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The potential of the Code for Sustainable Homes to deliver genuine 'sustainable energy' in the UK social housing sector

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ABSTRACT

Environmental concern in light of anthropogenic climate change will impact the housing sector as one of the major energy-consuming and carbon dioxide producing sectors. For new housing, currently the most important policy to combat this issue is the Code for Sustainable Homes.

The social housing sector is under obligation to comply with these standards, which entails a significant increase in the cost of housing delivery. The sector is also under pressure to increase much-needed housebuilding, without increased funding being available. The quandary facing the sector is how to achieve both aims. Therefore any policy, such as the Code, which impacts on the ability of the sector to deliver unit numbers must be truly effective at delivering its own main aim.

This paper explores the current situation, with a preliminary analysis of how the Code may not be able to deliver its 'sustainable energy' goals due to the ways in which 'low and zero carbon technologies' are assessed and how they behave in real world situations. It demonstrates that further research and policy changes are needed to deliver sustainable energy for this sector and ensure the delivery of crucial new housing is not hampered whilst also failing to meet energy goals.

1. Introduction

The threat from human-induced climate change is recognised by national and international bodies as a major concern (UNFCCC, 1992; IPCC, 2007; DEFRA, 2007a). The IPCC's Fourth Assessment Report confirms that 'Warming of the climate system is unequivocal', with the primary concern being that greenhouse gas emissions from human activity have risen 'by 70% between 1970 and 2004' (IPCC, 2007).

The UK is therefore under an obligation to address these issues through comprehensive policy and market mechanisms particularly in the energy and built environment sectors. It is necessary that any targets are made progressively more stringent over time, in order to reduce carbon emissions below that which 'is likely to cause a greater than 2 degrees temperature rise' (Stern, 2007). Meeting the energy goals of the UK can only be achieved through setting and achieving strict targets in all energy-consuming sectors, and as over a quarter of the UKs CO_2 emissions come from the energy used to heat, light and run homes (CLG, 2007a) the housing sector has a major role to play in tackling this issue.

This paper presents the likely benefits and drawbacks of the current solutions posed in the UK to tackle energy use in new housing, with a consideration of how this specific area of energy policy is being enacted through policy and regulation. The outcome is an examination of the likely impacts of the policy particularly on the social housing sector, together with an examination of a number of reasons why delivering on the policy may not lead to the environmental benefits assumed.

1.1. Energy and housing

It is estimated that the housing sector is responsible for over 27% of the total CO_2 in the UK (DEFRA, 2007b), accounting for 149 million tonnes—the equivalent of 2.5 tonnes per resident (Fig. 1). While emissions from the industry and transport sectors vary significantly from region to region, the local authority statistics show that domestic emissions per capita are fairly even nationwide (DEFRA, 2007b). Therefore a successful sustainable energy strategy for housing could be an effective tool for cutting carbon dioxide emissions by significant levels, right across the UK.

Policy instruments have been in place in an attempt to reach this goal for over 40 years in the UK, with standards for limiting energy loss through buildings first introduced in the 1965 Building Regulations. This now falls under Part L of current building regulations, 'Conservation of Fuel and Power' (ODPM, 2006), which takes account of limiting heat gains and losses, as well as of energy efficient building services and controls. The energy performance is now expressed in terms of CO_2 performance, with a carbon emissions value expressed in $kgCO_2/m^2$

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resulting from heating, hot water, ventilation and internal lighting referred to as the Dwelling Emission Rate (DER). This figure is calculated using the Standard Assessment Procedure (SAP) (DEFRA, 2005). The 'SAP rating' itself is based on the costs of energy for the above uses for the dwelling, with the result on a scale of 1–100—a rating of 100 indicating 'zero' net energy costs. The current SAP rating includes provision for energy savings from energy generation technologies, with appropriate reductions in running costs included in the calculation and the possibility of a rating over 100 for homes that are net energy exporters.

The average SAP rating of households has risen steadily over the past 30 years (Fig. 2). However, despite a threefold increase in the average SAP rating over this period, this has not translated into a reduction in overall energy usage in the housing sector as a whole. This may be attributed to the rapid and continuous growth of central heating systems over this period (Fig. 3). Replacing a single heated room with whole house heating is likely therefore largely to blame for the lack of any demand reduction over this period.

It can be seen that both overall energy consumption and energy used for space heating has remained roughly constant since 1970. Households chose to install central heating for a more comfortable living environment throughout the dwelling, whereas previously the main living area may have been the only heated space. This effect is now being mirrored by research which suggests that, given the choice between saving money and a more comfortable living environment, a household will heat their home to a higher standard (Pett and Guertler, 2004). The SAP rating therefore provides a useful measure of potential energy performance, however it does not take into account how occupants behaviour and uses of heating and lighting systems in particular, affect the results.

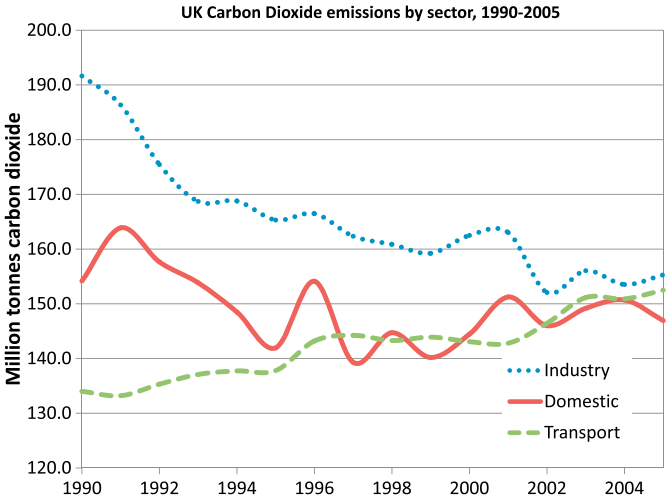

Fig. 1. UK carbon dioxide emissions by sector.
Source: AEA Energy and Environment, from DEFRA, 2007.

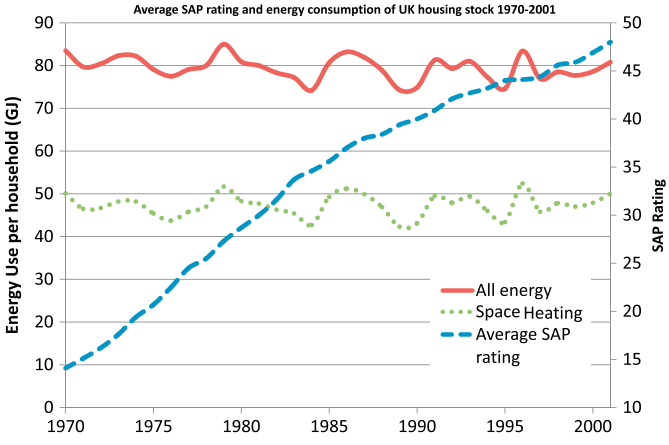

Fig. 2. Average SAP rating of UK housing stock and energy consumption (BRE, 2003).

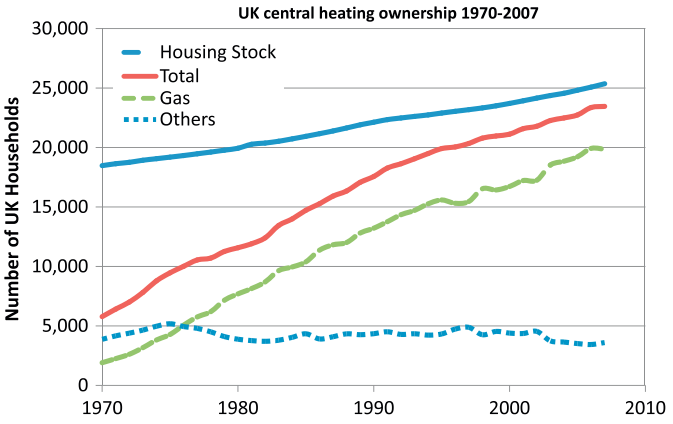

Fig. 3. Central heating ownership, UK households.

Consequentially, patterns of consumption and user behaviour may have the effect of negating some of the benefit expected from reducing the carbon intensity of the UK's energy sources in the future. This 'rebound' effect is especially likely to manifest itself more strongly in households for which fuel costs constitute a large proportion of household income, as households become able to afford a higher standard of heating or increased appliance usage. A significant proportion of these households are those, therefore, with low incomes and those more likely to be provided for by the social housing sector. These effects are discussed further in Section 4.4.

1.2. Social housing

Social housing is necessary to provide secure, decent housing for those unable to afford the open market prices of housing in the UK. In 2006, 18% of households were renting from the social sector, thereby constituting a significantly larger proportion than the 12% renting privately (CLG, 2006). To highlight the importance of delivering new housing in this sector, the housing survey also showed that this sector is the most overcrowded, with 5.5% of homes falling into this category, and provides for those with average household incomes of less than £11,000 a year (in comparison with a UK average of over £25,000) (National Statistics, 2006).

The UK housing market is under pressure from a rising population and a move towards smaller household sizes. For example, the UK population grew by 349,000 people in the year to mid 2006, representing a 0.6% increase (National Statistics, 2007). It is projected that between 2004 and 2016 there will also be an extra 1.85 million single person households in England alone, with these figures contributing to a total increase of 2.8 million new households by this date (CLG, 2007a). If current trends continue, these figures suggest that by 2016 a further 500,000 households will be renting from the social sector, requiring approximately 42,000 homes to be built each year. This figure is confirmed by the Barker review, which examined social housing provision and found that 'the number of newly built social houses for rent has fallen from 42,700 in 1994–95 to around 21,000 in 2002–03.' (HM Treasury, 2004). This is therefore an area where