

# Introduction to Panel 9: Dynamics of consumption

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## Introduction

The dynamics of consumption panel continues in its tradition of accepting papers from a wide range of perspectives and disciplines. Within the panel you will find papers based on quantitative analysis, those based on qualitative methodologies and many which use both approaches. Research disciplines include economics, behavioural psychology, anthropology, transport modelling and energy policy. Authors are not afraid to ask fundamental questions such as ‘can consumers save energy?’ and to challenge received understandings about, for example, how many energy users ‘see’ the price signal. Essentially, our authors’ research aims at finding out how and why people make use of energy sources and technologies, what the carbon impact of this is, whether it can be changed and, if so, how.

Providing energy users with feedback is an increasingly important area of research and action. Early research was pioneered by social science researchers, mostly psychologists, in the 1970s and 1980s, and use of feedback was trialled, most notably in Norway by Hal Wilhite and colleagues, in the 1990s (Darby, 2006). The positive energy saving effects of feedback have been communicated to and acted upon by policy makers. The European Directive on energy end-use efficiency and energy services, the so-called Energy Services Directive, which must be implemented in 2008, requires Member States to provide consumers with better and more frequent billing information based on actual consumption such that they are put in a position to act upon their own energy use. As well as being a key example of translating theoretical insights into empirical research and then into policy action, the use of feedback also forms a rich area of ongoing study. Several of the papers and posters in Panel 9 focus on feedback of various sorts – from time of use pricing to the use by consumers of internet-based

tools for carbon counting purposes (Fischer, Bottrill, Brange et al., Robinson and Rowlands).

In addition to engaging with emerging policy agendas, researchers have also recognised the need to learn from the body of established research. There are two papers concerned with meta-analysis of existing literature (Uitdenbogerd, Bruel). The researchers are re-assessing existing research on all interventions designed to affect energy-related behaviour, and evidence about the effectiveness of communication programmes focussed at consumers. Results from the first study demonstrate that the existing literature is of variable quality and that many interventions are empirical ‘learning by doing’ rather than having a basis in a theoretical understanding of individual and social values, attitudes and behaviours. This perhaps offers a challenge both to social scientists to communicate better with practitioners and to practitioners to learn from our existing knowledge of human behaviour.

## Moving up the learning curve: Behaviour research on energy use and its contribution to policy and programme development

**Diana Uitdenbogerd, Cees Egmond, Ruud Jonkers and Gerjo Kok** (9,040) have analysed a wide range of the existing literature on interventions designed to affect energy-related behaviour, using a structured approach which is rooted in a social-psychological understanding of behaviour. Perhaps not surprisingly, they found that many interventions have not been based on a theoretical understanding of how to influence behaviour and that there is a lack of systematic studies. They conclude that the evidence shows combinations of measures, e.g. personal advice

in combination with physical measures and feedback about energy consumption, are most effective in influencing energy use. Feedback is identified as a key instrument which influences several determinants of behaviour, and should become more widely adopted given the current direction of EU policy.

**Renée Bruel's** paper (9,009) describes the methodology which will be used by a European research consortium to undertake a meta-evaluation of communication programmes aimed at consumers. Because of their low relative cost, ease of organisation and high (media) visibility, these programmes are popular with policy makers. However, the evidence suggests programme design often does not benefit from past experience and resources may be wasted. The research to be undertaken aims to present and analyse success factors from the best European experience across many types of communication programme, ranging from mass media campaigns to personal advice.

**Megan McMichael** (9,162) examines the concept of social capital in relation to household energy consumption in an effort to better understand social influences on energy use in the United Kingdom. Although her findings are ambiguous, McMichael concludes that it may prove fruitful to properly assess types of social capital before designing an energy efficiency programme for any given local area aimed at changing behaviour. Social capital broadly refers to the social resources available through networks, social norms and associated levels of trust and reciprocity and the analysis is done at a social rather than individual level of consumption offering a broader framework for understanding than the individual level framework which characterizes much of the research within our field. However, more robust empirical research is necessary to demonstrate to what extent the concept of social capital and its relationship with household energy consumption provides knowledge that is meaningful for those designing and implementing energy efficiency programmes.

### Feedback and carbon counting

“What kind of feedback is most successful in getting people to save energy?” is the main question **Corinna Fischer** addresses in her paper (9,095) – a very pertinent one given the pending implementation of the Energy Services Directive. By using a psychological model to analyse the empirical evidence that is available she shows how and why consumer feedback on energy use works. Although empirical evidence in this area is scant, Fischer's findings suggest that the most successful feedback combines certain features: it is given frequently and over a long period of time, it provides an appliance-specific breakdown, it is presented in a clear and appealing way, it uses computerized and interactive tools, and may involve historic or normative comparisons. Hopefully, EU member states will take note of Fischer's findings when developing their National Energy Efficiency Action Plans to meet the requirements of the Energy Services Directive.

**Cathrine Bottrill** (9,211) discusses the opportunities Internet technology provides for engaging, communicating, encouraging and guiding consumers on low-carbon lifestyle choices. By reviewing twenty-three Internet-based carbon calculators she has looked at how they contribute to people's understanding of their own energy use and whether they help people save

energy. Bottrill concludes that in most cases this environmental learning tool is falling short of giving people the ability to accurately monitor their energy use; to receive meaningful feedback and guidance for altering their energy use; or to connect with others also going through the same learning process of saving energy and conserving carbon. Based on the results of this review, Bottrill and her colleagues are working on developing a next generation carbon calculator.

**Birgitte Brange, Troels Fjordbak Larsen and Göran Wilke** (9,226) describe the “1000 kWh/year per person is enough” campaign, a large TV campaign targeting domestic electricity consumption in Denmark. To support the main message, the campaign offered a new internet portal with updated information about numerous household appliances and an analysis tools designed to help people bring their electricity consumption down to 1000 kWh/year per person. The effects of the campaign are monitored through repeated surveys and analysed in relation to usage of internet tools, but it is too early yet to say anything about impact and results.

**Jennifer Robinson and Ian Rowlands** (9,234) report research in Ontario, Canada on the impact of time-of-use pricing on different demographic groups. The study focused on electricity usage by 225 households with ‘smart meters’ over a six month period and looked at how bills would have varied had proposed time-of-use pricing been in place. Individual households would have paid between 18% more and 14% less than under standard tariffs. The preliminary evidence indicates that those paying more are likely to have higher occupancy rates (specifically having more children) and to have lower incomes. Thus the social impacts of time-of-use pricing can be unequal and weigh most heavily on disadvantaged households, even when average bills are promised to be unchanged.

**Christian Brand** (9,228) has developed an innovative methodology and evaluation tool for profiling annual climate change emissions from personal travel across all modes of travel and applies it to a case study involving surveys of UK residents. Through his case study, Brand found that there is a highly unequal distribution of emissions amongst the population, independent of the mode of travel, location and unit of analysis (individual/household). For example, the top 10% of emitters are responsible for 43% of emissions and the bottom 10% for only 1%, with those in the top 10% flying 5 times more than the sample average. The area analysis (urban vs. rural) shows higher levels of urban emissions due to higher propensity to travel by air. The results provide an improved understanding of the extent to which individual and household travel activity patterns, choice of transport mode, geographical location, socio-economic factors and vehicle technology choice impact on greenhouse gas emissions.

### What can the economists learn? Contributions from a dynamics of consumption perspective

Two papers approached energy related behaviour and decisions using an economic framework. The authors employed the discipline of economics in one case to demonstrate benefits from renewable energy and efficiency measures, which remain uncounted in traditional studies, and in the other to identify limitations in influencing behaviour through energy prices only.

**Albrecht Stoecklein** and **Lisa Skumatz** (9,314) report on their study in New Zealand which analysed the indirect, hard-to-measure 'non-energy benefits' associated with a residential energy efficiency initiative. Their methodology helped to identify potential barriers to the uptake of measures such as solar water heating and solar design, e.g. concerns about maintenance, which could be addressed in future programmes. They also demonstrate the added benefits which householders gain from renewable energy and energy efficiency measures and have quantified these benefits in dollars. The demonstrated non-energy benefits should make it easier to justify and encourage householder involvement in future programmes.

In their paper (9,077), **Alan Meier** and **Anita Eide** address the question 'how many people actually see the price signal?'. Specifically they identify a wide range of situations where there is a 'principal agent' problem, where the person who pays the energy bill is not the same as the one with control over the energy-using technology. They show this situation affects as much as a quarter of all energy use in the US residential sector. Where the principal agent problem applies, the influence of the energy price signal is necessarily limited and there is a need for other measures to influence behaviour.

### Getting it right: Influencing consumer behaviour and realizing the energy efficiency potential

**Horace Herring**, **Sally Caird** and **Robin Roy** begin their paper (9,146) with a fundamental question: can consumers save energy? The paper reports on the reasons for adoption and non-adoption of renewable energy and energy efficiency technologies by UK householders. A key concern was to discover whether potential savings were offset by extra usage due to the well-known (and much debated) rebound / take-back effect. Fortunately, consumers' own assessment was that their energy bills had gone down as a result of their efficiency and renewables installations. The authors' advice, that as most adopters of renewable energy first adopt two or more efficiency measures, you should sell efficiency first and then renewables. They demonstrate strong interest in household renewables, particularly among older, middle class householders – which should make these people a key target group for expanding the uptake of renewable energy technologies.

**Tami Rasmussen**, **Jennifer Canseco**, **Rob Rubin**, and **Anu Tejaand** (9,301) look at compact fluorescent lamp (CFL) purchasing in specific regions in the USA in order to identify the remaining barriers which are preventing further uptake of this technology. They found a number of very practical measures programme planners could take to improve sales, including offering a wider range of speciality CFLs, ensure consumers know about the improved performance of modern CFLs and encouraging householders to replace more standard light bulbs with CFLs immediately. The barriers found related both to (mistaken) beliefs of householders and, more straightforwardly, lack of suitable products at the right price in enough retail outlets.

**Anna Green** and **Kajsa Ellegård** (9,191) address behavioural aspects of a large household appliance measurement study in Sweden and investigate the interplay between individual household members and their appliance use. The study demonstrates that household members' appliance use, and especially the use of ICT devices, is individualized. Based on their findings, they

suggest that using average householder's electricity use as a point of departure for policy and programme design may be inappropriate since individual variations might be big and energy savings messages may have to be more targeted. Green and Ellegård's paper does not hint at how this could be achieved in practice, but concludes that concepts are needed to develop appropriate communication strategies targeting appliance use in different household contexts.

### Developing country perspectives: Drivers and implications

The two papers related to developing countries, while using very different methodologies, both demonstrate rapidly changing energy practices and choice of energy sources.

**B. Sudhakara Reddy** (9,075) draws on a wide range of statistical data to give an overview of household energy use in India. In particular he analyses how different energy sources are used by different people – with key distinctions being made between rural / urban and richer / poorer households – and how this has changed over the past fifty years. This gives a rich picture of energy use in a key developing country. The author identifies opportunities to link better access to energy with increased use of renewable energy sources. Many people in India still have very limited access to modern sources of energy, whether through accessibility or affordability constraints, and meeting their needs is a key issue.

**Tanja Winther** (9,018) describes detailed anthropological work looking at the introduction of electricity into rural Zanzibar. She shows that the rate at which electricity is adopted by householders, and the uses to which it is put are not simply a function of the price and availability of electricity supply and end use technologies. Instead she paints a detailed picture of the social context for electricity adoption which includes gender relations, social status, ideas about modernity and the importance of education. The process by which new uses for electricity become normalised is exemplified by the changing status of televisions over just three years. The flexibility of a culture in adopting new technologies, and in turn changing in response to them, is a phenomenon which can be recognised far beyond the shores of Zanzibar.

### Concluding remarks

The authors represented in this panel come from a wide range of backgrounds, but it would probably be fair to say that the majority are not 'pure' social scientists, who happen to be researching energy use. Instead there seems to be a growing body of inter-disciplinary researchers who use techniques and insights from social science in order to further understanding and knowledge. While this is of course welcome, there are clear dangers of not engaging social scientists with the energy and climate change agenda. New policy ideas may well come about from theoretical models of behaviour – as happened with the idea of providing energy users with feedback. Without the contribution of specialists from all disciplines of social science, opportunities may be missed and fewer new insights and ideas will be generated. It is also clear from our author's research that their findings often are left out and not brought to bear on the development of policy and programmes. And as a community,

researchers engaging questions concerning human behaviour and energy use may need to develop improved strategies and ways of communicating with policy makers and practitioners to make sure existing knowledge is used. Before pondering the issue of improved strategies, it might be useful to ask ourselves 'why are policy maker and programme designers not drawing upon the body of existing knowledge in our field?'. Saying Just Do It! may be a little simplistic.

## References

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