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The power of renewable energy co-operatives: How can they contribute to wider socio-ecological innovation in the UK?

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Abstract

Co-operatively owned renewable energy projects in the UK have been praised for their potential to allow communities to take control and benefit directly from clean energy production. The model for energy co-ops has been developing for over twenty years, and some organisations in the sector are questioning where they can go next. This thesis assesses how far there is scope for energy co-ops to develop further, by benefitting communities more widely and doing more to tackle environmental issues. The thesis draws on case study research undertaken at three energy co-op sites, in addition to an online questionnaire sent to 24 energy co-operatives associated with the intermediary Energy4All. By assessing the activity and visions held in these co-operatives it draws out promising areas of innovation. It also highlights the complexity of these groups, and the challenges that they face in retaining engagement and navigating relationships with other public and private organisations. The thesis identifies several key areas where further consideration, or support from intermediary groups, would be helpful to maximise their potential.

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List of abbreviations and useful terms

Energy co-op: A community energy project operating under co-operative principles, often (but not always) focused around the generation of electricity/heat.

CRE: Community renewable energy

FITS: Feed-in Tariff Scheme

FCA: Financial Conduct Authority

CEE: Community Energy England

AGM: Annual General Meeting

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Chapter 1) Introduction

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The challenge of sustainably transitioning our energy systems has often been described as an 'energy trilemma'. Three dimensions need to be satisfied: energy security, social equity, and environmental sustainability (World Energy Council 2019). Renewable energy has been recognised as a key part of delivering this transition (BEIS 2018), but the trilemma draws attention to how technological solutions are deeply intertwined with social and economic factors. Grassroots movements have been known to address all of these needs, by paying attention to local contexts and putting citizens at the forefront of change (Seyfang & Smith 2007). Over the past three decades, community renewable energy generation schemes (referred to here as 'energy co-ops'[1]) have emerged as an innovative way for communities to take control and collectively benefit from energy production (UKERC 2018).

The UK's first energy co-op was the Baywind Energy Co-operative, formed in 1996. Community shareholders owned six wind turbines in Cumbria, receiving yearly interest payments whilst some profit was directed into a local Community Trust. Since then the model has spread and diversified, spanning rural and urban settings and incorporating other technologies such as solar PV, hydropower and heat. In 2018, an estimated 300 community renewable energy generation schemes were in operation (UKERC 2018). There are two main assumptions about energy generating co-operatives. The first is that they will produce some form of electricity or heat, to be exported to the National Grid or used on-site. The second is that, as 'community energy' projects, there will be some form of community involved which exhibits "a high degree of ownership or control, as well as benefiting collectively from the outcomes" (Seyfang, Jin-Park & Smith 2013: 978). The former is easier to measure: according to Community Energy England (2019), as of December 2018 the total electricity generation capacity of community owned energy in the UK was 236MW.

The latter raises more questions – who are the actors involved in this community, and what does it mean for them to control the direction of the energy project? Are there different visions of what it means for a community to benefit? Though praised for its potential to engage citizens and overcome local barriers to sustainable development, the phrase 'community energy' (which includes demand-

[1] Many of these 'energy co-ops' are not registered as Co-operative Societies, rather Community Benefit Societies or the pre-2014 Industrial & Provident Society. I continue to use the term 'co-op' because this is how members of the groups tended to identify themselves. This is due to both their adherence to co-operative principles, and contention around what 'community' means. For more details on the distinctions between registered Community Societies, see the Community Shares Handbook (Community Shares Unit 2019).

side/educational projects as well as energy generating projects) has been known for its diversity, leading to a range of projects with different profiles claiming the title (Walker & Devine Wright 2008). As of 2014, many new energy co-op schemes are registered as Community Benefit Societies; they legally exist for the 'benefit of wider society' rather than just for their members (FCA 2015). This notion that community renewable energy (CRE) projects benefit a wider society is often referenced, but what it means in practice can be unclear: there is a current need to consider what CRE projects *do* once they have been formed (Creamer et al 2019).

Energy co-ops in the UK are at an interesting point of maturity. Much academic attention focused on their early development stages, but now we see projects with a well-established energy source engaging with environmental and social development in different ways. Alongside their development, new organisations like Community Energy England (CEE) have emerged to provide support and consolidate knowledge. The conclusion of the Feed in Tariff Scheme (FITS) this year, along with great uncertainty surrounding the future of government support, has pushed community energy projects to think differently about what is achievable and how to operate in what looks likely to be a post-subsidy environment (CEE 2019).

These kinds of conversations are going on not just in the field of energy; it is increasingly recognised that the coming environmental crisis will radically change our system, and that "society is both the problem and mostly the solution" (Urry 2011: 155). Debates about what can be done and whose voices are being heard are being held across many sectors, from agriculture to transport. There is no easy solution, but this thesis contributes to a growing field which joins the environmental with the social to reflect on society's role in a changing environment.

The thesis is based on fieldwork conducted over three months. Three detailed case studies are used, as well as an online questionnaire sent to the members of these and a further 21 energy co-ops across the UK. By exploring some of the visions and activities going on in energy co-op projects after their technology has launched, the research opens up a more holistic understanding of their social and environmental potential.

The main research aim is:

To assess the wider socio-environmental potential of renewable energy co-operatives in the UK

In order to do this, the thesis considers:

- **How energy co-ops envisage their remit and their development over the coming years**
- **What it means for members and supported communities to engage with an energy co-op**
- **What local/national networks energy co-ops operate in, and what opportunities this presents**
- **What kinds of support energy co-ops would find useful in developing their potential**

The final aim is useful, because research has been conducted in collaboration with the non-profit social enterprise Energy4All. Energy4All assists in development and longer-term support of community energy projects across the UK; an intermediary organisation which in itself is helping to shape what it means to be an energy co-op. As their numbers have grown (their family currently consists of 26 co-ops), the nature of the sector has changed and Energy4All have questioned what kinds of ongoing support could be provided in this dynamic environment.

The thesis is divided into five sections. After a brief overview of the history of energy co-ops in the UK, Section 2 reviews existing literature, situating energy co-ops within the framework of socio-technical transitions and within wider grassroots movements. It opens up tension behind concepts like community and participation, discussing the inherent complexity of the label 'community energy'. Section 3 explains the methodology, and why mixed methods were chosen for research. Section 4 puts forward the research findings in three chapters. Section 5 brings them together to form some concluding remarks and recommendations for Energy4All, then reflects on the process and where further research would be helpful. On the one hand, the research seeks to highlight complexity and diversity in the sector, but it is also seeking common threads which could contribute towards an overarching development in the energy co-op field.

1A) Context of community energy

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The roots of community energy in the UK go back to the alternative technology movement of the 1970s and 1980s (Vickers & Lyon 2014; Walker & Devine-Wright 2008). However, during this period it was considered niche, largely outside the interest of government and academic research. Greater attention developed from 1997 when the New Labour government introduced the first of several feasibility and capital investment schemes: the Community Energy Programme (Harnmeijer 2017). According to Harnmeijer, at this time market-based co-operatives/mutual enterprises were desirable because they offered a "political compromise between different ideological positions and distributional goals" (ibid: 10). Baywind Energy Co-operative, the first *energy generating co-op*, was set up in 1996.

Interest grew through the 2000's, alongside a shift in the UK's popular discourse surrounding climate change and energy security (ibid). In 2002, Energy4All was set up by members of Baywind to help other community energy schemes achieve success; the first of its kind in the UK. A key turning point for community energy was 2009, when the government's Feed-in Tariff Scheme was introduced to provide a financial incentive to small-scale renewable energy projects (UKERC 2018). Making the most of this opportunity, in this period there was a flourishing in the number of community-owned renewable energy projects launched in the UK, and a broadening to urban areas as well as rural (Harnmeijer 2017). Government support peaked in 2014 with the publication of their Community Energy Strategy, a pledge to support and tap into the "huge potential" of community energy (DECC 2014: 3).

Most community energy projects focus on the generation of electricity (UKERC 2018), and these projects are often guided by co-operative principles such as democratic member control and voluntary membership (Spear et al 2017), hence the label 'energy co-ops'. Because of the structure of the UK's energy market, the energy itself cannot be sold directly to local residents; it is used on site or fed into the National Grid (Pfeifer 2018). Community generation projects are usually considered 'meso-sized', sitting somewhere between micro and macro in the scaling of renewable energy projects (Creamer et al 2019: 3).

Parallel to the growth in the number of community energy projects was a growth in academic attention to the phenomenon's potential, with literature considering what challenges the sector may face and how best to guide it (see following chapter). However, since the 2015 general election, support in the sector has diminished. Crucially, 2019 saw the final wave of new projects applying for the Feed-in Tariff Scheme before its closure in April. With its phase out, the number of new community

energy projects has significantly fallen (CEE 2019). It should be noted that financial opportunities are not uniform across the UK – Scottish co-ops, for example, can still apply for the popular Community and Renewable Energy Scheme (CARES) (Scottish Government 2019). This provides a source of funding, resources and advice which has helped projects get a foothold. However, a volatile political climate over the past several years has contributed to a wider sense of uncertainty in Britain with regards to institutional support for the field.

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Despite this uncertainty, CRE projects have shown resilience and continue to make progress. Given the barriers facing new projects, the discourse in the community energy sector has shifted somewhat from an emphasis on how best to set up new energy-generation projects to an emphasis on other innovations. These include "energy efficiency and awareness-raising… investigating electrifying transport, flexibility services, demand side response, local energy supply and peer-to-peer (P2P) trading" (CEE 2019: 1). As older projects have matured, economies of learning have developed, and networks have formed which facilitate the sharing of knowledge and experience between CRE groups and other organisations (Walker & Devine-Wright 2008). So, although the political environment may be less favourable towards CRE than it was ten years ago, the sector itself has evolved in this time, and ongoing attention is useful precisely because of this.

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Chapter 2) Literature Review

This literature review considers renewable energy co-ops within the broader context of community energy, using concepts of community, grassroots innovations and socio-technical transitions to frame the issue. It then considers literature which has focused on more specific issues related to community energy, such as participation, leadership and networked learning.

2A) Community energy: meanings and frameworks

2A) I) Community

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Despite the community energy movement receiving academic attention for several decades now, how to define what community energy is has been a consistent topic of debate. Part of the difficulty in pinning down what constitutes 'community energy' stems from perennial debates over the meaning of community itself (Jones 2003). Physical territory has long been considered a key indicator of community identity. Baker & Mehmood (2005: 328) argued that despite claims of globalisation causing the transcendence of space, "place persists as both a constituent element of social life and of historical change". Most energy co-ops are to a degree bound to a physical location by their technology or services: a wind turbine which is fixed and visible from certain villages, or energy efficiency tests provided to those residing within a certain postcode, for example.

The history and geography of a place can determine which technologies are considered most acceptable. Gormally et al's 2014 research of attitudes towards community energy in Cumbria found hydropower to be the overwhelmingly preferred renewable technology for local development. This preference was attributed to both the community's awareness of nearby physical resources, and hydropower's connection to Cumbrian cultural history: it was "providing continuity with the past" (ibid: 928). In this study, the attitudes of the community were entangled with the physical landscape and the technology that this favours. Other studies have found communities defined as 'rural' or 'suburban' to have a disproportionately high number of community energy projects (UKERC 2018), as well as higher participation in terms of volunteering and financial investment (Kalkbrenner & Roosen 2015). In 2013, Seyfang, Jin Park & Smith found that a vast majority of their UK community energy

survey participants (89%) identified their community as a community of place, as opposed to a community of interest.

However, de-territorialization in modern society, and with this constant *re*-territorialization and rethinking of cultural space, has led to a more fluid reconceptualization of community and culture (Gupta & Ferguson 2007). Walker (2011) highlights the multiple conceptions of community, from community as representing a bounded geographical space, to community representing a network, a process, identity, scale or an actor. Locality alone is not enough to justify being labelled 'community' in nature, and despite the normatively positive connotations surrounding the term (Walker 2011), it can also be used as a tool to exclude, gain project support or renounce responsibility on the part of the government.

For example, Walker and Devine-Wright's 2008 study of several community energy projects in the UK found strong resentment towards a wind-farm appropriated as a 'community project' because of its local ownership, but whose benefits were only going to a handful of wealthy local landowners. This shows how community is not synonymous with physical space, but it also indicates that *too* much fluidity in the term can lead to manipulation and distrust in its practical uses. For that reason, it is still helpful to apply a fixed definition of community energy to this thesis. I follow Gormally and co-writer's definition of a community energy project as a "community-owned energy initiative led either by a co-operative or community trust" (2014: 916). This definition mainly refers to ownership of projects, implying a strong degree of democratic control from members. Within the co-operative and community trust models there is also the assumption of some degree of collective benefit (UKERC 2018). Importantly, this definition does not bind community energy to a specific physical space.

The diverse understandings of what constitutes 'community' in community energy projects is relevant to this thesis, because a project with a strong local sense of community for example may have a different set of visions to one whose sense of community is dispersed or weaker. Often regarded as 'grassroots' organisations, it is tempting to imagine CRE projects as being geographically contained. The case studies used in my thesis however, similar to many other energy generation schemes, have shareholders spread across the UK. Here, the term community would refer more to a 'network of investors' rather than a locality (Walker 2011). Do these distant members feel like part of a community, and still feel an incentive to engage? In Slee's study of on-shore wind in the UK, he pointed out differences between locally-owned and broader 'community'-owned projects, saying further research was needed to see whether the two models generate similar levels of benefit (2015: 547).

Commented [NH7]: Corrected from 'distance members'

2A) II) Socio-technological regimes and grassroots innovations

Both academics and on-the-ground advocates of renewable energy have come under criticism in the past for framing the issues which surround its successful implementation as disproportionately technocratic (Hoffman & High-Pippert 2009). This has been part of a wider call for works on renewable energy to consider the social, cultural and political dimensions of development, rather than an overemphasis on top-down technological understanding (Cloke et al 2017). New technologies, however efficient, often struggle to fit into existing systems – for example, electric vehicles have been technologically ready for use in the UK long before wider infrastructure and behavioural changes have welcomed them (Kemp et al 1998).

The socio-technical regimes framework addresses this imbalance in focus. It draws attention to the complexity of institutions, agents and artefacts involved in shaping our practices (Seyfang & Smith 2014). By dichotomising social and technological issues, one overlooks the ways in which these are deeply interwoven; in the context of energy technology, Cloke and co-writers (2017: 268) explain that it is "one thread in a social fabric of community service provision and infrastructure". Therefore, a transition in our energy system requires a co-evolutionary approach. A change of not only technology but also the industry, markets, policy and culture, as well as how these all interact with one another (Geels 2012).

Commented [NH8]: Corrected from 'practises'

Looking at the transition to renewable energy in this way, alternative forms of social organisation appear which offer novel ways of understanding, owning or using renewable technology. Drawing on the framework of socio-technical regimes, Seyfang and Smith (2007) conceive of community energy projects as 'grassroots innovations': small-scale bottom-up initiatives which work outside of the mainstream regime to develop new solutions to our energy transition. Rather than relying on expert-led technological transitions, this signals a bottom-up socially driven approach. Grassroots initiatives incorporate a diverse range of activity including eco-villages (Espinosa et al 2011), organic food networks (Smith 2005) and Transition Town movements (Baker & Mehmood 2015). These kinds of movements are thought to have great potential for innovation, since they are not purely driven by profit but also/instead by social need and ideology (Seyfang & Smith 2007). This plurality of motives gives the space needed for experimentation and innovation, in a way less often found in purely profit-driven commercial enterprises. Grassroots movements can also work positively on public perceptions of sustainability; in the case of renewable energy, Walker & Devine Wright found that a successful community approach could do work on "hearts and minds" of local people to encourage support and increase interest (2010: 2657).

Considering energy co-ops within a socio-technical regimes framework assists my research by opening space to see their full potential; not just as small-scale producers of clean energy, but also as alternative forms of social organisation which allow for the technology to be owned and utilised in novel ways.

2A) III) Aims/scaling

Seyfang & Smith considered grassroots movements a "neglected site of innovation" (2007: 585). When considering how to strengthen their impact, Strategic Niche Management theory has been one proposition. Strategic Niche Management theory suggests that grassroots innovations, operating as more scattered niches, may eventually transition towards 'global niches' through scaling-up: thus becoming robust enough to challenge the dominant socio-technical regime (Geels & Deuten 2006). Lohtonen & Kern (2009) highlight how a learning culture must be nurtured in order for these kinds of pathways to develop, rather than an overemphasis on targets or accountability. This requires the creation of 'protected spaces' to test the desirability of their technologies and allow them to flourish (Kemp et al 1998: 185). Developing the theory, in 2011 Bergman & Eyre proposed a more conceptual form of Strategic Niche Management that tests not just technologies but also different forms of sustainable organisation. This gives more space to the 'soft' benefits of grassroots movements, benefits such as increasing energy literacy.

It can be argued that removal of key government incentives such as the FITS has weakened the protected space that had been in place for both technological and organisational niches. Parkhill et al's research in UK community-led energy initiatives concluded there was "a need to reflect on what sort of 'supportive governance' mechanisms could be developed outside of specific policy interventions" (2015: 68). Ideally, these would be mechanisms which support but also build a community energy project's resilience in the face of changing external conditions.

Commented [NH9]: Added apostrophe to 'projects'

In the Strategic Niche Management framework, the assumption is that niches can and should do much more work (Smith 2005). But questions must be asked about how far a community group has a cohesive *desire* to scale-up or extend their remit, and what form this would take (Seyfang & Smith 2007). Walker & Devine Wright have questioned how far community energy groups fit into the label of niche at all, and how far they really want to challenge the incumbent regime (2008). Seyfang & Smith highlight two key drivers of sustainable innovation; social need and ideology (2007: 591). A project can fulfil social needs not currently being met in a regime. This could be materially, for example by providing energy to light a public building, economically, by keeping profits held within the

Commented [NH10]: Changed 'nature' to 'form'

community, and so on. Once these needs have been met, there is no inherent assumption that the group will wish to develop further.

Indeed, there are different and overlapping visions of development and what it means to be successful: success could be in the sense of impactful sustainable development, in line with Strategic Niche Management goals. It could also mean local economic development, or a stronger sense of community identity (Vickers & Lyon 2014). Vickers & Lyon (2014: 458) pointed out how for some groups, growth meant a shift from reliance on government funding to independence; funding helped them to develop, but not to consider themselves successful. Seyfang et al (2007) distinguish between 'simple' projects which aim to only solve local problems, and 'strategic' projects which aim to have a wider influence. Researchers like Parkhill et al (2015) have drawn particular attention to the danger of focusing solely on environmentally-motivated goals, and emphasise the importance of considering a community energy group's own self-image.

Self-benefit can also underpin motivations to join an energy co-op, including a desire to make financial gain and an increased sense of self-worth. Although community energy projects can take many forms, most generation projects (including all of my case study sites) operate according to co-operative principles. In Co-Operative UK's 2011 renewable energy guide, Willis & Willis remind us that *"*Co-operatives want to trade successfully – they are businesses, not charities, after all*"* (2011: 6). This is an important reminder when considering the socio-environmental potential of energy co-operatives. Like many social enterprises, they hold an interesting space between private companies and charities; 'hybrid' in their mixture of commercial and social characteristics (Willis & Willis 2011: 29; Spear et al 2017). Collective ownership can be premised "on both moral and material claims" (Slee, 2015: 521): although it is tempting to focus solely on the community values of the co-op, the pursuit of fair financial return can be an important aspect of the model. Economist Alfred Marshall once described them as *"*At once a strong and calm and wise business, and a strong and fervent proselytising faith*"* (1889, cited in Mazzarol et al 2014: 7).

Spear et al (2017: 28) discuss the contention around labels like co-operative and social enterprise. There are varying interpretations of what the 'social' aspect is – whether this is the mutual benefit of its members, or a more general interest. As noted previously, the 'Community Benefit Society' registration (which many energy-generating co-ops now opt for) incorporates a wider society into the organisations remit. Yet, there is little in the way of guidelines as to how this 'benefit' is actioned (Community Shares Unit 2019).

Finally, if there is a shared vision within a community energy group, this is subject to change. Parkhill et al used a case-study approach to look at community energy projects in the UK. They noted how an

energy project in Wales (part of an eco-village) evolved in its vision and objectives "through an iterative process between those that initiated and fought for the site development during the planning application and those that took up plots in Tir-y-Gafel subsequently" (2015: 65). Community projects are not static. An energy-generating project may have a life expectancy of around 20 years; not only will key members change, but so too will the surrounding social, economic, political and environmental circumstances. In their recent re-visiting of central themes in community energy, Creamer et al note that there is still largely an absence of time in the framework (2019: 3). This is likely because research has tended to focus on the uptake and development of projects, rather than outcomes (Berka & Creamer 2018: 3400).

It is evident from the literature so far that energy co-ops occupy a contested conceptual space. There is no universal shared vision among community energy groups: literature consistently acknowledges the vast diversity in the sector. This is important to keep in mind when addressing the research questions regarding visions of development and engagement, as the solutions for one group may not be easily applied to another. On the other hand, a lack of certainty over where exactly energy co-ops fit in conceptual frameworks should not be seen as detrimental. On the topic of community for example, Creamer et al (2019: 2) say that "far from indicating its slippery lack of utility and difficulty to readily apply, [debates] actually indicate an aliveness; a vibrant, dynamic connection with community's given situation". So, whilst it is important not to pin down my case studies as representing any kind of fixed energy co-op reality, they can still provide insight into a dynamic phenomenon with some overarching themes and coherence.

2B) Community energy in practice

Commented [NH11]: Changed from 'practise' to 'practice'

2B) I) Multi-faceted nature of community energy

Despite encouraging figures, community energy projects still contribute a small portion to the UK's energy mix: around 1% (UKERC 2018). So far, the figures don't suggest a huge amount of impact in comparison to the 'Big Six' energy companies that have long dominated the energy market (Bergman 2009). However, looking at energy output figures is only one measure of the contributions of community energy. For one, several community energy groups focus on or incorporate demand-side initiatives, including behavioural change incentives and energy efficiency changes (Seyfang et al 2014). Examples of these activities include newsletters, public meetings, energy-efficient technology installation, and stalls at events (ibid: 983). It is more difficult to measure these kinds of initatives. The UK Energy Research Centre (UKERC) (2018: 25) found that energy generation dominates the activity of community groups, but Seyfang and cowriters (2014: 979) highlight the highly informal nature of many energy-conservation and behaviour-based initiatives. UKERC acknowledge that their figures may be limited due to non-generational activities going under the radar of broad surveys (ibid: 17, see also Phillimore et al 2010). There has been an increasing trend towards a pluralistic vision of the ways communities engage in energy activities, beyond only the production of energy (Parkhill et al 2015).

Hielscher et al. (2013) highlight this as one of the key ways in which community projects distinguish themselves from more mainstream energy groups: they are multi-faceted, rarely addressing just one technology or aspect of sustainability in isolation. For example, an energy project may have begun by installing solar panels on schools. Having established these, the project could go on to use profit to replace the schools lighting with LED bulbs. They could then provide resources about energy for use in classrooms, thus progressing from energy-supply to energy-efficiency and finally behavioural change. In 2018, CEE found £978,000 had been spent by community energy organisations on 'Community Benefit Funds' (CEE 2019: 18); these funds include grants to support other local low carbon initiatives.

This overlapping of activity may cause tension sometimes, as participants in Hargreaves and co-writers' study of intermediary organisations (2013: 876) suggested 'completely different languages' were spoken in the fields of behavioural change and community renewable energy generation. This disconnect was voiced by members of behaviour-focused projects, who struggled with technological and policy jargon used by energy generating groups and thus felt alienated from working with them. The pluralistic nature in which communities engage in energy activities has been acknowledged

several times in energy transitions literature (Shove & Walker 2010; Seyfang et al 2013; Parkill et al 2015; Creutzig et al 2018). It is part of what makes these projects attractive, what sets them apart as 'grassroots innovations'. However, integration of different aspects of sustainability did not go without difficulties, and this was particularly experienced by those trying to understand technology-based projects. My case studies are all primarily energy-generating sites. How far these sites consider themselves multi-faceted, and how easily they can integrate other non-generational activity, is a key part of understanding how they envisage development.

2B) II) Participation

In order to understand the wider potential of energy co-ops in the UK, it is important to consider who is making decisions within the groups and how members or affected communities engage. High participation is often thought to be beneficial in community groups because it can lead to greater acceptance and innovation. Walker and co-writers (2010: 499) referred to successful engagement with communities as working on the 'hearts and minds' of the people affected. Engagement could then have a catalytic effect in promoting further positive action around renewable energy (ibid). Participation from a range of individuals can also make use of tacit knowledge. An understanding what works in specific localities can lead to 'better-fit' solutions to sustainability issues (Seyfang & Smith 2014). This is an area where community energy projects can distinguish themselves from commercial projects and from individualistic measures; by finding the right solution to a specific context, based on a collective pool of participatory on-the-ground knowledge (Hielscher et al 2013).

However, 'participation' can become problematic when viewed too narrowly. Sherry Arnstein's 1969 ladder of citizen participation is a well-recognised typology which draws attention to the complexity of 'participation' and the different degrees to which it can be used as a tool of engagement. Participation without the intention of transformation is no more than tokenistic, even becoming a tool for manipulation and the re-production of inequality (Arnstein 1969). Arnstein labels groups as either 'have's' or 'have not's' of participatory power, and makes the normative assumption that participation exists on a continuum with an ideal end-point of full citizen control.

However, Jones (2003: 590) critiques this by arguing that power is a more fluid concept than just the 'powerful' and 'powerless' in society. In the context of community energy groups, there are varying degrees of participation. All members of a co-op project have equal voting rights and could be considered 'have's' in Arnstein's distinction. But, despite the right to participe, research has demonstrated several 'hidden' barriers in the way of significant engagement in community energy

groups (Jones 2003; Walker et al 2010; Gormally et al 2014). Lack of time was one of the most significant issues. This is unsurprising given co-ops rely almost entirely on volunteers (UKERC 2018). Financial barriers were cited, but also a lack of knowledge surrounding projects, and sometimes a lack of cohesive leadership. Then, there is the question of how far individuals *want* to participate. In Van Veelen's study of energy democracy in Scottish CRE groups some interviewees pointed out barriers, but several others were happy leaving staff or directors to 'get on with it' (2018: 651). Despite the positive assumptions surrounding participation in community energy groups, it should not be assumed that this is desired by all members.

There is also a wide community 'participating' in energy co-ops, for example the users of buildings with co-ops energy generators on them. UK-based literature has paid good attention to wider communities in the planning and development stages of projects; considering processes like procedural justice in shaping attitudes of acceptance (see for example Simcock 2014). However, less attention is given to projects which are up and running. My study will therefore consider not just how far shareholders are engaged, but also how other members of the community (such as users of the buildings or recipients of co-op grants) are engaged.

In Berka & Creamers review of local impacts of community energy, they note that CRE projects are "typically co-ordinated by small core teams whose motivation and leadership style heavily influence social capital development" (2018: 3412). Despite the democratic, one share one vote rule, a correlation has been found between strong leadership from a small handful of members and successful community energy projects (Hoffman & High-Pippert 2010; Martiskainen 2017). Martiskainen (2017: 84) found that leaders would often be very 'visible' members of their communities; visible through other commitments such as positions on town councils, voluntary groups and hobby clubs. Leaders would work closely with other intermediary organisations, as well as showing innovation in seeking new resources and opportunities (ibid: 85). Hoffman and High-Pippert also highlight the importance of a small number of key figures committed to activities, referring to them as the 'strong democrats' of a community energy group (2010: 7573). Finding such committed members was a consistent struggle (Jones 2003; DECC 2012; Kalkbrenner & Roosen 2016) and could lead to some vulnerability in organisations, due to overreliance on one person to see a project through (Martiskainen 2017).

As well as concerns about project continuation, this concentration of expertise in a small number of hands calls into question how far knowledge and experience is diffused throughout the community. According to CEE, "at the heart of most community energy organisations is the aim to develop local community capacity, cohesion and inclusivity" (2019: 7), and community energy has previously been

slotted within concepts of energy justice and energy democracy (Van Veelen 2018). This suggests that community energy empowers communities, but Slee (2015) and more recently Berka & Creamer (2018) have pointed out that we actually have limited empirical evidence about how this 'empowerment' manifests. Reflecting on Walker & Devine-Wright's (2008) process/outcome map of community energy, ownership in itself can be considered empowerment because citizens have power in the process. But what of the outcomes: does it bring about more widespread knowledge about renewable energy, for example?

Renewable energy generation is more technocratic in character than some other grassroots environmental movements, and as Fischer points out: "It is one thing to say that ordinary citizens require knowledge, but it becomes quite another question when we recognise the technical complexity of many environmental issues" (2018: 261). My findings later explore how these technocratic aspects can affect the ability for ordinary members to engage, and how that affects sense of empowerment through the projects.

Once again, a past tendency to focus on planning and developmental stages of projects (Creamer et al 2019) has perhaps led to these kinds of outcomes (related to ongoing cohesion and inclusivity) being less thoroughly studied. More recent studies, including Van Veelen's 2018 study of energy democracy in CRE groups, are looking closely at what CRE groups do in practice rather than just what the term means. But Creamer et al call for further attention – "what does it [community energy] enable, empower, inspire, include, exclude, obscure or obstruct" (2018: 2) – and this thesis tries to unpick some of these questions by looking at specific activity and examples of the ways through which members and affected communities engage.

2B) III) Learning

Literature has drawn attention to the abstracted forms of knowledge and expertise gained and shared between community energy groups and other networks. Seyfang et al's study of community energy projects in the UK (2014: 31) found high levels of shared learning between CRE projects, achieved largely through informal peer-to-peer methods, developing replicable models, and hosting visits to their projects. Since projects often experience steep learning curves when they begin (DECC 2012), effectively sharing knowledge with new and existing projects can lead to better resilience and success (ibid). Shared learning could ultimately lead to greater sustainable development, not just because fewer projects would fail, but also because projects could spend less time working through common obstacles and more time working on further sustainability. UKERC's recent report suggests that,

Commented [NH12]: Changed from 'sustainable initiatives' to 'sustainability'

alongside new non-governmental financial lending systems, it is thanks to these 'economies of learning' developing that community energy projects have managed to withstand a less favourable political climate in the years following the 2015 election, and project numbers have continued to grow (2018: 5).

Further to this are the growing relationships between CRE projects and intermediary organisations, who can provide resources and expertise as well as a space for networking (Hargreaves et al. 2013; Seyfang et al 2014; Martiskainen 2017). These organisations are varied in both nature and scale, and include government departments, non-profit organisations and corporations. They can operate as 'enablers': allowing social innovation to develop and be diffused (Baker and Mehmood 2015). Alongside enabling, or what they call formation of an 'institutional infrastructure', Geels and Deuten (2006) identify the role of 'aggregation'; taking local knowledge and transforming it into 'robust' knowledge which then can be abstracted and transferred between localities. This work is done through several mediums, both material and immaterial; Smith et al (2016: 421) noted evidence of conferences, toolkits, handbooks, mentor schemes and web-based repositories amongst others. As well as helping other community groups, a benefit of this aggregation is to present a coherent voice for community energy organisations to negotiate with government. A 'coherent voice' in community energy has previously been recommended by Department of Energy and Climate Change (DECC) civil servants (Smith et al 2016).

Given such a strong emphasis is placed on learning in community energy literature, these intermediary organisations as 'enablers' have great potential for the development of community energy projects. However, Hargreaves and cowriters argued that some intermediary organisations were still struggling to meet the needs of local projects (2013: 875). This was due to a range of factors which included limited resources and differences in aims which led to a lack of cohesive infrastructure. As noted previously, the community energy sector is dynamic, and they point out that any abstracted lessons may not remain valid for very long (ibid: 874). Issues arose in Seyfang et al's study too, where they discussed an 'upward pull' of knowledge which only obtained a part of the more ad-hoc information sharing that went on between the community and other groups (2014: 31). It was suggested that learning, rather than being a one-way process for the community group, should be a constant two-way process including the intermediary organisations themselves (Hargreaves et al 2013).

Should a cohesive 'voice' be found, this could be at the cost of reducing diversity in community energy projects, for example by framing their aims too narrowly. Additionally, there were concerns that developments in aggregated knowledge were "narrowing rather than improving community involvement", diminishing the space for communities to debate alternatives (Smith et al 2016: 422).

In this way, growth of community energy projects in the shape of consolidated knowledge/visions could be seen at odds with the core co-operative process. In Community Energy England's 2018 State of the Sector report, they noted an increasing trend in the 'joining up' of community energy initiatives and organisations on local, regional and national scales. For example, in terms of financing and shares there is now a "wealth of knowledge and expertise" to be shared through intermediary groups such as Energy4All, Ethex and Sharenergy (CEE 2018: 28). But, as Hargreaves et al pointed out, these groups must keep learning from the grassroots organisations and adapting to the dynamic sector. This is where my final research question, 'what kinds of support would energy co-ops find useful for developing their potential?' is relevant. Case study research can provide some up to date and detailed descriptions of the kinds of activity that may go under the radar when organisations like Energy4All are working with an increasingly large number of groups.

Finally, Seyfang et al's 2014 study found shared learning occurring between CRE groups and other non-co-op local organisations such as parish councils, universities and farmers. The structure of a CRE group is not always independent; they can partner with commercial organisations, work closely with local authorities, or emerge from pre-existing community groups amongst other organisations forms (Slee 2015; Simcock et al 2016). When considering this myriad of relations, we begin to see a whole web of actors and stakes involved rather than simply a niche group (plus intermediary) acting outside of the incumbent regime. This year's Community Energy England report spoke of ensuring "alignment of objectives between local communities, local authorities, private enterprise and ourselves" (CEE 2019: 1). It casts further doubt that community energy fits within a typical niche framework; as Hielscher et al have pointed out, there has been a tendency to simplify the initiatives into "unrealistically homogenous niches working against a similarly problematic homogeneous regime" (2013: 134). Therefore, in order to consider visions of development and further opportunities for energy co-ops, it was important not to frame the energy co-ops as being at odds with other private sector models/the public sector.

Learning and forming networks had been highlighted as significant for energy co-ops on several levels; sharing knowledge with each other, with specific 'intermediary' groups, and with other local organisations. This sharing could be done in ad hoc or more formally organised ways. It could increase the opportunities available to the organisations in the form of new partnerships, help them build resilience and form a stronger platform to promote community energy more generally. This research sought to be open to the variety of networks that could form, whilst also being aware of the dangers Hargreaves et al (2013) had pointed out in framing aims too narrowly when trying to consolidate knowledge or experiences.

The literature reviewed has alerted me to several key issues surrounding energy co-operatives. In terms of how energy co-ops envisage their remit and future development, the growing view of community energy as a multi-faceted phenomenon (Hielscher et al 2013) was significant. I sought to investigate my case-studies more holistically, paying attention to how well other aspects could be integrated into an energy co-op primarily focused on electricity generation. The complexity behind meanings of community and participation opened my eyes to the multitude of ways that people can be considered to 'engage' with an energy co-op; this may slide between communities of place and of interest. With the dynamic '*aliveness*' of community energy (Creamer et al 2019) in mind, I expected new networks and partnerships to have formed and continue to be forming since the launch of the projects. A socio-technical transitions perspective helped connect the social aspects of these organisations with the technology they were supporting, opening alternative views of what it means for them to develop. With this literature in mind, the following section explains the methodology I used to collect data from the energy co-operatives.

Chapter 3) Methodology

The research primarily focused on three case study energy co-ops sites. A case study approach was chosen because it can provide a more nuanced understanding of social phenomena compared with widespread surveys or armchair research, allowing space for consideration of contextual factors (Starman, 2013). This study also adopted some mixed methods: semi-structured interviews complemented by participant observation and an online questionnaire. Law (2009) understands social science methods as performative, providing results which are not untrue but rather present a particular kind of truth. The frame through which a researcher asks their questions will shape the version of truth that they enact. A mixed methods approach can therefore be helpful in order to "enact different versions of the world" (ibid: 250); deepening understanding of a phenomenon and increasing study credibility (Hussein 2009). These different methods will be described below, along with an explanation of my positionality in the research.

3A) Qualitative elements

Qualitative data was collected during fieldwork at three up-and-running community energy generation sites in the UK. These were purposefully selected from Energy4All's 'family' of co-operatives, currently consisting of 24 sites which span wind energy, solar PV, hydroelectricity and biomass. One option was to choose case studies that showed obvious similarities – power source, geography, organisation size and/or age of the project. This could form more of a comparative study. However, it would not take into account the great diversity in CRE projects which literature has consistently emphasised. For the scale of my study, any attempt to be representative of one comprehensive 'community energy' would be extremely difficult. Instead, it was decided that three very different projects would be chosen to provide interesting insights into the CRE sector: an illustrative, rather than exhaustive study (Sovacool & Hess 2017). This would help avoid applying what Hargreaves et al (2013: 876) refer to as 'cookie cutter solutions' to complex issues surrounding community energy.

To choose the case studies, I used the internet for preliminary research of all Energy4All's affiliated energy co-op websites. From this, I gathered simple data about size, age and nature of project. I proceeded by reaching out to a number of co-op directors by phone, asking them for more details about the history of the project and how it operates. I was looking for projects which appeared to have explicit goals or areas of interest beyond just paying back shareholders through the sale of energy. These kinds of projects were more likely to be indicative of innovation going on in the energy co-op sector – contributing more fruitfully towards my research questions, particularly for understanding how energy-cops might envision development. Again, it should be emphasised that this was purposeful sampling; actively seeking areas of promising activity. According to Michael Quinn Patton:

"Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry, thus the term purposeful sampling. Studying information-rich cases yields insights and in-depth understanding rather than empirical generalizations" (2002: 30)

If we regard the energy co-ops as niches, then it was suggested in the literature that community niches themselves "do not provide blueprints, but rather reservoirs of ideas and practices" (Hielscher et al 2013: 151). A purposeful approach serves a similar role to provide insight rather than representativeness, fitting with the wider conceptual understanding of the topic.

Case study briefs:

Edinburgh Community Solar Co-operative (ECSC)

Edinburgh Community Solar Co-operative is a Community Benefit Society which has to date installed solar PV on 24 buildings; predominantly schools but also leisure centres, community centres and day centres. These sites are all local to the Edinburgh postcode, scattered across the city and suburbs. Income is generated from the sale of electricity from these sites to Edinburgh Council, and from the Feed in Tariff. At the time of writing, the co-op is formed of 540 members, and total output from the buildings in 2018-2019 was 1.1GWh.

ECSC was formed in 2013, refined to solar after six years of community members trying to develop a broader local energy scheme. As the project has matured it is now entering 'Phase 2'; installing solar panels on several new sites, as well as working on other future projects including looking at solar storage options. They assign £5000 annually to a Community Benefit Fund (roughly 6% of profit, though this depends on generation performance and other costs), offering grants to sustainable initiatives. The vast majority of ECSC's members live within the Edinburgh postcode.

Commented [NH13]: Added details about the Community Benefit Funds to each case study

Westmill Wind Farm Co-operative (Westmill Wind)

Westmill Wind Farm was commissioned in 2008, after roughly 16 years of seeking planning permission. It consists of five wind turbines generating an average of 10.2GWh per year and sits alongside a more recent community owned solar farm (Westmill Solar Co-operative), together forming something of an energy 'park'. It is situated just outside the village of Watchfield on the Oxfordshire/Wiltshire border. Westmill Wind is registered as an Industrial and Provident Society, a term applying to Community Societies that registered with the FCA before 2014.

The wind farm was the first of its kind in the South of England, and the shared renewable energy site encourages educational visits as well as hosting open days and working with other sustainability organisations. Westmill Wind donates £6500 annually (roughly 6% of overall profit, though this depends on generation performance and other costs) to a designed charity, Westmill Sustainable Energy Trust (WeSET). Westmill Wind is formed of 2260 members, ranging from those in the nearby villages and cities to members across the UK and overseas.

Arrochar Community Hydro Society (Arrochar Hydro)

Most recent of the three case studies, Arrochar Hydro is a hydroelectric scheme situated outside the villages of Arrochar and Tarbet in Argyll and Bute, Scotland. It is registered as a Community Benefit Society. It began generating in 2018 and recently hit its first 500MWh milestone.

The scheme builds on a history of hydroelectricity in the Scottish Highlands – the nearby commercial Loch Sloy hydro-electric scheme was a huge local employer during its construction in the 1940's and continues to hold a significant presence in the nearby villages. Because the project is so recent it does not yet have a Community Benefit Fund, however in future additional profit will be divided between Arrochar and Tarbet's Development Trusts, intended to improve quality of life for the local residents. It is the smallest of the three projects, with 235 shareholders.

The range in project maturity, from a new site to a site in its eleventh year, was a point of interest. Parkhill et al's 2015 case study research found the vision and objectives for a community energy project in Wales changed over time, as new people joined and its needs developed. CRE projects are dynamic and evolving; whilst it was beyond the time-frame of my research to conduct a longitudinal study (something Creamer et al 2019 have called for), by looking at projects that had varying levels of experience I could gain a broader picture of the obstacles and issues faced at different stages. For example, a newer project might have more difficulty deciding where to direct its funds, and a mature project might have more difficulty retaining engagement.

There was a significant rural/urban distinction, also linked to the size of the membership. Arrochar Hydro (with 235 members) was linked to specific rural villages, Edinburgh Solar (with 540 members) to an urban city, and Westmill (with 2260 members) had fewer geographically specific ties. A 2014 DECC study found community energy groups to be disproportionately high in rural areas, however 59% were still found to be in urban areas, and this number was increasing parallel to wider shifts in technology (for example the decline of new onshore wind turbines). The extent to which rural and urban communities engage with environmental issues has been debated in academic literature, with no consensus on whether one space is more positively disposed to environmental protection (see Couch and Kroll-Smith 1994). Considering what barriers/opportunities were characteristic of either a rural or urban space provided insight into the different ways energy co-ops can manifest around the UK.

Process

After case studies had been selected, I contacted the membership base by email and post, asking for participants (see Appendix 1). I spent 2 weeks each in Oxford (a base for Westmill Wind research) and Edinburgh (a base for Edinburgh Solar). During these fieldwork periods, I conducted one-to-one semi-structured interviews. 30 were conducted in total, mostly in person but 7 by phone.

Interviews were mostly conducted in public cafes, with some conducted in the interviewees' homes due to limited mobility. Interviews ranged from 30 minutes to 2 hours, with most lasting around 45 minutes. The interviews in Oxford and Edinburgh were recorded and transcribed, then inputted to Atlas.ti 8 software and coded. I followed Cope's (2007) guide to coding transcripts by starting with open and descriptive codes (largely drawn *in-vivo* from the transcripts themselves) and then building on these with analytic codes that related more closely to the research aims.

Most interviewees (25 of the 30) were the co-op shareholders, contacted by email using Energy4All's membership database. However, some were found through a snowball sampling approach (Small

2010) – participants introducing me to other members of the community who didn't have shares but were somehow implicated by the project. This included school staff, council representatives and directors of connected co-operatives. Of the 25 shareholders, 20 had bought shares in more than one co-operative.

For both Westmill and Edinburgh, I also attended the Annual General Meetings. At these events, all members are invited along with the board to recap the year, vote on motions and have some kind of interactive session in which members can express their views. The structures were very different; Edinburgh's lasted just under 2 hours and was limited to the membership and board, whereas Westmill's was combined with the neighbouring solar farm and was a full 10am-4pm day involving guest speakers and exhibitor stands (of which my research project was one). This was a participant observation exercise aimed at better understanding the ways that members could engage with the co-op through collective decision-making. It was also an interesting space to see new ideas being proposed and negotiated, as well as getting a clearer vision of current co-op activity and innovation.

The fieldwork in Arrochar required a different approach. Though recorded semi-structured interviews were the original intention, it soon became apparent that this style of research would not be the most appropriate for the circumstances. Planning was more difficult and conversations needed to fit in with the flow of the village – a 30 minute car journey, 15 minutes with a café manager on her break, a couple of hours with some 'Friends of the Hydro' in their family home. Twice I walked up to the turbine hut and to the weir itself. Using an audio recorder was either impractical (muffled by wind or by being out of breath), or it was unwanted pressure. Instead I took field notes, typed up in the evenings.

At first this inconsistency in research methods with the other two field sites was a concern. However, the relaxed nature of this fieldwork presented several opportunities and was telling in itself of the way the project manifested in the area. It can be regarded as a 'go-along' method; walking or travelling with interviewees as they go along their normal routines, asking questions along the way (Kusenbach 2003). This is powerful because it has 'a tendency to highlight environmental perception, spatial practices, biographies, social architecture and social realms' (Evans & Jones 2011: 850). It became clear that the hydro project was deeply embedded in the landscape and the history of the area. I also met groups who would not have been contactable by email – not shareholders in the co-op but members of the community for whom the project was intended to eventually support and benefit.

Thus, the semi-structured interviews turned into a mixture of go-along interviews, participant observation and group discussions. I had 9 conversations and observed local Youth Group and Intergenerational Group meetings. In this way, it became more of an ethnographic approach, as I felt immersed in the village compared with the more individual semi-structured interviews (Hammersley

& Atkinson 1995). Rather than limiting the study, I found this reflected the character of the space, and was helpful in understanding the ways in which relations formed and 'business' was conducted. The different types of knowledge gained in Edinburgh/Westmill, and then in Arrochar, reflected whether they were more place-based projects (Arrochar) or interest/network-based projects (Edinburgh/Westmill); this is discussed in the findings section 4A.

Locality

There were some limitations to the qualitative elements of this study. As noted in the literature review, many co-ops are not fixed in one place, and the geographical spread of members is one of the interesting aspects of energy co-ops regarded as 'community' projects. However, because of financial cost, as well as practicality and environmental impact, I was mostly restricted to one location for each case – Edinburgh, Oxford (close to Westmill Wind) and the villages of Arrochar and Tarbet. The research could therefore be more representative of shareholders or other residents who are considered local[2] to their projects. However, of these local participants, twenty mentioned that they had invested in at least one other co-op scheme – many of which weren't local. Discussing these experiences, combined with the seven interviews conducted with long-distance members by phone, provided insight into what it was like to be both a local and non-local investor.

3B) Quantitative elements

As well as fieldwork, I sent an online questionnaire to members of all co-ops associated with Energy4All: 24 co-operatives at that point in time. Strengths of the questionnaire method include reaching a population that is too large to observe directly, and appealing to a wider audience due to a questionnaires unobtrusive nature/the ability to respond at convenience (Bhattacherjee 2012: 72). It has already been noted that this study was illustrative rather than exhaustive, and so the aim of the questionnaire was not to produce data which could be used to generalise about all energy co-ops. This would still be unachievable, given Energy4All represents only a portion of the energy co-operative sector, and the way these co-ops operate may well differ from others in the UK.

However, I saw it as a means to complement the interviews. The questionnaire was conducted after qualitative fieldwork had finished; this allowed the initial fieldwork findings to influence the questions.

[2] 'Local' here meaning within 50 miles, a typical radius used by co-ops when assigning priority shares. A discussion about what it meant for participants to be 'local' can be found on page 50 of the thesis.

If an interviewee raised an interesting point, I had the chance to shape that into a question which could reach a broader spectrum of members and add insight through a different form of information exchange. My findings combine these research methods, using elements from the questionnaire to spark a deeper consideration of the qualitative data and vice versa.

The questionnaire was first piloted to three members who I had previously interviewed. After adapting it to their feedback, an email was sent through Energy4All's mail address to several thousand members, with an explanation of the study and a link to the questionnaire. The questionnaire received 564 responses over the 2-week period in which the survey was open. SurveyMonkey software was used to create the questionnaire, chosen for its simple interface. The questionnaire consisted of 23 questions, including a final open feedback question.

The questionnaire was divided into several sections:

- Motivations for joining the co-operative
- Personal behaviour/attitudes to sustainable development and the co-operative model
- Use of community benefit funds
- Engagement with the co-operative

These sections were designed to provide an overview of both the participant's individual beliefs and their view of the wider energy co-operative sector. The questionnaire used a mixture of closed questions, and closed questions with an open-ended element, for example:

Q7 Would you say that joining the co-op has changed the way you think/act regarding climate change and carbon reduction? If yes, please provide details below.

Given my research was conducted in collaboration with Energy4All, this was seen as a good opportunity to gather a large amount of data for them to understand their membership base. Therefore, the remit of the questions went slightly beyond the remit of this thesis. Some question results have been omitted from discussion in this paper, but will be passed to Energy4All as independent points of discussion (the full question list can be read in Appendix 5). The questionnaire and the qualitative research are also contributing to a separate summary report for Energy4All, a document which will be more widely accessible than this thesis and could be shared with staff, individual co-operatives or the wider sector.

3C) Positionality

Reflexivity refers to "the ways in which the products of research are affected by the personnel and process of doing research" (Davies 2012: 4). Reflexivity does not attempt to erase the presence of the researcher in a study. Instead, it acknowledges the impossibility of absolute objectivity, that there is "no way we can escape the social world to study it" (Hammersley & Atkinson 1995: 17). Rather than escaping, a reflexive study asks for the researcher's positionality to be explored and put to creative use (Okeley 1996).

Positionality in research is determined by where one stands in relation to the people being studied (Merriam et al 2001). Earlier discussions in the social sciences tended to frame the researcher as either an 'Insider' or 'Outsider'. As a British person conducting a study in the UK, in ways (particularly through language) I could identify culturally as an 'Insider' with the co-ops I was studying. I also approached participants through Energy4All, immediately aligning myself with an 'Insider' organisation with whom they were all at least slightly familiar. On the other hand, I have never purchased shares in an energy co-op, and there are infinite ways of experiencing being 'British'; for one, I knew little of any of the cities/villages I would be visiting. The Insider/Outsider division is now more widely regarded as a fluid concept, a continuum which the researcher can move back and forth within (Merriam et al 2001; Mercer 2007).

The most significant 'Outsider' quality I became aware of during the interviews and AGM's was my age. CEE's State of the Sector report found 6% of community energy members/volunteers to be under 25, and 35% to be over 60 years old. Similarly, in my questionnaire 55% of respondents were over the age of 55, and less than 0.5% were younger than 26. Falling in the former age bracket, my age was drawn attention to several times in interviews. This may have sometimes been perceived as a 'lack of fit' in terms of empathising with their experiences (Riach 2009: 362):

> *"Of course, you wouldn't have been alive for any of this so…"* member of Westmill Wind talking about the earlier co-operative movement

However, at other times the generational gap was used to form connection and guide the conversation in a way that we could both relate to. For example, one discussion began with the interviewee saying:

> "*I worry, because things are going to be really difficult for your generation*"

This is a sort of participant-induced reflexivity, the participants themselves acknowledging my age as a factor in shaping discussion (Riach 2009). Dwyer & Buckle note that there is no superiority in the researcher being considered 'Insider', 'Outsider' or anywhere in between (2009). They have previously been listed with distinct benefits and disadvantages, but this example of age demonstrates ambiguity; a single quality acting as both a barrier and a way-in to conversation at different stages.

3D) Ethics

Commented [NH14]: New subheading added to distinguish from Positionality

From the beginning, the SME Energy4All has had a role in my research. It was through them that I had access to participants both for interviews and for the online questionnaire, and they who distributed the initial materials for me. Therefore, I was immediately positioned not as an isolated researcher but as a researcher *with* Energy4All; an organisation who helps to manage the admin and finances of the co-operatives being studied. This inevitably changed the interactions. Participants could see a more tangible outcome than perhaps would have been present if I had approached them independently, with some asking me to 'tell Energy4All ___'.

This wove me into some pre-existing power relations. One member, who I'd reached out to through Energy4All's database, expressed his disagreement with the study over the phone. Part of this disagreement appeared to stem from broader feelings towards Energy4All and their connection with the co-op. On the other hand, my closeness with the organisation could have led to a degree of social desirability bias, where respondents speak more positively about a topic because they feel there is a 'right' way to answer (King & Bruner 2000). All research has to contend with positive and negative elements of positionality, and all things considered, for this project working with Energy4All was beneficial in order to open greater methodological potential and to give the findings a sense of practical purpose.

As with any research involving participants, there were several other ethical considerations. Interview participants were sent an information sheet explaining the purpose of the study and the use of their data, and signed a consent form based on this (both can be found in the appendices). Qualitative participants were made aware that they could retract their contributions up to two weeks after the interaction took place. Although the co-op communities were not regarded as vulnerable groups, they were still part of operating businesses. Anonymity was essential so that participants didn't feel their role within these organisations would be compromised, in particular if they wished to give a critical opinion. All data has been anonymised and pseudonyms used, and both online and qualitative participants were made aware of this before taking part in the research. Where there was still any potential for the individual to be identified (for example, if there was a chance a co-op director could

be recognised by someone familiar with the organisation), they were made aware of these limitations. All transcriptions were backed up onto a hard-drive and removed from the recording device as soon as possible.

Chapter 4) Findings

In order to answer the research questions, the discussion section of this thesis is divided into three parts. To address how the co-operatives regard their remit, the first section explores what kinds of priorities the case studies have and how these are enacted through schemes like Community Benefit Funds. To address what it means to engage with an energy co-operative, the second section looks at the actors involved on several levels; shareholders, directors and other members of the community; and considers the degree of enthusiasm or barriers for these groups. The final section then opens out to consider wider networks involved, including how energy co-ops may be building resilience through sharing knowledge, and what the role of intermediaries may be here.

4A) Remit

Co-operative schemes operate in an interesting space between charities and commercial business. For the energy co-operatives I studied, members want them to simultaneously do good and '*have a heart*', but also be confident, business-oriented organisations to which they could safely entrust their money. By producing clean energy and also paying back interest, they could fulfil two needs:

> *"It was the idea of making an investment in something that would actually be pretty beneficial to society as a whole, let's put it that way. And which had financial advantages to me too. So that's doubly good."* Sam, Westmill Wind

> *"I've got to be honest… I like to support environmental issues and community benefit but I also want to sort of get a little bit of return on the money, and it just seems like a win-win for everybody."* Charlie, Edinburgh Solar

This ability to draw on both '*moral and material*' desires (Slee 2015) is a great opportunity for energy co-ops. But navigating the grey area between charitable and profitable has proven difficult in the past, and they have had to tread carefully to meet legal definitions and apply for funding. Some of it comes down to this notion of "*benefitting society*"; a common phrase used to promote community energy, but one which the literature showed could have a multitude of meanings (Spear et al 2017). The main purpose that united all the co-ops I visited was to generate and export renewable electricity. For some interviewees, this in itself was enough to satisfy both self-interest and societal goals; they receive

interest payments for sold energy, and they help 'society as a whole' by reducing the need for fossil fuel.

One interviewee told me that although co-ops were "*an excellent way to get renewable energy schemes started and running*", he would have no problem selling his shares to a bigger company who ensured the technology would be maintained. Members narrowly voted in favour of this happening to one of the interviewee's previous co-ops, Fenland Green Power Co-op, in 2018. Seyfang and Smith had described conflict within grassroots initiatives between ideological 'purists', and 'system-builders' who were prepared to compromise (by incorporating more commercial interests) to have a wider influence (2007: 598). This member could be considered a system-builder, the 'system' being widespread implementation of renewable technology. A co-operative form of organisation was useful for "*sowing the seeds*" of renewable technology, rather than being an integral aspect of his support. Another interviewee told me that although his shares in Westmill Wind Farm were a "*source of pride*" he would like to see higher interest payments, because "*I've always been interested in shares, and I'm interested in green technology, but that's as far as it goes really*".

The previous quotes have shown how, for some members, a successful project is simply one that gets the technology up and running and pays members a good return. However, all three of the co-ops make reference to some kind of wider social and/or sustainable aim. According to their websites, Arrochar Hydro is trying to "*generate income to reinvest in their communities*", Edinburgh Solar to "*help foster sustainable development in and around Edinburgh*", and Westmill Wind to "*spread the benefits of Westmill to the wider community*" through their assigned charity. For many, the projects were seen as important not just for the energy produced but for a further positive impact that their presence could have in a community.

> *"It's part of the community power thing, you have to educate people as well as just give them technology."* - Tom, long-distance member of several co-ops

4A) I) Community Benefit Fund

As Creamer et al (2019) had pointed out, a wider societal benefit is often loosely referred to but less often explored in practice. One way in which all the case studies enacted this was through a 'Community Benefit Fund', which an agreed percentage of profit was set aside for each year. However, there are no set rules or guidelines for how this Community Benefit Fund should be organised or spent. My study found use of the fund manifesting in diverse ways at each site, therefore each case study

will be explored separately, before drawing them together to look at commonalities and then exploring other ways that they could engage with further development.

Westmill Wind Farm

Every year a share of Westmill's profit is donated to an independent charity, the Westmill Sustainable Energy Trust (WeSET). This charity, which also receives funding from the neighbouring Westmill Solar Co-op, focuses on "*the deployment of sustainable energy through arts, education and energy projects*" (WeSET 2019). As well as some material contributions such as putting solar PV on a local village hall, they host school tours of the site, open day events, and have produced learning resources about renewable technology and the social issues surrounding it. The intention here is that once the clean technology is up and running, it can be utilised as a tool to encourage further interest or action. Many interviewees spoke fondly of this charity, confident that it had a positive effect, for example:

> *"The average new person, they might see a wind farm but they wouldn't know that it's a co-op. They'd perhaps find out it's a coop through their kids, when the kids go to the local primary school and WeSET show them round and my experience is the kids will go wow it's really interesting."* – Fred

> *"WeSET is a huge benefit… I was talking to a chap [at a WeSET meeting] who had two children and he said 'well the reason I'm here is my children have been to the site and said I really ought to go. So I came to the open day, and that was good*.'" – Steve

The second quote suggests that through the running of school visits to the site, and some of those children passing their enthusiasm on, an individual who may not have been interested in community energy is now actively engaged in the organisation. This supports the idea that community energy, as a social innovation, can have a significant impact by increasing local engagement with renewable energy (Baker & Mehmood 2015). Aside from one member, the members I interviewed at Westmill were all in favour of the co-op contributing towards education surrounding renewable energy, with one member describing working with schools as a "*core part of business*". I have referred to these activities as 'wider' benefits of energy co-ops, but for that member the educational remit was integral rather than any sort of bonus. According to another interviewee, members are consulted about where the money goes "on different levels":

"*There's the high level one of what proportion of our profits should go to WeSET, then further down what sort of things WeSET should be doing. How much should go on school's education, how much on general community publicity, should they do any advertising, and also a hot topic I think is what are the geographical boundaries that we look to cover*" – Fred

The 'hot topic' of geographical boundaries was indeed raised by several of Westmill's members. Sitting between several villages and close to the border between Oxfordshire and Wiltshire, the site did not have one ready-made community to focus their efforts on. There was talk in both the interviews and the AGM of broadening their remit to include Swindon more, the co-ops closest urban area. This signified a shift in how local they considered their responsibilities to be – even 11 years on from the launch of the wind turbines, its geographical remit was continuing to be thought over and renegotiated.

It should be noted that Westmill's WeSET charity was not solely funded by the shared co-op Community Benefit Funds; at the co-ops AGM, for example, they asked for additional donations to build a sheltered on-site visitor area. There was a distinction here, therefore, between what was considered to be within the remit of the co-op itself (part of the benefit fund) and what was an additional charitable activity. As will be discussed more in the next case, *material* benefits (like this visitor area) appeared to raise more tension than non-material benefits such as school tours of the sites.

Edinburgh Community Solar Co-operative

Edinburgh Solar spent its first few years of operation paying off the up-front costs of technology – now in its fifth year of operation, it had just awarded its first Community Benefit Fund. Edinburgh Solar dealt with their Community Benefit Fund more directly than Westmill, offering small grants to their host sites (the 26 schools, leisure centres and community buildings who had panels installed on their buildings) if they proposed sustainability-related initiatives. An application criterion had been put forward with an emphasis on carbon reduction, and board members decided who was successful.

Still in its early stages, a couple of tensions arose in both what the co-op could offer and what other members saw as being within its remit. In terms of putting the money towards material grants, this would be costly: "*At 2 or 3 thousand [pounds], our awards, they're not going to get much in the way of insulation of the buildings and such*". But in addition, some members disagreed with the idea that

the co-op should fund activity which they saw as the local council's responsibility, including material initiatives like putting LED lights in schools.

Edinburgh Solar's relationship with the council was very different from the other two case studies. As opposed to a single site owned by a landowner or a family estate, the solar panels were installed on various council buildings, requiring closer and ongoing collaboration with the local authorities. Because of this entanglement, one director worried about "*publicity problems*" – users of the buildings assuming the panels were council property. This shows how, as well as raising awareness of renewable technology, it is also important for them to convey the community ownership side; the project is driven by a belief in alternative forms of social organisation as well as meeting environmental needs (Seyfang & Smith 2007). Edinburgh Solar had installed electronic screens in host buildings to show how much energy was being generated, but also to make it visible that a *co-op* had been responsible. The danger of awarding material grants like LED lights could be that it would entangle the groups further, blurring what each side should and shouldn't be responsible for. In this way, the co-op still appeared to be in the process of negotiating their role alongside other institutions in Edinburgh, a challenge characteristic of its dispersed technology and also its urban setting. This example highlighted the complex conceptual space which had been noted in literature (Spear et al 2017); the co-ops are third sector organisations, but this could be blurred by operating with local government.

Commented [NH15]: Corrected typo ('Characteristic its dispersed…')

> "*It's interesting, because you start to say where does the community energy boundary finish?"* – Tom

> "*It's tricky, part of me thinks why should we be doing things in the city that should all be done already? But another part of me thinks well someone should do it'* – George

There were also issues on the side of those applying for grant funding. When asked about this year's grants, staff at one of the solar panelled schools explained why they hadn't applied:

> "*Like everything else it's time… It becomes a project in itself, so whenever you apply for funding, and there's a lot of funding out there, it's a huge amount of work"*

By mentioning the wide availability of funding, this staff member drew attention to how the human capacity rather than any financial constraints had limited them. The relatively low number of grant applications received (four) reinforced this. Lack of time had been cited in the literature review as a

barrier to greater involvement from members, and this was an issue for the organisations the co-op was working with as well. Applying for the grants was an additional job on top of already busy work schedules.

In some ways, setting the money aside for a Community Benefit Fund appeared to be easier than awarding it. A desire to have the fund contribute to carbon reduction was not always in line with what the co-op could afford, what was considered to be within their remit, or what host buildings had the time/resources to apply for. Some compromises had arisen, and it was certainly an ongoing process of learning and negotiating; ideas like food growing schemes or cycling to school infrastructure were positive because they could fall under a broader heading of sustainability without being too costly or regarded as core council responsibilities. There was some trial and error as well, for example it was noted that running the application period over December was an issue because it clashed with school holidays – this is the kind of tip that would be helpful for other new co-ops running similar schemes to know about. Given the number of community solar PV projects has rapidly grown recently (benefitting from falling costs in technology and registering before the end of the FITS), now could be a good time for an intermediary organisation like Energy4All to take note of these experiences and share them, perhaps in guidebook or leaflet form.

One member had the suggestion that, without focusing too specifically on sustainability, the community benefit fund could be used to tackle issues specific to the city:

> "*In inner cities, there are social issues that could be being addressed, like food or fuel poverty. So I think why wouldn't you promote the use of funds that are more relevant to the local area? You will have areas of social deprivation and I would have thought that project ideas that address those issues would be best*"- Charlie

This would be a widening of remit for the co-op. Rather than just benefitting the members and the connected communities (the users of the buildings), by working on initiatives like food or fuel poverty they would be extending their scope to more disadvantaged groups in Edinburgh. Like Westmill, conversations were being had about who the co-op had a responsibility towards and how far benefit extended. At the beginning of this thesis I asked who the community benefitting from energy co-ops was. Shareholders benefit financially, and a wider community benefits from initiatives like the Community Benefit Fund – but how far this extends is continuing to be negotiated.

Arrochar Community Hydro Society

Due to only being in its first year of energy generation, Arrochar Hydro had not yet turned enough profit to contribute to a Community Benefit Fund. However, when it does the co-op will donate this to two local village Development Trusts. According to Arrochar Hydro's website,

> *"The Trusts aim to improve the quality of life for residents, especially the young and the elderly within their rural locations."*

Parkhill et al (2015) had pointed out how framing community energy projects narrowly through an environmental lens can be restrictive of what they aim to do. Arrochar demonstrates this; the Trusts that they will support exist to improve quality of life for local communities, and there is no mention about the environment. Focus instead is kept to local social benefit, what Seyfang et al (2007) had referred to as a 'simple' project which aimed only to solve local problems. One local member told me he "*wouldn't join something that was detrimental to the environment*", but for him environmental impact was a "*side bonus*" to local development. When asked what kind of project this money might support, a member (who was also on the Community Development Trust board) said it would be *"whatever's next in line"* on the Trusts' agenda; it responded to current needs, rather than having an overarching goal. The Trust had already built and still manage the local 'Three Villages Hall', and residents I spoke to wanted to see a new café building, a village pier and a visitor centre.

Almost every resident I spoke to brought up some degree of dissatisfaction with the local council, who as one couple put it didn't "*give a monkey's arse*" about the area. This led to a sense that the community were taking matters into their own hands through these developments. The eventual financial support from the hydro project was thus seen as a piece of this bigger picture to build local independence. The motivation to set up Arrochar Hydro had been different to Westmill and Edinburgh from the outset, with a fixed community that it was envisioned to benefit, and it was working actively to take responsibility where they felt the council had failed them rather than working alongside them. The importance of place cannot be neglected here; the Development Trusts themselves are characteristic of rural Scotland, assigned with the specific task of delivering community regeneration (Zografos 2007).

Yet, despite the local and socially-focused goal, Arrochar Hydro actually has very few of its co-op members in the local area: 19 out of a total 235. There were two communities here; the community

of place and the wider community of interest who were supporting it through shares in the hydro project. In my questionnaire, Q11 asked:

"Do you think energy co-ops should always use the benefit fund for sustainability related initiatives, or should wider community benefits be considered? Example of 'wider' community benefit: paying for upkeep of a sports club"

40% of the 524 respondents who answered this question said that funding should always relate to sustainability, 25% said it should be open to wider community benefit and 35% said it depended on the co-op. Two interviewees at the other case study sites said that it should depend on the co-op – but both related this to levels of local *investment:*

> *"If the local community is prepared to invest to cover the whole scheme, then it's only right that perhaps money should go back to the local community. But if you end up finding that the local community for various reasons can't or doesn't want to invest...rather than feed all of the benefits back let's put some by for future investments or helping other schemes elsewhere" Steven, interviewed for Westmill Wind*

> *"It would rather depend on how much local investment there was in the co-op. Because I think if there hadn't been much, it should go to something sustainable, but if the community was enthusiastic I would have thought you could justify any community payback as it were…. mind you, you could combine the two." Edward, interviewed for Westmill Wind*

By these standards, Arrochar's low number of local shareholders would make it unsuitable for local community benefit, compared with a project like Edinburgh Solar where almost all members reside in the Edinburgh postcode. Yet, Edinburgh's aims were found to have a clearer emphasis on sustainability and Arrochar on social development. This highlights the complexity of community energy, how one fixed measure such as 'number of local shareholders' may not succeed in capturing the nature of the project. There could potentially be tension if energy co-ops were steered in a particular direction based on any single factor such as this. An understanding of the individual co-op, achieved through direct and regular contact with them, would be preferable for understanding what kinds of support they may need. Energy4All achieves this by having one of their own staff members sitting on most of the individual energy co-operative boards; if the organisation were to grow past a point at which this

kind of support can happen, then some other kind of ongoing review of the co-ops' needs would be helpful.

Having said that Arrochar focuses more on the social than environmental, Edward's point that "*you could combine the two"* is relevant; distinctions could not always be clearly cut between sustainability and community motivated agendas. Arrochar's director pointed out how the two intertwined. The aforementioned Three Villages Hall, for example, had been built in recent years with ground source heat pumps and strong insulation – the high environmental standards also kept running costs lower and made the hall better fit for the community to use. Here, being environmentally sound was a way for community benefit to be achieved more effectively. The hydro weir itself was both environmental and social, producing clean energy but also tying in with a long history of hydropower in the Scottish Highlands. The scheme was referred to as a 'younger sibling' of the huge Loch Sloy Hydro dam nearby, making it "in keeping" with the uniqueness and cultural history of the region (Gormally et al 2014: 928). It was also an economic opportunity, as an innovative project which could spark interest from outside, translating into more visitors to the area.

4A) II) Outside of the Community Benefit Fund

Looking at how profit is assigned through the Community Benefit Funds is a helpful way to gain insight into a co-ops 'other', i.e. non-generational, activity. However, not everything is separated into this category: a lot of less formal activity goes on in the community energy sector, which may fall under the radar of broader surveys (UKERC 2018). For example members of Edinburgh Solar, like Westmill Wind, saw education as important to the co-ops remit and acted on this with additional activity like producing some educational resources and giving voluntary talks in schools.

Because the solar panels were installed on 'ready-made communities' (Willis & Willis 2011), schools and public buildings, these kinds of activity were perhaps more naturally embedded in the co-ops' remit: no explicit Community Benefit Fund was needed. Also, members had an assumption that simply through their presence on public buildings the panels were having a positive impact on education. For one member, this was what gave her hope more than the production of energy itself:

> *"It's little steps that may contribute to something that's not exactly what you were initially aiming for, but something that is important… I like to think that the involvement of schools will trigger a few children to go further, to go into geoengineering or whatever that's going to help"* - Suzan

An interview with one school's business manager gave positive feedback on this goal:

> *"Pupils can see it, it's real, we've taken pupils onto the building. When they see the panels across the building, you physically can touch the panels, you can see the energy convertors and the metering, all of the information is there. And it makes it that much more real for them".*

Although not orchestrated through a Community Benefit Fund scheme, schoolchildren from the local villages near the Arrochar site had already been shown the hydro scheme on a school visit. One 'Friend of the Hydro' thought that "*renewable energy in communities needs to be better understood*", and it "*comes down to communication and education"*; the presence of Arrochar's community hydro project could help with this. When looking at the case studies' activity more holistically (rather than through a single measure such as the Community Benefit Fund), all used the opportunity to utilise their sites for a further educational purpose. This was a shared value, at least to some extent, but it was enacted in different ways based on the location and nature of the project. For the Westmill Wind Farm project, its bigger size and its remoteness (without a connection to any specific community) could have contributed to the need for a specific charity to connect schools with the site, whereas for Edinburgh and Arrochar much of these ties were already in place.

All of the energy co-ops valued having a connection with younger generations, and raising awareness about the need for renewable technology. It was seen either as a core part of their remit, or as a positive addition. As well as being something the members could ideologically support, it was also preferential because of its generally low financial cost. It was noted that having a significant *material* impact (for example the co-ops insulating buildings) with the kinds of funds available to an energy co-op would usually be difficult, and assigning more of the co-ops profit towards this could be controversial when the members clearly valued their financial returns. Education appeared to be a positive area of ongoing energy co-op activity, and this could perhaps be supported further in future. For example, an organisation like Energy4All could consolidate some educational resources for use by more schools. As mentioned, roof-mounted solar PV grew in popularity recently due to falling technology costs. Another of Energy4All's co-ops (Schools Energy Co-op) has a large number of new schools registered to build on in the next year, and support from Energy4All to develop strong initial ties with those school communities could be helpful. It was noted in Edinburgh that these ties was harder to build later on in the project stages.

4A) III) Development over time

One member, who had been a shareholder of the original 1996 Baywind co-operative as well as several subsequent ones, said he had perceived a shift in the focus of energy co-ops in recent years towards greater social benefit. He pointed in particular to the 2014 Co-operative and Community Benefit Societies Act, which changed registration rules leading to many new CRE organisations registering as 'Community Benefit Societies':

> *"That's really a change of emphasis, whereas the co-operative is designed for the benefit of members… it's not that it's wrong to be primarily for the social benefit of an area, but it is a different philosophy*" Lewis, member of several co-ops

With awareness of the wider policy shaping energy co-operatives, this member draws attention to how their remit may have transformed over time. This is helpful, as Creamer et al (2019) previously argued that attention to time has been largely absent in community energy studies. It appeared that there was some form of wider co-operative movement, shaped by the policy environment, which possessed a broader social focus than it had previously. The member also pointed to a "*subtle difference*" between doing things just because they are good for the environment, and doing things "*in order to educate people about the environment*"; suggesting that projects like Westmill Wind Farm had a tendency towards the latter. Though not referred to so explicitly in other interviews, other members noted changes, for example a Westmill member who highlighted how the WeSET charitable side had "*grown and grown*" and in the co-op there was now:

> "*a hardcore of real active people, and some people for whom a co-op is more of a political enterprise… in terms of the spread of how much surplus goes to members and how much goes to community projects, they're a bit more towards the community projects*" Fred

My findings so far have highlighted diversity amongst groups, as was also found in the literature review. Certainly, it would not be accurate to say that all energy co-ops launched after 2014 have a greater social focus; Westmill for example is *not* a Community Benefit Society and still has a strong social remit. However, these points did suggest there are some overarching trends in the sector, and that social benefit may have become increasingly important as a response to changes in policy. Parkhill et al's research highlighted a shift in UK policy *"to a more pluralistic conception of the ways communities can be engaged in energy activities"* (2015: 61). This is described as a shift *away* from

only considering projects that produce energy. However, my research shows that some of the projects which *do* produce energy can also incorporate social, cultural and educational activities, and this may be increasingly so.

Again, it is important to reiterate that even within a single energy co-op the attitudes towards remit and purpose were mixed. Fred's mention of the co-op as a 'political enterprise' was a particularly dividing factor, with some seeing the groups as '*inherently political*' and some saying that they '*transcended politics*'. The nature of co-operatives as 'hybrid' organisations (Willis & Willis 2011), operating in a space between commercial and social, allowed people to identify with different ideologies within the same group. Whilst there was great power in this, it also restricted the groups from reaching too far in any one direction; for example, assigning a significantly higher proportion of profit to community benefit would likely raise opposition, and paying a higher rate of return would likely do the same (as well as potentially conflicting with FCA laws).

4A) IV) Looking forward

So far, I have been examining the current activity of the case studies in order to understand what values are important to them and how these are being developed. I was also interested in whether there were bigger, innovative activities on the horizon for the co-ops. For this I refer back to Seyfang et al's 2007 labelling of 'simple' and 'strategic' projects; the former tackling only local issues, and the latter aiming to have a wider impact. I had referred to Arrochar as a 'simple' project, as benefits from the project were to be contained to local issues. However, as noted, the aims of a project could change over time; in only its first year of generation, there is capacity for its remit to develop.

Edinburgh had a more strategic focus to work on carbon reduction and promote the community ownership model (although these were also rooted in the 'local', for example the Community Benefit Fund was specifically for the Edinburgh area). They work in 'phases' of five years, and now the first phase is complete they are finalising plans for a second round of solar panels on local public buildings. Interviewees from both the Westmill and Edinburgh co-ops had expressed a desire for their projects to expand their renewable energy capacity in the future, opening share offers again rather than using existing profit to finance this. For example:

> "*They should go out and look for more money and more sites that they can install the solar panels on. That's what I'd like to see them doing rather than sitting on the system that they've got. I'd like them to be far-sighted about it"* – David, Edinburgh Solar

> "*I'd like to see new turbines put onto the existing site, personally. I'd like to see it rolled on and possibly expanded"* – Joe, Westmill Wind

Although it may have been a shared goal, this kind of expansion was more immediately feasible for Edinburgh than the other two case studies because of the difficulty in securing planning permission and developing more extensive technologies like wind turbines and hydropower. For Edinburgh's roof-mounted solar panels, much of the infrastructure (the buildings to install them on, and the relationship with the council) is already in place. In terms of the technologies involved, hydropower and onshore wind appeared to suit 'one-off' projects whereas roof-mounted solar had more scope to be expanded, as Edinburgh were doing in their 'phases'. *Replacing* the technology at the end of the project's lifespan was different, for example the original Baywind Co-operative reached its twenty-year lifetime and two higher powered wind turbines have been built to succeed the five which were decommissioned (Baywind 2019). However, in terms of expanding the amount of renewable technology *during* the lifetime of a project, there is greater potential for some technologies than others.

As mentioned, roof-mounted solar PV has grown in popularity in recent years whereas new onshore wind projects have become almost completely unfeasible. Rather than focusing efforts on developing new projects, there could be space for a group like Energy4All to focus on developing existing projects in a similar way to Edinburgh Solar. Energy co-ops do not have to stay with the same technology – The Baywind Co-operative, for example, was primarily a wind project but has since worked on putting solar panels on buildings too.

As well as expanding existing technology, there was a keenness from several members for the co-ops to engage in the development of other innovations such as battery storage. However, in my case studies, these kinds of activities appeared to require greater expertise and resources than was held in the co-ops themselves; where there was evidence of this happening it was in collaboration with other institutions. For this reason, these kinds of innovations will be discussed in the 'Networks' section from page 57.

Looking forward, some members envisioned a development not just in the quantity/nature of technology but also in the way that energy co-ops could operate in the market; the idea of being able to buy the energy that their co-ops were producing directly was an ideal goal. This is not possible under current market circumstances, but countries like Germany were referred to, where community energy organisations can operate within their own local distribution networks.

> *"Why can't I buy my energy from Westmill as a shareholder? I'd like to benefit from that, from my investment"*

> *"If I could look back in 20 years and be paying my bills locally, then I'd feel really great"*

If not themselves, one interviewee hoped that local schools could use it; "*if the local schools around Shrivenham and Swindon could buy their green electricity from Westmill, that'd be a great thing*". There was some financial incentive in these kinds of goals, but also a positive feeling around self-sufficiency and taking power back from the 'Big Six' energy companies, who one interviewee bluntly described as '*not our friends*'. It showed some members imagining a future where energy co-ops played a much more significant role, requiring a change in our current energy system to allow for this. Again, not all members envisaged development this way; the beginning of section 4A noted one member who regarded the co-ops as more of a 'stepping stone' to show what can be done and encourage bigger companies to take more interest. In terms of the niche concepts discussed in the literature, there were multiple visions of this; some members viewed the co-ops in line with the 'Strategic Niche' framework, where they should ultimately scale up and challenge the dominant regime (Geels & Deuten 2006). Others viewed them as more simple and contained projects. From my observations, although there was significant *appetite* for this kind of scaling up challenge, it was not clear how it would happen and the members who expressed a desire for it weren't necessarily acting towards it in a coherent way as yet.

Commented [NH16]: Changed 'coherent way yet' to 'coherent way as yet'

Section 4A has discussed some of the diverse ways that energy co-ops in the UK envisage their role now and in the future. There was evidence at all three sites of socio-environmental engagement, beyond their initial energy generation. Their remits were still shaped by place, though this was subject to change (for example expanding the geographic boundaries), and the vision of who was included in their 'community' was also subject to change and debate. Working on education, particularly with schools, appeared to be a 'safe' area for energy co-ops to engage in additional benefit; something almost all the members could rally behind. In the future this could be supported by helping to develop ties with schools, and consolidating resources for them to use.

But further interesting ideas were raised, such as working to tackle more local issues like food or fuel poverty; taking on these kinds of responsibilities would lean the co-ops more towards benefitting wider communities as well as shareholders. This is a conversation worth being had, especially by co-ops that have turned several years of profit and are now looking at what to do next. It would require consideration of where an energy co-op falls between sectors like public and private, market and social oriented. These are sticky areas, and the energy co-ops did not appear to fall neatly into any one.

4B) Engagement with co-op

My second research question sought to understand the ways that members and involved communities could engage with an energy co-op. Literature highlighted how community energy has typically been associated with strong participation and local empowerment, but how this manifested in practice was less clear. All of the co-ops I researched were operating under a similar organisational structure; members had equal voting rights, used to elect board members and to vote on motions (this could be done online/by post or in person at their Annual General Meetings). Immediately, this gives the organisations a degree of democracy not usually found in private organisations. Outside of this, I was interested to see how else members engaged with the co-ops, whether they regarded them as communities, and if members were the only stakeholders involved.

4B) I) Member engagement

It became evident throughout the interviews that many members envisioned their role, outside of investing money, to be a relatively minor one.

> *"I feel quite good that I'm in it. I'm happy I am. And that's… kind of as far as it goes on a regular basis."* – Catherine, Westmill Wind

> "*I just think it's a good idea, so I put money in. I get the reports and I read those, those are encouraging. But that's all there is to it really"* – George, Edinburgh Solar

> *"We support the project wholeheartedly, but not actively"* – Rob & Lisa, Westmill Wind

Most of the members I interviewed said that they kept up to date by reading emails, and about half attended regular AGM's. This was similar to the survey results: I asked respondents to select from 0-100 on a sliding scale "To what extent do you follow your chosen co-ops activities?", where 50 was 'Follow a moderate amount, e.g. reading newsletter and checking website'.

Figure 1: Question 13 of the online questionnaire, sent to 24 energy co-ops

Of the 564 respondents who were active enough to answer the survey, the average response was 49 – they kept an eye on co-op activity but did not go out of their way to attend regular AGMs or 'follow

closely'. Interviewees referred to themselves with phrases like "*passive", "backbencher"* and *"periphery member",* supporting literature which had suggested that community energy groups were driven instead by small core teams (Berka & Creamer 2018). This was in part due to strong trust in the boards, and a feeling that their further action or involvement was not needed:

> *"It was so competently run, there was no point in me getting involved in it administratively. You know, it had a marvellous team. And away it went."* – Steven, Westmill Wind
>
> *"I really let it run itself. There always seem to be enough people, committed directors and members, so."* – Joe, Westmill Wind
>
> *"I'm happy for the board to make the decisions. They're the guys that know it better, know it best."* – David, Edinburgh Solar

There was a sense that the board members from all case studies were experts in the field, and many members were happy leaving them to 'get on with it', as Van Veelen had also found evidence for in his study of energy democracy in CRE groups (2018). In terms of running for the board themselves, one member of Westmill said he didn't think they would be interested in him because they were looking for "*people with certain kinds of technical knowledge, engineers or people with quite detailed knowledge of the finance stuff*". Despite being considered grassroots organisations, the kinds of knowledge needed to drive the projects appeared to be quite technical. In Hargreaves et al's study, they noted that behaviour-focused projects struggled with understanding the technological and policy jargon used by generation-focused projects (2015). Technological knowledge/jargon also appeared to limit ordinary members from feeling like they could become involved.

Fischer had made the earlier point that any call for wider knowledge about environmental issues had to be sensitive to their often technical complexity (2018: 261); it is understandable how it can be difficult to take a technology like renewable energy and make all aspects widely accessible. However, if an aim of the co-ops is to increase and perhaps diversify engagement (CEE had noted, after all, that developing community cohesion and inclusivity was at 'the heart' of most community energy organisations (2019: 7)), then it is worth thinking about how to change this. For example, co-ops can more actively invite different skills into the teams. This appeared to be something that both the Westmill and Edinburgh co-ops were doing, as at both AGMs they encouraged people from all backgrounds and with '*all kinds of different skills'* to run for the boards. It could be encouraged further by specifically listing non-technical roles such as community engagement or marketing (for example, it was noted in Edinburgh that they had a wide following on social media without anybody actively

posting or making use of this resource). Being elected onto the board at energy co-op AGM's could also be quite an intimidating event, and the pressure may put off those without specialised backgrounds, so there could be space to incorporate less formal roles; as will be noted later in section 4B, there are other avenues to volunteer time.

4B) II) Distance

Edinburgh, Arrochar and Westmill all raised some or all of their money through a community shares model. Whilst priority shares tend to be offered to local residents, in order to meet the expensive up-front costs of renewable energy technology these are then widened to the public, leading to diversity in the geography of members. One Westmill interviewee lived close to the wind turbine site and had followed it throughout its development stages, which involved a couple of hundred people. He was surprised to learn that there were now more than 2000 members from across the UK and even overseas (another interviewee was from Germany, and one survey participant was living in Japan). Several interviewees had initially bought shares in their local project, and then became part of more and more widespread ones as opportunities became available. The questionnaire showed that the highest proportion of respondents (30.14%) found out about the co-op they were answering for through one of Energy4All's emails, suggesting a strong recurring membership base.

> *"It started because it was local, and then just having followed it it seemed… when new ones came along I was already predisposed" – Edward, Westmill Wind Farm*

In terms of these longer distance members' engagement, there was a sense that without being close-by, they might lack the kinds of knowledge and social ties required to participate in the co-op:

> *"If I had a bit more time to play with, then I might be a bit more inclined to engage with stuff that's further away from me, but I probably don't. I would feel kind of slightly strange about that if it was our area, and somebody who'd invested in it miles away turned up and said this is how I think"* - Dave, member of Edinburgh & several other co-ops

> *"If it was here I might know what would be good for the community and make suggestions and support it. But that's not the situation I'm in as a sort of non-resident investor"* - Bill, long distance member of multiple co-ops

This suggests that despite the wide dispersal of members, there is still assumed to be a '*community of place'* in the co-ops, a core of people who understand the project best. They then support this as a wider community of interest. It marks out who should be making decisions for the co-ops, given local members are expected to understand the nuances of the area and are more able to make use of the

'tacit knowledge' found in Seyfang and Smith's 2014 study. Distance was definitely regarded as a barrier to participation, and this was reinforced by survey results, where 63% of respondents ticked "*Distance from project*" in answer to the question "*Is there anything that gets in the way of greater involvement*?" (see full results in the graph below). At Westmill's AGM, this desire for local knowledge was evident when they explicitly encouraged residents from the area to run for the board, acknowledging that most directors were in fact not local.

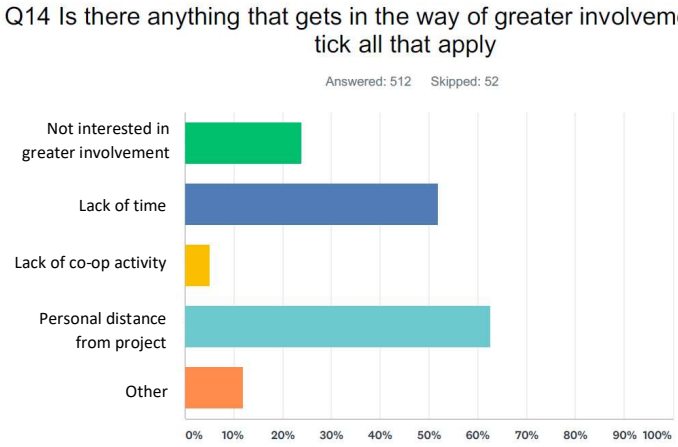


Figure 2: Results from Q14 of online questionnaire

Yet, this idea of a 'local' community who should making decisions came into question at times. Firstly, the radius of 'local' was pointed out to be variant dependent on place – 5 miles in an urban area of Oxfordshire could be the limit of locality, based on factors like school catchment areas and public transport options. On the other hand, "*if you were somewhere up in Scotland, a hydroelectric scheme, within 50 miles might be local*". Survey question 12, which asked members to choose on a sliding scale from 0 – 50+ miles how far they considered to be 'local' to a project, gave an average of 22 miles. Yet individual results were widely scattered across the scale, with more than 77 people choosing less than 10 miles and 57 people choosing more than 50 miles.

In addition, having a high number of members considered to be local does not automatically assert the co-op as having a 'community of place'. Edinburgh's roof-mounted solar panels are installed on 24 sites across the city and suburbs. This scattering of the technology suited the urban space; a co-op would be hard-pressed to find permission for one large solar park in a city. Edinburgh's population density provides different opportunities compared with the more rural co-ops; it allowed investment

to be contained more locally, and new potential partnerships/technologies to emerge. Yet, what made 100% local investment possible also *limited* the sense of community:

> *"Edinburgh's a big community and it doesn't really have... it's not a tangible thing. You can't pick up an area and go ok that's a community we can really reach that."*

> *"It's hard to build community in a city… there's potential to get lots of people interested but then you find there's so many different things going on in the city that the interest is diffused."*

So, although distance was cited as a barrier to involvement, being considered a 'local' project was not synonymous with higher participation. Section 4A had pointed out tension where some members said they only wanted *locally invested* projects to receive local benefit, despite this clashing with the reality of how the energy co-ops operated. Similarly, participation didn't seem to correlate directly with the number of members who were local.

A fairly passive involvement from members should not necessarily be considered a negative quality; during one interview a director said "*I don't think the co-op was set up in any way to be an active group*", implying that participation was not part of the original remit. However, it does suggest that in terms of the 'empowerment' referred to in the literature, for most members this is contained to the ownership – being co-owner of the project – rather than a more ongoing involvement.

Although most of my interviewees seemed content with their involvement, some did express a desire to do more. In answer to Q15 of my survey, "What information would you like to receive from the co-op?" 17% of respondents ticked that they would like to hear more about "how you can get involved in developing the co-operative". If a member did want to 'participate' more, it wasn't always clear how this could happen:

> *"We perhaps don't do as much as we could, but then what can we do? We don't have a lot of invitations do we?"* – Rob and Lisa, Westmill Wind

> *"What do you mean by being more involved? Because I read the emails, I mean I'm not going to run for the board, so I'm not really sure what that would be" – David, Edinburgh Solar*

This was a reasonable point. Outside of running for the board or attending the AGM, there were few obvious opportunities to be involved. Board members are voluntary roles, requiring the sacrifice of time. Time difficulties was cited throughout the literature on community energy, as an obstacle to people becoming more involved and operations running smoothly. 51% of my survey respondents ticked 'lack of time' as a factor getting in the way of greater involvement in their co-op. The combination of this, and the perception that boards were made up of technical/business experts,

would make running for the board an unviable option for most. Similarly, the Annual General Meetings are only once a year; inevitably excluding a large portion of membership. When one member was asked how much he followed the co-op: "*Not as much as I want to. They all have their AGM's on Saturdays and I'm always busy. It's really as simple as that".* In this case, how else can members express an ongoing interest in the co-ops? Edinburgh Solar had taken note of the difficulty attending AGM's, and decided to run a second members meeting in 2018 to keep news more current and give another opportunity to those who missed the main event. This will be repeated in 2019, and is something other co-ops could put forward to their members. As mentioned previously, the encouragement of other non-technical roles could be helpful, especially if these had more relaxed approaches than running for the board; volunteering to run social media pages, for example.

It was noted that engagement changed over time. During the planning and development stages of a project, activity focused around overcoming barriers to reach a concrete goal: the launch of some kind of renewable energy technology. Indeed, even 11 years on some of the local Westmill members reminisced about their involvement in these 'pressure group' stages. But after this point, the nature of involvement changed and some said they had become less active subsequently. Similarly, an Edinburgh member said that since the launch of the panels he was now "*sitting back and watching it work*". On the other hand, other members became more involved as roles in the co-ops changed over time; it was noted in the previous chapter that there was a growth of '*real active people*' in the socially-focused WeSET arm of Westmill. As the wind site itself was sufficiently '*running itself*' (with support from the 'experts'), this was where much of the further interest could be channelled.

Commented [NH17]: Corrected typo ('Edinburgh member said he since…')

To summarise member engagement, members tended to engage in more passive forms; reading newsletters, checking the websites and so on. The geographical spread of membership was cited as a strong reason for this, however it was noted that having a high percentage of local members didn't always equate to a strong sense of community or engagement either. This suggests that members are more empowered by their co-ownership of the projects, rather than other collective outcomes. If co-ops wanted to increase engagement and member activity, then it would be worth thinking about what kinds of roles and events could encourage this; perhaps coming up with some more diverse roles including events or marketing for the co-ops, and running more regular member meetings alongside the AGM.

4B) III) Engagement with affected communities

So far I have focused on how members and directors interact with an energy co-op. But my fieldwork in Arrochar showed that these were not the only people engaged. Most members of the communities associated with the Arrochar project (the villages of Arrochar and Tarbet) are not shareholders, and some of my participants cited financial reasons for this (as well as missing the very quick crowdfunding period needed to meet FIT deadlines). But several of those residents I spoke with considered themselves 'Friends of the Hydro'. This was an informal label incorporating them into the project through non-financial forms of support, for example petitioning during its planning stages, attending the launch, and/or following its general news. The phrase was also used for residents who volunteered to help with the maintenance of the project, in particular clearing debris from the weir. Kalkbrenner & Roosen's study of Germany citizen's willingness to participate in local renewable energy projects found a higher percentage of people willing to volunteer time than those willing to invest money (2015). With this in mind, considering only shareholders as 'participants' of a co-op could be considered restrictive. Given the financial barriers, and the potential to contribute to the co-op in other forms, if energy co-ops did want to widen their scope to benefit communities more then one idea could be to allocate a small number of free shares to representatives of the local community. This would give them voting rights in the co-op, and recognise/encourage the other ways in which they contribute. This suggestion would depend on the co-op – it is most relevant to energy co-ops with a specific place and community attached, like Arrochar.

The previous chapter quoted one member who said that an '*enthusiastic'* local community should keep the benefits. But this was only measured through financial investment; Arrochar appeared to have an enthusiastic community engaging in other non-material ways. I have already discussed the role of Westmill's charity WeSET, and how this has become a significant part of Westmill Wind's remit. This charity was set up later than the wind site itself, and many of the volunteers are not shareholders either. Parkhill et al's study found a community energy group's aims and objectives evolving over time with the incorporation of '*volunteers who became interested and started bringing their own perspective*' (2015: 65). In Walker et al's 2007 study, it was noted that focusing on *ownership* of renewable energy could devalue other types of community involvement. In my case studies, ownership of renewable energy was indeed the basis for the project getting started. But since this point, they had become 'community energy' projects in other ways, involving different actors. Some of the members who had been significantly active during development stages had taken a step back, and others who had not been around for the fund-raising period or who could not become a member in the financial sense had become more involved.

There was a sense that some board members would like to move from co-op 'beneficiaries' having things done to them to having them being active, engaged members themselves. Whilst I have highlighted how Edinburgh Solar's panels could be utilised as an educational tool for the schools, one interviewee said that "*for them [the schools] I think it's just something that happened on their buildings*". Another director said that they would "*dearly like our host buildings to be more interested in it… we do having teaching resources, but I have no idea whether anybody uses them"*. Again, time constraints had been one of the problems here, in a more organisational sense. Projects have typically had to meet strict deadlines to qualify for schemes like the FIT. This was said to have restricted the ability to form strong initial connections with the host sites, because of rushing through a development phase. A rush to meet tariff deadlines was also noted for the Arrochar Hydro project, where it was suggested that this limited the ability to recruit local shareholders. Edinburgh's Phase 2 is facing similar time pressures to install new panels quickly to qualify for the final Feed-in Tariff subsidy. In a potentially post-subsidy environment, it would be interesting to see whether fewer time constraints could change the way in which community energy projects develop ties in the communities they are building in. It would be helpful for an organisation like Energy4All to be aware of this going into new schemes; perhaps using the time to help the co-ops form stronger links and make the communities feel more like members themselves.

4B) IV) Diversifying membership

There is another reason why energy co-ops may wish to focus on becoming more inclusionary to increase their impact. Both the questionnaire and interviews suggested that co-op membership attracted a certain demographic. 86% of survey respondents were over the age of 45, with 68% of these over 55, and 70% of all respondents were male. Of course, there are weaknesses in this dataset; older retired members might be more inclined to answer a call for participants both online and in person. However, attendance of AGM's and some Community Energy conferences added support to these demographics. Additionally, although many co-ops sell minimum shares fairly cheap from £100, this still excludes certain people who cannot set money away for long periods of time; demonstrated by the financial barriers cited in Arrochar.

Though the age, gender and income of members does not impact the amount of energy being produced by the projects, it does impact how far the benefits reach and whose voices are heard in decision-making processes. Given the co-ops were keen to distinguish themselves from commercial or other projects (for example Edinburgh distinguishing their actions from the local council's), their

grassroots ownership structure is clearly important. Appealing to more diverse communities could help to increase their authenticity as grassroots organisations, as well as distributing benefits more fairly. Allocating a small number of free local shares as mentioned previously could help with this. Dropping the minimum share lower than £100 would incur more admin work, which may deter co-ops, however perhaps this could be offered to individuals from low income households. They could also work on marketing the projects through different channels (in particular social media) to attract a wider demographic, especially younger people.

Commented [NH18]: New section addressing age, gender and income of members

4B) V) Leadership

Martiskainen's study found dedicated, non-hierarchical leadership to be central to the successful development of community energy projects, but also pointed out the vulnerability in this when there was no plan for potential successors (2017: 87). In all three of my case study sites, 'key drivers' of the project were frequently brought up in conversation.

For Westmill Wind Farm, the landowner (a local farmer) had proposed the project and pushed it through the planning process, over a decade long. He had been a significant figure in the area since before the project was developed, referred to by one interviewee as a *'green energy nut… in the nicest possible way*'. This helped build trust and excitement around the project – he was known for his skills in publicity and ability to throw very successful events on the site.

> *"A lot of people in the area know him. He's been around for 35 years … his personal leadership made a difference."* – Sebastian, member of Westmill Wind

Although he was "*very much the driving force*" responsible for getting the wind farm (and neighbouring solar farm) built, it appeared that he had now taken a step back in involvement. One interviewee suggested that it may have "*lost a bit of character*" since that point, but the aforementioned strong trust in the board seemed to balance it out. This suggests that the role of a strong and charismatic leader was perhaps more crucial in the earlier development stages of the project; gaining that initial traction, publicity and local support. Now that the project had matured, it seemed to operate more smoothly without needing a figurehead.

Similarly, at Edinburgh Solar the figures responsible for getting the project up and running weren't necessarily the main drivers now. To launch the project after several years of difficulties, the combination of a councillor who '*wouldn't take no for an answer*' and a professional in community energy development who happened to be living locally was essential. Since this point, certain figures had taken a step back and the site had benefitted from having who one interviewee referred to as an

'arch-networker'; a director with sufficient time and interest in the project to keep it active and engaged with the schools and other actors in Edinburgh's sustainability network. One director noted a big shift in the board members after the project was up and running: "*Once the technical challenges were gone, they went. They got bored with it"*.

In Arrochar, one individual also emerged as the driving force behind the project's development. As well as a technical background in engineering, his visibility in the local communities and networking skills clearly remained beneficial to the project: for example during my short visit he made use of another local event (the opening of a new housing development) to recruit a couple more 'Friends of the Hydro' volunteers to help maintain the hydro weir. Martiskainen's study had found that leaders sought out innovative opportunities and made use of community energy networks that were "largely based on ad-hoc encounters" (2017: 86), and I found this director drawing on informal, local networks in a similar way.

One resident had cast doubt on how far community was really involved in the development of the hydropower project: *"It was led by you, driven by you, delivered by you".* This implies that during the development stages, the idea of Arrochar as a 'community' project were perhaps illusionary and instead the project revolved around one key leader. However, whilst the director's role was still significant, the subsequent recruitment of Friends of the Hydro, visits from schoolchildren, and connection to the local Development Trusts would suggest that it has become more of a community project since this point. There was now more than one local director, and the project was still only in its first year – as pointed out previously, the projects were dynamic and subject to change, and leadership may become more or less significant in future.

From the case studies, it appeared that having one or two key leaders had been essential in the development stages of the projects. However, the type of leadership needed could evolve over the course of a project; from technical to networking, for example. In the cases of Edinburgh and Arrochar, a strong networker appeared to be particularly important for continuing to raise the profile of the co-ops after the biggest 'technical challenges' had been dealt with. Evolution over time was evident here, and the need for an ongoing review of the co-ops is relevant; dealing with only one or two figures may not account for shifts in focus.

Section 4B has addressed some of the ways in which people interact with energy co-operatives; shareholders, other members of the community involved, and key leaders. It has been suggested that the energy co-ops could do more to include non-shareholders, given that members of the community can contribute in other ways. If there were to be fewer deadlines to meet in a post-FIT environment, perhaps more time could be spent developing relationships with the communities the co-ops are

impacting, for example schools with solar panels on. Much like section 4A, attention to change over time was important; as co-ops develop there could be more space to include different skills, particularly non-technical ones.

4C) Networks

4C) I) Local/regional learning and partnerships

In the previous sections I have mentioned some of the relations that can form between co-ops and other actors, such as their energy host sites. This final chapter explores co-op networks on a broader scale, as it had been suggested that shared learning and partnerships were a key part of co-op development (UKERC 2018).

For those who actively followed the community energy sector, there was a belief that the organisations involved were building the experience to support themselves:

> *"Because we know a lot more, we can BE a lot more productive now… we have more skills, we have more knowledge, and it's doable. That's the thing."* – Bill, member of multiple co-ops

This was raised particularly in relation to the ending of the Feed in Tariffs, for example one member said "*I'm not fazed by them ending. They got an awful lot of people interested, and I think it's helped us build up something really great"*. In this way, government support could be seen as a stepping stone leading to greater independence and resilience; a form of growth pointed out by Vickers and Lyon (2014).

The collective use of 'we' shows some members envisioning themselves as part of a wider energy co-operative movement, and three members made comments about not needing to '*reinvent the wheel'* in community energy; indicating that a lot of the experimentation and learning in the sector had been done, and projects now benefit from this. In terms of niche development, this would suggest that the co-operatives are acting in something more than a local niche; at least 'inter-local', as Seyfang et al had found in 2014.

Some degree of sharing between community energy groups was evident at all three sites. Westmill has a close relationship with the neighbouring Westmill Solar site – they run their AGMs on the same day, donate money to the same charity, and one of the directors sits on both boards. The pooling of their resources in the WeSET charity appeared to provide significantly greater opportunity for the co-op to contribute to wider socio-ecological development. WeSET had more funds to work on projects related to education, energy and the arts, and even to employ some part-time staff. With this additional capacity it could widen its focus (for example, changing its local remit to include Swindon, as discussed in section 4A), and it had money to engage in more material developments such as insulating the local Watchfield village hall. Westmill Wind Farm had an unusually clear connection to

the Westmill Solar Site through being built on the same landowner's site. If an organisation like Energy4All wanted to help energy co-ops to develop further, then perhaps brokering these kinds of partnerships with co-ops that are not so immediately connected could be helpful.

Several interviewees from Westmill mentioned another organisation called Low Carbon Hub; rather than generating electricity itself, Low Carbon Hub work as a regionally-specific intermediary raising money and offering support to other community-owned renewable energy projects in Oxfordshire. One member described the relationship between Westmill and Low Carbon Hub as follows:

> *"There is a lot of overlap. Oh yes I think sort of friendly cooperation. Certainly I've seen the chairman of Westmill Wind Farm at Oxfordshire Low Carbon Hub AGM's, we're all quite pally" - Fred*

He also suggested that Westmill had inspired the Low Carbon Hub, which was a more recent project:

> *"Westmill showed that there was something that could work, as a basic project, and Low Carbon Hub said right well they've shown this could work and let's build on this"*

As one of the UK's more mature energy co-ops (11 years old), it was encouraging to hear that another group had learned from Westmill's experience and built on this. It suggests an upward scaling of community energy projects, as Low Carbon Hub had taken inspiration and expanded ideas from a local project to work on the regional level. Energy4All, similarly, evolved from a local project (the Baywind Co-operative) and is now operating on a national scale. Energy co-ops have clearly grown and developed more of their own infrastructure to support themselves and each other, taking lessons from previous projects.

The urban nature of Edinburgh Solar meant the networks within the city were particularly diverse. One member noted that the same "*routine suspects"* appeared at all organisations linked to climate change, and a director pointed to several organisations which had overlapping members:

> "*There's organisations like Friends of the Earth, things like Transition Edinburgh, then we will have members who are Eco-Congregation members, I expect we have members who are Greenpeace members as well… I would ideally like to see us be a more active community effort, but it doesn't always work out. We must have quite a bit of overlapping membership, but I never really found out or tried to ask what it is.*"

As noted previously, this abundance of organisations with a shared sustainability agenda could potentially 'diffuse' individual interest and engagement, but there appeared to be potential for them to work together. Whilst there were shared members across the organisations, it was unclear exactly

how these could or should intertwine further. Therefore, whilst there was potential, there was not yet much evidence of a developed network of sustainability-driven organisations which Edinburgh Solar was a part of. Where the director said that being a community 'doesn't always work out', differences in aims and scale were noted; for example, some groups focused on particular neighbourhoods of Edinburgh, the Transition group had a greater political focus, and so on. Forming relationships with other energy co-ops, or organisations focused specifically on community energy (like Low Carbon Hub) appeared to be easier than working with other groups that coalesced under a more general notion of sustainability.

Both Westmill Wind and Edinburgh Solar had lent their resources to other innovative projects. Members of Westmill Wind, for example, were used as participants for an Oxford University study about Smart Meter usage. Edinburgh Solar was currently working with a Scottish charity on battery storage, and on a project with Edinburgh University looking at *"innovative ways of using the energy",* by transferring the solar power from schools to neighbouring social housing. Here, the social and economic incentives overlapped. They would be helping a local community by providing cheap energy. But using the solar energy directly could be more economically beneficial too, given the schools used up very little of their own energy during the school holidays.

According to one director, Edinburgh Solar was approached regularly with other such projects and ideas. He said "*It's all good conversations, but then it's how do you take it all forward*?". Again, it was a question of the co-ops capabilities, with more potential projects than time or resources available to develop them. Working with institutions like universities appeared to work well, because the co-ops could share their technology but pressure was taken off volunteers from them doing everything themselves. Intermediaries like Energy4All could also play a significant role here, given they tend to have paid professional staff, who could help pursue innovation projects outside of the co-ops core remit. However, a consideration of how time is distributed would be helpful, as will be discussed in the following 'intermediaries' section.

Engagement with newer technological innovations such as battery storage was certainly promising but still appeared to be in the fairly early stages for the energy co-ops. It was mentioned as a 'promising area' at a Community Energy England conference I attended earlier this year, but tentatively, and both the Edinburgh and Westmill AGM's appeared hesitant to discuss developments in too much depth. It is something that energy co-ops certainly appear to be working on, but it will likely take a few years to see how valuable these technologies will be for energy co-ops. Therefore, it would be inappropriate to speculate about how far technological innovation will be a significant area

for energy co-ops in the future. Further research in a few years would be helpful to assess how far new technologies have been incorporated into community energy groups' activity.

4C) II) Intermediaries

In Hargreaves et al's 2013 study of the role of intermediaries in community energy, they found that intermediaries could struggle due to the difference in aims and lack of cohesive infrastructure between local projects. Given the co-ops I studied were all part of Energy4All's 'family', I was interested to see how far their role as an intermediary manifested after the projects initial development stages were completed.

There appeared to be some ongoing negotiation in terms of how much Energy4All should be involved with individual co-ops. For example, one Energy4All staff member who sat on the board of Edinburgh Solar was contributing a significant amount of time to assisting development, such as helping with their 'Phase Two' solar panels and collaboration with the university. However, the staff member was also responsible for developing and supporting the other co-ops in Scotland, who needed/desired varying degrees of assistance. In contrast, Westmill Wind Farm appeared to be happy working quite independently from Energy4All (perhaps given the aforementioned technical expertise on the board). It was not necessarily clear how much support Energy4All was offering after the launch of a project. Given the number of energy co-operatives in Energy4All's family has grown significantly in recent years (mirroring growth in the number of projects in the UK generally), a consideration of how assistance should be distributed between projects would be helpful. This could include adapting their administration fees based on how much assistance the individual co-ops needed. Alternatively, if it was within the organisation's capacity, I would argue that a specific role for *post-launch support* of projects would be worthwhile. Rather than dividing time between large numbers of projects at very different stages, this would free up a role to specifically pursuing new activities in the existing projects. If there is a growing trend towards alternative innovations alongside energy generation, as Community Energy England had noted in their State of the Sector Report (2019), then now would be a relevant time to branch into this kind of role.

In Seyfang et al's 2014 study 'A grassroots sustainable energy niche?' they found a community energy niche operating at the 'inter-local' phase; projects mostly learning from each other locally in informal ways. However, an opportunity that Energy4All presented was to connect projects beyond the local level. In one of my previous quotes, an interviewee suggested that for some co-ops: "*rather than feed all of the benefits back let's put some by for future investments or* ***helping other schemes elsewhere****" [emphasis added].* Co-op to co-op lending comes under this notion of 'helping other schemes elsewhere', and the concept was brought up as desirable by more than one interviewee. This is

something Energy4All has been facilitating, and a specific co-op (Energy Prospects) was set up to raise capital for helping potential projects pay for the early feasibility stages. Given there is support within the membership for this, and given the current policy environment which is likely to make funding more difficult for co-ops, facilitation of lending looks likely to be very helpful in future. If Energy4All was more engaged in post-development of projects, as mentioned in the previous paragraph, this could be one of their focuses.

Sharing ideas, as well as financial resources, on a wider scale was also a potential for Energy4All:

> *"as one little organisation to be honest you're gunna have a limited amount of local information about a local area. But there's lots of other coops that are doing the same thing, have all got the same sort of ideas and same sort of drivers. Some sort of cross fertilisation about sharing ideas and presenting a much bigger more substantial sort of package of data and information and experiences would be very useful." – Steven, Westmill Wind*

However, how to successfully enact this "cross fertilisation" on a scale bigger than local/regional was not completely clear. The director at Arrochar Hydro Society was previously asked to be on a Community Energy Scotland Mentor scheme – a forum to bring directors together and exchange their knowledge and experience of community energy. He told me it had some good ideas but "faded out", suggesting it was because a forum of that scope would need somebody "really driven" to make it work. The directors I spoke to were aware of the great potential to collaborate with other co-ops, but it appeared that putting the scheme in place to facilitate this and seeing it through to success would be difficult. Seyfang and Smith (2007) had suggested that grassroots initiatives spent the vast majority of their time 'simply surviving'; taking on these kinds of additional roles could be difficult. Energy4All are currently in the process of setting up an online forum to trial for use by energy co-op directors. This could be a successful avenue; the flexibility of being online could help with time pressures, and the commonality of being part of Energy4All could drive the co-ops to use it more than bigger national forums such as Community Energy Scotland or England.

Sharing was beginning to happen in trans-national ways too, going even further beyond the 'inter-local' phase which Seyfang et al had noted in 2014. Energy4all is a member of REScoop; a European federation for renewable energy co-operatives, based in Belgium (REScoop 2019). Much like the UK-based intermediaries, their aim is to provide tools, contacts and advice whilst "representing the voice of citizens and renewable energy co-operatives to European policy makers" (ibid). This connection was sometimes filtering down into the individual co-ops. For example, my stay in Arrochar overlapped with a visit from members of a Danish wind co-operative, organised through a director at Energy4All. They were taken on a tour of the hydro site, and could compare and share their very different experiences

of being community energy projects. Westmill had also had REScoop representatives speaking at their AGM's previously. Therefore, the capacity to share and exchange ideas and knowledge appeared to be expanding, and this was viewed positively; it gave the co-ops more to report on in newsletters, and demonstrated how they were part of a significantly bigger movement.

Chapter 5) Conclusion and recommendations

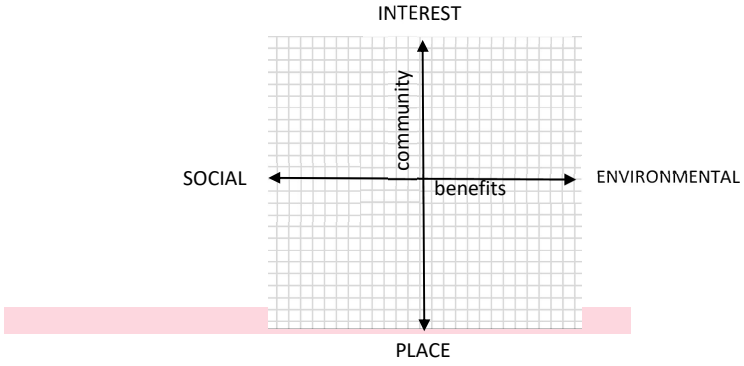
The previous chapters have addressed the potential for energy co-operatives to contribute to socio-ecological innovation; first by considering how they regard their remit, followed by an assessment of engagement within the co-op's, and finally by widening the scope to consider the opportunities of networks and partnerships between co-ops and other organisations. There was evidence at all sites of continued activity, outside of generating clean energy and paying interest back to their membership. The co-ops continued to meet up, to engage with new initiatives, to re-negotiate where their boundaries were and how far their responsibilities extended. Therefore, they could be considered grassroots innovations; the multiple motives gave space for experimentation and innovation, in ways found less often in purely profit-driven enterprises (Seyfang & Smith 2007).

In terms of their remit, some tensions arose in how far additional 'benefit' from the project was considered to be for the membership or for the local community, and how far this should be connected to sustainability. Much of this came down to how far the projects were considered 'local', but that in itself could be contentious. Engaging with schools was highlighted as a particularly safe area of further activity; something that had a significant impact which a majority of members saw as important and within the co-op's capacity. There were suggestions of tackling further issues such as fuel poverty, but these pushed the focus of the projects in even more of a social direction; further discussion would be needed. The characteristics of the co-ops were reflective of both their place and the nature of their technology; for example, Edinburgh's distributed solar panels led to a different conception of community and greater scope for technological expansion.

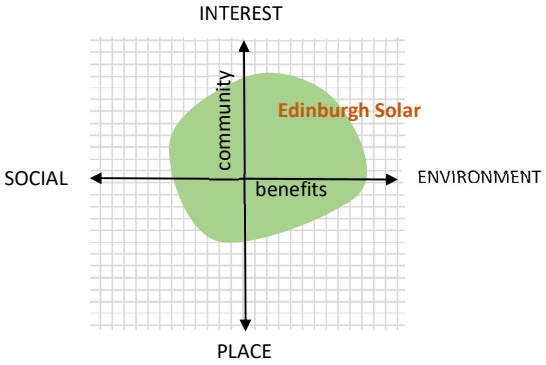
Throughout this research, several communities have been emerging alongside different motivations for the co-ops. There was a 'core' community who made decisions or volunteered, and a wider distributed community. There were those who saw the co-ops as strictly environmental organisations, and those who saw them more embedded within local communities.

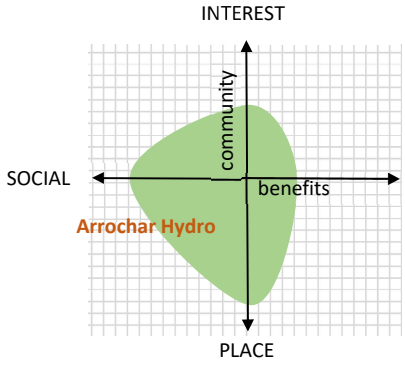
In Walker and Devine-Wright's study, they presented a 'process' and 'outcome' typology which has since been frequently referenced to help understand the diverse forms of community renewable energy projects (2008: 498). Whilst they recognise that all typologies can oversimplify, they are helpful means of communication, and I use the following figure to help visualise the different forms of community and focus that can exist within an energy co-operative:

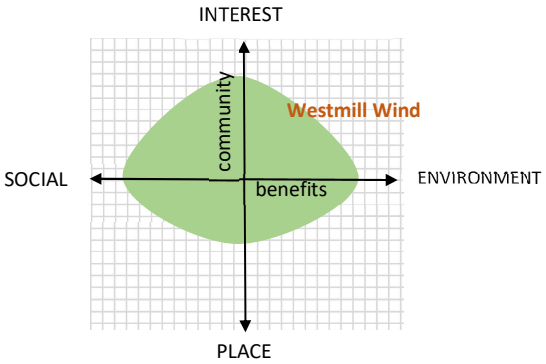
Figure 3: Typology to help understand the multiple communities and motives in energy co-ops:



Examples of how it could be used:







The diagram shows how sense of community, and the focus of benefits, can be divided. As the research showed, no co-op is likely to be only one extreme; for example, Arrochar had both a community of place (connection to local residents) and a dispersed community of interest (the shareholders). I would argue that the sense of place was very strong, and the project had a clear social focus (which overlapped with the environmental), which is why it has been placed further towards these axes on the diagram. Edinburgh was more focused on sustainability, and there was less of a sense of place even though benefits were concentrated within the city. These examples could be disputed, but that is part of the utility of the diagrams. They are not intended to be absolute truths but could spark discussion and reflection within new or existing energy co-ops, ultimately helping to clarify aims and purpose.

Commented [NH19]: Section removed from Engagement chapter and rewritten here, with new diagrams

The majority of members seemed to engage with the co-ops in fairly passive ways; reading newsletters, attending infrequent AGMs, and checking generational figures. Particular barriers included a lack of time, distance from projects, and uncertainty about what forms of participation there could be, as well as a perception that members were unsuited to the technical roles of boards. More diverse member engagement could lead to new ideas and new avenues of innovation, and it was noted that the needs and focus of the organisations could change over time, especially as technical challenges diminished. So there is space in energy co-ops to encourage greater engagement through other roles. It was also noted that participation wasn't restricted to shareholders; other members of the communities could volunteer or interact. Thinking of ways to represent them, for example giving them voting rights through assigned shares, could help achieve the 'community inclusivity' highlighted as an aim by Community Energy England this year.

Forming partnerships, collaborating or sharing experiences with other groups/organisations unlocked greater potential for the energy co-operatives, and there was evidence of this happening on local, regional, national and even some trans-national levels. These kinds of partnerships could help develop the sector as a whole (for example Low Carbon Hub taking inspiration from Westmill Wind Farm and developing the concept to a regional scale), and they can allow the projects to do more; as demonstrated by collaborative research into innovations like battery storage or smarter use of energy. Energy4All was facilitating some wider networking, such as connecting co-ops from further afield through their membership in REScoop, and helping to facilitate financial lending between the co-ops. Some members wanted to see more of this happen in future, and it could become especially helpful if there is an absence of FITS and other support mechanisms.

All this taken into consideration, my recommendations to Energy4All would be:

- **Tailor support to individual co-op's**
- **Support co-ops to pursue educational activity, for example by consolidating educational resources or helping to develop ties with schools**
- **Consider how time is distributed between co-op's and whether a specific role for post-launch development of projects would be feasible**
- **Consider whether a guide for Community Benefit Fund spending would be helpful, with information including the benefits of the different forms (donating to a charity, grant awards etc.) and tips such as the best time to open applications**
- **Consider how to include/represent members of the local community, this could be done for example by allocating some free shares to local volunteers, thereby giving them voting rights**
- **Consider alternative forms of involvement in the groups, for example helping facilitate additional members meetings or promote non-technical roles**
- **Pursue the development of an online forum**
- **Reflect on how the increase in dispersed solar installations (and the decline of new onshore wind sites) has changed the sector, in terms of community and capacity for expansion**
- **If a post-FIT environment results in less pressure to meet deadlines, use this time to help co-op's develop stronger ties with their associated communities**

Although my research has discussed changes over time when this was brought up by the interviewees, a longitudinal study of energy co-operatives would be an ideal area of further research. Assessing in greater depth how roles change, and how momentum in energy co-ops (or the wider community energy sector) can be maintained, would help understand their role over a longer time period. Future research into how far energy-generating co-ops can successfully engage in other types of technological

innovations, including battery storage, would also be helpful. These kinds of developments were at too tentative a stage to assess in 2019, but the landscape will likely change in a few years.

Despite a decline in the number of new energy co-op projects launched this year, the existing wealth of knowledge and experience in the sector can be used to help build resilience and inspire activity, and there is evidence that energy co-ops are continuing to contribute positively to social and environmental development long after their turbines, panels, or other technology switches on.

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Appendices

Appendix 1) Recruitment emails and letters

Email sent to Westmill Wind Farm members:

Dear Westmill Wind Farm Co-operative members,

I am Natasha Hoare, a postgraduate student from Lancaster University working with Energy4All on a project about the ways in which energy co-operatives are involved in the community and contribute to CO2 reduction beyond generating electricity. I have chosen Westmill as a site of research because of its continued strong commitment to action in the community since energy was first produced back in 2008.

I am currently seeking participants from the co-operative to take part in casual 1-to-1 interviews which will last around 45 minutes each. This is an opportunity to discuss your experiences of the co-op and your wider beliefs about sustainability/other local issues, all in a confidential environment. Please see the information sheet attached for further details.

Interviews will be conducted from **1st April to 14th April**, during which time I will be based in Oxford.

If you agree to participate or you have further questions, please fill the attached availability form and email to: n.hoare@lancaster.ac.uk

Please note: If you live elsewhere in the country, or if you are interested in participating but unavailable on the dates mentioned, it may still be possible to arrange an interview. Please let me know your location and I'll get back to you.

Thank you for considering and I hope to meet several of you soon.

Kind regards,

Natasha Hoare

MSc by Research in Environmental Studies at Lancaster University
07588821415

Email sent to Edinburgh Community Solar Co-op members:

Dear Edinburgh Community Solar members,

I am Natasha Hoare, a postgraduate student from Lancaster University working with Energy4All on a project about the ways in which energy co-operatives are involved in the community and contribute to CO2 reduction beyond generating electricity. I have chosen Edinburgh Solar as a site of research because of its continued strong commitment to action in the community since the first share offer in 2015.

I am currently seeking participants from the co-operative to take part in casual 1-to-1 interviews which will last around 45 minutes each. This is an opportunity to discuss your experiences of the co-op and your wider beliefs about sustainability/other local issues, all in a confidential environment. Please see the information sheet attached for further details.

Interviews will be conducted between **4th March and 15th March**, during which time I will be based in Edinburgh.

If you agree to participate or you have further questions, please fill the attached availability form and email to: n.hoare@lancaster.ac.uk

Please note: If you live elsewhere in the country, or if you are interested in participating but unavailable on the dates mentioned, it may still be possible to arrange an interview. Please let me know your location and I'll get back to you.

Thank you for considering and I hope to meet several of you soon.

Kind regards,

Natasha Hoare

MSc by Research in Environmental Studies at Lancaster University
07588821415

Appendix 2) Participant Information Sheet:

Research with Lancaster's Environment Centre: How do energy co-operatives contribute to wider social and ecological innovation?

Participant information sheet

I am a researcher at Lancaster University collaborating with Energy4All on a project about renewable energy co-operatives. I am looking for participants to take part in a study about the wider potential for co-ops to benefit communities and contribute to greater CO2 reduction.

Please take time to read the following information carefully before you decide whether or not you wish to take part.

What is the study about?

The co-ops which Energy4All work with began with a focus on energy generation. However, often the co-op activity goes beyond this – investing in local communities, working on other energy-demand incentives, and so on.

This is a promising area of co-op activity but there isn't much research into it yet. The study aims to understand more about what takes place after a project is launched, what motivates people to become involved, and where members might like this to go next.

What will I be asked to do if I take part?

We would arrange a suitable time to meet in person for an informal 1-to-1 interview. I will be asking some questions about your involvement with the project, your thoughts about its future and your wider lifestyle. It should take around 45 minutes.

I would also like to conduct a focus group for co-operative members. This is where several members get together at once and discuss ideas, for example brainstorming what kind of project you might like to see happen in future. It would take place in a convenient town where lots of members are located.

You would be welcome to take part in both forms of data collection, or just one.

What are the possible benefits from taking part?

If results are positive, this research could be used to support those arguing for the importance of energy co-operatives in our energy mix. It could also help suggest areas where co-ops might need some more support. You would be able to see the finished product at the end if you wish.

Do I have to take part?

No. It's completely up to you to decide whether or not you take part. **If you decide not to take part in this study, this will not affect your position in the co-operative.**

What if I change my mind?

If you change your mind, you are free to withdraw at any time before participation in this study.

If the interview has already taken place, you can choose for your data to be withdrawn up to 2 weeks after. Beyond this point, data may be anonymised and withdrawal difficult.

If you took part in a focus group, you will be unable to withdraw after it has taken place, as this would compromise all other participants' data.

Will my data be identifiable?

After the interview/focus group, only I, the researcher conducting this study will have access to audio recordings or transcripts. I will anonymise all data, removing names and any identifiable information, before it is shared in any form.

How will we use the information you have shared with us and what will happen to the results of the research study?

I will use the information you have shared with me for my Masters by Research thesis. The thesis will be shared with Energy4All, and may also be condensed into shorter summary readings to share with co-operatives. I will present key findings at the Energy4All Annual General Meeting in September.

When writing up the findings from this study, I will only use anonymised quotes (e.g. from my interview with you), so that although I will use your exact words, you cannot be identified in any publications.

How my data will be stored

Your data will be stored in encrypted files (no-one other than me, the researcher will be able to access them) and on password-protected computers. I will store hard copies of any data securely in locked cabinets. I will keep data that can identify you separately from non-personal information (e.g. your views on a specific topic). In accordance with University guidelines, I will keep the data securely for a minimum of ten years.

What if I have a question or concern?

If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact me at the following email address:
n.hoare@lancaster.ac.uk **Or phone number: 07588821415**

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact:

Professor Philip Barker (Head of Department at Lancaster Environment Centre):
p.barker@lancaster.ac.uk Or phone number: 01524 510262

This study has been reviewed and approved by Lancaster's Faculty of Science and Technology Research Ethics Committee.

Thank you for considering participation in this project.

Appendix 3) Participant consent form

CONSENT FORM

Project Title: Working title: (em)Powering energy co-ops: the potential for renewable energy co-operatives to engage in wider socio-ecological innovation

Name of Researcher: Natasha Hoare
Email: n.hoare@lancaster.ac.uk

Please tick each box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study and within 2 weeks after I took part in the study, without giving any reason. If I withdraw within 2 weeks of taking part in the study my data will be removed. If I am involved in focus groups and then withdraw my data will remain part of the study.	☐
3. If I am participating in the focus group I understand that any information disclosed within the focus group remains confidential to the group, and I will not discuss the focus group with or in front of anyone who was not involved unless I have the relevant person's express permission.	☐
4. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher/s, but my personal information will not be included and I will not be identifiable.	☐
5. I understand that my name will not appear in any reports, articles or presentation without my consent.	☐
6. I understand that any interviews or focus groups will be audio-recorded and transcribed and that data will be protected on encrypted devices and kept secure.	☐
7. I understand that data will be kept according to University guidelines for a minimum of 10 years after the end of the study.	☐
8. I agree to take part in the above study.	☐

_____ _____ _____
Name of Participant Date Signature

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent_____ **Date** _____ Day/month/year

One copy of this form will be given to the participant and the original kept in the files of the researcher at Lancaster University

Appendix 4) Participant availability sheet

Co-op research participant availability sheet

Thank you for your interest in participating in this project. Please fill in the following details, and I will get back to you as soon as possible.

Your full name: _____
Your address: _____
Your contact details: Email: _____ Telephone: _____

Are you able to get to ___ for the interview (exact location to follow)? **Y/N**
(If no, please email me separately and we can try to arrange an alternative)

In the following table, please fill in your availability. Please tick if you are free at any time throughout the day, specify am/pm, or specify exact times:

[month]	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
[date]							
[date]							

I will do my best to accommodate as many people as possible. Please note, I may have to turn down participants if a suitable time cannot be found. If you have a family member who is also part of the co-operative, it would be possible to interview you both at the same time.

REMEMBER, ALL INFORMATION IS ANONYMOUS, AND YOU ARE FREE TO WITHDRAW ANY TIME BEFORE PARTICIPATION IF YOU WISH.

Thank you, and feel free to email with any questions you may have.

Please email completed form to:
n.hoare@lancaster.ac.uk

Appendix 5) List of questions asked in the online questionnaire

Q1) Which renewable energy co-op will you be answering questions for?
(Open response question)

Q2) How did you find out about the project?
Answer choices:

- Through a friend or family member
- Through a co-op representative, for example an information stall in your local town, door-to-door knocking
- Passing by the project site(s)
- Energy4All email
- Print or poster advertisement
- Internet advertisement
- Can't remember

Q3) Consider the following motives. Please rank them from 1 (most important) to 6 (least important) in terms of why you chose to become a member of this co-operative
Answer choices:

- Appealing economic investment
- Carbon reduction
- Future energy security
- Boosting the local community
- Support/strengthen the co-operative model
- Being part of a community of like-minded people

Q4) When joining, how financially risky did you consider the project to be?
(Sliding scale from 0 to 50)

Q5) Apart from your membership in the energy co-op, are there other ways in which you engage with clean energy? Please select all that apply, or leave blank
Answer choices:

- Producing domestic energy
- Improved the energy performance of your home
- Chose a green electricity tariff
- Reduced your energy consumption
- Bought an electric car
- Changed travel habits e.g. using public transport, flying less frequently
- Other (please specify)

Q6) What about wider sustainability-driven activities (not energy exclusive)? Please select all that apply, or leave blank
Answer choices:

- Changed diet
- Buy locally or organic
- Recycling
- Reduced waste
- Joined another environmental or climate activism group
- Other (please specify)

Q7) Would you say that joining the co-op has changed the way you think/act regarding climate change and carbon reduction? (If you answered yes, please provide details below)
Answer choices:

- Yes
- No
- Unsure

Q8) Were you a supporter of co-operatives as a form of social organisation before you chose to participate in a renewable energy specific co-op?
Answer choices:

- Yes
- No

Q9) Have you become more interested in co-operatives as a form of social organisation since joining the co-op?
Answer choices:

- Yes
- No

Q10) Imagine the co-op has £1000 to grant to a local project and you are setting the criteria for how to spend it. For the following statements, please rank their priority, from high priority (1) to lower priority (3):
Answer choices:

- Project should directly contribute to carbon reduction
- Project should increase awareness/education surrounding environmental issues
- Project should benefit local residents, e.g. addressing fuel poverty or retrofitting a community hall

Q11) Do you think energy co-ops should always use the benefit fund for sustainability related initiatives, or should wider community benefits be considered? Example of 'wider' community benefit: paying for upkeep of a sports club
Answer choices:

- Should always relate to sustainability
- Open to wider community benefit
- Depends on the co-op

Q12) How far would you consider 'local' to a project site?
(Sliding scale from 0 to 50+ miles)

Q13) To what extent do you follow your chosen co-ops activities?
Sliding scale from 0 to 100:
0 = Don't follow the co-ops activity
50 = Follow a moderate amount, e.g. reading newsletter and checking website
100 = Follow closely, e.g. consistently attending AGMs

Q14) Is there anything that gets in the way of greater involvement? Please tick all that apply
Answer choices:

- Not interested in greater involvement
- Lack of time
- Lack of co-op activity since the launch of the project
- Personal distance from project
- Other (please specify)

Q15) What information, if any, would you like to receive from the co-op? Please select all that apply, or leave blank
Answer choices:

- Performance of the renewable energy generator
- Projects supported by the Community Benefit Fund
- How you can get involved in developing my co-operative
- Activities of other Energy4All renewable energy projects
- News about the wider community energy sector
- News about the wider co-operative movement
- Other (please specify)

Q16) Do you know other people who might be interested in joining an energy co-op and haven't already?
Answer choices:

- Yes
- No

Q17) If you answered yes to question 16, what do you think may be barriers to them joining? Please tick all that apply or skip if N/A
Answer choices:

- Lack of advertising/information
- Share offer confusing or unclear
- No money to invest
- Skeptical about the amount of energy which will be generated
- Would only join co-op in the immediate area
- Not convinced there is enough economic benefit to membership
- Other (please specify)

Q18) If the co-op wished to expand their activities outside of generating electricity, in general do you think that co-op members are interested and motivated to get involved in new activities?
Answer choices:

- Yes
- No

Q19) If you answered yes to question 18, how do you think volunteer involvement could be encouraged? Please tick all that apply or skip if N/A
Answer choices:

- Seek volunteers at the AGM
- Write to members with specific request for help
- Ask members for ideas for new projects or areas of activity
- Set-up specific working groups for members
- Other (please specify)

Q20) Please select your age group
Answer choices:

- 18-25
- 26-35
- 36-45
- 46-55
- 56-65
- 66-75
- 76-85
- 85+
- Prefer not to answer

Q21) What is your employment status?
Answer choices:

- Working full-time
- Working part-time
- Retired
- Student
- Not working
- Other (please specify)
- Prefer not to answer

Q22) Please select your gender
Answer choices:

- Female
- Male
- Prefer not to answer
- Prefer to self-describe as:

Q23) Thank you for taking the time to complete this survey. If you have any other comments or suggestions, please leave these below.
(Open response question)