



An Agenda for Social Science Research in Energy

Summary of a Research Council Workshop held on 6th April 2006

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Background

The long-term aims of UK energy policy were set out in the 2003 Energy White Paper (DTI 2003), and have been reinforced by the recent Energy Review (DTI 2006). Broadly speaking, UK energy policy aims to achieve the following objectives:

- reduce carbon emissions by at least 60% (over 1990 levels) by 2050;
- ensure energy security
- reduce fuel poverty
- maintain international competitiveness.

Academic, public and private sector research all have a critical role to play in meeting this challenge. The UK Research Councils' vision for energy and climate change research over the next 10 years is to 'position the UK to successfully develop, embrace and exploit sustainable, low carbon and/or energy efficient technologies and systems to enable it to meet the Government's energy and environmental targets for 2020' (EPSRC 2006).

Existing research supported under the Research Councils' Energy Programme includes the work of the UK Energy Research Centre (UKERC), research on Sustainable Power Generation and Supply (SUPERGEN), research on Low Carbon Buildings and Processes (Carbon Vision), the work of the Tyndall Centre for Climate Change, and the TSEC (Towards a Sustainable Energy Economy) programme.

A significant proportion of current research funding is focused on technological and engineering aspects of energy. It is widely acknowledged, however, that social science has a vital part to play in meeting long-term energy policy goals. Understanding the economic, institutional, social and psychological aspects of energy-related systems and behaviours is essential in the transition to a sustainable energy economy. Recognising this, the Research Councils recently convened a stakeholder Workshop to develop a social science research agenda for energy. This report summarises the findings of the workshop and discusses some of the emerging themes.

A Summary of the Workshop

The workshop was held on 6th April 2006 at the Energy Clinic in London. Around forty people, representing research users and researchers in approximately equal measure, participated in the workshop. A particular emphasis was placed on eliciting the priorities and needs of research users. The agenda for the day was built around an 'Open Space' type format. Several short presentations at the beginning of the day were followed by breakout sessions, report-back and intensive group-led discussion.

Paul Rouse (EPSRC), Prof Jim Skea (UKERC) and Dr Patrick Devine-Wright (University of Manchester) made brief presentations to familiarise participants with the range of existing Research Council-funded energy research. Some social science research is incorporated in a variety of existing programmes. For example, UKERC incorporates a range of economic and institutional research issues, particularly within its modelling theme. Research under the EPSRC/Carbon Trust Carbon Vision Programme incorporates some behavioural and institutional

research on low carbon buildings. The most significant support to date for social science research in energy is that funded through two calls under the TSEC programme, which currently supports three interdisciplinary Research Groups and a number of specific research projects all under social science themes.

Following brief personal introductions, the participants divided themselves into two main groups. One group was charged with exploring the issues associated with changing behaviours and lifestyles. The other was charged with addressing the economic and regulatory issues surrounding the Government's energy policy goals. It was acknowledged that there would inevitably be some overlap between these two discussions, but it was agreed that one group would focus mainly on behavioural issues and the other mainly on structural and institutional issues.

After lunch, each group presented its initial ideas for research topics to the workshop as a whole, and these were discussed in plenary. The main discussion areas were then condensed down into a manageable number of distinct themes or topics. Small group discussions convened around the individual topics, with the aim of providing more structure and teasing out research questions relevant to each theme. In the final, closing session, participants were asked to comment on the emerging themes, and to indicate their levels of support for specific areas.

Key Themes

It was clear from the early discussions that social science research themes are central to the development of Government energy policy and to the Research Councils' Energy Programme. One of the biggest risks for Government in relation to its energy policy targets is that of failing to understand the relationship between technological change, institutional change and social change. Energy systems cannot be thought of purely as technological systems. Energy technologies are embedded in institutional and social systems. Change in one implies change in the others. At the highest level, therefore, the role of the social sciences in energy research can be understood in terms of ***understanding and managing systemic change***.

In particular, attention was focussed on the relationship between long-term policy goals and the ***institutional design of the energy system***. How does the design of the system interact with (support or impede) long-term goals? What are the mismatches between the existing system and those long-term goals? To what extent can specific interventions guide systemic change towards long-term goals?

The workshop identified a series of research themes within this over-arching context. To some extent each of these themes can be thought of as being concerned with social change: understanding how change occurs; and how it can be managed. At the same time, each topic defines a series of research questions in its own right. In the following subsections, individual themes summarised briefly under five separate headings, and specific research questions are identified. In each case, the summary aims to distil rather complex discussions and there is considerably more that could be said. Specific research question should be regarded as illustrative only.

Changing behaviours and lifestyles

People's attitudes, behaviours and practices have a fundamental impact on energy-consumption levels, on the success or failure of specific energy-related technologies, and on the political acceptability (and success) of energy-related policies and measures. A key task for social science energy research is to understand how and where it is possible to influence these attitudes, behaviours and practices, and to foster lifestyle change.

A part of this task is related to **engagement and communication**. The workshop identified a series of research needs in this area, including:

- the need to 'map' people's current energy perceptions;
- the need to develop and test innovative methods of public engagement and engagement;
- the need to understand the role of the media and mass communications in forming lifestyle aspirations and influencing energy consumption.

It was also recognised, however, that engagement and persuasion have a limited influence on people's energy-related behaviours and practices, particularly where these are deeply engrained, habitual, or associated with highly-valued aspirations and desires. In this context, there is a need for a broader and deeper understanding of **lifestyle change**. Amongst the research questions relevant here are the following:

- what are the key social, psychological and institutional obstacles to lifestyle change?
- what are the social-psychological drivers of frugal ('energy-saving') and efficient energy-related behaviours?
- what lessons (successes and failures) can be learnt from previous or existing behaviour change initiatives?

This theme recognises that the relationship between technological change and social change is a dynamic and an interactive one. Not only will future behavioural changes alter the effectiveness of different technological and institutional interventions. But a need was also identified to understand and address the '**knock-on impacts**' of **technological changes** on people's attitudes, lifestyles and behaviours. Understanding this dynamic and interactive relationship between social systems and technological systems is a key task for social science research in energy.

The Product-Service Shift: incentivising demand reduction

The question of behavioural change is also important for businesses and the public sector. Many of the issues highlighted in the previous section could equally be applied to the behaviours and practices of private companies and public sector organisations. These behaviours and practices are framed and constrained by the set of institutions – the market 'landscape' – within which the energy system operates.

A particular concern surrounds the transition from a supply-oriented energy market defined around the concept of energy as a *product* (oil, gas, electricity) to one in which energy is viewed as the means to a variety of *energy services*

(cooking, heating, lighting, mobility/access, and so on). In principle, it has been argued, this '**product-service shift**' should be able to play a critical role in the transition to a sustainable energy system. Its potential for change consists, in part, in incentivising improved energy efficiency, in part, in reducing the cost of capital for demand reduction investments, and, in part, in removing 'perverse' incentives towards increased energy demand.

In spite of considerable and continuing interest in the idea (HMT 2006, DTI 2006), progress towards a market for energy services has been slow. The existing energy efficiency commitment (EEC) on suppliers has resulted in only marginal changes to the supply-oriented business model. Workshop participants suggested that a key task would be to make the EEC (or its successor) less techno-centric and more socially-embedded.

The principal research issues revolve around the question of **how to incentivise demand reduction**. Specific research questions include the following:

- what does an energy service infrastructure look like?
- what is the utility business model for demand reduction?
- what are the implications of the product-service shift for incentives structures in the supply/distribution industries?

At the same time it will be vital to consider some of the broader implications of an energy service transition. The workshop drew attention in particular to the following questions:

- how do households (companies) respond to an 'energy services' environment?
- what characteristics of energy/fuel do people value and how do they express this value?

This research theme will require a detailed attention to the institutional and regulatory structures that govern the existing system. It will also need to tease out the **social and political implications** of the new structures that could eventually replace the existing system. Again social science research is well-placed to explore the dynamic interaction between institutional change and social systems.

Equity

The workshop recognised that questions of equity are vital to the development of long-term energy policy. Specifically of course, a key objective for UK energy policy is to reduce fuel poverty within the UK. But issues of international and inter-generational equity also become important in the context of long-term changes in the energy system. The research needs here are driven by the question: what are the **equity implications of energy policies**? Or conversely, we could ask: how should questions of equity affect the way in which long-term energy policy is made? To what extent should the equity issue be incorporated into long-term energy policy? Or should fuel poverty issues, for example, be treated as part of more general poverty alleviation?

At the broadest level, the workshop identified a number of areas in which equity considerations inevitably touched on long-term energy policy. These included

inequalities in access to energy services (heating, lighting, mobility etc), inequalities in the distribution of carbon footprints, inequalities in the distribution of climate-related impacts and inequalities in access to mitigation against climate-related impacts. It was acknowledged that some disadvantaged groups could be adversely affected by energy security issues, or by certain technological or institutional responses to climate change.

Specific research needs include the following:

- the need to develop robust measures of energy inequality both for 'direct' energy consumption (energy consumed in the home) and for 'indirect' energy consumption (energy embodied in other goods and services);
- the need to identify the equity implications of specific policy interventions (taxes, subsidies, regulations, carbon trading schemes etc);
- the need to consider equity in issues of planning and siting;
- the need to consider equity in climate change mitigation;
- the need to identify the local priorities of disadvantaged communities and integrate these into energy policy initiatives.

Amongst the most challenging of the issues raised under this theme was the question of wider issues of **international equity**. In particular, the question of how to address global poverty while remaining within environmental limits was raised. Although the specific research implications of this issue were not fleshed out in depth, it clearly has resonances with a number of research areas: including the role of the UK in international negotiations on climate change, the role of carbon trading (and other flexibility mechanisms) in technology development, and the (ultimately ethical) questions around contraction and convergence and appropriate levels of 'carbon rationing' in the UK.

Security of Supply

A key issue in UK energy policy is the question of long-term security of supply. This is an area in which change is inevitable. Existing supply infrastructures are already changing. The UK is now poised to become a net importer of oil and gas and by 2020 could be importing as much as 90% of its gas. The over-arching issue of concern here is whether the institutions which characterise the existing energy system adequately reflect the need to address energy security issues (including demand reduction). Research questions might include the following:

- what do we mean by energy security? what are the factors that constitute energy security?
- what policy measures are justifiable in ensuring energy security?
- what is the role of microgeneration and decentralised supply in maintaining energy security?
- what kind of regulatory system is most responsive to security of supply issues?
- what is the role of the market in ensuring security of supply?

It was recognised that there are also a number of issues surrounding the **appropriate mix of technologies** to ensure security of supply, and in particular the role of renewable technologies and nuclear energy in the mix. Many of the questions here are specifically technical. But social, economic and institutional elements are also relevant. Key questions around the public acceptability, ethics,

economic cost and social implications of different technologies are all important questions for social science research.

Governance

One of the over-arching themes emerging from the workshop was the question of governance in a changing world. The combined threats from energy security, terrorism, and climate change pose unprecedented challenges for conventional notions of governance.

At the highest level, workshop discussion centred around the question of whether **'incentive' or 'dictat'** was a more appropriate policy response, given the broad-ranging nature and high social importance of long-term energy policy goals. A key issue here is the question of timescale. The timescales relevant for long-term energy policy are challenging in the face of both commercial business management and conventional electoral constraints on public policy. Broad research questions include the following:

- what will drive social and institutional change in the energy sector over the long-term?
- how can Government energy policy escape from the short time horizon imposed by electoral cycles?
- what kinds of market structures promote responsible business behaviour over the long-term?

The workshop also discussed specific governance options. For example, a good deal of attention was paid to mechanisms such as **carbon trading** – including personal carbon allowances – and carbon tax credits. Although a lot of work has been done on carbon trading, for example, there are still considerable research needs in developing a route map towards a coherent carbon trading scheme. At the highest level, this is governed by the question of the appropriate role of carbon trading in delivering energy policy goals. Some of the specific research questions raised in this area were:

- what are the links between carbon trading at different levels (personal/business/national)?
- how feasible is personal carbon trading and how effective will it be in changing people's behaviours?
- what social and political implications (obstacles, knock-on effects) are faced by carbon trading schemes?

Attention was also drawn to the role of **community-based energy initiatives**. As a model of governance, community-based social action appears to offer considerable promise. It is widely acknowledged that changing existing behaviours and developing new social norms is more likely to be successful in a group context. Communities are also known to be effective in disseminating and communicating new skills and knowledge. Some anecdotal evidence exists of successful community-based action in the area of energy. Representatives from some of the community-based groups were present at the workshop.

In spite of its latent promise, there are still a number of research needs before community-based social action can be considered an effective form of energy governance. At the highest level, this sub-theme is driven by the need to know whether, how, and under what conditions, community-based initiatives can be

'scaled up' to achieve a low carbon society. Specific research questions identified by the workshop included:

- what is the role of community in achieving lifestyle change?
- what are the conditions for success (and failure) of community-based energy initiatives?
- at what point does a household/community develop a) energy awareness and b) energy 'efficacy'?

At a broader level, the issue of governance raises deeper questions about ***the role of government as a change agent***. Who are the 'right' decision makers in this context? To what extent should government be led by public opinion in matters of energy policy? What is the role of government in changing people's behaviours and lifestyles? All these questions require sophisticated social and political science research inputs.

Summary and Conclusions

Research users and researchers were agreed that social science is uniquely placed to make vital contributions to long-term UK energy policy. The workshop highlighted the advantages of incorporating social science inputs into the energy research agenda and highlighted the risks of failing to account properly for the social, psychological and institutional aspects of the transition to a sustainable energy system.

The contribution of social science in energy research can be framed (in part) in terms of the need to understand and to manage systemic change. Participants identified in particular a number of key themes – behavioural change, the product-service shift, equity, security of supply and governance – in which clear social science research needs could be defined. It also articulated some specific illustrative research questions in each of these areas. It is to be hoped that these research questions can provide the focus for the future development of strong social science agenda in energy research.

References

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