

LOCAL EMBEDDEDNESS IN COMMUNITY ENERGY PROJECTS A social entrepreneurship perspective

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EL ARRAIGO LOCAL EN PROYECTOS ENERGÉTICOS COMUNITARIOS. Una perspectiva de emprendimiento social

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ABSTRACT

An increasing number of community energy projects have emerged recently, reflecting diverse sociotechnical configurations in the energy sector. This article is based on an empirical study examining different types of community energy projects such as energy cooperatives, public service utilities and other entrepreneurially oriented initiatives across the European Union. Based on an in-depth analysis of three case studies, the article aims to introduce a social entrepreneurship perspective when discussing the relationship between local embeddedness and different forms of organisation and ownership in community energy. The results indicate that community energy projects can expand beyond the local scale without losing their collective and democratic form of functioning and ownership. Moreover, social movements can act as catalysts for this expansion beyond the local, in a quest for wider social transformation. Social entrepreneurship may provide a suitable analytical lens to avoid the 'local trap' when examining different forms of organisation and ownership in renewable energy, and further explore the question of scaling.

KEYWORDS

Community energy; Energy cooperatives; Public service utilities; Renewable energy; Social entrepreneurship; Social movements.

RESUMEN

Recientemente, han surgido un número creciente de proyectos energéticos comunitarios, que reflejan diversas configuraciones socio-técnicas en el sector energético. Este artículo se basa en un estudio empírico que examina diferentes tipos de proyectos energéticos comunitarios como las cooperativas energéticas, las empresas de servicios públicos y otras iniciativas de orientación empresarial en toda la Unión Europea. Basado en un análisis en profundidad de tres estudios de caso, el artículo tiene como objetivo introducir una perspectiva de emprendimiento social cuando se discute la relación entre el arraigamiento local y los diferentes tipos de organización y propiedad en la energía comunitaria. Los resultados indican que los proyectos energéticos comunitarios pueden expandirse más allá de la escala local sin perder su forma colectiva y democrática de funcionamiento y propiedad. Además, los movimientos sociales pueden actuar como catalizadores de esta expansión más allá de lo local, en busca de una transformación social más amplia. El emprendimiento social puede proporcionar una lente analítica adecuada para evitar la "trampa local" al examinar diferentes formas de organización y propiedad en el sector de la energía renovable, mientras nos permite ahondar aún más en la cuestión de la expansión territorial de estos proyectos.

PALABRAS CLAVE

Cooperativas de energía; Emprendimiento social; Empresas de servicios públicos; Energía comunitaria; Energía renovable; Movimientos sociales.

INTRODUCTION

The transition to renewable energy in the energy sector relies on both technological innovation and social transformation. Many authors emphasise the ‘techno-logic’ (Scheer 2012) of renewable energy production, which holds the potential to decentralise economic structures and change social practices related to energy generation (Devine-Wright 2007; Shove 2014). Cooperatives and similar forms of collective initiatives have begun to promote the small-scale implementation of renewable energy technologies (wind turbines, solar panels, etc.). These community energy projects (Seyfang *et al.* 2013), grassroots initiatives (Blanchet 2015; Seyfang and Smith 2007) or collective and politically motivated renewable energy projects (Becker and Kunze 2014) are part of a more general movement towards clean, democratic energy supply at local, regional and global levels (Kunze and Becker 2014; Fuchs and Hinderer 2016; Scheer 2012; Morris and Jungjohann 2016). Although these socio-technical projects often emerge in nascent and small-scale niches (Geels and Schot 2007; Smith and Raven 2012), they nevertheless act as innovative examples of alternative production and supply models in the energy sector (Burger and Weinmann 2012; Wainstein and Bumpus 2016) and they may sometimes move beyond the local scale (Becker and Kunze 2014).

Community entrepreneurship, social venturing, non-profit organisations adopting commercial strategies, and social cooperative enterprises are just some examples of social entrepreneurship (Mair and Martí 2006, 2009). In spite of the different actors, contexts and mechanisms involved, social entrepreneurship has a strong social component (Mair and Martí 2006, 2009). It creates social value, as its aim is to solve problems affecting society – environmental, social and economic challenges – through innovative strategies (Morris *et al.* 2011; Rahdari *et al.* 2016). Social entrepreneurs seek to transform society by targeting unjust and unsustainable systems and converting them into entirely sustainable ones (Martin and Osberg 2015; Rahdari *et al.* 2015). Empirical studies show the strong influence of social entrepreneurship on social value and its potential for solving social problems (Felício *et al.* 2013). Social initiatives share with community energy initiatives the same eagerness to make our energy generation and supply systems more sustainable, and to promote social transformation.

The present article aims to discuss the aspect of local embeddedness in community energy initiatives. By interpreting community energy initiatives as particular instances of social entrepreneurship (cf. Becker *et al.* 2017), it aims to analyse how local embeddedness relates with different forms of organisation and ownership structures in renewable energy. To fulfil this objective, we focus on three case studies as

particular instances of social entrepreneurship that differ in terms of local embeddedness.

For the purpose of this article, we adopt the definition of social enterprises provided by Johannisova *et al.* (2013:11), describing these as ‘not only for profit organisations involved at least to some extent in the market, with a clear social, cultural and/or environmental purpose’. This definition allows us to focus on diverse forms of organisation and ownership in renewable energy, as well as on their potential to create social value and bring about social transformation. Community energy projects have generally been assimilated with the local community they were embedded in and thus defined in terms of ‘communities of place’ (Seyfang *et al.* 2013; Becker and Kunze 2014). Accordingly, the concept of embeddedness has been discussed in relation to actors’ interests, motives and behaviours that were assumed to be strongly determined by the local social structure (Granovetter 1985). We argue nevertheless that this kind of approach questions a possible scaling up of community energy projects and moreover contradicts social transformation aspirations, which is common for this type of initiative.

The article is structured as follows. In section two, we discuss local embeddedness as a key feature in both community energy and social entrepreneurship initiatives. In section three, we define our data and methods of analysis. In section four, we describe and compare three case studies to finally show how local embeddedness relates with different forms of organisation and ownership. We conclude the article with reflections and suggestions for future research.

LOCAL EMBEDDEDNESS AS A KEY FEATURE IN BOTH COMMUNITY ENERGY AND SOCIAL ENTREPRENEURSHIP

Various authors have debated the role of ‘sites and spaces’ in both social entrepreneurship and community energy literature, and how social or community initiatives can be transferred or up-scaled to other organisations or geographical contexts to increase their impact (Smith and Stevens 2010; Crowdhury and Santos 2010; Becker and Kunze 2014; Becker *et al.* 2017).

The label ‘community energy’ emerged in the United Kingdom (Walker and Devine-Wright 2008; Seyfang *et al.* 2013) to describe renewable-energy-generating social groups and structures that exhibit a high degree of project ownership and produce collective benefits on a local level (Walker and Devine-Wright 2008; Seyfang *et al.* 2013). More than one thousand ‘community energy’ projects, developed across the UK, came to justify the relevance of the term ‘community energy’ (CE) in scientific research (Seyfang *et al.* 2013, 2014; Walker 2011; Rogers *et al.* 2012).

Although the concept generally refers to community-based initiatives in renewable energy, a wide array of actors, practices and forms of organisation are included within this broad label, from village hall refurbishments and community-owned wind turbines or solar panels to behaviour change programmes (Seyfang *et al.* 2014; Van Veelen 2016). Community energy is thus normally perceived as dependent on or sensitive to the local context (Kunze and Becker 2014; Van Veelen 2016).

Although Seyfang *et al.* (2013: 978) refer to 'communities of place and interest', most community energy literature focuses on 'communities of place' which refers to their geography and face-to-face nature. Locality is thus linked with informality and embedded relations of trust and mutuality (Walker and Devine-Wright 2008; Walker *et al.* 2007). But traditional understanding of community has been questioned by some authors (Parrish 2002; Bradshaw 2008), who focus more on interaction, shared goals, interests and fears, or a feeling of a sustained connective bond, cooperation, and support, as opposed to a material sense of belonging. The concept of 'post-place community' (Bradshaw 2008) has emerged to underline the networks or social relations established between people beyond geographic boundaries. Accordingly, solidarity among people is no longer tied to place and this implies that places are not necessarily communities and vice versa, that communities are not necessarily linked to places.

Despite this argument, embeddedness is often conceived of as an antonym to scaling up. Seyfang and Smith (2007), for example, argue that the orientation of grassroots initiatives towards direct control and proximity impedes strategies of scaling up, or even of transferring their concepts. For community energy, it was argued that, even in the conceptual development of the term, projects on scales aside from local were not comprehended (Becker and Kunze 2014). Empirically, a focus on local interests and wealth is stronger than striving for wider social transformation such as is necessary, for example, in the case of climate change mitigation (Islar and Busch 2016). Community energy projects generally develop as a result of a horizontal learning process inspired by examples of innovation and best-practice; these examples are exported and translated to other more or less similar local contexts (Smith *et al.* 2016; Kunze and Becker 2014). This adaptation to different local communities or contexts enables community energy projects to expand beyond the scope of the community and thus promote wider social transformation (Seyfang and Smith 2007; Kunze and Becker 2015).

Community energy projects are considered to have a hybrid character between profit and non-profit motivations (Bauwens *et al.* 2016; Fleiß *et al.* 2017; Holstenkamp and Kahla 2016). Non-profit motivations are usually concretised in specific ener-

gy goals such as reduction of energy consumption, preservation of biodiversity or the achievement of sustainable agriculture, or wider social goals such as increased local accountability, redistributive justice and enhanced citizenship participation (Kunze and Becker 2015). Motivations of this nature render community energy projects oriented toward social value creation, as in social entrepreneurship. According to some authors (Smith and Stevens 2010), social value creation can occur anywhere along a continuum of for-profit to non-profit organisations, from small local organisations to major multi-national organisations, and social innovation can be confined to a small local community or dispersed throughout the world. The fact that community energy initiatives can be oriented as both profit and non-profit allows us to analyse them from a social entrepreneurship perspective (Becker *et al.* 2017) and further on explore their organisational forms and embeddedness.

Whereas commercial entrepreneurs are mostly interested in the creation of economic value (Shane and Venkataraman 2000), social enterprises and entrepreneurs are primarily conceived of as creators of social value, and also as agents of social change towards a more just or sustainable society (Austin, Stevenson and Wei-Skillern 2006; Johanisova *et al.* 2013). In fact, profit may be a concern for social entrepreneurs, but only to the extent it allows them to sustain their solutions (Santos 2012). For Mair and Martí (2006: 37), social enterprises represent 'a process involving the innovative use and combination of resources to pursue opportunities to catalyse social change and/or address social needs'. Similarly, Crisan and Borza (2012: 107) regard social entrepreneurship, as 'the way of using resources to create benefits for the society' while the social entrepreneur 'is the person who seeks to benefit society through innovation and risk taking'. On one hand, the authors highlight the innovative process through which value is created, while conversely they stress the potential of social entrepreneurship for stimulating social change in new ways.

Social entrepreneurs predominantly focus on value creation for the society rather than value appropriation for shareholders and management (Crowdhury and Santos 2010). In this context, Johanisova *et al.* (2013) favour the cooperative as an ideal form of social entrepreneurship. Other authors (Alter 2007; Nicholls 2008) argue that social entrepreneurship is open to different legal types or organisational formats. Similarly, Lautermann (2013) emphasises the need to focus on the society-oriented qualities and impacts of an enterprise rather than on its formal or legal definition. This approach opens up the possibility for social entrepreneurship to be viewed as creating both social and economic value (Nicholls 2009).

Local embeddedness is a key feature also in social entrepreneurship literature. Mair and Martí (2006) emphasise the necessity of a social context for the development of social entrepreneurship, while Johannisova *et al.* (2013: 11) equate this context with the local scale, as enterprises have to be 'rooted in and serving primarily the local community'. According to these authors, local embeddedness is inherent in social entrepreneurship initiatives. First, and in accordance with structuration theory (Giddens 1984), the agent (social entrepreneur) cannot be detached from the structure (community, society). Second, embeddedness acts as a precondition to create social value. In other words, enterprises that address social needs require an associated community expressing these needs.

Authors such as Rao *et al.* (2000), Alvord *et al.* (2004) and Lautermann (2013) emphasise that social movements can provide a fertile nurturing ground for social entrepreneurship. Social movements may motivate political orientation in social entrepreneurship as they carry with them 'new norms, values, and ideologies' that 'are infused into social structures via political contestation' (Rao *et al.*, 2000: 276). They may thus lead to new organisational forms of social entrepreneurship (Lautermann 2013; Rao *et al.* 2000; Davis and McAdam 2000), while inspiring and preserving its predominantly social orientation (Alvord *et al.* 2004). Accordingly, social movements may influence the development of collective initiatives in renewable energy generation and supply, and thus promote social transformation on a wider scale (Seyfang and Haxeltine, 2012; Smith *et al.*, 2014).

Smith and Stevens (2010) relate the geographical scale and scope of social enterprises with their degree of local embeddedness. The variance in the geographic focus of different types of social entrepreneurship may influence the types of social networks in which social entrepreneurship is embedded, and these may in turn affect the measurement and scaling of social value. Social entrepreneurs maintaining a more localised focus will preserve a more direct relationship with the local community and its key stakeholders; while those seeking to address more universal problems or issues will reach out to more diverse actors and thus develop less intense and lasting ties with each stakeholder. Therefore, the geographic focus of social entrepreneurs will play a large role in the upscaling of their social ventures (Smith and Stevens 2010).

We argue that the assumption of locality in both community energy and social entrepreneurship literature contradicts the social transformation assumption present in both perspectives. A strong emphasis on locality when social change is pursued could actually lead to a 'local trap' by reducing social change to the local level, thus ignoring the potential for change

at higher scales (Purcell 2006). The power of alternative 'island projects' to induce systemic change within an entrepreneurially-oriented environment may therefore be overestimated (Sharzer 2012). Recent empirical evidence (Becker and Kunze 2014) shows that community energy initiatives can in fact move beyond the local level without losing their collective and participatory nature. Social entrepreneurship literature, on the other hand, emphasises that, while deeply embedded social entrepreneurs or actors might have easier access to resources and legitimacy, they may also be conditioned by the surrounding norms, institutions and structures, and may therefore not be interested in changing existing rules or structures (Holm 1995).

In sum, both community energy projects and social entrepreneurship can adopt many forms depending on founders' aims and motivations, the scope and scale of the problem and the resources required or available to solve it (Zahra *et al.* 2009; Smith and Stevens 2010). We thus aim to examine how local embeddedness relates with different forms of organisation and ownership in renewable energy to finally show that community energy initiatives can operate beyond the traditional sense of 'community' without losing their democratic and participatory ownership structures. We also aim to explore the relationship between the geographic focus of these initiatives and their possible upscaling.

DATA AND METHODS

Empirical data of this article were derived from a larger research project that aimed to identify existing community energy projects across the European Union (see Kunze and Becker 2014). Different types of initiatives such as cooperatives, municipally owned utilities or squat housing projects, which combined renewable energy production with democratic forms of organisation and political ambitions, were gathered from existing databases and online resources. Approximately 100 different projects were identified, of which 16 cases were selected for deeper analysis. The 16 cases were selected based on their geographical and organisational heterogeneity (Kunze and Becker 2015).

The 16 cases were analysed in-depth and compared following a qualitative multiple-case study approach (Stake 1995; Yin 2003; Creswell 1998). The focus of analysis was the origin and development of the projects, and their organisational and ownership characteristics. Semi-structured interviews were conducted to explore the motivations behind these projects and experts' perceptions in terms of organisation, ownership and participation (Miles and Huberman 1994). Various documents such as formal statutes, project webpages and newspaper articles were also analysed. Participant observation was car-

ried out in cases such as the Berlin Roundtable. The data were inductively codified and analysed according to the documentation method (Nohl 2010).

In accordance with the aim of this article, we selected three cases that functioned on different scales and therefore displayed different kinds of embeddedness and forms of organisation and ownership: 1) Machynlleth in Wales, as a model of environmental engagement at community level; 2) *Som Energia*, as an example of successful cooperative in renewable energy that transcended the local scale; and 3) the Berlin Energy Roundtable, as an example of a potential participatory public energy utility at an urban level.

CASE STUDIES ANALYSIS

In this section, we analyse the selected case studies from a social entrepreneurship perspective, showing how local embeddedness relates with different forms of organisation and ownership structures in renewable energy. A social entrepreneurship perspective on community energy initiatives helped us to identify forms of organisation that transcended the local scale but maintained a democratic ownership structure. We start with a short description of the motivation, form of organisation and ownership of these projects, and then focus on how these aspects relate with local embeddedness.

A local energy project: Machynlleth

The rural Welsh community Machynlleth is known for its environmentalist tradition crystallised in a variety of organisations such as Ecodyfi, an eco-tourism Foundation, and the Centre for Alternative Technologies (CAT), a pioneering think tank laboratory in renewable energy technologies. Inspired by energy cooperatives in England as well as Denmark's tradition in renewable energy, in 2003 Machynlleth became the site of the first community-owned wind turbine in Wales.

The ownership structure of this project was quite complex as it involved a number of parallel associations. A previous association in favour of wind energy initially discussed and drafted the project, which was then supported by the Renewable Energy Investment Club, an association that distributed information in search for sponsors. Co-ownership of the turbine was finally concretised in the form of a cooperative, called Bro Dyfi Community Renewables, through which it was intended to finance the turbine by selling shares to the inhabitants. A multi-nested structure was established to ensure participation: some upstream associations were designed to inform and recruit inhabitants, while the cooperative was intended to cover ownership rights and achieve collective participation.

The main purpose of the project was to provide local electricity, while attempting to influence lifestyles and decrease energy consumption. It also aimed to change popular behaviour toward more sustainable forms of energy consumption through effective house insulation, energy-saving lights or specific information and educational programmes. Essentially, Machynlleth stands out not only for its success at local level, but also because of its political ideals of green energy generation that have inspired other community energy projects (Becker *et al.* 2017). Within the British energy policy discourse, Machynlleth is often referred to as a best-practice example of combining renewable energy, local development and citizen participation (Walker *et al.* 2007).

A Catalan cooperative: Som Energia

The Catalan cooperative *Som Energia* ('we are energy') was founded in 2010 in the academic milieu of the University of Girona (Catalonia, Spain). It started by producing renewable electricity at the local level but in spite of the economic crisis, has rapidly become a regional, almost national structure. At the height of its growth, *Som Energia* reported a weekly inflow of over 100 members to reach a total of 26,000 members in June 2016. The cooperative expanded beyond local boundaries to serve the growing demand for green energy generation and supply (Kunze and Becker 2015).

From the very beginning, the cooperative had been committed to renewable energy generation as part of a strong environmentalist motivation. *Som Energia's* main aim had been to achieve a 100% renewable energy model. Other objectives included: political and financial participation of all members; autonomy and independence for local groups; renewable energy education and awareness; and cooperation with other social movements and organisations in the field of renewable energy. In sum, the cooperative was founded not only to produce renewable energy but also to promote wider social and environmental values (Becker *et al.* 2017).

The cooperative was characterised by a participatory, horizontal organisation. Cooperatives normally function in an egalitarian-democratic way since every individual shareholder has one vote on the administrative board, regardless of the number of shares owned (Walk and Schröder 2014). *Som Energia's* social and environmental orientation sometimes restricted its economic activity, and a critical membership had to re-affirm and maintain adherence to these values. Its expansion and growth beyond the local level posed new challenges in terms of participation. Innovative forms of organisation were implemented, such as local groups which acted as independent instances of organisa-

tion and autonomously chose their focus of activity (i.e. education, project development or anti-fossil energy campaigns). Each local group was incorporated through the Annual General Meeting, which was open to all members. Equal voting was assured through video streaming in a digital assembly format. Organisational (and technological) innovations were thus implemented as a way of overcoming the organisational challenges posed by increasing membership and geographical expansion.

A new type of public utility: the Berlin Energy Roundtable

This case refers to a social movement campaign to regulate energy at city level rather than an implemented project (Becker and Kunze 2014). A social movement coalition was formed in Berlin in 2011 to campaign for the re-municipalisation of the electricity grid (Becker and Kunze 2014; Moss *et al.* 2015). This coalition, called the 'Berlin Energy Roundtable' (Energietisch), organised a referendum to challenge the corporate mode of energy provision in Berlin and re-establish public ownership of the energy grid (Becker and Kunze 2014). Although the referendum failed (by only 21,000 votes) in November 2013, the campaign created a new vision for the future governance of Berlin's energy grid and established a precedent in terms of collective action in the energy sector (Blanchet 2015; Becker and Kunze 2014).

The campaign made environmental and social goals mandatory, such as 100% renewable energy generation, reduction of overall energy consumption, employment creation and energy poverty prevention. All these aims were stipulated through a process of direct citizenship participation and consensual decision-making. The democratic, social and environmental orientation of the campaign challenged municipal governance and corporative modes of energy provision (Becker and Kunze 2014). If the public utility proposal had been successful, collective ownership would have been mediated through state ownership (the direct financial beneficiary), though with direct citizenship participation, unlike conventional municipal utilities. A number of participatory initiatives were suggested, such as public meetings at a municipal level, public access to key documents, and an extended steering committee with representatives from the City Council and elected citizens (Becker and Kunze 2014).

In terms of embeddedness, Citizens' Power Utility (Bürgerstadtwerk) would have owned the electricity grid covering Berlin's administrative territory. However the embeddedness would have also depended on citizen participation to counteract state interests. The direct link to social movements is even more evident than in previous cases, as the

Berlin Roundtable was a social movement project in itself, however with the practical aim of establishing a new type of public utility in the energy sector. The coalition behind the Roundtable encompassed various actors, from large environmental organisations, small NGOs and leftist activist groups, to anti-gentrification initiatives and professionals from the renewable energy field (Becker and Kunze 2014; Becker *et al.* 2015). The Berlin Roundtable succeeded in promoting wider environmental and social goals through the engagement of various social actors and organisations under the common umbrella of a concrete urban political project.

How does local embeddedness relate with different forms of organisation and ownership in renewable energy?

The three cases could be interpreted as different instances of social entrepreneurship. They were 'not-only-for profit', pursued social and environmental goals, were originally rooted in local communities, characterised by democratic mechanisms of participation and exhibited collective ownership structures (see Johannisova *et al.* 2013). Nevertheless, some of them expanded beyond the local level without losing their collective and democratic form of organisation and ownership. Moreover, their wider geographic focus affected their level of local embeddedness.

The three cases presented some variation in terms of organisation and ownership structures. The Machynlleth project evolved in a multi-nested structure including two private associations and a cooperative, each with specific attributions such as support gathering, investment attraction, and collective, democratic energy management. The Berlin Energy Roundtable aimed to administer the city's electricity grid through a public utility structure characterised by direct citizenship participation, however the local municipality was actually foreseen as the real owner of the electricity grid, and thus also the main beneficiary of the revenues. Citizens (with voting rights) could nevertheless have exerted their right to decide on whether revenues were to be invested in social or environmental action. This new form of state ownership through direct citizenship participation is different from the logic of cooperative functioning in which members can also be co-owners while having equal voting power in the general assembly, regardless of their shareholding (Becker *et al.* 2017). A certain fee is however a prerequisite for membership of a cooperative, which indirectly excludes deprived individuals. Moreover, *Som Energia's* expansion beyond local and regional boundaries challenged the direct participation of members and required innovative and nested structures with varying degrees of autonomy.

In terms of motivation the three cases were quite similar. All three projects worked with profit, as certain revenues were necessary to finance investments and create value to be distributed according to the non-profit aims. The Machynlleth project focused mainly on energy goals such as clean energy production and supply, and energy saving and efficiency. The project dedicated a significant part of its revenues to community development and energy saving through the households' support fund and educational programmes. The Catalan cooperative *Som Energia* focused on renewable energy production but had a strong environmental motivation. Accordingly, the cooperative formulated strict environmental regulations for its business practice. The Berlin Energy Roundtable promoted overall reduction of energy consumption as a 'central business objective'. It hoped to decrease energy bills through democratic ownership and full transition to renewables. It revealed a clear link between democratic energy transition, local benefits and social justice.

All three projects also generated social and environmental values through their clear orientation toward social transformation and sustainable development. We thus found a common pattern of motivation as the three cases combined specific energy goals with wider social and environmental aims. The aspiration to social transformation, besides maintaining the social orientation of an enterprise, may push for further expansion beyond the local scale. Other institutional and non-institutional actors, pursuing the same goals, may cooperate with and support social enterprises in the energy sector, in their quest for wider social transformation.

The three projects also differed in terms of local embeddedness. Although most community energy projects tend to be local in nature, they may establish networks of renewable energy niches as a result of horizontal learning processes (Seyfang *et al.* 2014), or expand beyond local boundaries (Becker and Kunze 2014). The Machynlleth case is the best example of a locally based community energy project. The project incorporated various local organisations and associations, the benefits were locally oriented towards energy efficiency and saving, and the high demand for shares in the cooperative indicated embedded relations of trust and mutuality (Walker *et al.* 2007). Since the project had a more localized focus, it maintained a more direct relationship with the local community and its key stakeholders.

Nevertheless, while advancing toward a nested cooperativist model of organisation and ownership, the Machynlleth project also engaged and motivated other actors, from outside the local context, for its implementation and further expansion. The project actually expanded beyond the local level

in terms of engaging outside actors (governmental and regulatory agencies, national or international entrepreneurs and experts, sponsors and investors or wider advocacy organisations and social movements), as well as motivating other community energy projects through its political ideals of green energy generation. The project was actually replicated in other local contexts through a process of knowledge transfer.

The Berlin Roundtable's main aim was local ownership of the electricity grid through a public structure (the local municipality), characterised by direct participation of citizens; however Berlin is a metropolis and, culturally, a very diverse one, which aggregates different needs and interests. It is questionable whether the same sort of local embeddedness based on trust and mutuality could have been achieved in such a wide, diverse context. By its very nature, the Berlin campaign was a project aimed to change energy grid ownership and reorient the goals of energy policy on the city level. However, we tend to believe that, if the campaign would have won the referendum, it would have created a best-practice example. Moreover, some of the actors involved were the local branches of nationwide or even international organisations (above all environmental organisations and social movements), implying that they could transfer knowledge to other places. This has actually occurred to some extent by informing grassroots activists in other German cities and also inspiring similar campaigns such as "Switched on London" in the UK. Furthermore, the more professional actors could have engaged in institutional work (Jolly and Raven 2015) to alter the conditions for remunicipalisation in the federal legislation.

The cooperative *Som Energia* came to operate throughout the whole of Spain through a supra-local, networked organisational structure made up of different local sub-units. It actually operated as an alliance of various 'communities of interest' within different locations with common motivations and goals and a shared form of organisation (Seyfang 2013). Local groups represent an appropriate unit of analysis to assess local embeddedness. Moreover, *Som Energia* did not compromise its democratic and social aspirations when it expanded beyond its local boundaries, but continued to abide to them. The use of new technologies and internal democratic control actually maintained this political orientation. The prevailing democratic nature of *Som Energia*, in spite of its growth in numbers and territorial expansion, challenges the assumption that a certain limit to membership is required for a cooperative to function well. *Som Energia* not only expanded geographically in both scope and scale, but also experienced a diversification in its form of functioning through the adoption of a federal structure of organisation and decision making.

All three cases presented strong connections with social and environmental movements. Traditional environmentalist institutions and organisations in the region motivated the Machynlleth project. Previous academic-based associations interested in energy transition prepared the ground for the cooperative *Som Energia*. The Berlin Energy Roundtable was a campaigning social movement that brought together activist groups and actors from various environmental and social movements. The three projects subsequently nurtured this link in an effort to preserve their predominantly social and environmental orientation. This strong background and connection with social and environmental movements allowed two of them to expand beyond the local level in quest of wider social transformation. One project remained confined to the local or municipal level, though continuing to promote overarching social and environmental goals. The relationship with social movements thus affected both the founding context and the internal development of the three projects.

In sum, the Machynlleth case exemplifies the localist nature of most British and European community energy projects. Although the project was successful in preserving its community-based character, it also succeeded in implementing political ambitions for green energy supply and consumption, while motivating other local communities in this endeavour (Kunze and Becker 2015). *Som Energia*, though initially founded within the local confines of the Girona community, finally transcended this boundary to reach regional and even national levels. Its collective, democratic forms of organisation and ownership were maintained through a federalist structure consisting of a central board and various local sub-units with certain degrees of autonomy. Technological innovations were also adopted to assure equal voting and participation. The Berlin Energy Roundtable represents an asymptomatic example of a community energy project. It started as a social movement platform at urban level, but aimed to change into a new form of public utility, based on collective ownership and democratic citizenship participation. Although we can identify a 'community of place', it is more difficult to delineate a clear 'community of interest' in such a diverse context. It is thus questionable whether this initiative was rooted in and served primarily the entire community of Berlin or a wider community driven by a common goal of democratic energy transition.

CONCLUSIONS AND FUTURE LINES OF RESEARCH

Transition to renewable energy as a key issue for climate change mitigation often implies decentralised forms of organisation and collective ownership structures. Indeed, various types of community energy projects or grass roots initiatives have

emerged in the energy sector across Europe in the shape of cooperatives, local public utilities or other legal entities. These initiatives, although initially locally bounded, sometimes expand beyond the local scale in a quest for wider social transformation. Actors involved in these types of initiatives could shape institutional contexts in a collective effort toward democratic energy transition at higher scales. Social entrepreneurship provides us with a suitable analytical lens to explore different forms of organisation and ownership structure in renewable energy and thus assess their relationship with local embeddedness.

We selected three types of community energy projects and analysed them as particular instances of social entrepreneurship. This perspective allowed us to analyse local, non-local as well as participatory public projects in the energy sector. The variance of geographic focus for the three examples of community energy projects revealed a variety of networks in which these projects were embedded. It thus allowed us to include, beside local communities, social movements and state actors as important policy-making actors in the energy sector, and furthermore to investigate the aspects of local embeddedness and upscaling. Social entrepreneurship initiatives in renewable energy were thus viewed as collectively owned organisations that innovatively combined renewable energy production and supply with other ecological or social goals, maintaining their democratic ownership structure although they sometimes expanded beyond the local scale.

The three cases presented different forms of organisation and ownership, namely cooperatives, private associations and participatory public utilities. These respectively translated into: a multi-nested organisational structure which helps to preserve the localist nature of a renewable energy project; a green energy cooperative, where collective ownership and democratic participation was maintained through innovative technological solutions and a federal organisational structure; and a potential public utility structure based on direct citizen participation after the re-municipalisation of the energy grid. Although they were generally hybrid in character between profit and non-profit motivations, their predominant focus on social value creation rendered them as good examples of social entrepreneurship.

The three cases, while focusing on specific energy goals, also pursued both environmental and social aims. Previous social movements and environmental traditions inspired their foundation, and these ties were maintained over time; in some instances this motivated their expansion beyond the local scale in a quest for wider social transformation. The values promoted by social movements often

functioned as a blueprint for controlling the business practice of social entrepreneurship initiatives in the energy sector. They maintained their political nature and avoided being turned into mere commercial or profit-oriented energy providers. The predominant social orientation of the three initiatives was thus preserved and nourished by continuous connection with environmental and social movements. The relationship between collective initiatives in the energy sector and social movements needs to be studied as it may reveal members' level of activism, their organisational and political knowledge, and their sources of motivation and inspiration. It may also reveal whether a social movement background is a precondition for the existence and development of this type of initiative, and whether the maintenance of these ties can explain projects' expansion beyond the local scale.

Two of the case studies presented clear trends toward regionalisation and urbanisation in the renewable energy sector, while one remained primarily embedded locally, though expanded its reach by becoming a model of democratic energy transition for other local communities. An increase in the geographic scale and scope of these projects (i.e. from a local community project to an urban municipal utility and then to a regional or nationwide cooperative) was accompanied by a decrease in the level of local embeddedness, as the ties with the local community became less intense and more diversified. Specifically, the Machynlleth project, while primarily local in scale (it did not expand beyond the local level), developed a range of external networks that enlarged its geographic scope. The Berlin Roundtable, an urban initiative toward public ownership in the energy sector, failed to achieve the level of local embeddedness necessary for its implementation, but has inspired similar campaigns in Germany and beyond. Only the cooperative *Som Energia* succeeded in transcending the local level in both scale and scope, thus becoming an almost nationwide cooperative, as well as an example of commitment in renewable energy transition and wider social transformation. However, the three examples show that community energy is no longer tied down by geographical boundaries, and that 'communities of interest' in the energy sector are becoming stronger. They also show that their geographic scale and scope play an important role in the upscaling of their social ventures.

While acknowledging the important role of the local context for development of social entrepreneurship, we found that supra-local membership

structures do not necessarily impede strong practices of direct democratic participation. State-wide structures may require higher organisational efforts to integrate different interests and uphold a democratic decision-making process, but innovative technological and participatory solutions can overcome these organisational challenges. These results question local embeddedness as a necessary and sufficient condition for collective initiatives in the energy sector, and show the importance of other actors such as social movements or state actors for promoting wider social transformation beyond the local scale. Growth past the local scale might be seen as a necessary feature of upscaling in energy transition that is just one goal in the quest for wider social transformation.

Although social entrepreneurship proved to be a suitable analytical lens for exploring the relationship between local embeddedness and different forms of organisation and ownership in renewable energy, further research into different types of embeddedness in social entrepreneurship initiatives in the energy sector are needed to confirm this result. To better assess how local embeddedness relates with different forms of organisation and ownership, future research could identify specific typologies based on these two dimensions. Future research could also better link community energy debates with social entrepreneurship debates, and thus enhance the analytical perspective in the renewable energy field. For example, a focus on the notion of "collective institutional entrepreneurship" would allow for a better understanding of the role of 'agency' in challenging existent institutional arrangements through political processes. Social networks and alliances with other partners need further exploration, not only in terms of scaling, but also for the more general purpose of knowledge transfer and best practices' sharing. Other methodologies such as surveys and choice experiments could also help advance knowledge in this field.

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