

## Design for Resource Effectiveness: Developing Sustainability Considerations for Small Household Appliances

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Product design for sustainability encompasses several approaches to effectively address the environmental, economic and social aspects enacted throughout the whole product lifespan; however, the focus of these approaches has greatly been on rethinking and reducing the impacts of production and disposal of products whereas the implications of product use has been considered less. The most significant environmental impacts of products, especially electrical ones, occur during use phase that is largely determined by the user behaviour (Tang & Bhamra, 2008). Yet, most people are unaware of how their relations with products are responsible for resource consumption and they have insufficient means to find it out. The development of new technologies enables energy efficiency in electrical products; however, such improvements are not effectively adopted by people during use phase. Design for Sustainable Behaviour (DfSB) is an emerging research area which explores how design can influence people's behaviour to reconsider environmental and associated social implications of product use (Wilson et al., 2013; Bhamra et al., 2011; Lidman & Renström, 2011). In that sense, designers would need to have a deeper understanding of people's behaviour to incorporate this input into early stages of design, and thus this would increase the acceptability of sustainable design interventions.

This paper will present the findings from a comprehensive research focusing on people's experiences with small household appliances (particularly compact grills and electric tea makers) to develop sustainability considerations with an emphasis on effective use of resources. In the preliminary stage of the research, eight user observations were conducted to explore use phases and habitual use behaviours and patterns leading excessive resource consumption for water and electricity. The products (*i.e. air humidifier, contact grills, coffee maker, tea maker, bread maker, steam iron, mini oven and electric frying pan*) were selected based on their frequency and duration of use in domestic everyday life, and product-user interactions were observed in their real-life settings. The observations were supported by semi-structured interviews to comprehend the experiences thoroughly.

In the later stage of the research, based on the problem areas identified through the analysis phase, two products (*i.e. tea makers and compact grills*) were selected to examine them further, since those appeared to be the most problematic ones in terms of resource consumption during use phase. Four semi-structured interviews for each product were conducted with the aim of inquiring detailed information related to use patterns leading excessive resource consumption. In the final stage, focus group sessions have been facilitated with tea maker and contact grill users to explore their behaviours and insights. The findings and conclusions from the studies mentioned above will generate a broad and in-depth understanding of design solution areas within the area of resource effectiveness for small household appliances to develop emerging sustainability considerations (*e.g. visibility of resources in terms of processes, scaling and temperature*) further.