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Environmental drivers & opportunities:- Impacts on housing sector in UK

Die britische Bauwirtschaft und ihre treibenden Kräfte: Chancen für den Holzbau

L'industria edile britannica e le sue forze sostenitrici: un'opportunità per la costruzione in legno

Document in English

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1 Introduction

There is growing demand for innovative building systems for homes/housing. European Social, Economic and Environment policies have now been in place for several years and they have been cascaded to almost all individual industries who are striving to address these policies through their own businesses and processes. For example, construction industry is trying to address the sustainability issues along with many other issues. It should be noted that these policies are not only applicable to the construction industry but also to all other associated industries. European countries have been looking into the stock of existing housing and required new houses with improved innovative methods and technologies meeting all the social, economical and environmental policies. Affordability has become one of the key issues while maintaining and improving the well being in homes.

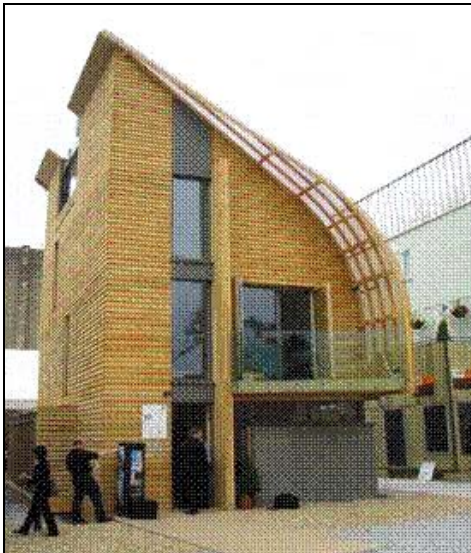


Figure 1: Kingspan Century timber building at BRE Innovation Park

New Techniques and materials have been developed during the last couple of decades but they have not been taken up in housing as much as they should be. The range of systems and construction techniques has been extremely varied but the main types of innovative systems have been in the fields of:

- Timber frame (figures 1, 2, 4 & 6) & Structural Insulated Panel systems(SIPs) (Figure 5)
- Concrete (Figure 3)
- Masonry (Figure 3)
- Metal frames



Figure 2: Stewart Milne Timber building at BRE Innovation Park



Figure 3: Hanson concrete & masonry



Figure 4: eco-TECH building at BRE Innovation Park



Figure 5: Osborne Structural Insulated Panel building at BRE Innovation Park

There is a huge demand for new housing in Europe which will put enormous pressures on the European construction industry and the environment. The question one should ask is how, in the face of severe skills shortages, is this demand to be met and how will it be done without intolerable environmental impacts – increase carbon emissions, pressure on energy and water supplies, more road congestion, more waste, etc.?

This paper summarises the requirements of the code as a new National Standard incorporating a set of sustainable design principles.

2 UK Code for Sustainable Homes

The UK Code for sustainable Homes was launched recently with the publication of “Code for Sustainable Homes”. It is a step change in sustainable home building practice which introduced a single national standard to be used in the design and construction of new homes in England, based on the BRE’s EcoHomes scheme.

It is a standard which builds upon existing systems and is a mark of quality. The code is a signal for the future direction and tends to encourage home builders to construct more sustainable homes and continuous improvement in sustainable home building.



Figure 6: Willmott Dixon Glu-laminated Timber School buildings at BRE Innovation Park

The code also empowers home buyers to drive demand for more sustainable homes. Adoption of the code is intended to drive continuous improvement in legislation, policy and good practice i.e. closely aligned with Building Regulations where applicable and complement Energy Performance Certificates.

The code at present is voluntary although UK government is considering to make it a mandatory. However, there are already organisations which require code compliance such as English Partnerships and Housing Corporation which build 40,000 dwellings per annum.

3 Sustainability Design

UK has decided to reduce emission by 12.5% by 2010 (1990 baseline) and reduce Co₂ emissions from all sources by average of 20% by 2010. Future related drivers in UK are

- Part L (L1A) of building regulations which at present encourages the use of 10% renewables energy supply to every dwelling;
- Display SAP (Standard Assessment Procedure) energy rating;
- Planning legislations and codes.

Table 1 shows the drivers which exist at European and UK levels relating to conserving energy and water, and minimising waste.

Initiatives	Energy	Water	Minimising Waste
Global	√	X	X
EU Policy	X	X	√
EU Directives	√	√	√
UK policy	√	√	√
UK legislation & regulations	√	√	√
Best practice	√	√	√
Incentives	√	√	X
Organisations	√	√	√
Technologies	√	√	√

Table 1: Summary of the drivers relating to conserving energy and water, and minimising waste

There are nine sustainability design principles for rating homes as a complete design package:

- Energy/CO2
- Water
- Materials
- Surface Water Run-off
- Waste
- Pollution
- Health & Well-being
- Management
- Ecology

4 Innovative systems

New innovative systems must be given the opportunity to demonstrate how they would meet the European policies and requirements as well as addressing some additional performance characteristics including durability, resilience, ease of repair and some aspects of whole life performance and adaptability. The areas that need addressing are:

- Innovations in energy efficiency (airtightness and leakage);
- Conformity (Certification);
- Innovative products and systems;
- Innovation in security;
- Sustainability;
- Waste and recycling;
- Planning and Risk;
- Acoustics and Fire design requirements
- Regeneration;
- Regulations and Standards;
- Quality and customer satisfaction;

5 Potential Benefits

Although the benefits associated with minimising pollution, climate change and resource depletion tend to have no direct positive business impacts on the construction industry and its clients, these issues are becoming pivotal factors for the survivor of construction industry in the future. Sustainable construction is increasingly demanded by clients, particularly by social housing associations and public bodies. Investors are looking at engagement with sustainability as a measure of the quality of a construction company's management. The UK government has also been promoting measures to increase productivity and value for money for clients; One of the routes has been through the Code for Sustainable Homes and gradually implemented through the Building Regulations.

Much greater use of offsite manufacturing and other innovative systems and methods of constructions are essential to meeting new housing demands. The construction sector industries soon or later will have to address sustainability issues related to energy, environmental impacts, sustainable housing design and construction, cost effective use of Brown-field sites, efficient and renewable energy use, the environmental impacts of material and waste reduction, transport, life cycle analysis, recycling and much more.

Housing sustainability and improvement often involves applying new technologies to older buildings too. Technologies must be invented to demonstrate how they can help to make homes safer, warmer, more energy efficient and generally better places to live.

By focusing on a specific (housing), sector we will have the real opportunity to make real impacts during the next decade and beyond. The aim will be that these impacts will include:

- more efficient and reliable use of materials and products in construction
- improved interfacing and interactions between materials
- faster exploitation of new materials and techniques
- reduction in cases of inappropriate use of materials
- improved cooperation between different materials supply sectors
- greater take-up and appreciation of research by industry
- materials information that more closely addresses industry needs.

BRE has been one of the leading organisations for creation of several tools for measuring the environmental impacts for materials, energy, waste, profiling, LCA, Whole life costing and many more. Tools relate to resource use, embodied energy, damage to environment, damage to humans



Figure 7: BRE Tools

6 Concluding remark

House builders in UK will be affected by:

- Code of sustainable Homes
- pdate of Building Regulations
- Activities of EST (Energy Saving Trust)

7 Reducing Energy

On reducing energy side, we can expect to see:

- EPCs compulsory;
- Better insulation standards for roofs, walls & floors leading to:
 - Thicker insulation
 - Larger overall footprint for same internal floor space
 - Cavities more than 100 mm
 - Full fill cavities (if permitted)
- Greater care for avoiding thermal bridging;
- Accredited construction details;
- Improvement of thermal performance of glazed units;
- Increasing use of communal heating systems;
- Less reliance on fossil fuels to produce electricity, heat and hot water;
- More reliance on energy sources such as wind power, heat pumps, CHP systems and solar technologies;
- Tightening of the air permeability requirements placing increasing focus on workmanship and construction detailing;
- Greater need for careful consideration of controlled ventilation to ensure satisfactory indoor air quality;
- Higher standards for energy efficient lighting and lighting technologies;
- Lower hot water flow rates in showers and more water efficiency in kitchen appliances;
- More care in design to avoid overheating particularly in lightweight construction;
- Increase in proportion of flats in new housing (less surface external envelope to insulate).

8 Reducing Water

On reducing water side, we can expect to see:

- Water quality, pollution and river basin management to be addressed;
- Bringing water conservation into Building Regulations (being considered at present).

Builders is likely to be affected by:

- the need to submit flood risk assessments with a planning application;
- Reduce flood risk to and from new development through building location, layout and design

9 Waste minimisation

On waste minimisation side, we can expect to see:

- Increased use of economic incentives and legislation to reduce waste;
- Minimising and recycling construction waste (due to landfill and aggregate taxes);
- More use of materials from sustainable / renewable resources;
- Less use of hazardous materials in construction;
- More use of recycled and recycling of building materials (for new construction and at end of life including packaging);
- Increased availability of construction components made from a proportion of recycled materials;
- Greater use of factory assembly of buildings / components (MMC) to minimise site waste (also need for high thermal mass & overdesign of units for transportation);
- Increased use of waste wood residues as fuel for community heating;
- Increased provision for bin storage areas in house design to allow for recycling bins;
- Increasing focus stage on “end of life” waste minimisation issues including the de-construction of a building.

Finally, the construction industry should realise that soon or later they have to address the sustainability issues if they want to be in business in the future.