

## Section 5: Barriers to Sustainable Housing Development

The construction of any sustainable housing development in the East Midlands will inevitably encounter the same difficulties as any conventional construction project within the region. The UK construction industry is at present suffering from a number of problems that include:

- a shortage of skilled labour
- under-investment in training
- a poor image that leads to the inability to recruit newcomers into the industry
- inefficient working practices
- a lack of coordination and communication between the partners responsible for different aspects of the project

These issues have been highlighted in many reports including Sir Michael Latham's 1994 publication "Constructing the Team" [1] and Sir John Egan's complementary 1998 report, "Rethinking Construction" [2].

The Construction Industry Training Board (CITB), which was established in 1964 as a result of the Industrial Training Act 1964, undertook a study of the workforce and skills needed in the East Midlands Region [3] and forecast the need for an additional 30,500 new recruits in the period 2002 to 2006 across all trades and professions, with the exception of plasterers. Overall, 63 percent of participating companies within the region said that they had experienced difficulties in recruiting skilled staff during the previous six months. More importantly, 22 percent said that they were unable to bid for a contract because of the lack of skilled staff.

The individuals or organisations responsible for delivering the projects documented in Section 4 were asked to identify the main barriers that they encountered in bringing the projects to fruition. Most of these barriers are *in addition* to those encountered in conventional developments. The responses can be broadly grouped under four headings: financial, professional, technical and social issues.

### 5.1 Financial Barriers

The additional financial cost of providing the measures to improve the sustainability of housing was cited by many of the social housing project managers as being a major barrier to the realisation of their schemes. Those individuals who were delivering one-off private schemes were prepared to bear the burden of the additional financial cost however, as they perceived the long-term benefits to be worth the initial increase in investment. The perceived long-term benefits were not expressed in terms of financial return in many of these cases, but focused instead on the environmental and social benefits that the developer believed the technology or methodology could deliver.

The average additional cost was stated as being between five and ten percent of the final construction cost for the new-build schemes, not including the cost of any photovoltaic (PV) equipment installed. In all but one of the projects (The Autonomous House), the installation of PV equipment has been dependent on external sources of additional funding, usually as part of a government initiative to promote the technology.

### 5.1.1 Social Housing Providers

From a Registered Social Landlord's (RSLs) perspective the problem is how to finance the implementation of novel building methods or systems within a grant regime that ultimately seeks to deliver the maximum number of dwellings within the constraints of an allocated budget. As mentioned previously, 2.5 percent of the total cost of the works can be claimed from The Housing Corporation for schemes that meet the EcoHomes 'Good' standard [4]. This can however still leave the RSL having to fund a majority of the additional cost from alternative sources.

#### **Potential policy solutions**

The Merseyside Green Housing Alliance (MGHA), a consortium of housing associations, architects and academics in the Merseyside area with an interest in 'green' housing, issued a report listing a set of recommendations to help to reduce the initial cost of sustainability features for RSLs [5]. The recommendations include:

- Identifying components common to many building systems, where joint purchasing by a group of housing associations could realise savings.
- Recognise the aspects of green housing that can be achieved by good design and appropriate specification at no extra cost.
- The development of supply chain partnering with *local* component manufacturers. This would both secure local employment and reduce the financial and environmental costs of transporting building products. In many cases the manufacturer would probably be required to upgrade their existing products, and an element of product development and staff training will be needed.
- Development by the Government of sustainability accreditation schemes, such as a national 'green kitemark', that can be used to promote sustainable materials. This would also provide an independent assessment, and therefore assurance, of the claims made by component manufacturers.
- The development of a costs database for sustainable homes that quantifies the real costs being experienced by RSLs for various green products - no real knowledge of these costs is readily available within the sector.
- Education of the house buying public to stimulate demand for more sustainable forms of housing within the larger private house building sector.

This final point is reiterated later in MGHA's report and emphasises a concern expressed by many RSLs that they shouldn't be called on to be at the vanguard of change for environmental improvements in housing design. "The way forward needs to be led by government. Individual or groups of housing developers, whether in the private or the social sector, do not have enough weight to overcome the obstacles currently before them. They cannot make enough difference quickly enough without direct government action." [Ibid].

MGHA also calls for changes in the present social housing grant regime. The level of rent charged is currently dependent upon the level of capital grant made available by the Housing Corporation to the housing association for the construction of social housing. Since the level of rent is restricted by government, it is difficult for RSLs to recoup the additional expenditure needed to improve the sustainability features of their dwellings through rental income. If the level of rent could be raised in recognition of the lower utility bills experienced by tenants in more resource efficient housing, then the RSLs would potentially have the ability to finance the inclusion of sustainable construction technologies and processes.

RSLs can play an important part in facilitating the uptake of sustainable technologies through their ability to create long-term partnerships with house builders. Information on innovation

is easier to disseminate within close inter-firm relationships, and partnering developers in the product supply chain provides an ideal opportunity for sharing the risks and uncertainties of using novel materials and systems. The use of environmental technologies by RSLs also provides evidence of their performance and reliability, again reducing the perceived risk and uncertainty of new products - a factor that currently inhibits their widespread uptake in the private housing sector [6]. In addition, the contractors and consultants gain knowledge and experience of sustainable construction technologies and processes, providing them with a competitive edge as the technologies transfer to the private sector.

The UK Government has it within its power to create the appropriate regulatory and fiscal environment to stimulate innovation in housing. It can monitor and give credence to green building and component accreditation schemes such as EcoHomes, and Forestry Stewardship Council (FSC) timber. The use of sustainable construction technologies and processes will assist in meeting the objectives of reducing carbon dioxide emissions and eradicating fuel poverty (see Section 3). The Government therefore has a crucial role to play, and much to gain, in assisting the Housing Corporation to deliver more sustainable forms of housing.

Improvements in the sustainability of housing can ultimately be delivered not only by building to standards in excess of the current Building Regulation, but also by the manner in which organisations and individuals collaborate in order to achieve common goals and overcome constraints and barriers – including risks and uncertainties.

### 5.1.2 Private Sector Housing

#### *The self-build sector*

The growth of the self-build sector is often cited as being a significant indicator of people's preparedness to pay extra for environmental features [7]. This sector has grown steadily since the late 1970s with around 15,000 completions per annum, which represents approximately 8.3 percent of all new-build housing in the UK [8]. This sector tends to desire a higher level of specification than is offered by the speculative builders, including greater levels of insulation, and is more innovative in terms of technology and design. Market research carried out by Building Link Ltd. and cited by Barlow suggests that this sector has greater interest in products that "...increase the perceived functionality of the house" [9]. These include active ventilation systems (64 percent), under-floor heating (57 percent) and solar panels (28 percent). Barlow also states however, that while self-builders may be more receptive to innovation than speculative builders, when costs become an issue innovation is generally sacrificed before floor area. The fiscal incentives outlined in Section 5.1.5 will have a positive impact on the affordability of sustainable technologies and processes for the self-build sector.

#### *Retrofitting of existing dwellings*

The additional capital cost of retrofitting sustainability features has always presented a considerable barrier to those groups or individuals attempting to improve the existing housing stock. Changes to Part L1 of the UK Building Regulations [10] have, to some extent, removed the option to ignore the opportunity for upgrading the thermal characteristics of existing dwellings when undertaking remedial works on the dwelling's envelope. Going beyond the requirements of the Building Regulations can require a more innovative approach to project management however, as shown in the Littleover case study, where energy efficiency works were incorporated into standard maintenance works as a method of reducing capital costs. Adoption of the fiscal measures outlined in Section 5.1.5 will also be effective in reducing the financial barriers of sustainable conversion or refurbishment.

### **Speculative housing developers**

The speculative housing developers basically respond to three stimuli: regulation, market demand and fiscal incentives.

- **Regulation**

Part L1 (2002 edition) of the UK's Building Regulations is not capable of contributing very much to the Government's statutory objective of cutting CO<sub>2</sub> emissions, as the U-value targets are still set relatively high and 'trade-offs' are allowed between different building elements. For example, to reduce the impact of heat loss through glazing, developers can either install glazing systems that have a higher performance or reduce the total amount of glazing. The latter route is the cheapest, and is usually the preferred option. Although this option produces a result that complies with the thermal insulation requirements of the Building Regulations, it may also lead to a reduction in solar gains and a potential increase in the heating loads, and an increase in the use of electric lighting to compensate for the darker interior.

- **Market demand**

Market demand can only be effective where there is sufficient choice, and where purchasers are fully informed about the implications of their choices. The current chronic low rate of housing construction, estimated at 60,000 fewer dwellings per annum than is actually needed [11], removes any incentive for house builders to voluntarily build to higher standards as they can presently sell everything that they build.

- **Fiscal incentive**

At present there are no fiscal incentives for those who build housing to a specification in excess of the Building Regulations. Additionally, most private sector housing developers do not believe that the house buying public are willing to pay extra for dwellings that include sustainability features, and argue that what is needed is an upgrade in building regulations, by government, that will maintain a level playing field for organisations working within a competitive market.

As James Wilson, Managing Director of David Wilson Homes, wrote when asked to attend a consultation on mainstreaming sustainable housing solutions:

"I would like to think that in the future, consumer demand and building regulations will be the vehicle to produce further sustainable housing practices in mainstream development. Currently market forces dictate that no one developer can go it alone and incorporate widespread sustainable solutions, as customers are not willing to pay the extra for them." [12]

The stance taken by the speculative housing developers is interesting for two reasons:

1. Housing developers have, to date, resisted government attempts to require that more ambitious energy conservation measures be included in dwellings. The main objection raised is that it would require them to adopt alternative construction techniques [13]. For example, in order to achieve the necessary levels of insulation that are mandatory in countries such as Sweden and Denmark, they would probably have to abandon the traditional system of double masonry layer wall construction and move to timber or steel frame building systems. Some companies are concerned about this technology and believe that significant defects may emerge after the houses have been sold. Over 70 percent of the population in the developed world live in timber-framed dwellings however, and this figure is 90 percent in the USA and Canada, and over 60 percent of all new-build housing in Scotland [14]. There is therefore already a large 'bank' of good practice that speculative UK house builders can learn from.

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2. At least fifty percent of the purchasers of dwellings on the Millennium Green development in Collingham, Nottinghamshire purchased their homes *specifically* for the environmental features that they incorporate [15]. These are executive homes selling for upwards of £250,000 at the time of the developments completion, and their purchasers did not suffer from a lack of housing choice in the area. This demonstrates that there is a latent demand for sustainable housing, and that given the choice a small but significant proportion of house buyers prefer dwellings that incorporate environmental sustainability features. Another example is the Beddington Zero Energy Development (BedZed) where all 82 dwellings for private sale and shared ownership that form part of the development in Surrey were sold before the scheme was finished, and in a complete absence of any sales marketing. The potential house buyers' awareness of the scheme was inspired purely by media coverage that focussed on the environmental features and aspirations of the development. In addition, a recent survey of a cross section of potential house purchasers carried out by the Gallup organisation on behalf of WWF revealed that 70 percent of respondents would be prepared to pay more for a home that incorporated energy saving features [16].

### **Potential policy solutions**

- **The Building Regulations**

The standards of Part L1 need to be improved by predictable increments at regular intervals, allowing developers to anticipate changes and potentially pre-empt them. The publication of an aspirational set of Building Regulations standards, for say 10 years hence, would also send a clear signal to the housing construction industry of the direction in which the government was committed to going and allow the industry to plan for the investment necessary to meet this target.

- **Creating demand for sustainable housing through the education of house buyers**

The house-buying public need to be better informed about the potential consequences of their purchase decisions. Research by National Energy Services (NES) demonstrates that major house builders are not playing any role in educating the public about the benefits of sustainable construction technologies and processes, even when they are legally obliged to do so [17]. In order to generate greater awareness of energy efficiency amongst the house buying public, the Building Regulations require the builder to affix a notice stating the dwelling's Standard Assessment Procedure (SAP) rating (see Section 1.5.1) in a conspicuous place within the dwelling. This has to be done as soon as practicable after completion, and must be no later than five days before the occupation of the dwelling. The NES research focused on the top ten house builders in the Southern and Eastern regions of England and involved visits to 50 sites where completed homes were available to buy. It revealed that:

- 98 percent of sites visited failed to comply with the Building Regulations by not displaying SAP ratings within their unsold properties.
- Only 12 percent of the sample sites had any information at all about the energy rating of the new homes up for sale.
- 74 percent of sales negotiators could not explain what the SAP is or how the rating system works.
- 51 percent of sales negotiators did not believe that the homes that they were selling had received an energy rating at all.
- No SAP information was available on any of the top 10 house builders' websites.

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The Government needs to raise public awareness of the SAP rating system, maybe as an integral part of the national energy efficiency campaigns, and greater enforcement of this element of the Building Regulations needs to be undertaken if the public are to be able to make informed decisions about their purchase. In addition, sales negotiators require training to develop their understanding of SAP, so that they can converse authoritatively with potential purchasers about the environmental and economic benefits of their houses. With such strong evidence of a lack of compliance with the legal requirements of SAP, it would appear that the major house builders have little commitment to raising the environmental awareness of house purchasers, or of provoking any demand for more sustainable forms of housing.

- **Fiscal incentives: Investment and Corporate Social Responsibility (CSR)**

A further incentive for the speculative house building industry to look more closely at the issues of sustainability is the growing interest, particularly by investors, in Corporate Social Responsibility (CSR). The FTSE4Good Index series includes only those companies that meet certain standards regarding environmental performance, human rights and stakeholder involvement. Of the 32 real estate companies listed on the stock exchange, 14 were eligible for inclusion on the first publication of the index in July 2001. Only 4 out of the 36 construction companies listed were eligible for inclusion in the same index however [18]. This demonstrates the lack of ownership of CSR within the UK construction industry.

The market for 'Socially Responsible Investment' (SRI) represents approximately £250 billion in institutional investment in the UK, and has seen a dramatic increase in its value in recent months [19]. In addition, the 1999 Pensions Act now requires all occupational pension funds to explain how they factor environmental and social issues into their investment choices. Twenty-one out of twenty-five of the largest UK pension funds intend to implement SRI principles into their statement of investment policies [20]. The rate with which the investment community is adopting these issues will mean that construction companies will increasingly have to demonstrate their environmental and social responsibility credentials if they hope to secure investment.

The criteria by which companies can be indexed on the FTSE4Good are set to become more demanding over time. Back-testing shows that the top 50 UK FTSE4Good companies outperformed conventional FTSE100 companies by 15 percent over the period 1997 to 2002 [Ibid], indicating that for investors a responsible approach to sustainability makes good business sense.

- **Fiscal incentives: Taxation**

The research by Barlow cited earlier, concerning the self-build market [8], demonstrates that even with awareness of the implications of design decisions with regard to sustainability issues, and with the best will to implement more sustainable methodologies, the additional capital cost of 'green construction' still remains an effective barrier to the uptake of these technologies and methods. There is, therefore, a need for government intervention to create the appropriate fiscal measures that allows sustainable housing construction to compete with conventional construction on cost. This would help to generate greater demand and stimulate the economies of scale that would eventually favour more sustainable construction technologies and processes.

The World Wildlife Fund (WWF) commissioned Environmental Resources Management (ERM) to identify potential future fiscal measures that could be introduced by the UK government to remove the financial barriers to sustainable construction technologies and processes, and assist it to realise its target of the construction of one million sustainable homes to be built in the UK by 2012. The study [21] reviewed current fiscal policy in this area, drew up an extensive list of potential measures that could be adopted and from this list selected four main recommendations on the basis of their link to sustainability issues, the

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potential impact they could have and their acceptability to government. These recommendations are:

1. Stamp duty relief on the first sale of sustainable homes and a rebate of the stamp duty paid on land on which sustainable homes are built or premises which have been converted into sustainable homes.

This would require the use of an accreditation system, such as EcoHomes, to validate the developer's claims. It would provide developers with an incentive for developing sustainable homes as they could claim back the stamp duty paid to acquire the land or buildings, and buyers would be encouraged to look for developments that were accredited, as the cost of purchase would be lower. As the stamp duty rates vary according to the value of the property being sold, the amount of refund will vary from between 0 percent for transactions less than £60,000 to 4 percent for transactions greater than £500,000.

2. Abolition of zero VAT on the construction of new buildings for residential use, to be replaced with a reduced VAT rate conditional upon receiving an environmental rating. New build housing that does not achieve the sustainability ratings would be taxed at the standard VAT rate.

At present there is an active tax disincentive against the conversion of existing buildings into residential use compared to new-build. Conversion incurs a VAT cost of either 5 or 17½ percent, whereas new build housing is currently rated at 0 percent. This recommendation aims to steer development in the direction of the conversion of existing buildings for residential purposes.

3. Reduced VAT rate of 5 percent on accredited supplies of building products.

This recommendation proposes that a group of accredited "Sustainable Supplies" such as certified timber products, rain / grey water and water conservation systems, reclaimed / recycled materials, etc. be eligible for the reduced VAT rate of 5 percent. This would give these products a competitive advantage over their less sustainable equivalents, and reduce the initial costs of installing 'novel' components. For this measure to be implemented, the government, or a government elected body, will need to draw up a list of qualifying products. A similar scheme currently exists in the UK whereby a reduced rate of VAT is applied to the supply of professional services such as the installation of energy saving measures into all dwellings and energy efficiency and security works undertaken as part of a grant funded programme. In the 2002 budget the reduced rate was extended to renewable energy heating systems, domestic scale micro CHP systems and factory insulated hot water tanks

4. Capital allowances for expenditure on the conversion of premises into 'sustainable' residential dwellings for the rental market.

This recommendation aims to encourage housing providers involved in conversions to do so in a more sustainable manner. It would remove the barriers of the perceived extra cost of sustainable features by offsetting these against the tax payable on the rent arising from the leasing of more sustainable dwellings. The UK Government introduced a scheme similar to this in 2001; commonly known as the 'flats above shops' scheme, which was aimed at assisting the regeneration of town centres. At present however, the additional capital allowances attached to these schemes cannot be claimed for conversions that form part of a larger scheme. This has effectively prohibited organisations such as housing associations from getting involved. It is therefore important for the allowance to be applicable to larger scale conversions so that social housing providers and their tenants can benefit from such schemes.

Together, the above recommendations could provide a potent incentive to encourage housing developers to build more sustainable forms of housing, not only removing the barrier of the extra cost of incorporating environmental features, but ultimately providing a financial disincentive for building housing that does not meet specified sustainability criteria.

- **“Green” mortgages**

Of particular relevance to house buyers and self-builders is the recent advent of the “green” mortgage. “Green” or “Ethical” mortgages have grown in popularity recently and offer people who wish to live in or build low-energy homes a discount, usually for a period of five years, on the standard mortgage interest rate. Coupled with the potentially lower fuel costs of the dwelling, this could result in a shorter payback of the capital invested in sustainable technologies and processes.

### Section 5.2 Professional Barriers

The professional barriers highlighted by the interviewees can be placed within two groups of professionals involved with the projects; the practitioners (developers and building contractors) and the policy makers (local government officers).

#### ***Developers***

- Many demonstrate a general lack of understanding of low-energy design strategies, the concept of whole-life costing and an inability to identify opportunities for the inclusion of renewable energy technology. Both the Ashton Green and Wellingborough East Urban Extension case studies provide good examples of this issue.
- The general approach exhibited by developers is that they attempt to trade the inclusion of sustainability features against other features, such as quality, to offset the perceived additional cost. A good example of this is shown in the attitudinal research carried out with regard to the Ashton Green development: “...the research indicated that developers/financiers adapted a dualist attitude with reference to the standards and codes for Ashton Green...adopting an “either/or” conceptual framework that is unlikely to result in sustainable development.” [22]
- Initial building cost estimates were considerably lower (up to 100 percent) than the final tender amounts submitted. This is often due to developers being unfamiliar with the real cost implications of sustainable building features, and adhering to an exaggerated perception of the additional costs of ‘green’ design and additional risks. The lack of any real data that demonstrates otherwise reinforces this position, and leads developers to build a significant contingency amount into their tendered quotes.
- Inflexibility of some professionals in taking on-board new ideas, and using their professional status to rule-out suggestions by junior team members without undertaking additional research to test their validity.

#### ***Building contractors***

- The issue of ‘professional myth-making’ was raised by many of the interviewees. Information about the negative aspects of a product or process appears to spread amongst the trades community far more effectively than information from any ‘Good Practice’ programme. Two classic examples of this are condensing boilers and timber framed building systems. Both of these products experienced technical problems in their early incarnations, which were widely reported by the construction industry press. Many years later, and in the presence of a large amount of evidence that proves that these



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systems are now as reliable as their conventional counterparts, members of the construction industry are still largely biased against them.

- Unfamiliarity amongst builders of wide-cavity construction and, more generally, with sustainable building techniques and products. Many interviewees highlighted the general lack of skilled labour within the construction industry, and the resistance that exists to adopting new building practices.
- The provision of additional product training had to be supplied in several cases for contractors who were working with 'novel' products or systems on housing association schemes. This meant that the project incurred additional time and financial costs that had to be borne by the association.

### **Local government**

- A structural conflict existed on some of the local authority led schemes between the environmental and social goals of the local authority and its internal financial policies (see Ashton Green case study).
- Resistance by local planners to novel developments due to the in-built conservatism of the planning community, and the emphasis that planners place, particularly in rural areas, on maintaining the vernacular of the area. This is particularly true in the case of the more radical projects where planners are concerned about setting precedents that other developers may try to exploit. This leads to considerable time delays and often the development of complicated Section 106 agreements that wouldn't be placed on conventional developments.
- Highways Agency staff were often unfamiliar with Sustainable Urban Drainage Systems (SUDS) and were reluctant to use systems for which they did not have the experience.
- Resistance by elected members of local authorities to set a precedent for a different type of development. This can be partly attributed to the in-built conservatism of the planning community (elected members are heavily influenced by planning officers), but also due to a lack of understanding of the principles of sustainable design and development and the way in which it can complement other government policies.

### **5.2.1 Potential Professional Solutions**

Nearly all of the above barriers originate from a lack of awareness of the concepts, methods and benefits of more sustainable forms of construction.

#### **Training**

A greater level of collaboration between the government, employers, professional bodies and training providers is essential to promote a learning culture within the construction industry, and to ensure that the training provided supports the changing needs of the industry and its clients. It is essential that this be backed up by a commitment to continuous professional development (CPD) that allows for the effective dissemination of innovation and best practice. As the construction task force pointed out in its report, "...training will only be given the emphasis that it deserves if all major clients, including the public sector, give preference to constructors that can demonstrate that they are trained workers." [23]. Presently, the main form of accreditation for trained workers is the Construction Skills Certificate Scheme, quality assured by the CITB. This provides a range of identification cards that specify the worker's level of skill and qualifications. The bearer of the card is required to continue to undertake training to upgrade their knowledge of developments within their trade. If clients, at a contractual level, specify that all contractors on their projects must be part of such an

accredited scheme, it would play an important part in encouraging the industry to take its training issues more seriously.

The level of financial investment in training within the construction industry must be increased to enable greater access to high-quality learning resources for all members of the construction community. At present these schemes are financed by a levy placed on the industry by the government. The CITB is charged with collecting and distributing these grants back to employers so that they may train their workforce. The amount of the levy in the UK (0.25 percent on main contractors direct (payroll) employees) is far below that of the training schemes in Germany (2 percent) or the Netherlands (2.8 percent) [24]. In their 1996 comparative study of social housing construction in Germany, the UK and the Netherlands, Clarke and Wall concluded, "...the high level of investment in training by the Dutch and German construction industries...produces a workforce more able to adapt to new technologies, materials and processes." [Ibid]

### **Guidance**

Local government needs to understand that the pivotal role that they play in the planning process gives them an ideal opportunity to promote sustainable development. Supplementary Planning Guidance should be put in place in each local authority area to raise awareness of the practical issues surrounding sustainable development, and this should be used as an opportunity to join up the policies affecting different areas of their work such as Highways, LA21, Housing, Waste, Economic Development, Energy Conservation, Environmental Health, Crime and Disorder, Equal Opportunities, Anti-poverty, Affordable Warmth, Best Value, etc. Local authority officers should be able to provide guidance to local developers and contractors on how they can assist the central government in achieving the essential social, economic and environmental aims of sustainable development.

## **Section 5.3 Technical Barriers and Potential Solutions**

The individuals or organisations responsible for delivering the projects documented in Section 4 highlighted a range of technical barriers that they encountered. These centre around two aspects of the project; the materials and products used, and problems encountered with the design.

### **Materials and products**

- The availability of locally sourced 'green' building products, such as advanced glazing systems, cavity wall ties over 100mm in length, etc, proved difficult for many of the documented projects. Products had to be imported from elsewhere in Europe in many cases, either directly by the project team or through a locally approved distributor. The lack of demand for such products within the UK creates no incentive for local building suppliers and component manufacturers to stock or develop products capable of the performance required by these projects. This ultimately results in a loss of both revenue and expertise within the region and the UK as a whole. Housing developers need to develop and implement local procurement policies, and be prepared to work with local suppliers and manufacturers to share the short-term risks and long-term benefits of developing a local supply chain.
- Conversely, delays were experienced by some projects because of the excessive demand for one particular 'green' building product: the Masonite I-Beam. A combination of the versatility of this product, its environmental credentials and positive publicity concerning its performance has led to this product being specified in many 'green' projects around the UK. This adequately demonstrates the dependence of the UK eco-builder community on a few specialist suppliers and manufacturers, and the need for a

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greater number of regional suppliers and manufacturers to diversify into the “green” market.

- The lack of the appropriate UK certification presented a barrier for some interviewees who wished to specify high-performance products that are available elsewhere in Europe. The new Europe-wide CE marking, which came into force on the 1<sup>st</sup> April 2001, and which asserts that the product is suitable for construction projects across Europe, will go a long way to removing this barrier.
- The availability of gas central heating boilers and stand-alone gas heaters that are suitably small for low-energy designs presented a problem for several projects. The outcome in most cases was the use of a product that was over-specified for the project, and therefore may not have been operating at its most efficient level. The energy consultant appointed by Derwent Housing Association on the Sinfin Energy Efficiency Project worked with a major gas appliance manufacturer to develop a small gas wall heater that was appropriate for the scheme’s design. This demonstrates the importance of involving product suppliers at the design stage of the project.

Two other more specific issues were raised:

- The need for some backup system to prevent flies and smells from composting toilets entering the dwelling in the event of the failure of the systems ventilation fan (The Autonomous House).
- The need to ensure that the type of natural paint used in the project is suitable for the area that it is covering. Some water-based paints appear to be difficult to maintain in high ‘traffic’ areas where they easily become marked, as when they are wiped a layer of the actual paint can also be removed.

### ***Design problems***

- The ability of energy analysis software to accurately predict the running costs of the buildings at the design stage was called into question by several of the interviewees. Very few of the projects documented in Section 4 had any post-occupancy evaluation research carried out on them, but many of the interviewees from the social housing sector were aware that the tenants were paying higher bills than originally anticipated. In some instances tenants had actually complained about the difference between the fuel bills that they were paying, and the smaller amounts that they had been told they would have to pay. Although much has been written about the problems of the energy rating methodology used in the UK to demonstrate compliance with Building Regulations [8, 25, et al], a large part of the mismatch between predicted and actual energy use is due to the assumptions made on how residents actually live in their dwellings. A greater volume of data is needed on the way different people actually use resources in their homes (heating patterns, internal temperatures, how they ventilate their dwellings, etc) to increase the accuracy of the energy use predictions. Additionally, there is a vital need to attempt to alter the behaviour of the residents, through a programme of education, which leads to an understanding of the way in which their actions influence the amount of energy the dwelling consumes.
- A lack of appropriate guidance appeared to exist for designers in the areas of passive ventilation strategies, passive solar design and achieving building air-tightness. It is important that information for these areas of design is made available to design professionals in an appropriate format, and to the contractors ultimately responsible for implementing the design. Access to such information at an affordable rate was cited as a barrier to the use of such techniques by several of the interviewees. It was cited as the reason that mistakes were made on some of the projects.

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- The use of bespoke systems in some of the projects became a problem if the original designer of the system was no longer available to provide advice on maintenance or failure. The use of non-standardised components or systems will often create problems during the lifetime of the project if detailed knowledge of the system is not kept in-house. It is essential that a comprehensive manual be created that outlines, in detail, all the systems employed in the dwelling. Future residents will be able to use this to maintain the systems that they have inherited.

### **Section 5.4 Social Issues and Potential Solutions**

The following three issues were raised by several of the interviewees, and arise from their experience of working with residents in dwellings incorporating novel systems. They all ultimately stem from a lack of follow-up communication between housing developers and residents.

- It was found in several cases that the controls for the heating or ventilation systems appeared to be too complicated for the resident to use. If residents do not understand the controls then they often do not receive the potential benefits that these controls can deliver, and often revert to only using the 'on-off' switch to achieve their comfort needs. It is essential to ensure that the choice of control interface is appropriate for the particular client group.
- Many of the interviewees stressed the importance of providing training to residents about the use of the heating, lighting and ventilation systems in their dwellings. Many found this strategy difficult to implement on an on-going basis however, due to time constraints on staff members.
- In several cases the tenants reacted to the 'draughts' caused by mechanical ventilation systems by blocking the source. Apart from reducing the amount of ventilation, this usually resulted in the system motor overheating and eventually failing. Again, an awareness of the benefits of the ventilation system, and of the appropriate means of controlling it, need to be explained to the tenant. A second issue is that if tenants perceive ventilation as a draught, then the system may not have been correctly specified for the application.

### **Section 5.5 Conclusion and Recommendations**

There are no real technical barriers to the implementation of more sustainable forms of housing. The barriers are political, economic and social. In countries such as Sweden, Denmark, Norway and Germany, highly energy-efficient, healthy to live in, affordable to heat houses are an 'off the shelf' product. The barriers existing in the UK can be summarised as:

- A lack of legislation that requires UK housing to be built to higher standards with regard to in-use resource efficiency.
- A fiscal framework that at present favours less sustainable forms of development and new-build over renovation.
- A lack of awareness amongst building professionals of the concepts and techniques of sustainable house design and construction.
- A lack of easily accessible, affordable and appropriate guidance in sustainable building methodologies and technologies.

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- A construction industry that is facing chronic skills and labour shortages, and that is subject to short-term economic fluctuations that prevent long-term investment in worker training.
- An insufficient level of funding for the provision of training to those working in the construction industry.
- A lack of awareness by the house buying public that leads to a lack of demand for more innovative / sustainable forms of housing.
- A lack of awareness of the longer-term financial benefits of sustainable construction. Education in 'whole-life costing' or 'life-cycle costing' for design professionals would enable them to advise their clients better.
- A lack of good, exemplar 'demonstration projects' across the country that could be visited, presented and interpreted by knowledgeable staff, and which could help shape the demands of house buyers.
- An assumption at all levels of the construction industry that 'eco-development' is somehow 'optional'; a choice that you can make but don't have to.
- A lack of recognition that 'business as usual' is not sustainable and therefore simply cannot continue indefinitely, and that there could be real benefits to those enterprises who take it onboard at an early stage, rather than adopting a strategy of 'minimal compliance'.
- A lack of time, professional development and supportive legislation in the planning community, which is resistant to novel developments.
- Difficulty in procuring environmentally sustainable building materials and technologies. Audit trails are underdeveloped and work needs to be done on standardising green certification schemes for products and materials.

The following set of recommendations is therefore made:

- Government needs to implement a range of fiscal incentives that favour more sustainable forms of construction, as per the recommendation made by the WWF.
- Government should endorse a range of national and international accreditation schemes that actively promote sustainable construction. This may take the form of developing a 'kitemark' that promotes sustainable building materials or technologies, or endorsement and promotion of existing schemes such as the Forestry Stewardship Council (FSC). Whole-house schemes that provide an alternative to the BRE Eco-homes standard also need to be developed.
- Government should increase the level of funding available to the Housing Corporation to enable it to support more sustainable forms of development. Any increase in funding should be directed and dedicated to supporting sustainability measures and construction.
- An increase in the level of investment in training provision is essential if UK construction professionals are to meet the challenges of developing more sustainable forms of housing. Government needs to increase the levy currently placed on the construction industry to make the level of investment in training in the UK comparable to that of countries like Germany and Denmark. In addition, the government should require that all contractors engaged on publicly funded projects be qualified to a suitable level, through a high-profile independently (CITB or academic institutions) accredited training scheme. Likewise, any extra investment in training should be at least partly targeted on training in sustainable construction and particular techniques such as timber framing and solar plumbing.

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- Greater awareness of schemes such as the Construction Skills Certificate Scheme (CSCS) needs to be generated among private sector construction clients by emphasising the importance of using trained contractors from a client's perspective.
- A review should be undertaken of the guidance that is available to housing design teams, developers, building contractors and local authority staff involved in the building process to assist them with the process of sustainable design and construction. The aim of the review should be to ensure that the guidance available reflects current best practice in sustainable housing, to ensure that the information available is appropriate for the target audience, that it is easily accessible to the target audience and that it is affordable.
- All local authorities should develop supplementary planning guidance that actively encourages an awareness of more sustainable forms of development amongst the local building community.
- The CITB, in partnership with the national careers service and the construction industry itself, should continue to promote construction as a viable career to young people, and raise the image of the industry from one of 'cowboy builders' to one of a highly trained and professional workforce that people can be proud to be part of, and one that specifically includes women.
- Registered social landlords (RSLs) should seek to implement the recommendations contained in the Merseyside Green Housing Alliance report, and seek other opportunities to collectively reduce the costs, risks and uncertainties of sustainable construction.
- It is essential that residents are educated in 'getting the best' from the resource conservation technologies incorporated into their dwellings, and that they understand the implications of their choices and actions both on their fuel bills, and on the environment. It is essential to link this training to immediate and direct benefits for the residents. Pilot or 'flagship' schemes should qualify for sufficient funding to carry out post-occupancy evaluation of the resource efficient technologies, using hard data (from built-in monitors) and the occupants own assessment.
- The house-buying public need to be made aware of the issues of sustainability and housing so that they may make a more informed choice about their purchases. Since January 2001 all housing developers have had to display the SAP rating of the property on new dwellings. Awareness of this scheme needs to be radically upgraded however, among both the public and property sales staff.

## References

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- [1] Latham, M, Constructing The Team, Final Report of the government / Industry Review of Procurement and Contractual Arrangements In The UK Construction Industry HMSO, London, 1994
- [2] Egan, J, Rethinking Construction, DETR, London, 1998
- [3] CITB, East Midlands Construction Workforce Development Plan 2002. Construction Industry Training Board, 2002
- [4] The Housing Corporation, Total Cost Indicator Grant Rate, and rent analyses for 2003/200, October, The Housing Corporation, London, 2002
- [5] Merseyside Green Housing Alliance, Green Housing for the Future, Accessed on 18/02/03 at [www.sustainablehomes.co.uk/ Green%20Alliance%20Report.pdf](http://www.sustainablehomes.co.uk/Green%20Alliance%20Report.pdf), June 2001
- [6] Scottish Homes, Innovation in Construction: A European Analysis, Précis 133, Scottish Homes, Scotland, May 2001
- [7] Olivier, D, Building in Ignorance: Demolishing complacency: improving the energy performance of 21<sup>st</sup> century homes, EEASOX and ACE, 2001
- [8] Barlow, J. et al, Homes to DIY for: The UK's Self-Build housing market in the twenty-first century, Joseph Rowntree Foundation, York, 2001
- [9] Building Link Ltd, What's Happening in the Self-Build Market? Building Link Ltd, Chelmsford, 2000
- [10] Department for Transport, Local government and the Regions (DTLR), Approved Document L1 – Conservation of Fuel and Power in Dwellings: Building Regulations, 2002 Edition, London, DTLR, 2002
- [11] TCPA, Sustainable Housing Forum Interim Report December 2002, TCPA, London, 2002
- [12] James Wilson, Managing Director, David Wilson Homes, Personal communication, June 2002
- [13] Royal Commission on Environmental Pollution (RCEP), Energy – The Changing Climate, 22<sup>nd</sup> report, London, June 2000
- [14] Wood for Good: Introduction: Timber Frames, website accessed 24/02/03, [www.woodforgood.com/Site/building\\_site/general\\_construction/01\\_timber\\_01int\\_p02.html](http://www.woodforgood.com/Site/building_site/general_construction/01_timber_01int_p02.html)
- [15] Stephen Wright, CEO Gusto Homes, in interview, December 2001
- [16] The Gallop Organisation, A Survey of People's Attitudes to Energy Efficient Housing, London, WWF, 2000
- [17] National Energy Services, Selling the SAP, Milton Keynes, National Energy Services, 2003
- [18] Crossley, R, Reputation, Risk and Reward: The Business Case for Sustainability in the UK Property Sector, Centre for Sustainable Construction BRE, London, 2002
- [19] Building Link Ltd, What's Happening in the Self-Build Market? Building Link Ltd, Chelmsford, 2000
- [20] Crossley, R, Reputation, Risk and Reward: The Business Case for Sustainability in the UK Property Sector, Centre for Sustainable Construction BRE, London, 2002

- [21] Environmental Resources Management (ERM), Fiscal Incentives for Sustainable Homes, WWF, London, May 2002
- [22] Leicester City Council et al. *Ashton Green 100% Renewable Energy Community*, Leicester, August 2001
- [23] Egan, J, Rethinking Construction, DETR, London, 1998
- [24] Clarke, L. and Wall, W, Skills and the construction process, Findings: Housing Research 172, Policy Press in association with the Joseph Rowntree Foundation, March 1996
- [25] Bell, M. and Lowe, R, Building Regulation and sustainable housing, Part 1: a critique of Part L of the Building Regulations 1995 for England and Wales, MCB University Press, 2000