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Original research article

Proximities of energy justice: contesting community energy and austerity in England

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ABSTRACT

Spatial inequities are deeply embedded in low-carbon energy transition processes. As a result, new forms of contestation are emerging that reveal social inequalities at the heart of community-led responses to climate change. This paper uses four tenets of energy justice – distributional, procedural, restorative and recognition justice – to critically analyse and understand the politics and geography of local renewable energy deployment in Bristol, England. Focusing on the development of two solar PV farms in and around Lawrence Weston, an area of high deprivation in North West Bristol, the paper demonstrates the critical nature of instances of both energy justice *and* injustice in a time of austerity. Using primary data obtained via a Participatory Action Research (PAR) approach in Bristol during 2015–2017, the paper draws on participant observation data and in-depth interviews (n = 10) with a variety of local energy actors and community members active in Lawrence Weston. The primary data details the extent to which spatial configurations of new low-carbon energy infrastructures are integral to their justice implications. Indeed, it is the proximity of projects both close to and within the Lawrence Weston community that shapes the participant's thoughts and deliberations on how to achieve local energy justice, through appeal to the four tenets outlined.

The findings emphasise the *distributional justice* impacts of creating new low-carbon energy infrastructures in deprived communities in a time of austerity, whilst also noting that 'opening up' local energy transitions to greater input from local communities' offers opportunities to achieve *procedural justice*. Shifting relationships between local energy actors and Lawrence Weston highlight opportunities for the remediation of past claims of injustice, facilitating processes of *restorative justice*, whilst local energy schemes that seek to advance greater 'active participant' (skills training & employment) opportunities for deprived communities in which they, or their projects, are embedded, may be underpinned by *recognition justice* concerns. This 'active participant' approach is shown to be key to advancing beyond 'passive recipient' approaches to community energy transitions and enhancing spatial equity. Finally, the paper offers novel empirical insights into the contested role of geography, space and place in local transitions and contributes to bottom-up perspectives on issues of spatial (in) justice in community energy schemes.

1. Introduction

As policy responses to the challenge of anthropogenic climate change continue to intensify across the world, a new geography of low-carbon energy infrastructures is rapidly emerging [1–3]. While these new infrastructures operate at multiple sites and across many scales, reflecting a broad diversity of low-carbon technologies, local actors, such as community and civic energy organisations, are embedding new energy technologies within their communities in an era of growing energy decentralisation and distributed energy generation [4–6]. This process of energy decentralisation has been gaining traction across the UK for over a decade, with both community energy [7] and civic energy sector [8] actors increasingly engaging in energy markets still

dominated by market players that have formed an oligopoly over the UK energy market [9]. One UK energy minister famously stated that the government was keen to see a shift from the 'Big six to the Big 60,000' [10], noting a trend towards a diversification of energy market competition and the proliferation of a new set of local energy market actors [11,12]. However, energy decentralisation has grown in complexity and in scope, featuring a variety of cross-sectoral actors collaborating across multiple levels of governance [7,8]. Rather than being a core focus of UK energy policy, it is still somewhat marginalised and lacking a comprehensive regulatory framework and strategic direction. In addition, the UK policy framework for decentralised energy has begun to shift away from community energy towards 'local energy' more broadly, in which partnerships between public and private actors,

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alongside emphasis on the role of local authorities, play a key role in energy decentralisation initiatives and processes [13,14].

Such developments in decentralised energy markets and the rapid growth of renewable energy technologies have been spurred in part by legislative developments, such as the EU Renewables Directive 2009, the Energy Act 2008 and the UK Climate Change Act 2008, that have ensured an increase in renewable energy generation capacity through subsidy schemes supporting renewables and decarbonisation targets aiming at significantly lowering the UK's carbon footprint by 2050 [12]. The introduction of the UK's Feed-In tariff (FIT) scheme in 2010, in particular, has supported the growth of community renewables projects focused largely on solar [15] and wind energy [16], as it provides guaranteed 20-year payments for the generation of renewable electricity. In addition, the cost of renewable energy technologies, such as solar PV and wind turbines, has been significantly reduced in recent years, with commercial-scale renewable energy power generation set to be cost-competitive by 2020–2022 [17]. This is due, in part, to their rapid uptake within global energy markets over the past decade, the creation of new economies of scale and global systems of production supporting widespread market penetration and increased global investment [17,18].

While a new host of actors, institutions and market players are set to benefit from this transition, we are simultaneously living in an era of unprecedented social and economic inequality [19]. Thus, when seeking to explore the various ways in which climate change and social inequality intersect, it is vital to contrast the new wave of innovation, economic prosperity and era of growth brought about by the low-carbon transition, with the worsening of social inequality in contemporary society. Such a contrast is particularly pertinent to the UK.

At the same time as renewable energy generation reaches record highs [18], alongside low-carbon energy generation accounting for the majority of electricity production in the UK [20], austerity measures have reconfigured the social landscape of the UK. Austerity – seen here as a macroeconomic shift involving widespread fiscal cutbacks of state spending that has been definitive of both UK politics and local-level politics since 2010 – has been widely criticised for its divisive impact on society and negative impact on social equality generally [21,22]. Recent research shows that social inequality has worsened in the UK, as central government has pursued an austerity agenda that drastically cuts back vital public expenditure for services such as education, health and welfare provision. Over the last decade, this austerity agenda has been shown to be devastating for low-income families, communities and regions across the UK [23]. Thus, in a context where the UK has one of the highest levels of inequality amongst the developed OECD countries, policy research points towards evidence of huge wealth disparities in the UK; the richest 1% of the UK population are wealthier than the poorest 50% combined [24], 13 million people have been classed as living below the UK poverty line [25] and a 'cost of living crisis' has meant that the poor have become worse off in recent years, as 'income inequality has fallen back to levels last seen one or two decades ago' [26 p.12]

Hood and Waters [27] predict that income inequality is projected to rise between the period 2017–2021, while UK poverty rates are to remain roughly unchanged during the same period. However, the onset of a new economic crisis brought about by the COVID-19 pandemic is drastically reshaping future forecasts for increases in social inequality, whilst also exposing a multitude of existing inequalities in the UK through disproportionately affecting the worst-off [28].

Combining the critical nature of the above areas presents new terrain for researchers at the interface of low-carbon energy transitions and social science research, as critical questions around the *spatial distribution* of new energy infrastructures and their embedding within landscapes of social inequality and material deprivation [29] present new challenges to those seeking to mitigate against the worsening of social inequality as a result of energy transition processes. Existing research that examines the interplay between new local energy systems

and deprived communities¹ demonstrates the relatively exclusive aspect of localised energy schemes, with more affluent communities with the necessary time, resources and capacity typically most likely to engage in, benefit from and develop their own local low-carbon energy schemes [30–32].

However, there is also emerging research that looks at the *opportunities* and *benefits* for low-income and deprived communities that are arising from low-carbon transition processes [33], such as the material and wellbeing benefits arising from home energy efficiency schemes [34,35], advice provision to low-income areas on energy usage /bill reduction [36] and revenue generation from subsidy-backed renewables deployment [37] which feeds into the development of 'community benefit funds' to support local organisations and local economies [38,39,16]. In a highly unequal society/societies, the spatially uneven distribution of such low-carbon transition processes and the ability of disparate and divergent communities to benefit from such processes reflects a form of social inequality previously unseen and little explored. Thus, this paper offers novel insights into new forms of social and spatial inequality – and opportunities to rectify and address those inequalities – that arise from local low-carbon energy transitions.

2. Theory & analysis

In exploring this little researched terrain, the aim of this paper is to draw upon energy justice theory to investigate the broad social impacts of low-carbon transitions in Bristol city, in a time in which increased public funding cuts and fiscal austerity measures are adversely affecting social inequality. In seeking to contribute this original insight, the paper draws on a distinctly spatial approach to understanding the interplay between an increase in local energy generation via energy decentralisation and social inequalities. Thus, it is important to briefly address what previous and current literatures have had to offer when critically analysing local energy schemes.

Catney et al [30], in a powerful study of two different communities' engagement in energy schemes in the west midlands in England, critically explored the social impact of community-led energy schemes. Seeing that highly unequal capacities for differing communities to engage in local energy schemes would be critical for their initiation, the authors suggest undertaking what they call a 'reality check' when exploring the potential for a deprived locality or community to engage in low-carbon energy generation projects [30]. In this, they put forward three different points of analysis; taking stock of a community's *social capital*; assessing *community capacity* and understanding their *cultural capacity*, as they note that '*for people living in poverty in deprived areas, personal responsibility for carbon emissions may be the furthest thing from their minds*' [30 p.11]. Additional analysis of Catney et al.'s [30] case studies drawn from the West Midlands, in which they compare two relatively affluent wards to two highly deprived wards, sheds light on the critical importance of geographical differences and disparities underpinning socio-economic inequalities. Indeed, Bridge et al [1] see energy transitions themselves as a *fundamentally* geographical process, arguing that the energy transition 'pathways' governments choose will shape the future geography of transitions. In their analysis of space and place in low-carbon transitions, they see the uneven and unequal landscape for the deployment of a diverse array of low-carbon technologies as embedded in 'spatial difference', emphasising that;

There are significant opportunities [...] for understanding the relationship between different trajectories of energy transition and the geographical conditions from which they emerge

¹ The definition of 'deprived communities' is informed by the 'English Indices of Deprivation 2019 technical report' [64], which looks at deprivation across seven core areas; income, employment, education, health, crime, access to housing and services, and living environment. These 'multiple indices' are a widely used framework for understanding deprivation in England and the UK.

[1 p. 339]

This spatial difference is not only intimately connected to a physical geography of resources, but also to the capacity of different regions, local authorities and communities to engage in energy transition processes. Interestingly, more recent studies have taken this explicitly geographical focus and have integrated *spatial justice* [40] approaches into energy justice. Scholars have found that local and 'area-based' policy solutions have the potential to remedy geographically uneven patterns of energy injustice [29 p. 646], whilst this geographical variation has been shown to be present in the spatially uneven deployment of renewable energy technology [41] and in distributing the benefits of decarbonisation unevenly between households and localities [42]. Bringing these literatures together, Bouzarovski & Simcock's [29] call for scholars to acknowledge 'landscapes of material deprivation' when considering processes of energy injustice within energy systems, demonstrates strong connections to Catney et al's [30] analysis of the inability of deprived areas to engage in potentially beneficial forms of local energy activity. This highlights the socio-economic implications of Bridge et al.'s [1] 'spatial difference' and connects to De Laurentis & Pearson's [41] examination of spatial unevenness and unequal local capacities in low-carbon energy transitions more specifically. Additionally, While and Eadson's [42] analysis of socio-spatial disadvantages arising from decarbonisation processes evidences the disproportionate effect of rising energy prices and job losses on low-income areas, whilst also shedding light on the relative exclusion of low-income households from benefitting from the FIT scheme [42 p. 1635].

Building on these relations between space and energy injustice, Golubchikov and O'Sullivan [43] and O'Sullivan et al [44] have introduced the concept of 'energy peripheries' that are integral to geographically uneven energy transition processes. Connecting to notions of energy vulnerability and drawing on an analysis of unequal low-carbon transitions in Wales, both papers emphasise the extent to which transition processes *reproduce* distinctly spatial injustices and *reinforce* pre-existing spatial hierarchies. In addition, Yenneti et al. [45] demonstrate how the implementation of a large solar park in India leads to spatial injustices for vulnerable communities dependent on the land where the solar park is installed, highlighting a process of unjust land acquisition for renewable energy deployment as part of the low-carbon energy transition.

It is apparent from these literatures, therefore, that space and place are integral features of unjust low-carbon energy transitions. Thus, there are clearly strong overlaps and powerful interconnections at play when we see that the *geographies of both social inequalities and the physical siting of new energy generation infrastructures are deeply interlinked*. This also connects to previous insights derived from an explicitly geographical focus on environmental justice research, whereby 'first generation' understandings of environmental injustices relate to the close proximities of disadvantaged communities to the geographical site of environmental injustice [46]. This overlap and interplay will only become more important for enhancing our understanding of energy policy responses to climate change as energy decentralisation continues to increase as a technological response to the mitigation of climate change, as well as featuring as an important component of the global energy transition.

In order to make theoretical sense of this complex interaction between differing levels of community capacity and its relationship to spatial difference, an energy justice framework is drawn upon to help illuminate the core social aspects of the case study featured in the following sections. Moreover, the first generation understanding of 'proximities' outlined above [46] is drawn upon here and extended to the energy justice field, whilst also enriching energy justice perspectives on low-carbon transitions [47]. Thus, four principles of energy justice are used here to assist with this analysis; (1) *procedural justice* – relating to the participation of people in energy-related decision-

making processes; (2) *distributional justice* – which concerns the sharing and distribution of energy system benefits and burdens; (3) *recognition justice* – which seeks to ensure the acknowledgement of marginalised and/or disadvantaged groups in relation to energy systems, and (4) *restorative justice* – a process of remediation in response to a perceived energy injustice [48,49]. In the analysis of the findings, these four tenets of energy justice act as thematic guides, providing a useful framework through which to sort, categorise and analyse the qualitative data collected. In addition, notions of 'space' and 'place' – and indeed ideas of 'spatial justice' – permeate throughout the research findings.

Next, this paper draws on the research methods used to engage with this vital theoretical overlap, using a Bristol case study as a reference point.

3. Research methods

While this paper draws upon an energy justice framework to shed light on the interconnections between the geographies of both social inequalities and the physical siting of new energy generation infrastructures, the empirical data used to support this insight is derived from two of the traditional techniques of PAR – in-depth interviews (n = 10) and participant observation. This data was collected over an 18-month period from mid-2015 to early 2017, forming part of the data collection process of a PhD thesis [39]. Participant observation was used firstly as a means to gain familiarity with civic energy communities and networks in Bristol and secondly, to record key discussions and occurrences at events in and around Bristol. After attending many local events and connecting with various civic and community energy actors in Bristol throughout 2015 and 2016, appropriate participants were approached to gain a familiarity with all actors involved in the Lawrence Weston area of Bristol after realising two energy projects were present within the area. In addition, it is vital to note that Lawrence Weston is one of the most deprived parts of Bristol and in the most deprived 10% of areas in England [50],² acting as a critical backdrop for advancing understandings of the empirical links between local low-carbon transition initiatives and deprived communities.

The case study mostly revolves around primary data collected during in-depth interviews with five key organisations present within Bristol's civic energy network, focusing exclusively on their involvement with the Lawrence Weston community. These are; Ambition Lawrence Weston³ – ALW (n = 3), Low-Carbon Gordano – LCG (n = 2), Bristol Energy Co-operative -BEC (n = 2), Bristol City Council – BCC (n = 1) and Bristol Energy Network – BEN (n = 2). In addition, two solar PV projects associated with this case study, namely; LCG's – Moorhouse Solar Array (MSA) and BEC's Lawrence Weston Community Solar Farm (LWCS) are critical to the contestations at the heart of this case study. A total of 10 interviews are featured in this case study, with one research participant featuring in two organisations. Presented below, in Table 1, is the identifier system for these organisations and actors, with unique identifiers assigned to each organisation and the associated participants interviewed, with anonymity ensured for all *individuals* involved.

The data thus draws on research *with* and *on* civic energy actors in Lawrence Weston, however, the level of participation in the organisations themselves varied throughout the period of data collection. After integration into Bristol's energy communities, subsequent attendance at

² For consistency in the definition of deprived communities, it is important to note that [64], state that the '*Indices of Deprivation 2019 have been produced using the same approach, structure and methodology used to create the previous Indices of Deprivation 2015*' [64], p. 7.

³ Ambition Lawrence Weston are a local regeneration charity set up in 2012 that seek to improve the lives of residents in the local area after a decline in local services. More information can be found here: <https://www.ambitionlw.org/>.

Table 1

Identifier system for research participants and organisations. *one research participant occupied two roles simultaneously

Position/occupation	Case study organisation	Organisational type	Identifier
Development Manager & Resident Member & Resident Energy project officer*	Ambition Lawrence Weston (ALW)	Local regeneration charity	ALW1-3
Chair & Director Director	Low-Carbon Gordano (LCG) Energy Project: (<i>Moorhouse Solar Array</i>)	Community energy organisation	LCG1-2 MSA
Community Energy Manager Investment Programme Manager (Energy)	Bristol City Council (BCC)	Local authority	BCC1-2
Director Secretary	Bristol Energy Co-operative (BEC) Energy project: (<i>Lawrence Weston Community Solar</i>)	Community energy organisation	BEC1-2 LWCS
Co-Director Community Outreach Officer Project Development Officer*	Bristol Energy Network (BEN)	Local energy network	BEN1-2

the ALW Planning Group meetings established deeper connections with Lawrence Weston residents, through forging links with key members of ALW. Despite this ‘functional’ level of participation in ALW’s activities [51], the in-depth semi-structured interviews, which lasted between 50 and 90 minutes, were conducted in a more classically ‘extractive’ fashion, where researchers seek to obtain knowledge and insight from key actors through a set of flexible pre-determined questions. However, room was given for research participant involvement in contributing understandings of local energy justice. While the participant observation technique was used to build connections to local energy communities, the in-depth interviews facilitated a much deeper conversation with research participants to explore the complexity of individual experiences and relationships between different organisations, alongside how these experiences and relationships relate to contesting local energy transitions and issues of local geography. In the in-depth interviews, participants expressed a shared interest in energy justice and saw the applicability of the theory in practice, offering their own interpretation of energy justice and describing how tenets such as distributional and procedural justice apply to their own experiences, activities and respective organisations. This collaborative approach to research contributes to local and bottom-up perspectives on energy justice and issues of spatial (in)justice in relation to community energy, one of the core contributions of the paper.

In addition, the analysis offered in this paper was presented to members of ALW (ALW1-3) and Low-carbon Gordano (LCG1) for feedback in April-June 2020 in the interests of transparency and accuracy, as well as to receive updates on the progress of ALW and LCG. After this follow-up communication had taken place via email, the participants confirmed the accuracy of the paper and this continued communication also contributes to the participatory and open spirit of a PAR approach in academic research. Given the ‘local’ scale of the paper’s fieldwork, the use of PAR is intended to forward the energy justice and low-carbon transitions research agenda [52] within Bristol. Theoretically, the paper also harnesses energy justice’s analytical power to provide insights into the role of geography and its critical interconnections to social inequalities in local energy transitions. Lastly, it is also important to acknowledge here the limitations of the data, as ALW1 and ALW2 are both lifelong residents of Lawrence Weston and active members of ALW. In the presentation of the data below, both

ALW1 and ALW2 are referred to as residents of Lawrence Weston and members of ALW simultaneously, as they both occupy dual roles. Finally, ALW3 worked for both BEN and ALW in two separate roles, representing both organisations in the data presented.

3.1. Background

The origins of the case study stem from a heated debate between a resident of Lawrence Weston and a Director of LCG. This was observed during the participant observation phase at an event in early 2016 held by BEN in central Bristol. During this event, one important recorded note summarised the nature of this dispute:

Low-carbon Gordano – Community fund doesn’t include Lawrence Weston – community benefit fund is well intentioned but hasn’t recognised Lawrence Weston, but the solar farm is very close to the community – resident of Lawrence Weston particularly vocal about this

This recorded dispute formed the foundation of this case study, proving critical to many of the topics discussed in the follow-up in-depth interviews with actors from the five organisations outlined above. Further activities that arose on the basis of this dispute also demonstrate tremendous resonance with different aspects of the three core tenets of energy justice, alongside the more recently proposed tenet of ‘restorative justice’ [49], expanded upon further in Section 4.1.4.

During the data collection period (2015–2017), the city council approved and supported the installation of two different solar arrays on council-owned land in and around Lawrence Weston – the ‘Moorhouse solar array’ (MSA) and the ‘Lawrence Weston Community Solar Farm’ (LWCS). The MSA, organised by LCG, consists of 7200 solar panels that produce enough annual electricity for around 500 homes. With a £500 minimum share offer, just over £2 million pounds were raised through a community share offer developed by LCG in 2014, and the project has been fully operational since April 2015. The project received technical support from local renewables company Solarsense (<http://www.solarsense-uk.com/>), based on the outskirts of Bristol, and was praised by the then-incumbent Mayor George Ferguson, who also attended the launch of the new solar installation, pictured in Fig. 1 below:



Fig. 1. MSA launch with the Bristol Mayor George Ferguson. 2015.

Whilst the MSA was widely supported as a key part of Bristol's low-carbon future, the project exhibited very little initial involvement with Lawrence Weston, despite its close proximity to the community, as detailed in Fig. 2 below:



Fig. 2. Location of MSA next to Lawrence Weston.

In contrast, the LWCS farm, organised by BEC, is based on Lawrence Weston road and resides more decidedly 'within' the community's territory. The LWCS farm consists of 4.2 MW of annual solar generation capacity that is enough to power 1000 homes – close to double the capacity of the MSA. The project has been fully operational since June 2016 and alongside a solar farm in Puriton, is part of two of BEC's key solar projects that raised over £9 million in total through public share offers, with the opportunity to purchase a £50 minimum share as part of this fundraising scheme. The LWCS farm received support from ALW, as seen in Fig. 3 below:

The LWCS farm was developed, in part, in reaction to claims of

injustice by ALW. As will be shown, BEC partially reacted to the claims made by ALW against LCG and against the city council's granting of planning permission to LCG in such a short timeframe, given their desire to be eligible for the FIT rates at the time to ensure their business model worked and the rate of return to investors guaranteed. Indeed, BEC sought to create a more just solution to local energy deployment, and enhance engagement through an 'active participant' model, while – as will be explained further towards the end of the research findings –

LCG have commendably attempted to involve themselves more closely with ALW in response to these claims of energy injustice against LCG's development of the MSA.

Underneath these shifting relationships and processes of remediation lie contestations over *spatial injustice* in the form of low-carbon siting dynamics [3]. These siting dynamics fundamentally underpin the claims of injustice made against LCG by ALW. As this paper will demonstrate, these justice claims are intimately tied to claims surrounding the proximity of projects and their closeness to the community of Lawrence Weston; a community that has felt as though it is on the geographical, economic and social margins of the city. Moreover, Lawrence Weston is shown to be significantly affected by austerity through the powerful statements of the Development Manager at ALW in section 4. As evidenced in the 'Lawrence Weston Community Plan' (2018–2023) [53], it is clear that the impact of austerity on the local area is a key consideration going forward:

In the next five years we will face changes and challenges in Lawrence Weston. The government's ongoing austerity programme will undoubtedly result in more cuts to local authority spending. This means that Bristol City Council will provide fewer services and support for residents. It will also mean less funding and grants for organisations in the voluntary and community sector

[53 p. 6]

Thus, the politics of austerity in the local area feature as a core concern for ALW. Drawing on secondary sources to generate further insight into the development of current and future relations between ALW and LCG, the paper will demonstrate that it is the overtly *geographical* aspect of spatial proximities that informs the energy justice disputes at the heart of these transition processes. In addition, wider concerns about the economic impact of austerity on the local area, as demonstrated above, force into focus the emergence of new low-carbon activity in deprived parts of Bristol, alongside the prospects of economic



Fig. 3. LWCS farm featured in ALW promotional media.

opportunity that this brings to new spaces and places in a time of austerity and economic crises.

4. Research findings & results

4.1. Applying four tenets of energy justice

The following subsections address issues of both energy injustice and justice, detailing the extent to which participants from ALW felt that processes of non-recognition, alongside a lack of inclusion within consultation measures around the installation of the MSA, led to claims of both recognition and procedural injustice. After using recognition and procedural justice tenets to explore these tensions, the following subsections explore instances of energy justice through the lens of distributive and restorative justice, drawing on the impacts of the LWCS farm on Lawrence Weston in a time of austerity, as well as changing relations between ALW and LCG. The following insights reveal the extent to which energy justice is capable of helping scholars to critically understand the complex nature of the politics of emerging local low-carbon transitions in areas of high deprivation.

4.1.1. Recognition (in)justice: focusing in on Lawrence Weston and contested geographies

As mentioned in the sections above, Lawrence Weston has long been recognised as an area of high deprivation and furthermore, is representative of some of the stark social, economic and geographical inequalities in Bristol. As a result, the Lawrence Weston community has felt a sense of recognition injustice for some time, with persisting issues including crime, poverty, low quality housing, poor transport links into the city and high levels of unemployment.⁴ This sense of injustice connects quite intimately to issues of *environmental* injustice throughout Lawrence Weston's history. As Fig. 2 showed, Lawrence Weston is located close to Avonmouth, an area that was historically a host to various industries in the mid to late 20th century, producing vast amounts of pollution that impacted upon surrounding areas. One local resident recalls how this industry and associated pollutants were once the norm amongst the local community:

It's all dirty industry then so you had smelt works, you got Britannia Zinc,

chemical plants and it was just accepted. Back in the day that was it, you had these big funnels and they're bellowing out dirt, dust and other pollutants [...] there wasn't a lot of concern given at that time because that was how people were working and getting a living. Historically, air pollution and environmental injustice has been quite bad, really (ALW1)

As these industries began to go into decline or move operations elsewhere, one resident noted a significant improvement in the air quality of the local area:

In the time I've been here I think the pollution has been improved basically with the closing down of the smelting works where I had one of my first jobs when I was about 17 years old. Most important of all was the closure of the waste incinerator, the city waste incinerator. That improved things (ALW2)

While the presence of local industry clearly brought economic benefits to the residents and families of local areas, this history of environmental injustice connects strongly to an ongoing scepticism within the community that is rooted in the lived experience of local residents and history of perceived environmental injustices. One participant noted that other parts of Bristol haven't inherited this sense of continuing injustice against the community, whilst also possessing a greater capacity to object to imposing and potentially damaging infrastructures:

There is a level of upset as soon as there is a mention of a power from waste burning plant. Or any other waste. There's a level of sensitivity. There is also a sense of disempowerment, whereas in other parts of Bristol [...] immediately – there's an electric response amongst the community 'we're going to oppose this!' Here there's a much more ready – a belief that nothing can be done – that 'they're doing it again! (ALW2)

Fundamental to the recognition justice tenet is the acknowledgement of marginalised and deprived communities in energy systems and transitions, which also applies to the distribution of both environmental ills and environmental 'goods' [46,54]. While renewable energy infrastructures, such as wind and solar installations, are often described as environmental 'goods' due to their contribution to CO2 emissions reductions, their imposition on local communities and landscapes, without some form of consultation and approval, potentially generates new forms of injustice [55].

Interestingly, ALW's Energy Project Officer, who as stated above, is also a member of BEN, was conscious of this history of non-recognition in Lawrence Weston, stating that: *'not only have they not benefited, they've also been recipients of poor air quality, noise, and numerous amounts of health impacts without that being recognised and well supported'* (ALW3).

⁴ See 'challenges' on pages 11–12 of the 'Lawrence Weston Community Neighbourhood Development Plan 2015 – 2030' [65]: <https://www.ambitionlw.org/wp-content/uploads/2018/11/Lawrence-Weston-NDP-Made-Plan.pdf>.

ALW's Energy Project Officer therefore sought to use community renewables as a means to counter this history of the community existing at the margins of Bristol, alongside bringing new economic opportunities to the local area. The residents/members of ALW therefore felt that both LCG and BCC had ignored the community when seeking to deploy the MSA, which threatened to repeat some of the mistakes of the past, in which the interests and voices of the local community are consistently ignored:

A planning application was brought forward and was well advanced for putting the solar farm in. Without any consultation with us – a neighbouring community – let alone as a neighbourhood planning forum [...] it was a significant development, it was right up against the boundary of the planning area and I felt they had simply ignored the community – the planning authority had completely ignored the community (ALW2)

In addition, another participant felt that other new low-carbon energy infrastructures, including the MSA, were deployed close to Lawrence Weston without recognition of the local community:

The solar farm at Moorhouse, the wind turbines, local authority solar farm and wind turbines, we didn't get to hear about any of that. Only when we realised that there is a benefit for us getting involved, then we remonstrated and got highly involved, really (ALW1)

While these residents of Lawrence Weston / members of ALW felt that local low-carbon energy transitions were failing to recognise a community within close proximity to new infrastructures, alongside seeing the potential benefit for greater involvement in transitions, a director of LCG felt that ALW's claims of injustice were unjustified:

They want as much support and a leg up for what they can get really. I feel to single out community energy for special consideration is slightly unfair [...] Avonmouth is stacked full of all sorts of businesses making money – they could all be asked for a contribution to Lawrence Weston's development fund. Why are we different? (LCG1)

In contrast, a director within BEC acknowledged that there was an issue of non-recognition in relation to new energy infrastructures around Lawrence Weston, and saw this as an opportunity to foster deeper engagement, financial support and new relations with the community via the LWCS farm:

We have a 10-year plan to rejuvenate the community. They're surrounded by energy – they're right in the shadow of the wind turbines – there's a whole load of energy plants down there in Avonmouth – on the whole they haven't benefitted from any of it really. They are just sitting right in the shadow of it [...] we're working very hard to ensure that surplus profits are going directly to them' (BEC1)

While these different approaches of LCG and BEC are clearly strongly opposed to one another, similar to the claims of injustice made by ALW, the difference in these approaches can be linked to contrasting conceptions of the geographical boundaries and indeed, contested geographies, of energy infrastructure siting. For example, when questioned on some of the claims made by ALW around the siting of the MSA, a director from LCG responded by stating that:

It's not in Lawrence Weston. It's in Avonmouth. Lawrence Weston is the other side of the motorway. In my geographic view of it, it was separated by quite a big barrier' (LCG1)

However, this geographical separation, while recognised by ALW, was not sufficient enough to justify the non-recognition and exclusion of Lawrence Weston:

'There wasn't any recognition [...] The solar farm at the moment and the wind turbines aren't really in our geographical area, or our border area, but it's so close to our border, I think we are affected by it' (ALW1)

'They should've been here and the community feel that they should've been included much more formally [...] the fact that it is just there. I think there is a general principle there as well' (ALW2)

Interestingly, LCG themselves admitted that they could've done

more initially, and that a sense of recognition injustice pervaded ALW's claims of injustice:

I think we could've worked harder on it [...] the lack of 'recognition' of Lawrence Weston as a community, by us, was pretty key in their sense of grievance about the situation (LCG2)

This data demonstrates the extent to which recognition justice is such a vital tenet within the energy justice framework, providing grounds upon which both the directors of community energy schemes (LCG & BEC) and members of ALW are able to voice their concerns around energy injustices in low-carbon transition processes. Key to this sense of recognition injustice and non-recognition was the city councils and LCG's failure to consult the community and include them in any decision-making procedures surrounding the implementation of the MSA. This is explored further in the next subsection addressing procedural injustices in the development of the MSA.

4.1.2. Procedural (in)justice: hostile localities, non-recognition and exclusion from consultation

Recognition justice can provide the foundation upon which both distributional and procedural justice can be realised. Thus, it would logically follow that in the case of non-recognition, instances of procedural and distributional injustice can arise. In the case of procedural injustice in relation to the MSA, the speed and short timeframes through which LCG had to act, in order to counter impending FIT scheme reductions, are instrumental to their failure to include ALW in their initial stages of decision-making and consultation. LCG also had to rely on voluntary directors for outreach work, which significantly reduced their capacity to connect with communities within close proximity to the MSA. Furthermore, LCG sought suitable sites for solar PV outside of North Somerset (South West England) due to the organisations location in a hostile local authority area that proved highly sceptical and unsupportive towards new low-carbon energy projects, as made clear by both directors in the interviews:

'I don't think they believe in communities here in North Somerset. The council here are dreadful. They've got in our way more than they've helped us [...] we've really struggled to get any traction. We've had no support from them' (LCG1)

They hate the idea of community energy, they've been as obstructive as possible on every conceivable front [...] I think they are antagonistic towards renewable energy and we've made no mileage with them at all. That has been one of the difficulties – it's why we ended up building the scheme in Moorhouse rather than in North Somerset (LCG2)

In addition, a director within BEC was sympathetic to the hostility LCG faced from their local council when speaking about the development of the MSA in Bristol:

Their remit is really to work in North Somerset. North Somerset is very conservative. They don't have a very positive attitude towards renewable energy. So the schemes that they are looking to do, in their direct patch, they were getting nowhere with [...] The problem was, was the speed at which everyone had to work [...] they had to just rush out as quickly as possible – so that happened and it went through in 2–3 months (BEC1)

Furthermore, this issue around timing and non-recognition was further reiterated by the Energy Project Officer at ALW:

Low Carbon Gordano had [...] an excellent team and they genuinely do believe in the social justice movement, but they just failed, catastrophically, to engage Lawrence Weston. They said they were in a rush to get it done, which is true (ALW3)

Thus, this hostility from North Somerset council⁵, coupled with the

⁵ Interestingly, in the follow-up communication with LCG, they noted that in 2019 North Somerset Council lost their long-held conservative majority. The

need to act quickly, underpinned LCG's drive to secure a project site. In the eyes of a Lawrence Weston resident, this meant that *'the response seemed to be, "well ok, we can look elsewhere, well over there is a much poorer community and not so used to objecting" (ALW2)*. Compounded by this tight timeframe due to FIT reductions and lacking in capacity for outreach work, LCG's failure to consult ALW before the MSA was installed was only worsened by consultation with other communities outside of BCC's territory, as one resident of Lawrence Weston notes:

They had conducted consultation with the South Gloucestershire community on the other side, but not with the BCC community [...] it was developed by a 'community' energy organisation – from a wealthy part of North Somerset [...] We said look, you need to talk to us – we are the 'community' and we are the local planning authority [...] I think – and I still think – that they felt they could ignore us really (ALW2)

Interestingly, the directors of LCG admit to their ignorance of ALW in consultation measures:

*We didn't contact them before we got going. Not that we didn't want to – we didn't know about them. We were ignorant of their existence. I did ask questions during the share offer about local groups in the area [...] They, for whatever reason, felt that they were left out of the process of consultation – over where it should be, what it should be or how big it should be or anything else. Partly because of my ignorance (LCG1)
I think they're being unfair here as we did try to engage with Lawrence Weston but we didn't know about ALW at this stage – and we just didn't get anyone coming forward when we built Moorhouse – I'm not exempting us from criticism over that (LCG2)*

Despite these admissions, a member of ALW / resident of Lawrence Weston was adamant that the local community were ignored and that Lawrence Weston were excluded from consultation measures:

They hadn't made a serious attempt otherwise they would've got through [...] I think they didn't try because they thought they didn't need to make any accommodation. If there would be any risk of the project being refused or running into problems, then they wouldn't have spoken to us (ALW2)

This subsection shows that ALW's sense of procedural and recognition injustice was amplified by the lack of consultation with the local community and ultimately the non-recognition of Lawrence Weston by LCG when they installed the MSA. This sense of non-recognition also extended to the city council as well as LCG, who approved planning permission for the installation of the MSA in such a short timeframe. While the restorative justice subsection details the efforts made by LCG to enhance community relations with ALW, the above two subsections have detailed some of the energy injustices associated with new, emerging low-carbon energy infrastructures in Bristol.

The next subsection concerning distributional justice turns to a focus on BEC's LWCS farm, seen here as a partial reaction on behalf of both the council and BEC to some of the claims of both recognition and procedural injustice made in the above subsections. It also details the distributional impacts of the LWCS farm on ALW, exploring what this means in a time of austerity.

4.1.3. Distributional justice: localisation, low-carbon infrastructures and austerity

Following the tensions between ALW and LCG outlined above, it would appear that these occurrences had both a direct and indirect impact on future low-carbon energy initiatives in Lawrence Weston. Indeed, much of the interview data suggests that BEC and BCC acted, to

(footnote continued)

current council are now comprised of cross-party councilors that are much more supportive of renewable energy and LCG, with a director of LCG also elected to the council.

some degree, to rectify these injustices. For example, when questioned on the relationship between BEC and the city council with regards to the development of new projects, an Investment Manager at the city council was keen to emphasise his support for the LWCS farm:

Something that I personally drove forward, was consenting for Bristol Energy Co-op to get access to a parcel of council owned land out between the motorways. That is a 4 megawatt solar farm site [...] Lawrence Weston road, right [...] that one we're really, really focusing on [...] that would be a very large chunk of community owned asset there, which would be very exciting for the city (BCC2)

Furthermore, while BEC had secured a partnership with ALW during the planning of the LWCS farm, they also sought to emphasise the bottom-up nature of ALW's involvement:

I'm very impressed with one of our partners – ALW [...] they've got a very well established committee, they've got a 10-year plan and I've been along to some of their meetings and it's very impressive [...]

It is really the ordinary people, local people that are driving that. There's no doubt. If you go to a meeting you'd be in no doubt that that is the case (BEC2)

While claims of injustice against LCG around the MSA influenced the council and ALW, it would be inaccurate to ignore the wider impacts of austerity on Lawrence Weston. Furthermore, it would be wrong to assume that both the city council's drive to secure a local energy project in Lawrence Weston and ALW's drive to assist the regeneration of the local area through involvement with the LWCS farm were *only* driven by this. Rather, as attested to by ALW's Energy Project Officer, the origins of ALW itself lie in broader inequalities and injustices in the city:

People there tend not to object to things, tend to be the low income, the low educated groups and so they've been disproportionately disadvantaged. That's why Ambition Lawrence Weston is being formed – because of that disparity (ALW3)

This subsection on distributional justice therefore moves beyond criticism of the MSA and directly addresses the impact of austerity on the local community, while detailing the contribution of BEC to ALW and considering the ways in which an 'active participation' approach to local energy schemes can extend distributional gains to localities.

During the in-depth interviews, austerity was shown to be a significant concern for key members of ALW, who, when questioned on the material and financial implications of austerity in the local area, noted the severe impacts of austerity measures since the introduction of fiscal cutbacks in 2010:

What we have seen locally since the austerity measures is increase in crime, increase in black market employment, an increase in zero-hour contracts and really poor employment conditions [...] because people are being forced to work [...] and the benefits can't keep up [...] there's lots of financial implications which affect social justice [...] because of the added pressure and stress that's put on people (ALW2)

I think the biggest impact it can have on us is service provision and lack of it, community cohesion, more vulnerable people being created [...] especially in the housing market [...] I think it will all impact on that. Crime, antisocial behaviour, drug use, more alcohol dependency simply because they are coping mechanisms to cope with all these cuts (ALW1)

Thus, ALW sought to prioritise new forms of economic activity that would benefit the local area to counter some of these harmful occurrences within the local community as a result of austerity. This localisation of new economic activity was therefore a key driver for ALW that closely aligned with

BEC's desire to localise the economic benefits of low-carbon energy infrastructures. In addition, the city council were also supportive of this localisation agenda in Lawrence Weston:

I think what is important is that any benefits that flow from the project become locally sited. I think that one of the benefits of the way that the finance on Lawrence Weston road is structured, is that there are lenders involved who are obligating the project to pay out to Ambition Lawrence Weston because of their proximity to the project (BCC2)

Therefore, the location of the LWCS farm more decidedly 'within' the community led to concrete distributional benefits for ALW, through direct payments to the organisation from BEC's surplus revenues as detailed by ALW1:

We'll be getting £155,000. Payment schedule is £43,000 up front for the first year [...] then £23,000 for the next four years. In addition to that – so, that's the upfront payment – a minimum of £8000 a year from the yield from the solar farm (ALW1)

This demonstrates the extent to which community energy projects can move beyond offering benefits to investors, to supporting local organisations that are contributing to the regeneration of their local economy, as reiterated by a director within BEC:

People don't have to be invested in it to get some of that benefit – it will be going to ALW who are doing projects for the whole community. That's the way we get our benefit out there (BEC1)

In addition, the creation of the LWCS farm and associated community benefits during a time of austerity proved highly valuable for ALW as an organisation going forward:

The beauty of this [...] is that it's totally unrestricted. So, we can use it for whatever is needed to deliver our community development plan. Which to me is a godsend [...] in these austere times, it's an absolute luxury to have available to us £155,000 plus £8000 a year that could be spent on core funding should we need to, but ultimately to have that money unrestricted to spend it on the needs of the local area is absolutely brilliant (ALW1)

This data reveals the extent to which community energy models can support local organisations and local economies, particularly in regeneration and development efforts. The findings above show that this is key to the distributional justice impacts of local energy infrastructures in deprived areas. However, while this level of community engagement and involvement certainly provides a stark contrast to LCG's non-recognition of Lawrence Weston, particularly in a time of austerity, it is not without its criticisms.

After some form of distributional justice had certainly been achieved through ensuring that ALW were supported financially as an organisation, rather than the economic benefits remaining the preserve of affluent investors, questions arose around *what exactly* this money was then going to support and how. Discussion around moving beyond a charitable 'passive recipient' approach to one which ensured the 'active participation' of local community residents and ALW's members therefore followed, alongside general questions around the apportioning of surplus revenue. While BEC's support for ALW signalled a milestone for community energy directly supporting the regeneration of a deprived urban community, further examination of these links brings forth a certain politics around the allocation of surplus revenues. A participant from the city council noted that *who* decides on this allocation is crucial:

Where does that last tranche of funding go, once everything else has been paid? I can't comment on that because that is the job of that board of directors, and the shareholders. If they are all middle-class shareholders – well, you know, they would come up with a different answer than if they are all living in Lawrence Weston, which as we know, is quite a deprived area generally (BCC1)

Indeed, this assumption was proved correct, as from the perspective of ALW2, the agreement reached between ALW and BEC around surplus allocation was unsatisfactory:

50% of the surplus that is generated will come to Lawrence Weston and 50% will go to the BEC Community Energy Fund, there was never really any negotiation with the community about that [...] because of its proximity and its impact on the community [...] it should've been more heavily biased in the local communities' favour [...] the community needs to feel that it is front and centre for the benefit that's coming out of that. I would've argued, if there had been a negotiation, that it should've been 75/25 (ALW2)

Furthermore, key to this idea of proximity requiring a greater level of community engagement and involvement, ALW2 also sought to emphasise the need for deeper relations with the local community, moving beyond grants and awards to more active participation in the training, upskilling and empowerment of the local community:

'We're setting up a fund for you and you can apply for the fund' – that's not what we want! We want involvement so there is knowledge coming back into the community [...] so [...] the project is having to educate and starts to build experience into the community about how it works, people understand what is going on and they get access to training and technical employment [...] we want it to work so people can see that there is a mechanism for taking control of their economy and their lives here in this community – their local community – that's what it needs to be (ALW2)

Far from merely clarifying and understanding *who* benefits, this emphasis on an 'active participant' approach raises questions around *how* local communities benefit once local energy schemes facilitate engagement with the communities within close proximity to their associated infrastructures. This emphasis also connects strongly to social science perspectives on energy transitions that advocate for a move away from passive to active approaches to citizen involvement in energy transitions [56,57]. The next subsection explores this move 'beyond passive recipients', whilst also addressing the changing relationship between ALW and LCG in response to claims of injustice via the lens of restorative justice. Thus, the following restorative justice subsection will make clear that developing relations between ALW and LCG have partially addressed issues of distributional injustice around the MSA.

4.1.4. Restorative justice: moving beyond passive recipients, rectifying past claims of injustice

As outlined in Section 2, the concept of restorative justice in energy justice, stemming from the work of Heffron and McCauley [49], relates quite broadly to a process of remediation in response to a perceived energy injustice within an energy system or as part of an 'unjust' energy transition process. This process of remediation may take place through formal or informal action, or through appeal to legal processes and procedures to ensure that justice is achieved. Drawing on secondary sources in the form of information sourced from both LCG's and BEN's websites, it is clear that ALW, LCG, BEN and BEC have worked together to facilitate deeper forms of engagement between the Lawrence Weston community and local low-carbon energy projects. Thus, this restorative justice tenet is relevant to this case study in two senses.

Firstly, LCG have now incorporated ALW into their community benefit activities. Secondly, both BEC and LCG are wary of the need to move beyond a passive recipient approach to community energy that has indeed become the norm within the sector, whereby few community energy organisations offer training opportunities in relation to the development of new low-carbon energy infrastructures. The development of an active participant approach therefore still stands as the exception, rather than the rule, as attested to by a Co-Director within BEN when speaking about BEC:

I think the energy co-op – although arguably you can say that as a bunch of, sort of white middle aged, middle-class techie types – they are very conscious of what they are doing, and so working with organisations like

Ambition Lawrence Weston, they are trying to create something that does deliver in a more inclusive way (BEN1)

LCG have recognised this and started to think of new ways to engage the Lawrence Weston community in some of their community benefit fund activities, as one director stated that *'finding a way of enabling the people who are, in this particular case local to the Moorhouse, to benefit, is actually something that we'd be very keen to do'* (LCG1). This is demonstrated by LCG involving ALW more closely in their activities: *'we've had a meeting with Low Carbon Gordano, and I'm now on the panel as an Ambition Lawrence Weston representative and as the new energy officer'* (ALW3). This desire for closer involvement is evidenced by the community benefit section of LCG's website, which builds on an active participant approach:

Ambition Lawrence Weston, representing the community close to our Moorhouse array, are going to train local, currently unemployed, people as energy advisers to help householders and businesses use energy more efficiently, and are working with local companies to ensure that there will be employment opportunities for the trainees after the project [58]

While LCG clearly sought to use some of their community benefit to assist local residents within Lawrence Weston, it is interesting to note the mention of the proximity of Lawrence Weston as a contributing factor to changing their relationship with and acknowledgement of ALW. This shifting relationship also connects to assistance from other actors within Bristol's local energy network, with BEN working with LCG to deliver on this active participant approach:

Ambition Lawrence Weston were granted £5,000 from Bristol Community Energy Fund [...] which was match funded by Low Carbon Gordano Community Benefit Fund. The grant was used to fund a community internship programme, with local long-term unemployed people working on various community energy projects in the Lawrence Weston area [59]

ALW3 then responded to this need to advance forms of deeper engagement with the local community, and proved instrumental to the delivery of this internship scheme:

We basically recognised, talking to marginalised groups [...] that people didn't access green volunteering in energy, because they basically felt they couldn't afford to do so. By creating an internship, which creates job opportunities, linking them to potential employers and giving them life skills, that would actually open a door to other opportunities (ALW3)

In addition to this, BEC wanted to encourage ALW to use their contributions to fund training activities within the local community, as noted by a member of BEN when discussing the passive recipient approach to local community engagement and support:

The energy co-op is moving away from that a bit, for example in how it's doing the Lawrence Weston project [...] if you look at the Bristol community energy strategy, the economic thing is quite important [...] there's very much an economic element as well which is upskilling, providing employment [...] that was very much in the front of our minds when we were writing that. That felt really important (BEN1)

Furthering the creation of new economic opportunities in a time of austerity, this aspect of restorative justice connects powerfully to distributive justice and a focused, targeted approach to delivering the benefits of the low-carbon economy to deprived areas.

This subsection has shown that, due to the claims of injustice around the proximity of the MSA to Lawrence Weston, alongside passive recipient approaches that fail to fully engage and involve communities close to energy infrastructures, the tenet of restorative justice can be used to understand how LCG have sought to rectify these past claims of injustice and assist ALW in wider regeneration efforts.

5. Conclusion: embedding the benefits of low-carbon transitions in deprived communities

This paper has demonstrated how the LCG Moorhouse solar development is initially viewed as somewhat of an imposition that is not benefitting the community in a time when services are being cut. This imposition is therefore particularly pronounced, with the context of both austerity and high deprivation placing greater emphasis on localising wealth generation, rather than allowing a leakage of profits to external areas. This localisation of wealth generation and the activities that flow from new revenue generation are a particularly important distributive justice concern, whilst further correspondence with ALW demonstrated that low-carbon energy would feature as a vital part of its continued regeneration going forward. Interestingly, this is attested to throughout Lawrence Weston's community plan [53].

Building on the follow-up communication with ALW in mid-2020, ALW were successfully granted planning permission by the city council to deploy a 150m 4.2 MW onshore wind turbine in the local area, which will be owned by ALW and will generate revenue for the local community. The projects revenues will also support the establishment of an 'energy learning zone', which will offer energy internships, energy events, workshops and focus on raising the skills of local residents [53 p. 54]. It is clear, therefore, that for both 'energy' and 'spatial' justice to be realised in local low-carbon transitions, deprived areas in which new energy infrastructures are deployed must be given the opportunity to benefit from those infrastructures, alongside opportunities for procedural engagement. These new infrastructures may then form a core part of their future regeneration efforts and plans, bringing a further cycle of benefits and localised revenue generation.

Once deployed, community-owned low-carbon infrastructures are in place for decades. This article has shown that how the organisations behind them choose to relate to the communities and people that surround them will shape the energy justice impacts of low-carbon transitions going forward. Surprisingly, the majority of community energy literatures and policy reports have, to date, seen community energy schemes as largely beneficial to the localities in which they are located, with much research to date containing 'uncritical assumptions' that community energy overwhelmingly leads to positive outcomes [60]. This paper has shown that, without careful consideration of the spatial hierarchies and inequalities embedded in the spaces and places in which low-carbon energy transitions take place, new injustices may occur that undermine the ability for local energy transitions to be socially just. Furthermore, the backdrop of austerity measures reducing service provision and worsening social inequality in an area of high deprivation, should encourage energy justice scholars to further explore the potential of new low-carbon energy infrastructures to be embedded within community or organisational strategies for regeneration. This is a particularly pertinent point in light of the impacts of the economic crisis faced by the UK due to the COVID-19 pandemic.

As Catney et al.'s [30] 'reality check' reminds us, deprived communities are not primarily concerned with lowering their carbon emissions. Rather, this paper shows that opportunities to combine low-carbon transitions with economic development and local regeneration appeal to deprived areas. Rather than simply making grants to local organisations and businesses, which is a ubiquitous feature of UK community energy organisations, local and community energy projects would themselves benefit from ensuring that they offer training to local residents in the installation, management and governance of local energy technologies and systems. In addition, this may also assist with gaining planning permission [55]. These issues also broadly connect to debates around just transitions in local energy schemes [60], whereby new low-carbon jobs, procedural engagement and opportunities for learning are ensured for the communities in which future projects are situated. As community energy schemes begin to plateau and local energy schemes take a leading role in energy decentralisation processes [13], it will be vital for local energy strategies and policies to consider

active participant approaches in policy.

5.1. Policy recommendations

As FIT's are locked in for 20 years, the findings also have relevance for the policies of current community energy schemes that seek to use their surplus revenue in more productive ways, moving beyond opening up competitive bids for grants to local organisations and towards supporting local employment and skills training. In addition, advancing an active participant approach is integral to building the 'community capacity' [30] needed to ensure the effective long-term management and governance of local energy technologies and systems, particularly as new innovations emerge. The UK does offer a 'Community Energy Specialist' apprenticeship⁶, however, this has not been widely used or supported to date. Community energy schemes with large surplus revenues could engage with this more fully, alongside forming partnerships with local authorities, energy intermediaries [33] and local energy networks to access finance and funding to scale up this type of activity in tandem with the shift from community to local energy more broadly.

Intermediaries are also vital for raising awareness of the potential benefits of low-carbon energy in areas high in deprivation that are close to deployed low-carbon technologies. Interestingly, two of the research participants (ALW1 and LCG1) noted in their interviews, that an area in North Bristol close to Lawrence Weston, Henbury, contains similar levels of deprivation to Lawrence Weston [61], but was not involved in local energy projects. Despite its proximity to newly deployed technologies, the area of Henbury did not receive benefits from any of the community-owned solar or wind deployment outlined in this paper – though this may well change in future initiatives. This finding places an increased emphasis on the important work of intermediaries in connecting low-carbon transitions to low-income areas that would otherwise miss out on such opportunities, as intermediaries have been shown to be effective forums and mediums through which these concerns may be voiced, acted upon and resolved [33,62]. Policy frameworks for local energy should therefore recognise the critical roles that intermediaries play in supporting energy justice concerns and prioritise them in outreach work and relevant strategies. Furthermore, this point also relates to how future local energy schemes can relate more productively to marginalised 'energy peripheries' going forward [43,44], alongside being integral to targeted and area-based approaches to spreading the benefits of future local energy schemes to communities in areas of high deprivation.

5.2. Future implications for local energy transitions

The geographical underpinnings of many of the claims made in the findings are closely tied to contestations over the *proximity* of energy infrastructures. This connects to two fundamental aspects of spatial justice within a broader discussion of energy justice. The first, is that many of the grounds for claims of both injustice and more just relations by ALW are based upon the proximity of projects to the area of Lawrence Weston. Therefore, various civic and community energy actors should be acutely wary of the spatial proximity of their projects to deprived communities in future endeavors, considering how best to consult and engage with local communities to raise awareness, seek planning consent or spread the benefits of new energy infrastructures, drawing on the support of relevant intermediaries where possible. The second, is that through the deployment of solar PV farms close to the community, LCG expressed a desire to facilitate greater distributional justice through becoming an energy supply company that would

provide low-cost electricity to fuel poor houses in Lawrence Weston. This kind of new energy supply set-up *also* relates to the closer proximity of Lawrence Weston to the source of energy generation, thereby reducing potential transmission losses and the transmission distance of electricity that is common to power provision within centralised grids. Thus, further distributional gains may be achieved, should a system of decentralised provision offer the opportunity of lower energy prices and a reduction in transmission losses in power provision. Such arrangements will require the critical lens of interdisciplinary energy justice scholars to understand how to embed social justice and equity concerns in future energy decentralisation initiatives, alongside interrogating how such initiatives perform in varying research contexts [63].

As energy decentralisation begins to take on new technological forms, particularly via the integration of various energy storage technologies into local energy grid systems enhancing the prospect for continued renewables deployment, the potential for local low-carbon supply futures to benefit local populations will become a critical concern for energy justice scholars. This will prove a vital area of future research for two reasons. Firstly, rapid energy market developments around the growth of energy storage technologies, flexibility markets, vehicle-to-grid services, smart meter deployment and smart grid development present a new wave of innovation in decentralised energy system development that also present a new set of challenges. One core issue that arises from such technological innovations will look at how *social innovation* – in the form of new social enterprise models and actors seeking to capture the values of such innovations for the benefit of the wider community – can counter the domination of incumbent market players and prevent the reproduction of the social and economic inequalities that undermine new low-carbon economies. Secondly, if we are to mitigate against exacerbating social inequality in a post-COVID 19 society, in which social inequality is once again brought to the fore after a severe economic downturn, such concerns must be prioritised as we continually research the impact new low-carbon infrastructures have on the people and communities that exist around them.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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⁶ Please see the 'Institute for apprenticeships and technical education' website link here: <https://www.instituteforapprenticeships.org/apprenticeship-standards/community-energy-specialist/>.

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