BEHAVE 2018
5th European Conference on Behaviour and Energy Efficiency
Zurich, 6-7 September 2018

UNDERSTANDING HOMEOWNERS' RENOVATION DECISIONS RESULTING IN LOW CARBON RETROFIT

Yekatherina Bobrova[1]*, Lai Fong Chiu[2] and George Papachristos[1]

1: UCL Institute for Environmental Design and Engineering, Central House, 14 Upper Woburn Place, London, WC1H 0NN, UK
2: UCL Energy Institute, Central House, 14 Upper Woburn Place, London, WC1H 0NN, UK
* e-mail: yekatherina.bobrova.12@ucl.ac.uk

Keywords: retrofit, decision-making, homeowners, energy efficiency, diffusion of innovations

1. INTRODUCTION

Encouraging low carbon retrofit among homeowners is widely recognised as an important strategy to reduce operational energy use in dwellings and mitigate climate change. A wide range of policies with varying levels of success has been implemented in the UK in an attempt to encourage low carbon retrofit among homeowners [1]. The formulation and logic of these governmental policies assumes a narrow, technical focus on operational energy use reduction, in which achieving carbon savings in the built environment are equated to the substitution of inefficient building services with more energy efficient ones and the insulation of the building envelope [2]. However, a review of the literature suggests that low carbon retrofit should be understood not just as a technical problem, but a socio-technical one, which accounts for a broader scope of social, economic, and sustainable dimensions [3]. There is also a lack of understanding of social aspects of a homeowner's decision-making process resulting in a low carbon retrofit. The current research aims to contribute to building such understanding.

2. THEORETICAL CONCEPTUALISATION AND METHODOLOGY

The home retrofit process can be conceptualized as an innovation adoption process, situated and shaped by the conditions of everyday life [2]. The theory of innovation diffusion explains how new ideas spread over time through communication channels in a particular social system [4]. Individual agents reduce inherent uncertainty associated with a new idea during the decision-making process related to its adoption. This process has five stages, during which an agent: (i) accumulates knowledge of a particular option, (ii) forms positive or negative attitude towards this option, (iii) takes a decision to adopt or reject the innovation, (iv) implements the new idea, and (v) confirms the decision. Different influences play a role at different stages of the process [2].

The research used a multiple case study design with a qualitative approach for data collection and analysis. Eight home retrofit cases were selected with a maximum variation purposeful sampling strategy. The aim was to maximise the sample diversity in terms of the retrofit timing. The 8 dwellings were selected from the SuperHome network. It is a UK-based voluntary network of homeowners that achieved more than 60% carbon reductions as a result of retrofit activities. Semi-structured interviews took place in owners' homes, retrofit processes were mapped together with the interviewees. Interviews were transcribed verbatim and decision-making processes were inferred from them. The analytical framework used matrices to look into different stages of retrofit decisions [3]. This framework provided the basis for cross-case comparison and analysis.

3. RESULTS, DISCUSSION AND CONCLUSIONS

The adoption of a sustainability-related retrofit measure or technology is difficult and inherently uncertain as to its outcomes. The uncertainty of the outcomes is associated with the trade-off between achieving the desired retrofit goals, and minimising the risk of unintended consequences associated with low carbon retrofit. The difficulty of retrofit implementation is associated with the level of the retrofit team's practical knowledge and the level of project management skills.

The homeowners have used several strategies to reduce the uncertainty of the retrofit outcomes. The strategies depended on homeowners' initial theoretical knowledge of low carbon retrofit. The owners were more confident to go for options they knew worked elsewhere. Otherwise, they got persuaded about various options through interpersonal communication with experts they trusted. Some owners, to secure the outcomes, adopted a number of retrofit measures that exceeded those necessary to achieve their goals. All owners were happy with the results of the retrofit.

In each case the owners were active member of the project teams and were involved at least in the management of the project. In the cases, where the owners had good level of initial practical knowledge or project management skills, the projects were completed without difficulties. In the cases, where the owners did not have sufficient project management skills and the teams did not have sufficient practical knowledge from the outset, it has been decided to learn by doing. If an initial project was of a big scale, it then grew out of scope, budget or required additional investment of personal time and resources. The owners in these cases found the retrofit experience exhausting and tiresome. However, in one of the cases, in which the owners did not have expert theoretical/practical knowledge or project management skills from the outset, a step-by-step retrofit approach was adopted, in which a result of every other installation showed them what else needed to be done. As each project was small in size and scope, they did not have negative experience of the projects going oversize and out of budget.

This abstract presents a part of the research findings with the following insights: 1) Homeowners' positive experience of both outcomes and the retrofit process appears to be important, in order to persuade others to retrofit their homes. 2) More effort should be put into creating social networks, through which homeowners could exchange their retrofit experiences and recommend products and construction experts. 3) A step-by-step retrofit approach may appeal to other owner-occupiers. These insights from retrofits in owner-occupied SuperHomes may help to develop policy that will support low-carbon retrofit in the private residential sector. However, research is needed into the advantages and disadvantages of step-by-step retrofit compared with the whole house approach.

REFERENCES

[1] M. Dowson, A. Poole, D. Harrison, G. Susman (2012) Domestic UK retrofit challenge: Barriers, incentives and current performance leading into the Green Deal. *Energy Policy* 50. Special Section: Past and Prospective Energy Transitions - Insights from History: 294–305.

[2] C. Wilson, L. Crane and G. Chryssochoidis (2015) Why do homeowners renovate energy efficiently? Contrasting perspectives and implications for policy. *Energy Research & Social Science* 7: 12–22.

[3] R. Lowe, L. Chiu and T. Oreszczyn (2017) Socio-technical case study method in building performance evaluation. *Building Research & Information*: 1–16.

[4] E. Rogers (2003) *Diffusion of Innovations*, 5th Edition. New York: Simon and Schuster.