Walking with energy: Increasing energy visibility through research participation

AMBROSE, Aimee <http://orcid.org/0000-0002-5898-6314>

Published version

AMBROSE, Aimee (2019). Walking with energy: Increasing energy visibility through research participation. Eceee Summer Study Proceedings, 2019-J, 83-92.

Walking with Energy: increasing energy visibility through research participation

Dr Aimee Ambrose
Reader in Energy Policy
The Centre for Regional Economic and Social Research
Sheffield Hallam University
Howard Street
Sheffield
S1 1WB
United Kingdom
a.ambrose@shu.ac.uk

Keywords

district heating, qualitative study, citizens

Abstract

Our contemporary relationship with energy is characterised by complete dependency and almost complete ignorance. The Walking with Energy project draws on oral history and walking interviews to offer an innovative method of (re)engaging the public in debates and decisions regarding energy production and consumption. This paper makes the case for this new approach and discusses the results of a pilot of the method undertaken in the UK in 2018 involving 15 members of the public.

Introduction

Since reticulated gas and/or electricity have been readily available in our homes and workplaces and we have stopped burning solid fuels as our main method of home heating, energy has arguably become taken for granted and perhaps even invisible in our daily lives. In the UK at least, we don't know and are not consulted on where our energy comes from in terms of how (and from what) it is generated and distributed and therefore lack the basic knowledge required to make an assessment of the ethical, environmental and economic implications of the choices made on our behalves. Energy is something that is therefore 'done to us' and our contemporary relationship with energy is one characterised by complete dependency and almost complete ignorance.

This paper provides an account of an event which took place in November 2018 in Sheffield, UK, which aimed to pilot a new and creative approach to (re)engaging members of the general public with key debates around energy generation and promoting greater environmental citizenship. The event was held as part of a national programme of popular science events known as the Festival of Social Science. The event used the case study of Energy from Waste (EfW) as a fairly controversial energy generation and waste management approach to assess the potential of participative research methods to reconnect the public with debates around energy generation thus eroding so-called energy invisibility. The event involved taking 15 members of the public on a walking tour of Sheffield City Centre which followed the route of the district heating pipeline to its source at the Energy from Waste facility (or incinerator) and taking a guided tour of the facility led by the plant manager.

This paper comprises of five sections in addition to this one. The Background section sets out the rationale for the project and introduces the issue of energy invisibility. The Literature Review then situates this debate in the context of several relevant bodies of literature including those concerned with citizen engagement with energy issues and decision making and those relating to participative research methods and how they might contribute to increased citizen engagement. The Methods section then sets out how insights from the literature review have informed the development of the Walking with Energy method piloted during the event. The data gathered during and after the tour is reported in the Findings section and the paper concludes with a discussion of the findings and some concluding thoughts about the potential for research participation to a play a role in overcoming energy invisibility.

Background

Cities face challenges to rapidly decarbonise and the engagement of citizens is critical in this respect, with domestic energy use an increasingly urgent priority (households account for 28 % of total energy consumption in the UK according to BEIS, 2018). Yet, our relationship with our own domestic energy consumption has been said to suffer from a 'double invisibility' as it can no longer be seen nor connected to everyday actions (Burgess and Nye, 2008, Hargreaves et al, 2010). This invisibility distances us from our consumption and the associated environmental, ethical and financial consequences. This represents a particular problem in the context of the increasingly urgent pressure on citizens to make more conscientious decisions about our consumption. Heat is a particular concern as, since we stopped burning solid fuels in the home as a primary form of heating, it has become almost entirely invisible to us yet estimates suggest it accounts for as much as 78 % of all non-transport related energy consumption in the UK (DECC, 2013).

The problem of energy invisibility in a domestic context has, to date, only been considered in relation to the potential of feedback technology (i.e. In Home Displays (IHDs) linked to Smart Meters) to reconnect us with our consumption (Burgess and Nye, 2008, Hargreaves et al, 2010). The literature on household responses to Smart Meters paints a variable picture of the effectiveness of this most prevalent of feedback technology in reducing domestic energy consumption. In Sweden, Vassileva and Campillo (2016)[1] found that the consumption information available through Smart Meters was not sufficiently detailed to allow users to reduce their energy consumption. Buchanan et al. (2016)[2] studied the British public's perception of smart meters and reported numerous barriers including "loss of autonomy/control, privacy concerns, and mistrust towards … energy suppliers and concerns about how it would affect their … daily lives". Other studies such as Wallenborn et al. (2011) contend that households already engaged in energy saving are the most likely to engage with feedback technology. Given the variability of the evidence on the effectiveness of feedback technology and the public mistrust identified, it appears we cannot rely on them alone to reconnect us with our energy consumption.

Research from around the developed world provides evidence regarding our lost connection with energy. Research by Goodchild et al (2017) conducted in the UK established that those who have lived through the transition from open fires to central heating felt that their own heuristic introduction to the management of household heating (handling and rationing solid fuel, building and maintaining fires) was far removed from that of their own children who are detached from the practices and costs of warming the home. Moreover, research by Sherriff et al (2019) undertaken in Australia revealed how citizens have lost touch with simple, low energy practices for managing the effects of extreme temperatures. For example, where in the past residents would have opened the windows, slept on the lawn, painted roofs white etc. to cope with the heat; they now relied on air conditioning to keep them cool and struggled when it was unavailable. These studies alone highlight a series of risks associated with the disconnect between several generations and their energy consumption at a time when energy is more precious and controversial than ever before. They reveal that we demand heat and cool as we need it with little or no consideration for the resource implications and with little or no awareness of how it is being generated and the associated ethical, environmental and economic implications.

In essence, our contemporary relationship with energy is characterised by complete dependency and almost complete ignorance. We are disengaged from decisions about how energy is generated in terms of modes of generation and types of fuel, engendering a sense that energy related decisions are something decided on our behalf by unseen 'experts' (Becker et al,2017). This detachment, it has been argued, can breed mistrust in relation to energy providers and controversy around energy projects (Corsini et al. 2018).

The project with which this paper is concerned has been developed in recognition of the need to consider the existence of energy invisibility within the domestic sphere, its consequences and means of promoting a reconnection between households and their energy consumption that extends beyond the technological realm. It focuses, in particular, on home heating as one of the most prominent and carbon intensive energy uses in our daily lives, particularly in Northern Europe. This project aims to use first hand encounters to help (re)connect urban citizens with energy, raising their awareness of the consequences of their energy consumption, promoting greater environmental citizenship and (re)engaging them with the debates surrounding future energy policy through an innovative act of research participation itself. To this end, we have developed a creative methodology called Walking with Energy which brings urban citizens face to face with energy generation processes. The methodology also offers the potential to help us better understand the processes through which energy has become so invisible in our lives.

Literature review

Several bodies of literature are relevant to the focus of this paper, namely those relating to the increasingly invisible or 'taken for granted' nature of energy in our everyday lives; public or citizen engagement with energy issues and decisions (including the concepts of energy democracy and energy publics) and why it is important; participative research methods- particularly so-called mobile methodologies and how they might contribute to citizen engagement. A number of sources which highlight our changing and increasingly distant relationship with processes of energy generation are discussed above in the Background section of this paper, therefore the remainder of this section focusses on exploring the two key questions of why it is important to involve citizens in decisions about how and where energy is generated and how research participation might contribute to this.

In much of Europe, citizen involvement is an established paradigm within public policy making and implementation representing the "gold standard" for decision-making (Felt and Fochler, 2008) as well as being seen as a crucial determinant of

1. Vassileva, I. and Campillo, J. (2016) Consumers' Perspective on Full-Scale Adoption of Smart Meters: A Case Study in Västerås, Sweden. *Resources*, 5, 1–18, https://doi.org/10.3390/resources5010003.

2. Buchanan, K., Banks, N., Preston, I., Russo, R. The British public's perception of the UK smart metering initiative: Threats and opportunities. *Energy Policy*, 91, 87–97, https://doi.org/10.1016/j.enpol.2016.01.003.

energy futures (Owens and Driffill, 2008). Such involvement is pursued on the basis of accepted beliefs that it will achieve lower costs, fewer delays and reduce scope for controversy when a policy is implemented (Department of Trade and Industry, 2007; Corsini et al. 2018, Owens and Driffill, 2008). Fostering community support for any given policy or proposal can also be seen as means of legitimising decisions (Beierle and Konisky, 2000) and making them more "socially robust" or socially responsible (Beierle, 1999). Although these rationales are persuasive and accepted, a number of studies suggest that they are not always meaningfully observed. The work of Cotton and Devine-Wright (2012) provides an example of this in an energy context through their study of rhetoric and reality in how electricity network operators approach public engagement in decisions about network development and the siting of significant infrastructure. They conclude that network operators adopt the rhetoric of deliberative engagement whilst failing to incorporate citizen perspectives into long term planning and specific infrastructure siting proposals and that the substantive engagement that does take place is "downstream" in the decision making process where there is less scope for influence. This approach, they argue, is in opposition to calls from the academic and policy communities to bring public involvement "upstream" where it can be more meaningful (Wilsdon and Willis, 2004) and where there is scope to improve the reliability, accountability and acceptability of decisions taken (Habermas, 2002). The Walking with Energy project has been developed in sympathy with these calls for more 'upstream' involvement and a meaningful dialogue between those developing energy policies and initiatives and their ultimate beneficiaries – the energy publics.

The literature also engages with questions about how citizen involvement is defined and how far it can and should go. Becker et al (2017) seek to summarise the debate around energy democracy which they take to refer to moves towards more participatory forms of energy provision and governance including greater levels of decentralisation and cooperative ownership of energy utilities. Striking a Marxist tone, they persuasively argue that the current energy system based on the extraction of fossil fuels is closely allied to capitalism and that the necessary shift towards renewable energies provides an opportunity for social transformation, greater energy activism and an alternative approach to energy policy. Despite the seductiveness of their vision of change, Becker et al. do acknowledge the sort of difficulties that have inspired Walking with Energy, specifically that "energy is often seen as a taken for granted necessity confined to the world of engineers".

The work of Bull et al (2008) is also relevant, assessing the extent to which public participation can result in a "lasting legacy of enhanced environmental citizenship" (pp.701) that transcends the act of participation to bring about permanent or at least long lasting change. In this paper, the authors subscribe to the belief that 'effective dialogue' has transformative potential to change 'hearts and minds' – an idea very much at the heart of the present project. By introducing the concept of 'social learning' to the debate around public participation in environmental issues, Bull et al. move the debate away from a focus on engaging individuals and towards an understanding of how a group dynamic or 'social' element to participation may enhance scope for change. Support for social learning is also implicit in the work of Becker et al. (2017) whose focus is on collective participation and action as opposed to the focus on either the individual or 'the public' in a very abstract sense adopted by many other commentators on this issue. Indeed, Bull et al highlight a number of proponents of social learning who have argued that the potential for individuals to develop both cognitively and morally is greatly enhanced by social interaction (see for example: Bandura and Walters 1969; Bandura 1977 and Lave and Wenger, 1991; Webler et al, 1995).

Bull et al. seek to test this hypothesis by revisiting those involved in a significant (and innovative) act of public participation in the context of an environmental issue (waste incineration) a decade later to establish whether there has been a lasting impact on the ability of participants to "see beyond their own agenda and pursue a collective one of responsible citizenship." (pp. 703). In brief, the study found evidence of lasting impacts on the way most participants thought about and behaved in relation to waste and allied environmental issues and as such underlined the value of public participation in promoting greater levels of environmental citizenship. It is also worth noting that those who reported the least impact associated with participation had always considered themselves environmentalists. However, they are keen to emphasise, in their conclusions, that public participation does not automatically translate into enduring positive change. In this vein, they highlight a range of practical and logistical considerations (of relevance to the present study) that will affect the quality of learning including infrastructure, time and resources. Owens and Driffill (2008) raise other more fundamental considerations for the present study such as the warning that the effectiveness of participation or educational initiatives may be limited if "it runs counter to other powerful influences such as social norms and prices" (pp. 4414).

Having established a strong case for a greater level of public involvement in relation to energy issues – which might fall anywhere along a spectrum from a meaningful dialogue to community ownership and hopefully result in enduring social learning – our attention turns to how energy research might contribute.

There have been several key calls for a paradigmatic shift in the way we theorise and understand human interactions with energy and therefore how we approach energy policy development. Of most notable influence on the present study is the work of Wilhite and Wallenborn (2013) who acknowledge the gulf between citizens and policy makers in an energy context. In common with the sources discussed above, they are great advocates of greater citizen involvement in policy making and implementation but their argument is more specific and nuanced. They argue that theories about energy consumption are disembodied and decontextualised leading to misunderstandings about our relationship with energy and ineffective demand reduction policy or "stagnated change agendas" (pp. 2227). At the heart of their argument is the idea that reductionist assumptions adopted by academics and policy makers have "collapsed body into mind" (pp. 2221) and that changing our energy practices relies upon "experiences and experiments in which bodies are explicitly involved" (pp. 2221). Crucially, they state the belief that "exposure to new experiences can be an important change agent for practices." This statement is a profound influence in relation to Walking with Energy, as is the concept

of 'practical learning' advocated by Lave (1991) who argues that 'practical' or 'first hand' experiences offer the greatest scope for us to reassess and adjust dispositions that are embedded in past experience. Wilhite and Wallenborn's characterisation of current energy demand reduction policies as ineffective and stagnant risks alienating the policy community from their message. Moreover, policy makers may struggle to know how to operationalise their calls for greater embodiment in energy policy. However, their plea is predominantly aimed at the research community, imploring us to take a lead in taking the kind of "epistemological risks" required to reinvigorate energy policy. We have taken up this challenge and hope, through Walking with Energy, to support policy makers and practitioners to rise to the challenge of enabling meaningful citizen involvement which encompasses both mind and body.

Methodologies explicitly or implicitly promoting a greater level of embodiment are becoming more common in certain fields, most notably in geography and sociology, but their influence is increasingly being felt within energy and environmental studies. Such methods include walking interviews (see for example, Evans and Jones, 2011) which aim to reveal rich insights into the relationship between people and place by embedding the research encounter in the landscape. In practice, this will commonly involve researcher and participant walking around a particular place (neighbourhood, building, street) whilst talking about that place and the participant's experiences and memories of it. This approach has provided a welcome alternative to reflecting on experiences of place from a distance and relying on respondents' descriptions as is required by traditional qualitative research approaches and has been shown to yield richer, more nuanced data and a more inclusive research experience where power imbalances between researcher and participant and reduced (Evans and Jones, 2011; Kinney, 2017).

A key pioneer of the walking interview is Evans and Jones (2011) who, echoing arguments about the need for greater citizen involvement in policy decisions visited earlier, contend that walking interviews are not just an innovative research method but are critical policy and decision making tools. Such methods, he argues, help to reveal the histories and preferences of local populations thus enabling fair and sustainable policy making which is embedded in the present yet sensitive to the past. In this sense, Evans and Jones are fully convinced of the argument that data generated as a result of a greater level of embodiment in the research process can enable more effective and sensitive policy making and adds to the debate by underlining the significance of history. Despite being embedded in the present landscape, Evans and Jones provide evidence that walking interviews are effective in eliciting events and feelings from the past. The work of Goodchild et al (2017) underlines the importance of these historical understandings by providing an illustration, in an energy context, of how recalled experiences from throughout our lives are reflected in our attitudes and practices in relation to energy consumption in the present. On a practical note, Evans and Jones highlight how proximity and a clear line of sight to the place or feature under discussion are critical in terms of stimulating discussion.

Castan Broto (forthcoming) has also worked extensively with walking methods in an urban energy context and has spent time walking unfamiliar neighbourhoods with their inhabitants in a bid to immerse herself and her participants in the energy landscape. She has used this technique to understand relationships between citizens and energy infrastructure and the ways in which it has shaped and been shaped by the development of the city. Although her work has a spatial focus and the present study does not explicitly, her conception of walking as a means of appreciating the 'extraordinary ordinariness' of energy landscapes and identifying what is distinctive in landscapes that have become familiar and indistinct to those around them, is a significant influence on the present study.

The case for employing walking methods – now relatively well tested within the field – as a means of connecting citizens with taken for granted energy landscapes and using this connectedness to prompt reflection on the way energy is generated and supplied and the environmental, economic and ethical consequences of this, has been made. However, the present study also seeks to understand how (and the extent to which) energy has come to be taken for granted in our everyday lives, as a number of commentators argue. The idea that we have become so distanced from processes of energy generation that we don't question them or their implications forms the very premise of the project and the motivation for efforts to reconnect citizens and energy. Oral history techniques have rarely been applied in the field of energy studies but offer significant potential to situate current energy dilemmas in their historical context, thus revealing how they have evolved to their current state. The work of Goodchild et al (2017) has effectively demonstrated the potential of oral history techniques to reveal detailed new insights into our changing relationship with heat. Oral histories, it is argued, are particularly useful for revealing stories that would otherwise remain confined to the heads and homes of the participant (Goodchild et al, 2017). The objective of their use in this instance would not be to understand energy transitions (such as the transition from solid fuel to central heating) *per se* and certainly not to provide a factual account of those transitions. Instead the objective is to understand, in the style of Darby (2017), how individuals have experienced energy transitions and how these experiences may have contributed to increasing (physical and figurative) distance between citizens and processes of energy generation and how (and the extent to which) this has resulted in greater apathy about how energy is generated. This notion is summarised by Goodchild et al (2017) when they say that "oral histories provide a rich data source that enables reconstructions of personal and local impact to rise to the foreground" (pp. 3).

The next section seeks to articulate the methodology that has resulted from the many influences discussed in this section and how it has been applied in the case study location.

Methods

In the pilot case study city of Sheffield, UK, a large incineration facility that supplies much of the city centre and beyond with heat and power sits at the confluence of a number of the main transport gateways to the city and cannot fail to be noticed by the thousands of motorists and train and tram users entering the city centre every day. Aside from some controversy around emissions highlighted by Greenpeace in the 1990s which died down long ago, the facility appears to go largely unquestioned,

receives no media attention and it is likely that the majority of the city's residents have little or no understanding of what it is and why it is there.

The Walking with Energy project was inspired by these observations, by the case for deeper and more meaningful citizen involvement in energy related decisions, the concepts of 'social learning' (Bull, Petts and Evans, 2008) and the appeal made by Wilhite and Wallenborn (2013) for a greater level of embodiment, experimentation and risk taking in our quest to develop more effective energy policy. The project methodology is influenced by walking interviews and their application in an energy context by Castan Broto as well as by the value of oral history approaches in helping us to understand individual experiences of energy transitions and how these have impacted on our relationships with energy.

The resultant methodology was piloted in Sheffield in November 2018 as part of a nationwide programme of events aimed at engaging the public with social research. The objective of the event was explicitly to promote a (re)connection between members of the general public and local processes of energy generation and as such, the events were open to anyone and places allocated on a first come, first served basis. The offer made to prospective participants was that the event would involve a 'walking tour with a difference', that they would learn about Sheffield's 'heat secrets', tour the incinerator and also be interviewed as part of a linked research project.

Taking account of all of the influences outlined above, the methodology involved taking 15 members of the public (who voluntarily signed up for the event), on a 45 minute (1.5 km) walking tour around the city centre and inner city which followed the route of 1.5 km of the 45 km of district heating pipelines that lay under the city's roads and carry hot water to 200 buildings around the city. The tour began with a briefing in a café which sits close to the route of the pipeline and provided a summary of the rationale for the event, health and safety information and details of the programme for the event. The walking route would lead us to the source of the pipeline – the city's Energy from Waste (EfW) facility. The facility burns all domestic and commercial waste collected in the city to generate heat for civic, commercial and residential buildings and electricity that is exported to the grid. Participants were then given a one hour long guided tour of the incinerator by the facility's General Manager who also took questions. One experienced researcher accompanied two or three participants and small walking focus groups were conducted as we traced the pipeline through the streets, stopping to point out key buildings supplied by the network (the ratio was due to high demand for an event with a maximum capacity for 15 people – we had hoped to achieve one researcher to every participant). A short topic guide was used to inform discussions with participants and covered topics such as their motivation for joining the tour; discussion of how their own relationship with energy has evolved over time (through the lens of home heating); their knowledge of and feelings about how heat and energy are generated in Sheffield today and in the past and their preconceptions and expectations in relation to their visit to the EfW facility. A de-brief was held for 30 minutes after the tour where participants were asked to reflect on what they had seen and heard and how it had impacted on the attitudes and opinions they had expressed beforehand and whether it was likely to impact on their behaviour. All conversations were audio-recorded and transcribed verbatim to enable rigorous analysis.

Findings

This section provides a short summary of the characteristics of participants and goes on to present the findings from the walking focus groups conducted at the start of the event and from the debrief conducted after the tour of the EfW facility. The section is organised thematically and a distinction is also made between data collected before and after the tour of the EfW facility. The themes which have been used to structure this section were generated through an inductive manual coding exercise. A discussion of the results in the context of the literature review is presented in the next section of the paper.

For reasons of safety, participation in the event was restricted to 15 people. There was higher than expected demand to take part in the event which was surprising and indicates an appetite to find out more about energy generation – or perhaps EfW in particular – amongst the general public locally or at least certain groups within the population. The programme which the event was part of has a track record of attracting older, mostly middle class participants. It was hoped that this event might reach beyond this demographic and attract an audience more representative of the local population. To this end, additional support was put in place including free transport to and from the event and free refreshments in the hope of broadening participation. The event was also publicised in a mainstream local newspaper with a wide readership in addition to various social media channels. In the event, a good mix of participants attended. Although most participants could probably be described as 'middle class' in terms of income and background, there was a good spread of ages ranging from 24 to 85. Six of the participants were between the ages of 50 and 70 plus one 85 year old, four between the ages of 30 and 50 and two under the age of 30. Data on their occupations and educational background was also collected in order to be aware of any specialist knowledge within the group. This was an educated group and most participants had a professional or skilled background and nine of the 13 were educated to degree level or higher. All participants cited an interest in environmental or urban issues as a motivation for signing up to the event.

BEFORE THE TOUR

Energy 'invisibility', mystery and intrigue

The idea that a key aim of the project was to explore the existence of and possible ways of overcoming so-called energy 'invisibility' was not explicitly discussed with participants to avoid biasing their responses. In spite of this, energy invisibility or at least the idea that energy is taken for granted in our daily lives was an implicit theme in discussions with participants throughout the event. This is partly reflected in the fact that most participants knew very little about the EfW facility prior to taking part in the event:

> I was only very vaguely [aware of the EfW plant], but I was aware that the facility was there cos I'd walked past it going in and out of the city, but other than that not really. I knew

> we had an incinerator somewhere and that was the extent of my understanding. (M, 45)

This lack of knowledge appeared to give rise to a sense of intrigue around the facility and when asked what had motivated them to take part in the event, most participants referred to a curiosity about the EfW facility (over and above the associated heat network) which was regarded as something mysterious, perhaps even classified, that they had little prior knowledge of.

> It was an opportunity to see something that you wouldn't normally get an opportunity to see and to learn about it. (F, 62).

> It's pretty intriguing. I've never heard of anyone going inside the place [incinerator] before. (M, 40)

> It feels kind of edgy. I feel like a sort of urban explorer. (M, 24)

> Once I'd seen the advert, I wanted to know what happens in there and couldn't really believe I hadn't wondered that before. (F, 68)

As we walked the pipeline on the way to the EfW facility, discussion turned to participants' awareness of where the energy they use at home comes from before it enters their home. Invisibility was also implicit in these discussions in so far as there was limited awareness amongst participants and few felt confident in their answers. Several participants reported feeling slightly embarrassed at their lack of knowledge and one commented that it was only in that moment that they realised how little they knew about this and felt surprised at their own lack of curiosity: "How silly that I don't know. I've surprised myself with my ignorance there." (F, 68)

> I: "So you all use gas as a main source. Do you have any sense of where it comes from?"
>
> "I haven't given it any thought. I presume the North Sea?"
>
> "No. It's not the kind of thing you tend to talk about."
>
> "I lived in Sweden for three months this year and I never really asked where the heating came from but it could easily have been from district heating of some sort."
>
> "Obviously gas presumably it's imported natural gas? I'm guessing some coal or electricity are also used? I'm really not sure."

While most participants felt they should improve their awareness of where energy comes from, one participant questioned how necessary this was. For him, the fact that citizens have little input into decisions about energy generation meant there was one less thing to worry about:

> We don't need to worry about who's supplying the heat, as long as we have it, cos we have all this other stuff to worry about. (M.24)

As other studies have found (see Goodchild et al, 2017), participants were quick to (spontaneously) contrast the current 'invisible' and intangible nature of contemporary home heating with the highly tangible nature of solid fuel which was used to heat the majority of homes prior to the widespread adoption of gas central heating in the UK in the 1970s. Many participants recalled a time when their homes were heated by burning coal-something once abundant in the area:

> I'm a retired GP and I worked in a [coal] mining village so most of the people there were miners and once a month or whatever, the miners had a free coal allowance but rather than deliver it to each individual house they'd just pile it up in the middle of each little side street and people went out and shovelled it back in. So you used to know exactly where your fuel was coming from. You might even have dug it out yourself. It couldn't be more different now. (M, 68)

Of the 13 participants, one still heated their home using solid fuel and recognised that their experience of home heating is in stark contrast to that of most households:

> I'm unusual these days because I know where my heating comes from. I burn wood that I chop myself or forage it. I grew up in a house, my parents have coal fires in their house, and it's a terraced house, so they come and deliver a tonne of coal so it's always been within our own control. (M, 30)

Perceptions of the EfW facility

In terms of awareness of the EfW facility, the associated heat network and what they do, most participants considered that awareness was likely to be low amongst most people in the city and some were able to share anecdotal evidence of this. It was felt by some that awareness might have been higher when the facility was first built (in the 1980s) and when it became the focus of a Greenpeace emissions campaign in the late 1990s (even this only attracted a brief mention), but that interest had waned and the facility has since seemingly merged into the landscape, unnoticed and unchallenged:

> I was at a meeting on Monday and I mentioned that I was coming here and nobody there knew about it, I thought that was terrible. I mean nobody knew about the [district heating] system. I don't think anyone noticed it. (F, 50)

> Yes I suppose when it was new it was more in the news but now that it's been running for 30, 40 years it's not, there's no news there, no story there, so it doesn't get talked about and unless you actually know about it why would you hear about it? (M, 48)

> I was aware of it, I remember when it was in the media when it was built and there was discussion about whether it's a good or bad thing. That must have been 30 odd years ago but not since. (M, 62)

In this vein, one participant shared an anecdote which they felt illustrated how few people are aware of how heat and energy is generated in the city centre and that those who were perhaps felt confused and conflicted about whether heat from waste was a 'good' thing or not. As she explains, there's potential to see heat from waste as a good use for the by-product of a waste disposal process or as a private company profiting from the provision of a public service:

> Sometimes I've looked into the Winter Gardens [major civic building on district heating network] in winter and there's some people who don't know saying this is wasteful having it this warm in here and you could hear people saying no, it's actually waste heat that's being reused and that's a good thing, so it's almost like free energy, so therefore it's ok to use it in this way, but then equally I'm sure Veolia [network

> operator] don't count it as free energy, they count is as profit, we've produced this energy and sent it off to be used in Sheffield and so I think there is kind of a, something of a dual standard where some people want to count it as really useful, some want to count it as free energy that's used to heat palm trees, other people want to count it as free cos it's just waste, and ok I think that's a useful way to think but there is a bit of conflict there. (F, 84)

DURING AND AFTER THE VISIT TO THE EFW FACILITY

The tour

The tour of the facility took around one hour and included a detailed explanation of how the plant and associated heat network works. Participants also had ample opportunity to ask questions and many did. Most of the questions posed related to emissions – how emissions levels are monitored, how harmful emissions are reduced and what happens in the event of an emissions level breach (the facility is legally required to keep harmful emissions within certain thresholds and may be sanctioned when these are breached). A number of less probing technical and logistical questions were also posed. The tour involved witnessing huge volumes of domestic and commercial refuse sitting in a giant pit and being transferred in relatively small quantities by a grabber into a furnace then seeing the resultant ash being cooled and transported along a conveyor belt where metals were removed from the stream by large magnets. The ash and metals are then gathered in piles in a large shed. After the tour had concluded, a debrief was held elsewhere on site where participants were asked for their thoughts and reflections on what they had experienced.

Reactions to the tour

The reactions of participants were fairly consistent and involved a combination of discomfort at the volume and nature of the waste gathered from around the city and a degree of reassurance that it was being put to a perceived 'good use'. Several respondents also remarked on the volume of plastic in the waste stream and lamented that it wasn't being recycled. Others felt reassured that burning plastic waste that can't be recycled locally would prevent it entering the oceans, picking up on the recent public concern about ocean plastics.

> We're consuming more and more and I don't know how you tackle that but at least this way you can stop the waste building up and deal with usefully and keep it out of harm's way. (M, 45)

> Personally seeing all the waste is quite a sobering thing coming face to face with the consequences of our over-consumption really isn't it, seeing our waste pouring into a pit like that. (F, 36)

> It's been reassuring. My husband and I have debates around recycling. We're both very keen recyclers but when things do go in the bin I can now say at least it's going to make something useful. (F, 52)

Overall, all participants were broadly positive (albeit with some caveats) about what they had seen, despite several showing concern about emissions levels from the facility during the tour. The approach was widely regarded as a favourable alternative to land fill. Concerns about emissions weren't widely raised at the debrief and participants seemed satisfied by the arguments put forward by the General Manager that the CO_2 emissions associated with the facility were less than those associated with landfill and that the heat network obviated the generation of large volumes of CO_2 compared to individual gas boilers.

> It makes me wonder why it isn't happening more in other cities. So it seems like a good thing, ok it costs money presumably, but it seems like it's the way it ought to be. So really the question is why aren't other places doing it? And this is the good version cos everywhere else you see it pouring into a big hole in the ground and then the big hole in the ground grows until they can't contain it and then they dig another one. (F, 36)

There was however a degree of cynicism that relying on burning waste to heat many buildings around the city (and proposals to expand the network) would act as a perverse incentive in terms of reducing waste.

Impact of the tour

In terms of whether the event had been effective in overcoming (however temporarily) energy 'invisibility' and (re)connecting members of the public with key debates around energy production, it certainly appeared that it had prompted all participants to reflect on the benefits and disbenefits of EfW and arrive at a conclusion about whether it is 'good' or 'bad' and something that should be widely deployed. Prior to the tour, as some of the material in the previous section illustrates, there was far more ambivalence.

> I'm thinking, it all seems like a good thing but we all put our own spin on things so we don't know what spin the guy from Veolia has put on it, but to me it sounds really simple and sounds really efficient and sounds as if it's a really good thing for Sheffield. It's important to be a bit cynical though I think. (M, 62)

Several participants remarked that events like this should be more common and could play an important role in raising awareness of issues allied to energy generation and waste management. EfW, it was felt, was a particularly good example for raising awareness of the interconnected nature of various forms of consumption.

> Incredible to see it all burning like that. Everyone should see that. (F, 50)

> I think it's good that there is an event like this. It's important to get more people involved and just get them thinking about it and becoming aware of it, just prompting them to consider a bit more, just awareness I think is an important first step. (M, 45)

> You realise when you come here that it's all linked up. What we buy, what we waste, how we heat and how much we heat etc. So the more energy we demand, the more waste they need to collect. There's lots of focus on reducing waste but this is always looked at in isolation of its impact on energy. You can save energy by consuming less but systems like this

> rely on us consuming more or the same maybe. None of this had occurred to me before this evening. (F, 84)

In terms of whether the experience was likely to translate into greater levels of environmental citizenship or even behaviour change amongst participants; the largely positive view held by nearly all participants appeared to have the effect of vindicating their current behaviour with regards to waste disposal, with many feeling relieved that the waste they do not recycle is used positively, in their view. However, the experience had clearly piqued a greater awareness of and sensitivity to both the volume of refuse we generate and the debates around EfW. The event was arguably less effective in terms of prompting participants to reflect critically on how EfW compares to other approaches to generating heat and energy and the energy mix we subscribe to in the UK. It appeared that the issue of waste and waste volume proved the most compelling aspect of the experience for this group. One participant, however, was prompted to express discontent with the gas heating system he had in his home, seemingly experiencing a realisation about how little choice he had over this important aspect of everyday life, how poorly it aligned with his own ethical stance and how little power he had to change it:

> It's made me think […] I'm not happy with gas heating. I would prefer something renewable, more like this but it costs such a lot to convert it. It's not something you get a say in unless you have a lot of money. I would feel better if I was on the heat network as I would know that gas wasn't being extracted to heat my home. (M,45)

The tour was also filmed by the British Broadcasting Corporation (BBC) and was aired as part of their regional news programme on 20th January 2019. Footage of the tour and some of the views of participants are included in the package which can be viewed here: https://markansell.blogspot.com/2019/01/incinerator.html.

It is hoped that that this coverage extends the reach of the project to a wider audience beyond the 15 participants.

Discussion and conclusions

The data collected during the event effectively illustrates the ways in which energy has become taken for granted in our daily lives with most of the group unable to even speculate about how the energy they use in their homes is generated. In terms of how we have become so distanced from energy production, participants alluded to explanations related to energy transitions in their lifetimes and drew unprompted comparisons between the very tangible nature of home heating in the past and its current largely intangible form. Of course if the public were routinely engaged in decisions about energy generation as we are, for example, on local planning applications, then we may have retained some level of awareness of energy policy issues despite this loss of tangibility. However, only one participant recognised that we are not consulted on energy generation policies when he expressed frustration that he has to accept gas central heating despite its poor fit with his own preferences. Others picked up on the idea that the EfW facility has had moments of enhanced visibility around the time it was built and briefly when it became the focus of a campaign and associated negative publicity. This suggests that there is a recognition that the transition away from burning fossil fuels in our homes has formed a critical turning point in our relationship with energy and that, aside from brief moments of awareness, energy generation has gone from being something we actively participated in to drifting out of our consciousness. The premise of the project was therefore confirmed.

The general acceptance within the literature on citizen engagement that meaningful public participation represents the 'gold standard' in policy making (Felt and Fochler, 2008) and the recognition of all the practical and moral benefits this brings is simply not heeded in relation to energy policy development in the UK. Although there may be some local exceptions, the fact that the 15 citizens that took part in this study, who are educated and interested in environmental issues, have little or no awareness of where their energy comes from and regard the local EfW facility as a source of intrigue or the territory of an 'urban explorer' is testimony to this. It could therefore be argued that those responsible for the development and implementation of energy policies are effectively avoiding their duty to ensure that their policies are socially robust and responsible (Bierle 1999).

The extent of the disconnection between citizens and policies and processes related to energy generation illustrated by this study suggest that the prospect of realising Becker et al's (2017) vision of decentralisation and collective ownership of energy infrastructure moving beyond a niche remains distant. It therefore follows that the opportunities for transformation of the current system to a more democratic model created by the necessary transition away from fossil fuels are unlikely to be widely capitalised upon by a poorly informed and demotivated public- a state ironically created by the historic absence of direct citizen engagement in relation to energy policy. This therefore suggests that in terms of the spectrum of citizen involvement described in the literature review that runs from meaningful two way dialogue between citizens and policy makers at one end and collective ownership at the other, even the most passive end of the spectrum appears challenging in the context of the status quo.

This project responds directly to the calls of Wilhite and Wallenborn (2013) for the research community to take the 'epistemological risks' required to reinvigorate energy policy. Inspired by the emergence of a raft of more participative research methods that take the entirely logical step of embedding the research process in the landscape or context in question, we have sought to bring self-selecting members of the public face to face with energy generation processes – in some case for the first time in their lives. Walking with them along the pipeline and taking them into the incinerator immersed their bodies in the energy landscape and the process of research participation engaged their minds. We hope, therefore, to have responded effectively to the calls of Wilhite and Wallenborn to bring mind and body together in the kind of act of 'practical learning' that Lave (1991) contends offers the greatest scope for us to re-evaluate historically embedded dispositions and in the hope of encouraging them to "see beyond their own agenda and pursue a collective one of responsible citizenship" (Bull et al, 2008).

On the basis of the data generated, it can be said with some certainty that participation in the event moved all participants from a position of relative apathy and being poorly informed to a position where they were keenly seeking information in

order to make an informed and reasoned assessment of whether EfW was a 'good' or 'bad' thing. Moreover, by the end of the event, most had taken the view that EfW was, on the whole, a positive approach to combining lower carbon energy generation with the responsible management of waste whilst retaining sensible reservations about this acting as a perverse incentive to waste reduction. There is therefore a very clear sense that the event was successful in engaging participants with ethical and environmental debates around this particular form of energy generation. Although their deliberations couldn't be described as forensic in nature, participants took on board new information, asked challenging questions and used this new knowledge to reach a position – hopefully sparking a curiosity and a confidence that will remain with them. Although we have no way of knowing, at this point in time, how long these impacts will last, the findings of Bull et al (2008) provide indications that it is possible for public engagement to generate lasting increases in environmental citizenship. Of course, the exercise that Bull et al refer to was a more in depth process that went on for many months and was in response to a particular and controversial proposal. It is therefore important to acknowledge the more limited 'quality of learning' and scope for impact associated with a one off event lasting three hours. However, the contentions of Wilhite and Wallenborn, Lave and others that practical, social and embodied experiences offer greater scope for learning and challenging preconceptions than traditional forms of learning, should also be borne in mind in this context.

In the time available there appeared to be sufficient scope for participants to acquire and consider a reasonable depth of information regarding EfW. But, as noted in the findings, the event was arguably less effective in terms of prompting participants to reflect critically on how EfW compares to other approaches to generating heat and energy and the overall energy mix we subscribe to in the UK. This suggests that if we are aiming to build the skills and knowledge amongst the general public to engage with major debates about our energy futures then short, off events will not be sufficient. However, this is arguably an unrealistic goal when we consider that the mechanisms to engage at that strategic level do not readily exist unless you are engaged with a pressure group or adept at gaining the support of an MP. Therefore, the reality of how most people engage with energy issues and decisions will be at the local level and probably in response to specific proposals or developments. In this context, Walking with Energy does appear to offer a creative means to engaging the public in the surrounding the debate and equipping them with the knowledge to contribute to it.

Given that the event had several components (the walk, the tour, the debrief), it is also worth reflecting on the functions fulfilled by each element of the event and whether any of the parts were more instrumental than others in reaching the identified outcomes. It was certainly clear that the tour of the incinerator was the most powerful aspect of the event for most participants and the multi-sensory nature (unfamiliar sights, sounds and smells were abundant) of the experience inside the incinerator appeared to captivate participants with many expressing surprise at various points and demonstrating a keen interest by asking lots of questions. It was during this part of the event where the bulk of the information was received and views on the benefits and disbenefits of EfW crystallised. However, the different components of the event fulfilled different functions. The walk along the pipeline appeared effective in preparing the ground for the first hand encounter with energy production that lay ahead. In particular, the walk provided the opportunity for the researchers to explain the rationale for the project and to learn about participants motivations for taking part and explore the idea of energy invisibility. It also familiarised the group with the 'hinterland' of the EfW plant, raising awareness of the role that the facility plays in heating many of the city's most frequently used buildings as well as raising awareness of the unseen infrastructure beneath our feet. The debrief was critical in terms of understanding the impact of the event and for giving participants the space to digest and reflect upon what they had been told and had seen. Therefore, all components of the event are considered to have made a contribution to the outcomes identified.

The event proved popular with more than 30 people on a waiting list to join the event (with a capacity of 15), suggesting that there is significant interest in both the topic and the format and a clear appetite for understanding more about where our energy comes from. It could, of course, be argued that this interest emanated from the 'usual suspects' – a group of educated and interested citizens but an initiative like this will nearly always start with a group like this and this is not necessarily a disadvantage given that they are well positioned to act on the new knowledge they've acquired. However, now the concept is proven, more work can be done to widen the reach of such initiatives including varying their forms and working outside of initiatives like the Festival of Social Science with a clear middle class leaning.

References

Bandura, A., 1977. Social learning theory. London: Prentice Hall.

Bandura, A. and Walters, R.H., 1969. Social learning and personality development. London: Holt,

Rinehart & Winston.

Becker S. and Naumann M. (2017), Energy democracy: Mapping the debate on energy alternatives, Geography Compass. 2017; 11:e12321. https://doi.org/10.1111/gec3.12321.

Beierle, T. C. (1999) "Using Social Goals to Evaluate Public Participation in Environmental Decisions," Review of Policy Research 16 (3–4): 75–103.

Beierle, T. C. and Konisky, D. M. (2000) "Values, Conflict, and Trust in Participatory Environmental Planning," *Journal of Policy Analysis and Management* 19 (4): 587–602.

The Department for Business, Energy and Industrial Strategy (BEIS) (2018), *Energy Use in the UK*, London: BEIS

Buchanan, K., Banks, N., Preston, I., Russo, R. (2016) The British public's perception of the UK smart metering initiative: Threats and opportunities. *Energy Policy,* 91, 87–97, https://doi.org/10.1016/j.enpol.2016.01.003.

Bull, R., Petts, J., and Evans, J. (2008)'Social learning from public engagement: dreaming the

impossible?', *Journal of Environmental Planning and Management*, 51:5, pp. 701–716.

Burgess, J and Nye M (2008), Re-materialising energy use through transparent monitoring systems, *Energy Policy*, (36) 12.

Corsini, F., Certoma, C., Dyer, M. and Frey, M. (2018), Participatory energy: Research, imaginaries and practices on people contribute to energy systems in the smart city. *Technological Forecasting and Social Change,* 7 (28).

Cotton M and Devine-Wright P. (2012) Making electricity networks "visible": Industry actor representations of "publics" and public engagement in infrastructure planning. *Public Understanding of Science,* 21 (1), pp. 17–35.

Darby, S.J. (2017) Coal fires, steel houses and the man in the moon: Local experiences of energy transition. *Energy Research and Social Science*, 31: 120–127.

Department of Energy and Climate Change (2013), *Estimates of Heat Use in the UK*, London: DECC.

Department of Trade and Industry (2007) Energy White Paper: Meeting the Energy Challenge. London: The Stationery Office.

Evans, J. and Jones, P. (2011), 'The walking interview: Methodology, mobility and place', *Applied Geography*, 31 (2), pp. 849–58.

Felt, U. and Fochler, M. (2008), The Bottom-up Meanings of the Concept of Public Participation in Science and Technology, *Science and Public Policy* 35 (7), pp. 489–99.

Goodchild, B, Ambrose A and Maye-Banbury A, (2017). Storytelling as oral history: revealing the changing experience of home heating in England. *Energy Research & Social Science* (31), p. 137–144.

Habermas, J. (2002) *On the Pragmatics of Communication*. Cambridge: Cambridge University Press.

Hargreaves, T. Nye, M., Burgess, J. (2013) Keeping energy visible? Exploring how householders interact with feedback from smart energy monitors in the longer term. *Energy Policy*, 52, 126–134, https://doi.org/10.1016/j.enpol.2012.03.027.

Kinney, P. (2017), *Walking Interviews*, Social Research Update, Department of Sociology: University of Surrey

Lave, J. (1991), Situated learning in communities of practice. In Lauren Resnick, John M. Levine, and Stephanie Teasley (EDs), *Perspectives on Socially Shared Cognition*. Washington D. C.: American Psychological Association.

Lave, J. and Wenger, E., 1991. Situated learning. Cambridge: University Press.

Owens S., and Driffill, L. (2008), How to change attitudes and behaviours in the context of energy. *Energy Policy*, 36, pp. 4412–4418.

Sherriff G., Trivess, M., Berry, S., Ambrose, A., Goodchild, B., and Maye Banbury, A. (2019), Coping with extremes, creating comfort : user experiences of 'low-energy' homes in Australia, *Energy Research and Social Science.*

Wilhite H and Wallenborn G. (2013), Articulating the body in theorizing consumption, *Proceedings of the eceee Summer Study.* pp. 2221–2228.

Vassileva, I. and Campillo, J. (2016) Consumers' Perspective on Full-Scale Adoption of Smart Meters: A Case Study in Västerås, Sweden. *Resources*, 5, 1–18, https://doi.org/10.3390/resources5010003.

Wallenborn, G., Orsini, M., Vanhaverbeke, J. (2011) Household appropriation of electricity monitors. *International Journal of Consumer Studies*, 35, 146–152, https://doi.org/10.1111/j.1470-6431.2010.00985.x.

Webler, T., Tuler, S., Krueger, R., 2001. What is a good public participation process? Five perspectives from the public. Environmental Management 27, pp. 435–450.

Wilsdon, J. and Willis, R. (2004) *See-through Science: Why Public Engagement Needs to Move Upstream*. London: Demos.

Acknowledgements

The author would like to acknowledge the support of the Economic and Social Research Council's (ESRC) Festival of Social Science for funding the event on which this paper is based. I would also like to thank Veolia Environmental Services for allowing us access to the Sheffield Energy Recovery Facility for the purposes of this event and for hosting a tour of the facility. Thanks must also go to Dr Will Eadson, Cathy Harris and Professor Tina Beatty for their support with the event.