

Financing Community Energy Case Studies: Edinburgh Community Solar Cooperative



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Contents

Preface	I
Edinburgh Community Solar Cooperative key facts – 2018	II
Summary of key lessons	II
1 Mission statement and value proposition	1
2 Origins and development	1
3 Legal structure	2
4 Business model	4
4.1 Activities	4
4.2 Customers	4
4.3 Resources	5
4.4 Partners	6
4.5 Finances	7
5 Future prospects and plans	10
6 Key lessons	11
7 Acknowledgements	12
8 References	12
Appendix A - List of interviewees	13
Appendix B – List of solar PV installations	13
Appendix C – Key features of common legal structures	14

Preface

Financing Community Energy project

Commencing in 2016, the Financing Community Energy project aims to provide the first systematic quantitative and qualitative analysis of the role of finance in the evolution of the UK community energy sector. It is led by the University of Manchester, working with the University of Strathclyde and Imperial College London, and forms part of the UK Energy Research Centre (UKERC) research programme.

The project involves a literature and data review, analysing the development of community energy to date; a UK-wide survey and statistical analysis of community energy finances and business models; in-depth case studies of a range of community energy business models in practice; and an ongoing stream of policy and practice engagement.

This report presents the first of four case studies of UK community energy organisations conducted during 2018/19. These will later be included as part of a synthesis briefing alongside findings from a series of sectoral-level interviews. The case study makes use of a combination of qualitative (e.g. interviews, organisation reports) and quantitative (e.g. financial reports) data.

UK Energy Research Centre

This project was undertaken as part of the UKERC programme, funded by the UK Research and Innovation Energy programme. UKERC carries out world-class interdisciplinary research into sustainable future energy systems. It is a focal point of UK energy research and a gateway between the UK and the international energy research communities. Our whole-systems research informs UK policy development and research strategy.

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Front cover image

Figure 1: Gylemuir pupils showing their sunglasses and solar panel
(Source: ECSC)

Edinburgh Community Solar Cooperative key facts – 2018

Year established	2013
Location	Edinburgh, Scotland
Legal structure	Community Benefit Society (BenCom)
Annual turnover	£215,000 ¹
Net surplus	£5,075 ²
Total assets	£1.48 million ³
Generation capacity	1.4 MW of solar PV, which was estimated to have generated 1.1 GWh per annum 2017/18 ⁴ . Roughly equivalent to 325 households in Scotland ⁵
Finance	Combination of (soft) loans and community shares
Subsidies	Combination of grants and long-term revenue payments (e.g. FiT)
Number of FTE staff	None. Most admin support carried out by Energy4All (community energy intermediary)
Number of regular volunteers	Board consists of 11 directors – 7 volunteers, 3 councillors and one Energy4All employee – plus one co-opted member ⁶
Number of members	540 ⁷
Key partnerships	Energy4All, Edinburgh City Council (local authority)

Summary of key lessons

- **The ability of community energy organisations to raise community finance is underpinned by government subsidies** (e.g. feed-in-tariff). By providing a long-term guaranteed revenue stream, they de-risk the energy project. Their removal presents investors with a less attractive proposition, potentially closing down an important stream of finance.
- **Local authorities are a key facilitator of community energy projects.** For example, they may purchase power from community energy organisations, as well as provide space for power generation. The latter is highly dependent on the extent to which the procurement process and council leadership values locally supplied, low-carbon energy from not-for-profit organisations.
- **Intermediaries are a key provider of economic, technical, social and political capital** to community energy organisations. A key example are project developers such as Energy4All.
- **Choices around legal structure have an important bearing on the financing and governance of a community energy organisation**, including the:
 - Extent to which ‘community benefit’ is incorporated into the legal entity.
 - Level and type of finance it can raise.
 - Degree of risk it exposes its investors to.
 - Way in which control is exerted over the organisation’s strategic direction and who wields this power.¹

¹ Taken from ECSC’s public accounts for year end 30/9/2018 (ECSC, 2018a).

² This sum does not include £5,000 allocated by ECSC to their community benefit fund.

³ Taken from ECSC’s public accounts for year end 30/9/2018 (ECSC, 2018a).

⁴ Ibid.

⁵ Based on average household consumption of electricity in 2015 (Scottish Government, 2018).

⁶ Taken from project survey.

⁷ Taken from ECSC’s public accounts for year end 30/9/2018 (ECSC, 2018a).

1 Mission statement and value proposition

Edinburgh Community Solar Cooperative (ECSC) is a Community Benefit Society (BenCom). It operates 1.4 MW of solar PV panels on the roofs of 24 council-owned properties in Edinburgh, including schools, leisure centres and community halls. The electricity is purchased by the buildings’ owner, namely the City of Edinburgh Council, and any excess electricity is sold to the grid.

The objectives of ECSC are a combination of environmental and social:

- to be involved in and support the development, installation, management, operation, generation, transmission and provision of the supply of energy from renewable energy and low carbon sources;
- to reduce climate change emissions, alleviate fuel poverty, improve energy security and help to foster sustainable development in and around the City of Edinburgh, by working with like-minded organisations, through supporting projects and educational work and such other activities (ECSC, 2014: 2).

Whilst energy and the environment are at the heart of the organisation’s mission statement, ECSC also seeks to provide social benefit through recycling any revenue that it generates into other local sustainability-related initiatives via a Community Benefit Fund (Section 4.5.3).

ECSC quickly settled on renewable power generation as a means of delivering environmental and social value. However, a key challenge for ECSC was that a high proportion of Edinburgh’s population live in tenement flats (Riddoch, 2013), with very limited private or communal land which residents could use to generate renewable power. Whilst there was still significant roof-space for solar PV installations, a lack of access to rooftops made this difficult to use (ECSC, 2015a). Rooftop solar PV on these tenements generally required the consent of all apartment owners and possibly also building management companies. Furthermore, not all tenement blocks are suitable for solar PV generation, due to their pitch, aspect etc., meaning that only people living in suitable properties could have benefitted.

ECSC’s solution has been to deploy cooperatively owned solar PV on the roofs of publicly owned buildings. This circumvented the difficulties of installing solar PV on privately owned tenement buildings, whilst creating the opportunity for local residents to join the cooperative for the price of a community share. As one founding member explains:

“Edinburgh’s quite a high-density city, everybody lives in a flat... So, the idea that [you] could own a solar panel for £250 was quite attractive for people in tenements”⁸

2 Origins and development

We can chart the origins of ECSC back to a social enterprise and charity called Changeworks, which had a profound influence on its development. Changeworks was founded in 1987 by the City of Edinburgh Council, Edinburgh University and Friends of the Earth Scotland (I20; Companies House, 1987). It focuses on energy demand and waste reduction, fuel poverty alleviation and low-carbon energy (I17; I20). Part of the remit of Changeworks was to support community renewables (I20). In this capacity, Changeworks hosted the meetings and undertook projects and partnerships that resulted in the founding of a company limited by guarantee (CLG) in 2007 called Edinburgh Community Energy Co-operative (I20) (Table 1).

Table 1: Timeline of milestones

2007	Predecessor organisation, Edinburgh Community Energy Co-operative, founded
2013	ECSC founded, to concentrate on rooftop solar
2014	Edinburgh Community Energy Cooperative dissolved
2015	Share offer announced
2016	Panels installed

Source: interviews; ECSC public accounts

The early collaborative approach drew in potentially influential figures. Attending one early meeting was a local resident and employee of Energy4All, an intermediary that specialises in supporting the establishment of community energy cooperatives (see Section 4.4.2). He would later join the Edinburgh Community Energy Co-operative and later still ECSC. His influence, founded on his experience and considerable knowledge in the community energy sector, would drive the project in the direction of solar technologies and community share finance, under the umbrella of the Energy4All group.

Collaboration also drew in the local Labour MP and member of the Co-operative Party Mark Lazarowicz, who became a founding member of Edinburgh Community Energy Co-operative and the chair of the organisation. The current chair of ECSC explains: “[Lazarowicz] was a keen ... green campaigner ... He wanted green things to happen in Edinburgh” (I18).

The links to the Labour Party proved significant. In the 2012 Scottish local elections, the Labour Party manifesto included a commitment for the party to support an energy cooperative as part of its commitment to making Edinburgh a “Cooperative City”. A founding member of the community energy group believes that Lazarowicz’s link into the Labour Party helped the inclusion of support for an energy cooperative in the city to get into the manifesto (I20).

⁸ Interviewee 20; a full list of interviewees is in Appendix B.

At this stage, the community energy group had explored the feasibility of a couple of projects, one of which was an onshore wind turbine on a property run by Scottish Water in the coastal suburb of Portobello. Whilst Scottish Water was supportive of the plan, the proposed site had been commissioned on a PFI contract with a Canadian Pension Fund called Ontario Futures, which ultimately blocked the development of the project. The group also looked at working to provide district heating for new housing developments on the waterfront in Leith, “but the financial crash put paid to the waterfront developments so that it never happened” (I19).

In light of these false starts, the group turned their attention to deploying solar panels. However, as a founding member of Edinburgh Community Energy Co-operative explains:

“We couldn’t find community buildings that would allow us a long enough lease to do the sort of thing we needed with the solar panels. Because we were ... basically signing a fixed contract for 20 years” (I20).

The group came to the conclusion that “we needed to work with the Council, we needed long-term security in terms of the asset base” (I20). But after the failure of the wind project and after the grant funding for feasibility of a solar project had run out, the group was despondent: “I think they just ran out of energy. They put so much into this wind turbine thing” (I20).

It was Labour’s 2012 coalition administration in the City of Edinburgh Council, with the SNP as junior partners, who breathed life into the community group’s venture, through its support for the Cooperative City idea:

“I think we’d done five years, and we were ... kind of, finished. And then we got a call from the leader of the council saying, come in and talk to us about energy co-op” (I20).

The group pitched the idea of establishing solar installations

on council buildings, with the support of Energy4All. Whilst the idea was met with scepticism by council officials, the administration’s leadership drove the project forward. The leadership was interested in the financial modelling of the Schools Energy Cooperative (SECL, 2019), which Energy4All had pioneered in England, where councils license⁹ buildings’ roofs for solar PV generation.

The plan involved the foundation of a new enterprise in 2013, called Edinburgh Community Solar Cooperative. It would be incorporated as a BenCom and focus exclusively on delivering the solar PV project in Edinburgh (Section 3). Whilst some of the original founders of Edinburgh Community Energy Co-operative would transfer over to the new company, including Changeworks and Energy4All employees, many decided not to, because of “burn out” (I17). Board members who decided not to make the transition included Mark Lazarowicz.

A feasibility study grant was sourced from the Scottish Government’s Community and Renewable Energy Scheme (CARES) (Section 4.5.1). ECSC investigated the potential for installing solar PV across 100 public buildings,¹⁰ 30 of which were deemed suitable, using criteria such as roof orientation, size and electricity consumption (ECSC, 2015a). The number was then whittled down to 24 for a variety of reasons, such as the intention of the council to sell a building within the project timeframe. Meanwhile, negotiations between ECSC and City of Edinburgh Council began to detail the exact agreement that ECSC would have with the council (see Sections 4.2 and 4.4.1). These issues were settled by September 2015, when the share offer was launched.

A CARES loan supported the project whilst finance was being raised by the share offer, and, by the end of the year, £1.4m of share capital had been raised by members of the public (Section 4.5.4), accounting for around 90% of what was required to complete installation on 24 roofs. The remaining funds were sourced from other cooperatives within the Energy4All group (Section 4.5.4). With the money raised, work could begin and the panels were installed in 2016, with the community benefit fund launched in 2018 (Section 4.5.3).

Thus, become constituted as a BenCom, CLG or Community Interest Company (CIC) were the only viable options for the community energy group if it were to access these funds.

The decision to raise share capital was grounded in financial and ideological reasons (see Section 4.5.4). Against these criteria, a CIC or a BenCom structure were the two options available to the group. However, CICs can only issue ordinary shares, much like a PLC. Publicly offered ordinary shares are floated on the London Stock Exchange.

This offers an established means of attracting institutional investment nationally or internationally. However, ordinary shares are not designed to attract small-scale investment from the local community. Moreover, due to regulatory and auditing requirements, public share offerings of ordinary shares are expensive, making them attractive options only for large scale investment (I17; I8). Thus, the creation of a BenCom was the obvious choice: it could attract government funding and also issue community shares. The legal structure of ECSC’s predecessor company Edinburgh Community Energy Co-operative was a CLG: a membership organisation that could not issue shares. Consequently, the CLG model was abandoned because it “wasn’t really designed for raising big share offers” (I20).

Whilst the raising of community shares offered a number of advantages, it is not without its challenges (Table 2). These include being subject to little regulatory compliance and therefore scrutiny, and the share capital being highly illiquid, because shares can only be sold back to the issuing society.

The imperative to raise private capital was in part a reaction to ECSC’s desire to capture the lucrative Feed-in-Tariff (FIT) subsidy, but it meant that it could therefore not also access capital grants easily, due to state aid rules. Therefore, the community energy group had to find another means of covering their capital costs. As one interviewee explained:

“You couldn’t [easily] combine grants and the FIT [and] a lot of communities were realising that actually the FIT was the one they wanted to go for. So that really precluded organisations from accessing grants capital for building a project” (I17).

Table 2: Comparison between ordinary and community shares

Ordinary shares (issues by PLC or CIC)	Community shares
<p>One share, one vote:</p> <ul style="list-style-type: none"> Greater number of votes in key company meetings depending on the ownership stake. 	<p>One shareholder, one vote:</p> <ul style="list-style-type: none"> Each member has one vote in key company meetings regardless of size of financial stake in company.
<p>Strict regulatory compliance:</p> <ul style="list-style-type: none"> Accounts must be independently audited. Company must stand on its own accounts. Financial Services Ombudsman (FSO) settles disputes between sellers and purchasers of PLC shares. 	<p>Light regulatory compliance:</p> <ul style="list-style-type: none"> No independent audit required. No FSO dispute resolution.
<p>Expensive: £10,000 or more for initial share offer.</p>	<p>Approx. £700 for initial share offer.</p>
<p>Highly liquid:</p> <ul style="list-style-type: none"> Ordinary shares are traded on London Stock Exchange. A familiar financial instrument for institutional investors, such as banks or investment firms and can therefore attract large sums. 	<p>Illiquid:</p> <ul style="list-style-type: none"> Community shares cannot be traded and can only be withdrawn from the issuing society.

Source: (Community Shares Unit, 2019; I8; I12; I21)

9 Similar to a lease except that a lease would change hands with the building if it was sold and a licence does not.

10 All buildings were owned by the council. Three of the 24 buildings are operated by Edinburgh Leisure, a charity established by the council, to manage and develop sports facilities. Buildings used by the general public (e.g. schools, community centres) were prioritised over the council’s administrative ones due to the opportunity to educate people about their energy consumption.

11 See Appendix C for a summary of the features of the common legal structures.

12 Energy4All supports bona fide cooperatives (see Appendix C) and BenComs. The term co-op is used here, as it often is, to describe both structures.

4 Business model

4.1 Activities

The core responsibilities of ECSC include the installation,¹³ ownership and operation of roof-mounted solar PV units on publicly or community-owned buildings in the Edinburgh area (ECSC, 2015a). In total, ECSC operates 1.4 MW of solar panels, which generated 1.1 GWh in 2017-18 (ECSC, 2018a). Administratively, ECSC is responsible for managing the community benefit fund (Section 4.5.3).

ECSC is also involved in educational work, maintaining display screens for staff and students in the host buildings to show the levels of solar power generation (ECSC, 2015a). Indeed, one reason why public buildings were chosen by the ECSC team (i.e. buildings where members of the public use facilities rather than just council staff), was to increase awareness of renewable technologies (117). The group has also been engaging with building users, having “done quite a lot of work ... in the schools and the buildings in terms of education and trying to explain to people ... why renewable is good” (118).

4.2 Customers

Edinburgh City Council is ECSC’s main customer. The council owns the buildings on which the BenCom’s solar panels are sited, and ECSC has a licence agreement with the council to install solar panels on up to 25 of its public buildings and operate them for 20 years (ECSC, 2015a). Importantly, the panels were installed at no cost to the council but are owned by the BenCom, meaning ECSC receives the subsidy from the FIT (Section 4.5.1). The council pays for the electricity generated by the panels through a Power Purchase Agreement (PPA), which was fixed at around 10.6p/kWh for a 20-year period,¹⁴ covering ECSC’s costs for administering and maintaining the panels. This was roughly equivalent to the market rate for the average non-domestic customers in 2015, when the panels were installed

(ECSC, 2015a; Ofgem, 2016), meaning the council was not paying a premium for ECSC’s power.

Around 20% of electricity generated is surplus to the requirements of the council and is thus exported to the grid under the FIT Export Tariff for 20 years (Section 4.5.1) (12, 14). Because the council has a corporate contract with EDF Energy, choosing another supplier was considered too complex for the community energy group when the project was launched (117). Should the council decide to remove the panels, it must reimburse ECSC for the cost of the removal but not for any lost generation revenue, “the idea being we would put the panels back up somewhere else if the roof were to be permanently unavailable” (S1). It is unclear whether ECSC would be able to continue to receive the FIT under these circumstances.

To date, ECSC has installed panels on 24 buildings, including schools, leisure centres, community buildings and other buildings, to generate renewable electricity (ECSC, 2015a: Figures 2 and 3). Figure 4 and Appendix B provide a complete breakdown of the group’s installation sites. The council enjoys a number of distinct benefits from working with ECSC. The first is that, at the end of the 20-year licence agreement, ownership of the solar panels will transfer to the council. At that stage, the council will therefore benefit from any electricity generated for free (ECSC, 2015a). Secondly, during the early years of the project, only those associated with the host buildings are eligible to apply for funding from the community benefit fund (Section 4.5.3). Thirdly, the council enjoys a fixed-price rate for 20 years, set at 2015 prices (ECSC, 2015a), thus reducing the risk of any unexpected price increases and helping the council plan its expenditure better. Finally, by acting as customer, the council supports activities that align with its own environmental and social welfare objectives. For some of the challenges ECSC has faced working with Edinburgh City Council, see Section 4.4.1.

Figure 1: Ratha School (Source: ECSC, 2019b)



Figure 2: Currie High School (Source: ECSC, 2019b)



Figure 3: map of ECSC solar panel installations (Source: ECSC, 2015a, 2018b)



4.3 Resources

4.3.1 Technological resources

Initially there was scepticism within the community energy group about the viability of solar panels in Scotland, a country not famous for its sunny weather: “I don’t think people considered solar really to be that viable in Scotland” (117). Instead, the group had concentrated on onshore wind and district heating projects, with little success. A key figure in driving the community energy group towards solar PV was the Energy4All employee, given Energy4All’s previous experience of installing solar PV on schools in England. In the words of one of the board members “all we [then] needed was a landlord with a number of roofs” (117).

Rooftop solar was particularly well suited for a city such as Edinburgh. Here land is at premium, and consent for some energy technologies is difficult to attain, as the failed onshore wind project at the Scottish Water site showed. Focusing on solar, and the public acceptability of technologies more generally, one Energy4All board member explained that “no one gets upset with solar, as proved to be the case – it sailed right through the planning system” (117).

Solar PV was also perceived to serve an educational function, given how it could be integrated into council buildings. For example, panels installed on schools were accessible to pupils, who could view the panels and monitor their performance live: “the kids can see the electricity that’s being generated” (118). This has led to the community energy group to do work in schools to educate students about the value of renewable energy (118), one of its core objectives (Section 4.1).

4.3.2 Political and social resources

Political capital was critical to ECSC’s success: “the only reason why Edinburgh Solar worked is because a couple of leading politicians thought it was a good idea, that’s the truth” (14). Politicians, such as Mark Lazarowicz and ECSC’s current chair, were keen advocates of the cooperative movement and instrumental in building support for the creation of an energy cooperative within the dominant political party governing the city (120). Their support mirrored wider party support for cooperatives in Edinburgh; the Labour Party had campaigned in the 2012 local election to make Edinburgh a Cooperative City, and an energy cooperative satisfied this agenda (117).

13 Out-source design and installation, see Section 4.4.3.

14 The price varies from building to building, but is on average roughly around this sum.

ECSC's chair explains the Labour Party's Cooperative City agenda in terms of the values of the co-operative movement:

"It's reinvestment back [,] there's a sense of 'for profit', but profit is then fed back into the members or into the ... community" (I18).

As time wore on, support from local political figures within the council drove the project forward. However, not all council members were in support of it, with council support split along political lines; "the SNP were for it, the Labour council members were for it, and the Conservative council members weren't" (I18). But because Labour and the SNP had a majority of the votes, this split did not stymie the project. The personal links between the council and the community energy group continue to exist today. The current chair of ECSC is an ex-Labour councillor who, after retiring from the council, took up a role with the BenCom.

4.3.3 Human resources

The board of 11 is made up of seven volunteers, three councillors and one Energy4All member. An additional co-opted member is the Energy and Sustainability Manager at Edinburgh Leisure, but serves in a personal capacity. This composition points to how ECSC is highly reliant on human resources sourced both from within the community and from its key partners, namely the council and Energy4All (Section 4.4). The community volunteers mostly engage with strategic governance of ECSC, as Energy4All is hired to manage the BenCom's day-to-day running (Section 4.4). The community volunteers are well qualified to perform such a role, being both highly skilled and experienced. For instance, the board includes a former councillor of 33 years, someone with experience of sustainable development charities, law firm partners and civil servants, with no fewer than three PhDs among them.

4.4 Partners

4.4.1 City of Edinburgh Council

The council is ECSC's primary customer, and local councillors were responsible for agreeing to support ECSC as a customer from an early stage (Sections 4.2 and 4.3.2). However, the council is not simply a customer but is also a key stakeholder, with a relationship between the two organisations going back to the very inception of the idea of an Edinburgh cooperative energy group.

The council was instrumental in establishing the social enterprise Changeworks, which helped ECSC develop during its very early stages (Section 4.4.3). The council is also involved in the governance of ECSC, with places reserved for appointees of Edinburgh City Council on its board (ECSC, 2014). This stipulation in the society's rules was designed to provide the council with oversight of the initiative, in case the BenCom got into financial difficulties. Various councillors insisted on the stipulation because "there's lots of community organisations that have gone bust ... then the council's ... had to bear the cost sometimes" (I18).

Whilst there was originally some scepticism from ECSC about allowing councillors board places, presumably because they felt that this undermined the group's independence from the council, over the long term the link has forged a stronger relationship between the two organisations. In the words of one board member, it gave ECSC "an 'in' to the decision making of the council and an influence as well" (I18).

Despite the council's support, negotiating council rules and procedures was challenging, especially regarding how any power supply arrangement would align with the council's procurement policy. The value of the contract which ECSC proposed for Edinburgh City Council was such that a public tender would normally have had to take place. It was felt that ECSC would struggle to compete against the private sector, on the grounds of being a new group with no track record and relatively little financial resource (I17). As a start-up, "we would have been completely knocked out of the competition in the early pre-qualification stages" (I17). The Council recognised the unique nature of the offering from ECSC and, following a detailed assessment of options, determined that it was in a position to engage directly with ECSC. In the end, a services contract, which emphasised that the services contracted from ECSC furthered the social outcomes of the council, proved the way forward.

In retrospect, one interviewee explained that ECSC may have been successful going via the public tender route, and saved an enormous amount of time and energy (I17). As the council were supportive, they could have weighted the community benefit elements of the tender over the cost of the project, in such a way as to favour a community group. To overcome the track record issue, ECSC could have emphasised the involvement of Energy4All and its years of experience in delivering energy projects around the UK.

Another issue ECSC faced in working with the council was bureaucracy and the associated time delays:

"Each time a report by the council was produced on what we were doing, it had to go through several committee rounds, and we had to wait for them to meet, and they'd come back with questions; and it just took forever" (I17).

Delays resulted in ECSC missing deadlines to access more lucrative FiT rates for solar PV, which were being reduced by the UK Government. This meant ECSC had to change their revenue model. The original plan was to offer the council a deal that would provide electricity at 75% of the market rate (I19; I17), however with ECSC only able to access the new, lower FiT rate, the group ultimately had to charge the council the going market rate (I17) (Section 4.2). Delays were also attributed to council staff struggling to commit the necessary time to deliver on the support shown by their "political masters" (I17). As one interviewee explained:

"[O]fficials were trying to be helpful, but this wasn't their main job. They were under pressure to do a whole load of other stuff, and we were putting extra demands on them" (I20).

Other council officials, "particularly the finance people", were nervous that the project did not provide the council with value for money (I18). For instance, officials at the council wrote a report which considered three options for developing solar on council buildings (I18), covering delivering the project: (a) by itself; (b) through a private company; or (c) through a community cooperative. The report concluded the council would enjoy the greatest financial benefit if it undertook the project itself, whilst any community-led project was expected to deliver the least. As one member explains: "I think, for Edinburgh [Council], the challenge was, well, if it's such a good idea why are we not doing it ourselves? Why do we need the community to do it?" (I18). The community's response was that the council had "obviously not got the capacity in house to do it" (I20), otherwise it would have done so.

4.4.2 Energy4All

Energy4All is one of the leading community energy intermediary organisations in the community energy sector. It is responsible for managing project development, financing, construction and operations of community energy projects (Energy4All, 2019). Energy4All's influence on ECSC's business model and legal structure has been profound.

Even before ECSC was founded, an Energy4All employee had been heavily involved in the community energy group. This individual became a member of the group at a time when various projects had fallen through and there was much dependency, and provided the group with a much-needed "shot in the arm" (I20). He became a founding member of ECSC. The decision to pursue solar energy was prompted by his arrival, and the adaptation of existing Energy4All business models for deploying solar PV on council properties in England¹⁵ to suit the Edinburgh group.

Energy4All devoted staff time during the early feasibility stages, drawing on their wealth of experience in the design and delivery of over 20 comparable cooperative projects, and in-house resources to help ECSC execute its business strategy (I19). Ultimately, ECSC adopted the Energy4All model, with the original board taking a "back seat" (I20) as Energy4All became responsible for the day-to-day running of the organisation. Energy4All also has a place reserved on the board of directors,¹⁶ meaning it has some influence over the governance of ECSC.

Energy4All was considered to have played a key role in negotiations with the council. It appointed a legal firm to assist in negotiations. Moreover, because of Energy4All's experience with energy projects, ECSC was afforded a stronger negotiating position, because the council had confidence in Energy4All's 'tried and tested' business model: "the financial model was

robust because Energy4All knows far better how to do these things than the council does" (I17). By leveraging their investor network, Energy4All was also critical in helping ECSC secure both share finance and investment from other cooperatives (Section 4.5.4).

On a more practical note, hiring Energy4All was considered to have saved ECSC money. As one interviewee explained, hiring a member of staff to manage the project would have depleted the community benefit fund (I20). Whilst it would have reduced ECSC's reliance on Energy4All for the future of its operations, it was able to harness the economies of scale of a single organisation managing multiple community energy projects (I20).

One trade-off has been how "very dependent on Energy4All" the group has become, especially for both energy sector and financial expertise (I19). The group was also conscious that they needed to critique what Energy4All was recommending. Thankfully, they "had good people on the board that knew enough, that we were able to check that what Energy4All was saying was good for us" (I20). Despite some initial reservations, the group feels that the positives of partnering with Energy4All have outweighed the negatives.

4.4.3 Other partners

ECSC has also relied on several other partners worthy of mention. ECSC owes much of its establishment to the administrative and technical support it received via the Changeworks charity (Section 2). Today, Changeworks continues to work with ECSC. For example, it is involved in research to explore options to secure funding to optimise ECSC's generation sites by deploying battery storage. This is considered "an ongoing resource we're getting free" (S1).

Looking to other partners, Emtec Energy installed and maintains the solar PV panels on the host buildings (Emtec, 2019). ECSC is generally content with Emtec Energy and would work with the company again (S1). Onsite Renewables, an energy-saving consultancy, acted as project manager for the installation of the solar panels on the host buildings (ECSC, 2016). It provides independent consultancy on energy issues.

4.5 Finances

4.5.1 Income

ECSC's income is centred on the sale of electricity and the FiT. It sells electricity to the council and to the utility EDF (Section 4.2). Turnover for 2018 was £215,000, substantially up from the £26,000 in 2016, when the solar PV assets were mostly commissioned (Appendix B). Our survey response covered income for the previous year (£214,000), with roughly 60% of revenue coming from the FiT (£129,000),¹⁷ divided into £119,000 from the generation tariff¹⁸ (12.15p/kWh) and £10,000 from the FiT Export tariff (5.03p/kWh) (S1). The other 40% of income stems from its PPA for power supply to the council, raising £85,000 from selling power at a rate of around 10.6p/kWh.

¹⁵ See, for example, the Schools Energy Cooperative (SEC) founded in 2011 (SECL, 2019). The key differences apart from location are that SEC is a bona fide cooperative rather than a BenCom, and that it partnered two councils and multi-academy school trusts rather than one council.

¹⁶ This arrangement is reciprocated, with ECSC entitled to have a representative present at Energy4All board meetings.

¹⁷ This is an average across all installations. Actual FiT rates vary, depending on the size of the installations (I17).

¹⁸ Solar PV systems commissioned at various points across 2016, so therefore eligible for FiT.

4.5.2 Expenditure

ECSC spent approximately £1.47m¹⁹ to deliver its 24 rooftop installations, including all costs incurred during planning, design, installation and commissioning. Prior to installation, ECSC had to cover a host of project development costs via loans from CARES and Energy4All's early stage development funding initiative Energy Prospects Cooperative (Section 4.5.4). These included preparatory work for the share offer, procurement of a solar PV installer, planning and grid connection applications, marketing the share offer, legal fees and pre-accreditation for the FiT (ECSC, 2015a).

Operational expenditure, which includes cost of sales plus administrative costs, equated to £135,000 in 2017/18 (ECSC, 2018a). These costs largely relate to "preparing accounts; insurance; monitoring, maintaining and repairing the panels and inverters; loan interest and depreciation" (ECSC, 2015a: 16). ECSC has no need for additional working capital, as it has no employees; however, it does pay Energy4All for its services, so in effect is contracting out these administrative tasks. They have a ten-year contract, dating from 2016²⁰ for management and administration services, which sees Energy4All paid an annual fee of 9% of turnover for its management, administration and secretarial services (ECSC, 2015a).

Other expenditure relates to the cost of finance (Section 4.5.1). Most notable is the share interest ECSC has to pay, standing at £80,000 in 2018. It has also had to service its debt (Section 4.5.4) with a strong emphasis on reducing ECSC's current liabilities (i.e. amounts due to creditors that fall within a year) and increasing its equity, which fell from £481,000 in 2016 to £22,000 in 2018.

4.5.3 Surplus and the Community Benefit Fund

Accounting for operational costs and share interest (Section 4.5.2), ECSC was left with a net surplus of £10,000 in 2018, down from £23,000 the year before. We suspect the surplus was lower in 2018 as ECSC had moved to dispense with almost all of its current liabilities. Any surplus is either retained in the company reserves or transferred into ECSC's Community Benefit Fund (ECSC, 2018a).

The Community Benefit Fund has thus far received two donations, with £20,000 donated in 2017 and £5,000 in 2018 (ibid). Each year, the coop will buy back share capital from members. As this happens, the business will be channelling less of its income towards paying shareholders so, assuming a fixed share interest rate and other fixed costs, ECSC's surplus will grow over time and it will be able to channel more money towards its Community Benefit Fund. Based on ECSC forecasts, the fund is projected to deliver over £1m over a 20-year period (117) (ECSC, 2015a: 18).

The fund has so far awarded grants of between £1,500 and £3,000 to four projects, for school playground lighting, sustainability awareness raising, community garden development and the re-wilding of school grounds (see Table 3). For the foreseeable future, the fund aims to make between five and eight awards per annum of up to £3,000, supporting projects that align with ECSC's core objectives (Section 1).

Until 2021, funds will only be available to owners, managers, employees, user groups or representatives of each of the 24 ECSC host buildings – such as primary schools, leisure centres etc. (ECSC, 2019a). After 2021, the fund will be made available to constituted non-profit-distributing organisations or other public buildings within the Edinburgh area (ECSC, 2015a).

Table 3: Previous Recipients of ECSC Community Benefit Fund 2018 (ECSC, 2019c)

Award

Liberton Primary School - Lighting Up Play

£3,000 for lighting the school play area so children can play outside in the winter months.

Oaklands School - Oaklands Growing Sustainable Communities

£2,750 for promoting awareness change towards sustainability / carbon reduction through community growing, meadows and interpretation activities.

Drumrae Leisure Centre - Community Garden

£2,954 towards their Community Garden, in collaboration with their Active Communities Programme and Holiday camps.

Friends of Redhall School - School Grounds (wildlife, teaching and environmental education).

£1,840 towards Redhall School Garden, to improve their school grounds for teaching and environmental education.

4.5.4 Funding and finance

ECSC received a grant from the Scottish Government's Climate Challenge Fund to undertake a feasibility study into the viability of a community-owned rooftop solar energy cooperative in Edinburgh (Edinburgh Community Energy Co-operative, 2012). ECSC subsequently accessed two streams of early-stages development funding, via the Scottish Government's CARES: a grant of £10,000 for feasibility and a £150,000 "soft" loan in 2015 (Local Energy Scotland, 2019). The latter carried a relatively high interest rate of 10% but could be 'written off' if the project was not been completed. which, whilst carrying an interest rate of 10%, would have been written off if the project had not been completed. CARES loans also only cover 95% of the agreed costs (CARES, 2018), meaning an additional loan from Energy4All's subsidiary Energy Prospects was required to pay for grid connections.

Beyond the development stage, however, the plan was to fund the project entirely by raising community shares (Figure 3). Community share capital is understood to have several advantages over other forms of finance for issuing societies (i.e. a co-op or BenCom). Firstly, it presents a cheaper form of finance in the short to medium term compared to debt finance (S1). Secondly, community shares are a more flexible instrument for the issuing society. Whilst debt finance typically involves repayments according to a strict schedule, the annual return on community shares and the ability of shareholders to withdraw their investment is at the discretion of the board of directors (Community Shares Unit, 2019). Thus, a society cannot be destabilised by an unforeseen withdrawal of share capital.



Figure 3: The Directors of Edinburgh Community Solar Co-op celebrating the launch of the share offer (ECSC, 2019b)

Thirdly, community shares constitute a patient form of capital. The ECSC share offer was "a long-term proposition for the life of the Project, which is 21 years" (ECSC, 2015a: 6).²¹ Of course, lower cost investment, greater flexibility and more patient capital from the perspective of an issuer of community shares means lower returns, greater inflexibility and a longer term commitment for investors who might purchase those shares, which may deter potential investors.

Community shares also present an approach that is compatible with ECSC's founding principles of community mobilisation and ethical investment. As one Energy4All employee explained:

"People putting their own money in rather than getting a bank loan ... is a useful way of engaging members" (117).

Edinburgh residents were given priority in the share offer and only if sufficient funds were not forthcoming would the offer be extended to outside of Edinburgh.

The share offer was launched on 29 September 2015 and by 1 December had raised 90% of the necessary capital from its 541 members, who together invested £1.48m (S1)(ECSC, 2018a). The financial modelling established a return on the investment at an RPI-linked 5%,²² with a minimum investment of £250 and period of three years (Energy4All, 2015). ECSC paid £80,000 to shareholders in 2018. It also has had to cover the approximately £61,000 of costs generated through the share offer. The costs of raising capital were covered by the CARES loan and repaid by money raised in the share offer.

Unfortunately, the CARES support provided before the share offer did not provide ECSC with sufficient funds to survey all of the buildings. This meant that, when the group launched its share offer, it did not know exactly how many buildings they would be able to utilise nor how many solar panels they would be able to install. This created a risk for ECSC, because it could not put a precise figure on either how much the project would ultimately cost or how much revenue it would generate. Consequently, if the group raised too little capital through the share issue, it would have insufficient funds to complete the project, but, if it raised too much, it would have had to pay a higher return on the capital than the project could support.

ECSC relied heavily on its relationship with Energy4All to navigate this problem. Energy4All essentially underwrote any shortfall with finance from its investor community (117). Ultimately the remaining 10% of investment needed came from loans sourced from three Energy4All cooperatives. Interestingly, sourcing what was effectively a bridging loan via the Energy4All group was a relatively inexpensive form of finance. ECSC was charged 4.5% interest, compared to the 5% that ECSC is paying on its shares. This also compares favourably to the CARES development loan interest rate of 10%. The loan from the 'Energy4All family' was offered for a 12-month period and has now been paid off (Community Shares Unit, 2019).

Time constraints were cited as a reason why 100% of the funding could not be raised via shares. Initially, the share offer was due to run from September to December, but unexpected changes to the Enterprise Investment Scheme (EIS) tax relief scheme²³ meant that all of the money had to be raised by November:

"Unfortunately we got slightly blindsided by Westminster when they decided to pull ... EIS tax relief, at the start of the share offer ... if we didn't get the money in by November we wouldn't be able to claim that tax credit ... So we had to raise the money damn quick" (117).

Again Energy4All's investor network was considered critical to ECSC being able to raise the funds so quickly by messaging individuals who had previously invested in Energy4All's projects around the UK. The trade-off, however, was that only around 80% of the shareholders and around 70% of the share capital were sourced locally (117). Without Energy4All, it would have been unlikely that the deadline for EIS tax relief would have been met, meaning a substantially less attractive share offer and potentially lower sums of investment raised. See Table 4 for a summary of the investments in ECSC.

21 21 years includes the year between the launch of the share offer to the installation of the solar PV, as well as the 20 years of energy generation.

22 The return of 5% is based on projected income. The board of directors has the right to vary this rate, subject to the approval of the membership.

23 Allowed investors to claim income tax relief of 30% on their investment, which effectively raised the rate of return from 5% to 7% (ECSC, 2015b). Community energy projects were no longer eligible for the EIS, or the similar Seed Enterprise Investment Scheme (SEIS), after the 30th November 2015. Energy schemes were also excluded from its replacement scheme: the Social Investment Tax Relief (SITR).

19 This is equivalent to the undiscounted value of ECSC's tangible assets, as outlined in their accounts for 2016.

20 Date of last site commissioned.

Table 4: Funding and financing secured by ECSC

Date	Type	Source	Amount (£)	Interest rate	Months duration	Annual repayments	Notes
c.2011	Grant	Scottish Government's Climate Challenge Fund	N/A	N/A	N/A	N/A	Feasibility study
N/A	Grant	CARES	10,000	N/A	N/A	N/A	Supported preliminary surveys of buildings. Energy4All provided project management time too, supported by the premium the Energy4All family pays to cover development staff costs.
June 2015	Soft loan	CARES	150,000	10%	N/A	N/A	Loan could be 'written off' if the project was not completed.
Aug 2015	Loan	Energy Prospects	Up to 27,000	N/A	N/A	N/A	Subsidiary company of Energy4All
c.2015	Loan	Other coops in Energy4All 'family'	135,000	4.5%	12	Repaid within year	
Dec 2015	Community shares	Various, but Energy4All were particularly helpful	1.48m	5% + RPI	N/A	Not fixed. In 2018 it was £80,000	

Sources: S1; interviews; ECSC, 2015

5 Future prospects and plans

ECSC is currently exploring “Edinburgh Solar Two” (I17). This is essentially an effort to partner with other local civic stakeholders, beyond the council, which also have suitable properties for solar PV deployment. Discussions have been ongoing with: (a) council-affiliated public institutions, such as Edinburgh Leisure and Transport for Edinburgh; (b) not-for-profit organisations, such as the University of Edinburgh and Edinburgh Zoo; and (c) public companies, such as Scottish Water (S1; I18; I19). Whilst they are looking to engage other public-facing organisations to diversify and broaden ECSC’s “community reach” (S1), they have not ruled out installing on more “council buildings again as [the] relationship is relatively simple” (S1).

Simultaneously, ECSC has been seeking legal advice on any proposed expansion because it does not want any risks arising from the new project jeopardising the current project. The advice it has received is that the group should set up a CIC as a wholly owned subsidiary of ECSC (see Section 3). This is because the existing board would retain control of the new venture, whilst ensuring that, should the new venture fail, it would be the new CIC that would absorb any losses, not the existing members of ECSC (I17). Whilst consideration of the financial arrangements for the new venture are still being discussed, the likely route of financing would be for ECSC to launch another share offer (I2)

Another area the group is exploring is gaining more value from the energy assets that ECSC already possesses. One board member laments that “maximising our income one way or

another is not something we’ve done so far” (I19). For example, ECSC has also begun negotiating “a better power purchase agreement” for the electricity exported to the grid.

The group has also accessed grant funding from CARES, for work carried out by Changeworks, to examine how the energy produced by the panels might be more effectively used in the buildings (S1). As one board member put it, the research is “looking at behaviour as well as storage” and the findings should “give us interesting information about how much difference storage and reducing the export could make” (I19).

In many ways, then, the outlook for ECSC is positive. However, the current board member representing Energy4All sounds a note of caution in relation to how replicable the ECSC model is, considering how councils in other areas of Scotland and the UK often “speak a good game” but rarely follow through with the same level of support as Edinburgh’s council demonstrated (I17). There is also a major question about whether sufficient funds could be raised through the ECSC model through a share offer in a less wealthy region. In 2016, Edinburgh City ranked 84th out of 391 local authorities in terms of Gross Disposable Household Income per head, sitting 10% above the average (ONS, 2018).

Looking more broadly, ECSC identified that further solar PV projects may be helped by the falling costs and the growing availability of low-cost social finance, but that the removal of the FiT and EIS tax relief are likely to make their offer much less financially attractive to investors (S1).

6 Key lessons

We discuss some of the key lessons drawn from this case study for community energy business models and financing.

1. Critical role of intermediaries and local authorities

The case of ECSC makes clear how community energy groups rely heavily on support from other energy system stakeholders. ECSC was especially reliant on the intermediary Energy4All and the local authority, each playing a different role.

Energy4All has played a number of critical roles, including informing the design of the business model, offering legitimacy and managing the day-to-day running of ECSC. Most importantly, Energy4All’s intermediary role enabled the group to raise both share and loan finance, as a gatekeeper to a wider community energy investor community. In this sense it provided technical, financial and political capital. This form of community energy organisation is seen in the case of ECSC to offer significant benefits to the local authority in terms of technical expertise and the sourcing of finance, where the council had insufficient capacity to delivery such an energy project.

The council’s key role was to provide ECSC not only with the properties from which electricity would be generated (i.e. roof-space) but also the customer base to purchase the power ECSC generates, despite the complications of satisfying procurement rules. The relationship with the council, however, was extremely reliant on a handful of political actors who helped lend ECSC the political capital it required to secure council support, as well as on a willingness to opt for a service contract arrangement that avoided competing with larger rivals via public tender.²⁴

What we find, however, is that, by drawing in different forms of capital from outside the organisation, ECSC has had to relinquish some degree of autonomy in order to access these resources. For example, four of its directors are from either the council or Energy4All.

2. Public sector custom depends on procurement process

The local authority’s ability to engage directly with ECSC was absolutely critical to the project being delivered. By acquiring power via a service contract instead of issuing a public tender, ECSC avoided the risk of being out-competed by much larger firms via public procurement. The process, however, was time intensive. Another option could have been for the council to weight social and environmental outcomes of its tender in such a way as to provide real opportunities for community energy groups to supply power to local authorities. Both avenues present models that other councils could replicate to help support community energy.

3. Community financing underpinned by government subsidy

The story of ECSC is one of community financing, either through raising community share finance or through loans provided by other community energy organisations. It points to how community energy projects can be delivered without the need for investment from institutional investors or large-scale public grants. Even so, the flow of finance was underpinned by two important subsidies that have now been withdrawn: (1) the FiT, which has provided ECSC with roughly £130,000 per annum; and (2) the EIS tax relief. Furthermore, the introduction of the FiT precipitated the need for capital financing, as it provided no upfront capital. The FiT meant that ECSC’s revenue model would break-even, and the EIS tax relief effectively raised the rate of return of the share offer, making it more lucrative for investors. Furthermore, the early stage grant and soft loans from the Scottish Government played a critical role in covering high-risk costs between the design stage and revenue generation.

4. Legal structures shaped by finance and risk

The decision to establish a BenCom was mostly grounded in ECSC’s appetite to raise shares, something its predecessor Edinburgh Community Energy Co-operative could not do as a CLG. Whilst other factors were important – such as ECSC being incorporated for community benefit, which played a key role in winning council support – finance-raising was pivotal. Any future expansion is expected to take the form of a CIC, as a wholly owned subsidiary of ECSC, to protect its shareholders from the risk of new ventures failing.

5. Business model innovation opened up niche market for generation on civic buildings

By opening up public buildings for community-owned power generation facilities, ECSC’s business model has helped mobilise a community not previously able to invest in renewable energy in their own tenement properties. It presents a model that could be replicated in other UK cities, as long as the built environment has a high-density of apartments unsuitable for rooftop solar PV,²⁵ as well as a community with both sufficiently high levels of disposable income and a strong appetite for local ethical investment.

The case of ECSC has, however, relied on a very forward-thinking council leadership and one that has been willing to offer its support, despite facing no statutory duties to support local low-carbon energy projects in the local area. Furthermore, with the FiT now discontinued, it is unclear whether ECSC could offer the same competitive rates for power supply to Edinburgh City Council as it did in 2015. The removal of both ‘carrot and stick’ means that community energy generation on civic buildings is less straightforward today than a few years previously.

²⁴ Local authorities could potentially weight social and environmental outcomes in such a way as to provide opportunities for community energy groups to compete against private sector companies on criteria other than cost alone, and without falling foul of state aid regulations.

²⁵ This may be due to architectural and/or legal issues.

7 Acknowledgements

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Appendix A – List of interviewees

Ref	Role	Organisation type	Date
S1 (Survey)	N/A	Community energy (CE) organisation	2018
I2	Manger	Government	Aug 2018
I4	Project Officer	CE intermediary	July 2018
I8	Director	Social investment	Aug 2018
I12	Lawyer	Law firm	Aug 2018
I13	CE Campaigner	Environmental charity	Sept 2018
I17	Project Officer	CE intermediary	Sept 2018
I18	Chair and board member	CE organisation	Oct 2018
I19	Board member	CE organisation	Oct 2018
I20	Manager	Environmental charity	Nov 2018
I21	Director	CE Group	Oct 2018

Appendix B – List of solar PV installations

Name	Type	Date commissioned	Capacity (kW)	Generation (MWh)
Cameron House	Community Centre	23/8/16	20	16
Carrickvale	Community Centre	13/7/16	30	25
Craighall Day Centre	Community Centre	27/7/16	30	24
Ainslie Park Leisure Centre	Leisure Centre	9/9/16	100	82
Drumbrae	Leisure Centre	5/10/16	50	41
Tumbles at Portobello	Leisure centre	22/9/16	125	103
Currie	High School	22/9/16	133	99
Blackhall	Primary School	27/7/16	15	11
Buckstone	Primary School	29/8/16	100	68
Canal View	Primary School	23/7/16	100	83
Carrick Knowe	Primary School	23/8/16	50	40
Clemiston	Primary School	17/8/16	21	18
Currie	Primary School	19/8/16	45	35
Davidsons Mains	Primary School	30/6/16	35	29
Dean Park	Primary School	28/8/16	83	66
East Craigs	Primary School	22/7/16	50	42
Gylemuir	Primary School	3/8/16	30	25
Liberton	Primary School	15/8/16	45	37
Ratho	Primary School	15/9/16	70	55
Wardie	Primary School	19/8/16	30	22
Oaklands School	Special education	24/8/16	125	106
Prospect Bank School	Special education	14/7/16	35	29
Redhall School	Special education	6/8/16	50	38
Woodlands School	Special education	29/7/16	20	15
			1.4MW	1.1GWh

Source: (ECSC, 2015a, 2018b)

Appendix C – Key features of common legal structures

Legal structure	Governance	Limited liability	Fundraising	Asset lock	Charitable status	Notes
Community Benefit Society (BenCom)	One shareholder, one vote. Run for benefit of (defined) community.	Yes	Grants, community shares, loans, bonds.	Yes	Possible	Prioritises community benefit; typically lower returns on investment than co-ops.
Bona fide cooperative	One shareholder, one vote. Run for the benefit of members.	Yes	Community shares, loans, bonds. Excluded from some grants and loans, e.g. CARES grants and loans.	No	Difficult	More flexibility with returns to investors. Financial Conduct Authority places conditions upon grid export.
Community Interest Company	Voting rights depend on whether CLG or CLS status. Run for defined social purpose.	Yes	Grants, ordinary shares (capped returns), loans, bonds.	Yes	No	Expensive to raise equity investment. Light touch regulation.
Company Limited by Guarantee (CLG)	Membership organisation with flexible structure. Often nominal (£1) membership fee. One member one vote common.	Yes	Grants, ordinary shares (capped returns), loans, bonds.	Possible	Possible	Different categories of members with different voting rights possible. No equity investment possible.
Charitable Incorporated Organisation	Membership appoints board of trustees.	Yes	Grants, loans, bonds.	Yes	Yes	Strictly regulated. No equity investment possible.
Scottish Charitable Trust (unincorporated)	Board of trustees.	No	Grants, loans, bonds.	Yes	Yes	Strictly regulated. No equity investment possible.
Private Company Limited by Shares (CLS)	One share, one vote.	Yes	Grants, loans, (privately exchanged) ordinary shares, bonds.	No	No	Shares cannot be made available to the public.
Public Limited Company	One share, one vote.	Yes	Grants, loans, publicly offered ordinary shares, bonds.	No	No	Structure familiar to institutional investors. Strictly regulated. Expensive to raise equity finance.

Source: (Community Shares Unit, 2019; Databuild, 2014; Smith & Teasdale, 2012; Thorlby, 2011; I2; I4; Brauholtz-Speight et al., 2018)

