Lively methods for net-zero governance and public engagement

Karen Henwood, School of Social Sciences, Cardiff University
Nick Pidgeon, School of Psychology, Cardiff University
Contact: henwoodk@cardiff.ac.uk

Abstract

Many current approaches to net zero and public engagement render the temporal implications of change for people and communities as essentially invisible. This pap=er demonstrates how creative design techniques and methods drawn from SHAPE-based research can help address this gap, through augmenting public engagement with situated, active, and energised aspects of human experience as lived in and through time—something referred to here as human and societal 'liveliness'. Creative design techniques are presented from public engagement projects on local energy system change, domestic heating decarbonisation, and community energy. Liveliness as something that comes with temporal understanding can and should be made integral to public engagements for net zero.

Keywords

net zero, public engagement, temporality, human experience, liveliness

Notes on the authors

Karen Henwood is Professor of Social Sciences at Cardiff University and a qualitative research methodologist with a track record in public engagement and net-zero research. Her current RCUK projects include 'Hydrogen Integration for the Accelerated Energy Transitions' (HiAct-EPSRC) and the BBSRC-funded 'Enhanced Rock Weathering Greenhouse Gas Removal Demonstrator' (GGR-ERW-D – BBSRC). She specialises in in-depth longitudinal and community case studies; deliberative, interpretive and psychosocial research, and the use of methodological innovation to engage local communities with issues of risk, environmental controversy and affect. A social psychologist by training, she has long-term interests in environmental and socio-cultural risks and uncertainties in changing times, with a specific focus on identity dynamics and their implications in everyday life and at systems level.

Nick Pidgeon MBE FBA is Professor of Environmental Psychology and Risk at Cardiff University and Director of its Understanding Risk Research Group. His research looks at public engagement, communication and decision-making for environmental, energy and emerging technology risks. He was awarded an MBE in 2014 for services to climate change awareness and energy security policy in the UK, and is currently a member of the independent Science and Technology Advisory Council at the UK Department of Energy Security and Net Zero. Nick chaired the 2006 All Party Parliamentary Group Inquiry on the scope for political consensus and climate change which recommended the setting up of the UK Climate Change Committee (https://orca.cardiff.ac.uk/id/eprint/48170).

to respond to the problem or challenge we are investigating … requires a researcher to approach design as an assemblage of different resources. … People, things and places are all valuable resources … knowledge frames, skills, insights, materials and collaborative spaces are (all) resources that facilitate progress. … It is it is in the design of such projects that the possibility for new imagination occurs.

Swift (2022: 291)

Introduction

This paper poses novel theoretical and methodological questions about the means for incorporating time and temporality into public engagements for net-zero governance and policy. Time expressed in conventional chronological terms of past, present and future is a critical but often overlooked dimension when thinking about net zero, but one with profound implications across multiple aspects of society. How will domestic activities and everyday rhythms of life change when homes of the future operate as part of a flexible electricity system? Can a consideration of time and timing contribute to greater fairness for industrial communities as production moves away from energy-intensive fossil-fuel use? How might cycles of farming activity be reorganised in both time and space to match assumptions made about land-based emissions in UK carbon budgets? Our lived experience and understandings of time are, however, more than merely chronological, being profoundly psychological and social in nature too. Hence, the term 'temporality' is used throughout to refer to the human perception and social organisation of time. The transitioning of everyday domestic spaces, industrial activity and land-use will need, as a result, to be embedded within communities and places in ways orchestrated at overlapping temporal horizons and rhythms. And as befits any complex systems problem, the choices made in one place and time will constrain what might occur elsewhere or later on.

Public engagement, its objectives and the varied publics involved have accrued multiple meanings and approaches over the past forty years.[1] Here we refer to it as processes of dialogue and deliberation amongst affected parties and citizens about a potentially controversial issue or linked issues,[2] in this case in the net-zero policy space. In doing so we make a key distinction between citizen engagement tools as *community-based* (bottom-up) or *policy-driven* (top down), and engagement as a fundamental *research and methodological effort* in the social sciences, humanities and arts based (SHAPE) disciplines. Our conviction is that the former two modes of public engagement should always be informed by insights and learning from the latter. In particular, addressing many net-zero questions within public engagement practice requires a deep understanding of qualitative aspects of time and extended temporality—what we refer to throughout as human and societal 'liveliness'. Liveliness can be thought of as comprising the situated, active and energised aspects of human experience as lived in and through time.

Attending to liveliness allows for:

- The everyday experiences and emotions of people and communities to be made central to net-zero thinking and policy.
- Questions to be posed about risk, uncertainty, choice and the material and emotional impacts of lived experience within a rapidly changing world.

[1] DEFRA (2021). See also Chilvers *et al.* (2021).

[2] Rogers-Hayden & Pidgeon (2007).

Reflecting upon the role of time and society is also important because it is itself an emerging point of contestation in the face of climate urgency. In the same way that extended transitioning around incremental technical innovation sits in uncomfortable juxtaposition with demands for an urgent and immediate response to accelerating climate risk,[3] so too are calls for extensive public engagement viewed by some as another discourse of 'climate delay'.[4]

In this paper we demonstrate how creative design techniques and methods drawn from SHAPE-based research can augment extant public engagement strategies to draw out aspects of human and societal liveliness. In this way we argue that the SHAPE disciplines can make a major contribution to net-zero governance and policy through addressing human and societal liveliness.

Provenance: SHAPE perspectives on liveliness, time and the relational nature of human life

When considering what is 'lively' about research methodologies it is important to start with the ideas and practices of interpretive inquiry. As a foundational perspective in the SHAPE disciplines, interpretive research aims to elucidate how ordinary meanings and everyday life practices are the making of our social worlds.[5] Capabilities in interpretive methods have been developed to overcome the limitations of approaches (surveys, quantitative testing, experiments, etc) that record systematically but in so doing render much of the human world lifeless and inert.[6] Philosophically speaking, bodies of work such as hermeneutics explain how working interpretively is a way of studying human life that is 'not the mere imitation, accidental or otherwise, of something but the deliberate creation of something in order to represent something else'.[7] Interpretation's liveliness comes from the ways in which it is possible to move beyond simple descriptions of objects and phenomena in the social world to elucidate the ways in which lived experience blossoms forth. In effect 'lively expression is that which expresses existence as alive'.[8]

A particular focus of interpretive methods is on emotions and affects, and in providing ways of capturing dynamic biographical and socio-cultural forms of meaning making. Time is implicated in this effort because 'daily existence comes through [as] far more than a private uninteresting space … that abstractly define its temporality … it is the sphere where history becomes concrete and where geopolitical events eventually become real, experienced on the nerves and skin of ordinary subjects'.[9] Such subjects are also seen as relational—that is, as making their own meaning by drawing on social and cultural resources (values, narratives, frames) opened up via their social, community and institutional relationships. People's perspectives on the world are as a result not only products of their individual biographies, they become heightened in salience, suppressed or otherwise (de)activated when entwined with shared socio-cultural histories and identities. Just as our biographical and historical narratives ensure that the past persists in the present, and presages the

[3] Lamb *et al.* (2020).

[4] Carr-Whitworth *et al.* (2023).

[5] Hitchings & Latham (2024).

[6] Back & Puwar (2012).

[7] Simms (2003: 62).

[8] Ricoeur (1977: 43).

[9] Dal-Gobbo (2023: 3).

future, they also construct the relationships that subjects take up as dynamic and in motion.[10]

Our own research makes use of interpretative perspectives in environmental risk research through an evolving portfolio of creative qualitative methods for studying everyday perceptions, experiences and meanings.[11] Such methods are often underpinned by the grounded theory approach, still extensively used across SHAPE disciplines for enabling a discovery-oriented perspective. Its formalised set of sampling, data collection, and analysis methods are geared towards understanding emergent phenomena, as contrasted with quantitatively testing predictive or explanatory models.[12] As part of this we utilise temporal research methods reaching backwards and forwards in time to foster a socially located form of reflexivity and rigorous but agile ways of knowing.[13] Social scientists studying technology innovation, infrastructural change and its governance rely heavily upon such interpretive and deliberative methods.[14] Hence, in Case Studies 1–3 below we explain public engagements that we have ourselves conducted in the net-zero domain. These qualitative methodologies are important for exploring what is deeply implicated in governance processes, as different framings become apparent, subjectivities are mobilised, and reality as lived is brought to the surface. In this way, uncertainties, ambiguities, contestations and tensions between emic (insider, participant, member) perspectives and etic (structural, expert, policy) frames can emerge.

Case 1: Decarbonising the energy system of Port Talbot—local scenarios, complexity and 'public things'

Environmental problems do not sit apart from everyday life…but instead are accommodated within and help shape the social construction of local reality.

Irwin (2001: 175)

While many net-zero scenarios depict decarbonisation of systems across a national scale,[15] such visions hold very different implications at a regional or local level. Socio-cultural, geographical and historical–political characteristics of places shape local risk perceptions, motivating broader questions from people about the impact of change on immediate and long-term concerns, and on their values, lives and identities.[16] Hence, delivering regional public engagement means embedding change in a local, identifiable context and debating these with participants already living and working there. This matters because we know that 'public acceptability' of major technological change is often ambivalent and almost always conditional, including upon local cultural and geographical context.[17] To explore public deliberation around locally realistic scenarios of net-zero system change, we drew upon approaches developed in earlier public engagement work using scenarios of national UK energy system change.[18] The focus was the industrial town of Port Talbot in South Wales

[10] Chamberlayne *et al.* (2000).

[11] Henwood & Pidgeon (2016). See also Henwood (2019).

[12] Henwood & Pidgeon (1992).

[13] Henwood & Shirani (2022).

[14] Pidgeon (2020). See also Macnaghten (2020).

[15] National Grid (2020). See also Government Office for Science (2023).

[16] Henwood & Pidgeon (2014). See also Henwood & Pidgeon (2016).

[17] Pidgeon (2020).

[18] Pidgeon *et al*. (2014). See also Butler *et al*. (2015).

and the new forms of production, consumption and social organisation that full-scale decarbonisation might entail there.[19]

The coastal industrial town of Port Talbot (PT) in South Wales was home to the largest integrated steelworks in the UK. Located on the site for 150 years, it is undergoing a major transition to green steel production, but during the research in 2019 was still operating its two fossil-fuel blast furnaces. With a seaward side dominated by Aberavon Beach, popular for recreation with locals and visitors, inland the elevated M4 motorway runs above the town. Interviews and five day-long workshops at a local community centre, each with six–eight community participants, took place over six months in 2019. Each workshop was homogeneous in composition, comprising people with different distinctive relationships to the town; one workshop comprised multigenerational residents, another former or current steelworks employees, a third people engaged with the local environment, etc. In this way participants in any one workshop could bring common cultural reference points about the town and its environment as the basis for initial workshop discussions.[20]

An orienting distinction in much of our work is between ‘open’ and ‘closed’ approaches to public engagement.[21] Open processes emphasise the open-endedness and uncertainty of information and systems, as well as the capacity for social interests and individual agency to cut across technical issues. Closed processes by contrast involve framings that attempt to bound the messy and intractable uncertainties of the world: for example, by pre-specifying objectives or technology options, or by using narrow concepts of monetary value or statistical risk to represent benefits and uncertain harms. In SHAPE research a similar distinction is made between emic knowledges (that is, insider, cultural, relational) and etic descriptions (top down, expert, formalised) of the world.

Alongside the emphasis upon eliciting open, emic understandings *in situ* with our participants, one additional idea framing the methodologies adopted here was that of ‘public things’. Honig draws on the work of object-relations psychologist Winnicott to define public things as objects of common concern that provide connections to things of importance beyond the self.[22] Contrasted with top-down expert or technology-driven visions of change, public things can help frame engagement activities in ways that elicit place-related meanings and historical processes that help people make sense of prospective technical *and* social change.[23] In doing so, they help contend with ‘expert’-driven framings of what is at stake.

To identify significant ‘public things’, participants were interviewed individually one week in advance of each workshop, completing a community mapping task of Port Talbot with coloured stickers to identify locations that they felt fell into one or more of several categories (favourite, important, needing improvement, unsafe, etc).

[19] This case study formed part of the Flexible Integrated Energy Systems project (FLEXIS)—a collaboration between engineering and social sciences from three South Wales universities.

[20] Macnaghten (2020).

[21] Rogers-Hayden & Pidgeon (2007).

[22] Honig (2017).

[23] Thomas *et al.* (2024).

Figure 1: Public things in Port Talbot showing the public objects identified by participants.

Each workshop began by discussing a composite of the maps produced by participants individually (Figure 1), as shaped by people's proximal relations to the town and important public objects identified collectively. Four public objects of salient value emerged: the Aberavon Beach with its expanse of sand and legendary sunsets, the park at Margam used for recreation, the hills and walking trails above the town, and the industrial area and steelworks. To depict the implications of system change, four localised scenarios were developed from interviews carried out with energy experts,[24] including both technology and associated social changes (Figure 2): (A) a largely centralised energy system (Grid Town) where electricity is still provided through the national grid from large-scale low-carbon sources external to the town, including wind, tidal, solar and nuclear power; (B) a decentralised energy system (Energy Island) largely separate from the national grid, with electricity for the town produced by local renewables such as solar and wind; (C) a second decentralised energy system (Industrial Hearth) where local council and industry have more control over energy generation in the town, and waste heat from industrial sites (including the steelworks) provides heating to homes and businesses; finally, (D) a dynamic localised energy network (Virtual Marketplace), where homes and businesses trade surplus energy as most buildings have solar panels and batteries.

[24] Groves *et al.* (2021).

Figure 2: The four net-zero scenarios presented to participants in the Port Talbot workshops.

Each group discussed the scenarios, which were presented using a variety of styles of information, including narratives, pictorial representations (Figure 2), localised timelines tracking change from 2020 to 2050, and a 'personas task' for each scenario (also Case 2, below) followed by a final group discussion of the scenarios.

'Liveliness' as a manifestation of both emotion (affect) and time emerged in the data analysis of the transcribed discussions in ways which went significantly beyond only analysing talk or discourses common to most public engagements.[25] In particular, the methods situated the everyday and emotions of life in Port Talbot into the envisaged processes of net-zero change. Three significant findings emerged.

- History lays heavily on emotions and what matters to people geographically and culturally in Port Talbot. From a long legacy of shifting industrial activities emerged distrust from broken promises, and a landscape and community already living a precarious existence with the constant 'borrowed time' of the ageing steelworks and periodic threats of closure.[26]
- Participants' close familiarity with the history of both steelworks and town brought to life the potential future consequences of net zero in its localised context and in ways that mere technology scenarios would not. In particular, the methods elicited reflection upon the precarities and uncertainties of change for already vulnerable members of the communities living there.
- While public objects (beach, park and mountains) offered alternative affective registers for envisaging pathways to change, so too did discussions of poor air quality from both steelworks and the adjacent motorway. The temporal rhythms of residents' experiences of shifting air quality in the town, both on diurnal or more

[25] Davies (2014).

[26] Thomas *et al.* (2024).

extended historical intervals, while often accepted as a ‘fact of life’ also produced moments of alarm and environmental and health risk awareness.[27]

For Policy, our participants argued that the values and public objects elicited should all matter in future local planning for net zero, as experienced and affectively embedded in the town’s industrial past and all that this had brought—jobs, housing and a sense of community. In addition, the community and personal (including emotional) implications of future energy system change locally required a focus on own and other’s vulnerabilities and relationships in ways moving well beyond ‘technology’ or ethical concepts such as ‘just transition’.

Case 2 Populating net zero for domestic heating using personas

Many approaches to net zero and public engagement render the temporal implications of change for everyday life and individuals as essentially invisible—hence they need to be inferred indirectly by participants, if at all. To make the implications of net-zero change lively in terms of the flow of everyday life, and in ways which aim to displace group discussions away from technology change alone, we have developed a first-person storyline technique. Using lived-reality storylines, which embed people and their social practices into expert scenarios of energy use and technology change, is of increasing methodological and theoretical interest in the social sciences of sustainability.[28] One method is to present participants with pre-prepared first-person narratives following ‘a day-in-the-life’ storyline of someone living in a changed future—showing implications of scenarios for everyday routines.[29] However, such storylines depict an atemporal vision of living within a particular point of transition. Our development of the persona-based methodology extends the day-in-a-life technique, such that participants construct their own future-oriented storylines around character pictures, or ‘personas’, onto whom emotions, motivations and dispositions may be projected.[30] Playful and creative engagement gradually brings personal experience and affective responses to bear as this proxy character negotiates changes over time. By anchoring these personas also in concrete examples of systems change we aim to bridge the disconnect between abstract (expert) scenarios and personalised responses to energy systems change, hence eliciting liveliness through lived experience and emotions.

Domestic heat decarbonisation in the UK is expected to entail disruptions and discontinuities for citizens, inevitably expanding into spheres often considered the domain of private preference and everyday life. In policy discourse, such disruption has been raised as a challenge to the acceptability of the heat transition, but framed primarily in material terms, such as heightened costs, changes to building fabric, or road excavation and temporary network disconnections.[31] An inter-disciplinary collaboration spanning technology policy, systems engineering, and social science research used personas to explore the social acceptability and relational implications of network disruption for the domestic heat transition.[32] Understanding the problem of disruption as a relational issue pays close attention to the multiple framings of problems, and how discourse and lived experience of inhabiting and interacting with specific contexts shape the acceptability of the solutions being

[27] Roberts *et al.* (2023).

[28] Moezzi *et al.* (2017). See also Dahlgren *et al.* (2024).

[29] Butler *et al.* (2013).

[30] Cherry *et al.* (2022).

[31] Lowes & Woodman (2020).

[32] Thomas *et al.* (2024).

proposed.[33] To encourage reflection on the diverse disruptions that heat decarbonisation might pose, the deliberative methodology involved a combination of information provision, group activities and discussions of personas. Since property age and location are important proxies differentiating ease and nature of low-carbon heating retrofit, workshops were conducted in locations where a workshop could be composed of residents with a relatively similar housing experience: for example, in Liverpool residents of terraced housing built pre-1930 vs in Gloucester in modern houses built between 1990 and 2000 vs in Hawick Scotland living in properties off grid without gas connections. As with Case Study 1, purposive workshop recruitment helped ensure an initial common repertoire of knowledge and experience, while the research design and data collection took place over a twelve-month period with a similar time allowed for data analysis.

Participants debated information (presentations, factsheets and posters) summarising the cost, environmental impacts and in-home and network changes necessitated by four main possibilities for decarbonising home heating in the UK: heat networks, heat pumps, hydrogen boilers, and hybrid gas with heat pump systems. Information was also presented on existing fossil-fuel boilers. Following discussion of ways of organising the governance of low-carbon heating, including how incentives, and regulatory and network changes might disrupt expectations of home renovation and heating replacement, we moved on to the personas task. Participants considered the choice between two of the scenarios of home heat decarbonisation (for example, heat pump versus heat networks) and created two characters who might live in the same kind of areas and houses as the people in the workshop did, such that one might struggle and one might take in their stride the choices presented. Participants had to choose a character sketch from a set of cartoon pictures presented to them and collectively construct their storyline around a profile built up on a common template (Figure 3). Designed to elicit sympathetic reflection on how the different scenarios for heat decarbonisation may impact other people in their community, the home, regulatory and institutional changes which the character had to navigate were all addressed. This drew together discussions from across the day, highlighting the forms of relationship participants felt were particularly at risk of disruption.

[33] Henwood *et al*. (2008). See also Boholm & Corvellec (2011).

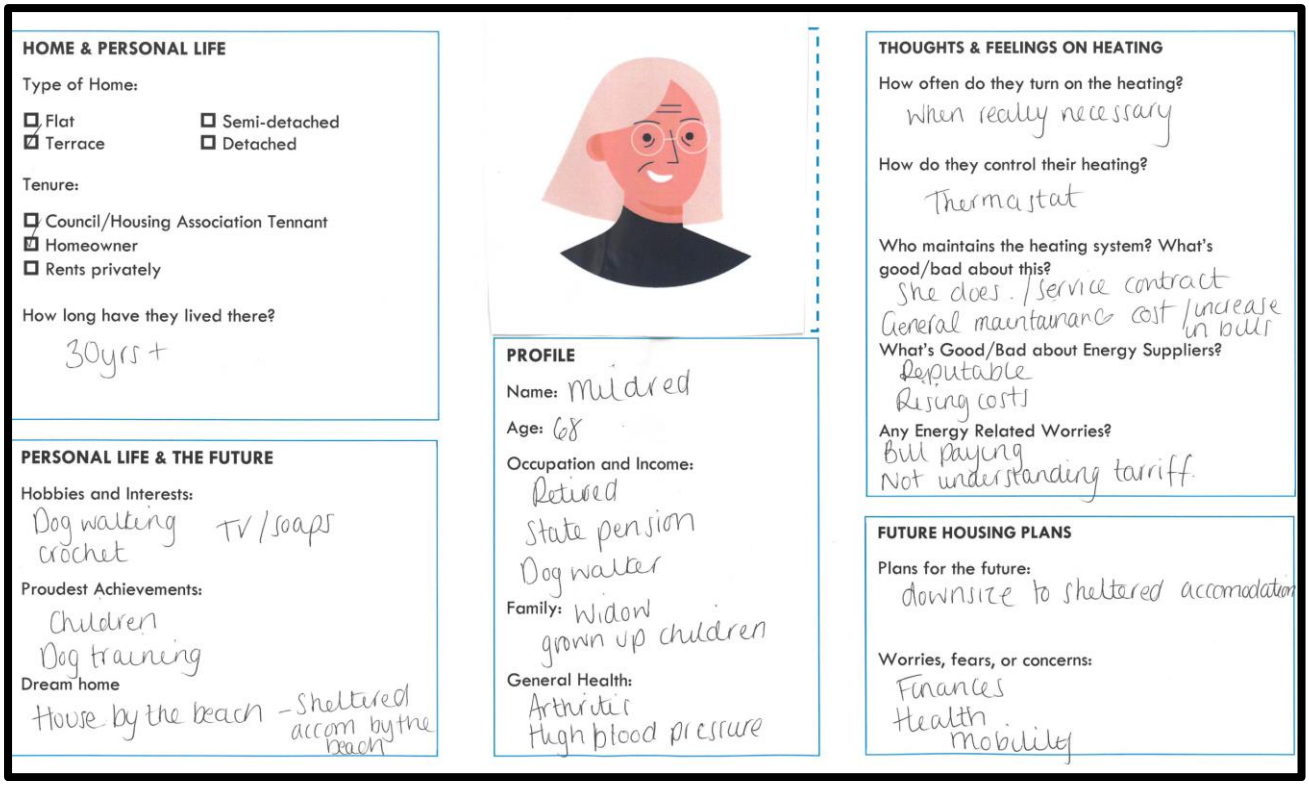

Figure 3: Persona for 'Mildred' as developed in the heat decarbonisation workshop in Liverpool.

In Figure 3, Mildred a 68-year old retiree had initially been expected by participants to struggle with the question of heating decarbonisation but eventually avoided it by opting for a heat network due to the support available from the local council as a reputable installer. The persona highlighted how difficulty navigating retrofit might be avoided via support from trusted parties and anxieties about how some (especially older people) might be at particular risk from complex processes and unscrupulous tradespeople. In the deliberations Mildred was contrasted with the persona of Julia who was constructed as an older women able to deal with the complexities of heating installation. Comfortable finances would allow Julia to buy her way out of any inconvenience and disruption, with a close relative or expensive tradespeople able to assist in dealing with the problem. The contrast between the two 'types' of persona (Mildred vs Julia) points to implications for people who lack capacity and would as a result find things particularly difficult. A third persona Ravi, by contrast, rented his home and hence was at the mercy of landlords and did not have any choice over the matter. While this potentially reduced his worry and anxiety, he remained vulnerable to future price hikes further down the line or if things did not work out as planned, as well as potential temporary relocation costs. Finally, Milly a younger woman persona highlighted space constraints and the need for increased hot water storage with heat pumps, since her family may grow or encounter unexpected health conditions increasing future space and heat demand.

Findings indicated that:

- The personas allowed exploration of the deeper emotional, ethical and relational ways in which participants engaged with the implications of negotiating (or not) future socio-technical transitions, highlighting also a strong concern for the impacts of change on others around issues of vulnerability, equity and fairness.[34]

[34] Thomas *et al.* (2024). See also Cherry *et al.* (2022).

- Looking to make choices on a temporal horizon (circa 2030–40) generated uncertainty and unease for some participants, associated with feeling pressured to act too soon, because of moral duty or climate urgency in a situation of imperfect information. This brought with it concerns about lock-in to untested technologies or undesired governance regimes. For some of our participants the apparent 'choice' between systems was in effect no choice at all.
- Unease about choice and the future was overlain by the shifting uncertainties associated with specific housing contexts and personal life arrangements, such as anticipated points of biographical or household change, renter anxiety and precarity, etc, generating further layers of unease about change.

For Policy this example illustrates how going beyond the material disruptions of heat decarbonisation to clarify the role of affective relationships, feelings of precarity, security and pressure can distinguish material inconveniences from more fundamental disruptions to valued ways of life. Additionally, giving choice over change may, in reality for many, be no choice at all.[35] At the same time some transitions perceived as 'going backwards' proved troubling as a temporal trajectory, brought to bear past and present experiences of living within such systems, and sharpened expectations of what constitutes improvement.[36]

Case 3: Affect and time in everyday energy biographies

As noted above, technical descriptions of net zero risk obscuring temporal implications for communities, our behaviours and the emotions that attach to such change. The human dimensions to time and affect are equally barely recognised, if at all, within most current social-sciences-led sustainability research. The *Energy Biographies* project[37] pioneered the use of biographical narratives and qualitative longitudinal (QL) methodology for understanding how people engage with low-carbon energy interventions in time, and whether biographical changes offer opportunities for intervention in personal carbon trajectories[38]. Energy Biographies was a large multisite study with the broad aims to elucidate everyday energy use, its current (un)sustainability and potentials for change.

The social scientific research of the time drew on sociological understandings of energy's invisibility given the embeddedness of its everyday use within wider material and social contexts.[39] In addition, social practice theory points to society-wide dependencies on energy and why it is difficult to change social practices that become societally 'locked in'. Here Voulvoulis et al[40] argue for a whole-systems approach to mobilise a socially as well as systemically transformative paradigm shift to meet sustainability goals. Our argument is that most technical visions, and even social imaginaries for systems innovation, fail to engage concretely with life's mundane practices and people's more affecting, everyday experiential and temporal concerns.[41]

At the outset, the Energy Biographies study was designed to investigate connections between the things we do that use and make energy meaningful to us, the need to elicit pro-

[35] Thomas *et al*. (2024).

[36] Shirani *et al*. (2024).

[37] Henwood *et al*. (2016a).

[38] Following a similar line of reasoning, Küpers and Batel (2023) have recently argued for deeper engagement with time, specifically in research concerning the social acceptance of renewable energy technologies.

[39] Burgess & Nye (2008).

[40] Voulvoulis *et al.* (2022).

[41] Henwood et al. (2016b). See also Groves *et al.* (2016a) and Henwood & Shirani (2022).

environmental practices and behaviours, and the larger social and temporal systems dynamics of net-zero change. This approach can be characterised as accounting for people's everyday concerns and emotions in ways that reflect (rather than discount) energy's significance in sustaining life.[42] Likewise Martiskeinen and Sovacool have argued for a greater focus on emotions in energy research.[43] Energy Biographies goes further by emphasising both the psychosocial dynamics of times of life (biographical, generational, historical) and the centrality of emotion and 'affects' within lived experiences. Accordingly, the study took up the methodological challenge of bringing together specific biographical-narrative and multimodal methods to make tangible the interconnections that evolve over time between the multiple areas of everyday life in which energy is consumed, and how people 'get things done' and what matters to them.[44]

The methodological approach of Energy Biographies emphasised the role of individuals and groups as makers of meaning, who as relational subjects act and make sense of the world in ways which are shaped by their relationships with other people and objects through time. Hence, the project adopted an approach to understanding how people use, and in some cases produce, energy, which was interview based, biographical and narrative in focus. Participants were interviewed about the everyday practices in which they engaged and their energy implications. They were also encouraged to explore biographical experiences of changes in energy use. The research was conducted at four sites in the UK, all with some kind of early-stage, low-carbon energy intervention underway. Specifically, an inner-city housing estate where a local community organisation supported solar panel installations on domestic roofs; environmentally sustainable living schemes in an affluent commuter village; a large hospital estates department advising employees on actions to meet carbon reduction targets; and the off-grid energy and land-based livelihoods of smallholders in an ecovillage.

[42] Dal-Gobbo (2023).

[43] Martiskainen & Sovacool (2021).

[44] Henwood *et al*. (2016a). See also Henwood (2019).

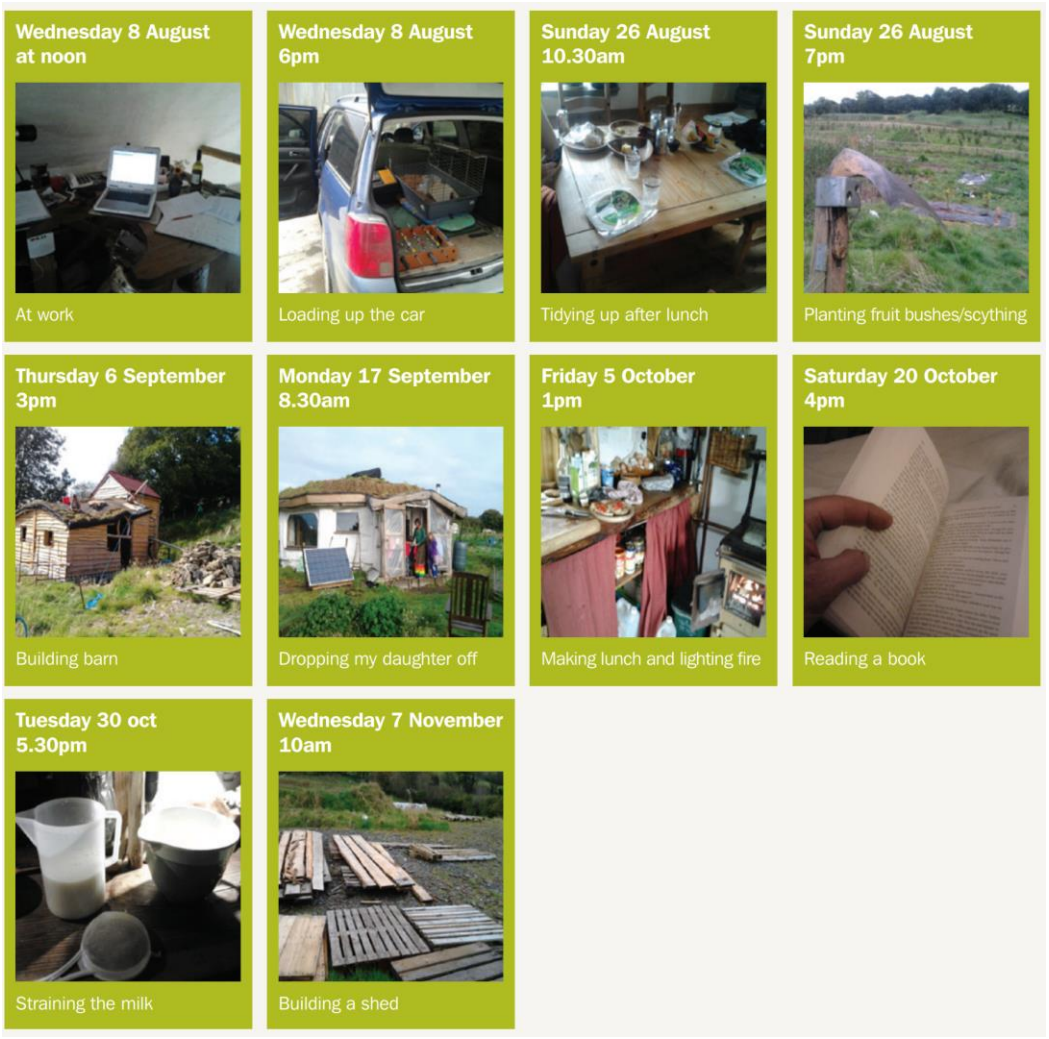

Figure 4: Participant-generated image sequence to aid temporal reflection.

Seventy-four participants took part in interview 1, after which a sub-set took part in the longitudinal element of the project: thirty-six interviewees engaged in QL interviews again after approximately six and twelve months. The narrative-based technique also asked interviewees about any changes they had experienced since they were last interviewed. This was to provide a rich resource for understanding the complexities that can be revealed by analysing cumulative individual case histories to capture processes that unfold over time and personal narratives. This is useful when studying how the past is used to construct the present, the ways in which the past comes to be reworked in the present, and how imagined futures help to reconfigure biographical experiences.[45] To achieve greater purchase on how individuals participate in different practices over time, and to make our energy practices more visible and tangible, we employed visual participatory methods in the periods between interviews. Camera-equipped smartphones allowed participants to engage with their everyday energy practices. By taking photographs of energy-relevant aspects of their lives between the interviews, this captured the multimodality of interactions. Figure 4 gives an example of participant-generated imagery, organised by the researcher for reflection, during interview 2 on aspects of participants' own energy use over time. Furthermore, during the third interview participants watched two video clips of homes of the future: from a film by

[45] Coltart & Henwood (2012).

Disney about the Monsanto-sponsored *House of the Future* at Disneyland (1950s) followed by the Channel 4 series *Home of the Future* (2012). These multimodal activities were introduced to sustain participant engagement, but also to connect transitions within individual biographies to broader patterns of change and to encourage reflections on wider social change and futures. A good deal of the liveliness in the methodology and knowledge-making came from these novel design features and techniques for enhancing participant reflections on their lived experiences, mundane practices, and everyday emotions and affects. Compared to Cases 1 and 2, the Energy Biographies data collection extended over a longer two-year period with subsequent time for data analysis.

The study led to multiple findings, including:

- Developing an approach, subsequently labelled 'energy phenomenology' by Sovacool *et al.*,[46] our analysis highlighted, in the context of wider processes of normalisation towards sustainability, the reasons why the perceptions and sustainability of everyday lifestyles can indeed shift but at times also remain stubbornly unchanged over time.[47]
- That changes to practices and behaviours have a biographical patterning, with new energy practices being opened up by the investments people make in sustainable ways of living. However, many participants also invested in unsustainable practices, as temporal interruptions to what might otherwise be sustainable transition pathways.[48] The latter investments often offered means of dealing with a lack of choice, threats to people's values and identities, or future uncertainty,[49] as well the expression of ordinary ethics[50] in ways that emphasise psychosocial sensibilities and logics.[51]
- The study yielded clear evidence to contradict the 'moments of change' concept, which proposes that life-course transitions (birth of a child, moving house) are singular times into which sustainable behaviours can be introduced because bad habits are more easily broken then. Our data showed by contrast that interruptions in the life-course can be experienced as exerting pressure on daily lives and routines, and a reason why additional demands would be neither welcome nor possible to meet.[52]

For Policy Energy Biographies illustrates why possibilities for change in our everyday lives and practices need to encompass more processual and dynamic intervention(s) being constructed over time.[53]

Concluding comments

This paper has illustrated what can be said to be 'lively' about social sciences study designs, approaches and methods and their relevance to net-zero public engagements and time. This idea connects the SHAPE net-zero governance effort with contemporary qualitative social research attending to the liveliness of matter and the material world, the study of 'how we

[46] Sovacool *et al.* (2020).

[47] Shirani *et al.* (2014).

[48] Groves *et al*. (2016a). See also Groves *et al.* (2016b).

[49] Groves *et al.* (2016c).

[50] Groves *et al.* (2017).

[51] Henwood. (2019). See also Smith *et al.* (2025).

[52] Shirani *et al.* (2017).

[53] Similar arguments are found in Burningham & Venn (2020).

feel', and a temporal framing of flows, forces and movements. These novel conceptual developments are important for net-zero policy and practice, with further work to be done to align them with other qualitative research methods.[54]

The studies described here highlight research strategies within two highly distinctive SHAPE interpretive research traditions: those of deliberative and qualitative temporal designs. While ostensibly very different, both types of design can be linked, as here, by their use of multimodal and interactive tasks. Another commonality is the use of creative tasks for participants to make imaginative connections between time/timing and lived experiences, thereby going beyond what is most immediate, striking or obvious about the presented topics and materials.[55] In this we have argued that the increase in community-led and policy-led public engagement exercises should not neglect the existing research resources available from the SHAPE disciplines. Drawing upon tried and tested methods and resources should generate efficiencies both in time and in cost of both producing and utilising original research data, avoiding expressed concerns about public engagement becoming yet another discourse of climate delay while also generating trustworthy outcomes and findings that have the widest applicability. That being said, the duration and costs of properly conducted qualitative inquiries are not trivial—not least because of the need to allow sufficient time for careful design and then for considered data analysis. Hence, all of the place-based projects described here have involved significant research funder investments, and an intensive engagement with the research contexts and communities of study. Equally, overlooking significant public concerns in net-zero policies could be vastly more costly in economic, political and reputational terms. The UK's seventh carbon budget has very recently woven forms of 'national-level' public engagement into its report and recommendations[56]—likewise, the methods described here could be employed usefully in more place-based planning processes such as Local Area Energy Planning.

Our own core discipline of interpretive and relational risk research has stood the test of time as a form of inquiry into how communities and individuals engage with environmental and technical risks in modern society.[57] To the list of topics that it has historically addressed, we now have to add that of net zero. This is important for decision-making for good environmental and technology governance, where uncertainties and mismatches arise between the periods of time proposed and available in policy terms, and the temporal dimensions of people's lived and biographical experiences of past, present and future. Our view is that an appreciation of liveliness as something that comes with temporal understanding can and should be made integral to public engagements for net zero.

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[54] For example, semiotic theories can be used to decode the language of infrastructural and energy technological imagery while also engaging with its affective qualities. See Smith *et al.* (2024).

[55] Henwood, K.L., Shirani, F. and Groves, C. (2018).

[56] UKCCC (2025).

[57] Rickards (2020).

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