

Introduction to Panel 9

Dynamics of consumption

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Introduction

End-users play a crucial role in the transition towards energy efficient systems of production and consumption – not only as financially powerful customers, but also as conscious end-users of energy devices, as ‘political consumers’, or currently more and more as prosumers. Buying decisions and use patterns are driven by the need for energy-demanding services (be it light, heat, comfort, ease, communication, entertainment or mobility), but these needs co-evolve with social values, norms, habits, attitudes, and wider externalities such as policies, institutions, infrastructure and technology.

In this panel we focus on the co-evolving of various relationships between production and consumption, societal trends, policy interventions, programmes, processes of social learning and technological innovation. The term consumption is used in a broad way, including a wide range of social players and a wide range of activities – from taking a shower to buying a new home or developing a sustainable neighbourhood.

This year’s contributions cover an astonishing variety of topics and research perspectives: they explore the nature of energy know-how in various contexts; shed light on the role of intermediaries to promote energy efficient behaviours; challenge the concept of demand response from a users’ point of view; discuss the social and technical relations between energy systems and individual users; provide new insights into energy feedback; focus on energy use in non-residential buildings; and propose new directions for energy research and energy policy. In doing so they add to the existing stock of knowledge, challenge what we thought to know, and open up new directions to study the dynamics of energy consumption.

Learning, doing, and know-how

One of the key challenges is to understand how agency can be created through learning, creating know-how and doing. This issue is addressed by Kevin Burchell et al. (9-048-15), Sarah Royston (9-078-15) and Isabelle Garabuau-Moussaoui (9-037-15).

Isabelle Garabuau-Moussaoui addresses the important issue of how to put teachers and children at the “heart” of the attempt to address climate issues. She demonstrates how infrastructures such as a net zero-energy school, come into conflict with the educational projects and practices of children and teachers and their agency. Based on experiences from a community action project in the UK, Burchell et al. reflect on the role of householder knowledge. Findings show that educational approaches that emphasise practical skills, experience and on-site guidance (know-how approaches) are more effective than approaches that focus on factual knowledge, cognitive reasoning, and attitudes and behaviours (literacy approaches). Sarah Royston presents empirical findings from a study of everyday innovation in domestic energy consumption in the UK. She argues that everyday innovations are ignored by most energy efficiency policy, but may make a real difference to consumer experiences of thermal comfort, and to energy use. To better make use of those everyday innovations Royston suggests developing and promoting more adaptive approaches to warming within design.

The role of intermediaries

There is growing interest in ‘middle actors’ or intermediaries. These actors can influence on energy use in the built environment and this session will go into different attempts at learning about the role these intermediaries can or should play. Sarah Darby and Christine Liddell (9-050-15), Corinne Moser et al.

(9-190-15) and Helena Karresand (9-229-15) all focus on this novel line of research.

Sarah Darby investigates meter installers and illustrates the social learning that can take place during and around the time of installation, for the utility and the installers themselves, as well as among households and their social networks. Corinne Moser explores how cities can promote energy sufficiency of private consumers through middle-actors. In particular, it examines whether formal social groups (e.g. sports clubs) may function as powerful multipliers for energy-saving activities. Helena Karresand focuses on housing companies as intermediaries with great influence on attempts at reducing energy use of appliances.

Demand response: new roles for consumers?

Smart grids definitely can open up new pathways for a more sustainable energy use. The papers in this session explore different types of users, point to the critical issues of ownership and privacy, and evaluate the effects of community approaches.

Based on empirical data, Georgia Gaye and Grégoire Walenborn (9-116-15) present a new user typology and show that some segments of the population are not considered in current smart grid policies. Based on this insight the paper discusses some options to overcome these deficiencies. Michael Fell et al. (9-207-15) tackle the tricky issue of trust, control and privacy in demand-side response (DSR) programmes and how end-users' decision to participate is influenced by their perceptions of their relationship with the influencing entity. Mari Martiskainen and Colin Nolden (9-121-15) explore the potential of community energy approaches to promote 'prosumption' and 'pro-saving' approaches. Based on three case studies, they show that community approaches are quite successful in stimulating energy efficiency measures and the adoption of renewable energy technologies as it is very likely that tacit knowledge is shared for free within existing communities. However, the cases also indicate, that projects so far fail to address both approaches and usually end up to focus on either prosumption or pro-saving measures.

Energy systems, consumption practices, and rhythms

This theme focuses on a newly forming research field which aims at understanding the patterns of energy-demanding practices in daily lives. Nicola Labanca et al. (9-137-15), Nicola Spurling (9-224-15) and Catherine Grandclément et al. (9-319-15) all address this issue, albeit from very different perspectives.

Nicola Labanca et al. draw on complex adaptive systems theory and social practice approaches to show that the progressive shift towards renewable forms of energy will deeply affect how time and space are perceived and used within social practices and that there is an urgent need to address the temporal dimension of energy consumption with future policy approaches. Nicola Spurling takes a historical look at what we do on a daily and weekly basis, where we do it, and how this is related to energy being drawn through the infrastructure. She demonstrates that the everyday practices which consume energy have rhythms and patterns – they happen at particular times and places. These rhythms and patterns change across time.

The paper by Catherine Grandclément et al. focuses on interfaces between energy infrastructures and end-consumers. Using the cases of smart meter and 'wall-box' for charging electric vehicles, the authors show how these interfaces are negotiated and how roles and responsibility are defined and allocated between the consumer, the market and the public interest. They argue that the arrangements at these interfaces are of contingent nature and therefore an important issue for energy policy.

In their paper, Alan Meier et al. (9-061-15) report on the surprisingly large and regular reduction in electricity demand during lunchtime in Japan. Every weekday between 12:00 and 13:00 the electricity use decreases by more than 6 GW. The authors argue that this tremendous saving can only be explained by homogenous lunch hour routines in the commercial sector and the widespread habit to switch off electronic devices before leaving the office.

Christine Boomsma et al. (9-217-15) aim at understanding peak behaviours and their variations and investigate household actions relating to one out of seven contexts: morning, evening, regular, important, most energy consuming, summer or winter. Participants ranked these actions on perceived energy use and also listed their current energy saving strategies. Reported actions clearly varied when asked about different times of the day and year.

New insights into energy feedback

Energy feedback certainly can make a difference, but it is also clear, that energy feedback is not a magic bullet to energy saving. The three contributions in this session renew this understanding and add some additional insights.

The paper by Julie Goodhew et al. (9-174-15) approaches the phenomenon of energy visualisation (eviz.org.uk) by investigating the expectations of building householders when they sign up for a thermal image to be taken of their own home. The paper discusses what it is about heat that needs visualising for households, what this tells about the context of domestic heat conservation and whether energy (heat) visualisations, such as thermal imaging, can meet these householder expectations.

Dimitra Dantsiou and Minna Sunikka-Blank (9-402-15) discuss the impact of real-time consumption on energy savings through behavioural change in office-buildings. Findings based on case study research indicate that the provided energy use feedback did not lead to significant energy savings. In the paper, the authors reflect on the possible causes and discuss options for improvement. In their paper, Magdalena Boork et al. (9-416-15) report on a similar, still on-going energy feedback project in office workplaces. In contrast to the findings by Dantsiou and Sunikka-Blank this Swedish project shows considerable energy savings that correspond to 65 kWh per office room or 17 % of the total electricity use on an annual basis. Here, the setup was developed in close cooperation with the participants which found the challenge interesting and took the opportunity to look over their habits.

Based on empirical research covering a total of 1,500 households in seven European pilot sites, Ina Renz and Georg Vogt (9-132-15) report on key results regarding the effectiveness and efficiency of ICT feedback instruments. The trials provided clear evidence that feedback is able to change domestic energy behaviour and lead to energy savings. However, the given feed-

back mainly affected behaviour related to heating needs and electricity use whilst there was found no meaningful influence related to hot water consumption. The authors conclude that the success of feedback is influenced by service and user-related factors as well as local circumstances such as the combination with management services applying on building level, motivational aspects and financial conditions.

Kathryn Buchanan et al. (9-110-15) argue that feedback strategies appear to rest on the assumption that “if only we knew better we would act differently”. In this paper they assess the validity of this assumption by examining whether feedback can influence pro-environmental intentions and the processes that it involves. 1,000 participants were provided with feedback about the yearly costs of their homes “energy vampires” (appliances such as televisions and laptops that consume energy even when they are not being actively used).

The new frontier: non-residential buildings

Organizations play many roles in the energy system, and research on dynamics of consumption aims to better understand the behaviour of organizations in the energy system. These three papers provide valuable insights and food for thought on how to research dynamics of consumption in the non-residential sector.

The paper by Margaret Taylor and Kathryn Janda (9-463-15) provides practical, theoretical, and structural grounding for research on organizations in the energy system. It reviews some of the existing energy-related research on organizations and concludes by providing a structure that ties together organizational actions in the energy system with organizational theory orientations.

Richard Bull et al. (9-205-15) share some insights from a pilot-project aiming at a more collaborative approach to energy management in non-domestic buildings in the UK. The authors not only report on the potential of increased user-engagement using ICT digital tools to facilitate behaviour change but also discuss a number of barriers that likely impede the implementation of such approaches in ‘real world’ contexts.

Elli Verhulst and Ida Nilstad Pettersen (9-129-15) finally focus on facility managers of non-residential buildings to address the often-reported energy performance gap. Inspired by social practice approaches and design theory they present a new framework for mapping activities related to energy management and use. The presented framework should allow for a more systemic view on energy management in non-residential buildings. The authors plan to test and further develop the framework within a qualitative case study scheme in Norway in the near future.

New directions for energy research and policy-making

The last theme of our panel is focused on new directions and options for policy and research.

Eric Vidalenc and Laurent Meunier’s paper (9-176-15) focuses on the very hot topic of planned obsolescence and the environmental impact of this challenge and how policymaking could start working with or around this challenge. Hans-Paul

Siderius (9-034-15) adds to this topic by providing a social practice view on product efficiency and policy. He shows that a focus on practices instead of individual behaviour of rational householders may increase the options for policy interventions and hence calls for a multi-dimensional policy set-up.

Katja Schumacher et al. (9-231-15) tackle the environmental justice questions that arise from energy saving measures and policy making aimed at facilitating their implementation. They explicitly focus on the distributional effects of energy saving measures for different German households and translate these findings into policy recommendations.

Philipp Grünewald and Russell Layberry (9-148-15) introduce a novel low cost collection method using smart phones that is able to produce statistically significant results on the temporal relationship of activities (e.g. cooking, washing, resting) and electricity consumption profiles of households and hence should allow for new insights into energy use practices. Mathieu Durand-Daubin and Cécile Caron (9-161-15) explore the diversity of people’s reactions to load shedding. How do people perceive those interventions? How do they change their daily practices? Who accepts the signal and why? These questions are explored to understand the gap between attitudes and behaviours and what research is still needed to investigate this puzzling phenomenon. The paper by Eva Heiskanen et al. (9-179-15) analyses relevant topics and framings for consumer and public engagement based on survey results from Finland in 2013 on energy efficiency services and argues that it is critical to consider the contexts and aims of the engagement when assessing its outcomes and that consumers are also likely to provide responses which are located at the intersection of consumerism and citizenship.

Erica Marshall et al. (9-241-15) provide an interesting outlook at the intersection of dynamic building energy modelling and social science research on heating practices. They demonstrate how including domestic heating practices as a way of delivering or attaining the service of thermal comfort within homes, aspects of building occupancy can be better included within domestic building energy modelling.

Outlook

Beside the large amount of findings the papers impressively give evidence of lively research activities in this field. Energy consumption is approached from different disciplinary perspectives, using different research strategies and methods. Although our collection is not able to cover all the activities in the field it appears that projects of this kind usually are carried out in national sometimes very local contexts, sponsored by national clients, often dealing with national or often even local peculiarities. Situatedness and contextualising appear to be the norm while international cooperation and comparative research are the rare exception. Although much has been achieved so far we firmly believe that research on dynamics of energy consumption would substantially take advantage of somewhat larger and more international project consortia. For this reason, we hope that the eceee 2015 Summer Study will help to make a next step in this necessary process to internationalise this important strand of energy research.

