Time for change?: the hard work of energy demand reduction

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Abstract

The objective of this paper is to frame or describe the patterns of change that take place when householders act to reduce their energy demand (for example, through adaptations in the performance of everyday practices, purchasing of energy efficient products and broader infrastructural innovations). The mainstream policy approach – predicated on behavioural insights – tends to conceptualise this form of change as a series of relatively straightforward events that are separate from everyday life. Evidence from Smart Communities – a community action project – challenges these mainstream conceptions, but both supports and extends recent sociological insights. In particular, this research suggests that householders' efforts might be better framed as hard work, a complex and time-consuming process that unfolds over lengthy periods of time. Energy demand reduction is time-consuming hard work because it often requires research, experimentation, negotiation and planning; this is the case, we argue, even for many ostensibly straightforward changes. Reducing energy demand should be understood as a process that unfolds over lengthy periods of time for four main reasons. First, as discussed, it is time-consuming hard work. Second, some changes can only take place 'when the time is right': when work is done on the house, when something needs replacing or when the cost becomes affordable. Third, work to reduce energy demand is easily squeezed out by the more pressing priorities of everyday life. Finally, change is easily halted or reversed as everyday life changes in other ways. In our discussion, we comment on: the relationships between behavioural and sociological approaches, the case for continued focus on action by householders and suggestions for practical action.

Introduction

This short paper contributes to understandings of the potential for domestic energy demand reduction by exploring the reflections of householders on what happens when they engage with

energy demand reduction at home. We are interested in framing or describing the change – adaptations in the performance of everyday practices, purchasing energy efficient products and broader infrastructural innovations – that does or does not occur when householders act to reduce their energy demand. In particular, we ask: how can we encapsulate or describe such activities. In brief, our response to this question is that this form of change can be understood as hard work, a complex and time-consuming process that unfolds over lengthy periods of time. We also argue that many explanations of this complexity are to be found in existing sociological and ethnographic work – as well as more behavioural work – on the ways in which domestic energy demand is shaped.

There are many approaches to understanding the things that happen around the home and the ways in which these shape patterns and intensities of demand or consumption. While it is an over-simplification to divide these approaches into two categories – more-or-less behavioural and more-or-less sociological and ethnographic – nonetheless it is not entirely unreasonable to do this. The mainstream policy approach is largely predicated on two behavioural approaches: social psychology (with a focus on knowledge, attitudes, cognition and choice; for instance, Dietz et al., 2009) and behavioural economics (with an emphasis on automatic mental processes, incentives, cues and defaults; for instance, Thaler and Sunstein, 2008). In the UK, these approaches have become the mainstream policy approach across a wide range of issues from public health to road safety (Cabinet Office, 2010; House of Lords, 2011; Behavioural Insights Team, 2014), including energy (Defra, 2007; HM Government, 2009; 2011; Cabinet Office, 2011; DECC, 2012; DECC-Palmer et al., 2012; DECC-RAND, 2012; DECC, 2014). Some documents that have emerged from energy demand policy contexts are broader in scope (DECC-Chatterton, 2011; Scottish Government-Darnton and Horne, 2013). These policy documents tend to conceptualise change as a series of events, for instance, in the context of energy demand reduction: behavioural changes such as turning down thermostats, the implementation of small measures such as draught proofing a window and larger infrastructural measures such as insulation or boiler replacement. These events are typically seen as taking place in particular moments in time, and outside of any broader notion of everyday life. Although there is clearly variation here, it is striking that these changes are often framed or understood as relatively simple to make in practical terms.

The second set of approaches – less prominent in policy – are more-or-less sociological and ethnographic. Above all, these approaches emphasise the ways in which energy demand is shaped by everyday life, and – in response – the importance of thinking 'beyond behaviour' (Shove, 2010; Strengers and Maller, 2014). Although these are clearly interrelated, the insights from this work could be organised in two main categories. One set particularly emphasises the ways in which everyday life is shaped at a distance from the household itself. Thus, these point out that domestic consumption is shaped over lengthy periods, inscribed in changing industrial standards and social expectations of convenience, comfort and cleanliness (Shove, 2003), processes of normalisation (Shove and Southerton, 2000; Shove, 2003; Rettie et al., 2014), social practices (Shove et al., 2012), systems of provision (Southerton et al., 2004), socio-technical systems or systems of practice (Watson, 2012) and shifting multiple and overlapping daily, weekly and seasonal temporal cycles or rhythms (Blue, 2013; Torriti, 2014; Torriti et al., 2015; Walker, 2014). While the broader social world remains central to the analysis, the second set focuses more on the household itself. These note that everyday life and consumption is shaped by: the evolving materials, skills and meanings that constitute the performance of practice (Gram-Hanssen, 2010; Shove et al., 2012; Watson, 2012;

Strengers, 2013; Royston, 2014), our senses and bodies (Pink, 2011; Wallenborn and Wilhite, 2014; Royston, 2014; Pink et al., 2015), time constraints (Southerton, 2006) and ideas about the home (Harries et al., 2014). Such approaches also emphasise the complexity (Browne, 2015) and interconnectedness (Shove et al., 2012) of domestic consumption practices, as well the extent to which energy – especially electricity – demand is implicated in practices across all aspects of everyday domestic life (Burchell et al., 2014a). In some analyses of thermal practices, the management of thermal flows is conceptualised as work (Jalas and Rinkonen, 2013; Royston, 2014).

Within the context of householders' engagement with energy consumption reduction, this raises the question of the extent to which these same issues are important, and what further issues might come into play. We already have some insights into this. For instance, work has illustrated: the ways in which temporal rhythms constrain efforts to load shift (Bulkeley et al., 2014; Powells et al., 2014), the extent to which inadequate know-how and skills limits householders' effort to reduce energy demand (Burchell et al., 2014a; 2015), the impact of competing priorities and time constraints (Wilson et al., 2013; Burchell et al., 2014a/2016), the ways in which some practices appear to be immutable in the minds of householders (Hargreaves et al., 2010; Strengers, 2012). As a further reminder of the ways in which practices and demand are socially shaped, Burchell et al. (2014a; 2016) have emphasised the ways in which community action and locally- and action- focussed communications can support change. In addition to these familiar themes, this work has highlighted the extent to which change is negotiated between household members – who, as practice theorists might put it, perhaps attribute very different meanings to energy consumption reduction – and can lead to conflict (Hargreaves et al., 2010; Burchell et al., 2016).

In this paper, we draw on 30 interviews with householders who had been participating, to varying degrees, in efforts to reduce domestic energy demand reduction. Within the context of the conceptualisations of change that feature in the mainstream behaviour change approach, the results from these interviews are somewhat startling. However, from the perspective of the sociological and ethnographic explanations described above, the interviews make much more sense. Far from straightforward, the interviews suggest that change for energy demand reduction should be understood as a hard work, complex and difficult. Rather than an event, change should be understood as a time-consuming and lengthy process. Above all, we argue, this is due to the extent to which change is embedded within the time-constrained (and somewhat financially-constrained) everyday lives of householders. A set of further social, sensory and embodied constraints is also readily identifiable. Importantly, these challenges should be understood to be present even when householders are motivated and incentivised in some way. The paper now proceeds as follows. In the next section, we briefly review the action research methodology that was employed in this study. Thereafter, we share evidence from the interviews, under three headings: Hard work, Time to change? and Everyday life. In our discussion, we comment on the relationships between behavioural and sociological approaches, make the case for continued focus on action by householders and make suggestions for practical action.

Methods

This study – a community action project on energy demand reduction called Smart Communities (Burchell et al., 2014a/b) – draws on the principles and methodologies of *action research* (Reason and Bradbury, 2008). In action research, research is typically undertaken alongside normatively-driven action in collaboration with particular social groups. Typically, the objective of the research and action is a blend of direct change, mutual learning and broader dissemination. Smart Communities took place in Kingston upon Thames, a middle-class suburb of London, UK, and the action lasted from May 2011 to May 2013. Recruitment was undertaken via a range of methods and around 400 households joined the project (16% of the total in the project area). All of the households that joined the project had access to a community action programme consisting of: a free energy monitor and an on-line energy consumption feedback interface, weekly emails, regular community workshops on topics such as lighting, thermal comfort and hot water; free energy-saving materials; an eco-gadget library at the local library; a web forum and advice line; and two summer celebration events. In addition, a limited number of experimental home energy visits were undertaken and a programme of energy-related activities was implemented in a local primary school. For further information, see Burchell et al. (2014a/b; 2015; 2016).

Action research typically yields qualitative evidence from two main sources. The first is informal interactions with project members. In Smart Communities, these took place face-to-face – for instance, at project recruitment events, workshops and other events – and in telephone conversations and email exchanges. In this context, data takes the form of hand-written or digital notes and email threads. The implication of this is that insights tend to be exploratory, context specific and sometimes anecdotal in form. The second is more formal research methods. In Smart Communities, 30 interviews were undertaken with project participants who were purposively selected from across the range of levels of engagement with the project and energy demand reduction. Ten interviews were conducted in early 2012, fifteen in early 2013 and five in October 2013. Depending on circumstances, some interviews were with individuals and some with more than one household member. The interviews were conducted in participants' homes, lasted around one hour and included discussions of the project activities and the ways in which change did and did not happen within the household. Interviews were recorded and transcribed. The data were analysed by the authors, drawing on the principles of thematic analysis (Boyatzis, 1998). Transcripts and other materials were iteratively read, re-read, discussed and coded. Themes were derived from the codes and then refined for presentation in written form.

Results

Hard work

Earlier we mentioned that Jalas and Rinkonen (2013) and Royston (2014) have conceptualised householders' management of thermal flows in the home as work. Building on this, the data from Smart Communities suggests that householders' efforts to change the ways they do things around the home might be best understood as *hard work*. Importantly, this applies even to changes that – on the face of it – might appear to be relatively straightforward to make, and we will try to illustrate this. This work can be broken down into a number of elements. In this section, we briefly comment

on two of these, householders' *research and enquiry* and *negotiation* as forms of works. We touch on some other forms of work a bit later.

We began to appreciate the extent to which a lack of know-how and skills is an important constraint on householders – and, therefore, why *research and enquiry* is an important form of work – in two key ways. The first was through our own efforts to reduce our domestic energy demand. The second was as new project participants repeatedly told us that they were joining because they wanted to reduce their energy consumption but did not have the knowledge or skills to do this. Of course, this challenge is predicted by the emphasis on know-how, skills and competencies at the heart of practice theory. Our experiences during the project led us to identify three highly challenging dimensions to this form of knowledge, which we have termed *energy know-how*, that together account for the extent of the research that is required by householders (Burchell et al., 2015). First, it has three distinct aspects to it: the things that could be changed or done, the practical skills to do these things and knowledge of the specific material objects and infrastructures present within the house. Second, to be helpful, this form of knowledge needs to be highly specific with respect to: the characteristics of building itself, the appliances within it, the existing level of know-how of the household members and the current ways of doing things within the home. Finally, much of this knowledge takes the form of practical skills and know-how, which is tacit and difficult to codify or write down. These three dimensions of energy know-how make it very difficult to share and acquire. On a more practical level, we learned that standardised tips and advice are not helpful and that sources of appropriate energy know-how guidance are not typically readily available. It was the emergence of these factors that led us to experiment with home visits (Burchell et al., 2015). The most common forms of *research and enquiry* that participants told us about were: using the energy monitor to learn about the energy consumption of individual appliances, engagement with the on-line energy consumption feedback and web-based research.

The challenging knowledge-related work of implementing even seemingly straightforward changes can also be illustrated by examination of an exchange that took place in this workshop with respect to trying to follow apparently straightforward advice regarding internal temperatures (all names are pseudonyms, except the facilitator):

> **Kevin (facilitator)**: Our thermostat is at 18, but I've learnt that the temperature in our living room is around 21, so we're experimenting with 17, to see what we end up with.
> **Pat**: I think I experienced the same, my thermostat is set for 19, but I have a separate electronic thermometer that tells me the real temperature which is usually over 21.
> **George**: Ours is set for 18 and a half, and like everyone else, it's in the hallway, so I know the hallway's 18 and a half, but I honestly have no idea what the other rooms are.
> **Karen**: Mine's set pretty low, I think it's probably about 17, but I don't think that is the temperature in the room, I think it gets higher than that, because again, it's in the hall.
> **Kevin (facilitator)**: So this issue of thermostats being in the hall is a confounding factor?

In addition, this passage highlights the value of experience and experimentation – the tinkering that is described by Royston (2014) – and social interaction in the emergence, sharing and acquisition of know-how.

Turning to *negotiation*, we have already mentioned the previous research that discusses the difficulties associated with conflicting views among householders with respect to making changes

around the home, and the resulting need for negotiation among household members (Hargreaves et al., 2010). This phenomenon was also present in the Smart Communities data, and is illustrated by this almost painful exchange between Doug and Miriam relating to something as simple as a single light and a radio:

> **Doug**: I've noticed that the 1.5 watt LED, which is on all night downstairs, is never switched off in a morning, and it's me that switches it off, and even though it uses nothing, it's still a little niggly.
> **Miriam**: Yeah, but it's one of those things, when you leave things on like this you say 'Oh, it's only 1.5', when I leave it on it's a big disaster. Or you leave the radio on in your workshop and you're up here and I say, 'You've left your radio on', and you say, 'Well it's only very little.'
> **Doug**: Well it is a little.
> **Miriam**: Yes, but then if I leave something on it's, 'You've left this on'. No, there's definitely an inequality.

This challenge also emerged when we discussed thermal comfort in our workshops. For instance, both Hayley and John highlighted a conflictual element, referring – perhaps jokingly – to 'fights' and 'wars', relating to changes in thermal management:

> **Hayley**: I live in a shared house, and so I'm having thermostat wars. It's currently at 20 and I'd like it lower as I have a smaller room than anyone else, so my room heats up and, 'oh, can we turn it down?', but everyone else is happy at 20, so I'm gritting my teeth.
> **John**: I'm in a constant fight with everybody else in the house, my wife likes to have the doors open…and I'm constantly trying to get them closed.

Time for change?

Such research and negotiation is time-consuming, and this means that change should be understood as a process that can unfold over lengthy periods as opposed to a discrete event in time. In this section, we offer evidence of a range of other issues that extend the time periods over which such change takes place. At the heart of these observations is the extent to which change for energy consumption reduction should be understood within the context of householders' everyday lives, longer term planning and changes in everyday lives over time.

For instance, interviewees often told us that some changes can only be implemented when the time is right. This might be when an existing appliance becomes redundant, for example, Adam told us:

> **Adam**: Once someone's spent hard cash on the product they're going to wait for it to wear out.

Alternatively, it might be when other building work is being done on the house. Audrey commented on this, drawing particular attention to the ways in which energy demand reduction is often embedded within the long term planning of households (and it is important to acknowledge that this longer term planning is a further form of time-consuming hard work):

> **Audrey**: We've been talking about longer term projects to increase the insulation and if we were going to do any building works how we could actually make those the most efficient that we could that would save us money in the future, rather than just choosing something basic.

In a more informal setting, and in terms that illustrate both this point and the issues of research and negotiation that we discussed earlier, Sonia described to us the ongoing somewhat conflictual discussions that she was having with her husband about whether the central heating needed replacing, trying to understand the right central heating option, and how this could be afforded.

It is notable that all of these comments refer to the cost implications of making infrastructural changes, and the tricky exercise of balancing future investments and potential savings. In two comments, Tom, a professional photographer, also emphasised the financial costs of smaller scale change, and illustrated the ways in which this issue extended the time period over which change could take place. For Tom, change should be 'opportunistic', and can only take place when the time is right:

> **Tom**: For a long time, 100 watt CRT monitors were infinitely better than 20 watt LCD or flat screen monitors; they were terrible, you couldn't do proper retouching on them. But all of a sudden, they suddenly started making quality, flat screen monitors, and now I've got two of them.
>
> **Tom**: Opportunist greening. No way am I going to take all the halogen lamps out and replace them with LEDs because that would cost hundreds. It's just not viable, but we'll replace them as we need to.

Project participants, especially those with young children, also often described the – sometimes seemingly almost overwhelming – busyness and competing priorities that pervade their everyday lives. Given our observation that engagement with energy demand reduction is time-consuming, it is perhaps not surprising that householders often told us how these activities are easily squeezed out by more pressing priorities. Sadie's and Lynsey's comments are good examples of this:

> **Sadie**: A lot of the [school] mums said, we haven't quite got round to monitoring things on a regular basis. It's just lack of time. It's not out of a lack of interest, it's just another thing to do, yeah, time.
>
> **Lynsey**: Looking after the house, the kids, the washing, the tumble drying, you try and get as much done so that the weekend you've got some time to just enjoy being together, to go out on walks, take the kids out, just to potter around and not be bogged down in household stuff.

Of course, we are alive to the possibility that Sadie and Lynsey just didn't want to tell us that they are simply not interested in energy demand reduction; certainly, some others did. However, we would argue that it is more useful to conclude that – even when householders are motivated by energy demand reduction, as social psychologists might put it – it is important to acknowledge the extent to which such change must be understood as embedded within and constrained by already busy everyday lives. Lynsey's comment is also helpful in another way. Notice the way in which Lynsey distinguishes between 'household stuff' and recreation ('just pottering about', as she puts it), and the way in which she implies that action on energy counts as further household stuff that she does not wish to get 'bogged down' in, especially at weekends.

As a final comment in this section, it is worth referring to two informal exchanges that were noted during the project action, both of which highlight the ways in which shorter term and longer term changes in everyday life can intensify the time-squeeze and constrain engagement with energy demand. We did conduct a formal interview with Nancy, a mother of two young children. However,

it was in the less formal context of a later telephone conversation that Nancy revealed the extent to which the pattern of her husband's frequent work trips shaped both her engagement with the project action and with domestic energy consumption. When her husband was not away, Nancy told us, she was able to come to evening and daytime project meetings, experiment with her energy monitor, investigate energy related issues on-line and so on. However, when her husband was away, Nancy had much less time for these things and was not able to go out in the evening. Similarly, in another telephone conversation, Janine – the Chair of a local residents' association – described how her capacity to spend time on Smart Communities and energy related matters was severely constrained when her elderly mother became very ill. Some six months later, Janine's mother had happily recovered and we saw her again at project workshops.

Gail's everyday life

Gail is 42, and lives with her husband and two children. Gail told us that she was keen to reduce her energy demand because she felt that her energy bills were too high: an eye watering £300 (€400/$430) per month. However, a strong sense of immutability pervades what Gail told us, as she described the myriad constraints on her efforts to reduce the household's energy demand. Gail's comments are particularly helpful because they reveal a range of ways in which the factors that shape energy demand – as identified in recent sociological and ethnographic work – also shape householders' actions when they try to adapt their performance of practices.

For instance, when discussing a number of practices, Gail referred to the senses. She told us that she judiciously employs thermal flows from her Aga, the central heating and electric heaters to achieve 'a nice heat' all around her home and at all times. She directly associated smell and cleanliness, stating, 'I love it, the fabric conditioner, everything smells fresh and clean'. Gail also recalled that she had tried some energy saving light bulbs, but 'didn't like the light'. In the comment below, Gail offers a further sensory consideration with respect to the laundry, and highlights the ways in which the changing limitations of her own body shapes energy demand in her home:

> 'In the past in the summer, I got a clothes horse and I've put the stuff out there and let it dry and I've ironed. But as my back has deteriorated, I don't want to be ironing. With a tumble drier everything's so much softer and nicer, and you don't have to iron'.

Although firmly rooted in her own perceptions as opposed to any broader evidence, Gail was also very mindful of the ways in which conventions or norms have changed over time. Despite this understanding of change, and in illustration of the way in which conventions can become immutable expectations, contemporary conventions appear to be so strong for Gail that she cannot imagine them changing. Everyone in Gail's family showers once or twice each day and the hot water is permanently on. Drawing on her own memories, Gail maintained that:

> 'I grew up in the seventies with a piddly shower. I can't see us having a quick sponge down. I think maybe the older generation might but I think younger people more or less have showers every day.'

There seems to be a strange circular – and naturalising – argument in what Gail tells us: things are as they are because that's how they are. That said, Gail also indicated that she is aware of other conventions, and she firmly disassociated herself from some of these. For instance, Gail's laundry regime is exacting, she runs her washing machine and tumble drier at least once each day, usually

not full. In explanation of why this is, Gail told us that she washes most clothes after one wearing and different types of laundry are washed separately (clothes, towels, bed linen and so on). Gail continued:

> 'We've got one double bed and two singles, so that's four times a week. And it's non-stop with clothes. My eldest and husband do sports, that's always needing to be washed, and you've got school uniforms, regular clothes and towels. I don't mix the clothes, I know there are people who put whites and coloureds together!'

One quite reasonable response to Gail's comments might be to suggest that this is a know-how issue: the challenge is simply that Gail does not know, for instance, that towels and bed linen can be washed together, that bed linen doesn't need to be washed every week, and that some clothes at least can be worn more than once before washing. At the same time, there seems to be something much more fundamental going on for Gail. It seems reasonable to argue that doing the laundry in this way has significant meaning for Gail, perhaps it means good mother or good home-maker.

Discussion

In this paper, drawing on evidence from an action research project, we have tried to unsettle the mainstream policy conception of energy demand reduction as a series of relatively straightforward events. Instead, we have sought to conceptualise householders' efforts as time-consuming, hard work, and as a process that unfolds over lengthy periods of time. To support this claim, we have presented evidence: that householders need to expend considerable time and effort on research and enquiry, negotiation with other householders and planning for change; that the hard work of energy demand reduction must be understood as embedded within householders' long-term plans for their home, their very busy day-to-day lives and their short- and long-term financial considerations; and, that householders are further constrained by conventions and expectations, sensory and bodily matters and firm attachments to the fundamental meanings of doing things in certain ways. In this discussion, we now sketch out some speculative responses to three questions that might emerge from these findings.

While we don't want to get bogged down in this debate (Shove, 2010; Whitmarsh et al., 2011; Shove, 2011; Wilson and Chatterton, 2011; Strengers et al., 2015), the first question relates to the relationships between the more-or-less behavioural and more-or-less sociological and ethnographic approaches that were described earlier. On this, we are perhaps in same kind of territory as Shove (2010; 2011), in that we agree that it is important to note that the two sets of approaches tend towards asking different questions, and Chatterton and Wilson (2011) and Strengers et al. (2015), in that we distinguish between 'pure' theory and 'impure' practice, and we seek a broad-based practical approach. Clearly, one of the key findings of our research is that the more-or-less sociological and ethnographic approaches to understanding how demand is shaped have much to offer in terms of understanding what happens when householders try to act on energy; everyday life and practice clearly constrain change in ways that cannot be adequately captured or addressed in behavioural approaches. Methodologically, it is clearly helpful to go beyond questionnaires and randomised-controlled trials, and to learn more about households, everyday life and change by

spending more time with and within households. In interventions, it is clearly essential to go beyond information, incentives and defaults. This is an important point, because the insights from sociological and ethnographic approaches appear to remain under-valued and inadequately understood in policy circles. However, we would not want readers to go away with the impression that we reject behavioural approaches entirely. For instance, our work suggests that the financial cost of energy demand reduction seems to be *part of* the challenge for many householders; it, therefore, seems reasonable to suppose that financial incentives could be *part of* the solution (and here the failed UK Green Deal might be held up as an example of a financial incentive that in no way accounts for everyday life). It is also worth reminding ourselves that a recent publication by the Behavioural Insights Team (2014) emphasises the importance of making things easy for people. In the context of the hard work of energy demand reduction, this does not seem like poor advice, though what this means in practice is less easy to say. That said, as a final comment on this question, it is important to comment on the *characteristics* of the many issues on which the Behavioural Insights Team cites success (for example: enrolling in pension schemes, paying car tax, paying tax, paying court fines, organ donation, university applications by under-represented groups etc). The key point here is that none of these issues are as complex, bound up in all aspects of everyday life and socially-shaped as is energy demand reduction. Clearly, more sophisticated thinking and approaches are required in this context.

The second question is: should householders have a role in carbon reduction at all? In this context, it is worth recalling that until the late 1990s energy policy was simply an economic and infrastructural supply-side matter of 'predict and provide', and even since then government policy has primarily focused on decarbonising the supply side. Although action within the household became more prominent in UK government policy between 2003 and 2015 (in energy efficiency and micro-generation policies), the current government appears to be withdrawing from these areas. Then there is the sociological critique of behavioural approaches which suggests that energy demand is primarily socially-shaped, at a distance from the household (in the ways that were described earlier), and that householders are merely carriers of practice. From this perspective, behaviour change can appear to be a flawed, inadequate and socially-unjust response which merely reinforces what it seeks to change, and fundamental social change becomes the requirement (Shove, 2010; and see Walker's 2014 summary). Into this picture, now, comes our paper which suggests that demand reduction is time-consuming, hard work for householders; far harder than is envisaged in the behavioural school. With all of this in mind, it is important to ask: might it not be more productive to focus exclusively on supply-side infrastructure or to advocate – through policy, politics or activism – for fundamental social change? Here are five – possibly provocative – reasons why action by householders remains important:

1. Supply-side responses (and practice approaches) run the risk of denuding householders of an agency that has the potential to deliver considerable carbon reductions over time;
2. Action by householders, especially at the community scale, can be understood as a socially-positive form of grass roots or bottom-up action, even in the absence of political engagement;
3. Action by householders can lead to political engagement;
4. Although we – people in academia, policy and practice – have made a start, we are only in the foothills in terms of understanding how demand and consumption are shaped, and how to purposefully shape change. We will get better at this.

5. Greater policy recognition of the importance of social factors, everyday life and practice offers would significantly aid this objective.

Our final question is: in practical intervention terms, what does our work imply? While there are clearly no panaceas here, at its broadest our action research suggests that – if implemented appropriately – energy consumption monitoring and feedback, various forms of local and community action, and regular action-based email communications can all be helpful interventions (see Burchell et al., 2014a/b; 2015; 2016). However, drawing in particular on the findings that we have discussed in this paper, perhaps the key theme is the specificity of each household, for instance with respect to: material infrastructures, current ways of doing things, understandings of conventions, levels of energy know-how, bodily constraints, household dynamics, time-squeeze, financial constraints and so on. To us, this speaks to the importance of moving towards interventions that are able to take account of this range of specificities (in ways that standardised approaches cannot). In Smart Communities, we operationalised this thought in a programme of experimental home energy visits, and these were very successful (Burchell et al., 2015), but this idea can surely also be operationalised in other ways that facilitate the kinds of social situations – for instance, open house events – in which specific and tailored demonstration and guidance can be emphasised. Specificity is also being achieved in the context of some commercial energy consumption feedback approaches (e.g. British Gas), which provide tailored advice based upon patterns of consumption, and householder-provided information typically related to material infrastructures and current ways of doing things.

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