



Unlikely climate pioneers? Net-zero governance and innovation in 'left behind' places

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ABSTRACT

Research on local climate governance is dominated by the epistemologies of large cities and affluent areas, casting less urbanised, structurally disadvantaged, and peripheral localities as 'laggards'. This mirrors economic-geography narratives that depict 'left-behind' areas as politically regressive and institutionally deficient. This article problematises that narrative by theorising peripheral climate leadership and demonstrating its empirical prevalence. It introduces a research strategy for systematically detecting and examining climate strategies and governance leaders in 'left-behind' settings. Empirically, analysis of 323 UK local authorities outside Greater London identifies 110 economically disadvantaged non-metropolitan councils, 26 of which rank in the national top decile in at least one climate-policy domain. These results suggest a more variegated geography of climate leadership, shaped by a contingent interplay of economic legacy, political agency, and governance innovation. Recognising these 'unlikely' climate pioneers reorients local governance scholarship and positions peripheral areas as pivotal actors in accelerating net-zero transitions.

1. Introduction

Innovation within public governance, including in relation to climate action, is widely celebrated in both academic research and policy advocacy (Jordan & Huitema, 2014; OECD, 2022). Local governments are positioned as pivotal 'agents of change,' capable of pioneering innovative climate strategies that inspire broader transitions (Lieberink & Wurzel, 2017; McEwen & Bomberg, 2014). However, in the context of deeply entrenched place-based development imbalances, innovation governance is typically associated with affluent 'central' places, such as larger cities and economically vibrant regions. In contrast, local authorities in economically disadvantaged areas are assumed to lack the capacity and agency for leadership. Pervasive assumptions across scholarly and political discourses are that such so-called 'left-behind' areas are institutionally weak and lacking in innovation (Martin et al., 2021; Rodríguez-Pose, 2018).

Despite this, there are local governments in 'left-behind' and peripheral places that do demonstrate a strongly innovative stance, resourcefulness, and leadership in different spheres of public governance (Shearmur, 2017; Pugh & Dubois, 2021). In this paper, we

particularly focus on net-zero action. Net-zero means "that the total greenhouse gas emissions would be equal to the emissions removed from the atmosphere, with the aim of limiting global warming and resultant climate change" (Burnett et al., 2024, p. 4); it is the target set by many countries as well as local jurisdictions. We consider how at least some 'left-behind' local areas, despite often being disadvantaged by the green agenda (Golubchikov & O'Sullivan, 2020; Rodríguez-Pose & Bartalucci, 2023), can nonetheless demonstrate proactive political agency, policy innovation, and remarkable achievements in this field.

Some strands of literature consider proactive 'left-behind' places as outliers or exception to expectations – leading to the notion of 'unlikely pioneers'. In a climate policy context, the term 'unlikely pioneer' was coined by Homsy (2018), who has identified innovative climate activities in rural communities in the US. Other studies have focused on structurally disadvantaged mid-sized cities in the UK (Jonas et al., 2017; Wurzel, Moulton, et al., 2019) and Germany (Haupt & Kern, 2022; Jonas et al., 2017; Wurzel, Moulton, et al., 2019). However, this evidence is based on a limited number of case studies. There is no systematic research on these 'unlikely pioneers'; such pioneers may even be more widespread than commonly assumed. In any case, the experiences of

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these ‘unlikely pioneers’ appear to be potentially more broadly replicable and scalable than those of places operating under privileged conditions and, therefore, of paramount importance for accelerating net-zero transitions.

In this paper, we propose a structured research agenda to explore and understand climate governance in ‘left-behind’ places. This requires taking ‘left-behind’ places *as the point of departure*; the goal is to purposefully investigate how likely – or unlikely – it is for such areas to become climate champions, where this occurs in practice, how it unfolds, and what these experiences reveal more broadly about institutional and innovative capacities of ‘left-behind’ places. To this end, we integrate two hitherto disjointed, although conceptually interconnected, bodies of literature: (a) the economic geography of ‘left-behind’ areas, which has traditionally focused on structural deficits and territorial injustice, and (b) political science studies on local governance innovation and climate leadership. This affords a novel lens through which to rethink the role of disadvantaged localities in energy and net-zero transitions.

One of the analytical hurdles for this agenda is how to identify ‘unlikely pioneers’ empirically. Given that they are deprioritised in research (Homsy, 2018), there is less material to draw upon in extant literature, requiring primary data collection. The paper makes methodological suggestions in this regard. We identify analytical tensions between local authorities’ climate policies and their actual performance in reducing emissions and progressing towards net-zero. The latter (or ‘output’) is often difficult to attribute to specific policy actions (or ‘input’), as it is a long-term and multi-scalar outcome. However, input without output raises questions about the effectiveness of climate action. While considering the relative merits of input- vs. output-oriented approaches, we suggest a hybrid approach that involves a situated understanding of governance action.

To substantiate the value and feasibility of this agenda, the paper pilots the approach through an analysis of UK local authorities. The UK represents a highly relevant case, as it combines a strong national commitment to climate action – including a legal obligation to achieve net-zero by 2050 – with fiscal over-centralisation and some of the highest levels of inter-local inequalities among developed countries. The lack of fiscal autonomy at the local level may suggest that climate leaders and laggards are more sharply divided along the lines of economic development. However, through mapping the most economically disadvantaged, non-metropolitan local authorities (local councils) in the UK and analysing their climate performance, we identify 26 councils (among 323 analysed in total) that appear to be punching above their structural weight. This opens debates on the factors that explain how ‘unlikely pioneers’ emerge and whether they are, in fact, as ‘unlikely’ as the term implies. Our quantitative analysis shows that structurally disadvantaged local councils are indeed significantly less likely to be national leaders across multiple policy domains; however, the extent to which they appear in the top performing deciles for specific climate domains challenges the universality of the ‘unlikely’ label. This finding also challenges generalising assumptions in economic geography regarding governance and innovation deficit in ‘left-behind’ areas, underscoring the importance of examining peripheral innovation and peripheral climate leadership.

The paper is structured as follows. The next section starts with problematising research on left-behind places, especially in the context of net-zero targets. This is followed by a section that reviews literature and conceptualisations around ‘unlikely climate pioneers’. We then propose three approaches to systematically identify and analyse ‘pioneers’: input-oriented; output-oriented; and hybrid. These approaches are piloted in the case of the UK; a combination of economic indicators and relative scores provided by the Council Climate Action Scorecards (Climate Emergency UK, 2024) reveals a cluster of pioneers among economically disadvantaged local authorities. We conclude by emphasising the importance of more inclusive epistemology of place-oriented climate governance.

2. Left-behind places in net-zero transitions

The concept of ‘left-behind’ places has gained traction in recent years (Rodríguez-Pose, 2018). Empirical evidence indicates that while income disparity among countries has declined over the past few decades, within-country disparities have increased, with poorer regions falling further behind (Asadi & Jafari Samimi, 2023). These places, often located in old industrial regions, have experienced periods of economic decline, stagnation and population shrinkage, leading to significant ‘behindness’ in wealth, employment opportunities, and access to resources compared to more prosperous regions (Martin et al., 2021). Many of these areas are perceived (internally and externally) as having ‘no future’ and ‘places that don’t matter’ for the national political landscape (Rodríguez-Pose, 2018). Left-behind places may be defined as those that are structurally and systematically disadvantaged due to their inferior position within the asymmetrical spatial distribution of economic, political, and symbolic resources and capabilities (Golubchikov & O’Sullivan, 2020).

The social and political sentiments in these regions are generally observed to result in making climate initiatives secondary to more immediate concerns (Eckersley, 2018). Indeed, the economies and well-being of old industrial regions are often dependent on high emission industries – even if these industries may experience a gradual decline or a ‘slow burn’ (Hommels, 2005). The dominance of high-emission economic sectors or industrial companies has led to lock-in effects that make it hard to decarbonise the economy without damaging local wellbeing. Net-zero transition threatens to leave already ‘left-behind’ regions further behind (Rodríguez-Pose & Bartalucci, 2023) and already peripheral places further peripheralised (Golubchikov & O’Sullivan, 2020), thus reifying instead of rectifying the pre-existing territorial injustices.

Growing economic grievances, uneven distribution of resources as well as the perception of being ‘left behind’ and a ‘collective embitterment’ have fuelled political resentment among the inhabitants of these regions (Hannemann et al., 2024; Rodríguez-Pose et al., 2023). The extant literature now converges on the view of the incapacity and even ‘immaturity’ of left-behind places, which is evidenced by their anti-establishment ‘revanchist’ voting for populist agendas in national and local elections. The recipe proposed to address this is that such areas should be the target for capacity building, unlocking their ‘untapped potential’. To some key protagonists, this would be done *not* through “providing transfers or welfare”, which is thought to increase these places’ dependency, but “through measures aimed at boosting training, promoting entrepreneurship and facilitating the assimilation of knowledge and innovation” (Rodríguez-Pose, 2018, p. 205). This suggests corrective measures to make these places more receptive to externally-generated innovation and more faithful to mainstream neoliberal democracy.

What is missing in these debates is that many economically lagging areas *are* institutionally mature enough to demonstrate strong vision, resourcefulness, and creativity. Many of them are even ‘ahead of the curve’ vis-a-vis stronger areas in terms of what they do, what they achieve, and what they can transfer to others in particular spheres of activities – although these achievements may be less visible in the discursive landscape privileging the epistemology of the centre (Shearmur, 2017; Pugh & Dubois, 2021) and generalising on the political inferiority of ‘left-behindness’. What such places need is not only, and perhaps not so much, that their ‘untapped potential’ is unlocked – many are already performing remarkably well given the constraints that they are facing. Rather, what is required is the application of the principles of distributive and recognition justice (Fraser, 1997), ensuring access to adequate resources (including – yes – through transfers and welfare), the scaling-up of their achievements and innovation, and affirming their agency and role as legitimate sources of policy learning and innovation.

Such an epistemological shift to privilege peripheral places – not as

takers, followers and laggards, but as givers, pioneers and leaders – could open new conversations and practices which are more meaningful and replicable across a greater variety of places and, consequently, be more instructive for an aspirational and inclusive energy transition. This brings us more closely to the idea of local climate pioneership, which we discuss in the next section.

3. Climate pioneers and unlikely climate pioneers

In the context of environmental policy, a pioneer is understood as a place/actor (e.g. a country or a city) that “at a given point or period of time effectuates and pursues the most stringent approach in environmental policy and thereby intentionally or unintentionally sets an example that can be emulated or where others even feel pressured to emulate it” (Knill et al., 2012, p. 37). Put differently, a pioneer has started earlier and/or is more active than others, and can also serve as a model for others.

The political science literature sometimes distinguishes between leaders and pioneers, with leaders exhibiting ‘extravert’ ambitions, meaning that they want to be visible – usually at a national and international level – and try to attract followers that are inspired by their models (Lieberfink & Wurzel, 2017; Torney, 2019; Wurzel, Lieberfink, & Torney, 2019). In contrast, pioneers may be thought of as being more ‘introvert’: they are interested in internal policy change and do not aim at attracting followers, either because they have no intention to do so or because they lack the capacities to engage in the time and resource-intensive outreach activities. Thus, while the terms pioneers and leaders are often used interchangeably, they may have different meanings in certain debates. Lieberfink and Wurzel (2017) proposed ideal-typical positions of leaders, pioneers, and laggards, based on local government’s internal and external climate policy ambitions. Building on this work, we offer an extended typology of local climate governance, which clarifies and expands associated terminology (Table 1).

Similar to economic geography and regional studies as outlined in the previous section, political science literature associates climate leadership and pioneership with structural conditions of location, such as city size and agglomeration, economic prosperity, and levels of education. Most of the internationally recognised high-profile leaders are indeed large cities such as Barcelona, London, Copenhagen or Oslo (Acuto, 2013; Hofstad et al., 2022). Larger cities have higher capacities for climate action and only very rarely find themselves among laggards. This remains to be the case even if they are structurally disadvantaged. A study from Germany has revealed that all cities with a population larger than half a million inhabitants – economically disadvantaged cities included – were significantly more active than the remaining smaller towns and cities (Otto et al., 2021). However, drawing on the distinction between leaders and pioneers above, most larger cities with disadvantaged/weaker economies are found to show the ambitions of pioneers (internal ambition) and not necessarily of leaders (external ambition) (Homsey, 2018; Otto et al., 2021). A few exceptions do exist, where structurally disadvantaged cities have gained recognition as climate leaders, though such cases often coincide with their broader economic regeneration. For example, Malmö, a former industrial city in decline, is recognised for its large-scale transformation into a place with eco-neighbourhoods, innovative urban design, and service-based economy (Holgersen & Hult, 2021).

Outside these larger urban areas, climate leadership/pioneership is

associated with places characterised by a strong and innovative economy (Zahran et al., 2008; Bedsworth & Hanak, 2013). Such wealthy communities have the financial capacity to pursue climate action strategically and not just incrementally (Kern, 2019; Shahab et al., 2021). Similarly, climate pioneers are also found among cities with a young and well-educated population, with a stronger and more active civil society (Homsey, 2018; Haupt & Kern, 2022). These characteristics often apply to ‘university cities’, where physical proximity to higher education institutions facilitates exchange and collaboration between public administrations and scientific actors (Haupt et al., 2023).

Places that lack these characteristics, such as the ‘left-behind’ areas introduced above, are in turn assumed to be ‘likely laggards’. Undoubtedly, the political landscapes look different in these places. While green parties that are typically associated with ambitious climate policy are often weak, populist actors tend to be more influential (Haupt et al., 2023, 2024). This latter point is relevant since studies suggest a connection between right-wing populism and climate-sceptic positions (Huber, 2020; Kulin et al., 2021; Rodríguez-Pose & Bartalucci, 2023). Such places struggle to build inclusive climate alliances, attract green jobs, and forge new images (Jonas & Wurzel, 2021).

Nevertheless, structural advantages or disadvantages are by no means deterministic for climate (in)action. Indeed, much also depends on the role of agency. In a climate policy context, agency can be understood as the ambitions and actions of individuals or coalitions of individuals, usually public administrators such as municipal climate managers. For example, comparative small-n studies on structurally disadvantaged UK and German cities have shown that they can explicitly seek opportunities opened by renewable energy and green economy (Eckersley, 2018; Jonas et al., 2017; Wurzel, Moulton, et al., 2019). This is particularly evident in cities whose economic backbone industries have entered a prolonged structural crisis or even entirely disappeared. Examples include maritime port cities with declining wharf and docklands industries, such as Hull or Bremerhaven (Jonas et al., 2017; Wurzel, Moulton, et al., 2019), or cities in former coal mining regions, such as Newcastle or Gelsenkirchen (Eckersley, 2018).

Another study on climate agency in German municipalities (Haupt et al., 2024) has revealed that some public administrators from disadvantaged places successfully put climate action on the municipal agenda, even though their approaches and policies might be different from those of more advantaged places – local leaders reframe climate initiatives as opportunities for economic development, using them to attract investment and create jobs. This pragmatic approach resonates with local communities, helping to build local coalitions for climate governance (Homsey, 2018). In contrast, there are numerous examples of places which despite their structural strengths (which in theory make them more likely to be climate pioneers) are not necessarily active in this field and are, in fact, about average or even ‘laggards’ (Otto et al., 2021).

The literature on ‘unlikely climate pioneers’ (Homsey, 2018; Haupt & Kern, 2022; Wurzel et al., 2019), although still nascent, brings an important perspective on the complex interplay between geographical conditions and local climate governance, also leading to a better understanding of the fundamentally uneven energy transitions (O’Sullivan et al., 2020). However, the main focus of this literature is on the shape and pathways that local climate governance takes in different areas and on the causal explanation behind the differences in local states’ climate actions; this literature is less concerned about the problematic of ‘left behind’ areas as such, as a systematic line of enquiry and beyond a limited number of case studies. The very notion of ‘unlikely pioneers’ suggests a rather incidental, outlier category in the broader spectrum of climate pioneers. Nevertheless, this literature potentially opens room for a more systematic exploration of the innovative and leadership capacities of lagging areas.

This is what we actively advocate here as a new research agenda: making ‘left-behind’ places a more privileged point of enquiry in climate governance and systematically detecting and examining climate leadership in peripheral settings. If so, three related methodological

Table 1
Typology of local governments in relation to their climate policy.

External policy ambitions	Internal policy ambitions		
	Low	Average	High
Low	Laggards	Followers	Pioneers
High	Opportunists	Promoters	Leaders

Source: modified from Lieberfink and Wurzel (2017).

questions emerge: (1) How can 'left-behind' areas be revealed as a class of places? (2) How can we identify climate pioneers? (3) How can we systematically identify climate pioneers among 'left-behind' places? In what follows, we propose a research strategy in this regard.

4. Identifying climate pioneers: three approaches

Most of the literature on climate pioneers reviewed above focuses on political *action*. This approach has its merits insofar as the governance, political will, ambition, intentionality, political processes, and activity fields of government actions are key concerns. However, this literature is usually less directly interested in the outcomes of the climate actions, such as to what extent local government action has resulted in greenhouse gas (GHG) or carbon (CO₂) emission reductions. One reason for this is that attributing observed outcomes, especially GHG or CO₂ reductions, to specific policies or interventions is methodologically challenging (Schoenefeld & Jordan, 2019). This is why relatively few studies attempt to measure or causally attribute climate policy outcomes to specific action. However, it is important to be explicit how different methodological approaches can bring different results regarding who is a pioneer and who is not. In this section, we explicate three possible research strategies in this regard: input-oriented, output-oriented, and hybrid.

4.1. Input-oriented approach

The input-oriented approach focuses on the development and implementation of climate action plans, programmes, and policies; this approach shapes much of the literature of climate governance and climate pioneers. Key indicators include climate-related policies enacted, the scope and ambition of local climate strategies, levels of stakeholder engagement, and the extent and share of financial and administrative resources allocated to climate initiatives. This approach can discover the intent, institutional commitment, timelines, and pioneering behaviour even in cases where tangible outcomes in terms of, for example, environmental impact are not yet apparent.

However, the presence of ambitious strategies or programmes does not per se guarantee reductions in GHG emissions (Otto et al., 2021; Salvia et al., 2021). The lack of measurable progress could be due to limited scale of intervention or the inherently multi-level nature of achieving tangible climate impacts. For example, many mitigation plans put considerable emphasis on education and behaviour change (Cattino & Reckien, 2021); their effects are long-term in nature and hardly attributable in terms of direct CO₂ emissions. In many cases, capabilities of local authorities simply do not realistically match their ambitions suggesting potential issues with delivery – which is, for example, the case for many UK local authorities (Garvey et al., 2023). But even more direct measures may still have limited measurable outputs, at least in the short run, such as low-carbon procurement, housing retrofit, greener building standards, switching to a sustainable municipal vehicle fleet, improving public transport, decarbonising public buildings or planning for active mobility. Combined, these measures are foundational for the overall strategy for climate-neutral cities and municipalities (Golubchikov, 2011; Golubchikov & Yenneti, 2024), but they may have limited immediate impact on CO₂ emissions at the local level. By recognising the importance of this foundational work, the input-oriented approach values the potential for long-term impacts that may not yet be visible.

4.2. Output-oriented approach

The output-oriented approach, in contrast, can prioritise a quantified, emission-driven impact, allowing for the identification of localities (local government units) where measurable progress has been achieved. Key indicators might include reductions in GHG emissions, improvements in air quality, increases in renewable energy production, or reductions in energy consumption (Hsu et al., 2020; Lombardi et al.,

2017). Among those, it is CO₂/GHG emission metrics that is ultimately the measure of progress towards net-zero. Many larger cities, which have set decarbonisation targets, have been guided by this metric, sometimes for decades, and review their progress against it, similarly to national 'carbon budgets' (Golubchikov, 2011; Salon et al., 2010).

However, even if leaving aside the reliability and availability of local-level emission data (which may be a challenge especially for smaller municipalities), the major limitation of this approach is that GHG reductions are attributable to many factors and actors, internal and external, as well as to decisions taken at different levels, not only by local authorities. In the UK, for example, local authorities are found to directly contribute only between 2 and 5 % of their local area emissions, even if their place-shaping powers and actions *potentially* influence around a third of UK emissions in areas such as the buildings, transport, waste and land-use sectors (Evans, 2020, p. 8). Furthermore, the locality's carbon footprint is very much a structural endowment and low or high relative footprint (e.g. measured in per capita) does not necessarily indicate the purposeful role of the agency. A locality might be able to achieve significant GHG reductions due to the closure or shrinkage of a major industrial producer under economic duress, and against (rather than thanks to) local policies and interests in maintaining levels of economic and social welfare. Given that the concept of local climate leadership/pioneership requires purposeful and proactive agency embodied in the local state, the output-oriented approach, even if it is territorially-bounded, may give a misleading picture in this regard.

4.3. A hybrid approach

An alternative could be a hybrid framework that integrates elements of both approaches above as a means of identifying local climate pioneers or leaders. Such an approach would need to be context-sensitive, such as considering the capacity gap between large cities and small municipalities. It would recognise localities that make significant governance effort and demonstrate innovation, while also juxtaposing these efforts with the 'reality check' of measurable outcomes, even if some (or all) of these outcomes may result from external factors. To fully understand the role of local actors in driving these outcomes, researchers need to engage with stakeholders within the locality. Methods such as (expert) interviews and other qualitative approaches would be essential to gain insights into the actions and motivations behind the observed climate leadership/pioneership and discern factors that contributed to their success.

What is important is not simply the establishment of the causal relationships between action and outcome, but also the *situated* understanding of governance action, including the complexity of local contexts, structural barriers, and obstacles. In this understanding, 'true' pioneers may even be rethought as not the ones that demonstrate achievements thanks to their favourable conditions, but the ones that demonstrate achievements *despite* their unfavourable conditions. The experiences of lagging/'left-behind' areas become particularly important here. This approach considers the broader systemic challenges faced by such localities, including structural economic dependencies and the lack of external support, which constrain their capacity to translate strategies into impactful outcomes. This is also needed in order to 'incorporate a richer sense of the structural, relational, and politically contested character of transition processes' (Bridge & Gailing, 2020, p. 1040).

In the following sections we will pilot these approaches in the UK, while also presenting some emerging data on a more systematic exploration of 'unlikely climate pioneers' in the context of 'left-behindness'.

5. Economically lagging areas in the UK

The economic geography of the UK is among the most polarised among European and OECD countries (McCann, 2019). The north-south regional divide, the economic primacy of London and the existence of

many 'left-behind' regions are widely recognised both in academic literature and governance strategies. Left-behind places often struggle to keep pace with national economic trends, and their residents face limited opportunities for upward mobility (HMSO, 2022).

While lagging areas in the UK are generally associated with more peripheral and old industrial places, there may be different empirical approaches to reveal them (Comim et al., 2024). Various indicators are used to measure local economic and social conditions. For example, indices of multiple deprivation are composites of a variety of indicators, such as incomes, housing conditions, employment rates, educational attainments, access to public services, and a range of others. They are measured at the neighbourhood level and can be constructed at different scales: from postcode districts to local authorities. However, Martin et al. (2021) stress the limitations of using this and similar metrics in aggregation for local authority units, given that a combination of different indicators and weights produces quite different rankings and geography. GDP per capita, jobs, unemployment, productivity, incomes, education, and life expectancy are often used as more reliable measures of the levels of development, which could also be used for longitudinal and cross-national analyses. Martin et al. (2021), for example, consider growth in jobs and output (GVA), namely cumulative differential growth between local areas and national growth between 1981 and 2018, to reveal 74 (dynamically) left behind local authority districts in the UK.

For our analysis, we have chosen data that are both transparent and easy to navigate, including in the international comparison context: gross domestic product (GDP) per head and gross disposable household income (GDHI) per head at the level of local authority/council. GDP per head reflects the output levels of local economy and as such represents *the workplace locality*. It is the best proxy for issues such as opportunities for high value employment, career progression, opportunities for business investment, entrepreneurship, and innovation (McCann, 2019). GDHI per head reflects the value of resident's salaries and other incomes and represents *the residence locality*, serving as a proxy for standards of living (McCann, 2019). A combination of both indicators, particularly in relation to the national average, appears to be the best integrated proxy to understand both the capacity of the location to *generate* values and the capacity of the location to *retain* values – as two aspects that ultimately determine the long-term welfare of the community.

We use local authority areas as unit of analysis. Local authorities in the UK are responsible for delivering a wide range of local services, with structures varying across England, Scotland, Wales, and Northern Ireland. There are over 370 local authorities in the UK. However, from our analysis, we excluded English county councils in a two-tier arrangement (primarily shire counties, $n = 21$) to avoid overlap in governance, as well all councils located in Greater London ($n = 36$) given our focus on places lacking agglomerative advantages. The number of local authorities with available data for our analysis was 323.

Our list of lagging areas/councils constitutes those councils that were 90 % or below of the UK average for *both* GDP per head *and* GDHI per head. Out of the 323 councils, 213 had GDP per head below 90 % of the national per head GDP and 153 councils had GDHI per head below 90 % of the national average in 2021. The combined category produced a total list of 119 councils. However, in the second stage of the analysis, we also excluded local authorities that had built-up areas with the population of over 200,000 (classified as 'major built-up areas' by the UK Office for National Statistics - ONS) – this was done to further reduce the impact of the agglomeration effect, which is often positively associated with 'likely' climate leadership as per discussions above (such places are also more frequently studied in literature). Based on 2021 data, there were 110 structurally weak non-metropolitan councils. The most populous of these was County Durham (521,447 people) and the smallest Orkney Islands (22,540).

The next phase of analysis was to consider the relative position of these 110 economically problematic councils in the 2023 Council Climate Action Scorecard to identify any climate pioneers among them.

6. Council Climate Action Scorecards

Climate emergency declarations have been a tool for local governments in the UK to signal their commitment to addressing the climate crisis. Since Bristol City Council made the first declaration in 2018, over 300 councils across the UK have followed suit, collectively representing the majority of the population. These declarations typically acknowledge the urgency of the climate crisis, set targets for reducing greenhouse gas emissions, and often include commitments to achieve net-zero emissions by a specific date, most typically – at least at the time of the declaration – 2030. According to one study looking into this, by 2020 75 % of the UK local authorities had a climate emergency declaration, and 75 % of them had selected a Net Zero target date of 2030 (Gudde et al., 2021).

However, these declarations are not legally binding, and for many councils in the UK, they have remained symbolic. Indeed, local authorities in the UK have no formal duty to tackle climate change, nor do they have any formal role in energy systems (Tingey & Webb, 2020; Gudde et al., 2021). Even so, the declarations represented a turning point in integrating climate action into local policymaking, with the extent of integration often dependent on the leadership of individual councils. For the 'unlikely pioneers' identified in our analysis, these declarations serve as a critical juncture and justification tools, both as historical milestones and as moral imperatives, driving relevant and meaningful action.

However, to reveal pioneers, a more comprehensive analysis is needed than simply declarative steps. We have used the ranking used in the Council Climate Action Scorecards developed by Climate Emergency UK, a non-profit organisation focused on tracking and supporting local climate initiatives (Climate Emergency UK, 2024). The Scorecards provide a rather comprehensive assessment of the climate actions undertaken by UK local authorities to achieve net-zero emissions. They provide a valuable source for academic research and have been used in a range of studies (e.g. Garvey et al., 2023; Clegg, 2023). These Scorecards evaluate councils across seven domains: Buildings and Heating; Transport; Planning and Land Use; Governance and Finance; Biodiversity; Collaboration and Engagement; and Waste Reduction and Food. The assessment is based on over 90 questions, tailored to different council types. Different indicators/questions are given scores and weights, resulting in a cumulative score for each of the seven categories as well as presenting a 'total' score for the council. The scorecards are conducted by trained volunteers, who review publicly available documents, such as climate action plans and council reports, to gather evidence. Councils are then given the opportunity to review their scores before final audits. By the time of our analysis, two series of Scorecards had been available, of 2021 and 2023 (although not cross-comparable). We used the 2023 edition in our analysis. The full methodology, scores and evidence underpinning the Scorecards are accessible through the Climate Emergency UK website (Climate Emergency UK, 2024).

The Scorecards do attract criticism from local authorities, as also revealed through our own interviews. Their reliance on self-reported data and volunteer assessments introduces potential variability and degrees of subjectivity, which may affect the consistency of evaluations. The rankings are also sensitive to different weights attributed to different measures. The framework places significant emphasis on plans and targets, which may not always translate into measurable on-the-ground impacts. Additionally, there is a risk of rewarding procedural compliance over transformative outcomes, as the criteria often prioritise detailed documentation over tangible climate results. This criticism is a caveat for our results presented below, although for our *relative* identification of climate pioneers, Scorecards represent a valuable, pertinent, and reliable proxy.

7. Unlikely climate pioneers in the UK?

The 2023 Scorecards indices were analysed for 323 councils (i.e.

those outside Greater London and with available data), including for 110 'economically disadvantaged' councils with no major built-up areas. To identify the best performing councils in net zero areas, we considered the following scores from the Scorecards: (a) six out of seven domains reported, excluding biodiversity, since the scope of this category mostly goes beyond net zero and energy transition, and (b) the total score, which is an aggregate of the seven categories (including biodiversity).

Table 2 shows 26 councils that meet three criteria at once: (i) they are among the 110 economically disadvantaged councils, (ii) they are in the top decile nationally on at least one of the six domains or the total score in the scorecards, i.e. ranked among top 32 places out of 323 selected councils (the position in place 32 can be shared by several councils if they have the same score); and (iii) they have the score of at least 40 % (this is to ensure that the achievers are not merely 'relative' but also 'absolute', although this has only affected the transport domain).

Four councils in this list of 26 have achieved a position within the 10 % best performing councils in the 'total' category of the Scorecards, including Lancaster City, Renfrewshire, County Durham, and North Kesteven District. In addition to these four, five other councils were top 10 % achievers in more than one of the six categories in the Scorecards, including: Blaenau Gwent County Borough; Bolton Borough; Bury Borough; Rochdale Borough; and Sefton Borough. The 26 local pioneers revealed in Table 2 are located in three out of the four nations of the UK. None of the lagging councils in Northern Ireland was performing as well according to the Scorecards (although Belfast, which is outside of our list of 110 disadvantaged councils, was among the top achievers). It is notable, however, that local governments in Northern Ireland are responsible for fewer functions than in mainland Britain and in this respect weaker councils appear to be even more marginalised (Knox & Carmichael, 2025).

The 26 top-performing disadvantaged councils are part of a larger group of 115 councils that fulfil the criteria (ii) and (iii) above but not (i); that is, they are top-performing councils in at least one of the six policy domains or in the total score but are not necessary economically disadvantaged. Statistically, the 115 top-performing councils represent 36 % of a total number of 323 councils analysed, whereas 26 top-performing disadvantaged councils represent 24 % of 110 disadvantaged counties. This suggests a somewhat smaller representation of disadvantaged councils among climate policy leaders. Another way to look at it is that disadvantaged councils make 23 % of the 115 top-performing councils, but 34 % of the total number of 323 councils. Either way suggests that even if disadvantaged councils are *less likely* to be scoring high compared to other councils, in principle it is not so much unlikely for them to be among leaders – at least if specific domains of climate governance are concerned. The difference is more significant for the 'total score' in the Scorecards, where, as we have already noted, only four disadvantaged councils (or 4 % of their total number) were placed alongside a total of 34 top-performing councils (or 11 % of the total number of all councils analysed). This indicates that it is harder (more unlikely) for disadvantaged areas to be all-round climate leaders/pioneers, performing well across different areas of climate governance.

Interestingly, our further analysis has also shown a noticeable correlation of the 'total score' percentages in the Council Climate Action Scorecards with the population of the 323 councils ($r = 0.37$) and even stronger correlation with the councils' total GDP ($r = 0.46$). This demonstrates a positive association between the councils' climate action and their aggregate economic power (compared to their *relative* economic strength measured in per head GDP). Given that we have focused on those councils that lack major urban areas, the majority of our list of 26 top-performing disadvantaged councils had their total GDP below the average for the rest of the 323 local authorities, meaning they were additionally 'less likely' to be the top performers for the Scorecards.

The performance in the Scorecards, which focuses on policy actions, can also be compared with change in GHG/CO₂ emissions. This is relevant to what we have introduced as the 'output-oriented approach'

above. According to ONS,¹ when the local authority emissions are aggregated, estimated total GHG emissions decreased by around 39 % between 2005 (the earliest year for which data are available at local authority level) and 2021: "falling from 657 million tCO₂e to 399 million tCO₂e ... [a]ll 374 local authorities have shown a decrease in total emissions between 2005 and 2021". Average GHG decrease of 323 local authorities in our database was slightly less - 37 %. From Table 2, 17 councils out of 26 had their GHG emission reduced by 37 % or more. As discussed above, however, the cause-effect relations between climate action and GHG reduction at the local level is convoluted.

ONS also reports data for CO₂ emissions estimates 'within the scope of influence of Local Authorities', which excludes large industrial sites, railways, motorways, land-use, livestock and soils. For the 323 councils from our list, the average CO₂ emission reduction in this category was 38 %. Of the 26 disadvantaged councils in Table 2, the majority ($n = 17$) have achieved this or higher levels. Equally, the majority ($n = 18$) had the related CO₂ emission per capita smaller than the average figure for 323 councils (4.4 tCO₂e).

Using only the 'output' data, in separation from the Scorecards, produces yet a different list of 'leaders'. Many economically lagging areas had CO₂ emissions per capita, within the scope of influence of local authorities, below average in 2021 ($n = 65$, out of 110 in total). Furthermore, 59 of them have seen reductions in their CO₂ emissions faster than the average of 38 % between 2005 and 2021. Table 3 reports a sample of economically disadvantaged local authorities which have reduced their CO₂ emission by rather astonishing 45 % or more, while at the same time having CO₂ emissions per capita below average of 4.4t for 323 councils in our database. Three of them are also featured in our list of 'unlikely climate pioneers' presented above: Dundee City Council; Sunderland City Council; and Rochdale Borough Council. Even so, most of the councils in this list have exceptionally low levels of GDP per head compared to national average, suggesting rather extreme forms of economic underperformance and de-industrialisation. These *structural* factors, rather than the role of *agency*, are, consequently, most likely to explain the decarbonisation profile in the majority of cases.

Overall, this output-oriented approach, in isolation from the input-oriented approach, may not be appropriate to identifying proactive and innovative forms of climate governance. Combining these two approaches and further pursuing more in-depth and nuanced understanding of local action, pathways, contingencies, and struggles (what we call a 'hybrid approach') appear to be better suited to such an analytical exercise.

Some components for such an approach have been developed by Salvia et al. (2021) and Otto et al. (2021, 2025) in other contexts. Both studies focus on climate ambitions (e.g. CO₂ reduction targets) and visible climate actions (e.g. participation in climate networks), as well as the relationships between them. For European cities, Salvia et al. (2021) showed that 90 % of cities with climate neutrality goals are members of at least one climate network. In their studies on German cities, Otto et al. (2021, 2025) expanded the set of indicators to include variables such as the year of the first climate plan, the number of updated plans, and recognition through climate-related awards and competitions. Based on these indicators, they identified distinct city engagement types, ranging from leaders to laggards. Integrating (some of) these indicators could provide a valuable basis for identifying additional cross-connections—such as between achieved CO₂ reductions and engagement types enabling analysis of whether cities that are ambitious in their actions also deliver output-oriented results. Furthermore, it could help uncover other specific relationships, for example, between climate network membership and CO₂ reductions.

In the framework of our own investigation, to reveal factors

¹ <https://assets.publishing.service.gov.uk/media/64a67cc37a4c230013bba230/2005-21-local-authority-ghg-emissions-statistical-release-update-060723.pdf>.

Table 2

Economically disadvantaged councils that are top performers in climate action.

Council	Country	Scorecard domains in top 10 % ^[1]	Pop'n 2021	GDP 2021 (£M)	Per head GDP as % of nat'l	Per head GDHI as % of nat'l	LA GHG emissions ^[2]		CO2 within LA scope of influence ^[3]	
							Change 2005–21, %	Per head 2021	Change 2005–21, %	Per head 2021
Lancaster City	England	1, 3, 5, 6, 7	142,351	3501	73	82	–29	7.5	–37	4.0
Renfrewshire	Scotland	2, 4, 6, 7	179,940	5512	90	86	–44	5.0	–41	3.9
County Durham	England	1, 5, 7	521,447	11,265	64	79	–42	5.5	–37	4.2
North Kesteven District	England	3, 5, 7	118,502	3313	83	89	–26	8.2	–31	4.7
Blaenau Gwent County Borough	Wales	4, 6	66,989	1163	51	69	–38	5.4	–33	4.6
Bolton Borough	England	3, 6	296,169	7262	72	78	–37	4.2	–43	3.2
Bury Borough	England	3, 6	193,866	4138	63	90	–36	4.5	–43	3.3
Rochdale Borough	England	1, 3	224,127	4488	59	75	–39	4.4	–45	3.1
Sefton Borough	England	1, 5	279,693	5578	59	88	–32	4.6	–34	3.5
Falkirk	Scotland	1	160,700	4670	86	84	–43	14.3	–42	4.1
North East Lincolnshire	England	1	157,188	4368	82	81	–44	8.2	–46	6.0
Dundee City	Scotland	2	147,720	4174	83	78	–45	4.3	–46	3.9
Bridgend County Borough	Wales	3	145,738	3830	78	79	–36	5.9	–43	4.1
East Ayrshire	Scotland	3	122,020	2378	58	80	–33	7.0	–36	4.6
Oldham Borough	England	3	242,003	4743	58	72	–38	3.5	–40	3.0
Tameside Borough	England	3	231,220	4149	53	77	–41	3.7	–44	3.0
Wigan Borough	England	3	329,796	6594	59	79	–40	4.1	–40	3.2
Sunderland City	England	5	274,378	7492	81	76	–49	4.3	–45	4.0
Torbay	England	5	139,440	2651	56	89	–43	3.1	–43	2.9
Calderdale Borough	England	6	206,828	6258	89	85	–36	5.2	–43	3.8
Cardiff City and County of Swansea	Wales	6	188,172	4161	65	80	–32	9.4	–33	5.5
Dumfries and Galloway	Scotland	6	148,790	4073	81	88	–17	16.4	–29	6.9
Isle of Anglesey County	Wales	6	68,937	1352	58	83	–47	8.6	–36	5.2
North Ayrshire	Scotland	6	134,220	2845	63	80	–47	6.6	–44	5.4
Rhondda Cynon Taf County Borough	Wales	6	237,545	5048	63	77	–46	4.7	–38	4.1
Average for 323 councils			175,063	5314	88	96	–37	7.0	–38	4.4

Notes.

^[1] 1 = Buildings & Heating; 2 = Transport; 3 = Planning & Land Use; 4 = Governance & Finance; 5 = Collaboration & Engagement; 6 = Waste Reduction & Food; 7 = Total score.^[2] Local Authority territorial GHG emissions estimates, 2005–2021. Per head indicators are given in tCO₂e.^[3] Local Authority territorial CO₂ emissions estimates within the scope of influence of Local Authorities 2005–2021 - excludes large industrial sites, railways, motorways, land-use, livestock and soils. Per head indicators are given in tCO₂e.**Table 3**

Economically disadvantaged councils that are top performers in reducing territorial GHG emissions.

Name of council	Country	Pop'n, 2021	GDP 2021 (£M)	Per head GDP as % of nat'l	Per head GDHI as % of nat'l	Total LA GHG emissions		CO2 within LA scope of influence	
						Change 2005–21, %	Per head 2021	Change 2005–21, %	Per head 2021
Blackburn with Darwen Borough	England	154,954	3917	75	69	–47	4.2	–49	3.3
Gosport Borough	England	82,169	1410	51	88	–51	2.6	–48	2.4
Middlesbrough Borough	England	143,943	3573	73	75	–44	4.5	–48	3.9
Tamworth Borough	England	78,842	2263	85	80	–43	3.4	–47	3.0
Dundee City	Scotland	147,720	4174	83	78	–45	4.3	–46	3.9
Walsall Borough	England	284,392	5517	57	74	–41	3.8	–46	3.0
Rotherham Borough	England	266,173	5814	64	79	–45	5.7	–46	3.9
Harlow District	England	93,428	2499	79	86	–41	4.9	–46	3.4
Hastings Borough	England	90,974	1934	63	87	–50	2.8	–45	2.6
Sunderland City	England	274,378	7492	81	76	–49	4.3	–45	4.0
South Tyneside Borough	England	147,919	2359	47	78	–50	3.3	–45	3.1
Knowsley Borough	England	154,978	4589	87	80	–41	5.6	–45	4.3
Blackpool	England	140,976	3216	67	77	–44	3.5	–45	3.3
North Tyneside Borough	England	209,128	5396	76	86	–42	4.1	–45	3.8
Rochdale Borough	England	224,127	4488	59	75	–39	4.4	–45	3.1

contributing to respective performance, interviews were conducted with selected local authorities listed in Table 2. Whilst discussion of this analysis lies outside of the scope of this paper and will be covered in subsequent publications, the research has produced a number of important observations, including: the important role of strong and persistent leadership for climate action among local senior management (“climate culture”), as well as that of the ability of the local authority to generate external income (mostly through national government grants) for climate action. The latter is particularly important in view of the inter-level asymmetries between different levels of government, including limited control of local councils in the UK over infrastructural provision and limited regulatory powers, as well as overreliance on funding from the national government. Local authorities in the ‘unlikely climate pioneers’ pool generally adopt a pragmatic approach where economic viability of their climate policies is negotiated with local social and economic realities. Leading councils are ready to take risk and ‘go the extra mile’ to experiment and innovate for climate action, but limited capacities (and scaling potential) of the local authority also explain why input-oriented performance may not directly correspond with output-related performance, such as the reduction of CO₂ emissions. Another limiting factor, particularly in smaller and rural locations, is the lack of agglomerative advantages, which limits the rolling out of public infrastructure such as district heating systems or mobility shift.

8. Conclusions

This paper highlights the significant yet often overlooked potential of local governments in economically disadvantaged or so-called ‘left-behind’ areas to drive climate action and the energy transition. This challenges the prevailing narrative that climate leadership is the domain of wealthier areas and larger urban centres. Drawing on an application of our proposed framework to local authorities in the UK, we illustrate that structurally disadvantaged places can mobilise local regulatory capacities and innovate and lead climate action under constrained conditions. Our findings indicate that it may be more common for local authorities in disadvantaged areas to perform as national climate champions than is typically assumed. This resonates with earlier case study-based research showing that local actors in deindustrialising or economically declining areas often pursue new economic futures through green technology and renewable energy sectors (Eckersley, 2018; Jonas et al., 2017; Wurzel, Moulton, et al., 2019). In this sense, the notion of the ‘unlikely’ pioneer warrants critical reflection and needs to be potentially revisited.

Our research underscores that the potential for local climate action is not solely determined by structural advantages or disadvantages but is also profoundly shaped by the agency of local actors. This aligns with insights from evolutionary geography and geographical political economy, which emphasise the differential potential of places “contingent upon the specific conjunctures of structural forces, social agency and the particularities of places, to enable and/or inhibit intervention by public institutions and/or collective resistance” (Pike, 2005, p. 95).

Given the macro-perspective and the exploratory nature of our research, characterised by a relatively large number of cases, several questions remain unanswered and require further investigation through in-depth case study research. For example, a deeper understanding of the forms, strategies, and constraints of agency in structurally disadvantaged places remains a key task for future inquiry. In this sense, the framework proposed in this paper is intended as a foundation for further context-sensitive empirical work that can illuminate the diverse pathways through which disadvantaged localities engage in net-zero governance and climate leadership.

Further research should also explore the specific factors that enable ‘unlikely pioneers’ to succeed, particularly in the areas of political leadership and institutional capacity, addressing “place-based ways of innovation and path creation” (Bridge & Gailing, 2020, p. 1044).

Place-based leadership perspectives, which focus on local business coalitions and cross-sector alliances between state, business, and civil society actors (e.g. Broadhurst et al., 2021), may offer a promising foundation for understanding how resources can be mobilised for net-zero transformations. Through this lens, a better understanding can be developed of how to facilitate similar transformations in other structurally disadvantaged regions.

What is ultimately important is the recognition and upscaling of climate initiatives and innovations emerging from lagging regions, alongside greater support, and resourcing from higher levels of government to amplify their impact. Rather than emphasising their shortcomings, as much of the literature on ‘left-behind’ places tends to do, we argue that these areas should be actively supported and empowered. By support, we do not mean ‘mothering’ or educating them but rather equipping them with the tools and resources (including financial resources) necessary to develop their own locally grounded approaches, while ensuring these are more broadly recognised and learned from.

CRedit authorship contribution statement

Oleg Golubchikov: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Sina Shahab:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Wolfgang Haupt:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Conceptualization.

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