

Predicting Energy Thieves

Error! Reference source not found., MariAnne Karlsson, Chalmers University of Technology, Sweden, Conny Bakker, Delft University of Technology, Netherlands

With a predicted increase in household energy consumption and appliances as the most rapidly growing energy consuming category within the household sector, there is a growing recognition that increased energy efficiency alone cannot address the problem.

The user's influence on the usage phase of products has been investigated to examine what factors affect the energy consumption and result in energy wastage. This was accomplished through a survey to determine users' understanding of energy using products and an extensive case study of a household product (a coffee machine). In the case study, a series of energy measurements based on usage data from data logger readings showed that the energy consumption to make one cup of coffee could vary greatly between users. A set of qualitative studies was performed to understand the reasons why.

Based on an analysis of the survey and case study, it could be concluded that energy wastage could be attributed to (i) users' understanding of the product and its energy usage, (ii) how users use the product in their context of daily use, partly as a consequence of the technical function and design of the user interface, and (iii) the choice of technology related to the effectiveness of the product's technical design. It was also concluded that there was a need to create a common user understanding of when energy using products consume energy or not as well as to design products that are intuitively used as energy effectively as possible. The fact that several of the users in the case study had developed certain usage habits, many of them not optimal from an energy perspective, emphasises the importance to develop products that are designed either to cue the right habits or around existing. It is in designing a product, that the interaction between user and product is ultimately shaped and as a result also future habits. We need to know what behaviour is desired from an energy perspective and design accordingly. In order to do so, we need to understand what factors we need to design out of the product.

A set of generic design principles and recommendations – Three Approaches to Energy Effective Products – has therefore been created to address how products can achieve the lowest possible energy consumption. In addition, an analytical tool – Energ-ability – has been developed with the purpose to systematically identify potential energy wastage as a result of the user-product interaction. This multi-disciplinary tool is intended to support product developers with different disciplinary backgrounds in creating a common understanding of the product and its potential energy impact during the usage phase. With this insight, product developers should have a better ability to improve products already during early development phases and thereby prevent the products from using unnecessary energy during the usage phase.