Electricity in the Home: How, Why and When do People Use it?

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Introduction

To meet emissions targets and ensure that future demands can be met innovative ways need to be found of fostering a transition to low carbon, secure, affordable energy systems. In addition to developing low carbon forms of energy production, efforts also need to focus on the ways that people can reduce their energy consumption in everyday life, including in the home.

By investigating the way that people relate to and interact with electricity in their homes this project will consider how to best support and facilitate uptake of innovative electricity supply technologies, and attempt to understand how people's relationships with electricity affects their consumption.

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Background

Modern lifestyles are highly energy intensive. Many domestic routines and practices - which help form people's identities - rely upon or make use of appliances that consume electricity, and households today are responsible for approximately one third of the UK's total energy consumption (DECC, 2011a).

Efforts are being made to design and engineer products that are less energy intensive, and new ways of generating and distributing electricity are being discovered and implemented.

However, a key aspect in reducing electricity consumption—which is important for ensuring that electricity networks can adequately meet demand in the future, as well as other government requirements such as meeting carbon dioxide emissions and climate change targets—is understanding and changing people's energy-related behaviour.

Reducing consumption at an individual and household level will make the technological challenges that electrical engineers face more achievable.

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Aims

The following research questions were devised to outline the aims for the project:

1) How do consumers understand and interact with their existing electricity supply system in the home?
2) What are the reasons and motivations for implementing future changes in network provision?
3) What role do consumers and engineers imagine electricity will have in future society and domestic settings?
4) How socially acceptable are planned future step-changes in electricity network provision, and how might this impact people's lifestyles?
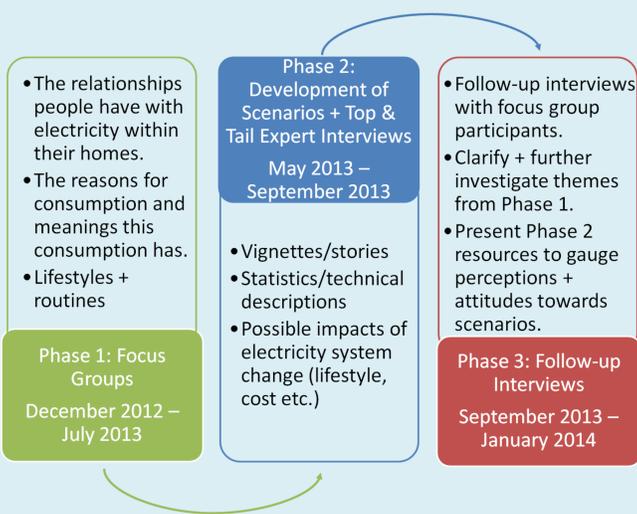
The research presented in this poster is based on focus groups undertaken in Phase 1 (see Methods) to answer research question 1 and inform future research to help answer questions 2, 3 and 4.

Methods

The project involves three phases:

1. Focus group discussions with members of the public were conducted to investigate people's consumption-related behaviours, perceptions and lifestyles.

2. Working alongside 'Top and Tail' network partners (primarily engineers) scenarios based on planned future changes in electricity systems and network provisions will be developed. The role that 'Sociotechnical Imaginaries' (Jasanoff and Kim, 2009) play in the formation of these imagined futures will also be investigated through observations and informal interviews.

3. Follow-up interviews (with members of the phase 1 focus groups) will be conducted to further investigate people's relationships with electricity in the home, and the resources developed in phase 2 will be presented to participants to identify their perceptions towards the scenarios being presented.
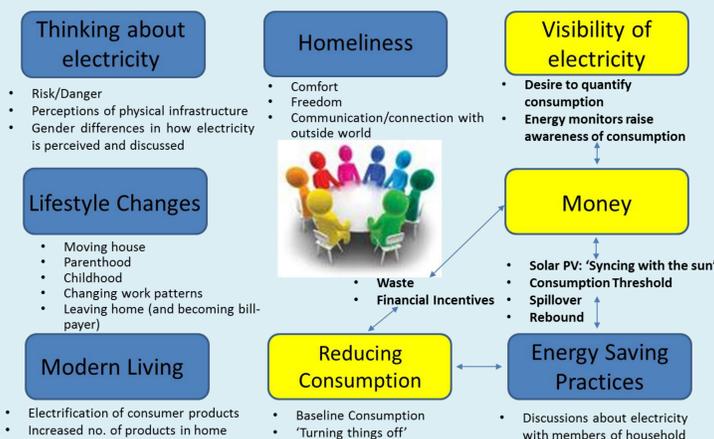
The findings reported in this poster are from Phase 1 (focus groups) only. Phases 2 and 3 are ongoing.

Phase 1: Focus Groups
December 2012 – July 2013
- The relationships people have with electricity within their homes.
- The reasons for consumption and meanings this consumption has.
- Lifestyles + routines

Phase 2: Development of Scenarios + Top & Tail Expert Interviews
May 2013 – September 2013
- Vignettes/stories
- Statistics/technical descriptions
- Possible impacts of electricity system change (lifestyle, cost etc.)

Phase 3: Follow-up Interviews
September 2013 – January 2014
- Follow-up interviews with focus group participants.
- Clarify + further investigate themes from Phase 1.
- Present Phase 2 resources to gauge perceptions + attitudes towards scenarios.

Initial Findings

The following findings are based on data obtained from the transcripts of 2 Phase 1 focus groups (analysis of 4 other focus groups in ongoing): a group of six young professionals living in rented accommodation, and a group of three couples who own houses that have recently had solar PV panels installed. The data was analysed using a grounded theory approach (e.g. Henwood and Pidgeon, 2003).

The mind map below shows themes that emerged from the data. Themes in yellow are discussed in more detail (Top-Right).

Thinking about electricity
- Risk/Danger
- Perceptions of physical infrastructure
- Gender differences in how electricity is perceived and discussed

Homeliness
- Comfort
- Freedom
- Communication/connection with outside world

Visibility of electricity
- Desire to quantify consumption
- Energy monitors raise awareness of consumption

Lifestyle Changes
- Moving house
- Parenthood
- Childhood
- Changing work patterns
- Leaving home (and becoming bill-payer)

Money
- Solar PV: 'Syncing with the sun'
- Consumption Threshold
- Spillover
- Rebound

- Waste
- Financial Incentives

Modern Living
- Electrification of consumer products
- Increased no. of products in home

Reducing Consumption
- Baseline Consumption
- 'Turning things off'

Energy Saving Practices
- Discussions about electricity with members of household

Initial Findings Continued...

Money

- **Cost has to be a strong incentive** for reducing consumption.
- **Bill payers think about electricity more**, and therefore context is important (e.g. differences between workplace & home).
- It may be difficult to change consumption through tariffs/pricing.

"I think it's like smoking. You know, you can't price people out of smoking, no matter how much tax you put on it, if people want to smoke they will smoke, and I think it will be the same with electricity. You can't force people to do something they don't want to do."

- However, despite recurring reference to economics being crucial in decisions over consumption – participants also acknowledged that **people do some things irrespective of cost** (particularly for leisure items and activities). The concepts of a **financial threshold** and **non-negotiable consumption** were suggested, where people are not prepared to give up some items/activities.

Visibility of Electricity

- **Electricity isn't necessarily seen as a resource**, instead the resources used to generate the electricity are.
- Feedback from **energy monitors raised visibility of electricity.**
- However, once novelty wore off and '**baseline' consumption** was reached participants grew frustrated and lost interest in monitors.

"We have one [energy monitor], but we don't use it […]. We've got an electric cooker that uses up almost all the electricity, everything else is pretty low level, and then we were like, what can we do?"

- **Power cuts and interruptions to supply may raise awareness** and understanding of role in modern lifestyles.

"I think the thing about electricity is, like a lot of things, you don't realise that you miss it until it's gone […], and then all of a sudden all the lights go out and everybody goes 'oh bugger what do we do now?'"

- Participants stated a **desire to quantify consumption** (particularly in cost terms). This included a desire to quantify other housemates' consumption to **add weight to arguments relating to electricity use** – could energy monitors raise **potential for conflict**? Others raised the issue of guilt and **feeling 'judged' by feedback** from energy monitors.

Solar PV

- Decision to install solar **PV framed as an investment** as opposed to an ethical/value-driven decision.
- It **was only once participants had had solar panels installed that they started to change the way they used electricity**.

"It wasn't until after we got the panels and thought 'hang on a second we're producing electricity during the day, let's start using things during the day."

- Participants **planned consumption around the sun** and attempted to maximise savings by using electricity whilst PV panels were generating.

"The minute the sun comes out, we throw on the washing machine, the dishwasher and any other appliance [...]. I mean, it is a means of saving energy and saving money at the same time".

- People with PV said they had a **raised interest in other renewable technologies**, and had considered investing in small wind turbines as well as heat pumps to increase energy efficiency.
- In addition to **positive 'behavioural spillovers'** in response to PV (e.g. energy efficiency improvements, reduction in consumption), **'rebound effects'** were also identified as participants made use of 'free' electricity and increased consumption on sunny days.

"If the sun's shining I wouldn't hesitate to put the washing machine on twice a day. I'd do two separate loads, rather than do it once. I would definitely on a sunny day I might think 'ooh I'll just put it on again this afternoon' just to finish this off so I don't have to do it tomorrow."

Implications/Next Steps

- Solar PV is a 'green' technology that, influenced by policy (e.g. feed-in tariff) resulted in increased uptake. Participants invested purely for financial reasons, and then changed their routines which resulted in shifting consumption patterns. Further work could **investigate ways this could be applied to other technology and/or policy interventions.**
- **Non-negotiable consumption** and **financial thresholds may have important implications for potential policies (e.g. tariff interventions).**
- Findings from these focus groups will be considered and further investigated upon in follow-up interviews to help understand perceptions of future domestic electricity use and the implications this may have for possible innovations in electricity supply and provisions.

Theoretical Influences and References

Broadly, this project is investigating how people perceive and use electricity in the home, and how possible future changes in domestic electricity provision may affect consumers. This interdisciplinary approach involves working with electrical engineers within the EPSRC 'Top & Tail' Grand Challenge Network to understand the expectations that exist within and mediate discourses on future technological change. The research spans the fields of Environmental Sociology - considering key theories including Social Practice Theory (e.g. Shove, 2004); Science and Technology Studies - considering theories that include Technological Transitions (e.g. Geels, 2002) and Sociotechnical Imaginaries (e.g. Jasanoff and Kim, 2009); and Environmental Psychology – considering theories such as Behavioural Spill over (e.g. Thogersen and Olander, 2003).

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