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Community energy: Entanglements of community, state, and private sector

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Abstract

The decarbonisation of energy systems is leading to a reconfiguration of the geographies of energy. One example is the emergence of community energy, which has become a popular object of study for geographers. Although widely acknowledged to be a contested, capacious, and flexible term, "community energy" is commonly presented as singular, bounded, and localised. In this paper, we challenge this conception of community energy by considering evidence about the role and influence of three categories of actors: community, state, and private sector. We demonstrate how community energy projects are unavoidably entangled with a diversity of actors and institutions operating at and across multiple scales. We therefore argue that community energy is enabled and constituted by trans-scalar assemblages of overlapping actors, which demands multi-sectoral participation and coordination. We point to the need for further academic attention on the boundaries between these actors to better understand the role of different intermediary practices and relationships in facilitating the development of decentralised energy systems with just outcomes.

1 | INTRODUCTION

Academic interest in community energy has been increasing for a decade. Early research focused primarily on understanding meanings of and attitudes towards community energy (e.g., Rogers, Simmons, Convery, & Weatherall, 2008; Walker & Devine-Wright, 2008; Walker, Hunter, Devine-Wright, Evans, & Fay, 2007; Warren & McFadyen, 2010), as well as exploring motivations for and barriers to participation (e.g., Bomberg & McEwen, 2012; Hoffman & High-Pippert, 2010; Walker, 2008) and the potential for community initiatives to contribute to system-wide change (e.g., Hielscher, Seyfang, & Smith, 2011; Hoffman & High-Pippert, 2005; Seyfang & Haxeltine, 2012). While these questions continue to have resonance today (e.g., Becker, Kunze, & Vancea, 2017; Hicks & Ison, 2018), there has also been growing interest in the socio-political dimensions of community energy, most explicitly expressed through concepts of justice and democracy (e.g., Angel, 2017; Catney et al., 2014; Forman, 2017; McHarg, 2016; Simcock, 2016; van Veelen, 2018). This expanding body of community energy scholarship is international and interdisciplinary, with particular interest in Europe (e.g., Bauwens, Gotchev, & Holstenkamp, 2016; Becker & Kunze, 2014; Blanchet, 2015; Hall, Foxon, & Bolton, 2016; Islar & Busch, 2016), especially the UK (e.g., Bomberg & McEwen, 2012; Markantoni, 2016; Middlemiss & Parrish, 2010; Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014; Simcock, 2016; Strachan, Cowell, Ellis, Sherry-Brennan, & Toke, 2015; van Veelen, 2017; Walker & Devine-Wright, 2008). Much of this attention has come from geographers interested in community energy as a manifestation of "new ways – and new geographies – of producing, living, and working with energy" (Bridge, Bouzarovski, Bradshaw, & Eyre, 2013, p. 331) developing in response to the need to transition to low carbon economies (OECD, 2015).

A range of terminologies has emerged in different contexts to refer to various forms of locally led, collectively owned, and managed energy projects, including civic energy (de Vries, Boon, & Peine, 2016; Hall et al., 2016); citizen energy (Yildiz, 2014); grassroots energy (Blanchet, 2015; Haggett & Aitken, 2015; Kooij et al., 2018); local energy (Arentsen & Bellekom, 2014; Hasanov & Zuidema, 2018; Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015; Schwencke, 2017); and "collective and politically-motivated energy" (Becker & Kunze, 2014). Nevertheless, in the UK, "community energy" is the most prevalent term used in both policy and practice, and it has become the dominant term within the international academic literature (Kunze & Becker, 2015; Seyfang et al., 2014). The explicit connection between "energy" and "community" may particularly attract geographers to the concept of community energy by focusing attention on the influence modes of energy production and distribution have on acts of place-making, and the ways spatial identities affect processes and criteria through which the legitimacy of staking a claim in, or profiting from, a specific energy project is negotiated (Calvert, 2016; Cowell, Bristow, & Munday, 2011; Murphy & Smith, 2013).

Despite the development of community energy as a distinct research object, "community energy" continues to be used ambiguously and flexibly both in practice and literature (Becker & Kunze, 2014; Klein & Coffey, 2016). Energy can be decentralised in many ways, and community energy encompasses projects of varying scale, complexity, and socio-technical organisation, embedded within diverse social contexts (Chmutina & Goodier, 2014; Pohlmann, 2018; van Veelen, 2017). Projects vary significantly according to the parts of the energy system they seek to influence, with different activities addressing how energy is *generated*, how it is moved around (*transmission* and *distribution*), and how it is sold (*supply*) to end users (*demand* for energy). Governance and ownership models also vary. Differences in how projects are controlled, owned, and financed translate into differences in civic actors' roles, and the degrees of risk, return, and responsibility for communities of community energy (Haggett, Creamer, Harnmeijer, Parsons, & Bomberg, 2013). Moreover, community energy is not the product of community endeavours alone. Community energy is enabled and constituted by trans-scalar assemblages of overlapping and heterogeneously configured actors.

This article therefore aims to challenge framings of "community energy" as singular, bounded, and localised by exploring the role and influence of three categories of actor in "community energy": state, private sector, and community. While we address these actors separately for clarity, we take them as overlapping, non-unitary, and contested domains. We highlight the differences in needs, constraints, and ambitions of these different actors and argue that, to date, insufficient attention has been paid to the fuzzy but productive boundaries between them.

This is not a systematic review of community energy literature. Instead, we draw on literature selectively to enable us to examine these different actors and highlight the interplays between them. We focus on the UK, because it bounds the review to a specific socio-technical energy system configuration and because a large proportion of the community energy scholarship has been conducted within the UK. While we draw on selected European, North American, and Australian scholarship comparatively to illuminate specific resonances and contrasts with the UK case, we have excluded literature on decentralised energy in developing countries. Although we recognise the value in incorporating this perspective, significant differences in socio-technical infrastructure systems and socio-political-economic and historical contexts add a complexity that puts this beyond the scope of this paper.

We take each actor category in turn, considering evidence of the ways they constitute and configure community energy projects, and factors influencing this role. We then bring these observations together to reflect on how framing community energy as a product of entanglements between these different actors helps to expose the role of intermediary practices in the development of decentralised energy systems and the need for more nuanced understanding of processes through which more democratic and inclusive outcomes are achieved through community energy.

2 | THE COMMUNITY

Communities are engaged in a broad range of energy activities, including electricity and heat generation (from a range of sources), energy efficiency and demand management, collective purchasing, storage, transport, and education and awareness raising.[1] Community energy is commonly differentiated from non-community energy by the (assumed) level of participation and involvement of community members in the process of developing a project and/or the outcomes of the project (van Veelen, 2017). Although some (e.g., Walker & Devine-Wright, 2008) use this "process/outcome" approach to map the broad variety of community projects that may exist, others adopt a normative perspective, where "more" (participation or benefits flowing into the community) is better (e.g., Callaghan & Williams, 2014). This is one explanation for the substantial body of empirical research on community energy focusing on understanding factors that encourage and facilitate participation in energy projects (e.g., Bomberg & McEwen, 2012; Park, 2012; Rogers, Simmons, Convery, & Weatherall, 2012a; Walker, 2008). Across this literature, scholars have particularly noted the importance of identification with a place-based community in facilitating participation: a sense of belonging to a particular place is observed to inspire voluntary efforts to develop community renewable energy to generate local benefits (Bomberg & McEwen, 2012; Haggett & Aitken, 2015; Rogers, Simmons, Convery, & Weatherall, 2012b; van Veelen & Haggett, 2016). This sense of belonging and place attachment has been observed to be mutually reinforced through participation in community projects (Haf & Parkhill, 2017; Hoffman & High-Pippert, 2010; Kalkbrenner & Roosen, 2016; van der Horst, 2008). For example, Haf and Parkhill (2017) found that the four community energy projects they studied in Scotland and Wales were driven by cultural values, but also contributed to the cultural sustainability of local areas through encouraging retention of Scottish Gaelic and Welsh languages.

Community is not necessarily place-based, and various legal structures are used to constitute different types of community groups. A group's legal structure—as well as its activities—can influence the potential impact of the project and inform interactions with society at multiple scales, including the degree and form of local participation (Devine-Wright & Wiersma, 2013). Some models of community energy rely on engaging a large number of residents in the local geographic community, whereas others depend more or less actively involved financial investors (Kalkbrenner & Roosen, 2016). In the UK, groups can adopt the structure of a Community Benefit Society, Community Interest Company, Co-operative society, Limited Company, or other charitable legal models. Community Benefit Societies serve the interests of their local community, whereas Co-operatives serve the interests of their members, who can be geographically dispersed (van Veelen, 2017).

Despite, or perhaps because of, the fact that "community" is embedded within community energy, what constitutes community in community energy has arguably been taken for granted or inadequately unpacked in much of the literature (Devine-Wright & Wiersma, 2013). "Community" commonly invokes feelings of "warmth, belonging, and comfort" (Evans, 2010: 33) and there is a tendency to make normative assumptions about the inherent moral

and ethical "goodness" of community energy (Taylor Aiken, 2014, 2015). The capaciousness of the term "community energy" can be valuable for communities. It enables experimentation with different models (Walker & Devine-Wright, 2008) and allows for a wide range of practices to emerge, dependent on, and sensitive to, particular contexts (Becker & Kunze, 2014; Pohlmann, 2018). In her study of three community energy projects in Scotland and Germany, Pohlmann (2018) observed that a multitude of different interests, ideas, knowledge, and norms shaped the projects. For one project, energy production was used as a way to generate money to realise the community's broader interests. For another, the project was used to directly challenge the existing energy system. For the third, the project was a means to raise international attention for the city and become a symbol for the production of renewable energies in the district. In each case, the communities were able to "make sense of" community energy in a way met their particular needs.

Community energy has been assigned a central role in new literatures on energy democracy and justice (Angel, 2017; Catney et al., 2014; Forman, 2017; McHarg, 2016; Simcock, 2016; van Veelen, 2018) and is associated with helping to give voice to those disenfranchised by existing energy system configurations (Wirth, 2014). It is argued that, through community participation, decisions around energy are more inclusive, decision-makers are more representative, and there is greater opportunity to hold decision-makers to account (Kunze & Becker, 2015; Vansintjan, 2015; Weinrub & Giancatarino, 2015). However, there is a growing strand of critical research on community energy highlighting that simply adding the prefix "community" does not necessarily lead to just or democratic outcomes. Community energy does not, in itself, generate progressive or regressive effects; it is the way that it is mobilised and enacted that matters (Berka & Creamer, 2018). It has been observed that, typically, only a relatively small number of highly active community members are necessary to initiate and manage a community energy project (Hoffman & High-Pippert, 2010). Fostering and sustaining participation in community energy projects have been found to be challenging, particularly given the apparent pervasiveness of individualism in everyday social interactions (Mulugetta, Jackson, & van der Horst, 2010). Kalkbrenner and Roosen (2016) note that low willingness to participate in local energy projects is partly due to "free-riding" as "positive outcomes, such as environmental benefits, are distributed amongst participants as well as non-participants" (p. 61). As Hoffman and High-Pippert (2010) suggest, sustained participation is therefore likely to be motivated less by personal benefit than by an appreciation of community-wide benefits.

Community energy is commonly assumed to deliver a range of positive social outcomes locally (Bere, Jones, Jones, & Munday, 2017; Callaghan & Williams, 2014; Gubbins, 2010; Hicks & Ison, 2011; Seyfang, Park, & Smith, 2013), and there is evidence to suggest that economic and social outcomes are at least as important as environmental concerns in motivating community energy projects (DECC, 2014a; Haggett et al., 2013; Hargreaves, Hielscher, Seyfang, & Smith, 2013; Islar & Busch, 2016). However, in a recent systematic review, Berka and Creamer (2018) found little robust empirical evidence of social benefits being generated in practice.[2] Moreover, participation is not guaranteed to be a positive experience with a positive outcome for all (Callaghan & Williams, 2014; Middlemiss & Parrish, 2010); nor is it automatically equitable. As Park (2012) and Catney et al. (2014) have demonstrated, varying levels of community capacity and social capital within communities may support or greatly inhibit local energy action on the ground, with participatory opportunities often taken up by those in higher socio-economic groups (Angel, 2017; Grossmann & Creamer, 2017). Consequently, there are fears that community energy is more accessible to affluent and able communities—or individuals within those communities—reflecting wider political issues concerning the role of social class, socio-economic division, and regional and spatial inequalities that underpin broader systemic inequalities in the UK (Catney et al., 2014; Johnson & Hall, 2014; Park, 2012). Here, the role and influence of the community meets, and becomes entangled with, the role of the state.

3 | THE STATE

3.1 | Central government

The actions of central government institutions are critical to the development of community energy projects. State funding and subsidy mechanisms, planning regimes, political commitment to low carbon energy transitions, and

arrangements for devolved decision-making all have significant influence (Walker, 2008). Less visibly, policy measures are both shaped by and serve to reproduce culturally specific social norms, understandings, and priorities, with direct and indirect consequences for the acceptance and normalisation of community energy (Bomberg & McEwen, 2012; Taylor Aiken, 2014).

In the UK, the roots of the community energy policy under the 1997–2010 Labour government were argued to be largely driven by instrumental objectives, with community as a vehicle for achieving these objectives. Walker et al. (2007) found three factors were particularly appealing for UK policymakers. First, an understanding that channelling benefits to local residents helped mitigate opposition to proposed wind farm developments. Second, the not-for-profit legal status of community-based bodies meant they could directly receive government subsidies while circumventing European rules on state aid, and help to stimulate the renewables market. And third, the recognition that renewable energy projects could generate new sources of income and employment for areas experiencing "agricultural decline, depopulation and economic collapse" (Walker et al., 2007, p. 73). There was also *some* aspiration to embed participatory approaches in decision-making on energy production, also evident under the "localist" rhetoric of the Liberal Democrat-led approach to community energy under the 2010–2015 Coalition government (Catney et al., 2014), culminating in the UK's first Community Energy Strategy (DECC, 2014b, 2015; see also Smith, Hargreaves, Hielscher, Martiskainen, & Seyfang, 2016).

The role of central government engagement with community energy goes beyond its ability to effectively catalyse or stymie civil society goals, and contributions have critically analysed how governmental programmes interact with and shape the activities of community-led initiatives, producing a trans-scalar politics of community energy (Bomberg & McEwen, 2012; Catney et al., 2014; Markantoni, 2016; Nolden, 2013; Oteman, Wiering, & Helderman, 2014; van Veelen, 2017). A strand of recent research has interrogated the effects of governmental intervention on actions, behaviours, and outcomes of community energy protagonists. A common theme is to focus on how governmental rationalities and conceptualisations of community energy interact with sometimes divergent understandings among those seeking to develop community energy projects. The impacts of funding criteria and governmental accounting regimes, for instance, are said to have shaped the work of grassroots energy and sustainability movements in the UK (Creamer, 2015; Hauxwell-Baldwin, 2013; Taylor Aiken, 2016). This has profoundly changed the dynamic of community energy for many projects, with increased emphasis on quantifying inputs, outputs, and outcomes exemplifying what Taylor Aiken (2016, p. 28) terms "governing through numbers." In his exploration of the Scottish Government's Climate Challenge Fund, Taylor Aiken describes a dramatic change in the operations of one neighbourhood community group after receiving funding and becoming entangled in the various practices of governing this entailed, such as meeting prescriptive legal and financial arrangements, to the everyday action of recording and *counting* activities, output, and outcomes.

The rise of governmental interest in community energy has also brought charges of co-option of "community" as a policy object leading to a narrowing of the diverse manifestations of community to elision *with* local, apolitical action. It has been argued that many of the UK government's "community" energy policy mechanisms have instead been aimed at marketising communities or using community as a misnomer for "meta-individual" activities (Aiken, 2012; Eadson & Foden, 2014; Hauxwell-Baldwin, 2013): "These policies promote the primacy of economic and market goals ahead of the idea of community as collective relations, which is fundamentally 'not individual' " (Eadson, 2016, p. 1625). This juxtaposes the focus on social relations, identity, and normative values within community groups (Hauxwell-Baldwin, 2013).

The past decade has produced many comparative studies of contrasting policy approaches to renewable energy in different countries (e.g., Hoppe et al., 2015; Sovacool, 2011; Toke, Breukers, & Wolsink, 2008; White, Lunnan, Nybakk & Kulisic, 2013) and differing "institutional space" these create for community energy (Oteman et al., 2014). Danish and German governments are noted for being particularly supportive of civil society engagement with energy systems, combining progressive approaches to decarbonisation and energy transitions with longer held commitment to municipal, citizen, and civil society involvement in decision-making (Bolinger, 2001). For example, KfW, the German government-owned development bank, provides low interest loans distributed through networks

of local and regional banks which have been instrumental in the growth of locally and cooperatively owned renewable energy in Germany (Hall et al., 2016). There were almost 1,000 renewable energy cooperatives in Germany in 2014 (Brummer & Herbes, 2018)—a significant growth from 136 cooperatives 6 years earlier (Hoppe et al., 2015).

It is important to note that central government institutions are not necessarily monolithic, unified or stable. Policy arrangements must be viewed as merely "temporary stabilisation [s] … in continual flux" (Arts, Leroy, & van Tatenhove, 2006, p. 96). Furthermore, national governments are themselves marked by competing interests and priorities, within and between departments. For example, in the UK, the dissolution of the Department for Energy and Climate Change and the creation of a new Department for Business, Energy and Industrial Strategy in 2016 were met with some concern that policy to address climate change might be undermined by ambitions for economic growth (Watson, 2016).

There is also scope for devolved governments to design energy policies that differ from or go further than national policies. For example, the Scottish Government—with its own target to achieve 1GW of renewable energy capacity in community and local ownership by 2020 and 2GW by 2030 (Scottish Government, 2017)—has launched various measures to support community energy in Scotland since 2002. The provision of grants and loans is enhanced by a range of general support and intermediary organisations designed to increase community engagement in low carbon transitions (see Markantoni & Woolvin, 2015, for the key Scottish community funding initiatives). Experiences in several northern European countries, particularly Germany, Denmark, and Sweden, also demonstrate that the governing context at *local* government scale is a key factor in understanding the development of community energy spanning the management of roles, responsibilities, and relationships between different scales of government.

3.2 | Local government

In several northern European countries, municipalities have taken a leading role in driving forward decentralised energy systems (Webb, Tingey, & Hawkey, 2017). As well as being the scale of government which interacts most with local civil society actors, local government has a commitment to locality and place. Municipal government is, therefore, often framed as more accessible than central government to those pursuing community energy initiatives and more engaged with local priorities (Warbroek & Hoppe, 2017).

Hoppe et al. (2015) highlight the potential impact of local government leadership in their analysis of two "best practice" local energy initiatives in Lochem in the Netherlands and Saerbeck in Germany. Counter to common "bottom-up" or "grassroots" narratives about community energy projects, these projects had been "to a large extent initiated by public officials … [and] success in large part was due to active, involved public leadership" (Hoppe et al., 2015, pp. 1917–1918). In some cases, development of community energy initiatives has catalysed a reworking of relationships between civil society and local government through politicisation of energy provision. For example, in Germany, the rising number of community energy cooperatives as part of the country's high profile *Energiewende* has stimulated larger scale citizen-led movements seeking to re-municipalise heat, gas, and electricity grids in Hamburg and Berlin into German public ownership[3] (Becker, Blanchet, & Kunze, 2016; Becker, Naumann, & Moss, 2017; Blanchet, 2015; Kunze & Becker, 2015; Moss, Becker, & Naumann, 2015).

In Denmark and Sweden, local government has a well-institutionalised role within the energy system and established legislated responsibilities in energy planning and a history of ownership and operation of energy provision and services. Hence, municipal and community energy companies in these countries contribute to more diverse market in energy services, working "in-against-and-beyond the state" (Angel, 2017; see also Becker, Blanchet, & Kunze, 2016). By contrast, in the UK, energy expertise, resources, and assets are concentrated in large, mainly transnational, corporations with primary responsibility to shareholders, meaning local authorities have more limited institutional capacity for energy (Webb, Hawkey, & Tingey, 2016). Not only has energy generation and supply been progressively centralised and privatised in the UK, local government also has less fiscal and decision-making autonomy to control local services overall (twinned with fewer resources conferred to energy). Consequently, recent

research has found considerable variation in the extent of activity and planning across UK local authority action on energy (Tingey, Hawkey, & Webb, 2016; Webb et al., 2016; Webb et al., 2017).

Where local governments do not take a leading role in developing energy projects, they can nevertheless be important players in partnerships with civil society-led energy projects (Castán Broto & Bulkeley, 2013). In the UK, examples include Bath & West Community Energy, Low Carbon Hub (Oxford), Plymouth Energy Community (PEC), and Swansea Community Energy (Webb et al., 2017). In these cases, local authorities supported community energy project through innovative use of council resources, including access buildings to host solar panels as well as access to finance, staff time, and expertise. The political priorities of these local authorities favoured community ownership and stemmed from councils' history of sustainable development work, as well as recent enabling powers. Supporting community energy was also considered a route to local engagement and community responsibility for assets, and a source of opportunities for training, skills development, and empowerment, which was important in the face of dwindling council resources.

Local authorities and community groups may also co-invest. For example, Public Power Solutions (wholly owned by Swindon Council) engaged in partnership with Abundance (a green economy investment platform) to co-finance Swindon Community Solar Farm from a mix of public finance and community investment (Crisp, 2016). Local authorities generally benefit from scale of assets, access to land and planning powers, and can therefore enable more straightforward replication of business development for local ownership. Increasingly, community projects in the UK have opportunities to partner with private sector actors, which—while not without challenges—has proved successful in several cases (Goedkoop & Devine-Wright, 2016; Vaughan-Morris, McNaught, Morris, & Cheung, 2015). However, it is argued that the nature of UK energy supply regulation plays a significant role in preventing small-scale companies from entering the market (Hall & Roelich, 2016). Here, the role and influence of state and community actors meets, and becomes entangled with, the role of private market actors.

4 | THE PRIVATE SECTOR

Private sector actors, such as energy utilities, developers, and independent consultants, have a complex and powerful influence on community and local energy projects (Rydin et al., 2015), and there are important considerations to make about the extent to which market actors and market-based rationalities shape the ways in which community energy is conceived, mobilised, and enacted.

Community energy projects are market actors themselves (Eadson, 2016), typically as companies engaged in one or more of the core "energy chain" activities of generation, distribution, and supply. In the UK, energy generation, distribution, and retail are currently dominated by a few vertically-integrated energy utilities, the "Big Six" (Koh & Goucher, 2014; Shrubsole & Cameron, 2014), and their dominance affects the operations of ancillary companies (such as manufacturers of equipment or providers of finance) and the structure of the whole energy market. Community energy ventures, commonly classified as "Non-Traditional Business Models" (Ofgem, 2015), are typically small scale and new to the challenges of managing an energy project. Consequently, these organisations may lack capacity to interact with large institutions in a way that is as timely and cost-effective as larger private sector energy developers (DECC, 2014a). Equally, market actors whose systems are organised around dealing with larger scale projects and more established companies may not consider it cost-effective to engage with community groups. This applies to suppliers of technologies, such as wind turbines (Gubbins, 2007), as well as providers of services including finance (DECC, 2014a; Hall et al., 2016). For financial institutions, community energy projects are often unattractive investments, not only because of their size but also because of their geographical embeddedness as they tend to be single project, single location initiatives, unable to spread the risk of project failure across multiple projects and locations.

The broad international trend towards more decentralised energy generation (OECD, 2015) is likely to force changes in large energy companies and provide additional market opportunities for community energy actors.

Funkhouser, Blackburn, Magee, and Rai (2015) suggest that, in the USA, large energy companies are already major promoters of community solar, seeing collective energy projects as more easily integrated into their business models than widespread adoption of "behind the meter" rooftop solar PV. There are also some initial signs of cooperative action between energy companies and communities in the UK. For example, energy company OVO Energy have established an "OVO Communities" division, which seeks to develop local energy schemes across England. To date, they have partnered with three local authorities and a social housing consortium to offer advice and expertise to energy schemes that address fuel poverty and prioritise local energy tariffs for local residents, demonstrating an innovative partnership between cross-sectoral actors (OVO Energy, 2018).

Despite the challenges portrayed in much of the UK literature, energy markets can be made to work for community energy; community energy may even have some advantages compared to private sector actors. There is some evidence that community or locally owned renewable energy projects have greater success in the land use planning process than privately owned projects, although other factors are also important (Bauwens et al., 2016; Szarka & Bludhorn, 2006; Warren & McFadyen, 2010). Community energy may also be able to operate with lower financial returns than private sector investors (Vaughan-Morris et al., 2015). While community energy project costs appear to vary more than comparable private sector projects, they are not necessarily higher (Harnmeijer et al., 2015). Smaller actors' power to raise finance and lessen their dependence on larger financial institutions has also been enhanced by widespread access to the internet (Davis & Braunholtz-Speight, 2016; Yildiz, 2014).

5 | DISCUSSION AND CONCLUSION

This review of community energy from three perspectives has sought to demonstrate that it is not possible to consider community energy as an entity (or set of entities) in isolation. Community energy projects are unavoidably entangled with a range of different actors and institutions operating at and across scales. These projects demand multi-sectoral participation and the coordination of governments, public and private institutions, and communities (Mulugetta et al., 2010). It is partly by virtue of the new partnerships, networks, and relationships engendered in this way that community energy initiatives have the potential to contribute to social and political transformation (Pinker, in press). Understanding the different roles that these actors and institutions play in the development of community energy projects is essential to understanding the sector as a whole.

Communities, however defined, cannot achieve large-scale, socio-technical reconfiguration single-handedly, but must be facilitated by a mixture of top-down policy and bottom-up initiatives, generating "heterogeneous actor constellations and organisational landscapes" (Moss, Becker, & Naumann, 2015, p. 1560). In this paper, we have considered some of the interactions and contestations between this plurality of actors, above all highlighting the complex effects of institutional context and trans-scalar politics on how community energy emerges. Even within the relatively homogeneous setting of north-western Europe, there is significant variation in nationally and locally specific governance arrangements and their underlying norms and assumptions. For example, in Germany and Denmark, priorities are observed to be relatively coherent and consistent between scales of governance, impacting positively on the degree of cooperation towards shared goals between community organisers, market actors, and national, regional, and local governments. By contrast, in the UK, as well as Belgium and the Netherlands, approaches to renewable energy policy are identified to be less strategic, more market-led developments and greater dissonance between governmental and community priorities, which coincides with smaller and less developed community energy sectors (Bauwens et al., 2016; Breukers & Wolsink, 2007; Kooij et al., 2018; Nolden, 2013; Oteman et al., 2014).

There is a growing recognition of the potential role that effective intermediary organisations can play at the boundaries between public, private, and community actors, encouraging and enabling new relationships in a complex context (Bush et al., 2017). A diverse array of non-governmental intermediary organisations has emerged to mediate between communities, private, and state actors. These intermediaries have been observed to support community energy groups in the development of a project, translating policy objectives to the local level, and helping develop

and nurture the types of network-oriented strategies required to "jump scale" and enact change beyond the local scale (Bird & Barnes, 2014; Hargreaves et al., 2013; Parag, Hamilton, White, & Hogan, 2013; Seyfang et al., 2014; Strachan et al., 2015). In some instances, local authorities can take on an intermediary role, making use of their "trusted brand identity" (Webb et al., 2017) to assist in scaling-up community activity. With respect to developing district heating, this role has been observed to include "persuading local stakeholders of the value of district heating, and building the social networks required to deliver projects" (Bush et al., 2017, p. 143), both externally (facilitating cooperation between local, public, and private sector stakeholders) and internally (encouraging cooperation across the local authority).

Despite the increasing recognition of the importance of intermediaries in facilitating local and community energy initiatives, this type of boundary work remains under-researched (Bush et al., 2017; Hodson, Marvin, & Bulkeley, 2013). Literature on the roles of intermediaries is dominated by authors adopting a multi-level perspective to socio-technical transitions, analysing the role these organisations play in niche nurturing (Hargreaves et al., 2013; Kivimaa, 2014). There would be value in research that sought to further unpick nuances in the practices, relationships and influence of different intermediary actors, building on existing work, such as Hodson et al.'s (2013) analysis of the "modes of intermediation" in urban low carbon transitions and Lacey-Barnacle & Bird's (2018) analysis of how intermediaries may facilitate justice in the local energy sector.'

Ultimately, as Becker and Kunze (2014) have argued, the term "community energy" may not be the most appropriate to describe these increasingly complex, trans-scalar decentralised energy arrangements in which state, private, and community actors collide. As multi-sector coalitions become more prevalent, there is a danger that the manifestation and position of community actors become increasingly obscure, to the point that the "community" of "community energy" becomes an empty signifier, arbitrarily defined (Rogers et al., 2012a), and little more than a means of garnering legitimacy for potentially controversial renewable energy projects (Pinker, in press). Recent community energy scholarship utilising the emerging concepts of "energy justice" and "energy democracy" to interrogate normative assumptions about participation and the relationship between community energy and normative ideals of democracy and justice (e.g., Becker & Naumann, 2017; Forman, 2017; McHarg, 2016; Rasch & Köhne, 2017; Simcock, 2016; van Veelen, 2018) is therefore welcomed. There remains, however, significant scope for further conceptual and empirical work on the intersection between participation and inclusion in material systems in the context of plural and dynamic understandings of community energy, including the types of participation enabled and the connection between inclusive participation and just outcomes.

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ENDNOTES

[1] For examples of successful community energy projects in the UK, see https://communityenergyengland.org/pages/case-studies (England) and http://www.communityenergyscotland.org.uk/case-studies.asp (Scotland).

[2] Several community energy organisations are currently collaborating to design a standardised "monitoring and evaluation tool" aimed at producing such evidence. See https://www.pureleapfrog.org/monitoring-and-evaluation for more details.

[3] The energy grids in both Hamburg and Berlin have been operated by Vattenfall, which is owned by the Swedish state.

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