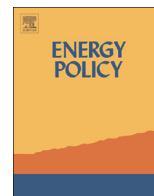




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Living with low carbon technologies: An agenda for sharing and comparing qualitative energy research

Karen Bickerstaff*, Patrick Devine-Wright, Catherine Butler

Department of Geography, University of Exeter, Amory Building, Rennes Drive, Exeter EX4 4RJ, England

HIGHLIGHTS

- We develop a robust strategy for comparing data from Qualitative Energy Research (QER).
- We apply principles of qualitative rigour to a reanalysis of two QER datasets.
- We demonstrate how this approach can strengthen extant analyses as well as reveal new interpretive insights.
- We highlight the academic and policy significance of developing comparative approaches to QER.

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ABSTRACT

Policies to reduce the carbon intensity of domestic living place considerable emphasis on the diffusion of low(er) carbon technologies—from microgeneration to an array of feedback and monitoring devices. These efforts presume that low carbon technologies (LCTs) will be accepted and integrated into domestic routines in the ways intended by their designers. This study contributes to an emerging qualitative energy research (QER) literature by deploying an analytical approach that explores comparison of data from two UK projects ('Carbon, Comfort and Control' and 'Conditioning Demand') concerned, in broad terms, with householder-LCTs interactions — primarily associated with the production and maintenance of thermal comfort. In-depth, and in many cases repeat, interviews were conducted in a total of 18 households where devices such as heat pumps and thermal feedback lamps had recently been installed. We discuss this comparative process and how a reflexive reading of notions of (and strategies associated with) credibility, transferability, dependability and confirmability enabled new ways of working and thinking with existing data. We conclude by highlighting the contrasts, conflicts, but also creativities raised by drawing these connections, and consider implications for methodologies associated with qualitative energy research.

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1. Introduction: The qualitative paradigm in energy research

This paper seeks to contribute to an emerging body of qualitative energy research (QER) by specifically addressing the methodological issue of comparing research across (often) small scale and idiosyncratic studies in ways that move beyond the confirmation of findings.

The application of qualitative methods in energy research reflects a growing interest in understanding and accessing narratives associated with people's everyday use of energy and the complex evolution of (energy-related) social practices (e.g. Butler et al., 2014), as well as a recognition that people are not passive recipients of energy (services) but play an active role (alongside

buildings, devices, infrastructures, policies etc.) in conditioning demand and their thermal environments (Nicol, 2011; cf. Brager and De Dear, 1998; Cole et al., 2008; Leaman and Bordass, 2007). Domestic (energy consuming) practices are read not as a matter of individual choice, nor technologically determined, but relationally constructed through engagement with broader socio-technical systems. In this vein, many recent studies have provided detailed accounts of the ways in which people use energy in order to meet particular needs, notably for thermal comfort, lighting, food, cleaning and entertainment (e.g. Shove, 2003; Pink, 2005; Spinney et al., 2012; Gram-Hanssen, 2010, 2011; Hitchings and Day, 2011; Hobson, 2006; Strengers, 2010; Strengers and Maller, 2011). All display a concern with capturing the richness of context-dependent sites and situations, drawing on relatively small (and often varied) cohorts, but with the use of intensive, in-depth interactions with participants — often deploying a range of methods

* Corresponding author.

E-mail address: k.bickerstaff@exeter.ac.uk (K. Bickerstaff).

Table 1
Evaluative principles and strategies adopted for comparative analysis (Based on Baxter and Eyles, 1997).

Criteria of rigour	Comparative strategy adopted
Transferability of the material: making what occurred intelligible and transparent to the audience; the history of the research; description of the study context and the interpretive strategy.	Stage 1: The two project leads ^a met (one meeting) to discuss (differences and similarities in) the study rationale, case study contexts and interpretive strategy. Reflection on these issues served to clarify where comparing data might be fruitful.
Credibility of the account: The plausibility of connections between the experiences of groups and the concepts developed to describe or simplify them. Achieved through (for instance) purposeful sampling, prolonged engagement, triangulation, peer debriefing (exposing data and interpretations to a respected colleague)	Stage 2: The two project leads shared a sample of anonymised transcripts reflecting the range of interventions studied, to identify ideas, patterns and concepts within topic domains selected for comparison. Two subsequent meetings reflected on the findings of interpretation – explored in/consistencies in analysis and interpretation and identified key analytic themes
Dependability of the interpretation: consistency with which the same constructs may be matched with the same phenomena over space and time, ensuring that the logic of the interpretation is not partisan. Achieved through (for instance): multiple researchers, peer examination (peer debriefing) and other methods of introducing alternative perspectives in data analysis prior to finalizing the set of theoretical constructs.	Stage 3: The final (fourth) meeting including a 'critical friend', a colleague that acted as a peer reviewer of the comparative data and interpretation (the annotated scripts, the data-theory links, and the degree to which they made sense). This provided a check on the dependability of interpretation and any prior commitments that might have impinged on the outcomes. The central analytical themes of the analysis were modified as a result ^b .
Confirmability of the study: the ability to audit the process through personal reflection of how decisions are made; reflection on the extent to which biases, motivations, interests or perspectives of the inquirer influence interpretations	

^a Project lead refers to the PI on each of the two QER research projects.

^b Here we would like to acknowledge the role of the reviewers in prompting fuller reflection on these principles and the resulting analysis.

(interviews, logs and diaries, video or audio tours, workshops and so on).

This qualitative engagement with everyday routines, meanings and contexts has undoubtedly invigorated social science contributions to energy research. However, there are questions that remain to be fully explored about the transparency of research designs and how sharing and comparing data and concepts from multiple projects might be meaningfully achieved and how such endeavours might enliven and extend the sorts of accounts being produced. Some have cautioned against analyses that transfer findings beyond the social, geographical and historical contexts in which they were generated (e.g. Hargreaves, 2012). However, we suggest there are strong empirical and theoretical grounds for developing rigorous comparisons that scrutinise dimensions of analytic continuity (and discontinuity) whilst retaining the depth and idiosyncrasy that makes case studies particular.

To explore these issues more fully we discuss the rationale for, and findings of, two UK QER projects—Carbon, Comfort and Control (CCC) and Conditioning Demand (CD). Although differing on many facets of project rationale, methodology and conceptual focus, both studies held an interest in householder engagements with low carbon devices following installation – specifically (though not exclusively) technologies concerned with heat generation and thermal comfort feedback. Reducing the carbon intensity of heating represents a particularly pressing policy challenge, since space and water heating account for about a quarter of UK energy consumption (LCICG, 2012). There are numerous technological options that have been developed to supply and manage heat demand, and our research is by no means comprehensive in this regard.

As part of the comparative strategy, we reviewed a sample of transcripts from across the two projects (9 post-installation interviews from CCC, and 3 longitudinal sets of [3] interviews for the CD project). Interviews involved people with often highly contrasting household structures, dwelling type and tenure, as well as relations to Low Carbon Technologies i.e. whether householders had an active (elected to have LCTs fitted) or passive (had no say, e.g. in the context of tenants) role in their installation. To aid the process of sharing and comparing data we explore and reflect upon debate, particularly in social geography (Baxter and Eyles, 1997; Bailey et al., 1999; Valentine, 2006), around rigour in qualitative research. From this we consider how sharing and

comparing data might extend the scope and reach of qualitative energy research.

2. Exploring rigour in qualitative (energy) research: Criteria and reflections

Qualitative research stands accused of being of little relevance or interest to policymakers because it involves small-scale case-study work (Valentine, 2006; 413). Such claims can be, and have been, challenged, recognizing how small-n (small number) research, in capturing the complexity of everyday life (DeLyser, et al. 2010, 6; Shove, 2010), can offer vital accounts of meaning, perception, values, intentions, motivations and so on, as well as giving voice to those previously silenced (Fuller and Kitchin, 2004; DeLyser, et al. 2010). Other prominent qualitative social scientists have argued in favour of adding quantitative measures to qualitative research projects, or using more rigorous sampling procedures, as a means of increasing confidence in the validity of results (Miles and Huberman, 1994; Silverman, 2011). In this paper, our intention is not to rehearse debate over the validity of small-n energy research but rather to suggest that issues surrounding rigour and comparing small-n data warrant fuller consideration, particularly in the context of increasing interest in and imperatives for research impact.

Influential work by Lincoln and Guba (1985) proposed a framework for ensuring the rigour of qualitative research, centering on four criteria. *Credibility*, that is demonstrating a true picture of the phenomenon under scrutiny; *transferability*, establishing sufficient detail of the context of the fieldwork for a reader to be able to decide whether the findings can justifiably be applied to the other setting; *dependability* seeks to ensure the study can be repeated, and *confirmability* requires researchers to take steps to demonstrate that findings emerge from the data and not their own predispositions. For each criterion the authors offer specific methodological strategies for satisfying qualitative rigour, such as the audit trail, member checks when coding, or confirming results with participants, peer debriefing and negative case analysis (Lincoln and Guba, 1985).

In the field of social geography, and drawing on Lincoln and Guba's framework, Baxter and Eyles (1997), in a widely cited review of 31 empirical and 18 substantive papers, call for the

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