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What are the barriers and incentives for community-owned means of energy production and use? ☆

Gordon Walker *

Department of Geography, Lancaster Environment Centre, Lancaster University, Farrer Avenue, Lancaster LA1 4YQ, UK

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ABSTRACT

This paper on community-owned means of renewable energy production and use, reviews experience to date in the UK and the incentives for and barriers limiting current and future growth. A broad view is taken of what the meaning of 'community-owned production and use' might constitute, as there are different models of community ownership, different notions of community and different degrees of connection or disconnection between production and use.

1. Community renewable energy

Community renewable energy has long been advocated, particularly by alternative technology activists, as a way of implementing renewable energy technologies, emphasising themes of self-sufficiency, local determination, engagement and empowerment (e.g. Dunn, 1978; Hoffman and High-Pippert, 2005; Lovins, 1977).

Since 2000, the UK Government has sought to develop community renewable energy through support schemes and funding programmes (Walker et al., 2007a) and has extolled the virtues of community-based distributed energy, including its contribution to economic regeneration, social cohesion and public understanding and support for renewable energy (DTI, 2000, 2006).

Many community renewable projects now exist in the UK. A database constructed at the end of 2004 identified over 500 ongoing or completed projects supported by programmes or initiatives with the word 'community' in their title and/or their rationale.[1] However, by no means all of these projects involve community ownership of the means of energy production. These constituted a small proportion at most of the projects listed.[2] Many different forms of project have been tagged with the community 'label', including those run by local authorities and by local entrepreneurs and organisations under standard institutional and business models. Government support programmes have not prioritised community ownership as a key feature (Walker et al., 2007a; Walker and Devine-Wright, 2008). A recent report by the Rural Community Carbon Network provides further evidence of the growing scale and diversity of local-level activity (Adams, 2008).

2. Models of community ownership and use

Projects that do involve community ownership—through financial investment or managerial control by or on behalf of groups of 'members of the public'—have achieved this to different degrees and in different ways (Stamford, 2004). Projects can be 100% community owned, or may be developed under co-ownership arrangements with the private sector, for example community ownership of one turbine in a larger wind farm. Projects can involve the ownership and financing of energy production that is fed into the grid rather than being used locally, or can combine the locally owned production and consumption of energy (e.g. where heat is produced for direct local use in a community building or a networked group of buildings). Different legal and financial models of ownership have been adopted. These include:

- *Cooperatives*. Baywind is the best known example. It set up the first cooperatively owned wind farms in the UK in the late 1990s, using a model transferred from Scandinavia (http://www.baywind.co.uk/) (Boxer and Harrop, 1997; Tordoff, 2004). People in the local community or further afield become members of the cooperative and buy shares to finance the project.
- *Community charities*. These usually take the form of an association with charitable status that provides or runs facilities for the local community, such as village hall

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* Tel.: +44 1524 510256.
E-mail addresses: g.p.walker@lancaster.ac.uk, Christine.mcdougall@dius.gsi.gov.uk (G. Walker).

[1] See http://geography.lancs.ac.uk/cei/CommunityEnergyUKProjects.htm.

[2] No precise figures are available.

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associations which use renewable energy to heat or power their buildings. Such charities can also have trading arms or community interest companies to provide local services. For example, they can manage energy projects, as with the biomass district heating network in Kielder, Northumberland (Walker et al., 2007b).

- *Development trusts*. These have been particularly used in Scotland to represent communities' interests in revenue-generation enterprises, and in some cases this has been extended to include variants of community ownership.
- *Shares owned by a local community organisation*. The gifting of shares in a commercial project to a local community organisation such as a trust, or in the case of wind farms, the gifting of one of more turbines (as at Earlsburn wind farm in Scotland), has been used as a way of providing a community benefit that is closely tied to the performance of the production unit (CSE et al., 2007). Part-ownership by the community may confer only limited rights to control or to make inputs into decision making.

These different models raise important questions as to who the 'community' is that may own or part-own an energy project. A distinction is often made between communities of locality and communities of interest. The latter refers to groups of people with a common interest but who are not local to each other, such as dispersed investors in a cooperative project (DTI, 2000; Stamford, 2004). Where community is equated with locality (however defined) different models of ownership may be seen as more or less inclusive and collective. For example, investment through share ownership brings benefits only to those able and willing to invest, while community trusts or charities may to varying degrees act in the collective interest of everyone in a defined area.

3. Incentives for community ownership

There is a wide range of possibilities for community-owned energy production, and of practices for implementing it. The incentives for different actors, including individuals, community organisations, local government and the private sector, to get involved vary with the context and form of each project. They include the following:

- *Local income and regeneration*. Community-owned means of production can generate income locally, through returns on investment, the sale of generated energy in the form of electricity or heat, or the creation of employment. Wind farms are by far the most profitable form of renewable energy and have generated proven returns (Bolinger, 2001; Stamford, 2004). Biomass-fired energy projects have also been shown to generate local income, through sales of energy and by providing a market for local wood, agricultural wastes and energy crops (Madlener, 2007).
- *Local approval and planning permission*. There is a widespread expectation, and some evidence (Loring, 2007; Toke, 2005; Walker et al., 2007b), that projects owned or part owned by the community will be more locally acceptable and have fewer problems obtaining planning permission than others (CSE et al., 2007).
- *Local control*. Where projects are managed and controlled by the local community, it will be able to determine such matters as the scale of development, and details such as the siting and orientation of turbines on wind farms. Where it is expected that project development by the private sector is going to take place in the future, actively setting up a community initiative may be seen as a way of maintaining local control (Dunning and Turner, 2005).
- *Lower energy costs and reliable supply*. Groups responsible for community buildings typically use renewables because they can provide heating more cheaply and reliably than the alternatives, particularly if grants can be obtained for upfront capital costs. This incentive operates particularly in rural areas where mains gas is unavailable. But the cost-effectiveness of renewables can be problematic, particularly if significant infrastructure costs are involved.
- *Ethical and environmental commitment*. Many of the individuals involved in leading projects such as Baywind and later cooperatives have been driven by ethical and environmental commitment to locally owned, sustainable energy generation (Hinshelwood, 2001; Walker et al., 2007a). Such drivers are also important for public and private sector bodies which have environmental and social responsibility policies.
- *Load management*. The deployment of large-scale renewables is creating various problems for the electricity network. Smaller-scale projects, it is claimed, avoid some of these issues. If they closely match the existing load in an area they can defer expensive upgrades and extensions of the network, create islands of security during grid outages, and contribute to voltage stability (Hain et al., 2005; Strbac et al., 2006).

4. Barriers to community renewable energy

Establishing a community energy project involves many complexities, whichever model of development is adopted. These include the legal conditions under which organisations or projects can operate, establishing a scheme's economic and technical viability (Dunning and Turner, 2005) and the need for extensive liaison (Hinshelwood, 2001). It is essential to have expert advice and support and to learn from previous experience (Adams, 2008; Walker et al., 2007b). The Community Renewables Initiative (CRI) managed by the former Countryside Agency in England played an important support, handholding and networking role. The decision in 2007 not to renew its funding leaves a gap at a time when it was reporting an almost overwhelming demand for its services. Community Action for Energy has a networking and information provision role, but lacks the regional support structure of the CRI. By contrast, the funding support provided by the Scottish Community and Household Renewables Initiative (SCHRI) has been expanded, and combines active support with capital funding.

While wind farms have achieved a clear commercial viability which helps to enable community ownership, other forms of renewable technology are less economically viable, with higher risks and longer return periods to recoup the upfront investment (Hain et al., 2005). This has called for subsidised capital funding, which has been available from a range of schemes. These include Clear Skies, now replaced by the phase 2 stream of the Low Carbon Building Programme (LCBP), SCHRI in Scotland, the Energy Savings Trust Photovoltaics programme, Community Energy and the Bio-energy Capital Grants Scheme, for District Heating. Some projects have also been able to source funding from local and regional regeneration grant programmes. Competition for funds can be very high, funding often has to be stitched together from different sources, and there has been much instability in funding programmes. For example, in 2007, the LCBP closed its phase 1 community funding stream at short notice to transfer funds to the oversubscribed householder stream (Renew, 2007). In the longer term, the costs of keeping systems maintained may become significant and problematic unless an adequate income stream is being generated.

Apparently similar communities can have different capacities to take on the responsibilities of a renewable energy project. Experience has shown that key committed individuals or entrepreneurs can be essential to success, as are supportive local institutions of various forms (Walker et al., 2007b). The cooperative wind turbine project at Bro Dyfi in Wales, for example, was led by people with a history of grassroots work connected to the nearby Centre for Alternative Technology, providing distinctive expertise that is not readily available elsewhere. Regional support workers have observed that, while some community organisations may take up new ideas and initiatives enthusiastically, others can be reluctant to become involved (Walker et al., 2007b). The long-term capacity of community organisations to keep systems maintained and operating efficiently, and the liabilities this involves, may also be an issue, particularly where knowledge and skills dissipate after the initial period of installation.

In common with microgeneration projects in general, community projects can struggle to realise their income-generating potential because of various barriers to market entry and network connection (Hain et al., 2005). These have been discussed in detail by Watson et al. (2006). They include the lack of incentive for network operators to connect to small generators (now partly addressed by Ofgem), the costs of trading, and the difficulty of obtaining access to green energy certificates. The lack of market incentives for heat production has been highlighted by Owen (2004). There are also barriers to the setting up of local heat networks. They require collective management, billing and metering arrangements that are unfamiliar in a British context.

Although community energy projects are generally expected to find it easier to gain planning permission than schemes proposed from the outside, things do not always work out that way. This is demonstrated by the Awel Aman Tawe community wind farm project in Wales. It was initiated by a local charitable organisation with all profits to be ploughed back into local regeneration projects (http://www.awelamantawe.org.uk/), but was refused planning permission by the local authority in 2005, with the decision upheld at appeal in 2006. Community projects can also become controversial locally, particularly if the extent of real community involvement and benefit becomes an issue (Walker et al., 2007b).

5. Future prospects

Community-owned renewable energy is only one part of wider community renewables activity, which itself is only a very small proportion of renewable energy generation overall. Renewables growth in the UK to date has been dominated by large, developer-led and institution-financed projects. Is this likely to change to incorporate a greater proportion of community-owned projects? In other European countries there is a far more significant level of community ownership. In Denmark in 2001, an estimated 150,000 households owned or held shares in wind turbines (Lauber, 2004), while in Germany an estimated 350,000 individuals owned shares in wind cooperatives (Sawin, 2004). In Austria, biomass district heating projects are now widespread, including some under models of cooperative ownership (Madlener, 2007). There is unquestionably a potential energy resource in the UK that might be tapped by small renewables projects suited to community ownership (DTI, 2006; Hain et al., 2005). But the conditions for this potential to be realised have not been in place and barriers have been stronger than incentives. Future prospects depend upon a number of interlocking factors:

- *The diffusion of recent and current innovations*. A range of models for community ownership are being pursued in the UK and some have been demonstrably successful in enabling 'front runner' projects to go ahead. A key question is the extent to which their success, however measured, can be replicated in other locations and contexts without the initial dynamics of innovation or the involvement of key enthusiasts and social entrepreneurs. Evidence of a process of replication for cooperative ownership models is now emerging. Energy4All was set up by Baywind to support other cooperative wind farm projects and the model has recently been successfully replicated at Bro Dyfi in Wales (through the Renewable Energy Investment Club), Westmill in Oxfordshire and Boyndie in Aberdeenshire. However, progress over nearly 10 years has been relatively slow and it remains to be seen if more rapid diffusion can be achieved. Some have suggested that the UK lacks a cultural history of local cooperative organisation and that it is far more prevalent, for example, in Denmark, where this model has been taken up on a large scale (Bolinger, 2001). But the approach developed by Highlands and Islands Enterprise in Scotland, which has set up a Community Energy Company that provides 'revolving fund security' for community enterprises, shows evidence of successful replication. The company has the objective of 'securing widespread community ownership of renewable energy generating schemes' (http://www.hie.co.uk/community-energy.html). In its first project, it took a shareholding in a small wind farm on Gigha which will be bought out by the Island of Gigha Heritage Trust (a limited company with charitable status) after five years of operation. Similar arrangements have since been set up for other projects. If such initiatives are supported, publicised and rolled out in other places, this model could become widely diffused over the next 10 years. It is particularly valuable for remote communities where diversification and regeneration needs are high, or when rural towns and villages become galvanised around a low-carbon agenda. But while grassroots networks are attempting to promote learning and networking (see http://www.energy21.org.uk/), government-financed support schemes are crucial to larger projects with several phases of development.
- *Market incentives and barriers*. Much policy attention has recently been given to lowering the barriers to small-scale generators entering the supply market (House of Commons Trade and Industry Committee, 2007). It is likely that many of these obstacles will be addressed over the next few years. The Climate Change and Sustainable Energy Act of 2006 has introduced a duty on the secretary of state to promote community energy projects, as part of a range of measures to encourage microgeneration. However, there remains a heated debate as to whether the current policy for supporting renewables, based on the Renewables Obligation, is as effective as it could be. Advocates for feed-in tariffs as an alternative argue that experience (particularly in other countries, including community-owned generation in Denmark and Germany) has shown that they are a better way of stimulating distributed generation (Meyer, 2003). Such evidence suggests that switching the renewables support mechanism in the UK could stimulate significant growth in community ownership. However, the importance of political, economic and cultural factors in other countries has also been stressed. The scope for policies to be transferred easily to the UK has been questioned (Szarka, 2006). There have also been calls for a Renewable Heat Obligation (Royal Commission on Environmental Pollution, 2004), a heat equivalent of the Renewables Obligation for electricity, which could be important for the growth of community-owned district heating networks, and generally for more attention to be given to heat as well as electricity (House of Commons Trade and Industry Committee, 2007).

Pressure is building for such moves and new policy initiatives are likely to take over the next few years.

- *Developer incentives*. Some developers are starting to engage in innovative co-ownership models as they recognise the need to address the imbalance between the local impacts and benefits of project development. If co-ownership proves productive in helping to secure planning permission, particularly for wind farms, it could become more widespread as standard industry practice. Local authorities could also encourage co-ownership. In Scotland, Argyll and Bute Council has set up strategic partnerships with renewables developers to maximise what it terms the 'long term socio-economic benefits to the population' of the region. The recently revised national planning policy documents PPS22 in England and TAN 8 in Wales direct local planning authorities to foster and encourage community involvement in renewables. However, proposed legislative changes to the planning regime for large-scale projects over 50 mW in capacity are likely to reduce the incentive for developers to engage more closely with local communities as decision making becomes centralised.
- *Cost-effectiveness*. Advances in the commercial viability and costs of small-scale technologies that do not currently break even without subsidy will be crucial to longer term viability of community ownership, particularly where models are based around generating a return to community investors or trust funds. If we are to see cooperative hydro, biomass or solar projects along the Baywind model for wind farms, considerable improvements in project economics will need to be made. A recent study by the Energy Savings Trust is optimistic in this regard and anticipates significant improvements in the performance and cost-competitiveness of micro-scale renewables over the next 10–25 years (Energy Savings Trust, 2005). While improving the performance of each of these technologies is important, so are shifts in the wider market context. A recent Select Committee report concluded that 'if costs fall, and/or prices of energy from other sources rise, and certain government interventions are put in place, local energy could contribute a sizeable proportion of the UK's energy mix in the long run' (House of Commons Trade and Industry Committee, 2007). For the moment, capital funding programmes are helping to overcome the high up-front costs that are often involved in a renewable energy project, but these are not expected to be sustained indefinitely. An additional stimulus and source of funding could emerge from carbon offsetting. While many of the carbon reduction projects being supported by carbon offset funds are in developing countries, community projects in the UK could also be seen as having both clear 'additionality' and secondary social and economic benefits. This could provide an additional funding stream to support various models of community ownership.
- *Urban implementation*. Nearly all of the activity in community renewables generally, and community ownership in particular, has taken place in rural areas. Part of the key to wider diffusion is to involve urban environments and populations. Wind, biomass and hydro are generally less viable in urban settings, but building-mounted solar, combined heat and power (CHP) and district heating networks are potentially more viable. While urban communities are typically less clearly defined and, arguably, less collectively organised and cohesive than rural ones, there may be models of collective ownership that are better suited to urban environments. The Castlemilk urban wind farm project in Glasgow, managed by a community trust, is an innovative example (http://www.powerpeople.org.uk/about). One idea is for renewable energy generation to become a standard part of urban regeneration initiatives, with community ownership providing economic and social returns as in rural areas, and linking to objectives for the reduction of fuel poverty. The growing use of obligations on developers to generate a proportion of their energy from renewable sources in new-build developments over a certain size could also be significant (e.g. the 'Merton rule'; http://www.themertonrule.org/). Most such obligations to date seem to have involved private sector projects, but could also apply to community buildings of various forms for which community-owned initiatives would be appropriate.

These factors suggest that coming decades could see more community ownership of renewables, particularly smaller-scale wind power in rural areas, and other renewables in both rural and urban environments. However, few observers are realistically envisaging a wholesale decentralisation of the energy system along the lines of the 'Grid 2.0' advocated by the Green Alliance (Willis, 2006). Most agree with the House of Commons Trade and Industry Committee (2007) that 'at best only incremental growth in local energy production' is being predicted. Present government policy, except in Scotland, is not especially supportive of community ownership and is continuing to resist feed-in tariffs, which some see as the key to the significant growth seen in other European countries. However, pressure to engage society more widely in carbon reduction, and the likelihood for future instability in energy markets, could be important drivers for more locally controlled and owned models of energy generation, and for shifts towards more concerted policies of support.

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