How should smart meters be designed so that they optimally motivate and support electricity saving behavior at home?

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Introduction

This study on smart meters is part of a project funded by the German Federal Ministry for the Environment. Smart meters give feedback about the electricity consumption of households on home displays and internet platforms. These interfaces may also provide other types of information supportive of saving behavior.

Intervention studies have shown that feedback is a powerful measure leading to a reduction of energy consumption, especially if combined with goal setting, action-relevant information, and social comparison, and if it is behaviorally relevant.

Our research questions are:

- What kind of smart meter information is useful and motivating from a consumer perspective and leads to the exploitation of saving potentials and the overcoming of obstacles?
- How do consumers think they would use this information in decisions concerning energy saving?
- Do current smart meter offers correspond to the interests and motivations of consumers?

Methods

We ran 12 focus groups with consumers differing in age and family status. Group discussions were transcribed and analysed according to the principles of qualitative content analysis. A questionnaire supplemented the qualitative data.

Results and Discussion

Results show that consumers consider it important to receive behaviorally relevant device-specific feedback on top of the global feedback on total consumption. Many prefer device-specific feedback centralized on the smart meter in comparison to feedback on individual device displays, because this facilitates comparison and the identification of energy consumption hogs.

In addition, consumers ask for tailored information and recommendations on how to act in the future. For example, if baking shows a high level of consumption, the smart meter could recommend switching off the oven 10 minutes before the baking is completed.

Families with children think that smart meters provide a good opportunity to educate children because the device-specific feedback makes the consumption visible and transparent.

A comparison of design recommendations given by the focus group participants with those which may be deduced from intervention studies yields important design criteria: feedback that is (1) behaviorally relevant, (2) device specific, and (3) is combined with tailored information on how to act in an energy saving mode are.