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Fuel poverty from the bottom-up: Characterising household energy vulnerability through the lived experience of the fuel poor



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ABSTRACT

Recent quantitative and qualitative evidence documents a dramatic reduction in average direct UK household energy consumption in the last decade. The ‘fuel poverty gap’ in the UK (average shortfall that fuel poor households experience in affording their energy bills) has also grown substantially in that period. Here we draw on the literature on vulnerability and on recent qualitative interviews with fuel poor households to characterise the experience of energy vulnerability in the UK. Using our qualitative data, we explore energy vulnerability from the point of view of our interviewees. In doing so we identify six challenges to energy vulnerability for the fuel poor: quality of dwelling fabric, energy costs and supply issues, stability of household income, tenancy relations, social relations within the household and outside, and ill health. In analysing these challenges we find that the energy vulnerable have limited agency to reduce their own vulnerability. Further, current UK policy relating to fuel poverty does not take full account of these challenges. Any attempt to address energy vulnerability coherently in the future must engage with structural forces (policies, markets, and recognition) in order to increase household agency for change.

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1. Introduction

In a recent report on household energy consumption, the Office for National Statistics [1] (ONS) documented a 24% reduction in average household energy consumption in the UK between 2005 and 2011. This radical change in energy consumption in the home is likely due to a number of factors, but the doubling of energy prices for households during the period must have had a substantial effect. The ONS figures suggest that the experience of living in fuel poverty during this period has altered substantially, and indeed this is supported by government fuel poverty measures. The ‘fuel poverty gap’ (average shortfall that fuel poor households experience in affording their energy bills) grew from £310 to £438 in England and Wales between 2005 and 2011 [2]. Understanding how the fuel poor experience change, and how they might be supported in coping, is increasingly important.

While these statistics give us an impression of the broad trends in fuel poverty, qualitative research is essential to understand

how change is experienced in the daily lives of the fuel poor. Relatively few qualitative studies exist that touch on the lived experience of fuel poverty or energy vulnerability [3–9]. These studies show households in the UK and Austria taking increasingly drastic measures to cope with changing circumstances. They also document a variety of experiences and responses depending on the circumstances of the household in question. Certainly, these studies suggest that the experience of fuel poverty is dynamic, and that it can be exacerbated or ameliorated by many factors, from energy efficiency to the social life of the household.

To date, the detailed insights available in qualitative work have not been drawn on in debates on the nature of fuel poverty. As a result, the problem of fuel poverty tends to be defined by macro-level indicators, such as the ‘fuel poverty gap’, as opposed to a richer picture of the lived experience uncovered in qualitative work. Recent use of the term ‘energy vulnerability’ in the study of fuel or energy poverty, pioneered by Stefan Bouzarovski and colleagues at Manchester University [10], has the potential to open up a more complex and dynamic understanding of people’s relationship with energy. There are links here to the broader literature on vulnerability, which attempts to understand how threats to people’s integrity can be measured, understood and mitigated against [4,11–13]. The term ‘energy vulnerability’ lacks a clear definition, however. There

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is an opportunity here: to build a definition of energy vulnerability from the bottom-up, drawing on insights from qualitative work.

In this paper we aim to do just that: bringing together the wider literature on (energy) vulnerability, and our own qualitative study of the lived experience of fuel poverty in the UK, to explore the meaning of energy vulnerability from the bottom-up. First, we want to understand ‘what are people vulnerable to?’ from the point of view of our respondents. We address this by identifying six key challenges to energy vulnerability for the fuel poor: quality of dwelling, energy costs and supply, stability of household income, tenancy relations, social relations within the household and outside, and ill health. Second, we want to explore how such an understanding might be translated into a means of identifying and alleviating conditions for the energy vulnerable. We address this in the discussion where we find that many of the ways of reducing vulnerability identified in our research are heavily reliant on structural changes, rather than on the agency of the household itself. Our six challenges to energy vulnerability are a useful starting point for household-level assessment of energy vulnerability. They also have value in analysing the potential of existing and future policy in this area. We argue that our analysis allows us to identify both household level and more structural causes of vulnerability to ensure a critical (and indeed realistic) assessment of the potential for reducing vulnerability.

While this paper draws on UK experiences of fuel poverty, the globalised nature of both energy prices and the current financial crisis, means that research in the UK is likely to be relevant elsewhere, particularly in similarly developed nations. While there will be variation in levels of income inequality, and in the impact of the financial crisis, we can anticipate that the energy vulnerable in such nations are experiencing change that needs to be understood. Certainly the framework we present in the form of ‘key challenges to energy vulnerability’ might prove a useful starting point for investigating these issues elsewhere.

2. Energy vulnerability and the lived experience

2.1. Characterising energy vulnerability

In fuel poverty research to date, there is limited engagement with the term ‘energy vulnerability’. To date there are no clear definitions of energy vulnerability, or discussion of the distinction between the two terms. We begin here by building a definition of energy vulnerability drawing on theory, and then complicating this with reference to work that discusses vulnerability from a lived experience standpoint.

In this paper we understand fuel poverty to be a state of being: while the precise definition of this concept is contested [14], it fundamentally captures the inability of certain households to acquire the energy services required to live a decent and healthy life. As a starting point for defining ‘energy vulnerability’, we turn to the substantial area of vulnerability research, which focuses on the potential for future harm, exploring a person, household or community’s likelihood of *exposure* to harm, *sensitivity* to that harm and *capacity* to *adapt* in response to it [13]. Research on vulnerability to climate change takes a similar starting point [12]. If we build on this work for the concept of energy vulnerability this translates to: the likelihood of a household being subject to fuel poverty, the sensitivity of that household to fuel poverty, and the capacity that household has to adapt to changes in fuel poverty. Given the dynamic nature of all three of these concepts, it is likely that the energy vulnerability of a given entity (household/individual/community) is subject to change over time. Finally, such an analysis of energy vulnerability suggests that different

Table 1

Spiers’s attributes of emic vulnerability and their application in an energy vulnerability context [11, quotations from p. 719].

Spiers’s attributes of emic vulnerability	Definitions	Application to energy vulnerability
<i>Integrity</i>	“the person’s sense of soundness in the various dimensions of her or his life.”	The ability to keep warm/cool and therefore live a decent life.
<i>Challenge</i>	“Vulnerability is experienced when there is a perceived challenge to integrity with a corresponding uncertainty about the ability to respond adequately.”	Anything that challenges a household’s ability to keep warm/cool.
<i>Capacity for action</i>	“Capacity for action refers to the individual’s perceived ability to withstand, integrate or cope with the challenge.”	How a household copes with (and perceives itself coping with) the challenges to its ability to keep warm/cool.
<i>Multi-dimensionality</i>	“the fact that vulnerability varies from one person to another and from one experience to another”	The fact that energy vulnerability is experienced differently by different people in different circumstances.
<i>Power</i>	“the extent to which a challenge directs or constrains action, and the extent to which the person perceives the potential for change”	The extent to which challenges allow a household to act to avoid energy vulnerability, and the household’s perception of their own agency on energy matters.

households will hold different degrees of vulnerability, according to their exposure, sensitivity and adaptive capacity.

Some aspects of this theoretical characterisation of energy vulnerability have been discussed by fuel poverty scholars, albeit using different terminology. *Exposure* to fuel poverty, in particular, has been repeatedly characterised by scholars. Boardman’s widely accepted categorisation lists the ‘determinants’ of fuel poverty as household income, cost of fuel, and the energy efficiency of the dwelling [15]. Changes in exposure to these three determinants will affect a household’s energy vulnerability. There have also been some attempts to capture variation in fuel poverty between households. Both the UK government’s ‘fuel poverty gap’ [2] and Walker et al.’s typology of fuel poverty by percentage of salary spent on fuel [16] describe financial variations between households. In all of these examples, fuel poverty is understood in categories relevant to experts and policy, rather than by looking at the experiences of the fuel poor themselves.

A definition of energy vulnerability built from theory feels rather unsatisfactory, particularly to a qualitative researcher. The concepts fail to take into account the complexity of the lived experience of fuel poverty and energy vulnerability. In order to address this, we engage a more bottom-up approach to defining vulnerability. In looking for bottom-up approaches to vulnerability we came across Spiers’s work on vulnerability in a nursing context. Spiers identifies a set of five attributes that relate to an ‘emic’ understanding of vulnerability, meaning “the description of the phenomena as understood by the person” [11, p. 716]. Spiers’s attributes are summarised in Table 1, together with an interpretation of those attributes in an energy context. While Spiers’s starting point is vulnerability in an unrelated field (nursing), translating her approach into energy vulnerability is highly valuable because it allows us to begin to define this based on the lived experience of the fuel poor: i.e. from the bottom-up.

Spiers's work also opens up the potential to theorise around what it means to be vulnerable, which is particularly useful in qualitative research. Much of the more quantitative work on vulnerability tends to focus around defining who is vulnerable and who is not, often based on demographic or geographic characteristics determined from the top down [13]. In fuel poverty research, there is also a long tradition of interest in subjective measures of fuel poverty (whether people feel like they are experiencing fuel poverty) which to some extent allows people to report their own experience [17]. More qualitative work attempts to explain why people are vulnerable, in particular, how their vulnerability is constructed by their life situation [4]. Establishing who is in most need of help, and why and where that help is needed, is critical to addressing problems of vulnerability.

2.2. The lived experience

So what do we already know about the attributes of vulnerability identified by Spiers in the context of work on the lived experience of fuel poverty? There is limited qualitative research on the lived experience of fuel poverty or energy vulnerability. By qualitative here, we mean studies that draw on data gathered in a relatively unstructured way allowing research participants to contribute their own categories and ideas to the research (we have excluded survey data from our analysis). We have identified a handful of publications that fit this description [3–9]. In the following paragraphs we use the attributes of vulnerability identified by Spiers (*ibid*) to summarise the existing work on the lived experience of fuel poverty/energy vulnerability.

Anderson et al. have drawn attention to the *challenges* that fuel poor households face, particularly low-income fuel poor households for whom rising energy costs are a pertinent threat [7]. In research conducted in 2009, they found that:

“Households who cannot afford to heat their homes adequately endure the winter months as best they can, using their heating intermittently or only when it is most needed, limiting their domestic lives to only one or two rooms, and wrapping up in extra clothes and blankets. All too often, life becomes a misery, physical health problems worsen and social isolation is exacerbated.” (*ibid.* p. 50)

It is clear then that fuel poverty poses a substantial challenge to households' *integrity*, affecting both the direct (keeping warm) and associated (keeping healthy) aspects of quality of life. The authors also note that in 2009 low income households in the UK are being forced to continually renegotiate their understanding of the boundaries between essential and desirable goods and services.

Harrington et al.'s earlier investigation into the UK's Warm Home scheme suggested that there were four main responses to fuel poverty in evidence [3]:

“a majority who keep warm by depriving themselves in other ways; those forced to economise on fuel on account of extreme poverty; a small minority who economised on fuel in order to be able to afford other activities; and those who cannot stay warm despite substantial fuel expenditure because of the heating inefficiency of their home” (*ibid.*, p. 266).

Gibbons and Singler find (in a subsequent review paper covering sources from a similar time period) that more drastic actions are being taken, including: juggling any household costs with a degree of variability (food, fuel) in order to cover regular overheads, rationing fuel consumption, and increasing indebtedness [18]. These actions are indicative of the fuel poor's *capacity for action* in the face of the various challenges of energy vulnerability. This

capacity seems to be fairly limited, with most actions involving a reduction in consumption that is likely to harm the household. Brunner et al.'s work in Austria would support this generalisation, as households “operate within a limited scope of action” [8].

The way households themselves conceive of fuel poverty does not always concur with the framings of the official definitions. This points to the *multi-dimensionality* of the experience of energy vulnerability. For example, recent evidence shows that young adults do not conceive of themselves as experiencing any form of energy vulnerability [9] and older people tend to distance themselves from the image of a passive victim unable to cope with the cold [5]. Likewise other groups in society (long-term unemployed, single parents) who receive government support but remain trapped in fuel poverty are more likely to be stigmatised as ‘undeserving’. In research on the experience of poverty in the UK, Shildrick et al. have found that the poor tend to interpret their own lives through these stigmatising lenses [19]. It also seems that interpretations of basic ‘needs’ [20] and notions of the acceptability of coping behaviour [5,21] are likely to be embedded in households experiences of, and responses to, fuel poverty. As such, the day-to-day experience of living in fuel poverty is characterised by people's understandings of themselves, and what is appropriate for them in their social context. This experience has implications for vulnerability: for example, fuel poor households might be more or less acknowledged as having a right to government support [22], which in turn impacts on their future vulnerability.

Less is said about the *power* of the individual to act to reduce their vulnerability. Work by Brown and Walker on residents of a nursing home and their exposure to heat is a notable exception here:

“When hot weather arrives, residents are reliant upon the nursing staff to carry out all of the preventative measures, not because they are physically incapable of doing it for themselves, but because this is what usually happens.” ([4], p. 369)

Intriguingly power here stems from the residents' perceptions of their own agency. Residents do not feel like they have the *capacity for action* and as a result they do not have the *power* to act. There will also be instances in which power to change circumstances is not present for more explicitly structural reasons (e.g. landlords unwilling to invest in energy efficiency, the general increase in energy prices).

While research directly in this area is limited, it should be noted that bottom-up understandings of energy are widely valued: for instance there is a recognition that households' understandings are often different from those of experts [23,24] and that people can behave very differently in identical buildings [25] and therefore that their energy requirements and needs might vary considerably.

2.3. Critiques of vulnerability

Discussions about power and vulnerability are important, as they allow us to address the various critiques of vulnerability and the broader literature on resilience. Incorporating bottom-up understandings of vulnerability could mask political attempts to disengage from a fair and reasonable treatment of vulnerable people. Households' interpretations of their own vulnerability are dependent on their understanding of what is socially acceptable. As such, bottom-up interpretations may underestimate structurally produced vulnerability due to high levels of perceived and actual coping capacity among individuals and communities even in straightened circumstances:

“The deprived people tend to come to terms with their deprivation because of the sheer necessity of survival, and they may, as

a result, (...) adjust their desires and expectations to what they unambitiously see as feasible” ([26], p. 62)

The broader political critique of work on resilience maintains that the discourse of resilience represents a neo-liberal strategy to encourage subjects to accept, and indeed take responsibility for, the dangers of modern life, and to rely more on their own resources than on those of governments to address the resulting stresses [27,28]. Further, by encouraging a rather passive subjectivity in relation to vulnerability *challenges*, these are further depoliticised, and any form of resistance is rendered less likely (ibid.).

On the one hand such critiques make it rather difficult to use the term vulnerability in relation to energy. Our objective here, in building theory around empirical work with the fuel poor, is to help to uncover the structural inequalities that affect our respondents rather than to reinforce them further. On the other hand, through our empirical work we concur with Spiers’s concept of *multi-dimensionality*, and advocate a more nuanced approach to understanding these experiences, given the diversity reflected in our data. Further, Spiers’s introduction of the concept of *power*, which confronts the issue of households’ agency regarding energy, politicises the concept of vulnerability somewhat. The rest of the paper should be read with this in mind, in particular, we start with a similar understanding of poverty as that outlined by Béné et al.:

“the chronic poor are (by definition) very resilient . . . clearly what these chronic poor need is not more resilience, but less poverty and less marginalisation” [29]

In summary then, we aim to construct a bottom-up understanding of energy vulnerability drawing on the lived experience of our respondents. In doing so we start with the ontological premise of *multi-dimensionality* (recognising that people experience vulnerability in different ways) while also wanting to construct means by which the most vulnerable can be identified, and their condition alleviated. To that end we draw two key questions from our review of the literature:

- Can we construct a bottom-up understanding of energy vulnerability, in particular to answer the question ‘what are people vulnerable to’?
- How might such an understanding translate into a means of identifying and alleviating the conditions of the energy vulnerable?

3. Methods

The research consisted of 17 in-depth interviews with representatives of 15 households. The first cohort ($n=7$) were interviewed in 2010, and the second ($n=10$, including 2 from the first cohort) in 2013. Interviews lasted on average an hour, and focused on the participants’ use of energy over time, experiences of fuel poverty, and (for the second cohort) the experience of policies that have been introduced since the Conservative/Liberal Democrat coalition government took office in 2010. Socio-economic data were compiled using a short survey.

Households were recruited for diversity through housing associations and health workers, who were asked to recommend respondents that they suspected to be experiencing fuel poverty. As a result, most of our respondents were living in social housing. See Table 2 for an overview of the sample’s demographic details. The maximum percentage of income that people spent on their fuel bills is given in Table 2 as an approximate indicator of levels of fuel poverty among our sample. We recognise that this is not an entirely reliable method of calculating fuel poverty, but this is the best data that was available from our respondents. Purposive sampling was used to ensure a diverse range of family types, for instance housing

associations were asked to refer respondents with specific profiles (e.g. single persons, families, multiple adult households). We also set out to collect a geographically variable sample, so as to allow us to control for variation across administrative boundaries and climates.

Semi-structured interviews were recorded and transcribed before being analysed thematically using Nvivo software. By ‘focussing on identifiable themes and patterns of living and/or behaviour’ [30], participants’ energy experiences, beyond their immediate energy consumption, were described and then analysed within the context of the existing fuel poverty literature and policies. For example, transcripts were scrutinised for evidence of energy vulnerability and coping strategies in the same way that sensitising concepts are used to guide inductive reasoning in grounded theory [31]. The emergent factors were then grouped into six challenges to household energy vulnerability.

A full ethical review was conducted before the data collection for the project took place. The main ethical issues were connected with the sensitivity of information discussed with participants, which could be construed as an invasion of privacy, and the payment of a small incentive for each interviewee involved in the research. All respondents have been given pseudonyms.

4. Key challenges to energy vulnerability for the fuel poor

In our interviews it was clear that the energy vulnerability of a household linked to six challenges: quality of dwelling fabric; tenancy relations; energy costs and supply; stability of household income; social relations in and out of household; and ill health. Each is by no means independent of the others and understanding their interactions may prove pivotal for tackling energy vulnerability. These six challenges are responsible for impeding or empowering the agency of the fuel poor; trapping households in their current state of deprivation and leaving them vulnerable to future shocks, or facilitating a pathway out of fuel poverty. Here we discuss each of the challenges in turn, with examples from our data.

4.1. Quality of dwelling fabric

As noted by Boardman [15], energy inefficiency is a primary cause of fuel poverty, thus any improvements in energy efficiency can reduce fuel costs and increase comfort. Of the households interviewed, six described their dwelling’s level of efficiency as inadequate and/or deteriorating while five said theirs was adequate or had improved in recent times. As a result of poor efficiency, some of our sample had made their own attempts to improve things:

“You get so much of a draft coming through the front door there. When it’s cold I have to stuff those socks into the letterbox. I’ve tried sticking some draft excluder around the lot of it. Across the bottom I usually have a rolled up blanket.” (John)

But most respondents acknowledged that without sufficient funds, technical information and control over their dwelling they could not make any significant or lasting improvement. Therefore, with a static or deteriorating level of thermal efficiency some households’ level of comfort and warmth is at the mercy of the climate, as John put it “During the winter I have to wear a coat, it never warms up in here.”

For those households where investment in energy efficiency was forthcoming, improvements lead to greater comfort at home and an increase in disposable income, in effect giving them more flexibility and control over their energy consumption practices. Very little room for agency on behalf of tenants was evident in this regard with Barbara and John being the only individuals personally

Table 2
Key demographic features of the sample.

Participant	Age	Household composition	Employment	Household income (monthly)	Maximum % of income spent on fuel bills	Interview date	Location
Alex	40–49	1 adult	Unemployed (incapacity)	Not available	Not available	2013	Edinburgh
Barbara	50–59	2 adults, 2 children	Foster carer	£2500	14%	2010/2013	Wakefield
Duncan	50–59	1 adult	Unemployed (incapacity)	£636	13%	2013	Dunbar
Jan	60–69	1 adult, 1 child	Part time Clairvoyant	£720	17%	2013	Leeds
Jane	40–49	1 adult, 2 children	Mother (incapacity)	£1280	13%	2010	London
John	50–59	1 adult	Unemployed (incapacity)	£480	25%	2013	Leominster
Kate	20–29	2 adults, 3 children	Mother	£1600	3%	2010	Kent
Kelly	30–39	1 adult, 2 children	Mother	£600	50%	2013	Bradford
Louise	30–39	1 adult, 2 children	Mother	£770	20%	2013	Bradford
Maureen	40–49	3 adults, 1 child	Mother	£870	37%	2013	Bradford
Mildred	60–69	2 adults	Retired	£1450	5%	2010/2013	Edinburgh
Mohammed	50–59	1 adult	Unemployed	£360	14%	2010	Edinburgh
Sally	40–49	2 adults, 4 children	Full time Cleaning Supervisor	£850	24%	2010	Leeds
Sarah	30–39	1 adult, 5 children	Volunteer and mother	£1110	7%	2010	Kent
Steve	40–49	1 adult, 2 children	Unemployed (incapacity)	£700	24%	2013	Birmingham

responsible for nominal efficiency gains (in the form of new appliances). Typically it was social housing providers (through their own initiatives or via government policies such as the Energy Company Obligation) that introduced lasting infrastructural improvements. Most of our respondents would not consider borrowing money to increase energy efficiency (as required by the Green Deal) with debt seen as a last resort.

4.2. Tenancy relations

Investment in energy efficiency was to a large extent mediated by households' tenancy situation. Some respondents benefitted from their landlords' investments in the property while others were left at an impasse. For our two interviewees in the private rental sector (Barbara and John) this was as a result of split incentives and uncertainty around tenancy duration:

"Yeah, there is some nervousness with private landlords. The permanency of the tenants and being left for long periods of time without any income from the properties. He didn't want to spend money on the place and then be left with it not bringing in any income." (Barbara)

The same fear of impermanence affects tenant coping behaviour as John pointed out when asked whether he would consider using Green Deal finance to install much needed insulation:

"Uh... no because my tenancy is only on a roll over and they can kick me out anytime they want." (John)

There was also some evidence of social housing providers taking into account tenancy duration:

"Any improvements or adaptations, they will do it but you have to be expected to stay in the property for five years..." (Steve)

In social housing, some interviewees found their housing providers to be pro-active, (fitting insulation, central heating, double glazing, etc.) while others failed to react to complaints about damp, cold and old appliances. In Sally's case this was partly due to the fabric of the building, which was an unusual construction with a wall made out of PVC at the front providing very limited protection against the cold. Her situation was not helped by a highly inefficient 40 year old boiler, which was overdue replacement. Where landlords took a positive approach to energy efficiency, this was not necessarily enough to prevent fuel poverty biting, but it did make it easier for less vulnerable households to function. For instance, while both Mildred and Mohammed lived in the same well maintained housing block in Edinburgh, Mildred was able to afford to heat the house comfortably, while Mohammed was not.

The wealthiest of our interviewees, Barbara, moved out of an energy inefficient social housing property and into a smaller privately rented property. While she would have preferred to remain in social housing, her move amounted to relocating out of fuel poverty by downsizing. Her reaction to moving into her first inefficient social housing property is interesting because it shows the limits of control that a household has over energy efficiency issues:

"When I first moved in to the house, because it was so much bigger than the other house, and when I first moved in it were like oh my God, look at the size of that bill, what the hell have we been doing? Massive tightening of belts and, you know, everything went to energy-saving bulbs, and like... oh my God what have I done?" (Barbara)

Barbara was both energy aware, and well resourced, but even so, it was difficult for her to exercise agency as a tenant given that there was no way of predicting that her new house would be so dramatically different to previous dwellings. Other interviewees' choices were framed by the availability of social housing. Steve, for instance, was desperate to get out of his flat in a run-down tower block:

Interviewer: "So you're not looking at staying here for five years then?"

Steve: "We haven't been looking at staying here five minutes!"

4.3. Energy costs and supply

The UK energy market is a privatised one, which is characterised by six big energy companies, who offer a wide range of different charges per kWh according to the tariff the customer signs up to, the means of payment and the type of metre they use. Price charged per kWh is decisive in determining levels of fuel poverty but so too is the method of payment and availability of cheaper alternatives. Due to a combination of poor credit history, lack of information and reluctance to engage with the market, many households remained on uncompetitive tariffs. For some, switching suppliers was an unpredictable process yielding minimal reward:

"The reason why I never shop about between different companies is because sometimes it can be quite expensive to transfer from one place to another place and when you're on benefits you tend to just stick with what you've got." (Duncan)

Such scepticism was seemingly vindicated by Barbara's experience of trying to switch energy suppliers, during which she encountered numerous difficulties. The second supplier offered her a rate that was less than half that of the first, evidence of the

exposure that people have to unscrupulous rates. Due to miscommunication, both companies ended up charging her for the same energy supply, and she is now both engaged in a long-running dispute, and back in fuel poverty due to paying two bills at once. Barbara's account is particularly illustrative of how even relatively wealthy households can come up against structural barriers which exacerbate their situation and discourage future efforts.

While some of our respondents were explicitly restricted to uncompetitive tariffs and pre-payment metres due to debt problems (it is not possible to switch suppliers if you owe over a certain amount to your current supplier), most favoured pre-payment using a card metre in any case. Despite its relative overpricing (pre-payment attracts a higher cost per kWh than direct debit payments), respondents found that pre-payment makes energy use more conspicuous, thereby enabling real-time budgeting:

“Well I'm on a pay as you go meter so . . . if you're on not much of an income it makes it much easier to know what you've got each week and not get in debt.” (John)

For some, this made coping with high fuel needs in the winter, when their income remained constant, rather difficult (Maureen, Louise, and Kelly). Others deliberately overpaid in the summer (Mildred and Jane) as a means of ensuring that winter months are not too hard. Paying by direct debit (monthly) was also problematic. There was evidence of energy companies allowing new customers to set up direct debits and get into debt, before placing them on restrictive and overpriced pre-payment metres. As Jan recalled: “They shouldn't have let me get into that debt. It were £2000 and odd before they even said.” Alex seemed to be in the first phase of this process, seeing energy bills as a cheap form of debt:

“Because I get direct debit I don't really have to worry about, I may be getting a wee bit into debt but they just take a bit off each month. If I had 'nay had that, and had the [pre-payment] power cards I would have had to have just put a jumper on. So I think direct debit is the answer because you don't have to worry too much.” (Alex)

4.4. Stability of household income

Most of our respondents were either reliant on state benefits (disability living allowance and/or job-seekers allowance) or on low-wage jobs, both of which made energy bills a substantial part of their living costs, and any reduction in income problematic. Most noticeable in our interviews was the reaction to benefits reform introduced by both the New Labour administration and the more recent coalition government. For example, when incapacity benefits were reassessed under New Labour it was disastrous for some:

“They stopped my money from November until April so we were basically just living on child benefits and the odd crisis loan of £20.” (Steve)

Others feared the destabilising effect of cuts to public services and caps on benefits: “on £71 a week they are all shouting about these 'scroungers' but you can't even live! You don't live!” (Jan). The ability of such reforms to destabilise household budgets was illustrated by Alex's thoughts on the proposed Universal Credit system (where all benefits will be paid direct to the claimant on a monthly basis, instead of weekly as at present):

“I would spend it. If I haven't got control of my drinking and my anxiety I could take a relapse.” (Alex)

Both Louise and Kelly were being shielded from the impact of the under-occupancy charge introduced by the coalition government (where housing benefit is reduced for those living in social

housing with a spare bedroom). Their social housing provider had recognised that they were unable to afford the extra £15 a month, and had exempted them, subject to review. While this might seem a small amount, it made up a considerable part of their expendable income and both dreaded losing their exemption.

4.5. Social relations

Social relations within the home had a substantial impact on both household priorities and on what was and was not considered negotiable. Adult household members would regularly adjust their own consumption and daily practices in order to secure that of their dependents:

Interviewer: “Do you have the central heating on much?”

Steve: “Not these past weeks but yeah, whenever the kids are in. If I'm in on my own I just wear a hat.”

For others, electricity-hungry entertainment was both less negotiable, and a source of tension within households. As Sally explained:

“It's a bit harder with them like the Playstation . . . it does my head in. You know, they are on it and there's not a lot I can do about that . . . I do 7 days so to be honest most of the time I'm not here. And if I says to them you can only go on 't Playstation three hours a day I'm wasting me breath.” (Sally)

While Sally has a very low income, she also has limited control over her children's choices, and recognises that in any case, depriving her children of entertainment in the home would be unfair given that there is no money for entertainment outside the home. Households with teenagers had the double bind of their children wanting the latest technology to fit in with their peers, and relying on this energy intensive technology for their social lives (Sally, Kelly, Louise).

There was also some evidence of financial support between family members outside the household that impacted on energy consumption. Kelly, for instance, regularly borrowed money from her mum in the winter. Conversely, Maureen's four grown up children and their families were often at her house, reducing their own heating costs, and she did some washing and drying for one of her daughters. In return, at her lowest financial ebb, she borrowed money to pay for heating the house from her grown up daughter, something which Steve also had to do when his young daughter received money from relatives at Christmas.

4.6. Ill health

The negative health impacts of fuel poverty are well documented in the wider literature but it is important to note how ailing health is not just an effect but also a cause of fuel poverty. Certain conditions require an increase in fuel consumption to treat symptoms and maintain adequate comfort and warmth, thereby driving up household energy costs:

“My husband's health has got worse. So we spend a lot in the winter with him being housebound and the heating being on 24/7.” (Mildred)

Other conditions are exacerbated by the cold or heat. Within this cohort health problems lay at the intersection of several public and private services and were sometimes not being resolved as a result. A story from Duncan exemplifies this complexity:

“When we first moved here we were told we were going to get new bathrooms put in. And I moved in on the pretence that I was going to get a shower because sometimes I have to wash

myself two or three times a day. . . I don't know how far down the road the council is with getting this sorted." (Duncan)

While it is clear from Duncan's case that recognition that someone suffers from ill-health is in itself not enough, others in our sample were unable to secure formal recognition that their health condition merited help. Kelly's teenage son, for instance, who suffered from Reynaud's syndrome, a condition which requires him to keep warm, was not registered disabled, but still had extensive energy needs.

5. Discussion

We have outlined six key challenges to the integrity of fuel poor households, in other words, key *challenges* to their energy vulnerability. These are not particularly new to those researching and working in the area, but they do represent a more comprehensive bottom-up reframing of the top-down perspective. For instance, while household income has long been recognised as a factor in determining fuel poverty [15], the fuel poor in our sample are more concerned about the stability of that income, particularly in the light of recent benefits reform. Interestingly, the *stability of household income* is a more dynamic conception of the relationship between income and fuel poverty, and therefore more appropriate to the concept of energy vulnerability. Our six challenges also reflect a more general broadening of theory noted in the literature:

"we are witnessing a conceptual shift in the mainstream theorization of domestic energy deprivation, away from the present narrow focus on poverty, access and energy efficiency, onto more complex and nuanced issues of household needs, built environment flexibility and social resilience" ([32], p. 11)

In Table 3 we attempt a more directed analysis of our data as a bottom-up account of vulnerability, using the concepts identified by Spiers in Table 1 [11]. Here the *challenge* column summarises the six challenges we uncovered in the previous section. The *capacity for action* column shows the range of measures people take to cope with each of the challenges. The *power* column exposes who has the agency to counteract each challenge. Finally the *multi-dimensionality* column shows the variation of capacity and power within the sample. As an exercise here, we deliberately looked for difference (multi-dimensionality) in constructing the whole table. The *capacity for action* column in particular attempts to outline both capacity to reduce vulnerability, and circumstances which impede this.

Table 3 is useful first as a summary of our findings. It is also revealing of some intriguing patterns. For instance, in the *power* column many of the vulnerability-reducing actions implied here do not involve isolated household action; instead they rely on state services or social relationships. For instance, those suffering ill health can be protected from energy vulnerability by increased entitlement to benefits or other services. Those with good social networks can also be protected from energy vulnerability by exchanging energy services with friends and family in times of need. This analysis points to the need to understand household energy vulnerability as embedded in a larger social system. Further austerity measures or loss of social capital, for instance, are likely to increase vulnerability. Such considerations provide a broader, more politically and socially sensitive reading than just focussing on fuel poverty as a function of household income and efficiency relative to energy costs.

In the interviews, we had a sense that our respondents were trying their hardest to live within straightened means, which often meant going without energy services. We also had the sense that these efforts were frequently confounded by structural barriers

(see Table 3). In particular a reading of both the columns on *capacity for action* and *power* suggests that our respondents have very limited power to face the six challenges. Our respondents' degree of energy vulnerability here comes from their lack of agency, which is connected to a series of concurrent institutions (e.g. benefits system, housing providers, housing stock, energy market). These institutions, and the organisations through which they are enacted, are indeed addressing issues relating to energy vulnerability (whether directly or indirectly) but our findings suggest that individual households are not benefiting from these measures and in fact are often constrained by them. This situation is no doubt aggravated by recent UK austerity policy, which has reduced and destabilised household incomes and failed to provide any meaningful investment in energy efficiency [33,34].

On the other hand, there is considerable variation in the experience of fuel poverty, reflected in the column on *multi-dimensionality*. While many of our key challenges to energy vulnerability are disproportionately present among the poorest in society, and our sample was largely made up of this demographic, not everyone experiences energy vulnerability in the same way. This suggests that there is something particular about energy vulnerability, which is reflected in the interrelatedness of these key challenges. Specifically, vulnerable households face a combination of more intense and non-negotiable energy needs as well as a lack of social and/or financial capital. For example, our respondent John faces all of the challenges we outline above, and as such is highly susceptible to knock-on effects or vicious cycles. Any change in circumstances will hit households like John's the hardest, even if they are currently managing to get by. The precise dynamic of these relationships is as yet unclear. Understanding the magnitude and mutuality of each challenge in relation to overall vulnerability, and to each other is an important avenue for future research, particularly where trade-offs emerge and households' perceptions, preferences and coping strategies come into conflict.

The bottom-up approach to vulnerability outlined by Spiers also encourages us to account for subjective conceptualisations of fuel poverty [11]. It is clear that some of our sample perceived themselves to be better resourced than others. Some respondents presented themselves as coping despite hard times. Jane, for instance, was relatively sanguine about the need for her family to go to bed early on a winter's evening to keep warm. Others were acutely aware of their own vulnerability, pointing out that the slightest change in circumstance could leave them unable to keep the heating on (John) or to care for their dependents (Steve) or themselves (Alex). The subjective experience of fuel poverty is hugely important, because if families feel that they are not warm enough, not able to afford energy, they begin to see more extreme coping mechanisms as legitimate, which may lead to other health and social problems. Witness the prevalence of pre-payment metres as a means of energy supply for budgeting reasons. This does not make sense economically and likely results in under use of energy services due to the higher cost per kWh. Again this is a case of the challenges of 'stability of household income', and 'energy cost and supply' interacting to produce a less than desirable outcome.

Bottom-up understandings are also affected by constructions of legitimacy in wider society. Walker and Day's work on the importance of 'recognition' that someone is deserving of help is useful here [22]. Current and upcoming changes in welfare policy are likely to make a substantial difference to the energy vulnerability of many which may go unnoticed, especially as this is informed and shaped by the level of recognition afforded to different demographics within society. While due attention will likely be given to the elderly – as a result of being deemed vulnerable under mainstream understandings of fuel poverty – single person households of working age and families with children are more likely to be overlooked,

Table 3
Challenges to fuel poverty and the nature of energy vulnerability that these engender.

Challenge	Capacity for action	Power	Multi-dimensionality
Quality of dwelling fabric	Can undermine the ability to regulate temperature; Improvements can reduce costs and improve comfort.	Improvements often dependent on housing provider, tenants able to make only minimal improvements.	A minority of wealthier respondents are able to buy efficient appliances, or consider loans for Green Deal.
Tenancy relations	A series of factors impede investment: <ul style="list-style-type: none"> • Split-incentives; • Concerns about impermanence of tenancy situations (from tenant and landlord); • Condition of the building (the worse condition, the greater the challenge). 	The tenant has limited choice over tenancy relations; with energy efficiency of buildings difficult to predict, moving house a substantial expense and inconvenience, and limited choice of homes in the social housing sector.	Tenants experience a wide range of tenancy relationships, from disinterested to highly engaged landlords.
Energy costs and supply	Can trap households into high costs and debt cycles; Poor credit history can limit household choice to switch provider; Households are exposed to unscrupulous rates; Energy bills can provide emergency credit.	People do not perceive themselves as having control over energy supply, switching is seen as a risk; Pre-payment metres are seen as an easy way to budget, despite high cost of energy; While being better value, direct debit payments do not allow for budget control.	Households use energy supply mechanisms in different ways (e.g. direct debit for flexibility, pre-payment to allow reserves to build up for the winter).
Stability of household income	Reduced or unreliable income can lead households into crisis; Stability of income can provide an opportunity for autonomy and flexibility.	Changing the means by which income is paid (e.g. monthly, direct to household) can be scary and disempowering; With limited employment opportunities, households have limited power to control income.	Those reliant on benefits do not have stability of household income; While many are nevertheless in tight control of the household finances, others may be tempted to spend less wisely if freedom increases.
Social relations in and out of household	Non-negotiable needs of household members can result in unaffordable fuel bills; People with limited social relations have no one to turn to in times of hardship; Family and friends help out with fuel bills and fuel-hungry practices where they can.	Can mean the presence or absence of a safety net, or create strain within a household around practices that use energy.	Households have a wide variety of different support network arrangements, those with limited support or limited links to others are most vulnerable.
Ill health	Poses a constant threat to income security and autonomy, as well as often requiring increased energy consumption; Can be associated with increased entitlement to benefits and care and support services	It is not always clear who bears responsibility for resolving fuel-poverty related health issues as they sit at the intersection of multiple services. Not all health conditions are recognised and some do not have entitlements to fuel payments attached.	The elderly and recognised sick are best catered for, although some fail to be addressed due to the intersection of services. Those without recognised conditions are most vulnerable.

despite being the most likely demographic to be earning under the minimum income standard [35].

So how might this work allow us to better address energy vulnerability, and, concurrently, fuel poverty? A starting point would be to use the six challenges outlined above as a set of qualitative indicators with which to understand the dynamics of the problem. In order to understand energy vulnerability at a household level, for instance, we could examine the way in which each challenge impacts on a household's experience. Thinking about the six challenges in these terms would allow us to understand whether a given household is falling further into fuel poverty or is on a pathway out of it. Clearly, there are interrelations between some of these challenges, not all of which are fully understood. Further consideration of their ability to offset and influence each other is important. Additional challenges not apparent in the current research may also emerge as our qualitative understanding of fuel poverty progresses.

Reframing fuel poverty along energy vulnerability lines in this way enables a more dynamic and responsive approach. However, such an approach does not directly address the more structural challenges facing the households that we have interviewed here. It also risks falling into the trap, identified in the critical perspectives on vulnerability discussed above, of perpetuating the idea that households cause their own poverty, and thus need to find their own solutions. It is clear that much of the *power* we

identified as potentially reducing vulnerability to the six challenges is dependent on public policy. Unfortunately, while this arena continues (in the UK) to be dominated by austerity rhetoric, and whilst energy and housing markets continue to lag behind in terms of pro-social investment, the picture is unlikely to change for the fuel poor. This suggests that we need to approach bottom-up understandings of vulnerability with a critical eye. In particular, when examining bottom-up accounts of vulnerability, we need to be aware of the structural constraints they may be engendering. These include both the manifest constraints seen in austerity policy and under-regulated markets, as well as the issue of recognition raised by Walker and Day.

6. Conclusions and implications

We argue that qualitative understandings of fuel poverty yield different and revealing insights about the nature of household energy vulnerability in the UK. Such bottom-up approaches paint a broader picture of the experience of fuel poverty, which includes both new elements (social relations) and reframed understandings of older elements (the stability of household income). One of our contributions here is to offer a starting point for characterising household vulnerability, we hope that this will be taken forward by other scholars and practitioners.

It is clear from our work on key challenges to energy vulnerability that a number of social, economic and political structures shape the daily lives of the fuel poor. Understanding the lives of the fuel poor in such a structural way, should help to explain why policies are more or less successful. The Green Deal and Energy Company Obligation, for instance, are unlikely to engage households that have precarious tenancy relations (when either tenant or landlord is unwilling to 'commit' in the longer term), unstable incomes (when the household concerned conceives of debt as a strategy only for hard times, and when the household cannot guarantee a steady income to pay back debt), or other markers of vulnerability (lack of social support which makes such a financial 'risk' difficult to take; being in debt with an energy supplier). (Re)designing policy with an eye to the lived experience is likely to make it more appropriate and ultimately more successful.

Given the number of intersecting policies that influence our six challenges of energy vulnerability, constructing a policy response to a problem conceived holistically is challenging. For instance, the significant changes to state benefits in the Welfare Reform Act 2012 play a major part in destabilising household incomes. Many of our respondents were deeply concerned about housing benefit reductions, the under-occupancy charge, and Universal Credit. We would also argue that family policy (which affects social relations in and out of the household), health policy (which affects people's health and how well resourced they are in the home), and housing policy (in agreements with social housing landlords, and initiatives such as Decent Homes Standards) have a significant impact on vulnerability to fuel poverty. This suggests that the most appropriate policy response is a joined-up one, working across sectors to consider how energy vulnerability can best be addressed. Of course such cohesive responses are the most challenging to effect in government, but perhaps local authorities who have closer working relations with landlords and vulnerable neighbourhoods are well placed to take the lead on such coordinated policy planning and delivery e.g. through Joint Strategic Needs Assessments.

Finally, we would agree with Fahmy that understanding the experiences of the fuel poor: "over time at a household level is a prerequisite for enhancing the effectiveness of policies in this area" ([36], p. 8). Further qualitative, preferably longitudinal, research is needed in order to understand the changing experience of fuel poverty, with a particular emphasis on how a shifting policy and socio-economic environment affects the six challenges identified here.

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References

- [1] Office for National Statistics. Household energy consumption in England and Wales, 2005–11. London: Office for National Statistics; 2013.
- [2] Department For Energy and Climate Change. Fuel poverty report – updated August 2013; 2013. Available https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/226985/fuel_poverty_report_2013.pdf [accessed 05.09.13].
- [3] Harrington BE, Heyman B, Merleau-Ponty N, Stockton H, Ritchie N, Heyman A. Keeping warm and staying well: findings from the qualitative arm of the Warm Homes Project. *Health Soc Care Community* 2005;13:259–67.
- [4] Brown S, Walker G. Understanding heat wave vulnerability in nursing and residential homes. *Build Res Inf* 2008;36:363–72.
- [5] Hitchings R, Day R. How older people relate to the private winter warmth practices of their peers and why we should be interested. *Environ Plan Part A* 2011;43:2452.
- [6] Jenkins D, Middlemiss L, Pharoah R. A study of fuel poverty and low-carbon synergies in social housing; 2011. Available [http://www.sbe.hw.ac.uk/documents/FuelPovertyReport220711\(1\).pdf](http://www.sbe.hw.ac.uk/documents/FuelPovertyReport220711(1).pdf)
- [7] Anderson W, White V, Finney A. Coping with low incomes and cold homes. *Energy Policy* 2012;49:40–52.
- [8] Brunner K-M, Spitzer M, Christanell A. Experiencing fuel poverty, coping strategies of low-income households in Vienna/Austria. *Energy Policy* 2012;49:53–9.
- [9] Bouzarovski S, Petrova S, Kitcking M, Baldwin J. Precarious domesticities: energy vulnerability among young adults. In: Bickerstaff K, Walker G, Bulkeley H, editors. *Energy justice in a changing climate*. London: Zed Books; 2013.
- [10] Centre for Urban Resilience and Energy. *Energy vulnerability and urban transitions*. Centre for Urban Resilience and Energy, University of Manchester; 2014. Available <http://urban-energy.org/> [accessed 30.06.14].
- [11] Spiers J. New perspectives on vulnerability using emic and etic approaches. *J Adv Nurs* 2000;31:715–21.
- [12] Adger WN. Vulnerability. *Glob Environ Change* 2006;16:268–81.
- [13] Hinkel J. Indicators of vulnerability and adaptive capacity: towards a clarification of the science–policy interface. *Glob Environ Change* 2011;21:198–208.
- [14] Moore R. Definitions of fuel poverty: implications for policy. *Energy Policy* 2012;49:19–26.
- [15] Boardman B. *Fixing fuel poverty*. London: Earthscan; 2010.
- [16] Walker R, Liddell C, Mckenzie P, Morris C, Lagdon S. Fuel poverty in Northern Ireland: humanizing the plight of vulnerable households. *Energy Res Soc Sci* 2014;4:89–99.
- [17] Waddams Price C, Brazier K, Wang W. Objective and subjective measures of fuel poverty. *Energy Policy* 2012;49:33–9.
- [18] Gibbons D, Singler R. *Cold comfort: a review of coping strategies employed by households in fuel poverty*. London: Centre for Economic and Social Inclusion; 2008.
- [19] Shildrick T, Macdonald R, Webster C, Garthwaite K. *Poverty and insecurity: life in low-pay, no-pay Britain*. The Policy Press; 2013.
- [20] O'Neill T, Jinks C, Squire A. Heating is more important than food: older women's perceptions of fuel poverty. *J Hous Elder* 2006;20:95–108.
- [21] Hards SK. Status, stigma and energy practices in the home. *Local Environ* 2013;18:438–54.
- [22] Walker G, Day R. Fuel poverty as injustice: integrating distribution, recognition and procedure in the struggle for affordable warmth. *Energy Policy* 2012;49:69–75.
- [23] Stern PC. Individual and household interactions with energy systems: toward integrated understanding. *Energy Res Soc Sci* 2014;1:41–8.
- [24] Royston S. Dragon-breath and snow-melt: know-how, experience and heat flows in the home. *Energy Res Soc Sci* 2014;2:148–58.
- [25] Walker SL, Lowery D, Theobald K. Low-carbon retrofits in social housing: interaction with occupant behaviour. *Energy Res Soc Sci* 2014;2:102–14.
- [26] Sen A. *Development as freedom*. Oxford: Oxford University Press; 1999.
- [27] Evans B, Reid J. *Resilient life: the art of living dangerously*. Cambridge, UK: Polity; 2014.
- [28] Joseph J. Resilience as embedded neoliberalism: a governmentality approach. *Resilience* 2013;1:38–52.
- [29] Béné C, Newsham A, Davies M, Ulrichs M, Godfrey-Wood R. Resilience, poverty and development. *J Int Dev* 2014;598–623.
- [30] Aronson J. A pragmatic view of thematic analysis. *Qual Rep* 1994;2:1–3.
- [31] Bowen G. Grounded theory and sensitizing concepts. *Int J Qual Methods* 2006;5:12–23.
- [32] Bouzarovski S. Energy poverty in the European Union: landscapes of vulnerability. *Wiley Interdiscip Rev Energy Environ* 2014;276–89.
- [33] Jordan B. The low road to basic income: tax–benefit integration in the UK. *J Soc Policy* 2012;41:1–17.
- [34] Guertler P. Can the Green Deal be fair too? Exploring new possibilities for alleviating fuel poverty. *Energy Policy* 2012;49:91–7.
- [35] Padley M, Hirsch D. Households Below a Minimum Income Standard: 2008/9 to 2010/11; 2013, online. Available from World Wide Web: <http://www.jrf.org.uk/sites/files/jrf/household-income-standards-full.pdf> [sccessed 04/11/2013].
- [36] Fahmy E. The Definition and Measurement of Fuel Poverty; 2011, online. Available from World Wide Web: <http://www.consumerfocus.org.uk/files/2011/06/The-definition-and-measurement-of-fuel-poverty-Dr-Eldin-Fahmy.pdf> [accessed 12/06/2013].