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Sue Baines
Manchester Metropolitan University

Chris Fox
Manchester Metropolitan University

Tamara McNeill

Lynn Martin
Anglia Ruskin University

SATISFACTION WITH DEMOCRACY IN PERSPECTIVE: ANCHORING TODAY BY LOOKING BACK AND FORWARD

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Authors
Sue Baines is Professor of Social Enterprise in the Policy Evaluation & Research Unit, Department of Sociology, Manchester Metropolitan University, UK. Her research interests span entrepreneurship, social enterprise, social innovation and the reform of public services. She has led many research and knowledge exchange projects on these topics.

ORCID no. 0000-0002-3859-9448
e-mail: s.baines@mmu.ac.uk

Christopher Fox is Professor of Evaluation and Policy Analysis and Director of the Policy Evaluation and Research Unit at Manchester Metropolitan University, UK. He has led many evaluation and research projects in policy areas including criminal justice, public service reform and social investment. His current research concentrates on innovation in the delivery of public services and the role of evidence in policy and practice.

ORCID no. 0000-0003-1931-2058

Tamara McNeill is an Impact and Evaluation Manager at The Open University, UK. She has over 15 years of experience in the private, public and university sectors. Her areas of expertise include project and programme evaluation, research and strategy development for urban planning and regeneration, and research into small firms, business growth and entrepreneurial learning.

ORCID no. 0000-0002-1880-5419

Lynn Martin is Professor of Entrepreneurship and Innovation in the Faculty of Business & Law at Anglia Ruskin University, UK. Her research involves identity work in technology, innovation and entrepreneurship, with recent publications exploring gender and identity in innovation and entrepreneurship.

ORCID no. 0000-0002-3608-1434

Abstract
This paper makes a novel contribution by turning an 'asset' lens onto social and technical innovation in the context of the small-scale generation of renewable energy. The authors draw on learning from an international project that aimed to develop innovative technologies for the micro generation of energy using wastes and residues. Variations on innovation that cut across the social and technical are introduced. It is noted that although emanating from different traditions, a common theme is emphasis on a distributed knowledge base in which the roles of innovator,

producer and consumer overlap or merge. This implies that the (social) innovation process is also one of co-creation. The authors borrow from international development studies the Sustainable Livelihood Analysis (SLA) framework, which is usually used for working with poor households to foreground strengths and resources rather than needs and deficits. To illustrate the utility of SLA for social innovation at local and community level, findings are presented from UK fieldwork on socio economic barriers and opportunities affecting the feasibility of new community energy generation and enterprise options. The importance and the fragility of human assets are highlighted.

Keywords: social innovation; sustainability; Sustainable Livelihood Analysis; co-creation; unpaid work

Introduction

Climate change, dependence on fossil fuels, and fuel poverty are among the 'wicked' problems that defy tried and tested solutions or easy consensus (Hulme, 2009; 2020). They demand innovation, but not in ways limited to technological advances. Innovation is a multi-dimensional concept that refers to the implementation of new ideas, processes and products (Committee of the Regions of the European Union, 2015). Social innovation is explicitly about addressing human needs (Marques et al, 2017). It denotes novel, effective, sustainable, and just solutions that benefit society as a whole (Phills et al. 2008). Much recent literature on commercial innovation foregrounds the active contribution of the consumer. This is reflected in social innovation, recognising the roles of innovator, producer and consumer as overlapping and merging (Willis, 2006; Grimm et al, 2013). In other words, the social innovation process is also one of co-creation (Voorberg et al., 2015; Fox et al, 2021).

The context of this paper is small-scale renewable energy in the UK. Renewable energy is a term that covers "a diverse and still evolving set of hardwares that … can be implemented at markedly different sizes – in terms of both physical form and energy generating capacity" (Walker and Cass, 2007: 459). Market frameworks and legal structures in the UK have tended to favour large, developer-led and institution-financed projects (Brummer, 2018). Yet the 1990s saw the emergence of small, decentralised energy generation projects and although the term 'community' was often deployed rhetorically, research demonstrated that many were "to some degree local and collective" (Walker and Cass, 2007: 461). In the 21st Century, community-led projects and community-owned energy generation expanded to become a small but growing part of an independent sector (Morrison and Ramsey, 2019).

This paper makes a novel contribution by turning an 'asset' lens onto social and technical innovation in the form of co-created initiatives intended to deliver on ambitions for local, small-scale generation of renewable energy. It poses the research question of what assets (or kinds of asset) are needed to help communities and their enterprises succeed in advancing renewable energy? We adapt a framework inspired by the theme of sustainability and by recognition of small-scale entrepreneurship as typically a matter of securing opportunities at the boundary of the market and the household (Baines and Wheelock, 2000). We borrow from international development studies, particularly the Sustainable Livelihood Analysis (SLA) framework, which is usually used for working with poor households in the global south to foreground strengths. The paper proceeds as fol-

lows: we first review various notions of innovation, and then explain the relevance of the Sustainability Livelihood Approach regarding that subject. We then report data collection involving a series of ten case studies undertaken in England and Wales as part of a larger international research project with a mainly technical focus. There follows a summary of the cases with detailed presentation of two of them illustrated by interviews and observation. Through an SLA lens, we examine how the case study initiatives succeeded or failed in advancing local renewable energy. Finally, the conclusion reflects on the asset-based perspective and emphasises in particular how it illustrates the importance and fragility of human assets.

Social Innovation and co-creation

An innovation is described as social innovation if it meets one or more common goals (Mumford, 2002). Nicholls et al (2015:1) describe the idea of social innovation as "fluid and diverse". It has roots in various traditions including but not limited to commercial and technological innovation (Grimm et al, 2013). Social innovations in all their diversity aim to satisfy basic needs, to transform social relations, and to increase people's assets and capabilities (Moulaert et al. 2013; Moulaert and MacCallum, 2019). Examples of innovation that encompass the intersection of the social and technical include grassroots innovation, frugal innovation, open innovation, and innovation in governance. Open Innovation proponents contend that commercial companies developing innovative products need to look beyond their R&D departments to multiple external sources of knowledge including their customers (Chesbrough 2011). Open Innovation 2.0 emphasises the importance of collaboration in the 'quadruple helix' (industry, government, universities, and communities) to co-create shared value (Curley, 2016). Frugal innovation reacts creatively to limitations in resources (Bound and Thornton, 2012). Innovations in governance "burst the boundary' of a single organisation's hold on a complex problem" (Moore and Hartley 2008: 15). Grassroots innovations respond to local situations with multiple stakeholders coming together to develop new ideas and practices (Seyfang and Haxeltine, 2012).

All these socio-technical versions of innovation, although emanating from different traditions, have in common an underpinning knowledge base that is "complex, expanding and dispersed" (Berglund, and Sandström: 279). In commercial contexts, the customer is increasingly perceived as contributing to (or co-creating) value. Co-creation within online brand communities, for example, has seen the status of the client shift "from being a customer to a producer and actor" (Cherif et al., 2013: 14). In the public service realm, co-creation has rapidly reached the status of orthodoxy (Osborne et al., 2016). There are varying definitions in relation to public services and co-creation (Voorberg et al. 2015). Nevertheless, there is a common thread in foregrounding legitimate knowledge and assets of people more traditionally seen as passive recipients, beneficiaries or 'service users' (Torfing et al., 2019; Brandsen et al, 2018). Co-creation is intrinsically related to asset-based approaches in which people exercise agency (Fox et al., 2021).

In the context of energy, co-creation aligns with claims that its users need to be reinterpreted not as mere consumers but as active participants in climate change and carbon reduction. Willis (2006: 13) adapted Zuboff and Maxmin (2004) to energy consumption: "individuals can no longer be written off as anonymous consumers who sit at the far end of the value chain, devouring the value created by managers". This is broadly consist-

ent with research evidence on various factors in success and failure for local renewable energy initiatives. Community-based champions (who sometimes identify themselves as 'social entrepreneurs') can generate, coordinate, and communicate action (Allen et al., 2012). Income can be generated from many activities along the supply chain (van der Horst, 2008). Civil society groups can animate innovation in experimental local projects (Seyfang and Haxeltine, 2012). Overall, the evidence points to a fundamental distinction between communities as passive targets of energy interventions and as active participants (Devine-Wright and Devine-Wright, 2009; Allen et al. 2012). This perspective dovetails with studies of technological innovation on the efforts of end users to make new technologies function and become embedded in everyday practice (McLoughlin et al., 2012). With these dimensions of innovation and co-creation (social and technical) in mind, we can now investigate further the kinds of assets that may (or may not) exist within communities to support new renewable energy initiatives.

Sustainable Livelihoods

Sustainable Livelihoods Analysis (SLA) is informed by Sen's (1985) influential concept of capabilities, in which the financial, social and human capital available to the individual (or household) are seen as assets forming the basis for capabilities, leading in turn to functioning and thereby to well-being (Oughton and Wheelock, 2003). SLA is mainly used at household level but can be applied to household clusters, villages, regions or even nations (Scoones, 1998; 2009). The international NGO Oxfam deployed SLA to conduct household and community (May et al, 2009). It has been adapted to assess and inform responses to austerity on the part of small voluntary organisations in the UK (Davidson et al., 2014). Very importantly for the social innovation angle, SLA defines capabilities as including innovating and experimenting as well as gaining access to information and services while also finding and utilising livelihood opportunities (Chambers & Conway, 1992).

The sustainable livelihoods approach divides assets into five categories, or capitals: human, social, physical, financial and natural (Chambers & Conway 1992). Later versions which were adapted to developed countries added public assets and removed or de-emphasised natural assets (May et al., 2009). In the context of renewable energy, clearly natural assets are important. A Sustainable Livelihoods Analysis should "build up an understanding of the power dynamics underlying the different aspects of people's lives [and] value what is often undervalued and invisible, for example non-financial assets" (May et al 2009:5). **Physical assets** are tools, equipment and infrastructures (housing, transport and technology, such as broadband for access to information). **Natural assets** refer to soil, the weather, livestock and crops. **Financial assets** for households are wages, business income, pensions, savings, cash transfers, benefits, and credit facilities. **Public assets** are access to public services, support and infrastructure organisations. Financial assets are closely interlinked with public assets in the form of confidence (or lack of) in the stability of publicly funded subsidies and incentives. Other public policy aspects include regulatory frameworks, for example for energy production or the treatment of waste. **Human assets** refer to skills, good health, physical capability and enthusiasm, as well as time (which may or may not be remunerated). In order to comprehend this, it is beneficial to think how people produce, exchange and distribute value beyond(as well as within) waged labour and market exchange (Folbre 1994). Such alternative economic spaces include mutual aid,

self-provisioning and community activism (Gibson-Graham, 2006). Small-scale entrepreneurship can be heavily reliant upon unpaid resources, especially from family members (Ram and Holliday,1993; Baines and Wheelock, 2000). In other words, household endowments are often critical to the enterprise (Oughton and Wheelock, 2003).

How entrepreneurs minimise costs and expand resources in ad hoc ways (such as sharing equipment or accessing gifts or loans from within the family) has been called "bootstrapping" (Jones and Jayawarna, 2010). A related perspective is entrepreneurial "bricolage", which is defined as making do with many kinds of resources to hand (Baker and Nelson, 2005; Fisher, 2012). Typical examples of bricolage include accessing free labour inputs from family, friends and even customers. Di Domenico et al (2010) in the context of social enterprise added the notion of social bricolage, referring to the construction of relationships with community stakeholders. Bricolage can also involve repurposing discarded materials by turning them into physical assets. Developing and utilising innovations in communities often involves links between state agencies, community activists, and businesses. For community groups and businesses **Social assets** (or social capital) relates to ties, bonds, relationships and networks that can be galvanised to access support. "Social bricolage" referred to above under human assets also involves seeking to influence more powerful stakeholders such as policy makers as well as working locally (Di Domenico et al., 2010). Having deployed SLA to identify the different kinds of assets that may be present in communities and their enterprises, we now turn to our research question. We consider how such assets may combine to help innovations in renewable energy succeed in the context of local community initiatives in the UK.

Local innovation case studies illustrating an asset perspective

Rural Hybrid Energy Enterprise Systems (RHEES) was an international technology project, funded under a UK-Indian collaboration entitled *'Bridging the Urban and Rural Divide'*, from 2012 to 2016. RHEES technical teams developed small-scale energy generation systems making innovative use of wastes and residues in India and the UK. This paper is concerned only with the UK context. As part of a 'community and business enterprise' theme within RHEES, three of the authors undertook a series of ten case studies of small-scale community renewable energy in England and Wales.

Case studies are widely used in social research to investigate contemporary phenomena within their real-life context (Yin, 2003). The case study is sensitive to context, detail and complexity through "rich dialogue between ideas and evidence" (Ragin, 1989: 52). A case study is better understood as an approach than a method and can encompass multiple, complementary forms of data collection (Stake, 1995). The selection of UK case studies in RHEES was purposive, intended to maximise what could be learned (ibid.). Following discussion across the wider RHEES project team, we were guided in case-study selection by the coverage of different technologies, the typology of 'scale' (household, farm, community and industrial) proposed by Walker and Cass (2007), and developmental status (planned, in progress or completed). In the first instance, we developed a list of potentially appropriate renewable energy initiatives through reference to the websites of, and discussions with, trade organisations, funding bodies and national and regional programmes. To be confident of capturing perspectives of multiple stakeholders required a flexible approach, so we also used 'snowballing': contacting projects on the recommendation of re-

spondents where it seemed likely they had power to extend and deepen our understanding as data collection and analysis proceeded. Due to the value of learning from failure and set-backs as well as the successes which are often celebrated, we included instances where planning had extended over a long period of time without leading to implementation, or even been started and abandoned.

Our data collection for the case studies comprised site visits and interviews (audio recorded and transcribed) with key informants who were leaders of the local energy projects. In addition, we undertook analysis of copious documentary material (e.g. newsletters, websites, reports, feasibility plans). Eleven informants (from five case study sites) also participated in a workshop in London after the interviews. In the first instance, we used the workshop to communicate preliminary research findings and gain feedback on emerging themes and theories. In this way the event served to provide a type of member check as suggested by Lincoln (1995) to help ensure credibility in qualitative research. Organising the event (fully funded through the project) also enabled us to give something back to participants, bringing people together and providing the opportunity for new connections, shared experience, and learning. The case study sites were concentrated at the community and farm 'scales'. The smallest (in terms of energy generated) belonged to one household but with neighbourhood sharing of inputs and outputs. The largest was essentially a rural industrial plant with very strong community ties and support. Data analysis proceeded through the study of transcripts, along with field notes and documentary material, to agree a set of themes. Initially, the emphasis was mainly on how resources were identified and assembled but analysis remained open to emergent themes from the data.

A list of case studies is provided in Table 1. For each, it denotes a descriptive pseudonym, an indication of 'scale' (according the typology of Walker and Cass, 2007), a brief note on the context, and developmental status. In this paper, we concentrate on presenting just two cases in some depth while making briefer references to others. We do this in order to share within the confines of a short paper some of the rich details of events, experiences and practices that constitute case studies, and to avoid the danger of erasing detail by over summarising. The focal case studies are one farm-based (*Organic farm Anaerobic Digestion*) and one community-based (*Hydro Social Enterprise*). We have highlighted them due to their involvement of different technologies and their representation of opposite ends of the spectrum from success to failure. Their details can be seen in boxes 1 and 2.

Table 1. Local energy UK Case studies

Case	'Scale'	Context	Developmental status
Mini Anaerobic Digestion demo	Household	Household with neighbourhood	Installed and working
Organic Farm Anaerobic Digestion	Farm	Farm with educational resource centre	Installed but halted
Gasifier	Farm	Farm with visitor attraction	Installed and working

Case	'Scale'	Context	Developmental status
Biomass District heat	Community	One village (27 households)	Installed and working
Canal side Anaerobic Digestion	Community	Urban nature park	Installed and working
Sustainable Housing Anaerobic Digestion	Community	Urban 'village'	Planned but abandoned
Zero carbon community	Community	One village	In planning: Various energy saving activities and community-run AD proposed
Off grid village	Community	One village	In planning: Community owned renewable energy power station
Hydro Social Enterprises	Community	Several villages	Installed and working (hydro) AD planned but abandoned
Brewery Anaerobic Digestion	Industrial	Business in community	Installed and working

In SLA terms, the trustees of *Organic Farm AD* wanted to improve the financial capital of the resource centre by assembling new combinations of physical and natural assets (see Box 1). The husband and wife consultancy team (trustees who lived on the farm and led the AD project) secured government funding and managed the installation and initial operation. Soon after the grant was announced, it was reduced by about ten per cent. Together with payment timing issues, this set-back came close to prematurely ending the project. One of the trustees, a former County Council employee, negotiated a short-term loan from the County Council. She told us, "I could go in at a senior level and talk to people at a senior level". In other words, a shortfall in financial assets was addressed successfully by activating local knowledge, networks and resources (social assets) which included vital links to a public body with power to intervene (public assets using social bricolage).

We visited the *Organic Farm AD* site shortly after installation when the digester was operational but not at full capacity. There had been a technical set-back, the consultants stating this "teething problems" and attributed to low grass yields following a very wet winter (natural assets). One of the consultants explained, "we had done…an awful lot of modelling of worst case scenarios but we didn't predict the worst case scenario of the wettest year for a hundred years!" An electrical grid connection had been installed, with the intention of electricity exports to the national grid once these technical issues were resolved. Since then, the plant was temporarily closed down. Similarly *Biomass District heat* also experienced an unwelcome surprise after installation of a technology (a biomass

boiler) that was new of its kind. The cost of powering the system only became apparent after installation. Albeit to a lesser extent than *Organic Farm AD, Biomass District Heat* proved to be a learning experience for the suppliers and the community.

The *Organic Farm AD* consultants invested considerable time on a voluntary basis to develop the project proposal and secure the funding, in addition to their paid role as project managers. Unpaid time was a theme echoed in other cases and it was not unusual, as in Organic Farm AD, for the same people to undertake both paid and unpaid roles. At *Canalside AD*, for example, a project leader told us, "the people who are involved with the project by and large are just keen to see it move forward so we don't have to pay them for every single hour that they are working on it". The amount of unpaid work needed was too demanding for some participants and this was given as, at least in part, an explanation for renewable projects that stalled after initial enthusiasm. We were informed that *Sustainable Housing AD* failed to progress because no community champion stepped forward. "I can put time into projects", observed the social entrepreneur who had attempted to gather support for it, "but I need to see on the horizon that there is some income to be generated there".

Although the consultants who led *Organic Farm AD* were extremely welcoming and generous with their time when we visited, they did not respond to further requests for contact or the invitation to attend the workshop. Reference to the AD disappeared from their website. We heard informally from a third party that they had made a non-disclosure agreement with the technology supplier but were not able to verify this. As indicated above, innovations often fail, and it is important to learn from those that do not fulfil their promise.

Box 1. *Organic Farm Anaerobic Digestion*

Organic Farm AD was situated within an organic resource centre in the north of England, originally founded in 2000 with a mission to promote sustainability and biodiversity, mainly through educational services. The resource centre, located on a 200 acre farm, is constituted as an Industrial and Provident Society governed by trustees. Two other businesses, an organic produce business and a renewables consultancy share the site. As a result of cuts in public spending that followed the financial crisis of 2008, the resource centre trustees looked to secure longer-term financial sustainability and began to investigate renewable energy options including solar, hydro and wind to generate income. They rejected solar on principle because of doubts about its sustainability and other options proved unsuitable for the local conditions. They did not initially consider AD as they assumed it was a large-scale technology but became aware that there were digesters on the market at the 50 to 75 kilowatt scale that would fit with the farm's size and available feedstock. AD is a natural process in which micro-organisms break down organic material in an airless environment. Often explained as a similar process to that which takes place in the stomach of a cow, AD produces biogas (a mixture of methane and carbon dioxide that can be burned to produce both heat and electricity), plus 'digestate' containing plant nutrients and organic humus. The technological process has been around for many years to treat sewage sludge and large-scale plants are common in the UK, for example to process municipal waste. AD also became recognised for potential to meet renewable energy needs (DEFRA, 2011). It was a highly attractive option for the resource centre because, in the words of one of the consultants, "you can take grass and a bit of poo and turn it into both electricity and heat….in a rural area everybody has got grass and everybody has got poo!" (natural assets). They successfully secured finance by preparing and winning a competitive bid for a government grant to develop and build a 50kw digester.

In contrast to *Organic Farm AD* and most other case studies, *Hydro Social Enterprise* did not receive public funding. Indeed, as its founder explained to us when we visited, its

relationships with the public sector are uneasy. There had been some conflict with local government, in particular tensions over the leasing of sites for communities to develop as physical assets. In the view of one of the founders, local authorities are "very un-co-operative and selfish". There was nevertheless a local authority Service Level Agreement for consultancy that contributed to the CIC's income **(public assets; financial assets**). The evaluation commissioned by the charitable foundation of its beneficiaries reported the creation of new businesses by *Hydro Social Enterprises* to generate income as one of the most successful innovation -models of the projects they had funded. They praised it for recycling profits from community-owned energy supply to support further low carbon/sustainable living activities. While the founders were proud of this achievement, they were keen to enhance democratic accountability by creating links with local democracy in community councils. The issue they brought to the workshop was that it would be much better if the community council were the drivers and owners of community energy schemes but they "don't see it as their role and don't want to take the risk". How, they asked, do we get community councils to take forward community energy projects?

Box 2. *Hydro Social Enterprise*

> *Hydro Social* Enterprises was established in south Wales following the winning of a competition funded by one of the UK's big six energy companies and a charitable foundation. From the outset, the winners sought to develop a financially sustainable organisation to enable support for local communities, rather than simply to fund short-term projects. Governance is through a regional steering group registered as a Community Interest Company (CIC), made up of volunteers with a wide range of skills and knowledge (human assets). Micro hydro is the primary technology in this case, depending on the natural asset of fast running water. The CIC established, and wholly owns, a small business providing design and development services to its member organisations, and to external customers. Profits return to the CIC to support its work. In addition, the CIC has invested in another start-up business which engineers micro-hydro units and supplies the various schemes in which the CIC has an advisory role or interest. As with the design and development business, this is a wholly commercial enterprise. Hydro Social Enterprises involves various income streams and associated stakeholders (financial assets and social assets). The steering group had become very excited by the possibility of an AD installation but their plans to advance this were abandoned when one key partner – a landed estate – decided to withdraw. At the outset, the focus was on energy generation and carbon reduction but the scope of activity expanded and supports a wide range of community projects including local allotments, a woodland management scheme and community litter picking. The litter picking – undertaken by volunteers – also became revenue generating by providing litter picking services for events.

Hydro Social Enterprise is less technologically innovative than the cases involving waste biomass such as *Organic Farm AD* and *Canalside AD*. Social innovation is prominent in the highly complex 'value constellation' underpinning its business model (Yunus, 2010). There is evidence of learning about enrolling diverse stakeholders and managing complex organizational forms to support utilisation of renewables to generate social change. *Organic Farm AD* was a more exploratory, innovative and risky technical project, given the developmental nature of affordable AD technology in the UK at this size. The suppler of the digester was a start-up business implementing this new technology. In effect, *Organic Farm AD* a was a (social) enterprise with volunteer support **(human assets)** enabling (and even subsidising) innovation and technological development in the renewable sector.

In summary, key findings from across the case studies were:

- The technologies were made to work in situ after development, purchase and installation by the combined, ongoing efforts of participants (**physical assets; natural assets; human assets)**. Throughout the case studies, there were strong elements of learning from experience, especially where the technology involved was relatively new and untried (**human, social and physical** assets). Learning about organisation and stakeholder engagement also took place (**human and social assets**).
- All the evidence from the case studies testifies that renewable energy at local level is supported with substantial contributions of volunteer time, drawing deeply on locally available skills, experience and contacts, as well as willingness and capacity to work unpaid **(human assets**).
- There were many varieties of collaboration involving social enterprises, community groups, charities, for-profit businesses and the public sector (**social assets; financial assets; public assets**). This is consistent with evidence that at local level, social innovations are more likely to be located in a network than in a single organizational unit (Brandsen et al. 2016).

Discussion and conclusions

As a social science team within a technically driven project, we sought to understand how, for what purpose, and with what results new renewable energy technologies could be configured and combined with enterprise (very broadly defined). We have begun to build upon extant research with new evidence to advance understanding of kinds of assets (encompassing income generation, stakeholder relations, and governance) through which a community might move towards capabilities for socio-technical innovation.

Co-creation in the context of socio-technical innovation implies active roles for individuals and communities. Consensus is not assured, and the case studies reveal disagreements and set-backs, for example when the founders of *Hydro Social Enterprise* were frustrated in their aspiration to build on business success by enhancing and expanding community participation. Overall, case study evidence is consistent with commentary that has identified energy innovations with co-creation involving people not only consuming but also testing and shaping products and services (Willis, 2006; Seyfang and Haxeltine, 2012; Aylett, 2013). The resource centre at *Organic Farm AD*, for example was both a customer and an innovator.

Finance and human assets in the case studies included public and private monetary inputs plus the very substantial contribution of volunteer time and skills. Notwithstanding some successes in these local pilot renewable projects, and others referred to in the literature, important questions remain unanswered. In particular, unpaid work can remain invisible until and unless its demands break a project, as was reported in one case study. More attention should be directed to understanding how much volunteer potential (enthusiasm, time, and know-how) exists, and how to build capacity to sustain it.

The renewable energy case studies were operating as pilot projects with elements of experimentation and adaptation, especially where the value of the technology was not yet clearly defined and benefits not widely understood. This was a common theme although the extent of experimentation varied and was sometimes more social and sometimes more technical. Taken together, the case studies illustrate some of the disruption associated with distributed renewable energy generation that could potentially lead to the emergence

of "radically new consumer–producer relations" as predicted by Waker and Cass (2007: 459). More speculatively, they may even start to bring incremental, bottom-up change to move towards sustainable development targets (Hulme, 2020).

The contribution of this paper is adapting and expanding Sustainable Livelihoods Analysis to frame some of the urgent challenges around social innovation in the context of renewable energy. In doing this we have highlighted the assets, and combinations of assets, that can potentially support social innovation. We have illustrated the extent to which **Human assets** in particular are vital for experimentation and ways of nurturing learning (Sabel et al, 2017). Yet they are fragile, with numerous overlapping combinations of paid and unpaid time. We have focussed on the UK but we end by reflecting that there are untapped opportunities for people in the global north to learn from the experience of different places, for example 'frugal innovation' that has emerged as a distinctive strength in India, minimising the use of resources or leveraging them in new ways (Bound and Thornton, 2012)

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