ARTICLE

Place-based and people-centred: Principles for a socially inclusive Net Zero transition

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Abstract

The transition to Net Zero marks a radical reshaping of many aspects of everyday life in the effort to reduce human-caused climate change. It also has the potential to influence positively a number of social challenges: improving public health, reducing the effects of poverty, increasing well-being and bringing neighbourhoods together. However, these positive outcomes are by no means a given. Households on low incomes are less resilient than ever following austerity, COVID-19 and the cost-of-living crisis. In this paper, we report on research undertaken in seven low-income neighbourhoods in Leeds and Newcastle in the UK, in which we ran a series of workshops to understand perspectives and concerns on this issue. We found that people's perceived ability to engage in Net Zero was shaped by the neighbourhood they live in (due to its geographical location, local services and infrastructure), their housing (the building and its tenure) and household (the people they live with) as well as by their inability to access funds. It is clear from our data that people have big concerns about their ability to participate in the substantial changes they can see ahead. Our research suggests that ensuring a successful Net Zero transition for low-income neighbourhoods will require a place-based and people-centred approach. We conclude by offering three principles for tailoring research and policy to specific geographic and socio-economic needs, including (1) recognising patterns of difference and their spatial and social roots, (2) bringing whole life experiences into narratives of the future and (3) prioritising social inclusion in climate policy.

KEYWORDS

just transition, low-income, Net Zero transition, people-centred, place-based

1 | INTRODUCTION

The transition to Net Zero marks a radical reshaping of many aspects of everyday life. Various published scenarios of Net Zero produced by the government (BEIS, 2021; Climate Change Committee [CCC], 2020a, 2020b, 2021), academics (Centre for Research into Energy Demand Solutions [CREDS] et al., 2021) and citizens (Climate Assembly UK, 2020) give us a sense of these changes. They evoke a world in which we live in renovated, energy-efficient houses with renewable heating and cooling, where we travel less, eat less meat, access public services locally, work locally for low-carbon employers and enjoy leisure time with less travel. From the perspective of households of any kind, this represents a huge amount of multi-layered and multi-faceted change and is likely to require leadership, advice, financial support and concerted coordination by local and national governments to achieve climate change targets.

Done well, the Net Zero transition also has the potential to positively influence a number of social challenges becoming a 'just transition' (Evans & Phelan, 2016; ILO, 2015; IPPR, 2019; Middlemiss et al., 2023; Snell, 2022; UNFCCC, 2020). Such a transition would potentially improve public health, reduce poverty, increase well-being and bring neighbourhoods together. However, these positive outcomes are by no means a given. Indeed, many people facing such major upheaval are already raising concerns, and in some cases, manoeuvring politically against Net Zero (Paterson et al., 2023). Households on low incomes are in a particularly difficult position in the face of the Net Zero transition. Following austerity, COVID-19 and perilous inflation, these households are less resilient than ever (Brown et al., 2023; Goldblatt, 2024; Stirling et al., 2023). Given that low-income households are patterned both socially (e.g. more likely to belong to an ethnic minority, disabled, woman-led) and geographically (e.g. in the North of England or peripheral coastal areas [IPPR, 2018, 2019]), this is likely to result in some households and neighbourhoods being further 'left behind' (MacKinnon et al., 2022). Note that this research takes place in the wake of austerity and COVID-19 and at the height of the cost-of-living crisis, which left households with 0.7% lower disposable income on average between 2019 and 2023 (Institute for Fiscal Studies, 2024).

In this paper, we report on our research in seven low-income neighbourhoods in Leeds and Newcastle (UK), in which we recruited a diverse sample of local people for a series of workshops in the summer and autumn of 2022 (see Theminimule et al., 2024 for a policy-facing report on this project). We used these encounters to articulate existing visions of Net Zero futures and to consider each neighbourhood and household's response to these, including any concerns they had about the impact of Net Zero policies now and in the future. We found that people's perceived ability to engage with the policy changes brought about by the Net Zero agenda was shaped by the particular neighbourhood they live in (due to its geographical location, local services and infrastructure), by their house (the building and its tenure) and home (the people they live with) as well as by their lack of funds. Our participants had big concerns about their ability to keep up with the more substantial changes they could see ahead.

We start by profiling the future scenarios of Net Zero, as well as academic literature that captures and explains the justice implications of this anticipated change. We then outline the methods we used for our empirical work in neighbourhoods in Leeds and Newcastle. Our results section shows how place, house and home, and money shape people's feelings that they can engage in this agenda, as well as the concerns that they have about the future. We conclude by articulating three principles for a people-centred, place-based approach, including (1) recognising patterns of difference and their spatial and social roots, (2) bringing whole life experiences into narratives of the future and (3) prioritising social inclusion in climate policy.

2 | GAPS IN VISIONS OF NET ZERO

In earlier work, we have argued that at present, two key gaps exist within both academic literature and policy debates around Net Zero and the just transition (Middlemiss et al., 2023). First, the failure to take into account social differences in the policy scenarios for Net Zero and the resulting failure to plan a truly just transition. Second, the failure to consider the links between different areas of life (e.g. mobility, food or housing), with much of the literature on the inclusion risks associated with environmental policy dealing with these areas independently, as well as a tendency to ignore broader structural factors that shape life as a whole. This includes the ways in which capital and power tend to accumulate among particular populations, and in particular places (Castán Broto & Baker, 2018; Massey, 1991).

The policy changes necessary to reach Net Zero, and visions of what life under Net Zero will look like are largely presented in an a-social, a-temporal, and a-political manner, with little distinction between people's starting points, for example, where they live or what they earn, and limited emphasis on the political relations behind these

differences. In the UK, projections of what life will look like under Net Zero are homogenous. Table 1 summarises the key policy changes associated with Net Zero as articulated in six government, academic and community-driven documents which aim to explain these changes, across six areas of daily life (BEIS, 2021; CCC, 2020a, 2020b, 2021; Centre for Research into Energy Demand Solutions et al., 2021; Climate Assembly UK, 2020). Most of these changes point to the need for the adoption of new technology, or changes in behaviour: framing the solution to Net Zero as better technology and better choices.

People's (limited) ability to adopt new technology or behavioural changes is not foregrounded in these debates, despite a long and deep recognition of the ways in which people's agency is constrained in the literatures on environment (Burningham & Thrush, 2001) and poverty (Lister, 2021). We know that not everyone is able to make these choices, we also know, based on existing literature on inequality, who is most likely to be excluded in specific policy areas (Markkanen & Anger-Kraavi, 2019). We argue that current Net Zero policy narratives fail to take into account existing evidence on how present inequalities will shape the future. With a notable exception of the work produced by the Climate Assembly (2020), which was written with reference to a specially recruited panel of citizens, this is likely associated with the relative homogeneity of voices in this field and its scientific origins. Aside from the Climate Assembly, visions are conceived by the government or by academics: experts in environment, climate change and climate science, rather than in social inclusion. The voices of those who are likely to be at a disadvantage in the transition are muted, their experiences are not represented in policy narratives, and as a result, the recognition of the structural causes of that disadvantage is further obscured. It is difficult to imagine a just transition to Net Zero in the context of policy narratives that fail to recognise existing inequality, differences in need and agency and the structural conditions that reproduce poverty and disadvantage.

The second gap in the literature relates to the relatively atomised nature of research in the field. For example, in our earlier work, we identified how the literature within the Net Zero and just transition space tends to address social inclusion risks in separate specific areas of life (e.g. mobility, food or housing) rather than understanding how changes will affect people's everyday lives as a whole (Middlemiss et al., 2023). We acknowledge the huge value of existing work on exclusion from environment-related policy. There is insightful and important research that deals with the precise nature of exclusion in particular policy areas including Henderson's critique of the social impact of EVs (2020) and Lucas and Pangbourne's formative work on transport exclusion and decarbonisation (2014). The existing literature falls short, however, of recognising the *cumulative* impacts of Net Zero policy changes on people's lives. Aside from Markkanen and Anger-Kraavi's (2019) overview of the potential impacts of a range of energy policies, Irwin and Wright's recent work on people's concerns about acting on climate change (2024) and IPPR on the spatial impacts of decarbonisation policies (IPPR, 2018, 2019), there have been few attempts to take a holistic

TABLE 1 Key policy changes identified associated with the Net Zero transition, reproduced from Middlemiss et al. (2023).

Area of daily life	Key policy changes (distilled from Net Zero scenarios)[a]
Where we live	More localised energy systems—for example, heat networks; increased micro generation, home- or community-based solar; greater electricity use for heating/cooking, including more heat pumps (electric heating); use of hydrogen as a home energy source; increased use of smart home technology and systems (e.g. smart meters and appliances); increased home energy efficiency (insulation and efficient appliances); more flexible use of energy (e.g. time of use tariffs)
Where we go	Move to electric vehicles, phasing out of cars with an internal combustion engine; encouraging and providing infrastructure for active travel (walking and cycling); providing green public transport
What we do for work	More jobs in green economy; Fewer jobs in carbon-based industries (e.g. mining, steel); new skills for green work; increased homeworking
What we eat	Eating less meat; reduced food waste and carbon footprint (e.g. reducing road miles, packaging); Changed agricultural practices to reduce emissions
What we do for fun	Travel less and enjoy leisure activities locally or virtually; increased green leisure and active travel; reduced high carbon footprint leisure (e.g. reducing flying and car miles)
What we spend our money on	Some products become more expensive as a result of carbon taxes/pricing, others become cheaper; increased standards and regulations result in some goods being discontinued, unusable or banned; from fast to slow fashion; More second hand markets, repair and reuse; reduction of waste

[a]BEIS (2021); CCC (2020a, 2020b, 2021); Climate Assembly UK (2020); CREDS et al. (2021).

perspective. This results in an obfuscation of social and spatial patterns of poverty in climate policy, which impact across the areas of life that we identify above, and an associated failure to recognise the deeper drivers of poverty in the broader climate agenda.

The separation of the various areas of life associated with Net Zero in policy and research has important effects on how inclusively policy can be designed. First, it results in a failure to engage citizens in a conversation about the radical social transformation that Net Zero represents. Second, it means that researchers, policy-makers and citizens can fail to understand how changes in one area of life might affect experiences in another. Third, as a result, it obscures social and spatial patterns of poverty, obfuscating the ways in which these are reproduced.

3 | OUR PARTICIPATORY RESEARCH PROCESS

Our research set out to address these gaps, working with seven low-income neighbourhoods in Leeds and Newcastle, UK, to understand people's perspectives on the wide scope of planned policies for Net Zero and to discuss how, and to what extent, they were able to see themselves engaging with this agenda. We adopted a qualitative participatory research approach, attempting to include those who might be defined as 'vulnerable' (Aldridge, 2016; Goedhart et al., 2021). In doing so, we asked seven diverse groups of people, who, being on low incomes, are likely to face some challenges in the face of Net Zero, what their perspectives on the full scope of these changes were. The seven neighbourhoods in Leeds and Newcastle were chosen as case study locations in recognition that the impact of the transition in the UK will vary region-ally, with particular concern for Yorkshire and the North of England (IPPR, 2018, 2019).

We identified specific neighbourhoods by drawing on existing quantitative data, principally from the Index of Multiple Deprivation (IMD). Starting from a full list of neighbourhoods in Leeds and Newcastle, we excluded neighbourhoods that had been directly affected by climate change (i.e. in a flood zone [Getthedata.com, 2022]), and where substantial miti-gation measures had been experienced (fewer than 10% of homes in our neighbourhoods had applied for an energy effi-ciency grant [DLHC, 2022]). We then sought out neighbourhoods in the lowest IMD income decile (Ministry of Housing, Communities, & Local Government, 2019), and with below average housing quality (more than 10% of homes rated E, F and G from the EPC database [DLHC, 2022]). Once we had narrowed down to the neighbourhood types characterised above, we sampled for diversity of deprivation in each city, by picking from the following four neighbourhood types:

1. Lowest 10% of IMD income decile surrounded by wealthier neighbourhoods (highest 30% in IMD) (Moortown and Gledhow in Leeds).
2. Lowest 10% of IMD Employment decile (Seacroft and Hollin Park in Leeds).
3. Lowest 10% of IMD health deprivation and disability (Byker and Walker in Newcastle).
4. Lowest 10% of IMD barriers to housing and services decile (Kenton and Lemington in Newcastle).

We used targeted recruitment to engage a diverse sample in each neighbourhood. We provided information about the research through several channels, including a letter to a random sample of residents of the area, social media, a dedicated webpage and a Freephone number. Recruitment materials focused on the benefits that participants might gain from taking part, including learning more about the transition to Net Zero and payment for participation. Participants were paid £100 per three-hour workshop to compensate for lost income and in recognition of their expertise. Participants were able to register their interest, and we selected the final sample based on diversity, determined by responses provided in the sign-up survey regarding household type, financial security and demographics. We invited participants to take part in the workshops in June 2022, and the workshops themselves took place between July 2022 and September 2022. Overall, 62 participants took part. Figure 1 demonstrates the diversity of our sample.

Research activities consisted of three workshops at a community centre in each of the six locations lasting three hours each, which prioritised mutual learning and building autonomy among participants (Vaughn & Jacquez, 2020), enabling an in-depth, nuanced discussion of Net Zero. Each workshop involved information sharing, group or individual reflection and data collection through participatory research methods. The majority of participants attended all three workshops. Workshops were themed by (1) learning about Net Zero and about the local place, (2) understanding local transition and people's abilities to engage and (3) understanding industry transition and people's ability to participate in this. In each workshop, we started by presenting some information about the theme concerned, then continued with a series of individual and collective activities, prompting participants to offer insights using diagrams and games (see Figure 2) to help them articulate their thoughts and concerns. Participants were mostly left to get on with activities, although we

FIGURE 1 Diversity of the sample of participants that engaged in this research.

ensured that an environment was created in which everyone could participate. Activities were highly diverse, for example, we asked participants to collectively characterise the assets in the neighbourhood in workshop 1 (see Figure 2a), and to reflect on their own position as a household in relation to the forecast changes by creating a 'pokemon card' for their household in workshop 2 (see Figure 2b). The final activity was a priority setting exercise for each neighbourhood, asking participants to rank the importance of different actions and policies for their place. We collected a range of data from workshop, including audio transcripts, photographs and written and visual products created by participants in response to particular activities. Workshops allowed us to understand the local context as well as the challenges and opportunities that this presented for Net Zero. The fieldwork took place during the cost-of-living crisis, which substantially shaped our data.

This engagement resulted in a large amount of complex data, and we used framework analysis to allow our team of researchers to move between multiple layers of abstraction while maintaining sight of the raw data (Kiernan & Hill, 2018). Our team of researchers engaged with both a top-down and bottom-up approach to analysis, sorting and categorising data with reference to a framework that we developed at the beginning of the project, but also iteratively developing codes from the data. 858 data points (quotations from audio transcripts) were extracted onto an Excel spreadsheet to enable collaborative analysis. Note that we numbered these data points and used numbers as references in our results section below, for traceability. Visual data produced by participants were considered alongside this. For the purposes of this paper, we report on some of the key themes in this analysis detailing what constrains or enables people's ability to engage in this agenda. We also report on concerns people expressed with changes under Net Zero.

The research asked participants to consider a range of personal and household circumstances that sometimes surfaced sensitive or difficult details. Given that we worked with people in a group setting, it was likely that some participants chose not to share insights and experiences that might have been relevant to our research. To mitigate this, we tried to pre-empt where this might be the case, and designed activities in ways that enabled sharing through activities that were
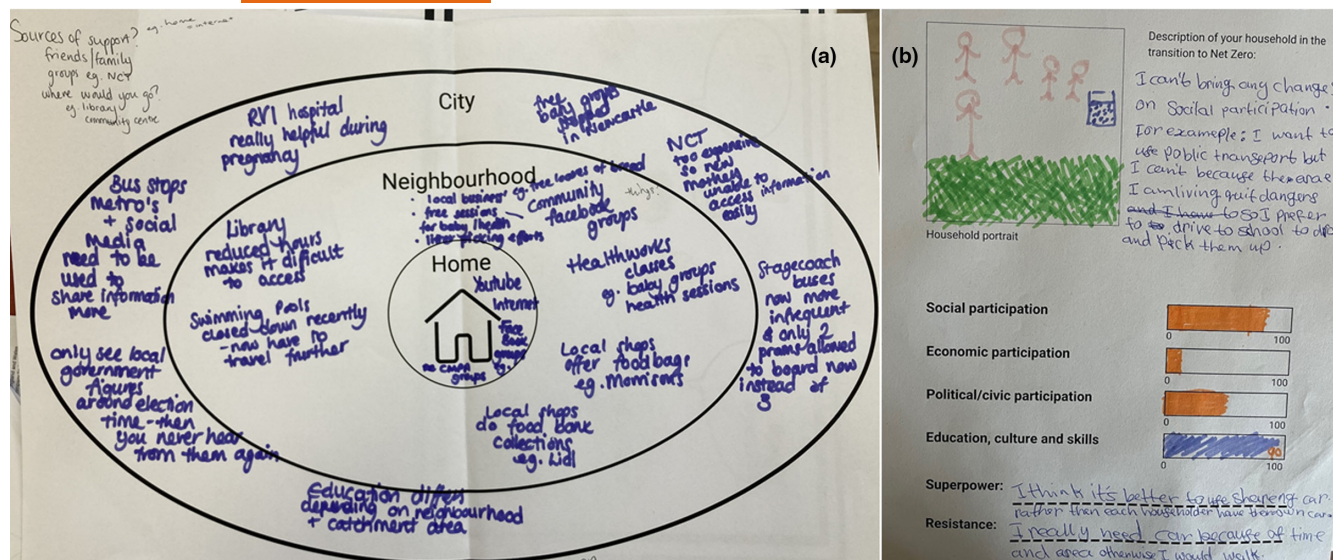
FIGURE 2 Examples of outputs from participatory activities, including (a) workshop participants' characterisation of the assets in their neighbourhood and (b) a 'pokemon card' for a household showing their strengths and weaknesses for involvement in Net Zero.

more private. Participants were of course free to choose to respond to the degree they were comfortable, and researchers avoid unnecessary probing. Ethical approval for the research was given by the University of Leeds.

4 | INTRODUCING LEEDS AND NEWCASTLE

At the time of the research, both Leeds and Newcastle had declared a climate emergency, setting a target of becoming carbon neutral by 2030, ahead of the UK's target of 2050 (Gouldson et al., 2020; Newcastle City Council, 2020). Leeds has since set itself the additional target of having zero emissions by 2050. Neither local authority explicitly discusses a just transition, but their strategies and action plans acknowledge existing local challenges, the risk of decarbonisation efforts exacerbating inequalities, but also the potential for a more progressive just transition.

Leeds is a metropolitan borough that sits within the West Yorkshire Combined Authority, in England's Yorkshire and Humber region. In 2021, Leeds emissions were estimated to be around 4.5 tCO$_2$e per capita (BEIS, 2024), slightly above the English average. With a population of 812,000 (Office for National Statistics, 2023a), Leeds is a well-established urban centre encompassing a larger rural area than most cities. Deprivation is highly concentrated in the south of the city, which has higher rates of disadvantage and poverty (Leeds City Council, 2019). In these areas, there is a greater proportion of people living in socially or privately rented accommodation (Office for National Statistics, 2023b). Only 0.2% of homes are powered entirely by renewable energy (Office for National Statistics, 2023c), and 16% of households experience fuel poverty (Leeds Observatory, 2022). The city is also home to a significant number of neighbourhoods where income is low and energy use is high (Childs, 2022). Leeds has historically been a major manufacturing and engineering centre; however, today its economy is dominated by financial and business sectors, with 7.5% of jobs are classified as green in the Yorkshire and Humber region (Kapetaniou & McIvor, 2020). Despite being an urban centre, Leeds is not currently served by a mass public transport system, and only 8.5% of people currently travel to work using public transport, while 9.4% use active travel (Office for National Statistics, 2022).

At the census in 2021, Newcastle had a population of 300,000 (Office for National Statistics, 2024), that sits within the North East Combined Authority, in the North East region of England. In 2021, its emissions profile was estimated to be around 4.3 tCO$_2$e per capita (DESNZ, 2024), below the English average. Newcastle has become relatively more deprived in recent years, with deprivation concentrated in the southern areas of the city close to the city centre (Newcastle City Council, 2021). In this study, 27.3% of people in Newcastle live in socially rented homes, whereas 22.8% live in privately rented accommodation (Office for National Statistics, 2023b). Spatial patterns of deprivation correlate with housing tenure, where in more deprived areas as much as 58.3% and 53.7% of people live in socially and privately rented homes, respectively (ibid.). In Newcastle, just 0.1% of homes are powered by renewable energy only (Office for National Statistics, 2023c), whereas 15.2% experience fuel poverty (North East Evidence Hub, 2024), similar to Leeds. Newcastle

was previously home to thriving but high carbon heavy industries, which has since given way to the public and retail sectors. However, only 3.32% of jobs in the wider North East region are classified as green sector jobs (Kapetaniou & McIvor, 2020). Currently, 12% of people travel to work using public transport, and 12.2% of people travel to work using active transport (Office for National Statistics, 2022).

5 | LOW-INCOME NEIGHBOURHOODS AND NET ZERO

Having profiled the context of the two cities in which we undertook research, here we discuss three key themes that we identified in the course of the fieldwork and data analysis: the importance of place, local services and infrastructure; house and home; and money in shaping people's ability to engage. For each theme, we first explain how these were seen to support and constrain engagement in the present, and second our participants' concerns for the future.

5.1 | Place, local services and infrastructure

5.1.1 | How does place support and constrain engagement?

There was an overriding feeling among participants that the place they live in, the associated services, transport and other infrastructures, and employment available substantively shaped their ability to make changes in their lives associated with Net Zero. People were looking for Net Zero support in their neighbourhood, which was frequently lacking.

Public services were seen as an important asset that played a role in providing information, resources and facilities for Net Zero. There was a strong sense in most places that civic and community-led infrastructure is under-resourced, and that this reduces the support available for engagement. This was mostly discussed by older participants recollecting what was available prior to austerity. Some participants did feel supported through libraries, schools and recycling, acknowledging that proximity and ease of access to these services made it easier to engage with them. Civic participation in the local place enabled by community strength was also frequently discussed. This included informal social infrastructure such as self-organised community groups and community-orientated activities like repair shops. As one participant in Leeds explained:

> I think one of the good things about COVID is the community that I'm a part of now on our street is much tighter and much more supportive. A lot of recycling between the streets; you know, if someone's getting rid of something now, we'll put it on the WhatsApp group.
>
> (Leeds, 302)

In some of our research locations, a perceived lack of community resources directly impacted on people's ability to think about Net Zero. The feeling that people in the community do not know what to do, associated with reduced services, meant that people were not able to seek help locally.

Other key local influences on people's daily lives are the organisations with which they regularly interact. Many participants acknowledged that their employer had an impact on their green practices, home working and attitude to energy usage and recycling. Participants shared examples of workplaces supporting them to reduce consumption with flexible work policies that require less commuting and reduced spending on fuel, such as the 'cycle to work' scheme, or the provision of electric cars. Schools were valued as sources of trusted information, helping both students and their families to adopt greener home practices.

5.1.2 | Place-based concerns for the future

In the light of this recognition that local services are critical to making change, a major concern among our participants was that the current level of services and public infrastructure available was unsatisfactory to support the transition to Net Zero. Participants' lack of confidence in services and infrastructure led to a distrust of new or more effective infrastructure emerging. This included people being worried that there was not much to do for leisure in the local area, a sense that the public transport infrastructure to get them to the city centre and elsewhere was poor, a feeling that information

and advice for Net Zero was limited, and that any change in employment was unpredictable. It also linked to a perception that there was limited political commitment to Net Zero (both locally and nationally), which reduced trust in the value of engaging in change.

Many participants were concerned about whether local services would really be provided. One participant gave a heartfelt account of why she needed her car because of the neighbourhood she lived in, which had both poor public amenities and inadequate public transport. A Net Zero future without a car would require considerable improvements in infrastructure to meet this family's idea of a good life, given that getting to opportunities means travelling out of the area:

> When you come from a deprived estate and you're living on the bread line, obviously, I feel my resistance to give up our car, if I did give up the car, it would significantly have a massive impact on our children's... basically what we can do for them... things like being able to participate in sports club, in after school clubs. The fact that these things aren't on your doorstep, and you do need to be able to toddle about to give them life skills and opportunities.
>
> (Leeds, 355)

Economic savings were a significant incentive, and people questioned whether plans around electrifying transport, for example, would change costs to individuals. A lack of trust and uncertainty played a role in people's enthusiasm for these changes.

> What to tell people on minimum wage, you know with the cost crisis at the moment in Newcastle... I'm thinking by the time the whole city becomes electric, will that actually reduce the price of the buses? ... is electric transportation cheaper for the everyday person?
>
> (Newcastle, 602)

There was also an acknowledgement of a knowledge 'vacuum' around Net Zero. People identified a lack of government-led, trusted information in clear, accessible language. This led to them not knowing what would actually make a difference, and finding it hard to engage with local changes to infrastructure, transport or policy without 'knowing if things are worth it'. As one participant put it:

> We need more support to be able to do that as a community, because there's not that much information out there ... practical support, rather than just somebody putting out a few leaflets and having a nice website.
>
> (Newcastle, 527)

Limited opportunities to get involved in local decision-making were also a common frustration. This linked to a belief that there was low commitment from national and local government to Net Zero, leaving people feeling isolated and mistrustful:

> [The city plan] isn't widely known because... they mention individual projects ... introducing the tram system or whatever it might be, which never happened, but they don't talk more generally about the whole idea of reducing to Net Zero. We're not getting anything through the letterbox ... How will people know?
>
> (Leeds, 98)

Contradictory political and policy messaging were also important for people. Both devolution and 'levelling up' left participants feeling confused, and disenfranchised, due to the associated drive for regeneration and re-industrialisation which seemed to run counter to decarbonisation. As one participant put it:

> So, the bottom line for me is trust. Do I really trust [local government] to do what they are promising? Am I just being roped into another scheme?
>
> (Newcastle, 510)

Finally, there were concerns and confusion about the availability of jobs in low-carbon industries in both cities, which affected peoples' willingness to consider changing industries. People did not know how carbon intensive industry in Leeds and Newcastle was, or whether opportunities to participate in a greener economy existed. Most people assumed that they would have limited choice over new employment prospects:

> It's more difficult here to change jobs ... maybe just because of the pool of businesses, you've got to pick from.
>
> (Leeds, 828)

Participants also expressed scepticism about employers' willingness to upskill or re-train their existing employees as opposed to hiring those who already have the necessary skills.

In summary, our participants painted a picture of degraded community assets after austerity and other funding cuts enacted by successive governments, and an associated failure of local government to step in to offer leadership, support and advice on the Net Zero agenda. In the face of the transformative project of Net Zero, participants felt that it was not apparent how their specific neighbourhood might enable them to engage in the various life changes envisaged. This high-lights the risk of the homogenous vision of the future that we critiqued above, which was unconvincing and unrealistic for our participants who were facing the reality of a poorly resourced neighbourhood.

5.2 | House and home

5.2.1 | How does home support and constrain engagement?

In existing visions of the future, people's homes play a central role in Net Zero. When talking about plans for home, a key theme for our participants was the existing quality or state of repair of homes. Some had to prioritise basic repairs over adaptation for carbon emissions reductions. As one participant shared:

> The outside cladding is cracked, coming away. So, I get a lot of damp into the house... the outside of my house is not very good whatsoever. You can actually see inside the house where the crack is coming through. I anticipate that by the time we get to winter that my house will yet again be damp so it's impossible to keep warm...
>
> (Leeds, 5)

Tenants were often frustrated by the inability to change their home, due to landlords not acting on this responsibility.

Knowing how people are using homes now is important. The high cost of living at the time of data collection, shaped how people used space. One participant described only using one room of the house to minimise consumption. Another talked about using the garden more in the summer to reduce energy use:

> So we sit out there a lot ... probably from beginning of summer, spring right the way through till it gets so cold that you can't manage to sit out anymore...
>
> (Leeds, 468)

While working from home is seen as positive under Net Zero, there is a notable trade-off between avoiding commutes by car and reducing energy consumption at home:

> I work from home... that's probably going to be quite hard in winter and I'm thinking of relocating to the library a lot of times just because it's in the flat with a hoodie on
>
> (Leeds, 7)

People's family life was also important in thinking about changes under Net Zero. People were influenced by their connections to others, including intimate and more institutional relationships. Many practices that affect climate change are collective, and as such require some kind of negotiation between household members, sometimes inter-generationally, to agree on a way forward. For instance, participants recognised the different needs of family members for using digital technology.

> TVs, game stations charging phones we've got a lot and no matter what we try and cut down like it's quite hard with them ... because they don't really listen.
>
> (Leeds, 457)

While family can pull together around Net Zero, it can be hard to make decisions for the household when not everyone has the same priorities. This was particularly challenging in households with teenagers, where it could be difficult to control household members' energy use. In multi-person households, this could create conflict.

> So, we've given up the car, we consciously turn off lights… but I can't persuade my husband to turn off the standby lights that are all over the place attached to computers and electrical extension leads.
>
> (Leeds, 354)

There can be distinct opportunities for leadership on these issues by one household member:

> This is me and my other half. Just the two of us. And he basically just does what I say. So, I say recycle, we recycle because of that.
>
> (Leeds, 306)

In some instances, we find people seeing leadership in their own homes as a responsibility:

> We've got to educate the kids for making changes as well you know, they need to understand, switching lights off, plugging things in, not having a TV on and playing a game at the same time.
>
> (Leeds, 357)

People sometimes felt that they had to do better for the sake of someone else:

> I'm trying to make more choices for the baby. So I try and use biodegradable or reusable nappies, toys and clothes …
>
> (Newcastle, 497)

Net Zero positive priorities are sometimes adopted as part of a broader family identity. One respondent described their family as a 'hoodie household' (Leeds, 310), meaning that they wear hoodies instead of putting the heating on. We also found examples of people turning to their broader social circle for information and support in the transition.

5.2.2 | Home-based concerns for the future

As participant's understanding of Net Zero grew across the three workshops, they often became increasingly aware of their own (lack of) agency. This emerged most strongly regarding making household adaptations, where many participants wanted to make changes, but were unable to, due to a combination of high costs and lack of decision-making power.

Participants lived in homes that were not easily or affordably adapted without support, either because of their build (e.g. no cavity walls) or existing disrepair. Not all homes were suitable for adaptation, even if households were motivated and able to make them. As one participant shared:

> I live in a flat roofed house, and I asked my landlord about insulation. And she said, because it's a flat roofed house she can't get it.
>
> (Leeds, 241)

Heritage and urban planning policies created further barriers to making household adaptations for the sake of prioritising aesthetic or historical conservation.

> The [grade listed] houses on the estate…we can't really change them. If you paint…you've got a paint it the colours [of the estate] and the heating system, the pipes have been renewed and things…well I feel as though you can't do what you want to do to the house.
>
> (Newcastle, 536)

In summary, participants recognised the home as an important site for change as part of Net Zero, but were frustrated by their ability to instigate change, in the context of tight budgets and/or living in rented accommodation. The sense of collective endeavour on Net Zero within the home was important, and experiences varied in relation to how much our participants were able to bring family members along with them. This is because people need their homes to work, care, relax and play in, and any decisions on change must support this range of activities. Our research reminds us that seeing people's lives in the round, and understanding what people use now, and need to improve in future, is essential in planning Net Zero.

5.3 | Money

5.3.1 | How does money support and constrain engagement?

Our sample was made up of low-income households, so the motivation and ability to reduce carbon emissions were not high when changes were expensive. For instance, switching from car transport to active or public transport is seen as increasing costs: Public transport is expensive, especially for people on low incomes, and there are other associated costs—such as extended childcare to make up for time spent on longer journeys. Where upfront costs were high, even when they represented an opportunity to save money in the long term, people could not see a way forward. Lower-income households described the trade-off starkly: increased upfront costs might mean diverting spending from basic needs.

> it's like, the world's going to burn up in 30, 40, 50, 60 years, I'm going to be dead. I can't put food on my plate for tomorrow, and I can't feed my kids. Priority, you know, in the grand scheme of priorities for your most deprived families in Leeds, climate crisis is not the jazz at the moment.
>
> (Leeds, 712)

Participants shared how the cost-of-living crisis was also making households more sensitive to risk. This was due to reduced disposable income as well as the perception of uncertainty that derives from constant fluctuations in prices. This participant expressed unwillingness to transition to a hybrid or electric vehicle, in case the cost of electricity rises:

> If [electric vehicles were] cheaper, I would... How do we know if an electric's not going to be, like, more expensive than gas?
>
> (Leeds, 101)

Some participants thought that access to loans and credit could act as a means of making some of these changes. However, people noted that poor credit scores would make these difficult to secure.

Some of our participants had had Net Zero-related government grants, especially for adaptation to the home. These were helpful not only in terms of the changes that they directly fund but also in freeing up money for other purposes. One disabled participant said the council approached them and offered various adaptations to their home.

Finally, the cost-of-living crisis highlighted changes that simultaneously reduce consumption and save money. The rising price of energy motivated many to think about reducing their energy use and waste and to seek ways of improving their insulation and changing their energy supplier. Many participants strongly associated reduction of carbon emissions with saving money.

5.3.2 | Money-based concerns for the future

In England, Government grants are not currently accessible to everyone. People were concerned about the eligibility for grants among slightly higher-earning households. As one homeowner explained:

> The problems that we have currently is we live in an area that has a lot of help in terms of getting solar panels and getting government funding for these things for your household. We don't qualify for any of that. And that's a kick in the teeth for me... because it's not like I've got the money for a lot of this stuff... We spent a lot in the past six months to make a lot of improvements ...now, I can't financially afford anything else.
>
> (Leeds, 27)

Participants also shared concerns over grant application processes, which they found difficult and inaccessible. Where grants required households to contribute this could be frustrating for low-income households:

> They say, "Oh, well, we're gonna give you ... nearly two thirds to call it 6000... Yeah, we will give you 4000 quid." But how many people have got that 2000 pounds in a bank account?... it's like a false promise.
>
> (Leeds, 479)

Engaging in change as part of Net Zero was frequently characterised as requiring trade-offs. Some participants were unwilling or unhappy to make trade-offs in favour of carbon emissions reductions, simply because of a lack of clarity about who should bear the costs of the transition to Net Zero. For instance, participants shared that they were sceptical about personal changes making a difference in climate change:

> I think there's no clarity around whether personal changes are going to make a difference
>
> (Leeds, 112)

In some cases, trade-offs resulted in reduced carbon emissions, but increased precarity. For instance, one participant used proceeds from selling their car to pay for energy bills.

> I sold my car a few months ago, because I don't use it, I realised that I was just sitting there costing me money... I've still got most of that money, and that's going to pay my electric bill over the winter.
>
> (Newcastle, 558)

Participants felt that government campaigns focusing on energy-saving measures were blind to the trade-offs in decision-making between risks to health and well-being.

In summary, there is little money available among low-income households to fund change, and people will need financial support if they are to engage in change. Our participants are making their money go as far as possible and are risk averse across their spending due to the consequences of 'getting it wrong'. Understanding how change intersects with the trade-offs already being made by households is important: without this, policy risks resulting in knock-on effects in health and well-being.

6 | A PEOPLE-CENTRED, PLACE-BASED NET ZERO?

Inspired by our findings, and by our reflections on policy in the 'gaps' section above, we conclude by suggesting that a new approach to Net Zero policy and research is needed. This involves adding both social and spatial nuance to climate policy and planning, articulating visions of the future which allow space for a range of needs, interests and starting points. We call for more socially and politically grounded policy and thinking, bringing the structural nature of poverty and disadvantage into conversation. We also suggest the need for a combination of deep qualitative and socially informed quantitative approaches, which help both to understand social and spatial circumstances, and to apply learning from specific people and places to other populations and locations.

Our vision is both people-centred and place-based because social and spatial drivers are so clearly shaping people's experiences. We build on Massey's concept of place here as physical locations containing layered networks of social relations (1991). The intersections between people and place are written through our analysis above. Understanding where people live, the infrastructure and support systems there, as well as their home lives and their need to maintain care, work and leisure practices, is essential to craft more inclusive futures. Critically, the differences between people's starting points are not coincidental: both minority groups, and 'left behind' places, come into conversations about the future with a legacy of discrimination and neglect. Given the known associations between spatial and social disadvantage, we argue that addressing change for people in place is critical. A people-centred, place-based approach to Net Zero therefore follows three principles.

6.1 | Principle 1: Recognising patterns of difference and their (spatial and social) roots

The first identified gap in literature and policy was the failure to consider social difference in designing the scenarios for Net Zero. The importance of designing a transition for diversity in the present is brought to life in our data, where we saw

people making links between their present circumstances and their concerns about future changes. In the context of the cost-of-living crisis, after COVID-19 and austerity in the UK, those on low incomes in particular are hard pressed to take on change on this scale without support.

This brings us to our first principle: *A people-centred, place-based approach needs to start in the present, recognising how social and spatial patterns of difference shape people's access to a good life, and paying attention to the ensuing effects of (environmental) policy*. The various 'justice' literatures in this field (environment, energy, climate) have established clear approaches to identifying inequalities in relation to environmental ills, as well as the ability to live well with adequate access to resources and services (Bouzarovski & Simcock, 2017; Evans & Phelan, 2016; McCauley & Heffron, 2018; Snell, 2022; Sovacool et al., 2017). This gives us a starting point to identify key variables shaping social and spatial exclusion.

The call to address climate change through place has become widespread in both policy and research (Bouzarovski & Haarstad, 2019; Bridge et al., 2013; Howarth et al., 2022, 2023; IPPR, 2018, 2019; Local Government Association, 2022; Yuille et al., 2021). This literature acknowledges that places are both important sites of transformation, but also that the differences between places are critical to the effects of policy. Again, the distribution of resources and opportunities in place is central and speaks to a justice agenda. Places have hugely different starting points in Net Zero according to their historical trajectories and the associated accumulation of resources and power.

6.2 | Principle 2: Bringing whole life experiences into future climate narratives

The second gap in literature and policy that we identified was the failure to engage holistically with change under Net Zero. Our data here brings to life the cross-cutting issues that affect people's experience and perceptions of the agenda. Our workshops showed that Net Zero policies often intersect across several areas of people's lives, in contrast to the siloed way in which they are typically dealt with. Low-income households were already making the links between the various policy areas intuitively, indeed our participants found policy areas difficult to separate. Participants expressed their decisions as linked to their individual circumstances, their relationships at home and in their neighbourhood, and the opportunities and infrastructure in their place. As people were confronted with the various planned changes under Net Zero, and as they anticipated the need to manage this on a low income, trade-offs in the household budget were a central part of the conversation.

This brings us to our second principle: *A people-centred, place-based approach needs to recognise that life is not experienced in silos*. This insight is already apparent in the literature that brings the voices of those with lived experience into the policy conversation (Calver et al., 2022; Middlemiss & Gillard, 2015; Snell et al., 2018), frequently rooted in social policy (McIntosh & Wright, 2019). Talking to people that are currently side-lined or ignored within policy debates about their lives is an essential first step. The next phase is to bring these experiences into thinking and planning. A specific need for focus on the intersections between areas of life, and the knock-on effects of change in one area to another will be important.

6.3 | Principle 3: Prioritising social inclusion in climate policy

The third gap that we pointed out above, concerned how social and spatial patterns of poverty are obscured and obfuscated by both the failure to address social difference and to understand the effects of Net Zero changes in the round. One of the most striking aspects of our discussions with low-income participants about Net Zero is how their spatial and social circumstances affect their opportunities for social inclusion in the present. This present experience also shapes the way in which people anticipate the future. In our data, being on a low income often means living in a poor-quality home, juggling competing needs of household members and compromising on basic needs to make ends meet.

Building on principles 1 and 2, in our third, and perhaps most important principle, we argue that *there is an urgent need to design socially transformative climate policy that prioritises addressing social and spatial inequalities*. Our participants were concerned that the current visions and planning for Net Zero were unlikely to creating meaningful change for them. We would extend this concern, to articulate the risk that Net Zero is likely to reproduce inequalities across society, entrenching legacies of discrimination for those from less powerful groups or neglected places. As such, our final principle is about not just considering, but prioritising social inclusion, to ensure that climate futures are truly transformative for those that need them to be. As such we build on existing calls to advocate a joined-up approach, starting with an understanding of who is currently excluded (IPPR, 2018, 2019; Local Government Association, 2022), finding place-appropriate solutions (Howarth et al., 2023; IPPR, 2018, 2019; Local

Government Association, 2022), and using trusted intermediaries and people's existing networks to support change (Emden, 2023; Middlemiss et al., 2024).

A socially transformative climate policy clearly links to the 'just transition', a concept well established in international policy debates, hinging on the importance of reducing and reversing harm to vulnerable people through mitigation policy (Evans & Phelan, 2016; ILO, 2015; IPPR, 2019; Snell, 2022; UNFCCC, 2020). There remains work to be done here, in developing the relationships between these concepts, and in translating broad principles into more concrete recommendations for action. We hope here to have provided a useful starting point for future research, policy and practice.

CONFLICT OF INTEREST STATEMENT
The authors have no conflicts of interest.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available upon request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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