

‘SMART ENERGY’: AN ANALYSIS OF UK HOUSEHOLDS’ INTENTION TO SHIFT ENERGY CONSUMPTION

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Overview

Increasing awareness of energy consumption through information feedback as a strategy for energy efficiency has dominated energy policy in recent times. The belief is that the provision of adequate and accurate feedback on energy consumption would help consumers reduce their energy use and limits the emission of greenhouse gases. This information feedback takes various forms such as the provision of more informative bills, offering of in-depth energy advice to consumers via websites, flyers and face-to-face, and more recently the provision of real-time/near real-time feedback from smart energy monitors. Smart technology can encourage householders to conserve energy in two different ways: First, smart meters are capable of collecting, storing, and analysing electricity consumption data in real-time or near real-time and of electronically transmitting data between utility provider and the consumers. Second, smart technology makes it possible to remotely switch off/on individual end user appliances (Darby 2010; Paetz, Dütschke, and Fichtner 2012). Although both researchers and policymakers have concentrated on the potential benefits of smart meters’ real-time information feedback in effecting consumption behaviour change, the capability of smart technology to remotely control energy consumption has attracted less attention. This study explores the UK households’ attitudes towards shifting energy consumption through remotely controlled smart appliances. One typical way to stimulate demand response by load shifting with minimal consumers’ intervention is through remote control technology. One advantage of this technology is that it would enable consumers to shift their consumption by having their appliances (temporarily or permanently) preset to run during off-peaks when supply is less costly. However, shifting loads to the times when supply is less costly might require significant behavioural changes in consumption patterns of users (Hong et al., 2011).

People differ in their beliefs, value, norms, opinions and attitudes, which can influence their consumption behaviour as well as how they weigh the costs and benefits of environmental changes. Social norms, routines and habits, institutional and infrastructural constraints, and the decisions of some individuals to make bad choices even when provided with adequate and correct information are all factors that make policy interventions which aim to effect behavioural change extremely complex (Jackson, 2005; Thaler and Sunstein, 2008). These heterogeneities in people’s behaviour may influence the acceptance, adoption, use, and invariably impact the overall performance of any device aims at controlling their energy usage. Therefore, it is useful to study the main drivers of households’ attitudes towards shifting energy consumption via remote control appliances. To examine the factors influencing the UK households’ attitudes towards energy shifting behaviour, we applied discrete choice valuation method.

The paper is organised as follows: After the introduction the second section gives a brief overview of the smart meter roll-out in the UK. The third section presents the theoretical framework and hypotheses. In section four we describe the methodology used for the analysis, followed by the description of the conducted market survey and the results in section five. In the final section policy implications are derived.

Methods

Stated preferences – discrete-choice contingent valuation

Random Probit model

Results

This is based on the preliminary results:

First, discrete-choice based contingent valuation questions are presented as a method to empirically measure willingness to shift consumption via remote controlled technology.

Second, the results suggest that self perception and concerns about the availability of smart technology – i.e., behavioural control – significantly influence UK households' decision to shift energy consumption. And that self perception moderates – but does not offset – the negative effect of behavioural concerns.

Conclusions

The findings suggest that behavioural factors play significant roles in making decisions concerning energy shifting behaviour, and that energy smart technology should minimise impact on availability and functionality.

References

- Abrahamse, Wokje, and Linda Steg. 2011. "Factors Related to Household Energy Use and Intention to Reduce It: The Role of Psychological and Socio-Demographic Variables." *Human Ecology Review* 18 (1): 30–40.
- Ajzen, Icek. 1985. "From Intentions to Actions: A Theory of Planned Behaviour." In *Action Control: From Cognition to Behavior*, edited by J Kuhl and J Beckmann, 11–39. Berlin: Springer.
- . 1991. "The Theory of Planned Behavior." *Organizational Behaviour and Human Decision Processes* 50: 179–211.
- Alberini, Anna, Barbara Kanninen, and Richard T Carson. 1997. "Modeling Response Incentive Effects in Dichotomous Choice Contingent Valuation Data." *Land Economics* 73 (3): 309–324.
- Darby, Sarah. 2010. "Smart Metering: What Potential for Householder Engagement?" *Building Research & Information* 38 (5) (October): 442–457.
- Davis, Fred D, Richard P Bagozzi, and Paul R Warshaw. 1989. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models." *Management Science* 35 (8): 982–1003.
- Paetz, Alexandra-Gwyn, Elisabeth Dütschke, and Wolf Fichtner. 2012. "Smart Homes as a Means to Sustainable Energy Consumption: A Study of Consumer Perceptions." *Journal of Consumer Policy* 35 (October 14): 23–41.
- Thaler, R, and C Sunstein. 2008. *Nudge: Improving Dcisions about Health, Wealth and Happiness*. New Haven; London: Yale University Press.
- Jackson, Tim. 2005. "Motivating Sustainable Consumption: A Review of Evidence on Consumer Behaviour and Behavioural Change. A Report to the Sustainable Development Research Network." https://hiveideas.com/attachments/044_motivatingfinal_000.pdf.