The WREN model – A template for community energy schemes in the future?

Submitted by Bertie Readhead to the University of Exeter as a dissertation towards the degree of Master of Science by advanced study in Energy Policy and Sustainability

I certify that all the material in this dissertation which is not my own work has been identified with appropriate acknowledgement and referencing and I also certify that no material is included for which a degree has been previously conferred upon me.

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Abstract

This research uses the Wadebridge Renewable Energy Network (WREN) to explore the opportunities and barriers facing the community energy sector. The community energy schemes can bring economic, social and environmental benefits at the local and global levels and there has been increased interest in providing support to this niche. The introduction of revenue generating policy initiatives including the feed-in-tariff has provided opportunities for local communities and has led to a groundswell of interest from communities looking to initiate their own local energy projects. Despite this interest there are significant barriers that need to be overcome before growth in the sector can become widespread. The lacks of resources at communities' disposable require innovative new approaches and the WREN model is one such scheme. This research provides a critical appraisal of the WREN approach and explores what and who are blocking serious progress being made. Consideration is given to the motivations of key stakeholders involved and the key trade offs that different parties need to make in order to achieve meaningful progress. This research highlights a number of important considerations and concludes by providing recommendations for effective government support.

Introduction

Background

Government targets

The increasing scientific evidence concerning the onset of climate change has developed an urgency in government circles to implement measures that will decrease carbon emissions at an affordable cost while ensuring energy security (DECC, 2007). The Climate Change Act 2008 sets a legally binding target of at least an 80% cut in greenhouse gas emissions by 2050 and a 34% cut by 2020 against 1990 levels (DECC, 2011). Furthermore the 2009 Renewable Energy Directive has committed the government to increase the amount of renewable energy generated to 15% by 2020 (DECC, 2011). These are challenging targets and action will be needed on all levels if they are to be met. The deployment of an increased number of community-scale renewable energy systems could significantly boost the chances of meeting these government in the years to come (Hain et al, 2005).

Community energy sector

There are a number of economic and environmental and social benefits associated with community energy projects relating to improvements in energy self-sufficiency, the retention of financial benefits within the local area and social regeneration in the community (Hain et al, 2005). Community based renewable energy schemes can contribute to government energy policy targets, reduce opposition to planning applications and raise awareness in the community about energy issues (Walker 2008, DTI 2007). Participation is crucial and community based initiatives are considered an ideal vehicle for connecting with people in their local communities (Schweizer-Reis, 2008). This will allow people to actively engage with the debate on a local level and help foster acceptance of new technologies and ways of doing things (Schweizer-Reis, 2008). Developing a more decentralized and community based approach to renewable energy is desirable because it can lead to a more resilient energy system (DTI, 2005). Small-scale renewables can improve the functioning of the grid by matching local demand and consumption (Hain et al, 2005). The introduction of policies such as the feed-in-tariff (FiT) are crucial for establishing long-term, stable revenue generating projects that ensure financial benefits are realised by communities (Hain et al, 2005). Currently community energy projects represent just 0.5% of renewable energy generation capacity in the UK so there is great potential for the sector to develop and grow (Communities for Renewables, 2011).

Policy narratives

Community energy has been undergoing a revival in recent years as government thinking is starting to move beyond just large-scale energy projects and towards smaller embedded community based projects (Walker and Devine-Wright, 2008). Community action for sustainable energy is reportedly an important element of the government's plans for a low carbon future (DECC, 2009). It also appeals to the coalition's notion of a 'Big Society' in which there is an enlarged role and responsibility for civil society in achieving policy objectives surrounding climate change and sustainability (Seyfang et al, 2010). The localism bill reflects the governments desire to devolve power away from central government in order to empower local authorities and local people to take action at a local level.

The current Government has placed a good deal of emphasis on the community energy sector and wants to move beyond the provision of small-scale grants and experimenting with a handful of pilot projects, to create a broad enabling framework giving every community the opportunity to develop their own energy projects (Grassroots Innovations, 2010). Despite these aspirations the landscape of austerity has sharpened the government's focus on cost effectiveness and it is not clear to them whether the community energy sector represents the best use scarce resources. The department for the environment and climate change (DECC) has emphasized the need for the community energy sector to gather robust evidence on its effectiveness in order to prove that despite its enormous diversity the sector can offer a meaningful contribution to a secure and low-carbon energy system (Grassroots Innovations, 2010)

Policies supporting community based energy schemes

UK energy policy for renewables has a history of being primarily geared towards large-scale renewable projects through support mechanisms such as the Renewable Obligation (RO), Levy Exemption Certificates and various capital grant schemes (Hain et al, 2005). These support mechanisms have created market conditions with high entry costs, leaving the main development activities to 'outside' commercial interests, particularly 'big' utilities, rather than locally-owned initiatives (DTI, 2005). It is becoming clear that even with successful policy design and the construction of large-scale low carbon power plants more will still need to be done (DECC, 2007). This is one of the many reasons that community based renewable energy schemes are now seen as a very integral part of the nation's efforts to reduce its carbon footprint (DECC, 2009).

To date there has been little coherent policy support available to community based renewable energy schemes aside from a number of support schemes and limited grant funding (Hain et al, 2005). This helps explain why the UK has seen few renewable energy developments with high levels of local involvement or leadership (Walker et al, 2007). The grant funding model is being wound down and a preference for simple support mechanisms aimed at a wider audience is deemed to be a more effective way of encouraging community energy schemes (Grassroots Innovations, 2010). The introduction of the FiT in 2010 has provided a means for supporting the development of small-scale renewable developments and has provided communities with an incentive to develop community energy initiatives in their local area (Seyfang et al, 2010). The Renewable Heat Incentive and the Green Deal are two other policy initiatives that are hoped will further inspire the adoption of low carbon and energy efficiency technologies in communities.

The aim of the FiT was to encourage activity at the micro level of individuals and small organizations but the 5MW (megawatt) banding limit proved ill thought out as commercial developers attracted by the high rates on offer below this threshold started to put in planning permission for hundreds of solar farms particularly in the South West (CPRE, 2011). The FiT is financed through the nation's electricity bills so ministers concerned at the prospect of large commercial developers making substantial profits and using up the limited funds set aside implemented a fast track review in May 2011, which led to a cut in subsidies paid to solar systems over 50kW (DECC, 2011). A further comprehensive revision scheduled for April 2012 is likely to further reduce FiT rates across the board (DECC, 2011).

Challenges facing the community energy sector

Many commentators believe it is crucial to develop policies aimed at the 'meso-scale' or community scale to help the community energy sector develop (Smith, 2010). This middle level falls between large-scale investments such as offshore wind farms and small scale generation in homes (Smith, 2010). Unlike many other northern European countries this level of policy support is absent from UK energy policy (DTI, 2005).

Developing the skills and capacity within the community organisation is a challenge for many communities and leaves many struggling to keep momentum going (Hoggett, 2010). An ownership stake in renewable energy developments is often deemed attractive but the difficulty of obtaining upfront capital or finance at risk makes this all but impossible for most communities (Hoggett, 2010). Cuts in government spending and a private sector scarred by the credit crunch have also made it harder than ever for communities to obtain grant funding or raise finance on reasonable terms (Hoggett, 2010). This has led to the rise of community benefit payments for communities not able to afford an ownership stake. Providing benefits to communities is seen as an important factor in sustaining public support and encouraging the development of similar projects elsewhere (DTI, 2005). The offering of community benefit payments while still voluntary is now considered best practice by many but determining what a fair share of the economic benefits is or who it is for is disputed (DTI, 2005).

Purpose of research

In recent years more community-based energy schemes have been emerging and the government is keen to explore how they can play an enhanced role in civil society (Seyfang et al, 2010). The challenge these schemes face has been made harder in light of government spending cuts so innovative business models and new sources of funding are going to be needed if community energy schemes are going to thrive. Given the government is restricted in its ambitions by the landscape of austerity, other actors will need to come to the fore to help support the nascent community energy sector.

The success of the community energy schemes rests on their ability to use the resources available to them to create mutually beneficial partnerships with other interested parties. This research will look to investigate the sources of strength and weakness surrounding community energy schemes in order to identify ways they can capitalise on the available opportunities. In the process the research will look to uncover who and what is hindering the development of the sector and identify what the key tradeoffs different stakeholders need to make in order to achieve meaningful. Finding ways to empower communities will be important to help this niche sector develop (Houghton, 2010).

Aims and objectives

The aim of this research will be to assess the strengths, weaknesses, opportunities and threats of the Wadebridge Renewable Energy Network (WREN). In the process the motivations of the key stakeholders will be explored to investigate how the private sector and community schemes can work together to create and sustain successful low carbon initiatives. Finally, the issue of effective government support will be considered to ascertain what can and should be done to promote growth in the sector.

Research Questions

- What are the strengths, weaknesses opportunities and threats of the WREN model?
- What are the motivations of the key stakeholders surrounding the WREN project?
- What tradeoffs do community energy schemes and the private sector need to make in order to achieve meaningful progress towards a low carbon reality?

Literature review

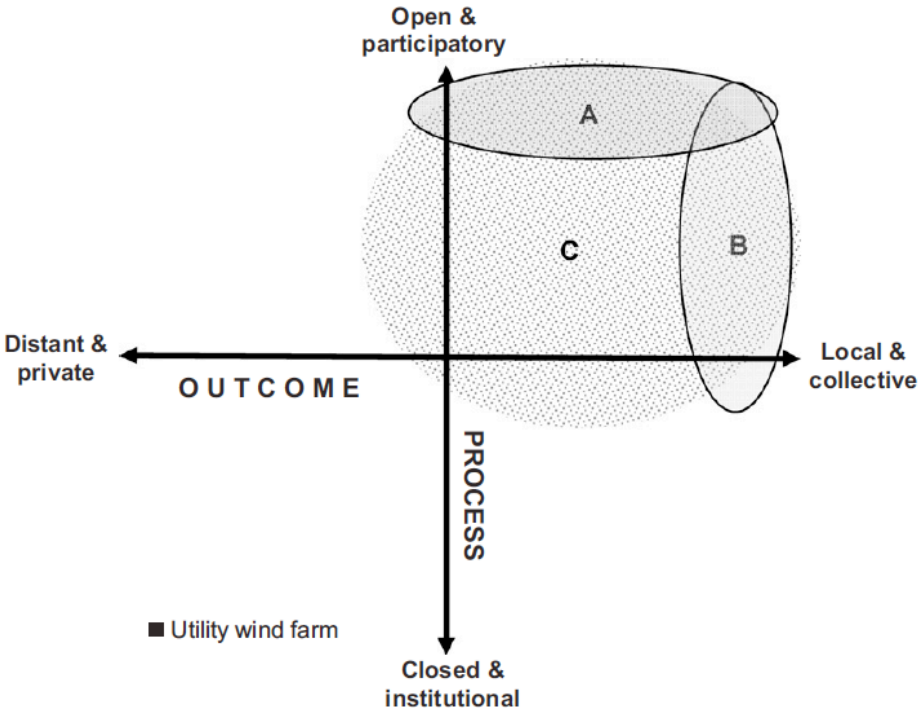
This section outlines what a community energy scheme is and some of its key characteristics before considering the different forms of engagement and partnership models that have developed in the sector. A look at European approaches to supporting community energy reveals what has worked well in other countries. The role of local authorities is then considered to identify ways they can contribute to the development of the community energy sector. Finally niche activity theory is introduced in order to provide a framework for the analysis. Some key themes in the literature are explored before the rationale for this study is introduced.

What is a community energy scheme?

The notion of community energy schemes has entered mainstream energy policy discourse but there is a great deal of debate as to what a community energy scheme actually is (Walker and Devine-Wright, 2008). The term 'community energy' has taken on many forms with varying emphases on the degree of community involvement, the geographical boundaries and the patterns of benefit absorbed by the community (Hielscher et al, 2011). A community can be defined by geography, interest or identity (Walker, 2008). Different types of community schemes will have elements of all of these but generally they can be categorized as one or the other. This study is mostly concerned with the geographically centered definition but there may be moments when the distinction can become blurred.

There are lots of different community energy schemes in the UK and it is not yet clear if there is a preferred model. From the literature surrounding community energy schemes two key dimensions have been identified. Some community energy schemes are defined by how they operate as an organization, with emphasis being placed on who is involved and who has influence, while others are more concerned with the outcome of a project where the focus is on who it is for and how the benefits associated with it are split between different stakeholders (Walker and Devine-Wright, 2008). Figure 1 illustrates the two dimensions of process and outcome that are commonly associated with community energy schemes.

Figure 1: Understanding of community renewable energy in relation to project process and outcome dimensions



(Source: Walker and Devine-Wright, 2008)

The benefit of an open and participatory process is the high degree of local involvement, which in turn can foster acceptance and support for energy projects. A local and collective outcome compliments this by ensuring the benefits flowing from the project are adequate and that they are equitably shared in the community (Walker and Devine-Wright, 2008). In an ideal world it is suggested that a community scheme should be open and participatory as well as local and collective (Devine-Wright, 2008). Unfortunately, there are often reasons why this ideal is not realised in practice as different parties with differing motivations and levels of influence look to shape the agenda so that it serves their own particular interests. The lack of uniformity has led to the wide mix of schemes that can be seen today (Devine-Wright, 2008).

The spectrum of community energy schemes cover projects of all shapes and sizes. The scale of the project has a bearing on the nature and scope of community involvement. Box 1 outlines how Community Renewables defines 'community renewable energy'.

Box 1: Community Renewable Energy

- Is developed by or in partnership with the local community, with broad community support
- Delivers meaningful local benefit through generating income for a local community fund and/or for local community investors
- Generates energy at a scale relevant to the scale of the local population (as opposed to household scale

(Source: Communities for Renewables, 2011)

The different forms of community engagement

The confusion over what a community energy scheme is has seen a host of different 'community' initiatives develop across the country. These schemes vary in terms of the level of engagement with communities, the sort of technology used and the social arrangements under which the projects are managed (Smith, 2011). Table 1 outlines the different degrees of local engagement that are often associated with energy projects.

Table 1: Different degrees of local embedding of energy projects

Degree of local embedding surrounding energy project	Information led	Varying models of partnership	Ownership led
Nature of the relationship	Local people are informed of a proposed development	Partnership between local people, interest groups, statutory institutions eg local authorities and private sector developers	Large ownership stake in the project
Level of influence	No involvement other than as passive recipients of information	Varying degrees of influence	High degree of local control

(Source: Devine-Wright, 2005)

The advantage of a community having more involvement with a project is that they will retain more control over its development and accrue more of the benefits pertaining to it (Walker and Devine-Wright, 2008). Information led approaches are often interpreted as invasive by communities who see little benefit and have little say over any proposed development (Devine-Wright, 2005). This approach neglects many of the benefits that can be gained from engaging the community and often leads to confrontation (Devine-Wright, 2005). Encouraging participation and sharing the benefits on the other hand helps to foster acceptance and can provide opportunities for further action in the future (Devine-Wright, 2005). A number of partnership models have emerged that take advantage of this approach although the particulars of each arrangement differ in terms of the degree of influence communities have over the project and how the benefits are shared.

Models for Community energy partnerships in the UK

Projects can be 100% community owned or involve co-ownership arrangements with the private sector (Kellett, 2006). It is considered preferable from a community perspective to have a large ownership stake in the project as this allows for a high degree of control and the retention of significant financial benefits (Devine-Wright, 2005). In reality the scarcity of grant funding and the lack of financial and technical resources in the community mean this is rare and most community energy schemes often have to forge partnerships with other parties (Hoggett, 2010). The level of community engagement in these models often depends on who the project is for, who benefits from it and how willing partner organisations are to share the rewards. Table 2 outlines the different forms of community energy partnerships that have emerged to date.

Table 2: Models for Community Energy Partnerships

1	2	3	4
Local developments providing opportunities for local private investors and 'small' investors nationally	Joint ventures arrangements between private individuals and non-profit distributing companies	'Community benefit' arrangements with private commercial developers	Developments by non-profit distributing bodies on behalf of all people in a community
Eg: co-ops, rural businesses	Eg: private landowners and local development trusts	Eg: Local development trusts, community interest co-ops	Eg: Wind farm community benefit payments

(Source: CES, 2010)

The type of partnership that emerges shapes the way projects are controlled, owned and financed (Walker, 2008). The first model can be defined as a community of interest where by people in the local community or further afield become members of a cooperative and buy shares to finance the project (Walker, 2008). This approach was adopted by the Baywind Wind Co-operative in 1996 and has been successfully replicated through the Energy4All initiative that has now helped to establish another seven co-operatives (Energy4All, 2011).

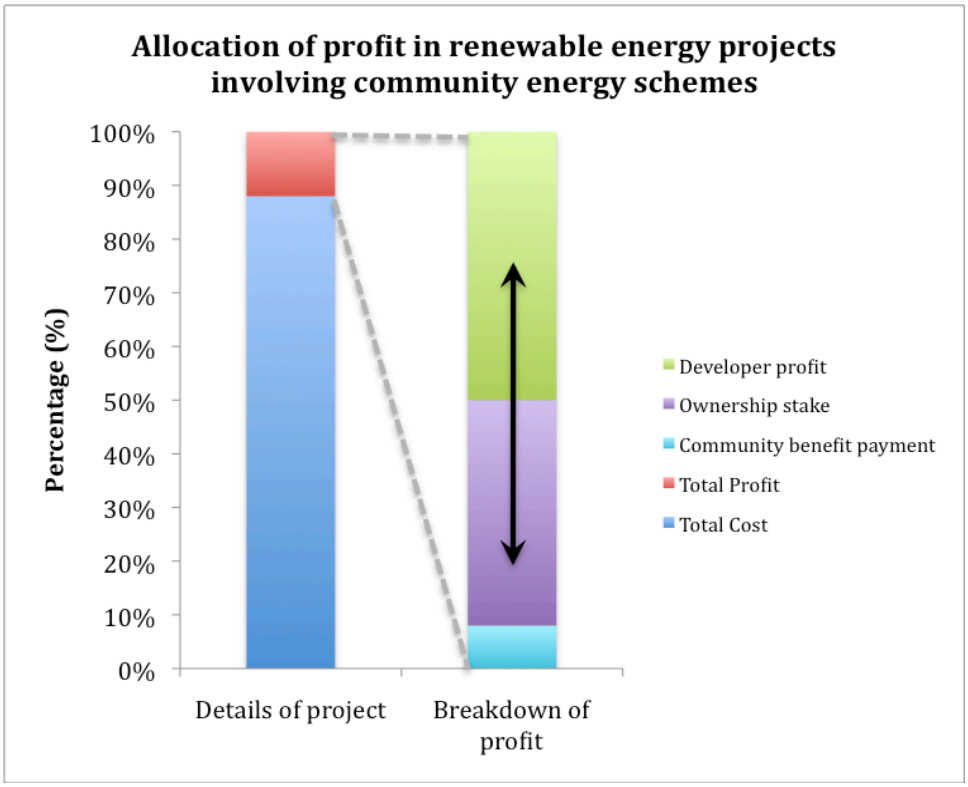
The second and third models involve arrangements between a private landowner or a private commercial developer and a community organization such as a development trust. The development trust is used a lot in Scotland to represent communities' interests in revenue generation enterprises and can even be extended to include variants of community ownership (Walker, 2008).

Finally the fourth model has been widely used in relation to commercial wind developments and although done on a voluntary basis provides communities local to a large wind or solar farm with financial benefits (Hoggett, 2010). The levels of benefits in this model vary but have typically been low and in some cases the community sees these contributions as mere bribes (Aitken, 2010).

The four models encapsulate different combinations of the two dimensions of process and outcome. What sort of partnership model that emerges in each instance depends on the aspirations, ambitions and capabilities of the community involved and the willingness of the partner organisation to enter into a meaningful partnership agreement. What this means in practice is less clear for part ownership in a project by a local community organisation may only confer limited rights to influence decision making with regards to the projects development (Walker, 2008).

The allocation of benefits in a renewable energy project involving a community energy scheme will depend on whether the community is able to find the capital to finance an ownership stake as illustrated in figure 2.

Figure 2: the Allocation of profit in renewable energy projects involving community energy schemes



(Source: Author, 2011)

Assuming the community cannot raise the finance for an ownership stake then they will only be able to benefit from potential community benefit payments offered by the developer. While it would appear that including the community in the process via ownership or through community benefit payments is considered desirable there is no still clear guidance on how the community should be involved and what level of benefits should accrue to them (Smith, 2011).

European approaches to supporting community energy

In other leading European countries such as Spain, Denmark and Germany significant local benefits are effectively built into the fabric of all energy projects (DTI, 2005). Germany and Denmark are at the forefront of innovation in this area and have designed policies that benefit the local area as a matter of course through jobs, local taxes and even local ownership via local co-operatives (DTI, 2005). These policies have subsequently produced significantly higher rates of renewable energy deployment than in the UK (DTI, 2005). Table 3 compares and contrasts the typical approaches adopted in five European countries.

Table 3: Comparison of 'Typical' Community Benefits from Wind Power in Different Countries

Benefit / Feature	UK	Denmark	Germany	Ireland	Spain
Community fund contribution	**Yes**	**No**	**No**	**No**	**No**
Community compensation	**No**	**No**	**Yes**	**No**	**No**
Pre-approval contribution	**No**	**No**	**No**	**No**	**Yes**
Local taxes	**No***	**Yes**	**Yes**	**Yes**	**Yes**
Jobs	**No***	**Yes**	**Yes**	**No**	**Yes**
Individual investments	**No***	**Yes**	**Yes**	**No**	**No**
Co-operative investments	**No***	**Yes**	**No**	**No**	**No**
	* Proposed government policy is looking to introduce more of these local benefits				

(DTI, 2005)

Lessons to be learnt from Europe

The evidence from Europe relating to community based energy schemes suggest that the UK needs to make meaningful community benefits more routine and systematic if future rates of renewable energy deployment are to grow (DTI, 2005).

It should be noted that while leading European countries have enjoyed more success relating to renewable energy deployment each country is different and attempting to import all the best models from the continent is unlikely to work in practice (DTI, 2005). It would be hard to try and replicate foreign community based energy models wholesale on these shores so the UK should try and find solutions that are best suited to its own particular characteristics and circumstances (DTI, 2005).

The role of local authorities

Local authorities are key drivers for encouraging the spread of renewable energy at a local level. Their multiple roles as decision-makers, planners, managers of government infrastructure and role models for businesses and individuals make them ideally placed to initiate lasting change (DTI, 2005). Historically in Germany and other leading European countries local authorities have enjoyed more autonomy (DTI, 2005). In contrast local governments in the UK are considered creatures of the central state with their ability to act largely defined by the principle of 'ultra vires'. This allows local councils to only do what they are statutorily permitted to do and implies their rights and competencies are not general but specific (Wilson and Game, 2002, cited in Bulkeley and Kern, 2006: 4). While most statutory duties are compulsory some are discretionary, which in turn allows for a degree of flexibility in the priority attached to them and the ways in which they are addressed (Bulkeley and Kern, 2006). This limitation to act coupled with the institutional ambiguity surrounding environmental politics, sustainable development and shifting governing terrains has created complex challenges for local government (Hajer 2003; Coafee and Healey, 2003 cited in Burkeley and Kern, 2006).

Local government in the UK is still the focal point for governing at a localised level and plays an

important role in defining and orchestrating collective goals and actions within society. (Bulkeley and Kern, 2006). They have some financial independence and the mixture of specific competences and local discretion implies that they enjoy 'partial autonomy' (Wilson and Game, 2002, cited in Bulkeley and Kern, 2006: 5).

Reforms aimed at local government over the last two decades have placed local authorities at the very centre of the governance debate (Bulkeley and Kern, 2006). The intention of these reforms has been to roll back the state and instead encourage and enable the voluntary and private sectors to fill the void (Leach and Percy-Smith, 2001, cited in Bulkeley and Kern, 2006). More recently, local governments have been tasked with improving the economic, social and environmental conditions in their constituency by involving the community and other partners in meeting local needs and in planning local futures (Bulkeley and Kern, 2006). In theory this increased discretionary scope for local authorities should provide opportunities for encouraging the spread of low carbon energy schemes, however, while some pioneering councils have enjoyed a measure of success action by others has been limited (Bulkeley and Kern, 2006).

The governing possibilities of local authorities can be split into four categories: self-governing, governing by provision, governing by authority and governing through enabling (Bulkeley and Kern, 2006). Table 4 summarises these modes of governing and the range of local climate change policies that are commonly associated with their approach to energy.

Table 4: Forms of local authority governance with regards to energy

Self governing – the local authority as consumer and role-model	Governing by authority – planning and regulation	Governing by provision – direct services	Governing through enabling – facilitating and encouraging action
Energy			
Energy efficiency schemes within municipal buildings	Strategic planning to enhance energy conservation	Energy efficiency measures in council housing	Campaigns for energy efficiency
Use of CHP within municipal buildings	Supplementary planning guidance on energy efficiency design	Energy Service Provider (Germany)	Provision of advice on energy efficiency to businesses and citizens
Purchasing green energy	Supplementary planning guidance on CHP installations or renewables	Energy Service Companies (UK)	Provision of grants for energy efficiency measures
Procurement of energy-efficient appliances	Supplementary (private) contracts to guarantee connection to CHP installations or renewables (Germany)	Community Energy projects (UK)	Loan schemes for PV technology
Eco-house demonstration projects			Home Energy Conservation Act progress reports (UK)
Renewable energy demonstration projects			
(Internal) contracting (Germany)			

(Source: Bulkeley and Kern, 2006)

The localism bill proposed by the current coalition government is the latest attempt to define the scope and nature of local government policies. At its heart it is looking to devolve power to local authorities. In relation to energy projects three important aspects have emerged as illustrated in Box 2.

Box 2: UK Localism Bill and renewable energy

1. Giving people and communities a greater say over there area by a giving them a new right to challenge the takeover of services, bid to buy local assets, and to veto excessive council tax rises.

2. Restoring local control over local planning by replacing the Infrastructure Planning Commission with a democratically accountable system for major infrastructures. The Bill will use neighbourhood plans as the new building blocks for a planning system where communities have the power to grant planning permission if a local majority is in favour.

3. Giving local government a stronger financial stake in the local economy so that they can attract businesses by granting discretionary business rate discounts and give a greater voice to local businesses.

(Source: Renewable Energy Focus, 2011)

There is some debate as to whether these measures will have a positive or a negative effect on renewable energy developments in the UK but it will certainly shake up the current system (Renewable Energy Focus, 2010). In general enabling forms of governing are seen as crucial for attracting partners who can provide the capital and resources that are needed to implement low carbon energy projects (Bulkeley and Kern, 2006). However, the challenges of securing financial resources, developing sufficient capacities for inducement, persuasion, co-ordination and learning suggest that this approach is failing to provide the majority of UK local authorities with the necessary capabilities to produce significant and lasting change. (Bulkeley and Kern, 2006).

Wider actors

The community energy sector has developed in collaboration with a number of other partner organisations including NGOs, energy agencies, commercial developers and other organizations interested in the niche (Hoggett, 2010). These actors are evolving and are becoming more specialised in terms of the services they provide (Smith, 2011). They play different roles in the sector ranging from getting projects set up to helping them deliver and are important part of the landscape helping to move community energy into the mainstream (Walker et al, 2007).

Niche activity theory

One of the emerging theories being used to analyse community energy schemes is that of 'Grassroots innovation and social learning', which looks to identify links between community action and innovation for sustainable development (Seyfang et al, 2010). Grassroots innovations reflect networks of activists and organisations generating novel bottom-up solutions for renewable energy generation, energy demand reduction and raising awareness on sustainable energy issues (Seyfang et al, 2010). This type of approach looks to find solutions that respond to the local situation, interests and values of the communities involved (Hielscher et al, 2011)

Social innovations of this type can be seen in the community energy sector in a variety of forms where innovative technological solutions, new organizational arrangements and new tools of delivery are being used in different arenas and at different scales (Seyfang et al, 2010). Grassroots, niche innovations differ in a number of fundamental ways from mainstream market-based innovations as outlined in table 5.

Table 5: Comparing the characteristics of market-based and grassroots innovations

	Market-based innovations	Grassroots innovations
Context	Market economy	Social economy
Driving force	Profit: Schumpeterian rent	Social economy
Niche	Market rules are different: tax and subsidies temporarily shelter novelty from full market forces	Values are different: alternative social and cultural expressions enabled within niche
Organisational form	Firms	Diverse range of organizational types: voluntary, associations, co-ops, informal community groups
Resource base	Income from commercial activity	Grant funding, voluntary input, mutual exchanges, limited commercial activity

(Seyfang and Smith, 2010)

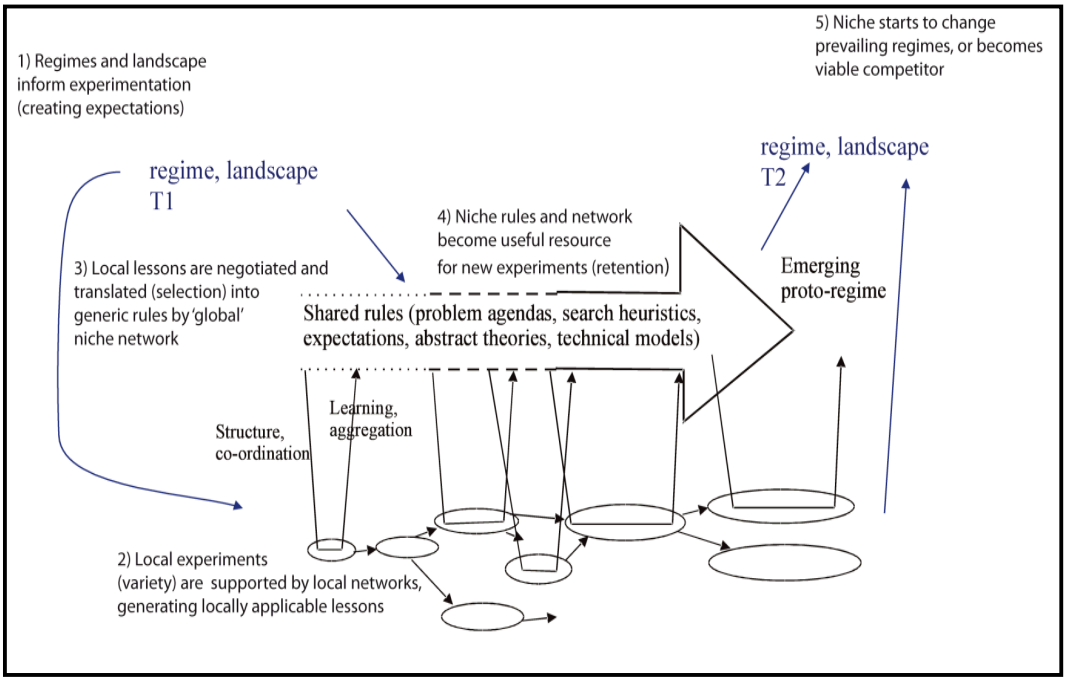
The role of the social economy is gaining popularity in policy circles as a source of sustainability transformation, active citizenship, and public service delivery (HM Government, 2005; Seyfang, 2006b cited in Seyfang et al, 2010). Evidence of this can be seen in the coalition governments 'Big Society' thinking and through policy measures such as the Localism bill that look to encourage active citizens and the development of strong local democratic institutions that can tackle issues of global significance such as climate change at a local level (Young, 1997 cited in Seyfang et al, 2010). This approach benefits from the local touch and will hopefully engage people at a community level to adopt behavioral and lifestyle changes that if widely replicated will make a real difference to carbon emissions at a global level (Seyfang et al, 2010).

The grassroots innovation theory also acknowledges the role that niche activity can play in the wider 'socio-technical regime'. Socio-technical regimes are defined in the literature as the mainstream, highly institutionalized, way of currently realizing societal functions (Smith et al, 2010). The current regime of centralized power generation from fossil and nuclear fuels constitutes the dominant socio-technical regime in the energy sector in the UK, however, the onset of climate change is putting pressure on this dominant socio-technical regime to adapt (Smith et al, 2010).

Niche activity has been building momentum in the community energy sector in recent years as new configurations of actors, institutions and artefacts are formed at different points within and beyond the regime (Smith et al, 2010). These niches provide space for new ideas and ways of doing things to be developed outside of the mainstream. If they prove successful and sufficiently robust they may even develop into niche markets, branch out and attract mainstream interest (Schot et al, 1994, cited in Seyfang et al, 2010).

As an analytical framework, the niche-based approach is able to study niche emergence and development in the context of the niche, the regime and the landscape (Smith, 2007 cited in Smith et al, 2010). Both regime and niche are placed within a broader landscape of social and physical constraints that set the scene and boundaries for change (Smith et al, 2010). Figure 3 is an outline of the process by which change to the dominant socio-technical regimes can occur.

Figure 3: Niche Activity



(Source: Geels and Raven, 2006 cited in Hierschler, 2011)

Evidence from niche activity research suggests that there has been some progress on creating a mainstream community energy niche (Hierschler et al, 2011). There are signs of networking and innovation but the large diversity in community energy schemes make standardizing an approach to policy difficult (Hierschler et al, 2011).

Some key themes from the literature

Different perspective on community energy

The government appears very keen on supporting the community energy sector in practice but their rhetoric rarely matches up to the reality (Grassroots innovations, 2010). Their focus on pursuing the most cost effective way of de-carbonising the economy that will ensure energy security at an affordable cost appears to leave community schemes on the periphery of the debate (DECC, 2009). Government policy is currently geared at the macro and micro levels leaving an apparent gap at the meso level of community energy (Grassroots innovation, 2010). With budgets being cut and a fearful private sector supporting community energy is a risky policy option if it will not actually deliver the carbon savings necessary (Grassroots innovations). Sources from DECC have indicated they are interested in the community energy sector but the sector must prove that it can deliver carbon savings on a sufficient scale to warrant substantial government support (Grassroots Innovation, 2010).

The challenge is for the community energy sector to prove itself. To do this they will need to engage with the incumbent socio-technical system and seek to transform it to their advantage (Smith et al, 2010). Shifting alliances of actors alter power balances in favour or against a certain socio-technical regime and it will be necessary for the community energy sector to engage with key stakeholders in order to gain recognition as a valuable part of the energy landscape (Smith et al, 2010).

Market incentives and barriers

The introduction of the FiT (feed-in-tariff) has enabled committed communities to engage in energy projects at a local level by providing them with a guaranteed income stream. Accessing this revenue stream requires capital and with the grant funding model in decline it remains to be seen whether communities will be able to obtain finance from the private sector (Grassroots innovation, 2010). The government's u-turn on tax incentives surrounding EIS (Enterprise Investment Scheme) and VCT (Venture Capital Trusts) is a positive development for community energy sector. Businesses who benefit from the FiT will now not be disqualified from accessing these tax incentives (Communities for Renewables, 2011). Despite this development policy is rarely aligned to community schemes needs as is evidenced by the fast track revision of the FiT, which makes no allowance for community involvement (DECC, 2011). The Renewable Heat Incentive (RHI) and the Green Deal are two other polices due to be introduced in 2012 that may provide opportunities for community energy schemes but the details are yet to be ironed out and it is not clear community schemes will be given preferential treatment.

Encouraging new means of accessing finance through the provision of market incentives will be needed if community energy schemes are going to overcome the hurdle of prohibitively high capital costs that are often associated renewable technologies (Community for Renewables, 2011). The lack of finance for management capacity is as another key area where community energy schemes are at a disadvantage (Hoggett, 2010). The community energy sector lacks the skills, capacity and support that will enable them to be develop and be taken seriously by key partners in the low carbon and financial communities. Without a track record or proven means of generating revenues it is very hard to convince the investment community to engage in meaningful partnerships with community energy schemes (Hoggett, 2010). In light of these problems one of the key objectives for any community scheme must be to reduce the perception of risk associated with it to an acceptable level to facilitate commercial interest (Hoggett, 2010).

Lack of ownership opportunities

There are a number of virtues of community based distributed energy that include contribution to economic regeneration, building social cohesion and public understanding and support for renewable energy (DTI, 2006 cited in Walker, 2008). The problem is that the majority of communities do not possess the resources to warrant a financial stake in large energy project so they are reliant on the goodwill of commercial developers to offer a community benefit payment (Aitken, 2010). These developers are often keen to embrace the concept of community engagement but their interests for doing so are often self serving as garnering local support can ease the development path of a project (Aitken, 2010). An important question to consider is why communities actually deserve to be engaged and potentially rewarded. Considering the community have to live with the development and its associated invasive impacts it is generally considered fair that communities are compensated (Aitken, 2010). Evidence from case studies suggest there is often a shared concern between both the community and the developer that meaningful long term benefits should be generated for a community trust fund but this common concern does not necessarily translate into agreement about what the level of the payment should be or who it should be for (Aitken, 2010). Issues of trustworthiness and fairness are important factors surrounding the level of community benefit payments and the sense of ownership that this conveys to the community. A key consideration is the lack of information available to the community as this is often deemed to affect their ability to negotiate on an equal footing (Aitken, 2010).

How to empower communities

Finding a robust model for community schemes is important and will help to reduce the risk profile surrounding community energy projects (Hoggett, 2010). Furthermore building trust between different stakeholders is part of what makes the community approach to renewable energy distinctive, desirable and attractive (Walker et al, 2010). One of the keys to engagement with outside interests is to establish a strong and capable organization that can add value to the process. Finding ways for communities to prove their worth in this respect will be important for empowering them in their dealings with the private sector.

Rationale

Currently there is no clear definition of what a community based energy scheme should encapsulate or how it should go about achieving its objectives (Devine-Wright, 2008). This begs the question as to whether there is a preferred template or templates that offer more chance of successfully implementing lasting change. Exploring the motivations of key stakeholders will reveal who is actively shaping the agenda surrounding community energy and why. Finally, identifying the best ways to harness and support community activities with the private sector will be important for informing policy in this area. The overarching goal is to be able to align policy, interest and action around community based energy schemes so that the sector can make a significant contribution to the energy system (Hoggett, 2010).

Methodology

Intro

The choice of this research topic was inspired by a presentation on the WREN project given one of its chief architects. One of the projects key aims was to be independently evaluated so that lessons can be learned that will inform the development of the community energy sector in future. Prior to the collection of the primary data a thorough review of grey and policy literatures on community energy was carried out in order to gain a good understanding of the topic area.

A case-study approach using a qualitative approach has been adopted for the research as the focus of the research relates in large part to the WREN project. The advantages of using a qualitative approach relate to the fact that the data and analysis are grounded in reality. There is not only a richness and detail in the data but also a tolerance of ambiguity and contractions and the prospect of alternative explanations, which make it a suitable approach for this research (Descombe, 2007).

Semi-structed interviews were the primary tool for generating data but the close interaction with WREN members and other interested parties also provided opportunities for participant observation and this was used as a secondary source of data. A small amount of numerical data collected during the course of the research also allowed for some quantative analysis.

Sampling

Interviews

The logic behind the selection of interview participants was to obtain input from people with specific knowledge or dealings with WREN, expert opinion in the community energy field and key stakeholders in the community energy sector. Interview participants in the research can be broadly categorized as follows: WREN members, academia, the private sector and local and central government. Given time restraints not all key stakeholders surrounding the WREN project could be interviewed directly, however informal conversations at events such as the Cornwall Renewable Show enabled some understanding of different parties perspectives.

Interviewees were approached through contacts developed with WREN and by direct approaches to individuals. Not all intended participants were available for interview but those who agreed to participate are deemed to represent a broad range of perspectives. The interviews were split into two distinct groups because some were limited in their purpose and scope. The first group is the primary source of data for the research and involved hour-long interviews conducted over a six-week period. The second group was made up principally from private sector participants who were questioned specifically about certain aspects of community energy schemes. Table 6 details those involved in the research (a full list of primary interviews can be found in appendix 1).

Table 6: Primary and secondary interview groups

Primary	Secondary
• WREN (x4) • Academics - University of Exeter (x2) • Green Wind Trust • Independent researcher • Cornwall Council	*Representatives from* • Solen Energy UK • Waldon Eco Solar • Eviko • Solar Century • Plug into the Sun • Garrard Hassan • Cornwall Heat and Power Systems • Dalkia Energy Technical Services • Treco • Communities for Renewables • Sungift Solar • Renewable Energy Generation • The Co-operative Bank • EDF

Participant observation

The close proximity to the WREN project provided ample opportunity for participant observation and was useful for observing a wider range of perspectives beyond the interviews. It was particularly valuable for revealing what actually happens and not just what people perceive to be happening (Nisbet and Watt, 1980 cited in Bell, 1999). Data from this method was gathered from attending board meetings, meetings between WREN and other stakeholders and events at which WREN was attending. This approach allowed the researcher to hear the views and observe the actions of other key stakeholders in the WREN project and the wider community energy sector. Table 7 details the meetings and events attended along with those who were present.

Table 7: Meetings and events

Meetings and events attended	Those present
WREN board meetings	• WREN board members
WREN meetings with other interested parties	• WREN members • The Mayor • Representatives of Local Government • Representatives of the European Government • Academia
Cornwall Renewable Energy Show	• The general public • Private sector • Landowners • Development agencies • Representatives of Local Government • Representatives of the Central Government

Interviews

Interviews were felt to be the best method for collecting detailed insights into the community energy sector due to the qualitative nature of research. The interviews used a flexible semi-structured approach that enabled the researcher to get a good breadth of coverage while simultaneously being able to explore subjects in more detail depending on their relevance. Some of the participants also had expert knowledge in particular fields so it was often useful to probe particular participants in more depth on specific subjects. The interview questions related to key topics and prompts were used to help guide the line questioning. Details of the interview questions along with their application are detailed in table 8.

Table 8: Application of interview questions

Key Question Area	Primary Group	Secondary Group
1. *Describe your ideal form for a community energy scheme?*	✔	
2. *What are the strengths and weaknesses of the WREN model?*	✔	
3. *What are the opportunities and threats facing the community energy sector?*	✔	
4. *What should WREN's priorities be as it looks to establish a renewable energy network in the local area?*	✔	
5. *What do you believe to be the motivations of the key stakeholders surrounding the WREN project or other community based energy schemes?*	✔	✔
6. *What are the key trade offs that WREN and any private sector partners need to make in order to achieve meaningful progress?*	✔	✔
7. *How should one define success?*	✔	
8. *Is there an institutional gap that WREN and other such community energy schemes are filling?*	✔	
9. *How can government provide effective support that will help community energy schemes?*	✔	✔
10. *How can community energy projects make an effective contribution to the broader processes of change in the energy systems?*	✔	✔

The limited time available meant not all key stakeholders could be interviewed directly so this mixed method was beneficial in the sense that while the primary interviews could be used to provide the majority of data for analysis; other stakeholder views could also be accessed on topics specifically relevant to them. A pilot interview was conducted to see whether the interview questions would provide useful data for answering the research questions. This proved a success and there was no need to modify the questions so the initial pilot interview has been included for the purposes of analysis.

Participant observation

The views expressed at meetings and events attended helped to add to depth of the research. While it was not possible to steer the direction of questioning at these events many of the topics covered were directly relevant to the research and were helpful for identifying issues and backing up themes emerging from the interviews themselves. The approach adopted was to observe and record in as objective way as possible the views expressed by those present (Bell, 1999). Detailed notes were taken at the time, which could be then referred back to during the analysis process.

Qualitative Analysis

The approach to analysis was guided by the four principles of qualitative analysis as outlined in Denscombe's Good Research Guide as shown in box 3.

Box 3: The principles of data analysis

- Grounding all analysis and conclusions on the evidence gathered
- Explanations of the data emerged from careful and meticulous reading of the data
- Care was taken to avoid introducing unwarranted preconceptions
- An iterative approach to the analysis of the data

(Source: Denscombe, 2007)

These principles were applied in practice throughout the research. The interview recordings were transcribed and categorized under the ten broad themes of the interview questions. The exploratory nature of the questioning meant that further refinement of this categorization was required after this initial step. The transcripts were then given unique characteristics in terms of colour and style. This was useful once all the transcripts were transferred to a master version under the same ten topics as it allowed individuals with their respective backgrounds to be easily identified. An excel spread sheet was then set up to ease further refinement and to break topic areas down into specific areas for investigation. During the transfer process similar points made were merged under key point sub-headings and specifics of the viewpoint were logged under a commentary and evidence column. A further discussion column was used to make notes that would be useful during the analysis stage. To ensure the integrity of the data was maintained a record of its origin was kept. The information gathered was recorded under the following categories: WREN, the private sector, academia, local government and central government. Once all the data had been logged it was possible to see the how many times a particular point had come up and who had raised it. The spreadsheet form made it easy to group similar points into common themes so that links within and between them could easily be identified. Finally these themes were ordered to provide a logical sequence to the findings. Full and reflective analysis was then undertaken using the number of citations included within a theme to identify its importance and the origin of the citation to clarify whether it was a broadly held viewpoint or a background specific one.

Quantitative Analysis

Some of the analysis makes use of quantitative techniques to present data collected during the research process. Details of these calculations can be found in appendix 4 and 5.

Strengths and weaknesses of approach

The interview sample is deemed to represent a broad range of perspectives but due to time and resource constraints some key stakeholders were not represented. The views of the local population, town council, other community schemes, investment and finance community, and central government were not included in the primary interview sample and the private sector was interviewed in a short format. This underrepresentation was partially made up for by data gathered during the participant observation process. It was often the case that those interviewed had a good understanding of the viewpoints of other stakeholders,

however less weight has been applied to these second hand opinions unless other sources of data and evidence in the literature could be used to back up them up.

The issue of objectivity is one that was kept in mind during the interview process in an effort to avoid letting personal bias creep in. Raising leading questions can introduce bias into the picture but on the whole this was avoided. Where instances of this did arise it turned out that participants were quick to challenge views they did not subscribe to and this often led to a more detailed discussion on the subject.

There are inherent weaknesses in using participant observation in that different people see different things so to help defend against this notes taken at meetings were cross referenced for consistency with the minutes produced by a third party. The development of close links with the WREN community also raises the issue of going native creep so the notions of objectivity, honesty and independence were borne in mind when writing up the findings. The narrow focus of the research on a single case study has implications for the generalisability of findings as experiences in a relatively small North Cornish market town may not be as relevant to an ultra diverse inner London borough so caution was taken to indicate the limitations of the findings in the analysis.

Overall the transparent and clear approach is deemed to provide a robust methodology for this research. The use of a framework tool has provides a clear audit trail and verification with the literature was used wherever possible to lend credibility to the findings (Descombe, 2007).

Ethics

A final point on insider knowledge and the possibility of revealing sensitive or potentially damaging information raises important issues in research ethics since it is vital to be respectful of the grassroots agenda (Seyfang and Smith, 2010). Bearing this in mind caution was taken not to include information of this kind in the findings.

The Wadebridge Renewable Energy Network (WREN)

The Wadebridge Renewable Energy Network is a community based energy scheme situated in North Cornwall. Its origins stem from the success of the Love Wadebridge campaign that opposed the planning of three new supermarkets in the town. Local activists were inspired to use this momentum to take action on climate change and environmental sustainability. The attraction of the idea of community based energy solutions operating at a local level and the introduction of a revenue generating policy initiative in the form of the feed-in-tariff inspired the creation of WREN. It is registered as an industrial provident society and box 4 outlines its principle goals.

Box 4: WREN's aims and objectives

- Designed to influence an entire population
- Aim to take the level of consumption in the local population of around 10,000 people to set the scale and ambition of its plans
- To provide 30% of Wadebridge's electricity needs from local renewable energy generation by 2015
- To implement energy efficiency and demand reduction measures
- To generate £300k per annum of income for a Wadebridge community trust fund to fund further low carbon initiatives and other non-energy related projects eg fuel poverty or a new guide hut
- To revitalise the local economy
- To change peoples relationship with energy

The logic governing the approach is the prevention paradox, which argues that if everyone were to do a little bit then this would have a much greater effect than a few people doing a lot. A history of key development and a map of the local area can be found in appendix 6 and 7.

Research Findings and Discussion

Is there an institutional gap?

The idea that there is an institutional gap needs to be explored in order to establish whether there is a role for community energy schemes within the energy system. An investigation into the real and perceived short-comings of local government will identify whether there is indeed a gap and if so are community energy schemes well suited to fill it.

Limitations of local government

There is broad consensus among participants that there is a gap but that it is one that should not be filled by the public sector. Local authorities are not deemed to be the suited to fill the gap firstly because there are scale and proximity issues and secondly because they are unable to. They operate across a much larger jurisdiction and have to cater for a much greater population, which limits their ability to actively engage people at a more local level and could invite accusations of favouritism if they are seen to be helping some communities and not others. Furthermore under the landscape of austerity there is common consensus that they are limited by their lack of resources and are struggling to fund even their statutory services. Cornwall Council has already made £170m cuts from its budget making it all but impossible to make any funding available for community energy projects. WREN is deemed to be a laudable project by the Cornwall Council but is too low down the political agenda for budgeted funding.

There is a strong view amongst WREN that local authorities, while being helpful on an individual level, suffer from bureaucratic inertia, conservatism and a silo mentality which prevents them communicating effectively with other departments and the outside world. Cornwall Council harbours grand ambitions to create a dynamic source of support for community energy through developing a joined up policy approach that cuts across different departments. To this end they have positioned their Green Cornwall Programme alongside the team responsible for the localism agenda to allow effective co-ordination of policy across the piste. Despite this new approach the perception from the community is this forward thinking is yet to filter down to the delivery parts.

The introduction of the localism bill opens up the possibility for a new approach but the general consensus among participants is that it is anybodies guess as to how this will effect planning decisions and the ability of local government to take more autonomous action. Different local authorities and the different councilors in charge take very different approaches to renewables and the low carbon agenda, which means any insights learned from Cornwall Council may not be applied universally.

A role for social enterprises

Community energy schemes have three major advantages. They are well suited to the task at hand as they are visible at the local level and can generate more local interest and acceptance. Their independence also allows them to be more responsive and they are more able to innovate through different approaches and experimentation than their institutional counterparts.

There are disadvantages of working outside traditional institutions in that people are unfamiliar with the concept of social enterprises and as a result may be less willing to work with them. One of the major worries raised was whether an independent community energy scheme would be in competition with the local town or parish council. In the case of WREN there was evidence that individual councilors held suspicions

that those involved were in it primarily for the money. This feeling was not universal and many including the mayor were indeed very supportive of the WREN initiative and its aspirations. The issue of competing with local institutions could become a lot more political should significant sums of money start flowing into the organisation. The WREN leadership believes they are natural partners and is aiming to patiently win them over by showing them they are a credible and useful part of the landscape. There was a strong belief from the community experts consulted that community energy schemes should work with other local institutions such as the local authority and town council for they have legal and constitutional credibility which can help community schemes build their own profile in both the eyes of the community and the private sector.

The findings from the research indicate that there is a gap and that community energy schemes are well suited despite their novelty to fill it although this view was accompanied by a note of caution that it would be best done by working in collaboration with local government. This appears to indicate there is a lot of potential but it will be very important to work out how much the community energy sector can actually contribute towards the government's energy policy objectives of de-carbonistation, energy security and affordability (DTI, 2007).

Is there an ideal form for a community energy scheme?

Given a gap has been identified and it could potentially be filled by community energy schemes it is worth exploring whether there is an ideal form for a community energy scheme as this could provide a model or template that other communities can replicate.

There was a clear consensus from individuals consulted that there is no ideal form for a community energy scheme. Every community is unique in its own right in terms of the natural resources, history, skills, capacity and interest that shapes the opportunities available to them. There were however, key characteristics in terms of aspirations and principles that emerged when participants were asked to describe their version of an ideal scheme. Box 5 summarises the aspirations of what a community energy scheme should embody.

Box 5: Aspirations for an ideal community energy scheme

- To make a real impact
- To pursue an integrated strategy on a significant scale – multi technology approach
- To be recognized as a valuable component of the energy sector
- To highlight an alternative development path for the energy system

Wanting to make a real impact in terms of carbon savings, generating money for the community and influencing peoples relationship with energy was seen as crucial in convincing other parties of the potential of the community energy sector to play a significant role in the energy sector. There was concern that government see them as a periphery concern while the private sector is unsure as to how much value they actually add. Designing a scheme of sufficient scale that is able to generate renewable energy using a variety of technologies, manage demand and consumption collectively enabling was considered important for this approach would allow more profitable projects to support less profitable ones. This represents a more holistic approach to tackling energy issues of production, consumption and engagement and it may encourage spill over into other sustainable community based initiatives. If these goals were realized and community energy was able to become more mainstream then policy design could be geared towards the sector with greater intensity in an effort to unlock its potential.

From the discussions there appears to be a degree of ideological influence to peoples' views with some supporting the notion of a new economic model for the energy sector and even the economy as a whole. They suggest the notion of free-market capitalism and its central tenets of private ownership and the profit motive in a competitive market place are incompatible with the creation of a sustainable low carbon economy and advocate more direct intervention by the government to promote a more socially inclusive and environmental agenda.

There were also a number of principles that were considered vital for any prospective community energy scheme as shown in box 6.

Box 6: Principles for an ideal community energy scheme

- Common interest and common purpose
- Inclusiveness
- Representative
- Transparent
- The existence of social benefits
- Reliable and trustworthy

Common interest and purpose highlights the idea that energy is unseen yet fundamental to so many activities and there is a need to engage with people in order to make changes. Mobilising around energy issues was considered a very powerful way of building social capital and raising people's awareness.

In order to achieve this it is very important to be inclusive and involve the whole community: people businesses, local institutions and not just those already involved. All stakeholders need to be engaged and WREN is trying to do this by involving local people, schools in the area, the chamber of commerce, academia and government institutions. The ideal proposed is to achieve wide acceptance so that a collaborative approach can be taken to tackle problems. By doing this community energy schemes will avoid becoming a self-selecting group of enthusiasts motivated only by common interest. The goal is to be able to legitimately represent the whole of a geographically defined community while generating interest from further afield.

To ensure that the motives of a scheme are not misinterpreted transparency is essential for building trust both inside the community and with any prospective commercial developer. A number of participants made the point that despite warm fuzzy aspirations; community energy schemes are often dogged by bitter infighting, suspicions and questions of trust.

Some social benefits were considered essential for the scheme to truly represent a social enterprise initiative although it was felt that these need not be restricted to energy related activities. Finally, a key principle that was of particular importance to the private sector was reliability and trustworthiness. They are used to working with professional partners who follow good practice.

Both aspiration and principles outlined above are widely believed to enhance the chances of success although defining what this is raises interesting questions about the notion of process and outcome that have been mentioned previously (Walker and Devine-Wright, 2008). These ideal characteristics may represent a template for replicability but won't be a toolkit. Different communities will need to adapt this hypothetical template to their own particular circumstances.

How does WREN measure up against the ideal?

In order to judge the WREN model a SWOT analysis has been used to highlight the key strengths, weaknesses, opportunities and threats surrounding their approach to establishing a community energy scheme. The strengths and weaknesses will give an indication of how WREN is measuring up against the ideals set out above while a look at the opportunities and threats facing community energy schemes will highlight the possibilities and pitfalls that will help to inform what their priorities should be for the future.

Strengths and weaknesses

Those with knowledge of the WREN model were asked what were the key strengths and weaknesses of the WREN model to date. The following areas were identified as key strengths and weaknesses (see table 9).

Table 9: Strengths and weaknesses of WREN in its current form

Strengths	Weaknesses
• Robust vision and strong leadership • High level of competence • Attracting attention • Ability to forge partnerships with other interested parties	• Lack of financial resources • Limited engagement • Accessing specialist knowledge • Over reliance on key individuals

The small nucleus of people who initially got WREN going are the driving force behind its success. They have devoted significant amounts of time and effort to get things this far and in so doing have been able to attract prominent members of the community to the WREN calling. They have been able to turn an aspiration into a reality. The leadership nucleus was described as being knowledgeable, articulate, wise to the ways of the world and with a genuine desire to drive the community issue forward. Their clearly defined aims and brand of don't take no for an answer has enabled them to attract significant attention in the community as evidenced by the attendance of six hundred people at their launch event and the growth of their membership to over two hundred. They have also been making a splash in the wider community through a number of press articles in both the local and national papers and even an appearance on the BBC Countryfile programme. This level of exposure has helped to build a strong profile and enabled them to forge links with high profile people, businesses and institutions early on. WREN now has links with established businesses in the solar and wind industry, local government and academia who are all interested in working with WREN although their motivations for doing so will be further discussed later.

There is now a broad range of skill sets present amongst the people on the board including individuals with relevant expertise in accountancy, finance, legal, technical, admin, IT and PR. The combination of these attributes has helped to build a robust social organisation, which is a key ingredient for success in an ideal world. They are now looking to deliver on their aims and have pursued solar and wind plans with limited success so far although the development of a 4MW solar allotment in partnership with Ecotricity and Triodos Bank would have drastically transformed this perception. The fast track revision of the FiT put a swift end to this development, which could have generated in excess of £100k per annum for the community trust fund.

While membership levels are considered impressive for a new organisation that has only been going for six months they are not high enough to be considered representative of the local population that numbers around ten thousand. 2% membership is a start but there is along way to go. The difficulties of getting people engaged were deemed to relate to the notions of apathy and ignorance.

Like many other community energy schemes WREN lacks any significant financial resources that are needed to build management capacity, finance low carbon initiatives or acquire an ownership stake in any prospective large project should they want one. This has limited their ability to deliver on their ambitious targets. The effort required to get this far is considered to be putting a strain on key individuals who can only devote so much of their time to WREN on a voluntary basis when they have other priorities to attend to.

From this analysis the WREN model can be seen to be performing well on the process side of things but the true test is to see whether it can actually deliver outcomes in terms of implementing measures that have a real impact.

Opportunities and threats

While the strengths and weaknesses have helped to highlight how WREN is performing against an ideal template investigating the threats and opportunities will highlight where the real and perceived opportunities and threats in the community energy sector lie. Table 10 summarises the key opportunities and threats identified.

Table 10: Threats and opportunities facing the community energy sector

Opportunities	Threats
• To be genuinely innovative • Revenue generating income streams • Mutually beneficial partnerships with the private sector	• Unsupportive policy environment • Conflicts of interest • Loss of trust

The opportunity given the most weighting by participants was the innovation potential of the community energy schemes sector. The idea of establishing and demonstrating the feasibility of a scalable and replicable model for a community energy powered town in a mutually beneficial collaboration with private sector partners and local government was considered a very exciting prospect. The broad consensus was that pioneering new schemes can be leading lights in the innovation process and could lead to widespread change at policy levels if they are proved to be successful. This view coincides with niche theory although some participants cited the danger that the process may be corrupted if it were to simply attracted the usual suspects in the energy world who may crowd out any potential new entrants to the energy sector. A number of specific examples were offered that would facilitate this sort of innovation as outlined in Box 7.

Box 7: Specific examples of possible areas for innovation

- Collecting data surrounding energy usage in the local area
- Bulk buying opportunities for micro technologies and energy efficiency measures
- A town energy management initiative aimed at influencing patterns of local energy consumption to compliment renewable energy generation
- Building up common experience on a street by street basis about how to install energy efficiency measures and micro-technologies

One of the most interesting ideas noted was the possibility that community energy schemes can provide a point of access for local markets to global players. Community energy organizations would be far better placed to garner trust in the local population, which would allow them to operate on their behalf in any dealings with the private sector and other interested parties. Negotiating a slice of the profits from energy

initiatives for the community would provide a valuable source of income that could be used to invest in the local economy and help to address fuel poverty. This would relieve pressure on local government and chimes nicely with the governments 'Big Society' thinking. It may also help to curb hostilility among local people if the benefits for the local community are more apparent (Devine-Wright, 2004).

Views expressed on grant funding were that it was limited and exclusive. WRENs efforts to access funding have proved to be false idols that are excessively complex and have too many strings attached. It was hard to know whether WREN would qualify and if did there was no indication of what its chances of success would be. The feeling inside WREN was that there is an inside track to it all, which WREN is a minnow in a world of bigger fishes was unable to access.

This forces community energy schemes to seek funding from the private sector sponsored funding programmes. Table 11 lists a number of programmes offered in collaboration with the big utility companies. On the surface they appear to be a positive development, however the common view held where that these programmes were little more than branding exercises or thinly veiled efforts to get people to sign up to a suppliers' green tariffs. The general perception is that they are not interested in community energy as it does not fit their business models

Table 11: Details of a selection of utility sponsored funding programmes

Sponsor	Programme	Details
British Gas	Energyshare "made possible by British Gas"	- Initial £500k to invest in innovative community energy projects - To be followed by a further £3m to be distributed over three years
British Gas	Green Streets "Helping Britain's communities be greener"	- 2m to invest in innovative community energy projects - 14 communities competing to see who can do the most to, save energy, generate energy and engage people locally - Prize £100k for the winner
EDF	Green Fund "Designed to generate energy from the sun, wind, water or other sustainable sources"	- £4.6m allocated since 2001

(Source: Energyshare, British Gas, EDF 2011)

The hidden agendas are considered unattractive for community energy schemes so there is a desire to seek finance through other means such as through revenue generating income streams. However, to do this they will need capital to be able find finance for the initial capital outlay that is inherent in many low carbon technologies.

A common feeling expressed by participants was that community schemes are still swimming against the tide in many respects. The 4MW solar allotment (farm) scheme shelved by WREN is a perfect illustration of how a community friendly policy could have allowed people, who did not have suitable rooftops or could only afford to invest a limited amount of capital, a chance to invest in a community energy project. The local

MP, the Mayor of Wadebridge, the vice-chairman of the Chamber of commerce and a local town and Cornwall councilor were supportive of the project, however the fast revision of the FiT brought it to a premature end. If policy had been designed so that individuals could group their 50kW allowances for the FiT together then the solar allotment scheme would have been a real possibility (50kW x 80 people = 4MW).

The FiT and other revenue generating (or cost saving) policies such as the RHI and Green Deal are creating economic opportunities although it is felt that they are by design being aimed primarily at individuals. There are no exceptions for community scale projects of a few MWs that exceed the FiT limits. The solar allotment project is evidence of this point. Unfortunately the case is not as straight forward as it would seem for even though the scheme would have provided members of the community with a chance to invest, the bulk of the profits would still have been going to the commercial developer involved if community ownership was limited. With a £15m cost this is likely to be the case so the government may well still view this as merely a novel way for commercial developers to extract profit from a large solar array. If replicated widely then it would quickly eat into the FiT pot that is supposed to be for individuals and small organisations and not commercial developers using the community tag as means of gaining access to it.

Conflicts of interest

Conflicts of interests were considered to be the biggest danger facing community energy schemes as this would lead to a loss of trust without which they will have no legitimacy, credibility or ability to act. Particular instances of potential conflicts of interests were identified from the WREN case study as outlined in table 12.

Table 12: Conflicts of interest

Conflict of interest	Risk	Safeguard
Paying members for their contribution	- Accusations of self-interest	- Procurement committee - Transparency
Vested interests	- Commercial interests looking to shape the agenda to their advantage	- A strong board - Trust - Membership approval of any large project
Exclusivity	- Being locked into uncompetitive deals - Upsetting private sector partners	- Board approval for agreeing to any exclusivity agreements

Paying members brings with it the notion that it is merely a job creation exercise however, for some the time they spend promoting WREN is eating into their working week so there is a feeling that they should be compensated for both their time and expertise. It is recognized as a sensitive issue and appropriate safeguards have been put in place on the limits to any remuneration to WREN members.

Certain board members who are involved in the low carbon industry are actively involved in drawing up WREN's plans for the future and could benefit personally from potential projects. The irony is that without their help it is perceived that WREN would not have got to where it is. It is commonplace for people in the industry to be civic minded with strong environmental concerns so it would be wrong to exclude them from the process, however their presence on the board brings into question their independence. There is a lot of

trust in the individuals themselves but it would be advisable to limit their ability to actively participate in the decision making process of the board.

Finally, there is the issue of exclusivity arrangements with private sector partners. There is a feeling with WREN that they are lucky to have attracted such prominent partners and they worry about upsetting them if competition were encouraged. While the current arrangements with companies in the solar industry are based on a gentlemen's agreement there is strong evidence from the private sector to suggest that while exclusivity is attractive they would not expect it as a condition for involvement with WREN. This implies that WREN should not restrict its dealings with other interested parties but instead encourage competition in order to get the best deal for residents. Issues were raised about how this would work in practice but it appears that a tendering process would work for bulk deals and if WREN is not actively promoting one partner over another then it could work with multiple businesses.

The WREN model has a number of key strengths including a strong vision, a high level of competence that has enabled it to attract attention and develop partnerships with other interested parties. It is limited by its lack of resources and limited penetration into the community although this can be expected at this early stage in its development. A number of opportunities and threats exist for WREN and community energy schemes in general. The evidence suggests the innovation potential in the sector is being primarily stifled by a lack of resources and an unfavourable policy environment. To succeed WREN must overcome these hurdles will being mindful of any conflicts of interest that may undermine their integrity.

What is Success?

Having established that there are opportunities to take action it is important to consider what success should look like. WREN will then be able to identify its priorities for the future. Participants offered an array of indicators for success.

The principles of process and outcome were both deemed crucial to success by the majority of participants although there appeared to varying degrees of emphasis should push come to shove. The broad consensus was that success should not be defined too narrowly in terms of the number of installations and the length of payback periods. Finding methods of measuring the more intangible benefits will be important in persuading others of the merits inherent in the community energy sector. Calculating the social return on investment would be a useful way of illustrating these benefits in financial terms (Cabinet Office, 2009). Table 13 highlights the key indicators that may be used to measure success. These measures of success can be used to judge the performance of WREN.

Table 13: Measures of success

Measurable success	Intangible success
• Getting an initiative set up • Hitting targets • Installations • Income into the community fund • Growing the membership	• Raising awareness about energy issues • Improving economic prospects in the area • Positive social outcomes • Inform policy • Inspire others to take action

Priorities

Now that WREN is up and running there is a desire to start delivering on some of their aims. Box 8 outlines the issues identified as important for WREN to make progress.

Box 8: Priorities for WREN

- Deliver on key aims
- Keep momentum going
- Engage the community
- Establish capacity
- Access finance
- Jealously guard reputation

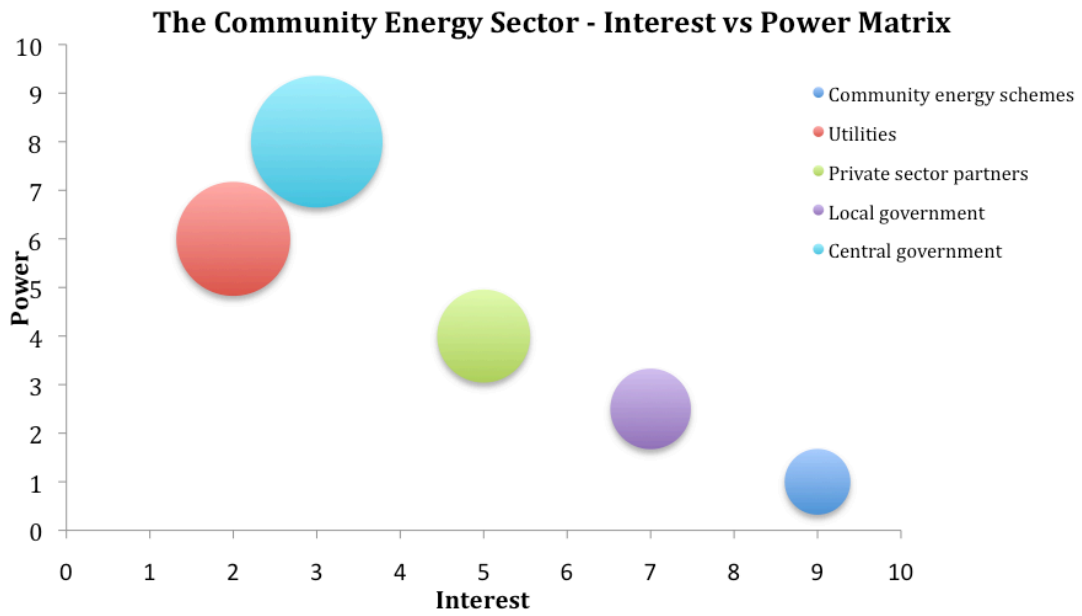
In order to have a chance of delivering on key aims it is vital to keep momentum going. It takes time and effort to engage the community so it will be important to establish capacity. This will be done primarily through the retention of committed volunteers until finance can be found for a more permanent paid presence. Accessing sources of finance will be helpful for building capacity but vital if WREN wants to finance its own projects or acquire an ownership stake in any large development.

The difficulties of getting anything done will test WREN's resolve especially if an opportunity arises to initiate a project that will deliver visible results. The prospect of 'getting something going' is important for showing people in the community that WREN is more than just a talking shop. The prospect of failure on the other hand may put pressure on the board to compromise on their ideals and give up more than they otherwise would when it comes to negotiating with partners about potential projects. While these may be considerations for the future WREN should jealously guard its good reputation for if this were to be tarnished its legitimacy would quickly be lost.

Motivations of the key stakeholders

To understand why the community energy sector is struggling to crash the energy party one needs to consider the motives of the key stakeholders who have the power to make a difference. Understanding the conflicting interests of these stakeholders will help to identify who is blocking growth in this niche. Figure 4 gives an illustration of the interest and power dynamics of the key players involved based on opinions put forward by participants and found in the literature.

Figure 4: The Community Energy Sector – interest vs power matrix



(Source: Author, 2011 - Note: the size of the bubble relates to their perceived ability to shape the agenda)

The primary motivation for action in the energy sector can be broadly seen to relate to money, concern for the environment and social benefits. One more factor at play is simplicity for sometimes a desirable but complex solution is discarded in favour of a more simple but crude solution. Table 14 outlines the interests of the key stakeholders involved as perceived by participants.

Table 14: Stakeholder interests

Stakeholder	Interests
WREN	• Environmental concern • Local economic benefits • Social dimension
Private sector partners	• Primarily commercial motives • Enlightened self-interest • Wider environmental and social issues
Utilities	• Pursuing their version of a low carbon future • Promotion of brand • Signing customers up green tariffs
Local government	• De-centralisation • Localism agenda • Statutory duties • Promotion of the low carbon economy
Central government	• De-carbonisation • Energy Security • Affordability

WREN's motives have been discussed earlier but the motives of the other stakeholders need to be considered to establish whether they see as much potential in the community energy sector. The private sector's interest in community energy was considered to relate in large part to business logic and the possibilities of generating attractive returns. There was evidence of interest in the wider social and environmental benefits but if the numbers don't stake up then it is not an area that they will enter into when other more attractive business opportunities exist. They have the financial and technical resources that can make a difference but the respondents generally agreed that they are unlikely to engage in meaningful partnership arrangements unless they believe that community energy schemes can add value to their businesses. Better policy design and the use of financial incentives were considered the best means for facilitating these relationships.

The energy utility companies are grappling with the prospect of a low carbon future and can be seen to be tuning their business models to what they perceive are going to be the most profitable pieces of the future energy pie. As detailed earlier community energy does not fit their business model and their interest in it is limited to small initiatives that are considered by a number of participants to be mere branding excersizes.

Cornwall Council harbours ambitions to use the Localism bill to encourage the development of community renewables in the county although their ability to act is limited by their lack of resources. It is central government, however who set the rules of the game hence their high degree of power. They have repeatedly stated their interest in developing the community energy sector current but policy appears to be geared towards the micro and macro levels. Views sourced from DECC indicate that although the idea is attractive the sense of urgency surrounding climate change and the complexity inherent in the community energy sector means that unless community energy schemes can prove they are able to make carbon savings on a significant scale and in a cost effective way then the government would be irresponsible to divert significant sums of scarce money towards supporting their development. Critics of this view point out that the problem is inherently a socio-technical one and supporting a purely technical fix will ultimately be more expensive and result in failure. They argue that engaging people in the process is a crucial element in developing a successful solution (Walker and Devine-Wright). There are a number of suspicions surrounding the real motives of government in this regard as outlined in box 9.

Box 9: Perceived government motives for not diverting any significant resources towards the community energy sector

- It is easier for them to deal with large commercial players who can deliver large renewable projects
- They like the current centralized energy system
- They want a neat and tidy approach to policy
- Too much political risk
- Government want to support community schemes but don't know how

It is clear that the there is a discrepancy between government rhetoric and reality with some participants going as far as stating there is a polar disparity between their stated aspirations and the reality of support on offer. If the community energy sector is to thrive then it is considered the government must use more of their power to help this complex niche enter the mainstream. The perception is they can do this by

encouraging businesses to enter into meaningful partnerships with community energy organizations through innovative policies that make a point of promoting community energy schemes within the wider policy environment and through the use of financial incentives.

Empowering communities

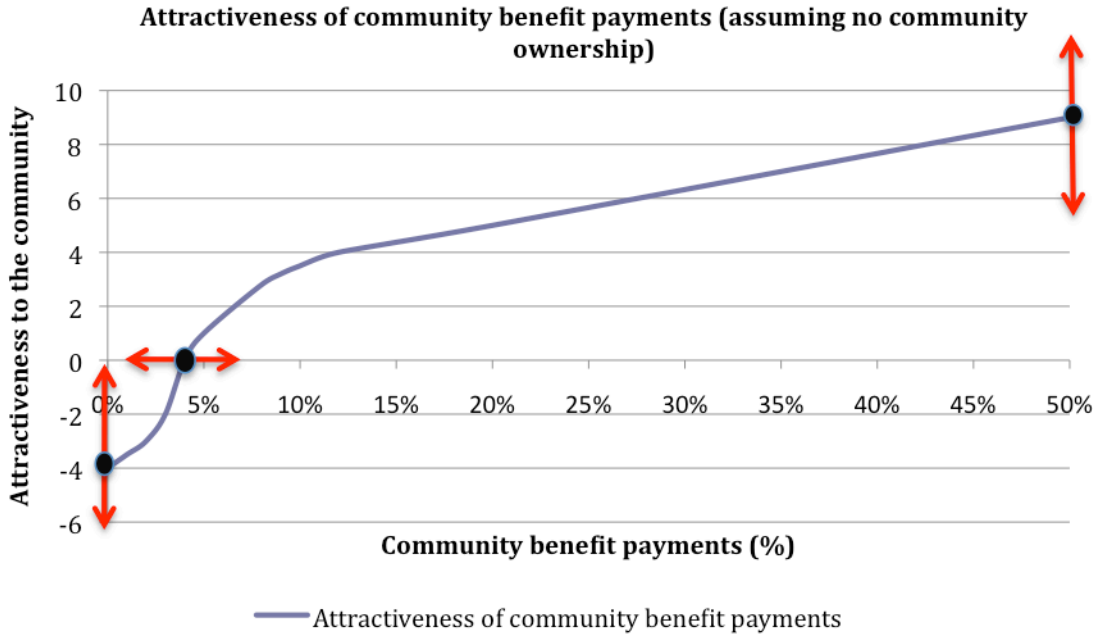
In the absence of government support community energy schemes are going to have to look to the private sector to help them develop. The basis of this relationship is considered to be driven primarily by commercial logic so it is worth considering what tradeoffs each party is willing to make in order to achieve a mutually beneficial outcome. Identifying how communities add value will help them to realize their worth and improve their negotiating position.

Communties hosting large renewable projects are waking up to the fact that they are sitting on a valuable natural resource and they would be advised to take advantage of this before a developer swoops in and takes ownership of it. The existence of a community energy scheme may help to bring commercial developers to the negotiating table but if they want to benefit then they need to convince the developer that they deserve a share of the rewards.

A strong and effective community organisation will be better able to do this but even then they are still percieved to be at a disadvantage. The lack of experience with the technology and finances involved often leads to a situation of asymmetric information where one party is privilege to more information than the other. This allows the commercial developer to offer much smaller sums of money to the community than they would otherwise accept if they knew the true extent of profits being made. On the surface the offer may seem generous considering the developers are not actually obliged to offer anything, however, it appears they believe that a sweetener to get the community on board is worth it to help with planning and general acceptance.

When considering the atrractiveness of communtiy benefit payments to the community it was noted that a number of participants felt that the relationship between attractiveness to the community and the level of community benefit payment was not a linear one. The literature backs this up suggesting that token gestures by a commercial developer may actually be counter productive in terms of getting the community on side (Aitken, 2010). Figure 5 illustrates this general point although the exact shape of the curve and the points of intersection may differ to a degree depending on the specific project and community involved.

Figure 5: Attractiveness of community benefit payments

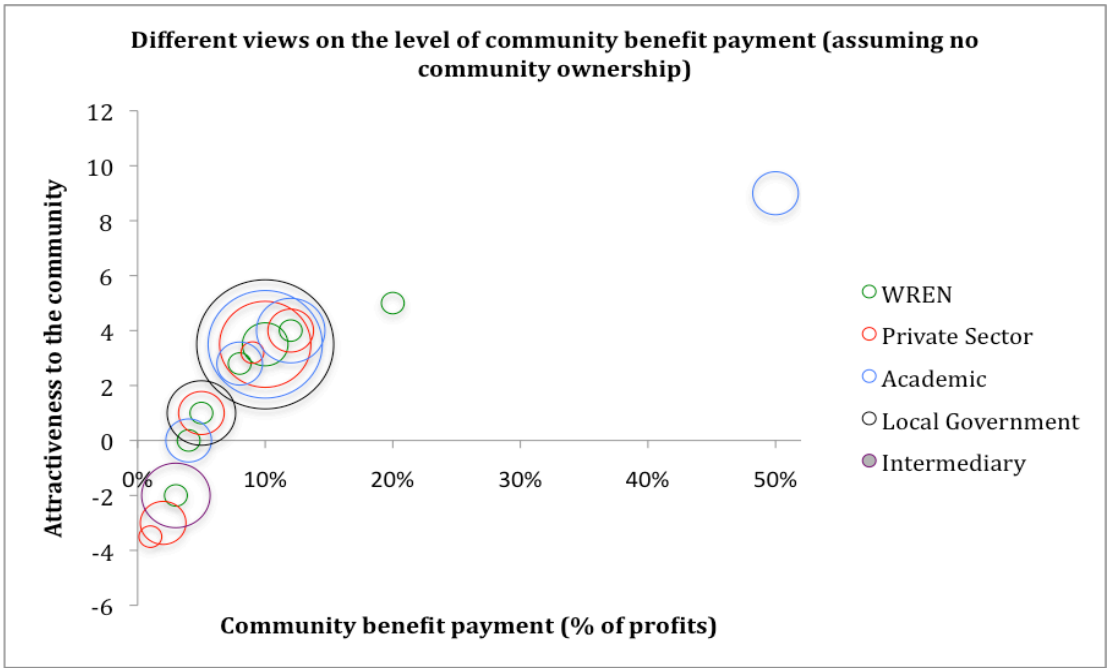


(Source: Author)

Community benefit payments

Participants were asked to offer an opinion on what percentage they believe a community should be rewarded (assuming no ownership stake). It was interesting to note that the most commonly cited percentage was around 10%. Figure 6a and 6b shows the different views on the size of community benefit payments in relation to a theorised level of attractiveness outlined above (see key for graph). From figure 6a it can be seen that private sector tended to be postioned on the lower end of the spectrum (0% - 12%) while a couple of academics viewed 50% as just reward if a partnership was to made in good faith. See Appendix 3 for a breakdown of these viewpoints.

Figure 6a: Different views on the level of community benefit payment

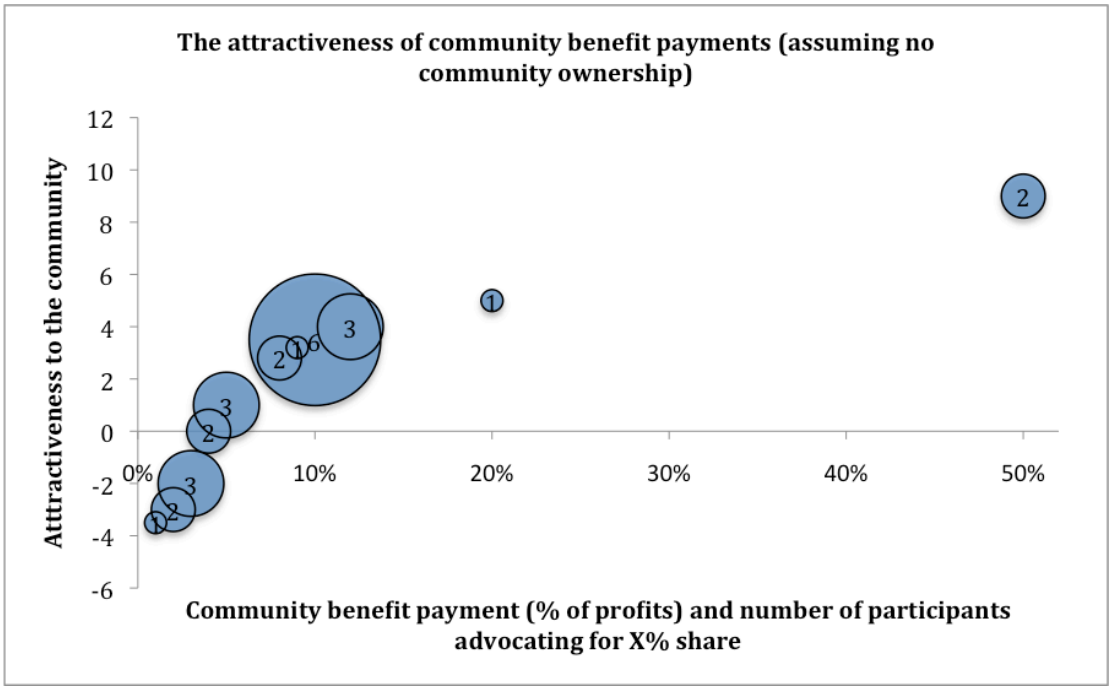


(Source: Author, 2011)

KEY

- *The colour of the circle relates to the backround of the group*
- *The rings are ordered with WREN first (inner ring) → intermediaries last (outer ring)*
- *Their increasing size reflects the incremental increase from any one particular group*
- *The outer circle size indicates the number of times that a particular level of community benefit payment was cited in total.*
- *The number of citations are specifcally identified in Figure 6b within the bubble*

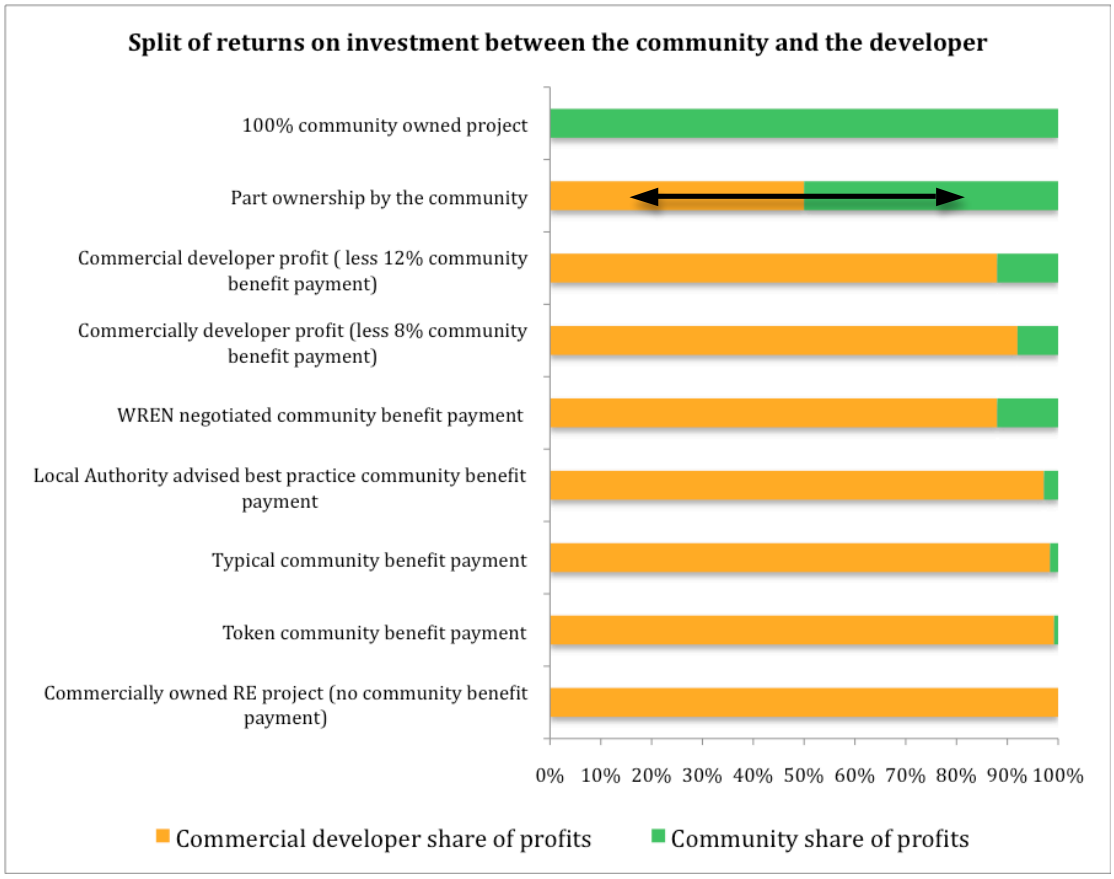
Figure 6b: Different views on the level of community benefit payment



(Source Author, 2011 - Note: the number within the bubble indicates the number of times that a particular level of community benefit payment was cited)

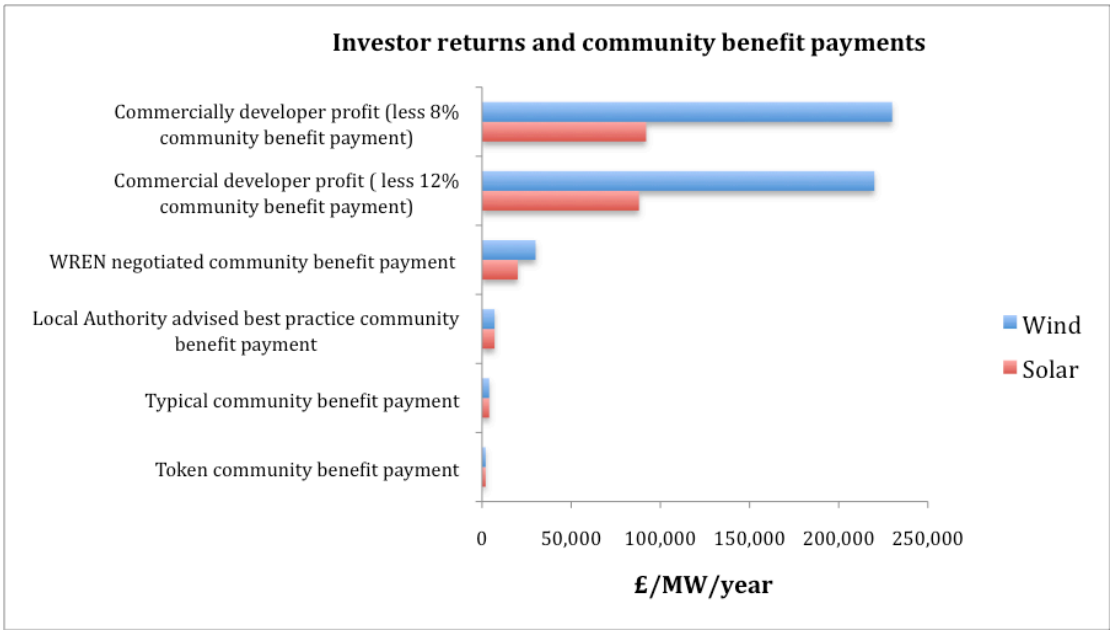
This suggests that community schemes should be able to negotiate with developers for around 10% of the profits from any proposed renewable energy project irrespective of an ownership stake. A number of different scenarios are outlined in Figure 7a and 7b showing the percentage split of profits between a developer and a community energy scheme and what this means for a typical community scale wind or solar development (See appendices 4 and 5 for details underpinning calculations). Considering that developers typically make a return on investment of between 8% -12% then negotiating for 10% share of this would appear to be a fair measure for sharing the rewards.

Figure 7a: Split of returns on investment between the community and the developer



(Source: Author, 2011)

Figure 7b: Split of returns on investment between the community and the developer

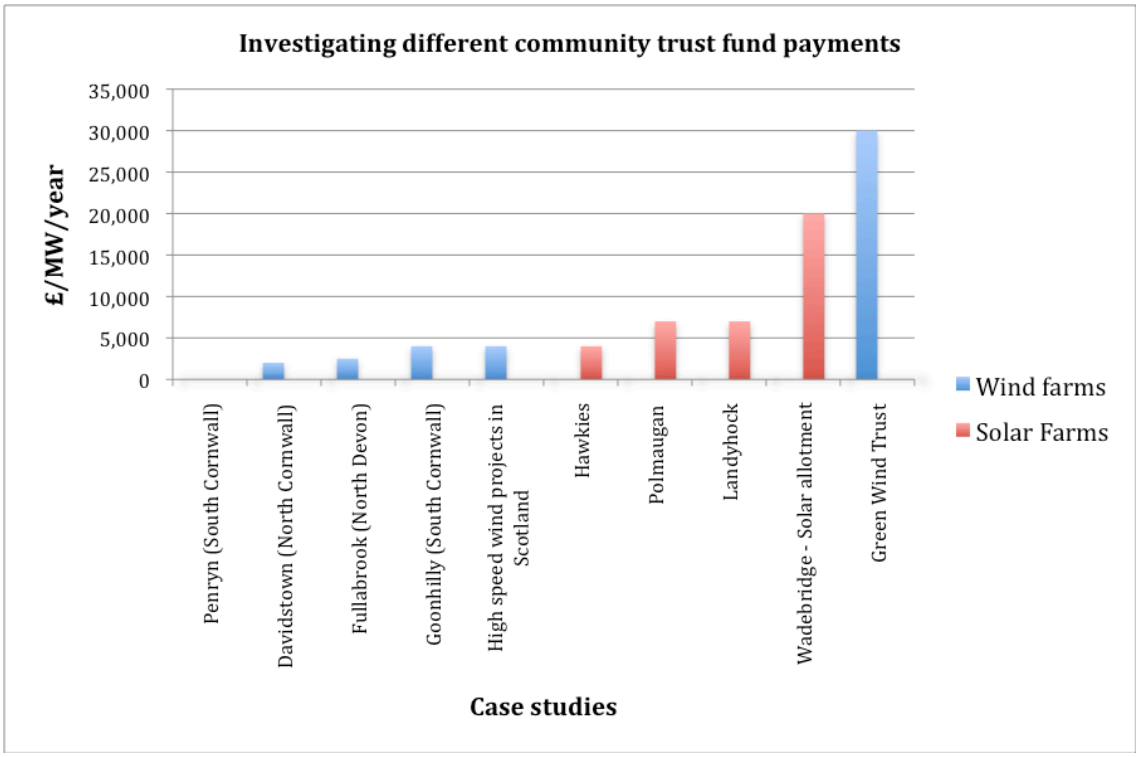


(Source: Author, 2011)

From the graphs it can be seen that WREN has proven more adept at negotiating than other community energy schemes. Another point of interest is that it would appear that developers are still able to make attractive financial returns despite a community benefit payment in the order of 8% - 12%. It was suggested by participants that some developers see value in community invovlement although whether this translates into a significant community benefit payment is subject to the perception of the level of this value and their ethical persuasions.

A number of case studies were investigated to see how other community trust fund payments were negotiated. Figure 8 shows that most were very small but that more ethically minded investors and developers can and do offer more in certain instances. WREN's dealings with Ecotricity (solar allotments) and Green Wind Trust support this argument. These companies both have green impulses, value community participation and have calculated that they can service their costs of capital and still share a significant chunk of the rewards with the community. See appendix 4 for details about the calculations underpinning these figures.

Figure 8: Examples of local community trust fund payments



(Source: Author, 2011)

It would appear from this analysis that generous community benefit payments are the exception rather than the rule and that asymmetric information combined with the limited experience and capabilities of communities puts community organisations at a significant disadvantage. One of the crucial factors affecting WREN's negotiation with Ecotricity was their insistence on being able to look at Ecotricity's financial projections for the solar allotment project. This allowed WREN to see how much Ecotricity was going to make from the development and emboldened them to increase the £50k pa community benefit payment on offer to £100k pa. They recognized that this would only make a small impact on Ecotricity's margins while it would provide WREN's with a significant revenue stream for the future. This show of trust and transparency from both parties was very important for aligning expectations and negotiating a mutually beneficial arrangement.

Adding value for the private sector is an important negotiating tool for community energy schemes and is not restricted to large energy projects but can also apply to smaller installations in the community itself. Participants were asked about other ways in which they think communities can add value, how this might be measured and what reward this could mean for the community. Table 15 summarises the results.

Table 15: What factors will help to empower community energy schemes

Adding value	How to measure contribution	Potential reward
• Marketing tool	Referrals	% of marketing budget per sale
• Increase sales – attracted by the WREN logo	Number of sales generated by the community energy scheme endorsed offers	Finders fee / commission
• Local knowledge and information	Depends on what opportunities this knowledge unlocks	Information specific
• Vetting installers	Referrals	% of marketing budget per sale
• Obtaining local authority contracts	Value of contract	% of profits
• Playing commercial interests off against each other	Difference between offers	Better deals for local people

A number of participants mentioned that the profit share of any arrangement would always be attractive to businesses if it would generate more business but the details of any particular arrangement would depend on the specific project itself but that a percentage agreement would be preferable in principle. Where possible it was felt by some that this percentage should be benchmarked in the community energy sector as it would be difficult for outside interests to judge the capability of a social organisation from afar, however the varying range of potential projects and different capabilities of community organizations in practice means this may be difficult in reality. An important issue raised in these discussions was the handling of commercially sensitive information. It will therefore be vital for any community scheme to be able to reassure developers that any commercial sensitive information will be kept confidential.

Membership and information were deemed to be the most valuable commodities that could be used to entice the private sector to the negotiating table. This suggests that if community energy schemes could gather detailed knowledge about buildings, energy use and consumption patterns in the local area then this could be used as a bargaining chip in negotiating a share of the rewards. The logic suggests a substantial information bank would help to identify opportunities for the most cost effective investments and a large engaged membership would make this possible. This appears to be the most fruitful way in which community energy schemes can add value at little financial cost.

From this analysis it can be seen that many participants agree that it is good that money is being made but it is also important how it is shared with the community (Walker and Devine-Wright, 2008). In other leading European countries community energy schemes don't appear to have to prove their worth where as in the UK this seems to be a much more important consideration. Convincing those in positions of power to engage and support the community energy sector will be important if it is to prosper in future. To facilitate this it appears trust and transparency are crucial for negotiating a mutually beneficial outcome (Aitken, 2010). Furthermore if communities can improve their capabilities especially in engaging the community and building detailed knowledge about their communities they will be able to negotiate a better deal for the community.

Effective government support for community energy schemes

There was a strong feeling that policies need to be designed specifically with community energy schemes in mind. The design of policy was considered important and flexibility needs to be built into it so that it compliments the diversity in the sector and lets communities decide what best suits their locality. A number of participants suggested policy interventions need to be more coordinated and inclusive in order to encourage new entrants into the market place (Seyfang et al, 2010). Differentiating between supports offered to commercial and community projects will help to address the meso gap in policy identified by all of the participants questioned and will provide clarity and consistency to the community energy sector. Furthermore developing more joined up thinking across different departments and different levels of government was deemed important for encouraging better strategic thinking.

Breaking the individualistic approach to energy relationships was seen as another important way of letting community energy schemes take action on a community level. Encouraging a more holistic community wide approach will help promote action on all levels in the community. Larger and more profitable technologies could be used to support small-scale less profitable technologies. This enables not only those investments with the best payback period to be undertaken but also those with the most carbon saving potential and those with important social benefits. A consensual whole town approach adopted with community benefits built into the model will help to take the focus away from the adhoc site specific approach that currently exists in the UK (DTI, 2005). For specific policy suggestions see appendix 5.

Conclusions

From the research a number of important insights are identified. There is a gap in the energy sector but it is suggested that local government should not be the ones to fill it. Scale and proximity issues, a lack of available resources and the position of low carbon development on the political agenda are deemed to be limiting factors concerning local government ability to act. It would appear there is a role for social enterprises in the form of community energy schemes to take action at a local level but it should be done in collaboration with local government in order to maximise the potential of this emerging sector.

There is no ideal form for a community energy scheme but a number of key characteristics have been identified in relation to aspirations and principles that are deemed to be important for ensuring success in this field. This adds to the perception that while there may be a template that other community schemes can use this is not a toolkit and individual circumstances will need to be taken into consideration in each case.

WREN represents a novel approach to community energy with its population approach. There are a number of key strengths highlighted including a strong vision and a high level of competence that has enabled the organisation to attract attention and develop partnerships with the private sector and local institutions early on. However, it will be important for the organisation to address the weaknesses of limited engagement, knowledge and resources in order for the organisation to continue to develop. The main opportunities for WREN relate to its innovation potential and the role it can play as an access point for global players looking to operate on a local scale. In an unfavourable policy environment they must try to build their capabilities and access finance while being mindful of conflicts of interest that may discredit and derail the organisation.

A variety of measures of success are identified and used to identify the priorities for WREN in the future. Tangible and intangible measures of success are both considered important for informing policy but the difficulty of getting anything done means delivery is seen as the next important milestone. This will help to keep momentum going and encourage the community to engage in the process. Without progress there is the risk of stagnation and compromising values.

The motivations of the key stakeholders are important for understanding who and what is blocking progress in the community energy sector. The private sector were identified as a capable and willing partner and some appear to be genuinely interested in the wider environmental and social benefits associated with community energy schemes, however it is imperative for the numbers to add up for their actions are on the whole dictated by commercial logic. Central government is identified as the key player with the power to unlock the potential in this sector but there rhetoric rarely appears to match the reality faced by those on the ground.

In the absence of a more supportive policy environment many community energy schemes are turning to the private sector to develop projects in their locality. The problem of asymmetric information is highlighted as one of the key stumbling blocks to the development of mutually beneficial partnership relationships. The research suggests that a community benefit payment of 10% of a projects profit represents a fair return for the community. There is deemed to reflect the inherent value from community involvement irrespective of any community ownership. In reality this amount will depend on the specific project and the willingness of the parties involved to engage in a meaningful partnership arrangement. The case studies analysed suggest that WREN has been relatively successful at negotiating a more attractive community benefit payment than other communities in the South West and in Scotland. Key components identified for successful

negotiations were trust and transparency for these helped to successfully align expectations so that a mutually beneficial partnership could be reached.

Community benefit payments in relation to large scale projects were not the only means by which a community can benefit. A number of ways in which community schemes can add value and for which businesses are likely to pay for were highlighted. In particular local knowledge and information was identified as valuable commodities in its own right. When combined with a strong presence in the community and high membership levels the community organisation can be considered to be at the gate of a ready made market that businesses are very likely to be interested in. Community energy schemes can be a capable and valuable partner and don't have to be all stick and no carrot. It was noted that while it is good that money is being made it is equally important how it is shared. This reflects the key components of process and outcome that are highlighted in the literature (Walker and Devine-Wright, 2008).

The role for community energy schemes in future can be that of a facilitator supporting and collaborating with businesses, developers and investors to achieve mutually beneficial arrangements. Policy interventions and financial incentives can help in this respect but it will be important for the niche to convince those in a positions of power that the community energy sector can contribute in a meaningful way to government energy objectives namely: decarbonisation, energy security and affordability (DTI, 2007).

Developing local energy networks offers considerable opportunities for strengthening local economies, skills base and innovation processes (Seyfang et al, 2010). The UK government, private sector, individual consumers and communities all have a major part to play in the transition to a low carbon future therefore support structures are needed at every level to help develop the community energy niche (DTI, 2005). The WREN project is a valuable addition to the sector and its ability to engage the private sector at a local level and the government at global level will ultimately define its success.

Limitations of findings

This research has looked largely at the isolated case of WREN so the generalisability of the findings may be limited. Furthermore the research only provides a snapshot of the experiences and progress of WREN so there is scope for further reseach.

Areas for further research

Revisit the WREN project at a later date to ascertain their progress

Potential for community energy schemes to contribute towards policy targets

What are the most effective financial incentives for promoting growth in the community energy sector?

Quantify how much value community schemes can add to businesses

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Appendices

Appendix 1: Participants in primary interviews

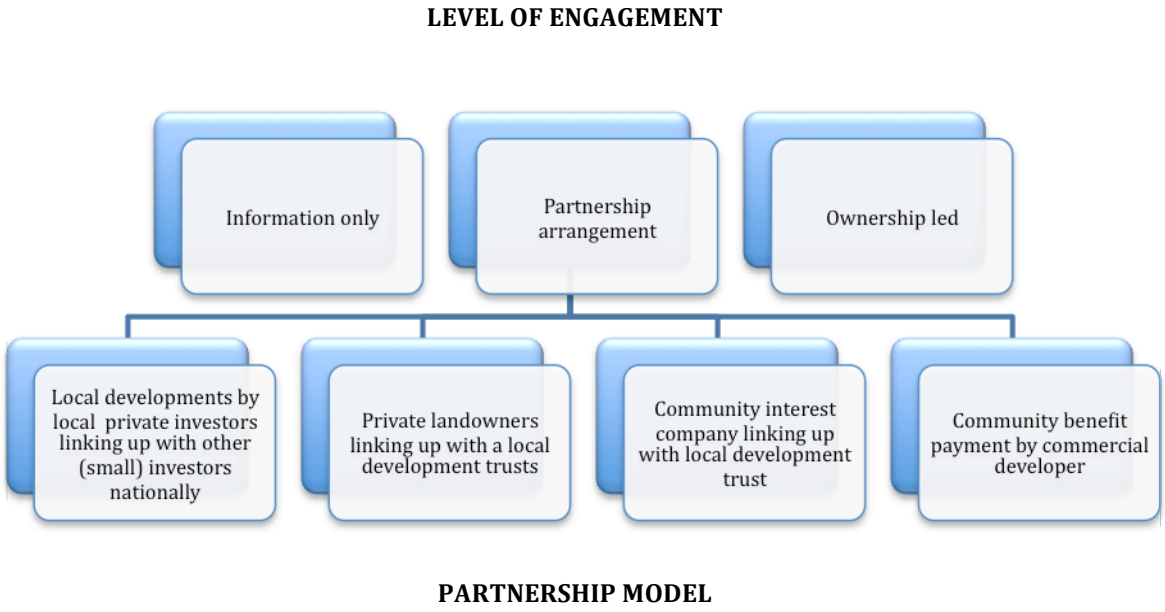
Table 16: Primary interviewees

Name	Organisation
Stephen Frankel Tony Faragher Jerry Clark David Atfield	WREN
Professor Devine-Wright Jimmy Aldridge	University of Exeter
Tim German	Cornwall Council
Jake Burnyeat	Green Wind Trust
Richard Hoggett	Independent researcher

Appendix 2: Where WREN sits on the community energy spectrum

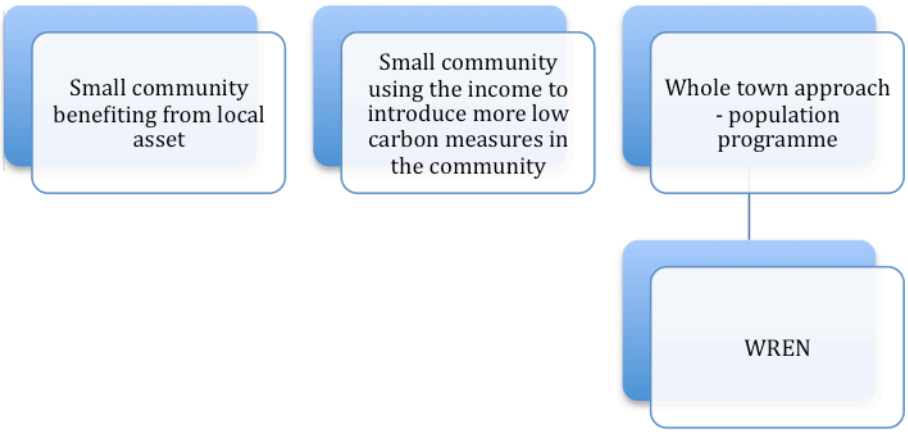
Wren has limited resources to speak of so their opportunities for action appear to lie in a partnership arrangement of some description. The second, third and fourth branches in figure 9 are the ones that WREN has been looking to develop in relation to large wind and solar projects. In terms of scale WREN is operating at the high end with their population programme (See figure 10). This is relatively unchartered waters in the UK although pioneering on the communities on the continent are evidence that if successful this can represent a more holistic approach to community energy.

Figure 9: Partnership models



(Source: Devine-Wright, 2005), (Source: CES, 2010)

Figure 10: Scale of energy scheme activity



(Source: Author, 2011)

Appendix 3: Attractiveness of community benefit payments

During the research participants were asked to indicate how much they think community energy schemes should be rewarded as a percentage assuming there is no community ownership. They were allowed to offer a single figure, a range or even an ideal versus realistic scenario. Those who offered a range or a real and ideal figure are overrepresented in this sample but it was felt that precisely reflecting their views as opposed to using an average was more informative in terms of the results in the graph. The results of this were logged and are outlined in table 17. The mode of the sample is 10% while the average is 12% (calculated using the average of a range given by the participant). The figures are not dissimilar so for the purposes of this report using the mode is deemed to be acceptable despite the issue of possible overrepresentation.

The attractiveness levels have been input by the researcher to reflect the qualitative data gathered during the research. The qualitative data gathered suggested that very small levels of community benefit payments would generally viewed as unattractive to the community. The logic for this was that no community benefit payments to the community would be deemed very unattractive as they were hosting the project yet were not getting any benefits. The visual impacts of a solar and wind farm is one example of why communities often develop a hostile attitude to large renewable projects as evidenced by the minutes of Constantine Parish Council (Constantine Parish Council, 2011). It was argued that if communities feel they are being taken for a ride then it would generate actually generate hostility, which may only be partially relieved by a community benefit payment (Devine-Wright, 2004). It is for this reason that the curve is deemed unattractrive at its beginning although how unattractive cannot be clearly defined. The curve eventually crosses over to become attractive at around the 4% mark and proceeds to become very attractive at the 50% mark. The arrows on the graph are included to highlight the uncertainties surrounding this illustration. The exact shape of the curve will vary in individual circumstances but its aim is merely to illustrate that token community benefit payments are unattractive to the community if they are very low and that the relationship between attractiveness to the level of community benefit payment is not a linear one.

Table 17: Citations of community benefit payment figures

INDIVIDUAL CITATIONS

Interested party	0%	1%	2%	3%	4%	5%	8%	9%	10%	12%	20%	50%
WREN				1	1	1	1		2	1	1	
Private Sector		1	2			1		1	2	1		
Academic					1		1		1	1		2
Intermediary				2								
Local Government						1			1			
Number of participants advocating for X% share of profits	**0**	**1**	**2**	**3**	**2**	**3**	**2**	**1**	**6**	**3**	**1**	**2**

Number of Citations

CUMULATIVE CITATIONS

Interested party	0%	1%	2%	3%	4%	5%	8%	9%	10%	12%	20%	50%
WREN				1	1	1	1		2	1	1	
Private Sector		1	2			2		1	4	2		
Academic					2		2		5	3		2
Intermediary				3								
Local Government						3			6			
Attractiveness of community benefit payments	(4.0)	(3.5)	(3.0)	(2.0)	-	1.0	2.8	3.2	3.5	4.0	5.0	9.0

Cumulative Number of Citations

Appendix 4: Community benefit and returns on investment calculations

The calculations for the community benefit payments were calculated using information sourced from participants and information found on the internet as indicated in table 18a and 18b. Information was sometimes in different forms so data sourced from The Times regarding typical community scale solar and wind projects was used to convert it into £/MW installed. The data gathered was cross-referenced where possible with other sources from the internet and information provided by participants interviewed to further ensure its reliability. On this basis the data is deemed to be fairly accurate if not precise. The data largely relates to the South-West and Scotland so it must be treated with caution. Every project is specific in its own right but the findings give a good overview of the issues that the analysis raises.

Table 18a: Case study community benefit payments

Case studies	Wind - £/MW installed	Solar - £/MW installed	Source
Penryn (South Cornwall)	-		Interviewee
Davidstown (North Cornwall)	2,000		Green Wind Trust
Fullabrook (North Devon)	2,500		Green Wind Trust
Goonhilly (South Cornwall)	4,000		Green Wind Trust
High speed wind projects in Scotland	4,000		Green Wind Trust
Hawkies (North Cornwall)		4,000	WREN
Polmaugan (South Cornwall)		7,000	Cornwall Council
Lanhydrock (South Cornwall)		7,000	Foresight, Cornwall Council
Wadebridge - Solar allotment		20,000	WREN
Green Wind Trust	30,000		Green Wind Trust

(Source: Cornwall Council, 2010, Foresight Group, 2010, Green Wind Trust, 2010)

Table 18b: Times Data for a typical community scale solar and wind farm

5MW Solar farm returns - Times Data	Units (£/%)
Total cost of development (£)	15,000,000
Minimum annual return (%)	8%
Annual profit (£)	1,200,000
Annual profit per MW/year	240,000
Community fund contribution (£)	100,000
Community fund contribution MW/year	20,000

4MW Wind farm returns - Times Data	Units
Total cost of development (£)	
Minimum annual return (%)	
Annual profit (£)	1,000,000
Annual profit per MW/year	250,000
Community fund contribution (£)	120,000
Community fund contribution MW/year	30,000

(Source: The Times 2010, 2008)

To work out the split of returns the individually sourced data from case studies was translated into percentages and £/MW/year using the Times data to ensure consistency. A typical return on investment of 8% - 12% was hypothesized having investigated the subject (confirmed by individual participants as a reasonable estimate). This figure was used in the split of return and comparing investor's returns graphs in order to illustrate what both parties would receive if profits were shared equally on this basis. The data used to compare investor and community returns can be found in table 19.

Table 19: Comparing investor and community returns for community scale solar and wind farms

Split of Returns	£/MW/yr - Wind	£/MW/yr - Solar	Commercial developer share of wind profits	Community share of wind profits	Commercial developer share of wind profits	Community share of wind profits
Commercially owned RE project (no community benefit payment)	250,000	100,000	100%	0%	100%	0%
Token community benefit payment	2,000	2,000	99%	1%	98%	2%
Typical community benefit payment	4,000	4,000	98%	2%	96%	4%
Local Authority advised best practice community benefit payment	7,000	7,000	97%	3%	93%	7%
WREN negotiated community benefit payment	30,000	20,000	88%	12%	80%	20%
Commercially developer profit (less 8% community benefit payment)	230,000	92,000	92%	8%	92%	92%
Commercial developer profit (less 12% community benefit payment)	220,000	88,000	88%	12%	88%	88%
Part ownership by the community			50%	50%	50%	50%
100% community owned project			0%	100%	0%	100%

Appendix 5: Specific policy recommendations

Table 20: Specific policy options

Specific policy options	Logic
Community FiT, RHI, Green Deal initiatives	Allow communities to benefit from the transition to a low carbon economy
Don't run the Green Deal solely through the incumbent utility companies	Allow space for communities and local businesses to innovate → retention of economic benefits in the local area and enables the training up of local capacity
Energy reduction FiTs	Could provide a more accessible revenue stream for communities who are not blessed with other natural resources
Low interest loans	Give communities access to capital which they can then pay back over the life of the project
Opportunities for community energy schemes to keep business rates	This could provide community organisations with more opportunities to invest in more low carbon initiatives
Allow community energy schemes to access CERT funding	WREN could then implement measures across a whole population in a cost effective way that can also be designed to maximise carbon savings
Super tariff for matching generation to use	This will reduce pressure on the grid and may avoid expensive upgrades
Use any underspend in the RO to put towards the FiT pot	Ensures action is happening and will put pressure on utilities to invest
Resolve legal issues regarding solar rent a roof schemes	This will increase the uptake in solar technologies
Encourage the development of a revolving finance model that invests on a portfolio basis by incentivising investment funds through tax incentives as is done for ISAs and pension schemes	This will increase the supply of capital to the sector and enable communities to raise debt finance Successful projects can then be relied on to finance another round of investments
Encourage community ownership	To ease the planning process and increase general acceptance of low carbon technologies Funds can then be used to invest in other low carbon initiatives in the community, address fuel poverty and finance other locally important schemes
Standardise means of accessing finance	Makes it easier for communities to understand and access finance
Provide funding for management capacity eg £75k per annum	Allows the community to fully explore their potential
Provide better advice – specifically on how to access financial and technical expertise (more funding for energy agencies)	Tailored advice will help identify feasible projects for investment Community Energy Scotland proved that with finding and capacity success stories can become commonplace