

# Challenges Facing Housing Developers to Deliver Zero Carbon Homes in England

M. Osmani, and A. O'Reilly

**Abstract**—Housebuilders in England have been the target of numerous government policies in recent years promoting increased productivity and affordability. As a result, the housebuilding industry is currently faced with objectives to improve the affordability and sustainability of new homes whilst also increasing production rates to 240,000 per year by 2016. Yet amidst a faltering economic climate, the UK Government is forging ahead with the 'Code for Sustainable Homes', which includes stringent sustainable standards for all new homes and sets ambitious targets for the housebuilding industry, the culmination of which is the production of zero carbon homes by 2016. Great uncertainty exists amongst housebuilders as to the costs, benefits and risks of building zero carbon homes. This paper examines the key barriers to zero carbon homes from housebuilders' perspective. A comprehensive opinion on the challenges to deliver zero carbon homes is gathered through a questionnaire survey issued to the major housing developers in England. The study found that a number of cultural, legislative, and financial barriers stand in the way of the widespread construction of zero carbon homes. The study concludes with several recommendations to both the Government and the housebuilding industry to address the barriers that hinder a successful delivery of zero carbon homes in England.

**Keywords**—Zero carbon homes; Code for Sustainable Homes; housebuilders; England.

## I. INTRODUCTION

IN recent years, the UK housing industry has been the subject of numerous government reports and initiatives. As a result, the housebuilding industry is currently faced with objectives to improve the affordability of new homes whilst also increasing production rates to 240,000 per year by 2016 [1]. More recently, the UK Government has targeted the housebuilding sector, which produces 30% of CO<sub>2</sub> emissions in the UK, as a key area where carbon reductions can be made. As such, the Code for Sustainable Homes, which sets sustainable standards for all new homes, was published in December 2006. The Code sets ambitious targets for the housebuilding industry, the culmination of which is the production of zero carbon homes by 2016. The aim of this paper is to examine the barriers that hinder the successful delivery of zero carbon homes in England. The paper reviews low carbon development drivers in the UK; analyses and discusses housebuilders' views on impediments and challenges to zero carbon homes in England.

## II. LOW CARBON DEVELOPMENT DRIVERS

Existing literature in the field of low carbon development is quite extensive; however, very little research exists on the feasibility of zero carbon homes from house developers' perspectives. In terms of low carbon development in the UK, several drivers can be identified, which are examined below.

With a considerable number of housebuilders being among the largest construction companies in the UK, there is a growing culture of corporate social responsibility (CSR) within the industry. The importance attached to corporate social responsibility is shown in the WWF (2007) report [2], entitled 'Building a Sustainable Future', where a survey of 20 of the UK largest housing developers revealed that 70% publicly report on their approach to sustainability and 65% have a corporate sustainability policy in place. CSR has the potential to be a catalyst organizational driver for zero carbon homes, however, construction supply chain has a more profound impact on the zero carbon agenda. Indeed, a study by Keeping and Shires (2004) found that the supply chain is more motivated to develop green products and practices due to marketing objectives and the market differentiation benefits, and consequently they act as a strong driver in zero carbon development [3]. Furthermore, Carter (2006) stated that exceeding minimum standards in relation to sustainability factors can lead to enhanced brand recognition and reputation [4]. Similarly, the WWF (2005) report, 'Investing in Sustainability', also indicated that achieving high standards of environmental and social performance can be used to a developer's advantage to attract customers and high caliber employees [5].

Although customer demand for sustainable low-carbon housing is currently limited, it is recognized as being a growing market and area of interest [4]; [6]. A study carried out by Sponge Sustainability Network (2007) found that there is a desire amongst the UK public to adopt sustainable lifestyles and this growth in customer demand is likely to encourage housebuilders to adopt more sustainable practices in their future developments [7]. The growing customer demand is being supported by favorable planning policies, such as PPS1 [8] and existing government policies, such as the Energy White Paper, which are aimed at promoting sustainability in the built environment. These policies pave the way for new legislation, which several studies have shown that stakeholders in the building industry react best [9]; [10]; [11.] The prospect of future legislation should prove to be a major driver in achieving zero carbon homes by 2016 [12]. It is anticipated that the Code for Sustainable Homes is likely to

be the most influential driver for housebuilders to build zero carbon homes.

### III. THE CODE FOR SUSTAINABLE HOMES

The Code for Sustainable Homes is set to be the basis of future energy efficiency building standards in the housing sector. The Code uses a star system to rate properties with '1' star representing a 10% improvement over Part L of the Building Regulations 2006 and '6' stars equating to a zero carbon home. This star rating system was deemed more suitable than the EcoHomes system of 'Pass' to 'Excellent' [7]. It is expected that the standards set by the Code will be gradually implemented through changes to the Building Regulations. Consultations are currently ongoing [1], however, the proposals involve incorporating level 3 (25% improvement over part L) in 2010 and level 4 (44% improvement) in 2013 before finally moving to zero carbon homes in 2016.

### IV. RESEARCH METHODOLOGY

The research element of the study, which provided quantitative data on the barriers to zero carbon homes, consisted of a postal questionnaire distributed to housebuilders around England. The sample population of 125 housebuilders was determined based on their turnover, number of employees and geographical location. This population comprised the following breakdown in terms of their geographical location in England: South West (11), South East (36), Midlands (22), North West (12), North East (13) and National (31).

### V. RESULTS

Of the 125 targeted housebuilders, 41 completed questionnaires were received, representing 33% response rate. The participating housebuilders in the survey were asked to rate a range of barriers against a five point Likert scale from '1' (no barrier) to '5' (major barrier). These are examined and discussed below.

#### A. Cultural Barriers

Responses related to cultural barriers to zero carbon homes have been presented in Table I, which reveal a lack of confidence amongst housing developers in emerging green technologies, with 76% commenting that it is a significant to major barrier. This has been agreed by all surveyed companies irrespective of their size. Additionally, 46% of respondents stated that the lack of widespread customer demand is a significant barrier, which was concurred by all developers except those whose turnover was less than £10m or between £50-100m. This indicates that small to medium developers may be finding a niche market for sustainable housing although this is not main stream yet.

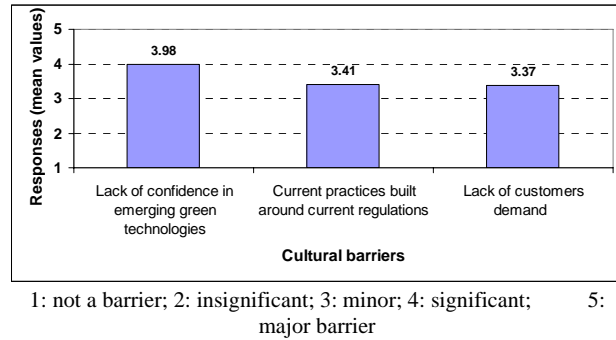


Fig. 1 Cultural Barriers to Zero Carbon Homes (house builders' responses)

#### B. Financial Barriers

Respondents views on financial barriers to zero carbon homes are summarized in Fig. 2. A lack of data related to the cost of zero carbon homes and short of financial incentives were recognized by 78% and 71% of the survey participants respectively. This was followed closely by the lack of sales data which was rated by 66% of respondents as being a significant to major barrier. This would indicate that housebuilders are concerned about the net financial cost and overall profitability of building zero carbon homes.

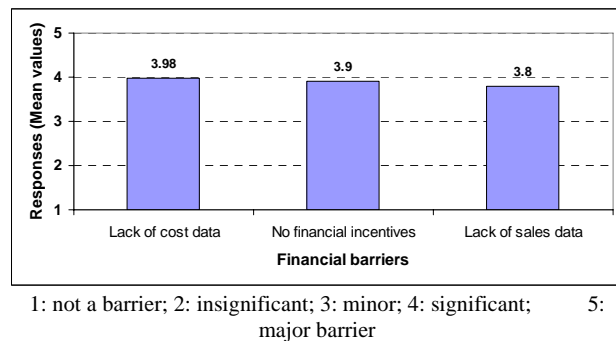
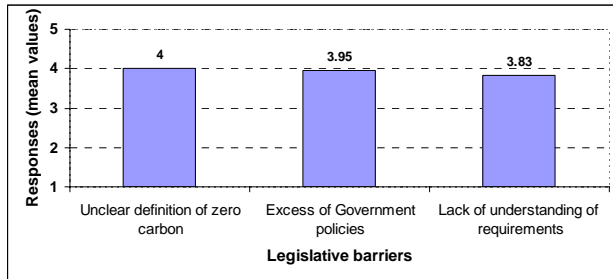


Fig. 2 Financial Barriers to Zero Carbon Homes in England. (house builders' responses)

#### C. Legislative Barriers

Fig. 3 shows that 73% of developers concurred that to the definition of zero carbon homes is a significant legislative barrier, as it is ambiguous and needs more clarity in terms of requirements and expected outcomes. Additionally, 68% of informants argued that there are too many government policies associated with energy conservation in buildings. This suggests that housebuilders would like to see clearly defined, legal guidelines to replace the existing bulk of policies.



1: not a barrier; 2: insignificant; 3: minor; 4: significant; 5: major barrier

Fig. 3 Legislative Barriers to Zero Carbon Homes in England. (house builders' responses)

## VI. DISCUSSION AND CONCLUSION

The aim of this paper was to capture housebuilders views on barriers to zero carbon homes in England. The research revealed that customer demand is an essential element in the widespread development of zero carbon homes. The survey highlighted housebuilders concerns over real or perceived costs associated with building zero carbon homes. Indeed, cost of sustainable measures in the housing sector was identified by WWF (2005) [5], Williams and Adair (2007) [13] and Cato (2008) [14] as being prohibitive. Furthermore, the housebuilding industry needs to know what their primary objective should be, and called for the Government to act now upon the growing interest in sustainability through financial incentives and legislation to create a national market for zero carbon homes. The latter has been acknowledged by Vorsatz et al. (2007) [15] as being an important driver for low carbon developments. Legislation will motivate housebuilders to commit to achieving the Code for Sustainable Homes and should also create a guaranteed market for suppliers, which could potentially reduce material costs and increase availability.

There was a consensus among the survey participants in calling for a joined up, holistic approach to the zero carbon target. This should drive the implementation of the zero carbon homes agenda in a cohesive manner, ensuring that all stakeholders in the housebuilding process, including material manufacturers, designers, local planning authorities, and contractors, are involved, committed, and above all adhere to the same guidelines with clear and consistent roadmap.

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## REFERENCES

- [1] DCLG -Department for Communities and Local Government (2007) The Callcutt Review of Housebuilding Delivery, HMSO, London.
- [2] WWF (2007) Building a Sustainable Future. UK Home-builders Progress in Addressing Sustainability, WWF-UK, Surrey.
- [3] Keeping, M. and Shiers, D. E. (2004) Sustainable Property Development A Real Guide to Real Estate and the Environment, Blackwell Publishing, Oxford.
- [4] Carter, E. (2006) Making Money from Sustainable Homes: A Developers Guide, CIOB Publications, Ascot.
- [5] WWF (2005) Investing in Sustainability. Progress and Performance Among the UK's Listed House-builders, WWF-UK, Surrey.
- [6] Futerra (2005) Public Understanding of Climate Change, (Available at: <http://www.defra.gov.uk/environment/climatechange/pubs/pdf/ccc-app1.pdf>), (Accessed on 17th December 2007).
- [7] Sponge Sustainability Network (2007) Eco Chic or Eco Geek? The Desirability of Sustainable Homes, Sponge Sustainability Network.
- [8] DCLG -Department for Communities and Local Government (2005) Planning Policy Statement 1: Delivering Sustainable Development, HMSO, London.
- [9] Adeyeye, K., Osmani, O. and Brown, C. (2007) Energy Conservation and Building Design: The Environmental Legislation Push and Pull Factors, Structural Survey, Vol. 25 No. 5, PP375-390.
- [10] Baiche, B., Walliman, N. and Ogden, R. (2006) Compliance with Building Regulations in England and Wales, Structural Survey, 24:4, PP279-299.
- [11] CIOB (2007a) Strategy for Sustainable Construction, (Available at: <http://www.cio.org/about/ciobpolicies>) (Accessed 12th December 2007).
- [12] Sayce, S., Ellison, L. and Parnell, P. (2007) Understanding Investment Drivers for UK Sustainable Property, Building Research and Information, 35:6, PP629-643.
- [13] Williams, K. and Dair, C. (2007) What is Stopping Sustainable Building in England? Barriers Experienced by Stakeholders in Delivering Sustainable Developments, Sustainable Development, 15, PP135-147.
- [14] Cato, I. (2008) Carbon Zero Homes UK Style, Refocus, 9:2, PP28-29.
- [15] Vorsatz, D., Koepfel, S. and Mirasgedis, S. (2007) Appraisal of Policy Instruments for Reducing Buildings' CO2 Emissions, Building Research and Information, 35:4, PP458-477.