

# Overcoming the Barriers to the Greater Development and Use of Environmentally Friendly Construction Materials

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## 1. INTRODUCTION

### 1.1 Green Building Materials and Products, Sustainable Construction and the Environment

With buildings and a building industry responsible for major environmental damage (Woolley1990), sustainable construction is fundamental to the wider environmental debate. Yet it is often set aside: ignored by environmental groups and not taken seriously by the construction sector. Most research –whether academic, industry or government led revolves around energy issues, and little is said about the importance of indoor air quality or the impact of the choice of building materials on the environment. As buildings become increasingly energy efficient, however, the current balanced will however beginning to change and more focus will be placed on embodied energy and subsequently on green building materials and products.

As a result of the growing interest in sustainable construction from clients, architects and government policy, many building materials and products are being offered as environmentally friendly. Other products have been specifically developed to meet the demand for 'green' sustainable materials. Yet it remains essentially a pioneering sector, dealing with a 'niche' market. In other European counties, such as Germany, green materials have a small but significant market share and many of the green products available in the UK are imported from Germany.

### 1.2 Aim and Background of the Research

In order to examine how green materials can be widely used, it is necessary to define the nature of green products in both manufacturing, distribution, installation and demolition. The research also examines the process of decision making by purchasers to assess to what extent their choice of material and products is based on economics, performance and environmental issues.

Because the research was a one-year pilot scheme, funded by the UK Government Engineering and Physical Sciences Research Council (EPSRC). We have carried out in-depth interviews with industrial partners and organised a seminar to discuss our results. We have looked at examples of how green materials have been used, and allow us to examine the reasons why they are (or aren't) being specified on projects. We have also met with a range of actors and organised focus group discussions to stimulate debate and obtain feedback on our findings.

### 1.3 Industrial Partners

We are working with six industrial partners. (Table 1) These companies deal with very different products and come from varied personal histories. Some would present themselves as ethical

companies and came to environmental construction from a political and ideological angle; others have an industrial background and grew concerned with health and safety regulations

- AAC Waterproofing Ltd./Prelasti:  
Based in North Wales (Anglesey), Prelasti produce EPDM roofing material (rubber based waterproof membrane for flat roofs, pond lining, etc.) <http://www.prelasti.demon.co.uk/>
- Green Building Store / Environmental Construction Products:  
Based in Huddersfield in Yorkshire, the Green Building Store has a dual function:  
They produce their own brand of high performance, environmentally friendly windows, doors and conservatories. The store (and on-line store) is also selling a range of related products (paints, varnishes, etc.) <http://www.greenbuildingstore.co.uk/>
- Solar Twin Ltd.:  
Company based in Chester. They produce and sell freeze-tolerant solar water heating system with integral solar-electric (photovoltaic) pump <http://www.solartwin.com/>
- Bio-bubble Ltd.:  
Located in South England in Emsworth, Bio-bubble conceive, install and maintain a waste water and sludge treatment plant using Sequencing Batch Reactor technology <http://www.bio-bubble.com/>
- Eco Solutions Ltd.:  
Eco solution patented an environmentally friendly/safe water-based paint stripper. Their range of product is sold from their North Somerset base as well as through more mainstream retail outlets around the country. <http://www.ecosolutions.co.uk/>
- NTB - Natural Building Technologies:  
Retail outlet as well as construction company, and technical advice service provider. They sell Earth and lime products; insulation material; timber; natural paints, etc. The company is based in High Wycombe. <http://www.natural-buildings.co.uk/>

## **2- POLITICAL AND CULTURAL FACTORS INFLUENCING THE DEVELOPMENT OF GREEN BUILDING MATERIALS AND PRODUCTS**

### **2.1 Government's Policies and Priorities**

The current UK policies on sustainable construction have largely been influenced by the 'Egan report' (DETR, 1998) which focussed on the management of the construction process and paid little attention to environmental issues, and "Building a Better Quality of Life" (DETR, 2000) which had its environmental policies watered down.

Most construction R&D work carried out at the Building Research Establishment (BRE) and Construction Industry Research and Information Association (CIRIA) has focussed on environmental rating systems and the assessment of generic materials. Little of this has been directly useful to our industrial partners as it does not deal with specific products so we are planning a joint research project which will build on some of the issues identified in our research.

Our study points to the need for more independent research. The recent ‘Fairclough report’ (DTI, 2002) on R&D in the UK construction sector has identified the need for a greater range of independent research. At present the vast majority of work reflects the vested interests of large national and multi-national corporations.

Legislation was identified throughout our interviews as *the* single most important potential source of change. A range of both positive and negative measures would substantially affect the current situation and could promote green building materials and products, for instance:

- Stronger public sector *green procurement and purchasing policies* at national and local levels. At present these largely concentrate on soft areas like paper rather than buildings.
- Legislative changes to encourage ‘best-value’ rather than lowest price contracts.
- Legislative changes to *allow specification* from government agencies
- *Setting of standards* for a wide range of materials. limiting pollution and toxicity levels
- Introduction of *financial incentives* to boost production of green building materials and products (E.g. lower VAT, subsidies, etc.)
- *General policy* measures, e.g. the inclusion of sustainable construction as a subject matter in schools of architecture and the introduction of sustainability in the curriculum...

## **2.2 Interest and Perceptions from the General Public**

Public opinion, and subsequently consumer demand, appears as the second most important source of potential change.

There appears to be a low level of public awareness of environmental issues in the construction sector in the UK. This is surprising there has been a huge expansion in demand for organic food. There is a suspicion of innovative materials when associated with property investments and the demand for traditional homes. Popular folklore supports myths that green materials are more expensive and not as good as conventional ones. Most SMEs are unable to finance market research though they all have a great deal of anecdotal feedback from their customers.

The influence of both the media and environmental pressure groups on public attitudes can be significant. The media tend to focus on unusual things like strawbale buildings while also promoting questionable materials such as MDF. Environmental groups, comparably, tend to tackle single issues such as uPCV or tropical hardwood. While the Forest Stewardship Council (FSC) has attracted support from a celebrity figure, Pierce Brosnan (James Bond), there are few high profile supporters of green building as a whole.

## **2.3 Need to Lobby Policy Makers**

Another issue to emerge from the research is the limited opportunities to influence government action. A number of key agencies have the possibility to change governmental and public attitudes ranging from professional bodies to housing associations but little is being done.

Demonstration projects seem to be one of the most effective ways of drawing green building ideas to the attention of the above agencies. We have compiled a database of claimed sustainable building projects in the UK and tried to identify the extent to which these products have incorporated green building materials and products. One such project, BEDZED, has attracted a

considerable amount of media interest and has shown that, despite its innovative nature, it has had no difficulty in attracting customers to buy the houses.

## **2.4 Legislation, influence and examples outside the UK**

The adoption of progressive policies in Brussels and Strasbourg has forced green issues onto the UK agenda. The Construction Products Directive may push manufacturers to address issues which they have so far been able to ignore. Given the increasing globalisation of the ownership of virgin material resources and manufacturing, environmental standards need to be international.

## **3. WHAT ARE GREEN BUILDING MATERIALS AND HOW 'GREENNESS' CAN BE ASSESSED?**

A wide range of building materials and products are now being offered as 'environmentally friendly', less polluting, more energy efficient, less wasteful of non-renewable resources and less damaging to health. We have tried to review the criterion for substantiating green claims for building products including environmental profiling, life cycle analysis, etc. Many established business are now making questionable environmental claims which causes confusion and undermines the credibility of products where genuine environmental improvements have been made. Given the lack of consensus on these issues it has created something of a 'free for all'.

All of our partners emphasise the importance of the green credentials of their product(s) for their clients. However, that relationship is based on 'trust', rather than on a particular method of environmental assessment. Generally customers seem willing to accept the claims often producers, but this close customer supplier relation of trust may not be appropriate in a wider market when larger customers will demand independent assessment of products.

### **3.1 Difficulties Associated with the British and European Accreditation / Assessment Systems**

In the UK, much of environmental assessment thinking has been dominated by a narrow focus on energy efficiency and a limited concept of setting targets for completed new buildings. While BREEAM has served a useful purpose in raising awareness on energy efficiency, not enough attention has been paid to resource depletion, pollution and indoor air quality. Our SME partners get very little direct benefit from existing assessment systems. There is a lack of commonality in the criteria that are included leading to a current practice in the industry of cherry picking environmental gains which are easy and ignoring others which are inconvenient. A further outcome of the research has been to form a partnership with a range of organisations to analyse existing assessment systems in order to develop a simpler 'tool box' which allows building developers to make transparent environmental decisions about products, materials and building systems.

Some of our partners also identified wider difficulties when considering assessment methods. For some companies which would describe themselves as 'ethical', assessment methods would need to include physical, social and health considerations, controversial as these may be. They further deplore the lack of transparency and accountability of research institutions, consultants and other accreditation bodies who use so-called 'black-box' methods. Environmental Building News refers to these problems as the search for the 'Holy Grail'.

“Problems arise concerning the quality, consistency and availability of data on products and processes; the methods used to compile inventories and especially the assumptions

and systems used to translate inputs and outputs into measures of environmental impact”  
(EBN, 03-2002)

#### **4- PRACTICAL DIFFICULTIES IN THE MARKET AND USE OF GREEN BUILDING MATERIALS AND PRODUCTS**

Most obstacles to a greater uptake in this sector appear at a practical level. The argument most commonly used to justify resorting to traditional building products has to be the supposed higher cost of greener alternatives. Myth or reality, there are technical, financial and business difficulties to the development of green products for SMEs.

##### **4.1 Producing and advertising green building materials**

Difficulties in the marketing of green products prove a major obstacle. Our industrial partners described their niche market as the ‘green ghetto’. Moving out of the ‘ghetto’ into mainstream is *vital*, not only for our partners’ businesses but also, more importantly, for sustainable construction as a whole. Indeed, the construction industry will only become ‘sustainable’ when the vast majority of buildings follow sustainable methods and resort to sustainable products.

Marketing and getting specified are crucial issues. ‘Greenness’ can prove a difficult value to sell; Marketing difficulties also include competition. SMEs often battle against the mainstream industry and powerful multinationals. Patents and IPR require an important investment and can lead to expensive legal battles i.e. to a lot of difficulties for small businesses.

##### **4.2 Specifying Green Building Materials**

Getting support from committed green architects can make a significant difference for SMEs producing green building materials and products. Without a privileged relationship with a committed architect or contractor, the specifying process becomes much more difficult.

A close relationship with designers, specifiers and builders has been essential in developing the use of green products. However relying on the dogged perseverance of a few is not a basis for developing a wider market. One outcome of the research is that we plan to contribute to the development of the “National Green Specification’ (NGS) which will create a full range of standards specification clauses for green materials and building methods.

##### **4.3 Use of Green Building Materials**

Despite the many problems identified in our research our SME partners have seen a steady rise in their business. A number of products are breaking out of the ‘green ghetto’ and getting onto the shelves of large builders merchants and DIY stores. For architects it can still be difficult to source them or get them used on site as building contractors frequently try to substitute more conventional products.

Very strong technical backup has also been identified by many as a prerequisite for the success of green building SMEs. Products can be complex and require new –or forgotten– techniques. Without a strong technical back up, contractors will refuse to embark on such an experience.

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