Placing communities at the centre of place-based approaches to decarbonisation: lessons for effective engagement and governance

Zoe P. Robinson, Adam J. Peacock, Tom Morton, Richard I. Waller, and Ryan Langley

Abstract

Place-based decarbonisation provides the holistic and systemic approach needed to address net-zero imperatives, while also maximising wider social, economic, and environmental co-benefits. Place-based decarbonisation projects vary in stage of delivery, scale, and scope. These facets have implications for engaging effectively with communities (who are often fringe stakeholders with less institutional influence) and developing mechanisms for community participation in decision-making for the areas in which they live. Effective community-centric approaches can help ensure that place-based decarbonisation contributes to a genuinely just transition, with improvements to the lives of local communities at its heart, by enabling community participation in identifying existing problems, priorities, and solutions. Using an insider-perspective, this paper reflects on the delivery of a community-centric approach in two place-based decarbonisation projects of different scales, scopes, and stages of delivery. Drawing from these comparisons, a transferable model and key principles for effective community-centric design in place-based decarbonisation projects are outlined, along with key policy recommendations to ensure that effective community-centric approaches are at the heart of place-based decarbonisation, contributing more holistic and participatory governance to accelerate decarbonisation and deliver on wider outcomes.

Keywords

Place-based decarbonization, Net zero, Community participation, Community-centric design, Just transition, Participatory governance

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1. Introduction

The UK must decarbonise its energy systems to meet the Paris Climate Agreement while meeting broader sustainability goals. Place-based approaches to energy system decarbonisation are increasingly championed for their capacity to achieve decarbonisation objectives at lower costs,[1] whilst concomitantly providing greater social value.[2] These approaches must also empower community stakeholders who, lacking formal institutional influence, are at greater risk of being excluded from net-zero governance and decision-making. Hence, ensuring a 'just' transition requires the development of effective, inclusive, and socially just 'community-centric' engagement strategies, which are attuned to their socio-technical-spatial contexts.

There are several barriers to place-based decarbonisation achieving its potential for a just, community-centric transition. First, there is no current consensus regarding the conceptualisation, practice, and language of place-based decarbonisation. Second, little has been documented about the rationale behind, and practicalities of *delivering* place-based decarbonisation through community-centric approaches. Third, little attention has been given to the local knowledge generated by community actors in enhancing place-based decision-making.

To address these barriers, this paper synthesises key learning from our involvement in designing and employing community-centric approaches in two place-based decarbonisation projects, situated within different contexts for decision-making.

This paper makes two key contributions: (1) a 'best practice' of community-centric design; (2) policy recommendations for the incorporation of community-centric design as a mechanism to involve communities in net-zero governance and accelerate decarbonisation.

2. Background

Place-based approaches to decarbonisation can include a range of energy system interventions and can be broader in scope: for example, incorporating green space developments and ecological benefits. Such holistic approaches can impact local communities in several ways, requiring new, diverse partnerships, trust building, and interactions to develop effective, socially just mechanisms in their design and delivery.

Many place-based decarbonisation projects are implemented by 'middle'[3] or 'intermediary'[4] actors, including private companies and third-sector organisations (often in partnership with local authorities). Whilst they provide 'technical know-how', they are often externally based, lacking an understanding of local community characteristics, place-specific contexts[5] and legitimacy within the local community.[6] However, local authority capacity to lead and inform local decarbonisation can be highly variable, hindered by insufficient resourcing and complex relationships with communities.[7]

Historically, engagement approaches within energy system design have focused on individual 'energy users'.[8] Place-based decarbonisation projects must go beyond an aggregation of individual users, placing local communities, their diverse experiences, and

[1] Bolwig *et al.* (2019), Chen *et al.* (2019), Thomas & Erickson (2021).
[2] Dowling *et al.* (2022).
[3] Parag & Janda (2014), Zoha (2021).
[4] Sovacool *et al.* (2020).
[5] Sovacool *et al.* (2020).
[6] Bäckstrand *et al.* (2018).
[7] Bedford *et al.* (2023).
[8] Fensel *et al.* (2014), Gupta *et al.* (203).

their contexts at the centre of energy system transformation. For example, local backlash to the hydrogen village proposals in north-west England,[9] combined with key learnings from unsuccessful energy efficiency programmes,[10] demonstrate how insufficient recognition of local context, and appropriate mechanisms of community engagement, can hinder local 'buy-in' to low-carbon solutions.[11]

Consequently, there is a need to develop a 'best practice' for holistic *community-centric* approaches within the new zeitgeist of 'place-based decarbonisation' governance. Community-centric approaches are bottom-up and iterative, focusing upon what is socially acceptable/desirable at local levels, paying attention to cultural identity and historical experience that inform attachment to/interaction with place as well as considering existing vulnerabilities within local communities to ensure a just energy transition[12] and through greater community support, accelerate pathways to decarbonisation.

3. Case study details and author positionality

This paper draws on two case studies, Zero Carbon Rugeley (ZCR) and Net Zero Neighbourhood:Dudley (NZN:Dudley). ZCR aimed to design a town-scale 'Smart Local Energy System', funded as part of the UKRI Prospering from the Energy Revolution innovation programme.[13] Funding ran from March 2020 to March 2023, beginning during COVID-19 lockdown restrictions. NZN:Dudley is funded by the West Midlands Combined Authority, and is the first of seven local authority led 'Net Zero Neighbourhood' delivery projects across the West Midlands. Funding for NZN:Dudley runs from January 2024 to December 2025.

A 'community-centric' approach was key to both projects, with the paper authors (academics and researchers working at one university) responsible for the design and delivery of the overall community engagement approach and activities. Both projects created a mixture of responses from community members, but were largely supported by the local community.

3.1. Zero Carbon Rugeley

Rugeley is a rural town in Staffordshire, England, with a population of around 25,000. Coal mining in Rugeley occurred from1960 until 1991. Adjacent to the town are the grounds of a former coal-fired power station, which was a major employer and social hub for employees until closure in 2016. The ZCR project was inspired by the former power station owner's (a major multinational energy services company and project lead) proposed transformation of this site into a mixed-use, 'smart home' development. ZCR aimed to incorporate the wider town through the design of a 'Smart Local Energy System', including multiple energy systems/vectors, housing, and travel.

3.2 Net Zero Neighbourhood: Dudley

NZN:Dudley is situated in Brockmoor, part of a suburban ward within the Dudley Metropolitan Borough Council area, eighteen miles west of Birmingham. The project boundary encapsulates ~600 properties across six streets, representative of a wide range of property types and ownership, and several areas of green space and a primary school. The objectives of NZN:Dudley include home energy improvements (retrofit), travel, and improvements to green space.

[9] Gordon *et al.* (2023), Mavrokefalidis (2023).
[10] Gooding & Gul (2016), Rosenow & Eyre (2016).
[11] Ryder *et al.* (2023).
[12] Cherry *et al.* (2022).
[13] UK Research and Innovation (2023).

4. Comparisons of place-based decarbonisation: stage of delivery, scale, and scope

The two case studies presented differ in three significant ways: the stage of delivery; geographic scale of the project; and scope of elements considered. Comparisons between the cases explore the implications of these three aspects to the development and delivery of community engagement approaches. Reflections on the case studies' delivery alongside relevant literature are used to develop a model and principles for a transferable approach to community-centric design for place-based decarbonisation and consider implications to net zero governance and decarbonisation pathways.

4.1 Stage of delivery and community-centric design domains

ZCR was only funded for the *design* stage of a smart local energy system, while NZN:Dudley funding required the *delivery* of intervention measures (including fifty retrofits). Despite the different stages of the two case studies a similar 'community-centric' approach was adopted, drawing on ideas from user-centric design[14] applied to a community scale.[15] This approach was designed to ensure that the projects' design and delivery were iteratively informed by a holistic understanding of the local community and their insights, provision of effective support for community members, and a legacy beyond the project. Hence, in both case studies, this community-centric design approach utilised four different non-sequential 'domains' of engagement: Exploration, Specific, Support, and Legacy. The individual engagement activities associated with each domain and project were varied, iterative, and reflexive, adapting according to changing circumstances and learnings from the community. Below we outline the role of the four domains in the context of both design (ZCR) and delivery stage (NZN:Dudley) place-based decarbonisation projects, and give examples of associated community engagement activities in Table 1.

Table 1: Outline of the different purposes and example engagement activities under each community engagement domain. The examples given are not the only activities carried out. The specific activities undertaken are place-specific and dependent on what is appropriate for each project and place at any particular time as the projects progressed. Some activities serve more than one purpose in each domain.

Engagement Domain	**Purposes of each domain**	**Example activity undertaken under each domain**	**ZCR**	**NZN: Dudley**
Exploration	(1) Understand the social and cultural context of the local community: e.g., identity, heritage, concerns	Meetings with key community stakeholders (e.g., councillors, existing community groups, local projects and organisations)	Y	Y
		Workshops to explore community identity: e.g., 'Who is Rugeley'	Y	
		Performance-based walking focus group exploring the intersection of energy heritage and the energy transition	Y	

[14] Norman & Draper (1986).
[15] Robinson *et al.* (2023).

		As part of project open events, displays of historic maps of the area engaging participants in conversations about place identity		Y
	(2) Understand existing social and physical community assets: e.g., community groups, key gatekeepers, organisations, physical community 'hubs', such as schools, community centres, churches, theatres	Walk arounds of the local area and visits to key community spaces	Y	Y
		Establishment of a 'Community Gatekeeper' group bringing together local stakeholders on a regular basis to discuss project developments	Y	
	(3) Raise the local community's awareness about the project and its objectives	Introductory 'open' engagement events in community spaces displaying different aspects of the project to catalyse communications	Y	Y
		Online talks on different aspects of the project	Y	
		Letter drops and door knocking to introduce the project and its different elements		Y
	(4) Develop communication channels for ongoing use.	Establishment of social media presence (Facebook) as a two-way engagement tool, providing information and posing questions	Y	Y
Specific	(1) Develop insights into community needs and wants around specific project elements (e.g., travel, green space)	Project specific engagement events hosted in key community spaces (e.g., theatre, primary school, council-owned green spaces) with intervention specific displays: e.g., engaging participants with potential green space interventions to develop a long-list of interventions; voting for preferred interventions to create a shortlist of green space developments; maps for people to annotate with particular travel related 'pain points'	Y	Y

		‘Pop-up events’ as part of other community events (e.g., school fair) with short activities to engage on specific intervention areas, e.g., discussion of energy efficiency using a doll’s house	Y	Y
		Use of social media (Facebook) to pose interactive questions and polls about specific intervention areas	Y	
	(2) Test intervention ideas with community members	Online or in-person workshops to explore specific intervention areas: e.g., comfort with different levels of smart energy system automation; different business models; perceptions of autonomous vehicles	Y	
	(3) Recruit community members for specific interventions	Letter drops and door knocking to provide information about retrofit offers to specific households		Y
		Q&A sessions about retrofit offers		Y
Support	(1) Support resident decision-making on uptake of financed retrofit offer	Individual household visits to discuss retrofit offers		Y
		Q&A sessions about retrofit offers		Y
	(2) Support residents to develop confidence in effective use of new energy technologies	Development of user-friendly handover information and videos		Y
		Opportunities to see low-carbon technologies, such as air source heat pumps, solar PV (photovoltaic) system, battery storage in a ‘open house/show home’		Y
	(3) Support development of community-led initiatives	Supporting discussion sessions as part of community food-growing initiative	Y	
	(4) Support links between project	Teacher continuing professional development linking to intervention areas	Y	

	objectives and other community activities	Contribution to school curriculum and co-curriculum activities linking to intervention areas	Y	Y
Legacy	(1) Enable community members to continue to engage with their local communities on issues related to project objectives	Training in thermal camera use and thermal camera donation to community group to enable community-led support for local households around energy efficiency	Y	
		Donation of carbon footprint game cards enabling community group engagement activities with youth groups around carbon literacy	Y	
		Net Zero Champions/Train the Trainer course developing community member's net-zero literacy and ability to train others	Y	
		Community noticeboard providing an ongoing physical communication channel within the neighbourhood for community groups		Y
	(2) Create/further develop local partnerships which can continue to address local sustainability goals beyond project timelines	Establishment of a new community group/growth of existing community group providing a vehicle for a range of on-going community action, including food growing and engagement with youth groups	Y	Y
	(4) Ensure ongoing support available for homes with low carbon technologies installed	Continuing professional development training on new energy technology for Local Authority Energy Advice Team		Y
	(5) Physical asset improvements	Solar PV (photovoltaic) system installed on community assets (primary school, community centre)	Y	Y
		Retrofitted households		Y
		Traffic calming measures (in progress)		Y
		Green space improvements		Y

4.1.1 Exploration

The ‘Exploration’ stage aims to understand more about the local community (for example, key community assets, stakeholders, challenges, identity) without a specific ‘decarbonisation lens’, building trust and going beyond simple ‘data extraction’ approaches.[16] Local community gatekeepers, community-led groups, walk arounds, and exploratory workshops and events for community members contributed to a broad understanding of the local areas. In NZN:Dudley, the local authority as the project lead, contributed key additional local insights. In ZCR, a workshop entitled ‘Who is Rugeley’ bringing to the surface intra-local distinctions relating to relationships with energy between ex-mining families and others, leading to a framing of ZCR at the intersection of energy heritage and energy transition.

4.1.2 Specific

The ‘Specific’ stage aims (i) to gather community insights about specific project intervention areas (for example, travel ‘pain points’) and inform iterations of design, and (ii) to recruit community members to specific interventions, such as retrofit assessments (NZN:Dudley). This stage includes a wide range of activities responding to the needs for insights across different project intervention areas, as well as targeted towards different audiences and different depths of engagement to provide numerous avenues for individuals with different needs and capacities to engage.

4.1.3 Support

Building in a ‘Support’ domain as part of community engagement is essential to net-zero governance for the effective adoption of low-carbon technologies (for example, NZN:Dudley), as well as the development of trust. Research demonstrates that, without sufficient handover and support, householders can be left ill-equipped to operate and care for new systems.[17] Effective support requires in-person, household-specific advice[18] by those confident to engage with individuals about their everyday practices.[19] In NZN:Dudley, technology ‘handover’ was built into the project’s community engagement approach as well as future support mechanisms through upskilling of the local authority energy advice team. In ZCR, support with a community-led food-growing initiative was offered to community members to help build relationships and trust with community members.

4.4.4 Legacy

Considering the legacy, and the positive outcomes and benefits for the local community that outlast the project[20] is important, irrespective of whether projects are design or delivery-focused. Legacy can be varied, including physical assets, new relationships between community members and local stakeholders, through to training of local stakeholders to provide continuing support for decarbonisation activities (Table 1). An early commitment to project legacy can help build long-term trust and buy-in for community members.[21] For example, in ZCR, community members wanted to see significant change in their community as a result of their involvement, despite the project’s design focus. This led to providing the community group with resources and training to continue to have an impact within their community.

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[16] Perkins (2023).
[17] Baborska-Narozny *et al.* (2026), Temby & Ransan-Cooper (2021).
[18] Wise *et al.* (2025).
[19] Palm (2020).
[20] Davies (2024).
[21] Davies (2024).

4.1.5 Summary of approach

This four-fold community-centric design approach provides an open-ended and iterative mechanism to build an understanding of the local community and place, irrespective of project stage. It is underpinned by co-design, which situates community members as 'local experts' through lived experience of place, capable of meaningfully informing design outcomes. The approach ensures effective support for project delivery stages and builds trust through supporting community priorities in design stages, as well as ensuring a project legacy for the community. This approach aims to build agency and prevent feelings of being 'locked out' of decision-making,[22] improving procedural justice outcomes by 'transitioning with' rather than doing 'transition to' communities.

4.2 Scale and boundary setting

The two case studies differed in terms of geographic scale, with ZCR operating at a 'town-scale' and NZN:Dudley at the scale of several streets. Project scale as well as the positioning of project boundaries have implications for community-centric approaches. This includes access to community assets (for example, green spaces, and community buildings) and events (for example, street parties, market days) to underpin engagement (see Table 1 for examples). At larger project scales (ZCR), it becomes more difficult and costly to directly reach a high proportion of the population. In contrast, the smaller scale of NZN:Dudley allowed letter drops and door knocking to be carried out, ensuring each household received information. In ZCR, reliance on community gatekeepers, in particular local councillors, was essential to increase reach.

Project scale influences the scale of potential interventions. The small scale of NZN:Dudley led to community engagement bringing to the surface very localised transport issues, including parking and speeding on particular streets, leading to the design of street-level interventions. In contrast, community engagement in ZCR focused on larger scale issues, such as public transport connectivity and mobility hub locations.

Irrespective of scale, the positioning of project boundaries may have implications for place-based identities and attachment, influencing community-centric approaches. Research suggests that individuals more attached to the place they live are more likely to contribute to civic activism and protection of their environment[23] and high levels of support for energy technology innovations have been linked to residents' sense of pride in 'their' local area being situated at the forefront of energy innovation.[24] However, project boundaries do not necessarily reflect place-based identities and attachment, as place attachments can exist from those external to project boundaries,[25] while local perceptions of neighbourhood boundaries, influenced by myriad historical, social, and environmental factors,[26] may differ from project-constructed boundaries. Even at the NZN:Dudley scale, distinct place identities were attested to by community members from either side of a disused railway line dissecting the NZN project boundary.

Boundary setting inevitably introduces issues of exclusion of places and people outside of project boundaries, which may be compounded by smaller scales. The broad scope of place-based decarbonisation projects adds further complexity, with geographically dynamic aspects, such as travel, concerning populations outside of the project boundary. Similarly, the 'open' nature of some community engagement activities may attract participants from outside project boundaries. In NZN:Dudley, access to funding for retrofit was only available

[22] Lennon *et al.* (2019).
[23] Maricchiolo *et al.* (2021).
[24] Robinson *et al.* (2022).
[25] Devine-Wright (2009).
[26] Parker-Bernstein (2024).

to (select) properties within the project boundary, requiring tailoring of messaging at community events based on determining where individuals lived. Open community engagement events therefore need multiple purposes for participants inside and outside of the project area. However, there are potential procedural justice issues where individuals from outside the area (or at a distance) may influence very localised interventions but would not experience potential negative impacts.

Several studies have attested to the 'imperfection' of 'boundary making' and difficulties putting abstract definitions of place into practice.[27] Decisions on scale and boundary setting in place-based decarbonisation projects must grapple with these challenges, and acknowledge the impact on a community-centric approach.

4.3 Scope of place-based decarbonisation

The two case studies differ in their scope. Both ZCR and NZN:Dudley include a focus on domestic decarbonisation and energy efficiency and decarbonisation of transport, while NZN:Dudley also includes a 'green space' improvement goal. Both champion(ed) the potential for wider social, environmental, and economic co-benefits, including mitigating fuel poverty.

Green spaces were a clear interest for community members in both case studies (even though this was not an area of focus for ZCR). In NZN:Dudley, an existing community group 'Friends of Brockmoor Park' (the largest area of green space within the project boundary) provided an existing, albeit small, community network to support community engagement. At community engagement events, individuals were often interested in engaging in discussions around local green spaces, helping shape future interventions or identify areas for project support. In ZCR, a new community-led group, 'EcoRugeley' was formed by individuals who engaged with ZCR as 'community ambassadors'. This group focused around a community allotment, providing regular community activities and a physical base beyond the funded ZCR project timeline.

There are potentially indirect and important intersections between these different project elements. For example, Oliveira and Marco's (2018) study demonstrated how some people experiencing difficulty in managing unfamiliar energy technologies in their home experienced a sense of social isolation, but balconies and a community allotment created chance encounters where experiences of learning could be exchanged. Because of the importance of word of mouth and social networks in new technology and behaviour adoption,[28] the 'public' nature of green spaces provides additional opportunities for 'information diffusion'[29] and local learning[30] around project decarbonisation and wider objectives. Therefore, a strength of holistic place-based decarbonisation projects may be in the intersection between the private and public sphere, in contrast to a sole focus on either private (for example, housing retrofit, private cars) or public space (for example, community gardens, public transport) sustainability interventions.

The broad scope of place-based approaches to decarbonisation provides a breadth of potential co-benefits to local communities across the economic, environmental, and social pillars of sustainable development. These include: generating improved health and quality-of-life outcomes and contributing to alleviating the cost-of-living crisis through mitigating fuel poverty and increasing disposable income,[31] alongside decarbonisation and other environmental benefits. The scope and potential synergistic benefits of place-based

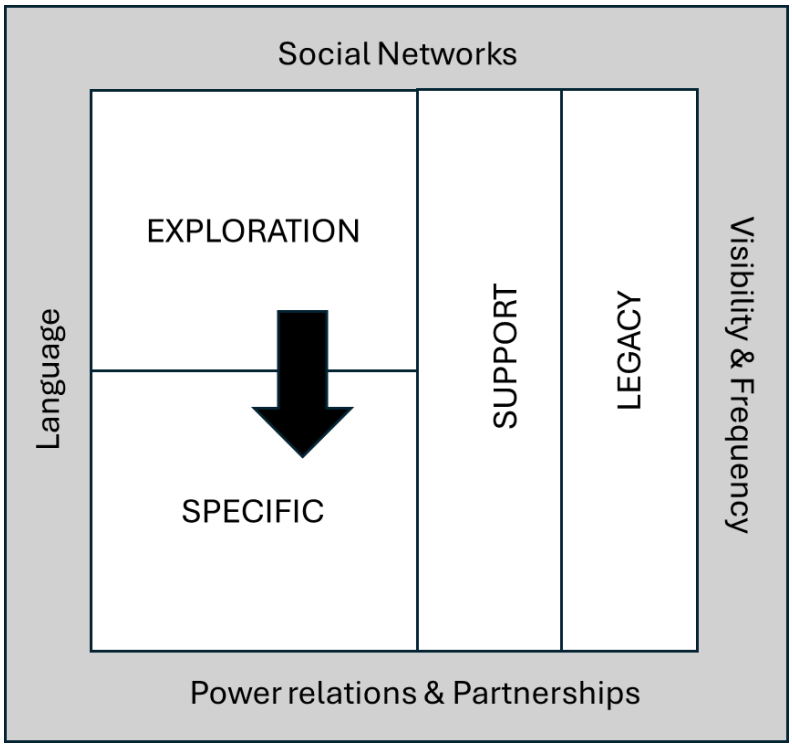
[27] Devine-Wright & Sherry-Brennan (2019), Parker-Bernstein (2024), Simcock (2014).
[28] McMichael & Shipworth (2013), Van Raaij & Verhallen (1983).
[29] Rogers (2003).
[30] Neij *et al.* (2017).
[31] 3Ci (2023).

decarbonisation continue to grow as place-based decarbonisation thinking and practice develop. For example, in NZN:Dudley, local wildlife-focused stakeholders identified synergies between housing decarbonisation and biodiversity improvements, through the potential to install nesting boxes for swifts while scaffolding is erected. 3Ci[32] propose a 'Net Zero Neighbourhoods' model, which broadens the place-based decarbonisation scope further to include 'community waste'. In NZN:Dudley, a regularly cited concern was the resource waste associated with replacing working boilers with heat pumps. Therefore, building circular economy objectives into place-based decarbonisation projects could stimulate reuse of boilers, further reducing barriers to heat pump transition.

5. Community-centric design model and principles

Drawing on the two contrasting case studies and relevant literature, we present a model and principles for community-centric design for place-based decarbonisation (Figure 1). The four domains outlined in Section 4.1 are central to an effective community-centric approach, irrespective of stage of delivery, scale, or scope of place-based decarbonisation. Accompanying these four domains are four key principles, outlined below, underpinning the design and delivery of this community-centric design model.

a)



[32] 3Ci (2023).

b)

Exploration: Develops broad understanding of the local community (e.g., key community assets, stakeholders, challenges, identity); develops channels for ongoing communication; builds trust; goes beyond 'extracting' data
Specific: Gathers insights about specific project intervention areas; recruitment to interventions (e.g.. retrofit).
Support: Helps with practical implementation of low carbon behaviours in public and private spheres (e.g., heat pumps, community food growing)
Legacy: Create outcomes and benefits for the community beyond the projects funding (e.g., physical assets and new social networks) and increases capacity (e.g. CPD for energy advisors/teachers).

Figure 1: a) A conceptual model demonstrating the relationship between the four different domains of the community-centric design approach, and the four community-centric design principles. b) Outline of key attributes of each domain.

Principle 1: Using and developing social networks

The use of existing, and the development of new, social networks are fundamental to ensuring a community-centric approach, and were a key component of both case studies. Research has shown that word of mouth, social networks, and social comparisons can influence the adoption of new energy technology and behaviours,[33] with energy-saving innovations and behavioural changes having a stronger 'diffusion' in more socially connected neighbourhoods.[34] Enhancing the mobilisation of existing social networks is important because of the trust attributed to these established communication channels.[35] However, research has also suggested that the diffusion of *negative* messages (where social contacts derogate the innovation or its source) may be influenced by the *number* and *strength* of social ties, with multiple, weak ties more likely to make people more aware of potential risks of an option than potential benefits.[36] However, situations can be created to generate 'buzz' (the non-deliberate exchange of information and knowledge outside formal collaboration) and sharing of local-level experiences.[37] Both ZCR and NZN:Dudley used outdoor and community spaces for 'open events', where members of the community could meet both serendipitously and through structured events and interactions in order to support the development of new peer interactions, as well as working with existing community-led groups. ZCR established a new group, of 'community ambassadors' who engaged regularly with the project as an advisory body involved in informing the direction of the project, advising on interventions, and providing a voice for the project in the community. In NZN:Dudley, residents requested a peer network for those on the path to new domestic low-carbon technologies. As social networks can support the diffusion of both negative and positive messaging, ensuring positive community experiences of both design and delivery

[33] Cialdini (2003), McMichael & Shipworth (2013), Temby & Ransan-Cooper (2021), Van Raaij & Verhallen (1983).
[34] Van Raaij & Verhallen (1983), Warren & Clifford (1975).
[35] McMichael & Shipworth (2013).
[36] Weening & Midden (1991).
[37] Neij *et al.* (2017).

stages in place-based decarbonisation projects is essential to ensure that social networks positively contribute to adoption.

Principle 2: Power dynamics and partnerships

Ensuring appropriate power dynamics and relationships between communities and project partners is a key principle of a community-centric approach. The negotiation of power dynamics in community engagement can have different purposes, ranging from co-production, to community empowerment to catalyse changes to policies, programmes, and practices.[38] Decisions of the engagement approach underpin power dynamics between community and project actors. Our community-centric design approach sought to overcome formal, institutional (and often exclusionary) modes of expertise. For example, in ZCR we employed cultural animation workshops,[39] a participatory arts-based method of knowledge co-production which encourages abstract thinking rather than participants' direct engagement with research topics.[40] Such practices generated local knowledge, which challenged pre-conceptions about the social, spatial, and technological dimensions of the projects.

A university led the community engagement across both case studies. Universities are examples of 'anchor institutions', long-standing, place-based organisations 'anchored' in their communities.[41] Yet, in neither case was the university proximal to the local community. There are advantages and disadvantages of community engagement being led by local organisations (with existing relationships) versus external organisations. Local organisations, such as local authorities, can build on existing knowledge and networks, and support legacy activity beyond project funding; but there may be existing complex relationships and biases influencing perceptions of the project and engagement activities. In NZN:Dudley, local authority leadership was from the housing team. The project benefited from the local authority's existing relationships with a private delivery partner (a formal project partner) removing a barrier for households to find their own trusted suppliers;[42] existing relationships with social housing tenants; and the experience to provide householder-level energy support. However, owner-occupier residents initially assumed the project only included social housing because of the local authority involvement. In contrast to local organisations, external organisations, particularly recognised and trusted institutions (such as universities), need more time to develop local knowledge, relationships, and legitimacy. Collaboration with local partners to understand local networks, and time in communities can mitigate some of these disadvantages.

All project partners in both case studies contribute(d) to the projects' community-centric approach in some way, whether: (i) informing community engagement activities (to ensure relevant specific intervention insights were brought to the surface); (ii) using community insights to inform interventions; (iii) contributing directly to community engagement activities; (iv) contributing local knowledge from previous experience of the community. Community engagement leads worked with project partners leading specific intervention areas to bring to the surface local community insights: for example, developing understanding of local transport 'pain points' to inform a long list of potential interventions (NZN:Dudley). Even where partners were not usually community-facing, experiencing the engagement events first-hand gave them confidence in the value of in-depth qualitative methods and a community-centric approach.

[38] Andress *et al.* (2020), Schiavo (2021).
[39] Keleman *et al.* (2018).
[40] Lam *et al.* (2018).
[41] Cassetti (2020).
[42] Wise *et al.* (2025).

Principle 3: Community-focused language

The variable and emerging language of place-based decarbonisation can be challenging for community engagement, and needs careful and consistent consideration for an effective community-centric approach. Net Zero terminology falls foul of increasing politicisation[43] and implies a more limited scope than articulated in place-based decarbonisation desired project outcomes, downplaying important outcomes such as fuel poverty reduction,[44] and enhanced comfort and wellbeing. The 'Zero Carbon' name of ZCR led to questions from the community about whether the project was really 'zero carbon', particularly regarding the life-cycle costs of proposed interventions. Within NZN:Dudley, challenges of 'net zero' terminology led to the adoption of a public-facing name—Community BEES (Brockmoor Energy and Environment Scheme) linked to a logo designed by children at the local primary school. ZCR workshops with community participants highlighted the challenge of terminology used widely by project partners but misunderstood by community members. For example, the term 'retrofit' for some, implied notions of 'old' or outdated, while phrases such as 'fabric first' were associated with household furnishings. Consequently, in NZN:Dudley, the term 'retrofit' was replaced with the phrase 'home energy improvements'.

Language was also tailored to highlight the 'specialness' of individual places. Both NZN:Dudley and ZCR used messages around the 'specialness' of the place, situated at the vanguard of new thinking, and national government interest. ZCR drew upon the energy heritage of the area, framing the net zero transition as building on the town's proud history of energy production.

Principle 4: Project visibility and frequency of communication

Ensuring visibility of the project through prioritising early external-facing interventions, signage, as well as ensuring regular communications is important in supporting the community-centric design process and maintaining the community's engagement with the project. Energy decisions and practices are largely invisible and inaccessible, yet diffusion theory[45] suggests that behaviours and technologies are more likely to be adopted if already seen to be adopted by others. Hence observable rather than hidden energy interventions may more effectively enable early adopters' influence on others.[46] Early external interventions such as roof-mounted solar panels can provide visible evidence of early adoption, whilst visible links to the project can be enhanced through signage and project branding. 'Show homes' or 'open door' events (NZN:Dudley) can make normally 'private' energy interventions and technology 'observable', which can influence adoption decisions.[47]

A disadvantage of the community-centric design approach is potential time lags between community engagement activities and the delivery of related interventions. Such delays can lead to uncertainty in the community about project progress, with the potential to undermine trust.[48] Regular communications about the project are therefore key to managing community expectations.

6. Discussion: implications for net-zero governance and decarbonisation

Current place-based decarbonisation projects differ significantly in terms of delivery stage, scale, and scope, with a need to draw out transferable, effective practice to ensure

[43] Paterson *et al.* (2024).
[44] Sherriff *et al.* (2022).
[45] Rogers (2003).
[46] Klein & Coffey (2016).
[47] Temby & Ransan-Cooper (2021).
[48] Robinson *et al.* (2022).

community-centric approaches. Increasingly, the need for local leadership is acknowledged in achieving the UK's decarbonisation targets.[49] With over 300 local authorities declaring a climate emergency, there is a clear mandate for local authorities to lead place-based decarbonisation, requiring support from national governments to increase capacity and resources at local levels.[50]

Beyond the political leadership of local authorities, the combination of breadth of responsibilities and expertise within a local authority and the scope of place-based decarbonisation projects, means practical implementation could legitimately be led from several different areas within a local authority, as several different areas of local authority responsibility are required for delivery across the scope of place-based decarbonisation. However, piecemeal approaches focusing on single policy sectors for decarbonisation have been reported in local authorities,[51] and decades of austerity have increased pressures to 'deliver more with less', reducing local capacity. The community-centric design approach outlined can support local authorities in new ways of working with communities, which cross-cut traditional areas of responsibility, while building on existing insights and relationships with the local community.

Much of the work studying injustices of net-zero policies deals with one aspect of decarbonisation in everyday life at a time (for example, housing, transport), and fails to address differences in people's ability to take part in a just transition and the diversity of experiences.[52] In addition, studies have shown that community stakeholders (who typically lack formal institutional influence) are at greater risk of being excluded from net-zero governance and decision-making.[53] Both case studies discussed reflect a more holistic approach to decarbonisation than traditional methods focusing on a single aspect of decarbonisation, providing the potential to unlock a much wider range of positive outcomes alongside decarbonisation. Community-centric design provides a mechanism to involve communities in net-zero governance and understand a diversity of experiences and perspectives. By putting people's experiences at the centre of decision-making, this provides a way to overcome barriers and develop local support for decarbonisation measures, ultimately accelerating efforts and delivering wider outcomes.

7. Recommendations

Comparison of, and lessons learned from, the community-centric approach to the two place-based decarbonisation case studies outlined, have been used to generate policy recommendations to catalyse successful community-centric design for place-based decarbonisation projects, enabling place-based, just transitions to net zero.

1. *Requirement of a community-centric approach for place-based decarbonisation funding*

Policy can support the use of community-centric approaches in place-based decarbonisation through the requirement for community-centric design principles within funding allocations, using the four community-centric design domains, in order to:

(i) ensure understanding of the community context;
(ii) gather community insights for specific interventions;
(iii) provide sufficient in-person, individualised, community, and peer support as appropriate to different interventions;

[49] Local Government Association (2025).
[50] Wise *et al.* (2025).
[51] Bedford *et al.* (2023).
[52] Middlemiss *et al.* (2023).
[53] Sharp *et al.* (2022).

(iv) ensure a community legacy.

In addition, funding allocations should require assurance of:

(i) the use and development of social networks;
(ii) the use of a range of innovative approaches to reduce power dynamics and ensure inclusion of voices from those not usually heard;
(iii) ensuring appropriate and tailored language;
(iv) ensuring the visibility of interventions and mechanisms to keep the local community regularly updated on project progress.

It must be ensured that adequate resourcing is allocated for ongoing community engagement throughout the project duration.

2. *Consideration of community-centric implications of scale and boundary setting*

Policy influencing the scale and boundary setting of place-based decarbonisation initiatives must consider implications to community-centric approaches. Project boundaries need to recognise and ideally align with place-based identities, and consider available community assets to provide community spaces for informal peer learning. Consideration needs to be made in procedural justice terms of implications for communities sitting marginally outside project boundaries.

3. *Expanding definitions of place-based decarbonisation to include green space/natural capital and circular economy.*

Place-based decarbonisation can benefit from a holistic scope that encompasses green space and the circular economy. Benefits include additional community interest, peer networking opportunities, addressing community concerns around resource waste, delivering additional tangible social, health and environmental benefits, and a community-asset legacy. Place-based decarbonisation policy should look to drive more systemic approaches to achieving net zero through a broader scope than simply energy to maximise the synergies between these intervention areas.

4. *Providing the conditions for the upskilling and resourcing of local authorities and the development of innovative, multi-sector partnerships*

Enabling the critical role of local authorities in the delivery of community-centric place-based decarbonisation initiatives requires a two-fold approach. First, it requires upskilling of local authorities in the ‘best practice’ of community-centric engagement. Second, it requires empowering local authorities with appropriate resources (dedicated staff and funding for community engagement costs). However, local authorities alone cannot deliver place-based decarbonisation, nor can it be done without further social and technical innovation. ‘Middle’ or ‘intermediary’ actors with different specialisms, as well as diverse local stakeholders, are required to enable design and delivery of holistic, community-centric, place-based decarbonisation. This requires the policy conditions to ensure appropriate funding and governance to build and sustain the required multi-sectoral partnerships and the flexibility of outcome assessment to encourage innovation.

7. Conclusion

Place-based decarbonisation is in the early stages of practice and policymaking, with early examples of projects differing significantly in terms of stage of delivery, scale, and scope. While the place-based nature of this approach to decarbonisation intrinsically requires bespoke solutions to both technical decarbonisation and engagement approaches, it is important to learn from projects with differing characteristics to understand what effective practice is transferrable. Drawing from two case studies of place-based decarbonisation

differing in stage, scale, and scope, this paper outlines a model and associated principles of community-centric design for place-based decarbonisation, which is transferable irrespective of project characteristics, enabling flexibility to respond to the specific characteristics of place. Community-centric design enables understanding of the diversity of experiences within the local community to influence decision-making and governance, increasing community support for decarbonisation measures, hence accelerating decarbonisation efforts while delivering wider outcomes. Adopting this model and principles as part of emerging policy and practice will ensure net zero governance and place-based decarbonisation focuses on more than just a smorgasbord of technical solutions, but has improvements to the lives of local communities at its heart and draws on the understandings of, and meaningfully involves, local communities, ensuring a just transition for all.

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