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Beyond acquisition: Exploring energy consumption through the appreciation and appropriation of domestic lighting in the UK

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ABSTRACT

A combination of energy efficiency improvements through bulb innovation and the strengthening of government policies that have encouraged the acquisition of low-energy bulbs have contributed to moderate energy consumption reductions in the UK domestic lighting sector. The story of this transition is often presented as a success of sustainability initiatives, even though the rate of this transition has been slow and the limitations of the dominant framing (market-led initiatives) have been consistently questioned. By analysing contemporary usages of lighting this article presents two additional analytical frames beyond 'acquisition' to explore domestic lighting and explain its consumption. Using new data from a survey (N = 1458) focusing on domestic lighting, the paper considers how bulbs and lighting set-ups are 'appreciated' explaining, in turn, why energy-efficient bulbs have diffused slowly and why, in some instances, households are adopting more energy-intensive lighting systems. The paper considers how and why light is 'appropriated' within everyday domestic practises and how these practises demand different types of lighting. It is argued that rooms where multiple practises are performed require multiple light points to cope with varying lighting demands. In conclusion it is argued that multiple changes in domestic lighting have occurred in relation to the qualities of light that are appreciated through the performance of everyday practises into which that light is appropriated, and that policies focused on purchasing and product innovation capture only two aspects of lighting dynamics.

Keywords: Lighting; Energy; Home; Appreciation; Appropriation

1. Introduction

This article explores contemporary patterns of UK domestic lighting and offers a novel approach for understanding the dynamics that underpin these patterns. A series of technological innovations over the last decades has increased the energy efficiency of bulbs. But, demand-led attempts to stimulate a shift towards the use of low-energy bulbs did not unfold as expected and required increasingly strong policy interventions to encourage low-energy bulb diffusion. This article moves away from a techno-economic focus on bulb efficiency and product substitution to argue that, if we are to move towards more sustainable lighting futures, more attention should be paid to how lighting is appreciated and appropriated through everyday practises in the home. The appreciation of lighting refers to its aesthetic properties, its capacity for generating pleasure, self-expression and communication. The appropriation of lighting relates to how lighting is adapted and used for the purpose of competently performing practises in the home. Better understanding the range of mechanisms that underpin domestic lighting trajectories matters because lighting represents nearly 20%

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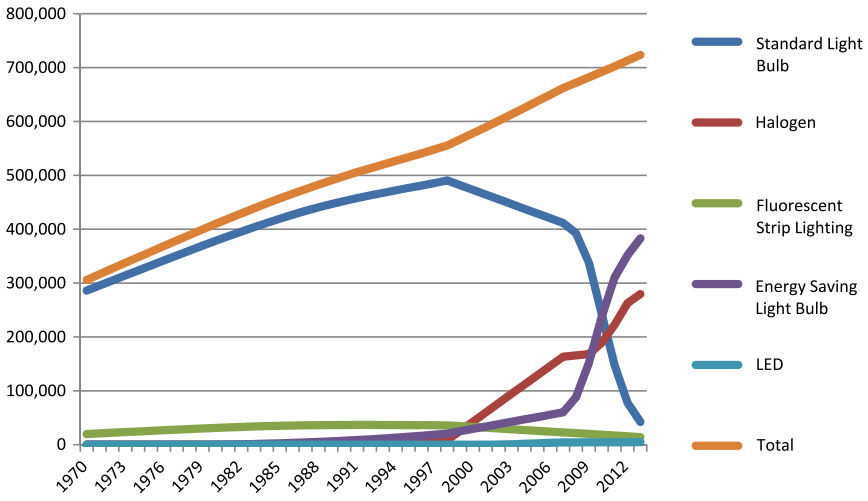

Fig. 1 – Number of light bulbs of different types (1000s) owned by UK Households, 1970–2013 (UK Government Energy Consumption in the UK data, chart compiled by authors DECC, 2014a).

of global electricity use (IEA, 2015) and, in the UK, over a quarter of total domestic electricity consumption is used for lighting. Domestic lighting thus contributes significantly to greenhouse gas emissions given the reliance on current forms of producing electricity (LIA, 2014).

The article begins by providing an overview of bulb innovation over the last decades and the policy measures that have sought to encourage the substitution of less efficient bulbs with more efficient alternatives. While it is noted that improved efficiencies and policy interventions have had some success in reducing the greenhouse gas emissions attributable to domestic lighting, much still remains to be explained. Three framing devices are used in the analysis that examine, in turn, how and why bulbs are acquired, how lighting is appreciated and how it is appropriated through daily practises. The analysis draws on new data from a survey on domestic lighting to help illustrate the effectiveness of this approach. Sections 4.1 and 4.2 thus assess how price and appreciation influence the acquisition of a variety of bulbs. The appreciation of lighting does not relate solely to bulbs, however, and Section 4.2 moves away from discussing the substitution of bulbs to detail instead how lighting set-ups within rooms might off-set potential energy savings and corresponding emissions reductions. The final substantive section then examines how lighting is appropriated and used differently depending on what the light is being used for and the spaces in which light-using practises are performed. In conclusion it is argued that to better address future patterns of domestic lighting it is important to take full account of the dynamics of everyday practises in domestic space. Such an approach is necessary to move beyond myopic price-based and consumer information centred framings of the problem that have informed previous policy initiatives, and that recent transitions from standard to energy-saving domestic lighting cannot simply be explained as responses to those policies.

2. Sustainable domestic lighting

The story of low-energy electric lighting has received significant attention in academic studies and policy reports. Its prominence rests on the fact that a 'sustainable solution' in the form of compact fluorescent lightbulbs (CFLs) already existed in the early 1980s and, as a consequence, presented itself as 'low-hanging fruit' in the early 1990s when energy efficiency and 'demand side management' entered policy arenas worldwide. The cultural significance of 'keeping the lights on' in debates about electricity generation and consumption was perhaps also a factor. Fast-forward to 2013 and lighting had become one of the few domestic electricity-using categories where overall electricity demand in the UK had started to fall. But, the path from the early 1980s to the 2010s was far from smooth. Indeed, the story of low energy lightbulbs has become emblematic of many frustrations, debates and controversies within the wider field of sustainable consumption, including explanations for the slow rate of diffusion and debates about alternative policy approaches and instruments.

Fig. 1 shows 'headline' diffusion patterns for UK domestic lighting, based on the UK Department of Energy and Climate Change's figures.[1] Adoption of energy saving (CFL) lightbulbs was clearly very slow from the early 1980s to 2007. In fact, the more significant substitution effect involved halogen bulbs. Light emitting diodes (LEDs), which emerged in the early 2000s, have not yet diffused substantially. And, the overall number of domestic light-bulbs more than doubled between 1970 and 2013.

In the context of increasing overall numbers of lightbulbs installed in homes, substitution effects (halogens and CFLs for standard or incandescent bulbs) have yielded reductions in CO2 emissions attributable to lighting (Fig. 2) from 2001, initially very slowly, and then more significantly from 2007.

One approach to understanding the dynamics of the observed diffusion and efficiency patterns combines insights into learning and innovation trajectories for each class of lightbulb technology (i.e. within each technology class, there has been potential for energy efficiency innovation), with an account of incentives and barriers in consumer choices for

[1] The data in Fig. 1 is based upon Market Transformation Programme modelled data. The data is gathered from three surveys: a Euromonitor survey from 1983; an Electricity Association survey from 1997; and a Tangible/Lighting Association survey from 2007 (see MTP, 2009). The trends in Fig. 1 are extrapolated from these three data points. A briefing note from the MTP notes that the stock of CFL bulbs in the 2007 survey was lower than expected. The figure also assumes 30% of bulb sales from 2007 onwards are Halogen and 70% CFL based on expert opinions.