growth areas) as well as refurbishment under the so-called Housing Market Renewal (HMR) Pathfinder Schemes. According to the Department of Trade and Industry (DTI, 2006), there is a wide range of factors, which are now encouraging developers to adopt sustainable practices. Thus:

- sustainable development is a core objective of UK and European Policy with the requirement that 20% of national CO<sub>2</sub> emissions are cut by 2010 (based on 1990 levels);
- sustainability is central to UK planning policy (e.g. within its Planning Policy Statement (PPS) 1 and PPS 22);
- it is a legal requirement that sustainability appraisals are undertaken as part of regional and local planning policy;
- the landfill tax, aggregates levy, climate change levy, stamp duty exemption for deprived areas, have all been introduced to provide economic incentives;
- development agencies are tasked with promoting sustainable development and are building requirements into procurement processes; for example, requirements to meet EcoHomes or the Building Research Establishment Environmental Assessment Method (BREEAM) rating targets; and
- forthcoming legislation including the Energy Performance of Buildings EU Directive and updates to Part L (Conservation of Fuel and Power) of the Building Regulations and the Implementation of the Sustainable and Secure Buildings Act will increase minimum standards relating to sustainable construction.

Furthermore, it has become widely accepted that holistic strategies are required to address the high levels of energy consumption in UK cities (Waters, 2006; RICS, 2006; DETR, 1999; Boardman, 1998; Department of the Environment, 1997), reducing energy, waste and cost.

## **2.2 Redevelopment versus Refurbishment**

The issue of redevelopment of existing dwellings or their retention and refurbishment is complicated by the long-standing debate amongst the UK development sector surrounding the retention of buildings which are seen to contribute to the heritage of a location, and particularly within the realm of urban redevelopment. There is widespread acceptance within the planning and academic community of the reuse of historic buildings (English Heritage,

2005; Raco and Keogh, 2004), at least in part because it accords with the ideal of conserving 'embodied energy'. To demolish and redevelop such properties would both lose that embodied energy and expend further energy during the construction process. In addition, vast quantities of waste would be created. Public perception is generally extremely supportive of retaining existing dwellings, seeing them at least in part as contributing to the sense of place, and therefore the sense of belonging, and heritage associated with the location. Refurbishment, as a process, expends less energy than development processes, although in situations where the configuration of buildings and street patterns is inconvenient to modern living, redevelopment has other attractions.

According to Yates (2006), more than 4 million homes in the UK were constructed pre-1919, so the ability to reuse and refurbish these properties to modern standards represents a positive step towards sustainable construction. However, there is the premise that changing economic and social conditions has turned this legacy into a liability because of the high costs of maintenance, the financial attraction of redevelopment and thus the increased housing demand threatens historic interest (Cullingworth and Nadin, 2005). Developers therefore face an immense challenge in balancing the demands of changing demographics and increased demand for property, against the preservation of heritage as represented by refurbishment proposals. Such issues have been raised most recently in the HMR programme – a government initiative that seeks to tackle low demand (typically across the Midlands and Northern England) by regenerating the local housing markets. This initiative has sparked much debate over the benefits and disadvantages of refurbishment over demolition and new build. Undoubtedly in order to secure the retention of historic buildings, the development community must provide an economic base for their conservation, often involving the creation of new uses.

Conversely, a key rationale for the demolition of large areas of existing housing in some parts of the UK is their poor environmental performance, non-compliance with modern building regulations and the absence of demand for its continued ownership or occupation, coupled with evidence of huge costs involved in refurbishment. While developers are able to reclaim value-added tax (VAT) on expenditure on new build, they are unable to reclaim the 17.5% VAT on refurbishment projects – this additional cost can be make or break for the financial viability of a proposed scheme. Thus, the UK tax system discriminates against refurbishment and in favour of demolition and new build.

Therefore, the situation of appraising sites on the basis of redevelopment or refurbishment can be complex, with competing demands, and thus it has become essential to evaluate the various options early in the decision-making process. To reflect truly sustainable practice, schemes should be assessed on a whole life cost basis, with equal consideration to the social and environmental benefits over the entirety of the useful life of the building (e.g. energy performance, public transport facilities and health care), and not merely on the initial construction costs.

## 2.3 Assessing Sustainable Construction in the UK

As with commercial property, the ownership of residential units is transferred to the end user and, unless sustainability features command a premium in the market, there is little incentive for developers to consider the range of sustainable measures, such as reduced energy consumption, and this has restricted progress on the introduction and monitoring of sustainability during phases of construction. Historically, the UK construction industry has focussed on the initial and economic cost of project delivery. However, the Government is increasingly attempting to control the environmental standard of residential property through the planning system, most recently by the introduction of sustainable building codes, working alongside existing EcoHomes ratings. The Code for Sustainable Buildings, launched in 2005, seeks to rate the environmental performance of buildings on a 0 to 5\* scale (with the highest rating representing 'carbon neutral'). However, at present these codes suffer from a non-mandatory status as well as the challenge of addressing the environmental performance of older stock. The Royal Institution of Chartered Surveyors (RICS), in a recent response to the Department of Trade and Industry's UK Energy Review, felt a more prescriptive form of assessing environmentally-sound buildings, together with quantifiable indicators are required (RICS, 2006). Hemphill *et al.* (2004) also highlight that:

*'...sustainability indicators can be meaningful provided that they are applied at the appropriate level, although there is a lack of consensus in the literature about what indicators should be used to measure sustainability and how these indicators should be measured and scored.'*

This debate would suggest that a greater level of certainty is required in decision-making processes when assessing individual sites for development potential and more importantly the options for the retention of existing stock or the prospects for its replacement with new build development. It seems clear that both options require an appreciation of innovative sustainable construction and day-to-day operational efficiency in order to meet the objectives of sustainable development. Hence, the measurement of progress is fundamental and this can only be achieved with the use of a suitable set of indicators. Furthermore, it has been acknowledged by Chartered Institute of Builders (CIOB) that requesting sound monitoring tools for practitioners to assess sustainability may be considered a competitive advantage in the marketing of eco-property. A number of common toolkits exist and a brief description of these toolkits are outlined in Table 2.1.

**Table 2.1 Assessment methods for sustainable construction in the UK**

Toolkit	Brief description
<b>EcoHomes</b>	This is predominately used for new builds or major refurbishments and assesses the environmental performance of residential dwellings. Assessment is undertaken both at the design stage, which gives the opportunity to make adjustments to the specifications prior to work commencing and post-construction to monitor the achievements. The scheme establishes best practice criteria for a broad range of environmental issues ranging from climate change, use of resources and impacts on wildlife and the need for a high quality internal environment. Licensed assessors compare developments on a rating system of pass, good, very good or excellent.
<b>EcoHomes XB</b>	EcoHomes XB is a separate tool for the assessment of existing buildings, applied to assess minor works and minor refurbishments. It is organised around a number of environmental measures and indicators including: management policies (energy efficiency and labelling); energy (fabric loss, heating systems, SAP rating); access to public transport; pollution (zero emission energy sources); water usage; health (internal and external private spaces, controlled ventilation) and waste reduction/management.
<b>SAP</b>	This is the UK Government's Standard Assessment Procedure (SAP) for the energy rating of residential buildings and forms part of the national methodology for calculating the energy performance of building to show compliance with Part L of the Building Regulations (England and Wales). A SAP rating is required for both new homes and dwellings undergoing significant alterations (such as an extension).
<b>Envest</b>	Envest 2 is a web-based tool, designed to simplify calculations relating to the environmental and whole life costs of building, allowing for easier comparison to be made about different strategies in a way that allows for the environmental and financial tradeoffs can be fully understood. A buildings design elements are input (height, roof covers, number of storeys, etc), and the system identifies which element have the greatest environmental impact and allows for the effects of choosing different materials to be seen. The system can also be used to evaluate different strategies of heating, cooling and operating the building.
<b>Environmental Profiling</b>	BRE's methodology for environmental profiling of construction materials was introduced in 2001 and allows for the independent assessment of construction materials and products in terms of their environmental performance in both their manufacture and use. The scheme works by way of certification, which can be used to demonstrate a company's environmental performance. The profile is based on 13 environmental indicators and a Building Research Establishment (BRE) Ecopoints score, which compares the environmental impact of the product against the impact of a typical person in the UK for a year.

<b>Considerate Constructors Scheme (CCS)</b>	This scheme was introduced in 1997 to improve the image of the construction industry and is a voluntary code of practice for those involved in a construction site to sign up to. The Code commits those in the Scheme to be Considerate and Good Neighbours, as well as Clean, Respectful, Safe, Environmentally conscious, Responsible and Accountable. The scheme is administered by the site advertising by way of posters that they are part of the CCS and inviting members of the public to contact the site manager of scheme's office if they have a comment or complaint about the site, which will then mean a set of disciplinary procedures are followed.
<b>BEQUEST</b>	This is an international framework designed to offer a tool or procurement protocol to support decision-making for a sustainable built environment. It uses a variety of indicators and gives consideration to relevant environmental and sustainable development issues. It examines sustainability (e.g. ecological integrity, community participation, futurity of plans, cultural heritage and forms of settlement) in relation to key stages of the construction process examining, for instance, key issues, consultations, procurement methodologies and monitoring itself.
<b>Sustainable Building Codes</b>	This is a voluntary initiative launched in 2005, aimed at promoting changes in construction practices which are designed to be more sustainable. It requires that building use energy, water and other materials more efficiently and that the practices are designed to safeguard occupants health and well-being. The goal of the code is to become the national standard for sustainable building which is demanded by consumers.

A suitable amount of progress is also being made with the establishment of a common set of indicators to measure the sustainability of residential development projects in the UK, although these are still seemingly criticised for lacking clear objectivity and offering an inadequate amount of information for sound management.

### 3. RESEARCH METHODOLOGY

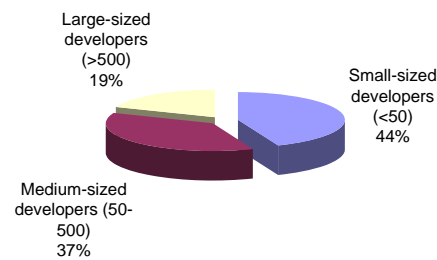
The background and policy sections of this paper have highlighted several key themes:

1. There is a growing awareness of sustainability within the UK construction industry, promoted largely through government policy. However a standard definition or measurement criteria is lacking;
2. A robust toolkit or set of indicators is required to enable practitioners to measure the sustainability of residential schemes; and
3. It has been shown that UK practitioners have been slow to adopt measures of sustainability, largely due to economic and financial considerations, together with the omission of a well-established consumer market for eco-property in the residential sector.



To investigate these themes further, a national postal survey of house builders (both private and social), together with a number of professional advisors including architects, building and quantity surveyors was undertaken between November-December 2006, in order to gather their opinions on the drive towards sustainable development within the residential sector. Of the 2,767 questionnaires sent out, 217 responded positively in terms of their involvement with UK residential schemes and therefore this represented a survey response rate of 7.8%. The sample was separated further to reflect the scale of residential projects worked on and this classification is shown in Figure 2.

**Figure 2** Proportion of survey responses (based on number of units per annum)



For the purpose of this research analysis, the classification of housebuilder size was taken by analysing a frequency distribution of annual unit outputs, sourced from the UK Top 100 Housebuilders Annual. It was deemed important to use this template of size classification to assess whether the size of a company (based on units per annum) was associated with the measurement and use of sustainability indicators. Therefore, the survey was able to determine whether the responses associated with the size of the company (small, medium or large) differed from their sector orientation, such as private or social housing provider. The following results of this paper focus on the core area of measuring sustainability in construction projects, which are important if academics and the wider research community are to gain an insight to the attitudes of residential developers towards assessing and implementing sustainability.

#### 4. MAIN FINDINGS

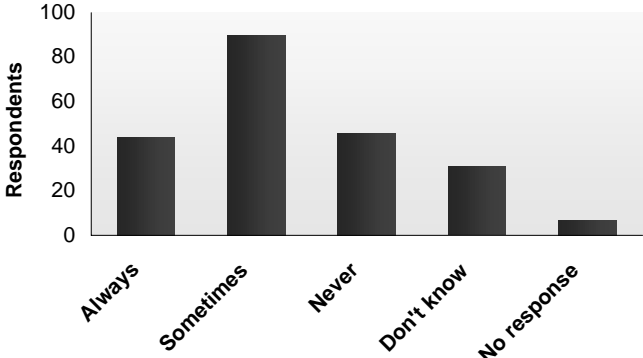
The overall aim was to examine critically residential developer attitudes to measuring sustainability with particular reference made to the redevelopment and refurbishment debate, which has continued to attract vast media attention, none more so than in the government's HMR areas. However, most survey respondents (68.8%) had not been involved in conservation-led regeneration projects, suggesting that UK housebuilders are still focusing on new build projects and feasibility studies on specific sites is perhaps more likely to follow a redevelopment rather than refurbishment policy. In support of this statement, the proportion of refurbishment projects over the last five years has largely stayed the same (45%). Approximately 30% of survey respondents stated that the number of refurbishment projects was increasing, whilst one-fifth commented that it had in fact decreased.

There may be a number of key reasons why new build projects are still favoured. In general, financial cost was the principal barrier to refurbishment. All elements of the costs related to residential refurbishment were mentioned as being higher per square metre compared with new builds. In addition it was felt that there were hidden costs associated with refurbishment.

Amongst private housing developers, lower construction costs, greater speed in delivery time of a completed scheme and the ability to incorporate modern day design and layout appeared to be key ‘push’ factors favouring demolition and new build. Social housing providers and professional advisors whilst in agreement with these principal factors also saw the opportunity to improve the sustainability of a development and the ability to incorporate higher densities as important. These two groups of the respondents also commented on the benefits of refurbishment schemes. The retention of existing communities, heritage conservation and the offering of ‘more affordable’ housing were likely to impact upon their decision-making process when choosing between redevelopment or refurbishment. It appeared that developers were conscious of ‘social sustainability’. The issues surrounding existing communities were highlighted by respondents, particular such challenges as the presence of inherent social problems and of a high proportion of tenanted properties.

In relation to the monitoring process that is undertaken by UK practitioners, our survey indicated that a reliable assessment may still be lacking or the promotion of a standard environmental policy absent, as there appeared minimal take-up of commercially available sustainability toolkits. Figure 3 shows that only 20% of the survey saw it important that every scheme was monitored, whilst a large proportion, 39%, never undertake any formal monitoring process: they in fact were uncertain about the use of these toolkits. In relation to company size versus uptake, it is perhaps unsurprising to find that it was the larger house builders that more commonly monitor the sustainability of residential schemes (31%). This may be for a number of reasons, such as the available resources to provide a sophisticated monitoring system or the need to be seen to follow a stricter protocol of corporate social responsibility. In contrast, only one quarter of medium-sized housing providers and one-seventh of smaller developers ‘always’ monitor sustainability.

It was expected that the principal reason for not undertaking widespread assessment of environmental standards would relate to the financial costs involved, based on previous research undertaken at The College of Estate Management in 2005. This work indicated that the cost of implementing higher environmental standards was an issue for a large section of the UK house building industry who did not consider that purchasers would yet pay premiums for eco-property (Dixon et al. 2005(a))



**Figure 3** Frequency of monitoring sustainability in UK residential projects

The survey results also indicated the popularity of ‘traditional’ measurement tools, such as EcoHomes and SAP ratings, both of which determine the environmental performance of residential development schemes.

EcoHomes is increasingly being used to establish targets for new development, and to demonstrate a track record in achieving high ratings may help when bidding for development opportunities (see Figure 4). Both SAP and

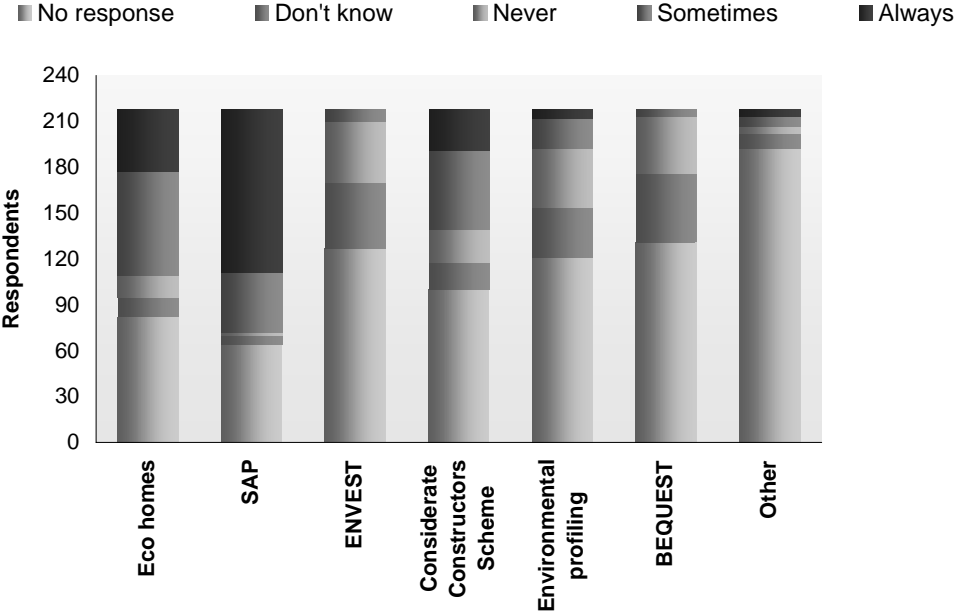


Figure 4 Survey respondents' use of codes for assessing sustainability

EcoHomes are frequently referred to in government guidance and local planning authorities reference both methods in relation to the granting of planning permission, for instance. Environmental profiling, which is assessment of construction materials and products in terms of their environmental performance in both their manufacture and use, together with the Considerate Constructors Scheme also appears to be used to some extent by the UK development industry. A large proportion of respondents (53%) across the three sections of the survey were in general agreement that whole life cycle costing techniques are currently not sufficiently well developed to be useful for appraising the relative sustainability of new build and refurbished housing projects. The results of our survey indicate that private developers and social housing providers preferred to use SAP ratings and EcoHomes to compare the relative sustainability of new build and refurbishment proposals. Professional advisors, whilst using these techniques, were more accepting of and perhaps more reliant upon whole life costing as a method of assessment.

The survey respondents were offered the opportunity to suggest amendments that could be made to improve the reliability of the assessment process. The principal areas of consideration included:

- **Common-sense approach in assessment methodology** (16%) – it was felt important that to improve the assessment methods there should be consistency in the approach, scoring and measurement.

- **Simpler methodology/process** (14%) – respondents felt that the format and calculations could be simplified to improve the usage of the assessment methods.
- **More guidance required** (11%) – respondents suggested that more guidance is required as there is an uncertainty surrounding the term ‘sustainability’ when related to the construction sector.
- **Enhanced criteria in environmental profiling** (11%) – the survey found a general appreciation that the criteria used in environmental profiling should be modified to allow greater transparency.

Other recommendations included the establishing of a formal network for the monitoring of the assessment methods by an external organization with the presumption that this would improve the reliability and the supply of end-user information made available to developers and other housing providers. The use of a single, universal toolkit was seen to enable a better understanding amongst practitioners, together with the need for an improved route for communication between stakeholders. A small proportion of respondents also felt that there was a greater scope for assessment methods to be more closely related to the planning process with the possibility of making a sustainability assessment a mandatory requirement for the granting of residential planning permission.

## 5. CONCLUSIONS

This paper has reviewed the attitudes of the construction industry to the dilemma of whether to demolish existing dwellings, to lose their “embodied energy”, their heritage value and redevelop a cleared site, or to refurbish these existing dwellings to modern standards, incurring additional costs and potentially failing to provide the market with the modern residential environment it is seeking. The debate contained within this paper has demonstrated that the use of indicators offers practitioners the opportunity to improve their knowledge of sustainability, providing a tool for analysis as well as for mediation or decision-making. They can also be useful in terms of long-term planning and development appraisal.

Nonetheless, it appears from our findings that a key concern within the construction industry is the absence of consistency in suitable government-led incentives, including taxation advantages (or at least a level playing field), and the absence of any robust, clear, simple and reliable measurement of environmental performance within buildings. It does seem contradictory that government proposals to retain and refurbish buildings should be penalised within the tax system. Confusion will merely delay the commitment to sustainable principles within the industry, and given recent announcements regarding climate change, delay is dangerous. It would appear that practitioners are seeking a simpler, more transparent assessment methodology that can become the widely adopted technique for sustainability appraisals.

It is not enough that the assessment be based on initial construction vs refurbishment costs. Energy savings must last and be assessed over the entire useful life of the building and it is important, therefore, that whatever measures are devised and adopted, they reflect the whole life cycle costs. This could include building into properties the mechanism whereby they can be dismantled (not demolished) at the end of their useful life and components reused. But such forward planning is a long way off. What must not be overlooked is a sound methodology for appraising residential development projects in terms of sustainability, ranging from the broad spectrum of social, economic and environmental considerations to consumer education and informing occupiers on energy saving both in terms of how to use buildings and their components efficiently but to value such efficiencies and to pay for them in the market place.

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