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McMillan, E., Barnes, J., Nolden, C. et al. (2024) Local, place-based governance for net zero: a review and research agenda. *Journal of the British Academy*, 12 (4). a47. ISSN: 2052-7217

<https://doi.org/10.5871/jba/012.a47>

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Local, place-based governance for net zero: a review and research agenda

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ABSTRACT

Net zero is widely perceived to be a societal challenge that cannot be addressed through business as usual but requires active governance aimed at societal transformation. In the UK, three quarters of all local authorities have declared climate emergencies, yet local action on net zero remains slow and uneven. Transforming local governance so that it is capable of organising to deliver change at a speed and scale commensurate with net zero targets is proving problematic. In this commentary the reasons why are explored. Using a narrative review method, informed by contemporary thinking on Transformative Innovation Policy, the commentary critically examines a growing body of knowledge on local, place-based governance of net zero, which has emerged at the interface of policy and practice in the UK since 2019. The review synthesises this evidence into seven place-based governance challenges and identifies extant obstacles and opportunities in navigating towards more effective governance arrangements. Collectively these challenges highlight the importance of organising to deliver change, not just organising the delivery of change, and the guiding role of the state in the process. The commentary concludes by setting out future research avenues.

Keywords net zero, governance, place-based governance, societal challenges, transformative innovation policy

Published: 11 December 2024

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Citation

McMillan, E., Barnes, J., Nolden, C. & McDermont, M. (2024), 'Local, place-based governance for net zero: a review and research agenda', *Journal of the British Academy*, 12(4): a47
<https://doi.org/10.5871/jba/012.a47>

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Published by The British Academy.

1. Introduction

Net zero is widely regarded to be a wicked problem (Rittel & Webber 1973), that requires transforming societies and economies through active governance at multiple levels (Adger *et al.* 2003; Castán Broto 2017; Rosenbloom & Meadowcroft 2022; Scoones *et al.* 2020). Geopolitical tensions, structural inequalities, and inequitable decision-making processes further compound contemporary societal responses and create tensions between rapid and just transformation pathways that cannot be easily addressed without developing more participatory and responsive modes of governing (Barnes 2021; Newell *et al.* 2022). Nevertheless, worldwide, governments at all levels have enacted legislation to meet the target of net zero.

The UK is no exception. In June 2019, the UK Government signed into law a target of reaching net zero (NZ) by 2050. By the end of 2020, three quarters of local authorities (LAs) in the UK had declared climate emergencies. Since then, a body of knowledge on local, place-based governance of NZ in the UK has emerged at the *interface between policy and practice*. This body of knowledge, contained within documents produced by arm's-length government

organisations, charities, advocacy networks, think tanks, unions, and consultancies highlights the commitment of local actors to achieving NZ, and substantiates the multiple organisational challenges involved in orchestrating and delivering local, place-based progress.

In academia, interest in new forms of policy and governance capable of tackling societal issues like NZ has arisen in parallel. Such interest is concentrated at the *science–policy interface*, where insights from innovation and transition studies (e.g., Schot & Steinmueller 2018a; Steward 2012) have merged with interest in mission-orientated policy frameworks (e.g., Mazzucato 2016), upturning existing thinking on innovation and change. Transformative innovation policy draws attention to the failure of prior (innovation) policy for failing to address emerging environmental and social concerns; calls for recognition of emerging grand societal challenges (GSCs) as new types of policy issues, and sketches out a new policy paradigm to guide societal responses (Haddad *et al.* 2022; Schot & Steinmueller 2018b). Research on Transformative Innovation Policy has grown steadily over the last decade, focussed largely on (supra)national systems and nation states. By comparison, relatively little attention has been given to local scales, dynamics, and responses (Allan *et al.* (2023), Bedford *et al.* (2023), and Honeybun-Arnolda *et al.* (2024) provide notable exceptions) despite growing, if cyclical, recognition of its importance (Köhler *et al.* 2021). This has resulted in calls to incorporate greater practical experience with new forms of transformative policy and governance (Haddad *et al.* 2022), including at subnational scales (Bugge *et al.* 2022).

On the one hand, then, there exist enthused UK LAs calling for new approaches to policy and governance on NZ. On the other hand, there exists new thinking on policy and governance seeking to address the unique qualities of GSCs like NZ, with deep theoretical roots but largely applied to national scales (e.g., Parks 2022). To help bridge this divide, this commentary reviews and synthesises the emerging body of knowledge at the interface between policy and practice in the UK on local, place-based governance of NZ and it contributes to growing interest in developing transformative, multilevel governance, capable of addressing societal challenges like NZ. The commentary has three objectives:

- (1) To review and synthesise the existing body of knowledge contained at the interface between policy and practice in the UK about local, place-based action on NZ by identifying the core governance challenges entailed,
- (2) To identify the obstacles to and opportunities in getting local, place-based governance for NZ right,
- (3) To establish areas for further research.

The commentary proceeds as follows. Section 2 situates NZ as a grand societal challenge and introduces transformative innovation policy as one, promising, societal response. Section 3 details how the emerging body of knowledge about local, place-based action on NZ was reviewed. The analysis of this literature highlights seven challenges of organising to deliver NZ, which are identified in Section 4; whilst there are significant obstacles to effectively navigating each challenge, they also offer opportunities for addressing

inequalities and engaging communities who are subject to the most difficult aspects of climate change. Areas for future research are set out in Section 5. Section 6 concludes by relating the findings back to Transformative Innovation Policy.

2. Net zero, grand societal challenges, and transformative innovation policy

Delivering NZ is a grand societal challenge. Grand societal challenges (GSCs) are qualitatively different from other governance issues, such as maintaining national security, supporting thriving economies, or providing universal education. By contrast, they are thought to represent complex, multi-level, and multi-dimensional systems problems that require concerted engagement by a variety of actors to be successfully addressed (Haddad *et al.* 2022; Voegtlin *et al.* 2022). Originating in contemporary environmental and social challenges, examples include achieving the sustainable development goals, reversing biodiversity loss, or achieving NZ. Such challenges cannot be narrowly reduced to (technical) problems to be addressed by singular organisations or government policies. Rather, they entail changes to multiple system elements that transcend technologies and infrastructures to include changes in cultures and practices (Schot & Steinmueller 2018a). As a result, such challenges are characterised by complex interdependencies between system elements, require systemic, whole system responses, and entail transformative change to be effectively addressed. The extent of change is such that it cuts across infrastructures, technologies, institutions, cultures, and practices that shape contemporary societies. Crucially, they also necessitate transforming contemporary governance in how societies organise to deliver change.

Recognising the distinct qualities of GSCs, scholars have, over the last decade coalesced around Transformative Innovation Policy as a new governance paradigm offering insights into the nature of such challenges and how they can be governed (Mazzucato *et al.* 2020; Schot & Steinmueller 2018b; Steward 2012). Collectively, this work makes the convincing argument that the unique qualities of GSCs must be better understood before new policy and governance approaches can be developed.

The new paradigm can be defined by five central characteristics (Haddad *et al.* 2022). First, through the lens of GSCs, government intervention is legitimised in responding to a failure of prior policy logics to transform societal systems. These prior policy logics include concern with addressing market failures through incremental market corrections to account for environmental externalities, or addressing system failures through the creation of industrial strategies designed to foster globally competitive industries (Schot & Steinmueller 2018a). Second, there is a widely recognised need to direct change towards normative goals that are defined more by societal needs and environmental issues than the possibilities of science and technology progress. Third, this search for systems level transformations is thought to require multifaceted policy interventions

capable of destabilising incumbent structures and fostering new systems (Kivimaa & Kern 2016). Fourth, directing change towards wider societal agendas is thought to require the involvement of broader sets of societal actors, including public authorities, publics, and civil society organisations. Fifth, steering change is thought to necessitate more reflexive, provisional, and dynamic forms of governance across scales, more experimentation, and heightened capacity to respond to new knowledge (Kuhlmann & Rip 2018).

In practice, early experiences suggest the new paradigm faces similar challenges to previous approaches (Casula 2022; Kristensen *et al.* 2023). In a review of country-level implementation practices, Björk *et al.* (2022) highlight a variety of challenges hindering the creation of effective governance practices. This includes, for instance, election cycles and limited political commitment, which can stymie setting clear directions, and aligning resources across and beyond government departments, which can challenge efforts to coordinate change. Managing and navigating the conflicting priorities of the multiple actors involved also makes collaboration challenging. Meanwhile, questions of accountability can challenge the experimentation required, whilst misalignments between strategy and actions can undermine legitimacy and challenge cross-actor working (Steffen & Patt 2022). Developing new governance approaches is clearly not straightforward, with the unique qualities of GSCs creating a range of new governance challenges that require increased recognition before they might be addressed.

Whilst GSCs are global, they are also local. They require action across a diversity of scales to be effectively addressed (Brett *et al.* 2023). Where GSCs challenge incumbent (innovation) policy, it follows that they also require new forms of subnational policy and governance to be effectively addressed. Similar challenges are likely evident in the implementation of transformative governance practices at regional and local scales, though quite what challenges manifest and whether they are qualitatively different to governance challenges at national scales has not been asked.

Research exploring the governance of subnational GSCs has near exclusively centred on the implementation of mission-oriented policy. Henderson *et al.* (2024) demonstrate how regional or local missions have to address local challenges and explore the role of universities in creating spaces to convene local actors. Wanzenböck & Frenken (2020) extend this further by arguing that subnational levels are the best and only place to address GSCs because of the contested nature of problems and the contextual nature of problem-solving. For others this has resulted in a focus on understanding how mission-oriented approaches can be anchored in local contexts to facilitate local goal setting (Butzin *et al.* 2024; Honeybun-Arnolda *et al.* 2024). Meanwhile, Brett *et al.* (2023) argue that local missions become more multifaceted and dynamic than missions conceived at national scales (see also Allan *et al.* 2023). Collectively, this work begins to sketch a diversity of localised, subnational challenges emerging in new policy and governance approaches, but stops short of articulating the sum total of challenges in adopting a place-based approach to governing NZ.

The following commentary seeks to build on Transformative Innovation Policy as a new policy and governance paradigm. It takes seriously the call for greater understanding of GSCs as a new policy and governance challenge and explores what challenges emerge in developing new place-based policy and governance approaches.

3. Research design and methods

A review of knowledge on local, place-based governance for NZ in the UK faces several methodological challenges related to the emergent nature of knowledge and its location, at the interface of policy and practice. Systematic review methodologies, as outlined by Petticrew & Roberts (2008), provide useful principles, when collecting data for example, and procedures when sifting and sorting results, but do not offer a simple blueprint. Here, the body of knowledge reviewed is emergent, derived from practice rather than academic research. It is also multifaceted, defying a discrete, quantifiable research question. Moreover, because of where knowledge is situated—at the interface of policy and practice—the use of traditional databases commonly used in systematic reviews, such as Scopus and Web of Science, was not viable as there were no relevant peer-reviewed works at the time of the research commencing (July 2023).

In the following, we adopt what Sovacool *et al.* (2018) term a narrative review, providing an ‘exploratory evaluation of the literature or a subset of literature in a particular area’ (22). Less rigorous than a systematic review, Sovacool and colleagues suggest narrative reviews are researcher led, may be comprehensive when done well, and are particularly useful for exploratory reviews, which seek to synthesise insights from diverse perspectives and where there is insufficient data to conduct a systematic review. They further distinguish between narrative reviews that utilise a search criterion and explicit parameters as being more rigorous than those that sample for convenience. The following review adheres to the former, making explicit the approach taken (aiding transparency) and the procedures followed (aiding rigour and replicability). Strengths and limitations of the approach are discussed following explanation of the search and analysis process.

The review was guided by two questions:

1. Which actors are important for delivering NZ through local, place-based action in the UK and why?
2. What are the main challenges of organising to deliver local, place-based action for NZ?

The search was performed between July and October 2023 and followed a series of iterative steps (Figure 1). First, pieces literature on delivering NZ through place-based action in the UK previously known to the research team were collated ($n = 20$) before being screened for relevance. To be included, documents had to be focused on local, place-based delivery of NZ in the UK. Documents were excluded if they addressed governance for NZ only in passing

and if they did not shed any light on the challenge of governing NZ through place-based action. Second, a literature search was performed using Google¹ with the first fifty results screened for relevance. After removing duplicates, thirty-six documents were included in the final documents analysed (Annex 1).

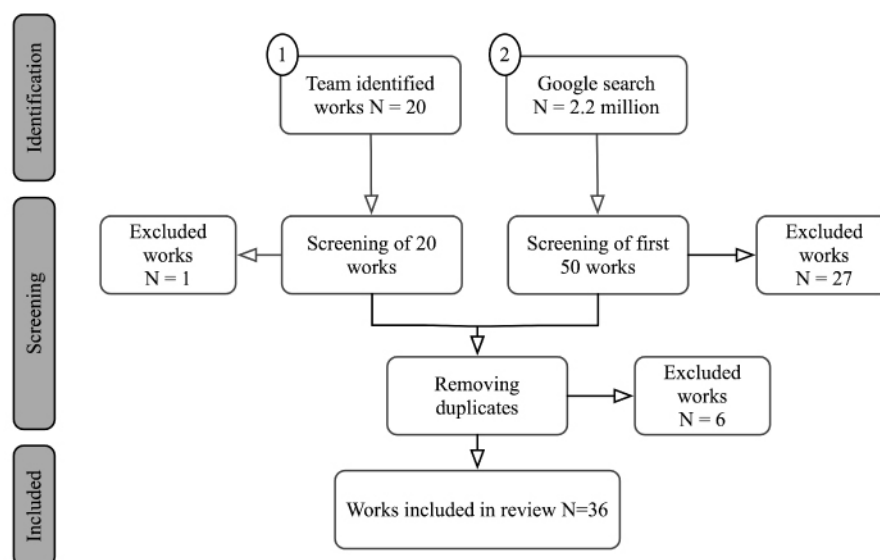


Figure 1. The search and screening process.

The identified works were subsequently analysed using NVivo qualitative analysis software. First, the works were reviewed by the first author to identify the actors thought to play a key role in place-based action on NZ, as expressed by the works. This resulted in a list of six types of organisation: national government, local government, regional agencies, the private sector, citizens, and community and third sector organisations. The anticipated roles of each stakeholder were subsequently analysed by identifying their expected contribution to local NZ action. Second, the works were thematically coded (Braun & Clarke 2006) to identify what issues were raised in acting on NZ locally and to build understanding of why organising to deliver NZ in the UK through place-based action is problematic. This resulted in a list of sixteen issues.² This initial list was reviewed by the first and second authors to identify primary characteristics of the challenge of achieving NZ through place-based action. By clustering issues and through using an iterative theory development approach (e.g., see Eisenhardt & Graebner 2014; Neale 2016), in which the researchers moved back and forth between the data and theory on

¹The following search string was used: “local” AND “net zero” AND “policy” AND “UK”. The results were restricted to pdf files to capture published reports rather than websites and blogs and the search was performed using a private browser, so that results were not skewed by prior search histories.

²Communication; coordinating between levels of governance; coordinating within levels of governance; decision making power; centralisation; finance; capacity; public engagement; multistakeholder problems; politics in policy; time; data and measuring; scale; systems issues; local variability; and variability in governance solutions.

Transformative Innovation Policy, this initial list of issues was revised into a set of seven governance challenges. The final step involved identifying stated opportunities and obstacles and their relation to each challenge from the works.

This approach has both strengths and weaknesses. The narrative review is less rigorous than a structured systematic review and therefore has the potential to exclude relevant works. Researcher bias can influence what works are deemed relevant and are included or excluded. The approach taken also pays less attention to the methodological quality of the reviewed works, as would be the case in meta and systematic reviews. Nonetheless, the nature of the emergent knowledge base and its origins in public reports commissioned and undertaken by a variety of quasi- and non-governmental organisations means, in most cases, assessing methodological rigour of reviewed works is not possible. The small number of papers reviewed (fifty) is another weakness. For example, when reviewing the use of Google Scholar in literature reviews (cf. the generic Google search engine as used here), Haddaway *et al.* (2015) argue that 200–300 hits should be reviewed to ensure comprehensiveness. Though far fewer hits were reviewed in this search, the search was concluded at this point and after discussion amongst the authors as the amount of new information on the topic was deemed to be experiencing rapidly diminishing returns. Reviewing fifty papers was therefore a compromise between depth of knowledge to be gained and time taken. By contrast, the strength of the review resides in the narrative review approach adopted, allowing for exploratory analysis of emergent knowledge. Adopting a systematic review approach would have excluded much of the material that is practice orientated and on which the review depends. It would also not have met the aims of the review, to synthesise emergent knowledge at the interface of policy and practice. Further, the multifaceted nature of governance requires an approach that is flexible yet structured to derive useful qualitative insight. Moreover, effort was taken to be transparent in the search, screening, and analysis processes adopted, which accords with the code of practice for all literature reviews, outlined by Sovacool *et al.* (2018).

4. Results

The review resulted in the identification of thirty-six documents from thirty-one organisations and individuals (two were co-authored by two or more organisations), including ten arm's-length government organisations, six charities, five national research and advocacy networks, three academic institutions or consortia, two think-tanks, two unions, one consultancy, and two academics. A list of reviewed works is provided in Annex 1. Most documents included primary data collection, and many drew on existing reports, with documents frequently cross-referencing each other. Thirty documents focused exclusively on local NZ action, the remaining six having a wider focus. Of the total, sixteen focused on specific actors involved in governing NZ locally, of which fourteen concentrated on LAs, one addressed parish councils, and one addressed the private sector. Nine documents adopted a sectoral focus

examining local governance of energy (three documents), planning (two documents), finance (three documents), economy (two documents), and agriculture (one document).³

Despite differing foci, the works were remarkably consistent: similar issues arose throughout, with similar rhetoric used to describe them. Achieving NZ was seen as a ‘cross-Government delivery challenge’ (CCC 2020: 7), with ambition perceived to be abundant at local scales but lacking or absent at national scales. At the same time, acting on NZ was presented as complementary to rather than competing with other (local) social, economic, and environmental policy goals, such as reducing energy poverty, improving air quality, ‘levelling up’, stimulating growth, and creating jobs. In this way, the potential co-benefits of acting on NZ were frequently argued (e.g., Brenan 2021; Skidmore 2023; Williams 2020).

Which actors are foregrounded in the local governance of NZ?

The reviewed works consistently argued that local, place-based action on NZ will not be delivered by any single actor. Partnerships and collaborative working between a range of actors at various scales are required. Actors perceived as central in the governance of local NZ included national government, the private sector, regional agencies, community groups, citizens, and local authorities (LAs), with the latter being frequently foregrounded as critical. There was near unanimous agreement about *why* local authorities are important. Local authorities were regarded as committed and highly ambitious, with intimate knowledge of place making them capable of tailoring NZ delivery to local circumstances.

By contrast, there was no consensus between the documents regarding *how much* responsibility LAs have over emissions arising within their geographical area. Wildly different quantifications of responsibility and influence were present. On the one hand, CCC (2020) and Ryan (2021) estimate that LAs are directly responsible for between 2 and 9 per cent of all UK emissions, arising from their estate, service operations, and procurement. On the other hand, the proportion of ‘area-based emissions’ that LAs are indirectly responsible for—through their decision-making power, engagement with and convening of local stakeholders, and ‘soft influence’ (Borrowman *et al.* 2020: 6)—was contested. The CCC (2020) claimed LAs have influence over a third of an area’s emissions, whereas the UK Government (BEIS 2021) suggests 82 per cent of all UK emissions are within their ‘scope of influence’. The difference is not academic. It presents a large discrepancy across the reviewed documents on the perceived importance of LAs. It likely encapsulates national government attempts to shed responsibility to local government and demonstrates limited knowledge about the complexities of organising to deliver NZ through local place-based action, including on the importance of local connections, partnerships, and alliances, the dispersal of power at a local level, and the possibilities for local action arising from and between multiple actors. At the

³Some documents focussed on more than one sector.

very least, divergent estimates inhibit greater clarity about the role of LAs in local NZ governance and of the accompanying resources required.

What are the main challenges of organising to deliver local, place-based action for NZ?

From analysis of the documents, seven interlinked challenges of organising to deliver local, place-based action for NZ were identified, as shown in Figure 2. Illustrative evidence from the works supporting each challenge is provided in Table 1.

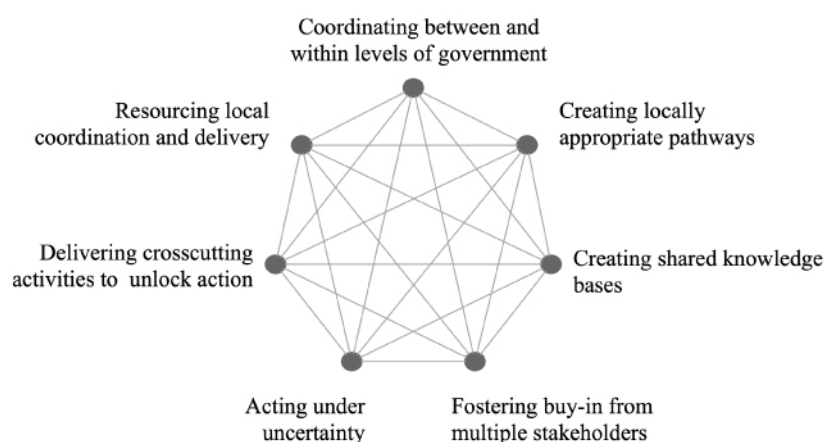


Figure 2. Seven challenges of organising to deliver local, place-based action for NZ.

Coordinating between and within levels government

The most pronounced and frequently vocalised challenge concerned the need for coordination between and within different governance scales. Almost all documents consistently highlighted the acute need for coordinating local, place-based NZ action, whilst simultaneously emphasising the acute challenge presented in coordinating between actors. For local delivery to be effective, even possible, different levels of the multi-level governance system must align. There was wide agreement that different levels of government need to work together, with distinct roles, to realise NZ and that this is proving difficult to achieve in practice. The reviewed works deemed current multi-level governance coordination to be ‘piecemeal’ (CCC 2020: 6) and ‘patchwork’ (Quantum 2021a: 12), with local actors largely absent from UK government plans. The documents acknowledged some progress on this issue: the introduction of the Net Zero Hubs often providing an example, yet this was viewed as insufficient. Indeed, there was scepticism around whether the Hubs meaningfully contribute at all (Nice & Sasse 2023).

Allocating and aligning responsibility between governance layers was subsequently viewed as important, alongside the autonomy to make decisions. The planning system was frequently given as an example of where this type of

Table 1. Illustrative evidence of the seven challenges within reviewed documents.

Challenge	Evidence
1. Effective coordination between and within scales	• ‘The Sixth Carbon Budget can only be achieved if Government, regional agencies and local authorities work seamlessly together.’ (CCC 2020: 3) • ‘There must be more place-based, locally led action on net zero. Our local areas and communities want to act on net zero, but too often government gets in the way.’ (Skidmore 2023: 12) • ‘National and local delivery of Net Zero is not integrated.’ (Quantum 2021b: 23)
2. Creating locally appropriate pathways	• ‘We need to allow places to tailor their net zero approach to their own strengths and needs, informed by the kind of extensive local engagement that central government cannot undertake.’ (Skidmore 2023: 188) • ‘Integrated place-based solutions and whole systems thinking deliver greater co-benefits, cost-effectiveness and economies of scale than sector-specific approaches to Net Zero.’ (Quantum 2021b: 22)
3. Creating shared knowledge bases	• ‘There is the issue however of availability and accessibility of data in order to translate climate emergency declarations into actionable plans, underpinned by an up-to-date, robust and credible evidence base.’ (Howarth <i>et al.</i> 2021: 30) • ‘The sharing of information – both good news and bad—and making visible the consequences of different decision-making pathways can play a huge part in understanding what society values and what concessions people are willing to make for a resilient future.’ (Wildfire & Ramsey 2021: 14)
4. Fostering buy-in from multiple stakeholders	• ‘Local action without national support is challenging, but national policy without local buy-in will fail.’ (Howarth <i>et al.</i> 2021: 42) • ‘It is important that such engagement includes those most likely to be impacted by the decisions made.’ (Brenan 2021: 16)
5. Acting under uncertainty	• ‘42% 14/33 of local authorities reported that their emission reduction targets were conditional on the success of an externality or component of policy outside of their control.’ (CDP 2021: 25) • ‘Local authority actions towards a Just Transition can be undermined by central government inaction or sudden changes in focus.’ (Copeland <i>et al.</i> 2021: 5) • ‘An environment for risk-taking innovation and culture change is lacking.’ (Quantum 2021b: 36)
6. Delivering crosscutting activities to unlock local action	• ‘Taking this holistic view presents opportunities to remove barriers and put in place the enabling policy environment needed to drive action on cutting emissions. A cross-cutting approach reveals beneficial synergies enabling the transformative actions necessary to address the needs of people, climate and nature simultaneously.’ (Greenfield & Barker 2023: 4) • ‘Local and combined authorities need to reset their decision-making processes so that every decision, on planning, education, economic development or even procurement of social care, contributes to achieving net zero. Embedding net zero into all local government decision making processes needs to be supported by policy changes, staff and councillor training, and culture change.’ (Williams 2020: 25)
7. Resourcing local coordination and delivery	• ‘Local authorities require sufficient funding, whether in their annual settlement or through ring-fenced funding, to increase their skills and capacity to deliver the project pipeline for Net Zero.’ (CCC 2020: 8) • ‘Without more expertise, funding and an enabling central government framework, they cannot begin to make the changes they want to, and consequently they are missing out on the local economic and social opportunities of doing so.’ (Borrowman <i>et al.</i> 2020: 1) • ‘Net zero necessitates renewal of local and regional government capacities to manage the organisational change and innovation needed.’ (Tingey & Webb 2020: 23)

coordination is currently lacking. Numerous documents lamented the disconnect between attempts by English local authorities to address NZ through local planning and the lack of strict requirements to report against NZ in the National Planning Policy Framework preventing this ambition (CPRE 2022; Ellis 2022). Indeed, around a quarter of documents recommended that more statutory duties be introduced and more powers be devolved to LAs, whilst noting diverging practices across Scotland, Wales, Northern Ireland, and England. Despite this, some aspects of effective coordination were noted to require more, not less, centralised oversight (CCC 2020). The need for strong standards, regulations, and incentives set by central government was given as an example. Meanwhile, clear communication practices were thought to lubricate coordination (Howarth *et al.* 2021).

Increased coordination within levels of governance was also viewed as important. Instead of the current ‘siloe’d’ approach (Skidmore 2023: 10), the reviewed works emphasised that different departments both at local and national

scales need to share a common purpose. With NZ presented as a crosscutting issue, it was argued all departments need be united in and geared towards NZ delivery (CPRE 2022; Urban Foresight 2021). The complex and overlapping nature of English institutional arrangements was singled out as particularly problematic (Nice & Sasse 2023; Skidmore 2023). Meanwhile, the reviewed works made clear how coordination must also go beyond levels of government to incorporate diverse non-state actors at multiple scales (ICE 2022; Nice & Sasse 2023; Stegman *et al.* 2021).

Effective coordination appears far from easy. Complex, evolving institutional landscapes across the four devolved nations of the UK make improved coordination challenging, especially given time and resource constraints. The need to consider all policy, not just NZ-specific policy, expands the scope of coordination significantly and further compounds the challenge (Dowling *et al.* 2022). Around one-third of documents (notably Borrowman *et al.* 2020; Dowling *et al.* 2022; Quantum 2021b) called for a clearer national framework provided by central government, to clarify the roles of different actors. Others, notably the HCLGC (2021), emphasised an emergent tension between guiding and prescribing NZ delivery, suggesting that striking the right balance is seen as no easy task. Despite this, the reviewed works articulated multiple opportunities in getting coordination right. Clarifying roles and responsibilities was thought to create ‘coherent problem-owners’ (Tingey & Webb 2020: 4), ensuring all emissions are accounted for (Barlow 2021), whilst empowering actors to deliver on their ambitions (ICE 2022). Improved coordination was thought to foster innovation, cross-boundary collaboration, and accelerated delivery (Barlow 2022; Urban Foresight 2021).

Creating locally appropriate pathways

A second challenge of organising to deliver NZ through local, place-based action emerges from local place-based variability. Across the reviewed works it was recognised how places are endowed with differing physical resources, infrastructures, actors, and knowledge; they have unique strengths that can be mobilised and contain localised issues that must be considered and addressed alongside achieving NZ. It follows that NZ is going to look and feel different in different places. Such variability was thought to demand more flexible yet tailored governance, capable of preventing inaction in the face of uncertainty through pursuing ‘parallel’ (Williams 2020: 24) and ‘no-regret and low-regret options’ (CCC 2023: 27) for delivery. Thus, in recognising place-based variability arises the challenge of creating appropriate place-based pathways to NZ.

The reviewed works were clear that ‘no one size fits all’ and that creating locally appropriate pathways was vital if progress is to be effective and just. Related, it was often noted how rural areas and smaller cities are less well resourced than large, urban counterparts, but that, despite featuring less prominently in national policymaking, they can have greater capacity for renewable energy generation than cities (CCC 2020; Fenna & Marix Evans 2023; Skidmore 2023). Taking a ‘place-specific’ approach to NZ delivery was

argued to result in significantly better social outcomes, such as addressing local needs and ‘levelling up’, saving £137 billion in investment costs whilst generating an additional £431 billion in energy savings and wider social benefits compared to a ‘place-agnostic’ approach (Dowling *et al.* 2022: 13).

Despite the benefits on offer, creating locally appropriate pathways brings with it challenges concerning the appropriate scale and form of governance to deliver NZ. Documents often called for devolution of powers to attend to place variation (e.g., Nice & Sasse 2023). However, such diverse, decentralised governance was thought to go against the grain of current governance arrangements, characterised as top-down and centralised (Fenna & Marix Evans 2023; Verma *et al.* 2019). Given the range of commitments and actions set out by LAs currently (Quantum 2021b), there is a danger of missing local or national emissions reductions targets or of leaving places behind if each locality is allowed to follow its own path and there is no standardisation. Across the reviewed works further tensions arose around the meaning of ‘local’, with diverse interpretations mobilised, and about the scalability of NZ solutions (Quantum 2021b) versus their locally embedded and therefore unique qualities.

Creating shared knowledge bases

Creating shared knowledge around problems, solutions, and progress made is a third challenge of organising to deliver NZ, articulated in approximately half of documents analysed. Such knowledge bases were thought to include shared information about the problem, such as a definition of NZ (Urban Foresight 2021), and information about possible solutions and their efficacy. Shared evidence was thought to result in informed decision-making and accelerated delivery, and was viewed as necessary across all aspects of NZ, not just individual sectors. Limited local resources were widely regarded as compounding the challenge of creating shared knowledge bases, leaving the ‘power of data’ unharnessed (Quantum 2021b: 42).

For many of the documents analysed, collating shared evidence bases was reduced to better collection, understanding, and utilisation of data. Collectively, the documents were united in dismay at how little data is collected locally, with Barlow (2021) asserting that only 60 per cent of UK LAs publish emissions inventories, with large discrepancies across the devolved nations: in Scotland it is mandatory, whilst in England, Wales, and Northern Ireland only 58 per cent, 45 per cent, and 18 per cent of LAs provide such data, respectively. Documents highlighted the absence of a statutory duty, outside of Scotland, as being the cause, making reporting optional and therefore uneven (Howarth *et al.* 2021; Skidmore 2023; Stegman *et al.* 2021). Regardless of the reason, the reviewed works viewed the results as the same: a lack of shared knowledge bases prevents LAs from making informed and replicable decisions, thus siloing and slowing progress (Wildfire & Ramsey 2021).

In response, many documents called for the development of consistent methodologies for recording and analysing data, most notably around local area energy planning (Copeland *et al.* 2021; Rankl *et al.* 2023) and carbon reporting (NAO 2023; Quantum 2021b; Stegman *et al.* 2021). Whilst for the former such

methodologies are well developed if not widely employed, a lack of standardised monitoring and reporting frameworks was thought to undermine understanding of local progress, limit the identification of best practice within and between localities, and impede local accountability. Meanwhile, a paucity of local emissions data was thought to result in national government struggling to recognise, understand, and value local action. Collectively, what emerges is a tension about what types of data and evidence should be collected, how and by whom, whether nationally or locally. Regardless, the reviewed works noted that for shared evidence bases to have value they also require actors capable of interpreting and understanding the evidence. In many documents this resulted in calls for upskilling LA staff, allowing for inhouse interpretation and analysis of evidence, and reducing reliance upon external consultants (CCC 2020; Copeland *et al.* 2021; Skidmore 2023; Wildfire & Ramsey 2021). The outsourcing of evidence gathering and analysis was widely viewed as insufficient. Nevertheless, few actors were proffered as possible stewards of evidence.

Despite tensions and resourcing issues, creating shared knowledge bases was thought to offer many opportunities for local, place-based action. It can encourage multi-actor collaboration and partnership working, widely regarded as critical for delivery (Howarth *et al.* 2021). Increased evidence was thought to aid the identification of areas to target and prevent emissions from being missed (Barlow 2021; Urban Foresight 2021). Additionally, shared knowledge bases can prevent ‘variances in the ownership and attribution of emissions’ (Barlow 2021: 46) through helping to clarify and quantify roles and responsibilities. Similarly, it would help to improve the transparency of decision-making (Wildfire & Ramsey 2021).

Fostering buy-in from multiple stakeholders

With NZ widely perceived to be beyond the scope of any individual actor, a fourth challenge concerns fostering buy-in from multiple stakeholders. For example, the decarbonisation of domestic buildings requires homeowner and landlord participation, but it will also involve private finance, training providers, SMEs (small and medium-sized enterprises), and the wider public, the latter often pre-occupying discussion in this area (Nice & Sasse 2023). Just under half of documents reviewed highlighted the importance but challenge of securing buy-in from multiple stakeholders. Accordingly, documents regularly viewed engagement as synonymous with buy-in, where information provision and education (including re-skilling the workforce for green jobs) were frequently mentioned alongside deeper forms of direct participation in local change. Wider methods to foster buy-in included focus groups, assemblies, and referendums.

Documents consistently emphasised the need for multiple stakeholders to get on board with and participate in NZ delivery at local and regional scales. LAs were regarded as having a critical role and, by implication, responsibility for convening others, whilst partnership-based approaches were viewed as promising means to mobilise the energy and expertise of private and civic actors (Howarth *et al.* 2021). As such, fostering buy-in was implicitly associated with opening up opportunities for citizen-led and community-based participation in

NZ and the development of community solutions (Locality 2022). Buy-in was, in turn, presented as capable of helping to ‘build social permission’ for political and financial decisions, especially for those that are potentially ‘radical’ (Williams 2020: 13, ICE 2022). Accordingly, documents positioned engagement and buy-in as important means for creating legitimacy. Less discussed were wider social implications of change and the need to ensure equity. The absence of sufficient engagement was positioned as one reason why ‘decarbonisation efforts are often frustrated in the local political arena’ (Copeland *et al.* 2021: 4).

Nevertheless, the reviewed works identified multiple issues to achieving buy-in from net zero stakeholders’. Carrying out stakeholder engagement can take a lot of time and resources, both of which are limited (Copeland *et al.* 2021). According to the National Association of Local Councils (NALC 2021), town and parish councils feel they have limited capacity to carry out engagement with their communities, despite being the most geographically local form of governance in England. Meanwhile, too many consultations can lead to ‘engagement fatigue’ (Copeland *et al.* 2021: 3), undermining possible support and legitimacy of change. Furthermore, with engagement taking multiple forms, how to balance depth and breadth of engagement to secure local stakeholder buy-in and therefore what constitutes effective, just, and legitimate buy-in for local action was less than clear across the reviewed works.

Acting under uncertainty

Across the reviewed works the need for ‘holistic’ (Wildfire & Ramsey 2021: 16), ‘systems-wide’ (Fenna & Marix Evans 2023: 182), and ‘strategic’ (CPRE 2022: 12) approaches to NZ delivery were frequently acknowledged as required to address ‘cross-cutting technological, social, behavioural, and economic challenges’ of NZ (Skidmore 2023: 39). As Quantum (2021b: 47) stated, NZ ‘is not a set of pick and mix options and enacting some parts without the whole will not help to make the major and urgent changes needed’. However, despite repeated importance attached to developing systemic approaches, the reviewed works highlighted how this creates a set-up where local actors do not have control over all the options, yet are still required to make decisions and act in the face of ‘known unknowns’ (CDP 2021; Quantum 2021b; Urban Foresight 2021). Thus, a further challenge of delivering NZ, clearly linked to the nature of GSCs, resides in making decisions with partial and incomplete knowledge, facilitating action when the ‘best’ or most appropriate path forward is uncertain.

That local decisions and actions are affected by decisions taken elsewhere is so widely appreciated that it rarely necessitates explicit mention. Though just over half of documents picked up on this challenge. For many of the documents reviewed, the resultant implication is for strategic, cross-sector decisions to be made at higher scales. Unsurprisingly, there was little agreement across the documents at which scales—local, regional, national—sectoral and cross-sectoral decisions should be taken. This suggests that such a crisis of scale presents a significant obstacle to local, place-based action: it is challenging to act on partial knowledge, yet also difficult to foresee where systemic decisions should be taken. The CCC (2023) cites, for example, the need for a strategic

decision, made by the UK Government, on the role of hydrogen in decarbonising residential heating. However, numerous other documents called for development of Local Area Energy Plans (LAEPs) as required for local decision-making on decarbonised residential futures. Both are widely recognised as important. Yet, there remains no *a priori* logic offered within the reviewed works as to how they might be reconciled. By extension, the example suggests that, if decisions can be made and action taken under uncertainty, then progress might be accelerated. Conversely, taking decisions which are then conflicted by others elsewhere could prove costly. The result of such uncertainty appears to be paralysis, yet the reviewed works call for an acceleration not stagnation of local delivery.

Conflicting perspectives on how to navigate such paralysis were apparent. Some documents, such as that by Fenna & Marix Evans (2023), interpreted the need for a system-wide approach as a call for standardisation of NZ delivery, and contrasted this with a move towards individually negotiated devolution deals, which are likely to leave out the less well-resourced or smaller LAs. On the other hand, other documents contend that system-wide thinking cannot be separated from place-based delivery: Wildfire & Ramsey (2021: 16), for example, called for ‘a localised, holistic approach’ which remains centred on local circumstances but uses cross-boundary collaboration to compensate for where a single local actor’s remit is limited.

Collectively, the reviewed works emphasised that taking a systems approach to local, place-based delivery offers many benefits. Joined-up decision-making, even if only within the local scale, can reduce duplication of efforts and save costs. A systems approach can also help hit ‘multiple synergistic objectives’ (Wildfire & Ramsey 2021: 25) at once, such as tackling fuel poverty as well as reducing emissions from the domestic sector through better insulation of housing (Dowling *et al.* 2022). By implication, there was a strong implicit recognition of the need for decision-making under uncertainty and, by implication, how local actors can be prepared or better ‘underprepared’ to navigate such a complex terrain.

Delivering crosscutting activities to unlock local action

To deliver systems-wide change through coordinated and collective action, in which diverse resources and energies are mobilised, is widely regarded as necessitating undertaking a range of foundational activities. Dowling *et al.* (2022) describe such work simply as overcoming ‘blockers’ to action. Many other documents adopt a more optimistic framing, describing crosscutting activities as those critical enabling actions that transcend sectors, government departments, and actors (Greenfield & Barker 2023), actions that ensure ‘multiple and interrelated decarbonisation components’ (Wildfire & Ramsey 2021: 10) are effectively and efficiently tackled. Nonetheless, delivering such crosscutting activities capable of unlocking local action for NZ remains a challenge in the absence of clear responsibilities and within a context of heavily constrained public financing.

Achieving NZ requires enabling actions. Despite widespread consensus on this position, there was limited agreement about what constituted enabling

actions (though sustainable procurement, planning, and legislation were frequently mentioned). Beyond this, documents variously regarded financial resourcing, expertise, governance coordination, multi-stakeholder engagement, and innovation as capable of unlocking action. Each has been discussed within earlier sections of this review, demonstrating how varied perspectives were over what constitutes a crosscutting activity for local, place-based action. It is precisely this pervasiveness that defines such actions as crosscutting and that makes them challenging to resource, monitor, and govern.

LAs were again presented as the primary actor with responsibility for such activities with an associated range of obstacles. One prominent challenge discussed was the inhibiting set-up of multi-level governance: because of the separation of power in the current system, national government can act as a ‘blocker’ where only it has the power to deliver on local underpinning actions (Dowling *et al.* 2022). For example, planning was regarded as in the remit of LAs, yet central government controls the National Planning Policy Framework, limiting local ambition (Ellis 2022). Fenna & Marix Evans (2023: 4) were more explicit, arguing LAs require ‘underpinning powers’ to deliver on NZ, which only national government has the ability to provide. Further obstacles discussed included limited risk-taking and institutional cultures adverse to innovation and culture change, despite the high ambitions of LAs (Quantum 2021b). This was attributed to the limited capacity within LAs compounded by costly operating structures, such as the ‘litigious nature of the planning system’ (Skidmore 2023: 205). These obstacles link the ability to undertake enabling actions with some of the other challenges, such as coordination and resourcing, demonstrating the interlinked and mutually reinforcing nature of these challenges.

Resourcing local coordination and delivery

The final challenge concerns resourcing, both financial (that is, funding) and human (that is, staff time, knowledge, skills, and capabilities), for coordination and delivery. Sufficient ‘resources, skills and financing capacity’ (Dowling *et al.* 2022: 44) are needed at all levels of governance; however, there were exceptional concerns amongst the documents about the lack of this in local government. Indeed, ‘capacity in local government is the single biggest barrier to innovation by councils’ (Urban Foresight 2021: 52). Clearly, scarcity of resources is not limited to questions of NZ—documents noted that austerity policies and COVID-19 have significantly diminished the total capacity of LAs to act (ICE 2022; Tingey & Webb 2020; Weghmann & Transition Economics 2021). However, the reviewed works highlighted that these problems become acute when looking at NZ.

Taking financial resources first, documents lamented the lack of total funding available for local, place-based NZ action. Borrowman *et al.* (2020) reported that local councils can finance as little as 25–35 per cent of their net-zero ambitions. A lack of local control over spending decisions was noted as compounding the issue (Fenna & Marix Evans 2023). Quantum (2021a: 22) explains succinctly why this is such an issue for delivery: ‘with less money, there is less power’. Financial support to LAs for NZ delivery was consistently

regarded within the reviewed works as piecemeal, segregated, and inefficient, mirroring the coordination challenges delivery faces (Losse *et al.* 2021; Rankl *et al.* 2023; Skidmore 2023). The resounding criticism from the documents was that the current financing system for LAs via short-term competitive bids does not work: they are costly to apply for, unevenly accessed across the country, and cement short-termism in NZ delivery.

Across the reviewed works there was prominent and consistent criticism of current institutional funding arrangements. ‘Strategic, long-term, [and] scalable’ (Stegman *et al.* 2021: 20) financing was called for, though it was recognised how the short-term, political nature of decisions often works against such a possibility. Though no concrete suggestions were made, increased flexibility around projects and what department funding is designated for, was thought valuable owing to the crosscutting nature of NZ action (Quantum 2021a; Urban Foresight 2021). It was also recognised how current sources of funding (for example, revenue from car parking) contradicts NZ goals (Dowling *et al.* 2022). Several documents also cautioned that LAs have diverse needs and varied abilities to raise funds. Future financing, therefore, needs to ensure it does not exacerbate inequalities between places, as currently happens with the competitive system (Copeland *et al.* 2021; Urban Foresight 2021). On the other hand, the reviewed works emphasised that sufficiently resourcing local NZ delivery can aid provision of other council priorities/duties through the synergistic benefits of achieving net zero (Stegman *et al.* 2021). The reviewed works also find that spending now to deliver NZ saves money in the long term and encourages growth and innovation (ICE 2022; Skidmore 2023; Weghmann & Transition Economics 2021). In addition, delivering NZ locally provides the opportunity to mobilise alternative finance, including local procurement and community investing, which can benefit the local economy (Davis 2021). Whilst the documents are clear on the benefits of greater financial resources for unlocking NZ delivery, there is far less agreement on how additional resources can be unlocked.

Turning to human resources, it was noted that there is a need for more staff across a council, in general as well as specifically for NZ, as it was emphasised that delivery will require all departments to work together. However, there was a concern amongst several documents that there may be a lag in the need for extra (specialist) staff and the ability to hire them. Moreover, the reviewed works warned of the potential for positive (and negative) resource spirals, to the detriment of equal access of opportunities between councils: existing staff with appropriate expertise can seek out further resources, such as alternative finance, bidding for funding, or working with partners, including managing relations with the private sector (Borrowman *et al.* 2020; Urban Foresight 2021).

Taken together, it was emphasised that a lack of sufficient capacity hinders local NZ delivery, as it ‘leave[s] local authorities with the false choice between delivering essential services and meeting their climate targets’ (Weghmann & Transition Economics 2021: 24). Several documents noted that this is compounded by the current absence of a statutory duty to deliver NZ: this ‘risks deprioritisation of net zero action’ (Skidmore 2023: 192) because limited

resources must be deployed in service of mandatory requirements instead. Whilst outsourcing has been used as a remedy for capacity issues, many documents were critical of this. Locality (2020: 3) goes so far as to declare outsourcing a ‘scale fail: poor quality services that do not deliver the outcomes promised and do not deal with people’s problems at source’. Similarly, there is a tension in how a lack of capacity can stifle innovation and risk-taking, whilst at the same time innovation is seen to compensate for limited resources (Dowling *et al.* 2022; Greenfield & Barker 2023; Quantum 2021b; Urban Foresight 2021).

Table 2 summarises the seven challenges alongside perceived obstacles and opportunities in navigating each challenge.

Table 2. Seven challenges of organising to deliver NZ through local, place-based action, including obstacles and opportunities in navigating each challenge.		
Challenge	Obstacles in navigating challenge	Opportunities in navigating challenge
1. Coordinating between and within scales	Multiplicity of governance structures. Variation in local actors, their interests, and resources. Politics. Siloed working practices. Limited resources. Short-term thinking.	Empowered actors with clear roles and responsibilities. Enhanced ownership. Increased cross-boundary and multi-scalar solution development.
2. Creating locally appropriate pathways	Local variability. Diversity in governance structures, roles, and responsibilities. Aligning locally appropriate pathways within coherent regional approaches and national strategy.	Mobilisation of local resources and expertise. Increased local buy-in and acceptance to change.
3. Creating shared knowledge bases	Limited resources for data collection. Limited local, public expertise to understand data. Complicated data landscape with data and knowledge held in multiple places and by multiple actors.	Enhanced understanding of problems and solutions. Increased transparency of decision-making. Targeted, early action. Reflexive governance approaches.
4. Fostering buy-in from multiple stakeholders	Limited financial support, capacity, and expertise to lead participatory exercises. Pressure to act, reducing perceived time available.	Clear roles and responsibilities. Opportunities for community and citizen led action. Potential for more radical action.
5. Acting under uncertainty	Limited local leadership. Limited knowledge base obscuring identification of problems and solutions.	Accelerated delivery. Reduced duplication of efforts.
6. Delivering crosscutting activities to unlock local action	Limited problem ownership. Limited resources. Disagreement about what activities are required. Unclear roles and responsibilities across governance levels. Constrained local powers.	Clear problem framings. Improved local coordination. Development of local solution pathways. Accelerated delivery.
7. Resourcing local coordination and delivery	Under-resourcing. Competitive funding environments. Reliance on competition to reduce costs.	Unlocking accelerated action by enabling crosscutting activities. Facilitating participatory approaches. Increased local coordination. Potential to unlock alternative finance.

5. Discussion

Clearly, governing NZ is no easy task. The review highlights multiple, interlinked challenges, each embodying tensions, and each with implications for local, regional, and national actors. The following section highlights two points for discussion—what the results mean for creating more effective governance for NZ and the guiding role of the state in the process—before turning to set out possible avenues through which this research could be taken forward. The section ends with a discussion of strengths and limitations of the review.

Shaping a national–local framework

Notable within each challenge were conflicting ideas about potential responses. For example, tensions were evident between allowing for a diversity of local pathways to emerge versus making sure no place is left behind, or in fostering buy-in versus delivering change at speed whilst avoiding consultation fatigue. In another instance, the recognition of the need for systemic, joined-up thinking variously prompted calls for increased standardisation and increased devolved decision-making. Overall, this suggests a tension between guiding and prescribing how local decisions are made, how local stakeholders are organised, and how NZ actions are delivered. Section 4 has not shied away from vocalising these tensions. On the contrary, acknowledging these tensions has been important because it provides deeper understanding about why organising to deliver NZ is not easy. At a basic level these tensions justify and substantiate why the challenges are governance challenges. They defy easy solutions.

More broadly, there exists a tension between setting the groundwork for local NZ action versus delivering action on NZ. This points to a fundamental difference in types of governance required. On the one hand, there is a need for local stakeholders to *organise to deliver NZ*. That is, local stakeholders need to negotiate local NZ pathways, build shared knowledge bases, and foster local buy-in. On the other hand, local stakeholders also need to *organise the delivery of NZ*. That is, once pathways have been locally negotiated, projects need to be designed and delivered that make tangible progress towards desired ends. The former is likely to require a national framework in which the local orchestration and delivery of NZ can take place. The latter is likely to require a range of skills associated with the governance of projects.

Too often attention is concentrated on delivery. Whilst creating a national–local framework for NZ is a conclusion repeated across many of the documents reviewed, emphasis is near exclusively placed on delivery whilst negating what is often required behind the scenes to enable delivery: varying amounts of organisation. It is here where identification of seven governance challenges in organising to deliver NZ may be of most value. They not only offer greater understanding of why organising to deliver on NZ is challenging, but also help identify key elements of a national framework. In short, a national framework must assist regional and local stakeholders in navigating these challenges.

Local authorities and the guiding role of the state

Across the reviewed works, LAs were consistently positioned as strategically important to the local governance of NZ. Scant evidence emerged to challenge this. On the contrary, and in synthesising this body of knowledge, the review points towards LAs as having significant responsibility for *organising to deliver* local, place-based action on NZ, whilst individuals, communities, and business emerged as more important for *delivering change*. This multiplicity of actors, each with significant skin in the game, need space to engage with and shape

decisions related to local delivery of NZ. They need to be actively involved in local, place-based governance. However, in organising to deliver change, LAs appear to hold a prominent position.

From this, two points arise. The first concerns questions of scale. Frequently singled out as the central actor in the local governance of NZ, LAs were depicted as under-resourced and yet vital for organising to deliver on NZ. Despite this prominence, few reviewed documents paused to reflect on the diversity of local government scales and governance structures LAs currently occupy. This plethora of scales and state actors is particularly pronounced within England with a variety of two-tier, single-tier, and regional structures. As each has differing responsibilities, this undoubtedly complicates the organisation and delivery of NZ. Whilst governance structures are more simplified and standardised in Scotland, Wales, and Northern Ireland, different levels of local government still exist, serving to complicate many of the challenges identified. The point is well acknowledged. Nonetheless, and analytically speaking, the reviewed works largely avoid addressing a basic yet foundational question over what precisely is meant by local, place-based action. This commentary has side-stepped this conceptual ambiguity by adopting an inductive (bottom-up) approach to reviewing the literature. Future insight will nonetheless depend on active engagement with questions of scale.

The second point concerns the guiding role of the state. Reasons for the central role of LAs in organising to deliver NZ were numerous. Often repeated was LAs' knowledge of local contexts and assumed intimate connection to citizens, resulting in the idea that LAs are central because they know and understand their local areas. However, looking across the seven challenges identified a more fundamental explanation. It starts from a recognition of each governance challenge involving an element of public good. Overcoming or acting on these challenges necessitates acting for the wellbeing of all. Viewed in this light, it is hard to see how private enterprise might create business cases that provide the economic rationale for acting to resolve some of these challenges. As a result, the state, in its various forms and scales, appears to be the only actor capable of playing a primary guiding role in organising to deliver NZ. Moreover, LAs, endowed with intimate connections to citizens and knowledge of local specificities, appear better placed than national governments to govern local, place-based action for NZ.

Contemporary experience further supports the state playing a formative role. Examples exist where non-public organisations are seeking to create shared knowledge (challenge 3) or undertake local participatory exercises (challenge 4), yet they remain discrete exceptions rather than the norm. It also remains unclear whether they amount to more than their constituent parts. Civic universities may hold promise as stewards of local evidence bases, whilst public-private partnerships may assist in resourcing local NZ (challenge 7) and undertaking some enabling actions (challenge 6). All may be necessary to support the scale of change required to meet NZ ambitions, but efforts seem unlikely to succeed without the state playing a foundational guiding role.

Collectively, this suggests that LAs will need to play a central role in organising to deliver place-based progress towards NZ. Indeed, the review suggests that effective place-based governance for NZ needs to mobilise diverse local stakeholders, including citizens, communities and third sector organisations, universities, private enterprise, and regional agencies, develop shared knowledge bases, and articulate and coalesce around locally appropriate NZ pathways, to take decisions and mobilise resources. At the same time, various elements of place-based governance need to be reformed, including planning and procurement. This suggests that effective governance of and for NZ needs to be multi-scalar, if not polycentric, given the multiple, overlapping levels of government within the UK and England in particular, even before addressing the potential for governance beyond the state.

These broad characteristics align closely with emerging understandings of governance for transformations, as outlined by work on Transformative Innovation Policy. Where Transformative Innovation Policy stresses orientating governance towards addressing normative goals that focus on societal needs and environmental issues, the review highlights how, in doing so, place-based governance needs to take account of local economic, social, and cultural strengths whilst at the same time responding to local needs and concerns. Transformative Innovation Policy further posits that effective governance must be directed at systems change. The review clearly articulates how local action cannot be selective, enacting some parts whilst neglecting others, as this risks duplication of efforts and delivery, resulting in missed opportunities to realise co-benefits and ultimately undermining progress towards NZ.

Future research avenues

From the review and synthesis of documents at the interface of policy and practice, a variety of research avenues emerge at various scales.

Working from the bottom-up, a variety of research questions can be identified within each of the seven challenges. Salient questions are set out in Table 3. Next, and looking across these challenges, future research efforts could usefully explore the interactions between the challenges identified here. Throughout their presentation, in Section 4, numerous interactions and dependencies arose. For example, resourcing coordination and delivery (challenge 7) clearly opens up the possibility of tackling other challenges, such as creating shared knowledge bases (challenge 3) or delivering crosscutting activities (challenge 6). Meanwhile, more effective coordination between scales (challenge 1) is likely to facilitate multi-scalar solution development and reduce uncertainties in decision-making (challenge 5). Mapping out the connections between challenges would be a useful starting point. For instance, some challenges appear more foundational than others (for example, resourcing). In other instances, challenges appear to share similar origins (for example, the need for systemic change). Exploration of challenges with practitioners offers the potential to explore these interactions both conceptually and practically. Exploration of sensitive intervention points, akin to those suggested by Mealy *et al.* (2023), offers one conceptual entry point

Table 3. Future research avenues linked to governance challenges.

Challenge	Research questions for empirical research
1. <i>Effective coordination between and within scales</i>	• How does the multilevel governance of NZ differ between UK nations and what are the implications of different institutional arrangements? • What tensions exist in the creation of a national–local framework and how might they be navigated? • What roles do the creation of regional and local, multi-actor governance arrangements play in coordinating NZ action?
2. <i>Creating locally appropriate pathways</i>	• What commonalities exist between places and how might knowledge of local archetypes facilitate understanding of common problems and solutions? • What tensions exist between local, regional, and national action plans and how are trade-offs between pathways negotiated? • How, where, and with what consequences do economies of scale collide with economies of place?
3. <i>Creating shared knowledge bases</i>	• How effective is Scotland’s mandated approach to data recording? • How can evidence be gathered and shared for effective decision-making? • What options existing for collating and sharing data across the UK? • How can roles and responsibilities for collecting and sharing data be allocated effectively between actors at different scales? • What tools and capacities are required to understand and act on diverse NZ evidence?
4. <i>Fostering buy-in from multiple stakeholders</i>	• How, where, and through what means do publics currently engage in local NZ problems and solutions? • When does ‘engagement fatigue’ set in around NZ delivery at different levels? • What constitutes sufficient, appropriate, and just engagement of regional and local stakeholders in NZ governance? • What trade-offs emerge between depth of engagement and speed of action?
5. <i>Acting under uncertainty</i>	• What low- and no-regret NZ solutions exist regardless of place? • What common problems arise in the place-based governance of NZ and which actors are implicated as being involved in their resolution? • How is uncertainty of decision-making handled?
6. <i>Delivering crosscutting activities to unlock local action</i>	• What activities are critical to enable local NZ action? • Who has responsibility for delivering crosscutting activities and at what scales? • How are crosscutting activities currently resourced and financed?
7. <i>Resourcing local coordination and delivery</i>	• How are different areas of NZ resourced and what implications do different funding arrangements have on local NZ governance? • How can core, public funding for NZ be used to unlock alternative finance?

to generate practical insight, whilst exploration of the governance capacities (e.g., see Hölscher *et al.* 2019) required to navigate challenges offers another.

More broadly, this research supports calls for more fundamental explorations of the governance arrangements used to tackle NZ. The review highlights instances of inadequate, even missing, governance institutions, processes, and practices. It also points to different forms of governance as being required, notably around organising to deliver NZ and organising the delivery of change. As such, exploration about differing types or modes of governance for NZ presents a promising point of departure for further work. An important component of this will be utilising knowledge of these challenges to substantiate the contours of a national framework to guide local action.

Clearly, there are multiple avenues through which this work can be developed. How they are brought together, or not, will depend on the interests and resources of researchers, practitioners, funders, and policymakers. In setting out multiple questions and options, this exposition demonstrates a breadth of possibilities and suggests various points of departure.

Strengths and limitations of the review

All reviews have strengths and limitations. This review is no different. Strengths and weaknesses of the review approach are detailed in Section 3. The following reflects on the broader outcomes. The review approach identified multiple documents of value to synthesising emergent knowledge on place-based governance for NZ. In this sense, the review achieved its stated objectives, synthesising the emerging body of knowledge contained at the interface between policy and practice in the UK about place-based action on NZ, identifying the obstacles to and opportunities in getting place-based governance for NZ right, and setting out areas for further research. Nonetheless, the findings should be viewed as provisional, covering an important yet emerging area of knowledge that is currently rooted in practice rather than academic knowledge. This is perhaps the central strength of the review: it offers an exploratory synthesis of a crucial topic and creates a foundation for further analysis. It is also a limitation that can be reduced through further inquiry. Further research effort could be usefully directed to analysing the experiences of diverse places in navigating the seven challenges. Employing case studies or surveys of LAs and/or local stakeholders offers promise for in-depth insight. Workshops or focus groups with local stakeholders on these governance challenges, how they are experienced locally (if at all), and how they are navigated might also generate actionable insight whilst refining understanding.

6. Conclusion

NZ is widely regarded to be a ‘wicked’ problem that requires concerted local action within a supportive national policy framework. And yet, despite longstanding recognition of the need for local, place-based action, local progress towards NZ in the UK remains limited and uneven. Building on insights developed within the field of Transformative Innovation Policy on the governance of responding to GSCs, this commentary explored why organising to deliver local, place-based progress towards NZ appears intractable. By reviewing and synthesising the experiences, challenges of, and prospects for the local governance of NZ, the commentary identified seven challenges of organising to deliver NZ: (1) coordinating between and within governance scales, (2) creating locally appropriate pathways, (3) creating shared knowledge bases, (4) fostering buy-in from multiple stakeholders, (5) acting under uncertainty, (6) delivering crosscutting activities to unlock action, and (7) resourcing local coordination and delivery.

In doing so, the commentary extends the emerging field of work on TIP concerned with fostering understanding about and actionable knowledge on GSCs like NZ. In many ways, our seven governance challenges mirror those discussed within the literature on GSCs (Björk *et al.* 2022; Schot & Steinmueller 2018b; Steward 2012). This should come as no surprise. The challenges emerge from the unique qualities that define GSCs, regardless of the scale at which they are being addressed (though they appear especially acute at the local level). For example, the extent to which NZ represents complex, multi-level and multi-dimensional problems forcefully points towards the need for concerted engagement by multiple actors over extended periods. Moreover, because NZ requires transformative change across multiple sectors and between multiple system elements, tackling NZ requires the development of whole-system approaches. It should come as no surprise that NZ fundamentally defies existing local, place-based governance arrangements rooted in delivering statutory duties. The need for transdisciplinary research on local, place-based governance of and for NZ could not be more urgent. As reiterated throughout the review, whilst ambition is unrestrained and future pathways are plentiful, how to organise to deliver local change remains elusive.

Accordingly, our work demonstrates how the qualities of GSCs are equally pronounced at subnational scales as they are at (supra)national scales. Some challenges increase, whilst new features can arise. In this respect, this commentary elucidates several new governance challenges that acting locally entails. Many challenges take on unique qualities due to the multiplicity of public and private actors and the often-limited devolution of power and decision-making capacities at the local scale. In some instances—including acting under uncertainty (challenge 5), delivering crosscutting activities (challenge 6), and resourcing local coordination and delivery (challenge 7)—the challenges arise because of a lack of local powers. This suggests the further devolution of powers and associated resources would be useful. Yet, the answer is unlikely to be so simple. What shape devolution takes and how far power is devolved will be important. Indeed, the shape of any national framework will be crucial to the success of achieving NZ ambitions through local action.

Finally, it is worth reiterating how each of the seven governance challenges identified embody collective, societal problems. It is this that underlies their importance as governance challenges. They cannot and will not be resolved by harnessing the innovative potential of private enterprise or reliance on social enterprise alone. Neither is it likely that ad hoc and piecemeal decentralisation of powers through devolution deals will suffice; such a road is likely to be littered with potholes and cul-de-sacs. NZ is a public good. Accordingly, each challenge must be engaged with as a contemporary societal problem, with a central, strong role for the state. Given the ambition and willingness to engage with these challenges at local scales, frequently reported on within the reviewed works, action by the UK Government is required to unlock the embedded capacity of the state in organising to deliver local, place-based action on NZ.

Annex 1. List of reviewed works

Author (year) title	Publishing organisation	Thematic focus	Discussion of challenges
Barlow (2022) <i>Net Zero: Local Authority Powers</i>	Edinburgh Climate Change Institute	Powers held by Scottish local authorities and their effectiveness in supporting net-zero delivery	1, 2, 5, 7
Borrowman et al. (2020) <i>The Local Climate Challenge: A New Partnership Approach</i>	Green Alliance	Opportunities and barriers to local authority action on delivering net zero	1, 3, 5, 6, 7
Brenan (2021) <i>Local Urgency on the Climate Emergency? A Review of Local Authority Climate Emergency Declarations and Supporting Action Across the UK</i>	Environmental Law Foundation	Characteristics of UK local authority Climate Emergency Declarations and action delivered	1, 2, 3, 4, 5, 6, 7
CDP (2021) <i>Climate Action from UK Local Authorities 2020 Disclosure</i>	CDP	Assessment of local authority action in 2020	1, 7
Climate Change Committee (2020) <i>Local Authorities and the Sixth Carbon Budget</i>	Committee on Climate Change	The role of UK local authorities in delivering net zero	1, 2, 5, 7
Climate Change Committee (2023) <i>Progress in Reducing Emissions: 2023 Report to Parliament</i>	Committee on Climate Change	UK's progress on national decarbonisation with policy recommendations	1, 2, 4, 5, 6, 7
Copeland et al. (2021) <i>Tools for Local Government Net-zero Decision Making</i>	Policy@Sussex	Local authority decision-making for local energy planning in the UK	1, 2, 3, 4, 5, 6, 7
CPRE (2022) <i>Climate Emergency: Time for Planning to Get on the Case</i>	CPRE The Countryside charity	Planning and local plans as tools for net-zero action at a local level	1, 5
Davis (2021) <i>Community Municipal Investments: Accelerating the Potential of Local Net Zero Strategies</i>	University of Leeds	Innovative financing for local authorities to meet net-zero targets	2, 4, 7,
Dowling et al. (2022) <i>Accelerating Net Zero Delivery: Unlocking the Benefits of Climate Action in UK City-regions</i>	Innovate UK, PwC, Otley Energy, University of Leeds	Place-based governance for net-zero delivery	1, 2, 3, 4, 5, 7
ECCI (2021) <i>Local Authority Contributions to Net Zero</i>	UK100	UK local authorities and net-zero delivery.	1, 2, 3, 7
Ellis (2022) <i>Local Plans and Net-zero Objectives</i>	Town & County Planning	Role of local planning in delivering net zero	1,
Fenna & Marix Evans (2023) <i>Powers in Place: The Handbook of Local Authority Net Zero Powers</i>	UK100	Local authorities and net zero	1, 2, 5, 6, 7
Greenfield & Barker (2023) <i>Leading the Way: How Government Can Accelerate UK Climate Action Across the Economy</i>	Corporate Leaders Group UK/CISL	Lever for UK government to meet the dual goals of net zero and economic growth	1, 4, 5, 6, 7
Housing, Communities and Local Government Committee (2021) <i>Local Government and the Path to Net Zero</i>	House of Commons	Roles of UK local authorities in delivering net zero and the wider processes governing this	1, 5, 7
Howarth et al. (2021) <i>Trends in Local Climate Action in the UK</i>	Place-Based Climate Action Network	Local authority climate action in the UK in 2020 and role for business in local net-zero delivery	1, 2, 3, 4, 5, 6, 7
ICE (2022) <i>Financing and Funding Net Zero</i>	Institution of Civil Engineers	Options for financing net-zero infrastructure	1, 2, 4, 5, 7
Locality (2020) <i>Keep it Local: How Local Government Can Plug into the Power of Community</i>	Locality	Partnerships between local government and community for local service delivery	2, 7

Author (year) title	Publishing organisation	Thematic focus	Discussion of challenges
Locality (2022) <i>Principles in Practice: Lessons and Examples from the Keep it Local Network</i>	Locality	Role of partnerships between local government and community for local service delivery	1, 2, 5, 7
Losse et al. (2021) <i>Local Government and Net Zero in England</i>	National Audit Office	Role of local authorities in delivering net zero in England	
NALC (2021) <i>What Can Local Councils Do on Climate Change</i>	National Association of Local Councils	Role of parish and town councils in delivering net zero in England	1, 3, 4, 7,
NAO (2023) <i>Approaches to Achieving Net Zero Across the UK</i>	National Audit Office, Audit Scotland, Audit Wales, NI Audit Office	Governance arrangements, legislation and policy for delivering net zero in the UK and each of the devolved nations	1, 2, 3, 6, 7
NFU (2021) <i>Net Zero & Agriculture: A Guide for Local Authorities</i>	National Farmers' Union	Role for local authorities in working with agricultural sector in net-zero transition	1,
Nice & Sasse (2023) <i>Net Zero and Devolution: The Role of England's Mayors in the Climate Transition</i>	Institute for Government	Devolution and the role of mayors in delivering net zero in England	1, 2, 3, 4, 7
Quantum (2021a) <i>Power Shift: Research into Local Authority Powers Relating to Climate Action</i>	UK100	Local authorities' context and powers for NZ	1, 2, 3, 6, 7,
Quantum (2021b) <i>Research into a National–Local Net Zero Delivery Framework</i>	UK100	Investigates new governance arrangements for enhancing local net-zero delivery	1, 2, 3, 4, 5, 6, 7,
Rankl et al. (2023) <i>The Role of Local Government in Delivering Net Zero</i>	House of Commons Library	Roles of UK local authorities in delivering net zero	1, 2, 3, 7
Ryan (2021) <i>Accelerating Climate Action: The Role of In-country Local Leadership Networks in Delivering Net Zero</i>	UK100	In-country local government networks for delivering net zero	1, 2, 6, 7
Skidmore (2023) <i>Mission Zero: Independent Review of Net Zero</i>	HM Government	UK-wide progress on net-zero action and role for local action	1, 2, 3, 4, 5, 7
Stegman et al. (2021) <i>Enabling Smart Local Energy Systems: Finance and Investment</i>	Energy Systems Catapult	Innovative place-based ways to decarbonise energy through smart local energy systems	1, 2, 3, 7
Tingey & Webb (2020) <i>Net Zero Localities: Ambition & Value in UK Local Authority Investment</i>	Energy Revolution Research Centre, University of Strathclyde	Local authorities and local energy planning as vehicles for delivery	1, 2, 5, 6, 7
Urban Foresight (2021) <i>Getting to Net Zero: Bridging the Innovation Gap Between Places and Companies</i>	Urban Foresight	Barriers to innovation in delivering net zero for local authorities and private sector	1, 2, 7
Verma et al. (2019) <i>Localising the Grand Transition: Enabling Citizen Participation and Encompassing Local Government</i>	World Energy Council	Exploring local approaches to delivering energy system decarbonisation	1, 2, 4, 5, 6, 7
Wegmann & Transition Economics (2021) <i>Getting to Net Zero in UK Public Services: The Road to Decarbonisation</i>	UNISON	Public services for delivering net zero	1, 2, 3, 4, 7
Wildfire & Ramsey (2021) <i>A Place-based Approach to Net-zero</i>	Mott McDonald	Role of national and local government in place-based approaches to net-zero delivery at the city scale	1, 2, 3, 4, 5, 6, 7
Williams (2020) <i>Local Leadership to Transform our Energy System</i>	Regen and Scottish and Southern Electricity Networks	Role of local government in decarbonising energy and governance structures and approaches to enable local leadership	1, 2, 3, 4, 5, 7

Acknowledgements

This commentary has benefitted greatly from feedback from Henry Richards, Tuisku (Snow) Kolu, and Tim O’Riordan. Mistakes and omissions remain the authors’. The research was funded by the British Academy as part of its Net Zero Governance programme.

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