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Towards an emotional energy geography: attending to emotions and affects in a former coal mining community in South Wales, UK

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Abstract

In this paper, we make a case for bringing energy geography into closer dialogue with emotional geography, and argue that doing so has the potential to greatly improve our understanding of energy systems and their intersection with everyday life, bringing essential but often overlooked aspects into view. We draw on research carried out as part of an arts and humanities-based project in South Wales (UK), a region once dominated by coal extraction. We present and discuss material from sixteen oral histories recorded with long-standing members of the village of Ynysybwl. Reading their accounts through the lens of emotional-affective constructs reveals not only participants' emotions about aspects of energy production and consumption, but also the atmospheres and affects arising within and out of the energy system. This brings to light the affectual agency of the energy system as an infrastructure assemblage and its role in everyday production of space. Related to this, it surfaces essential aspects of experiences of energy system change. We argue that recognising and exploring affect and emotion is crucial for energy geography as it continues to explore the functionings of energy systems, and energy transitions.

Key words

Atmosphere; oral history; energy transition; assemblage; whole energy system; infrastructure

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1. Introduction

Energy research has long been dominated by the technical disciplines. Only recently have the social sciences and humanities started to make significant strides in this area, as acknowledgement that energy questions are societal, ethical and political, as well as economic and technical has gained traction (Sovacool 2014; Stern 2014; Sovacool et al. 2015). Energy geography has grown as a subfield accordingly, and if initially endeavours had focused largely on energy resources and their management (Calvert, 2015), the field is now much wider, embracing for instance geographies of energy poverty (Bouzarovski, 2014; Bouzarovski and Thomson, 2018); social and spatial justice in energy development (Baka, 2017; Yenneti et al., 2016); cultural meanings, specificities of energy services (Kumar, 2015) and historical geographies of energy infrastructure development (Harrison, 2013), as well as geographical methods of energy modelling (Hamhaber, 2015; Pasqualetti and Brown, 2014).

There remain, nevertheless, some gaps, and our aim in this paper is to draw attention to an important area that we feel has not been adequately attended to in energy studies generally and energy geography more specifically: that of emotions and affect. The reason for this may well be a kind of 'residual cultural Cartesianism' similar to that which Thrift (2004, p. 57) referred to 15 years ago in relation to urban geography, whereby emotions are seen as something quite separate from the rational business of power plants and cables and grids, even perhaps markets and policies; and yet energy geographers, although few in number, have been relatively strong on advancing understanding of cultural dimensions of energy problematics. Still, it seems that energy geography and emotional geography have stayed apart, such that energy geography has not engaged significantly with the 'emotional turn' in geography and the now more than a decade of work on emotional and affectual geographies.

This, we contend, is a missed opportunity, which results in some shortcomings and problems. There is much interest in 'behaviour change' in relation to energy consumption (Barr et al., 2011; Staddon et al., 2016), and yet we cannot adequately understand collective and individual choices and

preferences about energy without acknowledging emotional aspects to these. Likewise, what are hailed as advances in understanding the 'lived experience' of energy use (Bouzarovski et al., 2017, p. 1), will be incomplete without incorporating emotional and / or affectual dimensions. We also argue that affectual dimensions do not belong only to spaces of energy consumption, but also to spaces that surround and are shaped by energy production and transmission, that is, the whole energy system.

Geographers are well placed to take such a holistic view, and through work on emotional and affectual geographies, have at their disposal an ample conceptual armoury to be taken up to explore this territory. Methodologically, geographers also benefit from eclecticism, and we suggest that there is opportunity in turning to methods drawn from the arts and humanities, in order to work more fully with emotional and affective dimensions of energy systems, at least as a first step to bringing them more into view. This paper arises from such an engagement, based on work undertaken as part of a large collaborative interdisciplinary project funded by the UK Arts and Humanities Research Council (Smith et al., 2017), itself part of a programme to engage and connect communities in questions of energy and sustainability through co-created research with arts and humanities at its core. The more specific work that this paper draws on was a series of oral histories elicited from older residents of a former mining village in the Rhondda Valley of South Wales, UK. We discuss extracts of these oral histories in order to draw attention to the emotional-affective aspects of a specific energy system. We take as fundamental an understanding of an energy system as a form of infrastructure, where infrastructure is understood as socio-material assemblage (Amin, 2014; Day and Walker, 2013; Harrison and Popke, 2016) comprising (in the energy system case) among other things materialities of mineral substances, buildings, appliances, and non-material entities such as working practices, economic arrangements, policies, and norms and practices of consumption. Like other infrastructures, energy systems may be in part invisible while in part highly visible (Larkin, 2013); they are constantly in flux and process, acting to channel and to choreograph, and hence are highly agentic in the production of space (Simpson, 2017).

This paper is divided into five sections. In the next section, after briefly reviewing the limited ways in which energy related research has to date engaged with emotional-affective dimensions, we discuss the concepts of emotions, affect and atmosphere as they are deployed in geographical work, and which we take forward as the conceptual framework for our analysis. This is followed by a methodological section, in which we explain our use of oral history and introduce the case study area. Next, we present our empirical findings on the emotional, affectual and atmospheric aspects of living with a specific energy system, the coal-based system of early to mid-20th century Britain, as

revealed by the oral histories. Finally, we discuss what those findings mean for energy geographers before concluding and suggesting areas for future research.

2. Emotions, affect, atmosphere

2.1 Emotions and affect in energy research

As we noted in the introduction, few studies in energy geography or related literature have explicitly focused on emotions or affect, but there have been a small number of insightful contributions that point to the value to doing so. The most developed theme has been in relation to the role of emotions, especially emotions about place, in the acceptance or rejection of energy and related extractive developments. Graybill (2013) draws attention to the emotions expressed by indigenous people of Sakhalin about the exploitation and socio-ecological transformation of their homeland for oil and gas extraction, whilst Ey et al. (2017) and Cass and Walker (2009) use Australia and the UK as case studies to argue that public opposition to energy and mining developments is often underpinned by emotions around disrupted place attachments. Huijts (2018) discusses how anger, fear, joy and pride are all implicated in the variety of public responses to the Netherlands' first hydrogen fuel station. Other work has revealed how a sense of loss, including loss of place, can be felt upon the *de*-commissioning of established energy and resource developments, such as nickel mining in Australia (Pini et al., 2010). Pertinently, all of these authors highlight how the energy and resource sectors have a damaging tendency to sideline and dismiss emotions. Emotion and affect have also been examined as coping mechanisms in the face of both unwelcome energy development and loss of such industry. Bennett (2009) considers the nostalgia expressed by an ex-mining community in northern England and interprets this as a means of sidestepping the painful experience of change and enhancing the sense of community in the present, while Parkhill et al. (2011), in a rare mobilisation of the concept of affect in the energy social science literature, discuss how the humour of people living near nuclear power stations in the UK reveals vulnerability, anxiety, and anger to a careful listener, yet also serves to keep these affective states under control.

Whilst the above work tends to position emotions as being more or less *about* energy and energy developments and their impacts, a very few studies have drawn attention to emotions *within* the day to day functioning of energy or mining enterprises. Ey et al. (ibid) discuss how the performance of particular masculinities within the Australian mining sector further serve to marginalise emotions; Pini et al. (ibid) briefly discuss the practices of emotional control employed in a company's managing the processes of the mine closure. More positively, recent innovative work by Reger (2017) examining the trajectory of community energy projects in the UK beyond their early start-up phases found emotional labour and emotional relations to be essential to their remaining viable; Reger

concluded that energy assemblages need to be understood as socio-material-*emotional* assemblages.

Turning to energy consumption, there have been some useful pointers to emotional- affectual aspects of energy consuming practices in domestic space, and the significance of energy consumption for the production of such space. Whilst Devine-Wright et al. (2014) do not theorise affect or emotion, they write about the significance of a 'domestic atmosphere of cosiness' and 'glow' created by the use of heat, fire and light among a set of older rural English householders, and how this 'cultural energy service' may be more valued than efficiency or emissions reduction. Wilhite et al. (1996) earlier made similar observations of the cultural importance of cosiness in Norwegian living rooms created through heat and light, while Bille et al.'s (2015) work more explicitly discusses the intentional production of affect and atmosphere through the deployment of lighting in Danish homes, designed to create and express specific subjectivities of self, home and neighbourhood.

Taken together, this incipient body of work starts to illuminate the many spaces and niches in which emotions and affect come into play in and around energy systems; and yet the body of work is also fractured, attending to either production or consumption, focusing on one technology or energy service or another. In the following sections of this paper, we address this by taking a more holistic approach to explore how an emotional-affective geography can arise around and within the time-spaces of a specific energy system. Even more fundamental to the relative lack of development of this area of research so far is a lack of sustained engagement with emotional geography work and the conceptual possibilities that it offers. Having identified this gap, we next discuss the concepts from emotional-affective geographies that we have found useful for our case study analysis, and which we believe offer particular opportunity for energy geography more generally.

2.2 Emotion and affect

Emotions are responses to our contact with other people and things in the world. They have a biochemical underpinning, but are usually understood as being cognitively processed, although not reducible to cognition (Hochschild, 2003; Pile, 2010). As such, whilst socially and culturally constructed through socio-historically contingent frames of reference (Lupton, 1998) they are generally held to be nameable and describable, such that people can talk about them, albeit sometimes with difficulty. Perhaps because of the association with cognition, theorisations and explorations of emotion have tended to focus on how they are experienced individually (Bondi 2005); yet, emotions are also relational, i.e. they arise in relation to something or someone (Ahmed, 2014; Bondi, 2005; Pile, 2010). Mindful that humanistic geography, an important forerunner of

emotional geography, has been subject to criticism for over-focusing on individual subjectivity, some scholars have sought to decentre the individual subject in emotional geographies, notably Bondi (2005) in drawing on psychotherapeutic theory and feminist perspectives, both of which emphasise intersubjectivity. Nevertheless, the concept of emotions, especially when contrasted with affect as we discuss below, tends to emphasise cognitive processes, communication through language, and at least by default, self-contained subjectivity.

For other geographers, the concept of affect has been mobilised in part as a way of getting beyond the apparently inherent individualism of the notion of emotion (McCormack, 2007, 2003; Thrift, 2008, 2004). Affect is more consistently theorised as transpersonal (Anderson, 2006), or "both within and between bodies" (Pile 2010 p.8), emerging from encounters. With affect, there is a greater focus on embodied experience, and on the body as the carrier of affect rather than the source and location of it; and it is also claimed that affect more readily acknowledges surroundings or context (Thrift 2004, p.60). In contrast to the cognitive inclination of emotions, affect is understood as pre-cognitive, and associated with the unconscious. Affect and the experience of affect therefore is not readily explained through language. As such, affect scholars often deploy non-representational approaches and methods or means of capturing affect that are non-verbal such as dance and performance (Dewsbury, 2003; McCormack, 2008; Wylie, 2002). Nonetheless, others do write about affect, and even draw on verbalisations: Bissell (2010), for example, uses observations and auto-ethnography as well as quotations from participants to infer affect. Pile (2010) is critical of this kind of equivocation, whilst conversely some authors question the need and value in opposing emotions and affect (Anderson, 2009; Bondi, 2005; Smith et al., 2009; Thien, 2005). For instance, from her knowledge of psychotherapeutic practice, Bondi (2005) argues that it is incorrect to assume emotions to be straightforwardly cognitively apprehendable; the naming and verbalising of them is always interpretive work, and often a collaborative project. For Bondi then, the distinction between emotion and affect is questionable, because emotions are always embodied, intersubjective, open to interpretation and often difficult to capture in language (see also Katz, 1999).

Whilst in this paper we acknowledge but cannot do full justice to the detailed ongoing discussions on emotions and affect, we understand the two concepts as not sharply distinct, but rather as overlapping concepts with different leanings that are nevertheless not entirely synonymous. If we think of a range of emotional—affective experiences, we understand the construct of emotion as relating more to experiences that are essentially felt by an individual, although other individuals might feel similarly, and more readily 'known' and satisfactorily communicated about through language. On the other hand, we take affect to draw attention to feelings that are more obviously

co-produced usually through co-presence, more embodied than cognitively processed and articulated, and in all likelihood harder to verbalise. Affect has the appearance therefore of flowing between bodies, or as a field, or potential, whilst emotion is more crystallised, "the capture and closure of affect" (Massumi, 2002 p.35). We do however believe that people can and do attempt to explain affect-related experiences in language, and that therefore language-based methods can be drawn on to apprehend affect, whilst not perfectly capturing it – as indeed, language alone can also be inadequate to convey emotion.

Although emotional geographies and geographical work on affect are concerned with setting and context one way or another, in practice attention is often to experience at a very small scale, of individuals, micro-encounters and within relatively intimate spaces. In seeking to explore the emotional-affective dimensions of a village setting and community life, we have found it useful to turn to the related notion of atmosphere.

2.3 Atmosphere

The concept of atmosphere may be best seen as an extension of the notion of affect (e.g. Anderson, 2009; Bissell, 2010; Duff, 2010) indeed, some authors refer to 'affective atmospheres' (Bissell, 2010; Shaw, 2014). The concept of atmosphere however provides a more 'grounded', place-based notion of affect and one that gives more attention to material aspects (Shaw, 2014, p.89): Bille et al., (2015, p. 36) for example define atmosphere as "a spatial experience of affect and materiality." In contrast to affect, the notion of atmosphere tends to be employed in association with more complex networks of things and people. Bissell (2010) argues that atmospheres emanate from the interplay of "different configurations of objects, technologies, and bodies" (2010, p.272). In other words, atmospheres emerge from assemblages (c.f. Shaw 2014), a point that we find particularly useful in relation to energy systems. Indeed atmospheres have been discussed in relation to other forms of infrastructure assemblage, notably transport (Bissell, 2010; Merriman, 2016; Simpson, 2017).

Like affect, atmospheres are fields, or propensities, between people and things, that offer potential for experience, feeling and action but are not always realised as such. Anderson (2009) discusses the relationship between atmosphere and emotion, arguing that atmospheres belong to collective situations, but can be felt personally. They are, then, resources on which emotional states can be formed (2009, p.78); but, Anderson adds, "[atmospheres] are always being taken up and reworked in lived experience – becoming part of feelings and emotions that may themselves become elements within other atmospheres." (p.79) Thus, the relationship of atmospheres with emotions can be understood as recursive: they may be pre-emotional, a resource from which emotions are derived, but at the same time emotions can be constituents of atmospheres.

Whilst atmospheres might be associated with a place (Duff 2010), they cannot be strictly located (Anderson, 2014, p. 148; Shaw, 2014, p. 89) but they can be felt through emplaced sensory experiences (Gandy, 2017) and in this way impart a sense of place (Rodaway, 1994). Atmospheres also have a temporal dimension: they are situated phenomena that are created and maintained through time, until they are transformed or cease to exist. Quite how long they exist for is indeterminate. For Bissell (2010), atmospheres are fleeting, being constantly formed and reformed. Anderson (2009) implies that they may be more enduring, whilst for Shaw (2014) they are in between those two positions, not stable in time but recurring (for example, nightly) in a similar fashion. Edensor (2015) encapsulates this temporal dynamism in documenting atmospheres of soccer stadia. On the one hand, he presents them as in continuous flux during a single match, whilst on the other hand, he also demonstrates how similar atmospheres are repeated from one match to the next, thus having a certain persistence and regularity as match situations are re-assembled.

In considering the more sustained manifestations of atmospheres, we come up against the phenomenon of 'structures of feeling', a term coined by Raymond Williams to describe "the felt sense of the quality of life at a particular place and time" (1975 p.47). Williams conceived of structures of feeling as affectual states characterising a specific generation or historical period, and we understand them thus as having a wider spatial reach and more temporally enduring nature than most atmospheres (see also Anderson, 2016). However, Williams did acknowledge them as potentially differentiated, and likely to be class-linked (Harding and Pribram, 2004). Literature on structures of feeling gives little attention to the role of materialities in their generation, and yet we would argue that infrastructural assemblages deserve consideration as pertinent contributors, through the atmospheres they induce and choreograph, that in repetition, form the substrate of the structure of feeling.

Having set out the conceptual framework drawn from emotional and affectual geographies that we wish to apply to our own case study, we now turn our attention to questions of methodology and how we used oral history to elicit emotions and interpret affect and atmospheres in the energy system.

3. Methodology

3.1 Oral history as a way of knowing

Emotion and affect can seem out of reach of many standard social science methods, although we take the view that both emotional and affective experiences can be expressed in language, if imperfectly. We worked with oral history interviews, a humanities-rooted method, and although the

choice of this method was not driven by an *a priori* analytical focus on emotions and / or affect, our intention was to bring conversations about energy into a different, more personal register. Later, we came to a stronger realisation of the multi-layered affinity of the method for working processually and analytically in the emotional-affectual realm. Here, we discuss oral history as a method before giving some more details of the case study context and our methodological procedures.

The practice of oral history involves recording people's spoken accounts of memories and life stories (Perks 1995). Its early development in the 1950s and 60s was concerned with documenting the histories of minority groups and working classes, as a type of subaltern, "history from below" (Thompson, 1966). It is now a well-established method in the humanities and social sciences, but also amongst non-academics who have an interest in recording and preserving everyday experiences of the past.

Although its uptake in geography has been rather modest (Riley and Harvey, 2007a) geographers have utilised the method in line with its origins to surface the stories of the relatively marginalised, (Smith and Jackson 1999; McDowell 2004) especially regarding relationships with equally marginalised or hidden places (Andrews et al., 2006; Brown, 2001; Bryden, 2004). The biographical nature of oral histories has enabled the tracing of individuals' perceptions and understanding of change around them including space and landscape change (Andrews et al., 2006; Riley and Harvey, 2007b; Rogaly and Qureshi, 2017). Other scholars have been interested in how such situated knowledge about change may be put to substantive use for contemporary problem solving, especially in people-environment relations (Riley and Harvey, 2007a). Recent work related to climate change has used oral histories to explore locally embedded relationships that people have with weather, arguing that one strength of the method is its ability to bring emotional aspects into view (Hall and Endfield, 2016; Jones et al., 2012).

Our decision to work with oral histories was a joint one with the community in which we were working. From the community perspective, the process and product could be interesting for participants and the wider community. For us as researchers, its ability to engage fulfilled a primary objective, but informed by the above literature, we recognised further advantages to applying the method in energy geography. The everyday, intimate histories and geographies of energy systems and transitions often remain obscured as dominant narratives relate to larger scale policy and technical change. Oral histories as a form of emplaced, personal narrative have the potential to rescale and re-situate our understanding. They may give us substantive knowledge for identifying pathways for change; and most importantly for the purposes of this paper, the personal narratives have the ability to hold and communicate emotion.

Oral history as a research method has had some critique, which we should not overlook. An oft-discussed problematisation relates to the accuracy and reliability of memory (Andrews et al. 2006; Ní Laoire 2007; Rogaly and Qureshi 2017). To a large extent this is an extension of debates about reliability in qualitative research more generally, which are well-rehearsed, and defended (e.g. Denzin, 1994; Tracy, 2010) – but like other interview methods, it would be unwise to use oral history within a naïve realist framework.

Linked to such concerns about accuracy and 'truth', nostalgia, especially about past communities, is a dimension of recollection often regarded with suspicion on the basis that it is inaccurate, reactionary, and a device for exclusion (e.g. Watson and Wells 2005; Savage 2008). Recent reassessments however argue that nostalgia has the potential to be 'productive' (Blunt, 2003) revealing hopes for the present and future, and helpful in holding place and community attachments during times of change (Bonnett and Alexander, 2013; Ramsden, 2016). For example, Bonnett and Alexander, reflecting on interviews with ex-residents of Tyneside, show nostalgia for neighbourhoods and communities of earlier years to be reflexive as well as sentimental, and expressive of an active current engagement with place, containing negative and positive critique of changes that the ex-residents saw. As an "affective connection to the place's past" (Wheeler, 2017, p. 481), nostalgia is relevant for understanding present experiences of space and place and supporting people in dealing with the social and physical changes of the place they are attached to.

We take from these critiques a caution against simplistic interpretations of oral history material as straightforwardly revealing the past as it was, and we are aware that the narratives in our research – like other interview narratives – have been recorded in a specific context with various positionalities at play. We view them as selective accounts that reveal something of the past, but also something of what the tellers feel about the present and future, a point that we shall return to later.

3.2 Case study context

The village of Ynysybwl lies fifteen miles north-north-west of Wales' capital city Cardiff in the country borough of Rhondda Cynon Taf (RCT), which includes five valleys. It is in the heart of the South Wales coalfields, once one of the most productive coal producing regions in the world. Until the late nineteenth century, Ynysybwl was a small agricultural village, but this changed with the establishment of the Lady Windsor Colliery in 1883. This colliery was located abutting the village (see figure 1) and operated until the demise of the deep coal mining industry in the UK, closing in 1988. This was a turbulent period in UK history and the de-industrialisation of the Welsh valleys and other mining areas was socially and economically traumatic. The area remains one of the most economically deprived in the UK: 23 percent of the Welsh population lives in relative poverty

(Joseph Rowntree Foundation 2016), with the South Wales valleys worst affected (Welsh Assembly Government 2016). Ynysybwl currently counts around 4,600 inhabitants, with around 22 percent of the population aged 60 and above (NOMIS, 2011). Since the pit closures, the physical signs of coal mining in the landscape have mostly disappeared and have recently been replaced by structures of renewable energy production, as the Welsh Government attempts to implement an ambitious low carbon energy transition. For example, since 2014 the Swedish-owned Pen-y-Cymoedd project has installed seventy six wind turbines in RCT and the neighbouring borough - developments which are failing to gain the full support of inhabitants (Llewellyn et al., 2017).

Figure 1

3.3 Data collection

Underpinned by an ethos of co-creation, our work involved a long process of engagement and relationship-building in the village, starting with meetings with various community organisations in October and November 2014 to discuss the aims of the wider project and their possible involvement, followed by regular visits to the village throughout the 2014-2015 winter. The focus of those conversations was on how we could use the concept of 'stories', central to the wider project, to explore local inhabitants' evolving relationship with energy. Various ways of doing so, such as walking interviews, were discussed. Having settled after discussions on an oral history-based activity with older residents as a first significant project, we started participant recruitment in April 2015 and conducted energy-themed oral history interviews with sixteen people between May and June 2015. Whilst we draw in this paper on those oral history interviews, our involvement with the community continued, culminating in a two-day event in May 2016 co-organised by our team and our community partners, which showcased material produced through the project in the region, including extracts of the oral histories. The community retained the oral histories in their own archives and the oral histories are available to a wider audience via the project's online platform[1].

Oral history is less concerned with representativeness than with depth of information (Plummer, 2001), therefore we adopted a purposive sampling strategy based on the project's interests in everyday lives and place-based communities. Participants needed to be sixty or over at the time of the research, and to have lived locally for a majority of their adult lives, allowing us to collect a set of emplaced histories. Six of the 16 participants were introduced to us through the Ynysybwl Regeneration Partnership, a local development trust. Five more volunteered after we gave an informal presentation about the project to the local branch of the Coal Industry Social Welfare Organisation and a further 5 came forward after we gave the same presentation at a local sheltered housing scheme. Especially with the latter group, we were mindful of potential vulnerabilities that might need to be balanced against the project's ethos of inclusion, but self-selection proved to be effective at managing these concerns. Of the 16 volunteers, 11 were women and 5 were men. Fourteen were born and grew up in Ynysybwl or nearby villages in RCT, one was born in northern England and moved to Ynysybwl aged 26 due to her husband's work at the colliery, and one was born in London and settled in Ynysybwl in her late 30s. At the time of the interviews, the youngest participant was 61 and the oldest 81.

[1] All participants gave explicit consent for material to be held under a creative commons licence, to be available online, and for identities to be known. [https://storiesofchange.ac.uk/]

One purpose of the initial presentation was to orientate people to the focus of our interest in energy, and the intention to produce energy-themed oral histories. We recognised that it is not a straightforward topic, hence, we aimed to provide some ways into thinking about how energy features in people's lives generally. We also wanted to encourage people to think not only about the mining industry, which we anticipated to be where thoughts might fix, given the community's history. The presentation therefore invited people to think broadly about energy consumption, energy conservation, and energy production, using images of everyday objects, and we facilitated a conversation with attendees about what the images evoked for them. With those whom we did not meet as a group, we held similar individual conversations.

The following one-to-one sessions lasted 45 minutes to an hour, and took place in the participant's own home or another familiar place. Before starting, each interviewee was invited to describe the time of their life that they were interested in talking about. We also reminded participants of the energy focus, and discussed this further where necessary. There was no interview protocol, but rather our technique was to use prompts or follow up questions that based on where the conversation took us, could be used to explore the energy related aspects of participants' lives. For example, participants might be asked to expand on any activities where they may have been using energy, such as heating their homes, preparing their food, or travelling. Intervention by the interviewer was kept low, in order for the material to consist as much as possible of the participant's own narrative. Although it was not prescribed, all the participants chose to talk about their childhood, with some also speaking about early adulthood and married life. Very few talked unprompted about the more recent past or the present.

3.4 Data analysis

The interviews were recorded and after transcription were thematically analysed using NVivo. We developed a coding framework inductively, through independent readings of the transcripts followed by discussion. Initially, descriptive categories were used and interpretation of the material within these was an iterative and collaborative process.

Emotions and affect were not an *a priori* focus of our inquiry and hence not the basis of a deductive approach to analysis, but rather emerged as key aspects of people's lived experiences with energy on close reading of the transcripts. We therefore introduced in our coding a node on 'emotions' which started by focusing narrowly on expressed feelings relating to "specific, nameable states" (Bondi 2005, p.437). Whilst there were many instances when people described such emotions, we also felt that there were other related aspects that this did not sufficiently capture, which led to us developing our thinking in terms of affect and atmosphere. Bearing in mind the aforementioned

methodological challenges associated with researching affect, we follow Parkhill et al. (2011, p.327) in their proposition that through interpretation, we can “bring affect into representation, without invalidating its inexpressiblity.” We argue that through their evocative accounts, participants offer ways into the affective and atmospheric landscape of the particular situated energy system. We are also mindful that the interviews generated their own atmosphere, in which the interplay between the subjectivities of the interviewees and the interviewer created the ‘emotional texture’ (Holmes, 2017) of the interview. As a result, we approach the stories not as direct revelations of emotional and affectual phenomena, but as artefacts that are open to interpretation, as is reflected in our use of quotes in the following sections.

4. Emotional and affective potential of a coal-based energy system

In this section we present an interpretation of the emotions, affects and atmospheres encountered and engendered in the various time-spaces of Ynysybwl as a community of both energy production and consumption in the mid-20th century, as gathered from the oral histories. For presentational purposes we structure the discussion in terms of mine, home and village, but emphasise that these time-spaces were highly porous and interconnected, at once produced by and fundamental elements of the energy system, and open to emotional and affectual flows.

4.1 Multiple atmospheres of the coal mine

Ynysybwl’s coalminers were on the frontline of the extraction industry and exposed daily to its risks. The coming together of miners’ bodies with the hard yet often unstable rock, the machinery of the lifts, tracks and drills, and the necessary explosives, resulted in frequent injury and occasional fatality. Apart from such immediate violence, the coal dust was taken into miners’ bodies, forming blue scars as it lodged permanently under the skin after cuts, and wreaking slower damage to their health through pulmonary diseases. It is not surprising then that from this assemblage there would emanate a widely perceived atmosphere involving a sense of danger and apprehension. Only two of the study’s participants were miners themselves, but all the participants had a mining connection in their close family. Their accounts vividly evoke how such an atmosphere was an ever-present backdrop to family life, circulating through the village, crystallising from time to time into emotional experiences of anxiety and fear, and intensified by a particular incident or association. For example, Jill, who grew up in the 1950s, remembered this:

> “But when I was a child … even before I realised that accidents did happen in these collieries, I was afraid when my father went to work under the ground, … I didn’t like it as a child and he’d go off on

> nights and I can remember lying in bed thinking, praying really, saying your prayers and saying, 'Please bring dad home in the morning' because it was such an awful, awful place as far as I was concerned, and the more that people sent you away from top pits to play, the more it had this sinister sort of feel about it, and of course the men went down clean and came back dirty, and you used to think, what are they doing? And things like getting dad's tommy box ready, my mother would have to unwrap the chocolate biscuits and I'd say, 'Why are you taking the silver paper off?' 'Not allowed to take silver paper down the pits. Not allowed to take anything shiny[2] down the pits."

Although worry could be read as a sensible cognitive response to the regular harm that miners came to at the time (e.g. 429 miners died due to work-related accidents in South Wales in the 1960s alone, Johnes, 2016), it is notable that Jill's first apprehension of the danger of mining was not to her recall through any specific occurrence or factual knowledge, but rather through a realisation of what we read as the atmosphere propagated through the materialities and practices surrounding the mine and the miners' work.

At the same time though, a co-existent atmosphere centred on the mine itself was portrayed in the accounts of the two participants who were themselves miners. Apparently, in the small spaces of the mine, affectual flows of intimacy and friendship abounded, engendered by the close proximity of bodies and reinforced through the performance of co-operative practices that were crucial to miners' survival.

> Lionel: Some of it was part of my job, and other work wasn't but I was helping out, do you know, the ropes used to go up and down, when they changed them I helped with that. Everybody mucks in and helps. And all kinds of different work, everybody has a go to help each other. That's the one thing, …, camaraderie, you know, and it's all done in good … good faith then, you know.

The miners themselves did not talk about intimacy at length, and more often obliquely through practical examples of co-operation and assertions of strong loyalty. Nevertheless the 'camaraderie' fostered underground was a recurring theme, also figuring in other participants' accounts and often

[2] Safety precautions banned anything that could have caused a spark and thus an explosion from being taken underground.

in our wider conversations in the village. It was clearly fundamental to community life. Indeed, it was explained, the strength of the community bonds could not be understood without understanding the solidarity and mutual dependence deeply rooted in this affectual crucible of the small underground spaces, where lives depended on co-operation.

A further complication, subversion even, of the more pervasive, danger-filled atmosphere connected with the mine came about through the playful practices of the participants as children. Perhaps surprisingly, children would be found regularly around the overground operations of the mine, creatively transforming the landscape into a playground. Jill's memory of various games played on the tips[3], typical of the kind of anecdotes that we heard, evokes the more fleeting atmospheres created through the children's playful engagement with the substances and edifices of the mine's site, and the embodied, barely verbalised affects that we might describe as excitement, fun, or mischief, circulating between them:

> "So the coal figures very highly in my childhood because we played on the tips, we slid down the tips, we played on the slurry bays[4], the policeman would knock on the door and say we'd been up there and we'd get into all sorts of trouble because it was very dangerous! We'd go up on the railway that takes the coal away from the colliery. If you were caught on top you were in big trouble. So it was an awful lot of my childhood going round the pit.
>
> So we didn't realise you didn't have any money, because nobody else had any money, and you were very rich 'cause you had this wonderful playground where you could go, the tips … if you were lucky you'd find a bit of conveyer belt and that was really good [to slide down]!"

Following Duff (2010) we can apprehend how the materialities of the mine enabled and were drawn into specific games that were part of the children's place-making through this recursive affective engagement with each other and the surroundings.

We have a sense then of a diversity of atmospheres of varying temporalities in and around the mine, arising from the convergences and practices of different groupings of people in their encounters with the mine's materialities, and instigating outward affectual flows and precipitations of emotion.

[3] Mounds of waste from the mining activities
[4] Storage areas of waste water mixed with coal dust

Moving beyond the mine and the activities of fuel production, further emotional –affectual phenomena come into view, discussed next, where we also consider those arising from energy system change over time.

4.2 Affect and emotions in domestic spaces

As participants were growing up, coal was the primary fuel within their homes. Most people in the Welsh valleys did not have electricity through the 1950s, relatively late compared to England where ninety percent of homes were connected to the national electricity grid by 1951 (Ravetz and Turkington 1995). Coal fires were the only source of heat for both cooking (on ranges) and space heating and generally only the kitchen and one living room would be heated, partly for reasons of economy, and partly because of the work required in preparing and tending coal fires. The micro-geography of warmth within the house dictated where activities would take place, and therefore when indoors, people were in very close proximity. Energy services for entertainment were also limited to the radio (or 'wireless'). Both wireless and fire provided focal points around which people gathered. Mabel's account vividly depicts a convivial atmosphere that would arise out of such gatherings, and of the need to be resourceful about entertainment:

> "… because we'd no television and we had to wait so long for the batteries in the wireless to warm up, so we all entertained ourselves, and then we were all laughing in our place, because the fires were back to back, the big lead grates were back-to-back and Mr and Mrs Hughes next-door they would knock the wall with a broomstick and they'd come in and he would fetch his ukulele and we'd all have comb and paper and we'd all be singing and what-you-calling in our house. So our kitchen would be crowded."

The design and construction of the houses based around a coal system is important here, as the fireplaces provided not only the essential source of warmth, but also, through the shared chimney, a conduit of sound and of affect, alerting the neighbours to the growing atmosphere of gaiety and recruiting them into it.

Whilst this is a memory of a specific instance, there is a sense across the collection of oral histories that this type of event would be recurring. Each would have had their own specific atmosphere, negotiated 'in the moment' (Duff 2010), but the recurrence of similar convivial atmospheres (Edensor, 2012), contributed to a more enduring sense of (working class) community, that could be read as a structure of feeling (Williams, 1975).

Over time, as the valleys were electrified, new appliances started to appear in domestic spaces. Our participants recalled their own personal emotions of wonder and amazement provoked by the arrival of such things in their own and their friends' homes, as they were still children, and struggled to understand them:

> Tony: "going back to youngsters and prefabs, in the early sixties, late fifties, they had fridges! I couldn't believe it. I kept opening and closing this fridge because it was a light in it, and I … you couldn't believe it! And they had a washing machine, a proper washing machine. It was like a toy for us, it really was!"

> Wynford: "And I can remember, it must have been in the fifties when we had our first electric cooker, a Revo I think it was called…. And this cooker was <laughs> out of the ark we'd say now, but at the time it was state-of-the-art … And it was a marvel, because you were getting heat out of something we couldn't see, with a coal fire you can see the coal, you can see the sparks and you know it's heat, but this thing was electricity, you pressed a button on the wall and this thing cooked your Sunday joint. But it was marvellous really."

Yet for adults, these appliances needed to be absorbed into the domestic arrangements and routines, mastered and trusted – a process often involving suspicion, confusion, and a host of other emotions. The following anecdote from Jill illustrates what can be interpreted as a brief atmosphere of hilarity, occasioned by an encounter with an untamed washing machine:

> Jill: "I think we were the first people in the street to have an automatic washing machine. But my mother … my mother would still wash all the clothes with a scrubbing board in the bath and then put them in the automatic washing machine, because she felt they wouldn't come out clean. And it was a Bendix washing machine and it had be cemented into the floor, there was a big bar to be cemented in the floor and one day dad said he was going to move it a few feet, 'cause he wanted to put something else there… and he moved it but he didn't cement it back in the floor, so the next time my mother put it in she was riding it round the kitchen and it was ripping up the floor! It was quite good! <Laughter>"

Clearly the energy transition away from a coal dominated system to one drawing more on electricity and mains gas involved a change in the infrastructural assemblages, and given the propensity of infrastructures to 'produce the ambient conditions of everyday life' (Larkin, 2013, p. 336) thus in the atmospheres encountered in domestic spaces in Ynysybwl. In reference to this, some participants expressed a sense of loss, telling us they missed coal and coal fires. What they missed was not usually the materiality of coal as a fuel, as it was acknowledged as messy and hard work to use, but more often sensory experiences of the type of warmth, smell, taste of food, and the affectual atmospheres of coal-fired homes.

> Ann: "Well now I'm on gas, ain't I? I was on coal central heating, which as I told you I prefer the coal. <Pause> (with longing): But I do miss my coal fire. If anybody come to me and said, 'I'd sort your coal out. Would you go back?' I'd go back to it tomorrow. Definitely would."

So far, we have discussed the emotional and affective potentials of the spaces of energy production and consumption somewhat separately, but they were of course adjacent and overlapping. Next we address how the coming together of these created certain atmospheric conditions around the village and its environs.

4.3 Village atmosphere and sense of place

As with Shaw's night time city (2014), the assemblage of structures, activities, materials and organisms in and around the village of Ynysybwl would have generated a specific atmosphere, which may also be understood as a sense of place. The energy system was fundamentally constitutive of this, through the materialities and practices of both production and consumption, which created particular sensory experiences. Larkin (2013) draws attention to the aesthetic power of infrastructures, part symbolic and representational, but also strongly embodied and sensorial, and our oral histories are full of confirmations of this, and expressive of the attendant affect.

Gallagher (2016) discusses sound as a potent affective force, both conveyor of affect and a form of affect in itself; and our participants' accounts of Ynysybwl in their childhoods and earlier adulthood contained many mentions of sounds that were part of the fabric of the place: the conveyor belt and the washeries, the transport of coal out of the mine by steam train, the sound of coal dropped onto the road outside houses when the regular 'concessionary'[5] deliveries were made. The most emblematic sound was that of the pit hooter, marking miners' shift changes but also a useful time-

[5] Regular coal allowance given to miners as part of their wages

keep for the rest of the village. A change in the hooter would bring about a swift change in atmosphere, as it signified something wrong – a sudden affectual flow would precipitate as intense fear and anxiety in village residents, emotions which would become incorporated as elements of the new atmosphere (cf. Anderson 2009):

> Jill: "And I can remember the pit hooter going … oh yeah! I can remember the pit hooter going out of sync and even as children we realised that there was something wrong, that there'd been an accident. We would know if the pit hooter'd gone…"
>
> Marianne: "I can remember the hooter going when there was that dreadful explosion there and that man got killed because it was a noise that everyone hated here, nobody wanted to hear it."

Air itself can be "encountered and inhabited as a materiality constitutive of affective atmospheres" (Adey, 2015, p. 57), and the air in Ynysybwl during the active mining years had particular qualities imparted by dust and smoke. The coal dust that was already mentioned as lodging under the skin of miners and dirtying children's clothes, was also spoken of as travelling far beyond the mine to coat the environs of the village and valley, and literally colour their world. Comparing the contemporary cleaned up landscape with the landscape of her childhood, Eleanor reminisced:

> "You never seen a lilac tree with white flowers on it, you'd see 'em with dark grey because of the coal dust flying everywhere…..and the flowers, red roses were grey red roses, because they would be! Where I lived they used to have the sheds where they'd repair the engines, so you'd have all that smoke and stuff like that from the engine sheds and you didn't know what colour anything was really."

Indeed, in an energy system that relied on coal for heating and cooking, coal smoke and its attendant, particular smell was pervasive,

> "You always smelt fire, because everyone had a coal fire. And especially when the damp coal was put on the fire … and the drift of smoke, the smoke through the village." (Tom)

Like sound (Gallagher 2016), smell is a conductor of affect in a way that can produce a sharp connection with place (Rodaway, 1994). Lighting can also contribute to affective contexts (Edensor 2012; Bille et al 2015) and in Ynysybwl, it played a part in creating the village's atmosphere,

specifically that from the mine site itself. In an evocative description, Tom, who then lived, and still lives, some way up the valley, expressed the closure and turning off the mine's lights, up until then a constant presence, as a signifier of the "disappearance" of the village:

> "Up until the pit closed, the only knowledge we ever had from this house that the village was there was the light of the pit. And it was as if the light was put out, not only the pit closed but actually we couldn't see anything of the village. From my front garden you can't see the village. But we always could see the village because of the light of the pit. But that's gone."

With the closure of the mine, the atmosphere of the village as it had been experienced up until then ceased to exist. With the cessation of mining activities, key sensory cues ended, and people's experiences of their environment were transformed, disturbing their sense of place. This connected with a feeling that the village had lost its purpose and was woven with narratives of people leaving the village to go and look for work elsewhere. As well as the understandable emotions associated with economic decline (Pini et al., 2010), participants expressed emotions about the changed atmosphere , both in itself and as a metaphor for the health of the community:

> Kathy: "So in the 25, 26 years since the colliery's gone certainly the heart has gone out of the village as far as standards and pride is concerned. Read into that what you will, but I can certainly see it as you go along. The main roads are not… shops are boarded up and one or two people will … will go to the extent of putting a bit of dressed stone back up on the buildings, but it's just slap up as quick as you can and let's get people in there and visually it's just degenerated, I think."

4.4 Affect and atmosphere in the oral history telling

We noted earlier that oral histories are not straightforwardly objective testimony about the past as it was, and relevant to thinking about the implications of that is attending to the oral history telling as an affectual event, building an atmosphere between and around the teller and the listener (the interviewer, or the listener to a recording) (Gallagher et al., 2017). The selection of what is told, but as much as anything the voices, tones, pauses, are the means by which this is induced. The interview events could be interpreted in parts as an exercise in nostalgia; for example, through several instances of a 'poor but happy' trope:

> Ann: "Yeah, when we were younger, my mother had ten of us and we used to go over to the tip with my father with the horse and cart, a bucket each, up on the tip getting buckets of coal, and we used to come home and we used to have a bath in the tub in turns. I think we'd see a better life then than we do today. It was more enjoyable…"

> Wynford: "When you're looking back I think, 'My gosh, is that all we had?' but I had such a happy childhood, wonderful it was."

Building on Bennett (2009) and Blunt (2003), we argue that in this instance nostalgia is significant as a coping mechanism in the face of difficult change, but also in that it reveals something about what people feel about the present and future: what they care about, what they feel they have lost and would like to regain. For instance, in this testimony from Tony, his sense of loss of conviviality, and community sharing, a fundamental element of the structure of feeling of the past working-class community (see also e.g. Ramsden, 2016) transpires:

> Tony: "So it was always families would share, communities would share. Life is too fast now I think and people go home and shut their doors and have a cup of tea and their TV or whatever, and just watch television."

Even so, nostalgia, in our reading and hearing, was not dominant, and alongside some sense of loss was also relief, as some changes were spoken about as life improvements. Noticeably, while ex-miners often expressed a longing for the return of active mining, relief at a burden left behind came through more in women's interviews, which might have something to do with the emotions and affect that they had experienced – and those they did not experience – as family members of miners, rather than as miners themselves.

> Eleanor: "Look at all the men – alright we still use coal and one thing and another, but look at the men who've lost their lives through the chest infections and they've gone down there and worked for their families, and no better off. Young men doing it. I think it's better now."

5. Discussion

As we noted in the introduction, energy enterprises and energy research have been, and largely continue to be, affected by a kind of Cartesian dualism that sees the energy domain as quite separate from the world of emotion and 'feelings'. And yet, once one starts to look for it, emotional-affectual phenomena are to be found everywhere within energy systems. Our suggestion is that using research and public engagement techniques drawn more from the arts and humanities is more likely to surface these, with one example being the oral history method we have discussed here. We have also sought to demonstrate that concepts that have been much discussed in the field of emotional geographies, in which we include affect, atmospheres and structures of feeling, can provide the vocabulary for grasping and exploring these phenomena. Whilst we acknowledge that we are not the first to identify any kind of emotion in relation to energy (see section 2.1), we have endeavoured to bring together more specifically an emotional energy geography that can take a more holistic view of an energy system, and is attuned to how it contributes to the production of space.

Our discussion of accounts from Ynysybwyl has revealed more than just emotions *about* energy at play. Rather, we can interpret a variety of atmospheres and affects, some more crystallised as emotions, engendered by the energy system and arising in different spaces within it. In such a place, where energy production and consumption are co-located, we can really grasp the infrastructuring (Simpson, 2017) power of the energy system, and the affectual agency of that assemblage. This is indeed a lively infrastructure (Amin, 2014), and one that organises and choreographs bodies and other materialities in such ways that myriad affects and atmospheres are induced, and in this way the emotional-affectual background, not only the sensory texture (c.f. Larkin 2013), of everyday life is brought about. The evocative accounts of past Ynysybwl bring to the listener (or reader) a resonance of those atmospheres of differing temporalities, the currents of embodied affect, and the perhaps more private and cognitively processed emotions (although we remain aware that the affect-emotion distinction is not so straightforward).

These stories also tell us a lot about how change in energy systems feels, and this is perhaps where their greatest significance lies, for our current times. Again, this is more than just feelings about loss of livelihood (c.f. Pini et al, 2010), or about landscape change (c.f. Cass and Walker, 2009) although both of those figure. It is also about major changes in sense of place, in affectual bonds, as bodies become choreographed in quite other ways, and in the atmospheres of everyday life-in-place that can amount to a change in the whole structure of feeling. Although it is easy to fix on the sense of loss in Ynysybwl, it is important to note that different parties had different emotions about various

aspects of change – above we touched on some differences between ex-miners and women's accounts for example – and also that change threw up positive emotions as well, such as wonder, relief, and hope for the future. Our contention is that recognising and engaging with emotions and affect is crucial in managing energy system change, and can offer ways forward, as negative emotions once acknowledged can potentially be collectively worked through, and more positive emotions harnessed and nurtured. Additionally, we need to pay attention to the multiple atmospheres arising in and from the new assemblages of novel energy systems that supersede older ones as energy transitions unfold, and insofar as affect can be engineered (Thrift, 2004), we should engage people in how best to create infrastructural assemblages that induce positive affect, to better facilitate their acceptance.

6. Conclusion

In this paper, we have argued that energy geographers should pay more sustained attention to affectual aspects of energy systems. To exemplify how energy geography may be enriched by deploying concepts from geographical work on emotions and affect, we have considered a case study of a former coal mining community in South Wales UK, based on oral history testimonies of some of its older inhabitants. We have discussed how our participants' accounts vividly communicate a rich emotional-affectual geography arising from and within the coal based energy system. Through them, we can apprehend how the assemblage of materialities, bodies, practices and vibrations gave rise to an array of atmospheres of differing extent and temporality, currents of affect, and provoked a range of emotions. The testimonies evoke how these currents created both a specific sense of place, and point to the affectual power of energy infrastructures and their agency in generating the affectual landscape of the time. Further affects arise from the telling-listening dynamic, where the stories communicate and provoke feelings not only about the past, but also about the present and future, of energy systems and the spaces, places and communities that they produce.

Such emotions and affects arising from, within and about energy systems matter enormously, most obviously in relation to the imperative to achieve energy system change, for reasons of decarbonisation and more equitable global development. In the difficult work of managing energy transitions, much more engagement with emotion and acknowledgement of the affects and atmospheres of energy systems is needed. We propose therefore many avenues for further research. There is much opportunity to explore the emotional-affectual landscapes of different energy systems and assemblages, and their agentic role in the production of space. Differential experiences according to different positionalities need consideration, for example in relation to

gender, generation, employment. Bringing about the sharing of experiences in a more emotional register stands to be fruitful; and visioning landscapes of future emplaced energy systems to explore their atmospheres could be exciting. Such endeavours may require experimentation with different methods, for example non-representational and creative methods, to find ways of communicating affect and emotion, both in and about energy systems. It is our belief that energy geographers specifically are excellently placed to lead on such an agenda, so as to better equip academic and non-academic communities to grapple with the multiple energy challenges we currently face.

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Figure 1 caption

Ynysybwl from Lady Windsor Colliery winding gear, circa 1964; image courtesy of Rhondda Cynon Taf Archives