



Low carbon housing refurbishment challenges and incentives: Architects' perspectives

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ABSTRACT

The UK has a legally binding commitment to reduce CO₂ levels by 80% by 2050 relative to the 1990 emissions baseline. The existing housing stock, which accounts for approximately 30% of total UK energy demand, has the potential to provide significant opportunities for this reduction; however, currently there are no legislative measures driving widespread low carbon housing refurbishment (LCHR) design and construction. Architects have a decisive role to move forward the LCHR agenda owing to their leadership and significant involvement in the initial briefing, conceptual and design development phases of a project, regardless of project procurement types and project sizes. Hence, the aim of this research is to investigate the key challenges and incentives for achieving LCHR in England from architects' perspectives.

The research adopted a triangulated methodological approach, consisting of a desk study, postal questionnaires, and follow up semi-structured interviews. The questionnaires and interviews were executed amongst a wide geographical sampling frame of architects in England with previous housing refurbishment experience. The research concluded that high capital costs for micro-generation technologies and energy efficient materials; disparity in VAT between new build and refurbishment; and the complexity of the UK existing housing stock are the most considerable LCHR challenges. In contrast, the research indicated that a tax rebate; removal of the VAT difference between new build and refurbishment; increased research to produce affordable micro-generation technologies; and increased government supplied low carbon programmes were identified by the participants as the key incentives to drive the LCHR agenda.

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1. Introduction

The UK has a legally binding commitment to reduce CO₂ levels by 80% by 2050 relative to the 1990 emissions baseline [1]. The UK housing sector accounts for approximately 30% of total UK energy demand and produces 56.5 MtC per year, which accounts for 27% of the total UK CO₂ level [2,3]. The UK national domestic energy usage is characterised by a number of variables, namely: the age of the housing stock; the differences in housing types across the regions; and the diversity in housing ownership [4,5]. Furthermore, a newly built home emits on average 0.86 tonnes of carbon dioxide per year; whereas an existing home produces yearly an average of 1.6 tonnes [6]. Notwithstanding the government's plan to increase the

UK housing stock by 240,000 homes a year, approximately 70% of today's dwellings will still be standing in 2050 [7].

Energy efficiency of UK existing housing stock has been put forward within the UK government's Energy White Papers [8,9] as the cleanest, safest and most cost effective approach to meet the carbon reduction targets [10,11]. During the last decade, the European Union and the UK government brought about several energy conservation directives, policies and initiatives, such as: the Energy Performance of Buildings Directive; the EU Renewable Energy Strategy; the Climate Change Act 2008; and the UK Low Carbon Transition Plan [12,13]. However, the uptake of effective energy efficient strategies within the UK is piecemeal and currently not sufficient to achieve the necessary CO₂ reduction targets [13,14].

Improvements through a range of cost effective energy efficiency measures are currently promoted in a variety of government programmes, and heat loss standards for new homes have become progressively tighter in the regular cycle of revisions to the Building Regulations. Part L (Conservation of Fuel and Power) and Part F

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