

# Affecting Consumer Behaviour on Energy Demand

## EXECUTIVE SUMMARY

Mari Martiskainen, Sussex Energy Group, SPRU, University of Sussex  
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This report provides a review of the literature on household energy consuming behaviours and how those behaviours can best be influenced with the goal of reducing energy consumption and carbon dioxide emissions (CO<sub>2</sub>). The research also examines whether and how measures to encourage behavioural change can be included within future phases of the UK's Energy Efficiency Commitment and related policies.

As energy consumers, people do not simply consume gas or electricity in their homes, but rather the services that these energy sources provide. We all require energy for heating our homes, cooking, lighting, washing and using electrical appliances. There has been a significant increase in both gas and electricity consumption per household, as well as in relation to total energy consumption from households, related to the increase in household numbers. Household energy consumption will need to be significantly reduced if the UK is to meet its objectives for reducing CO<sub>2</sub> emissions.

If both buildings and transport are taken into consideration, households account for almost half of UK's CO<sub>2</sub> emissions. Domestic buildings alone account for 28% of UK's CO<sub>2</sub> emissions. These high emissions are partly a consequence of the UK's old and inefficient building stock. But the legacy of the building stock and the growth in incomes and household numbers form only part of the problem. The challenges associated with changing household behaviour form another and in many respects more challenging one.

For the majority of the time, energy use in the home is invisible and our energy consuming behaviours are based on routine and habit. We turn the lights on, leave televisions on standby and boil our kettles without having to think about how these actions are carried out, where the energy comes from or what the environmental consequences are. These behaviours are both complicated and difficult to change: partly because they are shaped by the characteristics of the building and the energy-using appliances, but more importantly because they are influenced by a range of internal and external factors, such as our beliefs, values and attitudes, other people's behaviours, the cultural settings we live in, and various economic incentives and constraints.

Behaviour can, however, be influenced and in some cases it has changed rather rapidly, for example in the increased popularity of organic food. Changing households' energy consuming behaviours, however, have been shown to be more complicated. Several studies have looked at the impact of intervention measures such as various forms of feedback on energy consumption, the use of better and more informative bills, or financial rewards and incentives, as well as employing techniques such as community-based campaigns or the use of micro-generation technologies. Some of these interventions appear to have resulted in considerable energy savings. For example, studies on feedback show an average of 5%-15% energy savings (at least in the short-term), while studies of community-based Eco-teams (where people get together on a monthly basis to discuss their energy, waste, transport and water use) suggest that even larger savings are possible.

However, existing research on intervention measures fails to provide clear evidence on which measure or a combination of measures is the most effective in achieving quantifiable, long-term energy savings. Many of the existing studies use small sample sizes, are prone to selection bias, fail to include a control group or have other methodological weaknesses. Many also only consider one type of

intervention measure, or if they use multiple intervention measures, fail to distinguish the relative contribution of each. This makes it difficult to estimate the potential impact of different forms of interventions with any confidence.

Nevertheless, previous research does suggest that feedback on energy use has the greatest potential to influence household energy consuming behaviours. Once people receive regular and effective feedback on their energy consumption, together with the associated costs and environmental impacts, they are more likely to change their behaviour, especially if their existing behaviour is not compatible with their values and beliefs. Feedback may also have the potential to change people's attitudes, make them aware of their 'bad habits' in relation to energy consumption, help them break these habits and form new behaviours.

Despite the fact that the evidence on behavioural change measures is still in its infancy, our results show that behavioural measures could be included in the next phase of the UK's Energy Efficiency Commitment (EEC). This has the potential to act as a pilot for behavioural change measures, and to provide further evidence on which measures, or combinations of measures are effective, to what extent and under what conditions. Since the existing evidence on the energy savings from behavioural measures is relatively weak, a rather conservative approach may be required to begin with. Behavioural change measures could be for instance ring-fenced to form their own part within EEC3, with the risk on the amount of savings being borne by the Government, rather than energy suppliers. EEC already allows flexibility in the choice of energy saving measures by suppliers, and this could also prove helpful in the inclusion of behavioural change measures, thereby encouraging innovative approach to trialling these measures.

In order to establish which intervention measure or a combination of measures prove to be the most effective, further research is required. The Government has already announced trials on feedback devices such as smart meters and direct displays, which are due to begin in Spring 2007. The inclusion of trials of behavioural measures within EEC3 would further contribute to the expanding evidence base. However, more fundamental changes in households' behaviour are likely to require a holistic approach, that goes beyond energy use in the home to also consider transport, waste and water use - all of which ultimately have energy and climate impacts.

#### **Summary of key conclusions:**

- Behaviour is a complex combination of our emotions, morals, habits, social and normative factors and changing any of these components can be challenging
- Majority of energy consuming behaviours are based on habits and routine (repetitive actions such as using lights and cooking), minority of behaviours are one-shot behaviours (e.g. investment in loft insulation)
- Habits need to be broken down and changed by introducing new behaviours, building awareness can help
- Measures such as feedback displays, better billing and micro-generation can help making people more aware of their energy consumption, and consequently influence their behaviour
- Research has shown that feedback on energy consumption can encourage households to save energy, by an average of 5-15% depending on the measure
- To be effective, intervention measures such as feedback via a display unit/bill have to be:
  - Clearly presented and consisting of simple messages
  - Containing information relevant to the household/consumer
  - Involving some kind of a goal or a commitment
  - Be visible, consistent and frequent.
- A combination of energy advice with display units and more innovative billing for example could provide households with a mix of better information and feedback on their energy consumption, and initiate awareness and possibly behavioural change
- Further experimental research is required to establish which behavioural change measures can achieve the most, long-term energy savings.