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Irrational homeowners? How aesthetics and heritage values influence thermal retrofit decisions in the United Kingdom

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ABSTRACT

In order to reduce CO2 emissions in line with UK policy, existing UK homes need to be retrofitted to high thermal standards. A large proportion of these homes have traditional or aesthetically pleasing features which people are reluctant to compromise for the sake of thermal efficiency. A minority of such dwellings are protected by statute, but millions are not. There is a dearth of structured discussion on the issues owners of such homes face when planning thermal retrofits. This study begins with a literature review of sustainable development, heritage and aesthetics. It then reports the results of qualitative interviews with retrofitting owners of such homes in Cambridge, UK. It finds homeowners struggling to balance thermal issues against a range of heritage and aesthetic concerns which often overlap or clash. Homeowners develop their own logic in working these through, and their aesthetic convictions strongly influence what happens with retrofitting. The interviews suggest that concern for the heritage embodied in the housing stock can be one reason current policy does not always engage homeowners in retrofitting.

1. Introduction

The housing sector produces approximately 27% of UK CO2 emissions, of which about 75% comes from space heating [1]. To meet the UK's legally binding commitment of 80% reductions by 2050, there is strong policy commitment to reducing these emissions. While some reductions are expected to come through fuel switching to renewable energy and replacement of old homes with newer, energy efficient dwellings, the greatest potential for emission reductions lies in thermal retrofitting of existing homes [2,3]. Recently there has been much discussion about 'hard-to-treat' homes, usually meaning dwellings with solid walls, which cannot be treated with cavity wall insulation [4–6]. The assumption is often that most of these homes can be thermally upgraded with a layer of external wall insulation covered by a new façade material.

This intersects with a wider and more prevailing issue in the UK housing stock: the heritage value of many homes, where this lies outside statutory protection orders. Many solid walled dwellings have brick façades, which are often seen as attractive and worthy of preservation. Streets can have architectural value due to uniformity of dwellings, even if buildings themselves may not be architecturally significant [7].

Of the 27.7 million homes in the UK, about 40% were built prior to 1939 [8]. In England there are 23.3 million dwellings but only 374,000 buildings have listed building status [9,10]. A large number of old buildings have heritage features that are likely to be appreciated by homeowners but are not deemed worthy of listed building status, nor in a conservation area (often called 'heritage by appropriation', rather than 'heritage by designation').

As energy prices increase and policies such as the Green Deal have aimed to stimulate large-scale retrofits in the UK, for most homes there may be no legal obstacles to covering solid brick walls with insulation or substituting PVC double glazing for wooden framed Victorian windows. The Department of Energy and Climate Change (DECC) introduced the Green Deal Communities Fund in 2014, with a total capital funding of £80 million. Cambridgeshire was identified as one of the first of the six priority areas for this scheme. Grants (up to £6,000 per household) provided by the Green Deal Communities Fund aimed to increase the uptake of solid wall insulation. The planning laws have been revised in such a way that if a property is not in a conservation area, the installation of external insulation is now considered as a 'permitted development' and

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does not require a planning permission. But is this a course that homeowners want to follow?

Currently this question tends to hover round the edges of the policy and academic discussion of thermal retrofitting. There is much research on retrofitting as embedded in a socio-technical system [11,12] or as a social practice [13]. This paper, however, considers retrofitting from a different perspective. It attempts to bring aesthetic/heritage values into centre-stage and offer a preliminary assessment of the issues at stake. Fouseki and Cassar [14] argue that the approach to energy efficiency in heritage buildings reflects predominantly the perspectives of experts, neglecting other values that may be more relevant to non-expert users of buildings. They identify an obvious lack of knowledge regarding occupants' perceptions, while policies tend to reflect professional expertise and often fail to address the needs of the wider public. Fouseki and Cassar [14] propose that the driving question for energy efficiency projects should also be 'what does this building mean for those who use it' and 'what interventions can be implemented that could co-exist harmoniously with those meanings?'

Although the paper is concerned with a UK case study, the issue has wide international implications. As thermal retrofitting has become common due to concerns about climate change, fuel costs and energy security [15], governments have recognised that general regulations on thermal retrofitting may not be suitable for buildings with official conservation protection. For example, German federal building regulations specifically exempt such buildings from the stringent demands of the energy saving regulations (*Energetische Einsparverordnung*—EnEV) [16]. Nevertheless, a large number of Germany's buildings with no official conservation designation are seen by their owners and some local authorities and organisations as having heritage value, mostly due to their traditional façades. Bodies such as Hamburg City State, Stadtbild Berlin (a building conservation organisation) and Bauen. de (a national building advice agency) have expressed concern that hundreds of historically significant buildings are being damaged through the EnEV rule that any retrofitting or restoration of these buildings must achieve high thermal standards [17–19]. As expressed in a report by Stadtbild Berlin:

> Sadly, too little consideration is being given to the aesthetic and city-enhancing features of these buildings, with catastrophic consequences for the face of the city. . . Traditional local architectural features are disappearing under 30 cm thick wads of insulation... Germany already suffered a heritage wipeout in the destruction wrought by the Second World War, and now our remaining attractive façades are falling victim to an onslaught of insulation. (Stadtbild Berlin [19]; authors' translation from the German)

This reaction has coalesced with other misgivings in Germany about insulation, particularly mould, fire risk and inflated claims as to projected energy savings, and this kind of anti-insulation movement has gained support from architects, building organisations and media groups [20]. It would seem that there is a need to take account of concerns for the preservation of heritage beyond officially protected buildings, if thermal retrofitting is to proceed without controversy. Examples of attempts to do this can be found internationally. In the US, for example, the Environmental Protection Agency gives detailed advice on thermal upgrade options for what it loosely calls 'historic homes' [21], and the National Parks Service for 'historic buildings' [22]. In the UK, technical-regulatory advice is given by the Department for Communities and Local Governments [23], and more practice-oriented advice by English Heritage [24]. The European Commission has also initiated research into appropriate methods and technologies for improving the energy efficiency of historic buildings [25].

While a great deal is known about the technical issues in thermally retrofitting homes with traditional architectural features, it is also important to explore how home owners actually frame and deal with any heritage or aesthetic issues associated with their homes, when they plan and carry out a thermal retrofit. The question as to what actually counts as heritage or aesthetic value does not have a simple answer, and it is important to see what the homeowners themselves think about this and how it can influence the way they retrofit. Hence this study covers three main areas:

- A theoretical dimension: What actually is heritage/aesthetic value in this context, and why is it important?
- A practical dimension: Based on the interviews in retrofitted homes in Cambridge, UK, how do aesthetic and heritage values influence these homeowners in relation to a possible thermal retrofit of their homes?
- A policy dimension: How should a local thermal retrofit policy approach buildings that are not deemed worthy of listed building status, nor in a conservation area, but are perceived to have aesthetic value ('heritage by appropriation') ?

It may be observed that heritage and aesthetic issues can arise when any kind of retrofit is planned for an existing home, be it thermal, acoustic, internal layout, extensions, etc. However, aesthetic issues are likely to arise with thermal retrofits in particular because these can involve extensive changes to very visible features of a building, such as the façade, and because of the strong energy policy impetus towards mass retrofitting of homes throughout the UK. Energy saving in buildings can be approached as a purely technical issue but it is also well recognised that there is large untapped potential for energy saving through occupants' behaviour change [13]. While it is recognised thermal retrofits need to be technically and economically feasible, this paper focuses on the under-researched area of homeowners' motivations rather than technical performance and costs of these projects.

The concerns addressed in this paper arose out of unexpected findings in an empirical study of the role of homeowner-occupiers as innovators in the process of thermally retrofitting their homes [12]. Although heritage and aesthetic considerations were not necessarily to the fore in these homeowners' motivations or concerns regarding thermal retrofitting, they had tended to emerge as the retrofit discussion, planning and design proceeded. When these issues became apparent the empirical work was extended, with additional interviews and a wider range of questions.

This paper begins by surveying literature relevant to the theoretical dimension of how heritage and aesthetic value are currently conceived in sections of the built environment that may be candidates for thermal retrofits.

The empirical section reports on qualitative interviews with a targeted sample of Cambridge homeowners who had thermally retrofitted their properties. These interviews with homeowners were supplemented with interviews with architects within the same local community who were involved in some of these (and other) retrofits, and with leaders in citizens' initiatives who network homeowner-retrofitters in the same community.

On the basis of the interview findings a first attempt is made to understand some of the ways heritage and aesthetic concerns can influence what homeowners choose to do in retrofitting. The paper aims to increase understanding of what actually motivates