IPPR

REPORT

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with Will Cook
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GREEN STREETS, STRONG COMMUNITIES

WHAT COMMUNITIES CAN DO FOR EMISSIONS REDUCTIONS AND WHAT EMISSIONS REDUCTIONS CAN DO FOR COMMUNITIES

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ABOUT IPPR

IPPR, the Institute for Public Policy Research, is the UK's leading progressive thinktank. We produce rigorous research and innovative policy ideas for a fair, democratic and sustainable world.

We are open and independent in how we work, and with offices in London and the North of England, IPPR spans a full range of local and national policy debates. Our international partnerships extend IPPR's influence and reputation across the world.

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POSITIVE IDEAS
for CHANGE

CONTENTS

People...

COMMUNITY

...across Great Britain...

Top left: coffee morning, Transition Town Horncastle; top right: community meeting, Tackley Village; lower left: the Eilean Eisdeal community group is based on Easdale Island in the Scottish Hebrides; lower right: the Meadows project is based in a very deprived inner-city area of Nottingham.

...using new technologies...

ENERGY

...to improve their communities.

Top left: wind turbine, Ingram Village; top centre: solar panel on a home, Llangattock Green Valleys; top right: biomass stove, Newmill Village; lower left: riders at Bradford BMX Bandits benefit from floodlights which run on electricity paid for by a nearby solar PV installation; lower right: energy efficiency measures installed at Beccles Lido help it to reopen.

EXECUTIVE SUMMARY

Can capable, innovative and determined groups of people in Britain's many and diverse neighbourhoods play a leading role in improving the energy efficiency of homes and community buildings and putting renewable energy technologies to work? This report argues that they can and, in doing so, can quicken the pace of efforts to reduce the nation's carbon dioxide emissions and help add significant value to their own endeavours into the bargain.

This is an evaluation of the British Gas Green Streets community energy challenge in which 14 groups from dramatically different communities in England, Scotland and Wales were selected to compete for a prize of £100,000. Each was given a share of a £2 million injection of capital, as well as technical advice from British Gas, to spend on a variety of microgeneration (or 'microgen') and energy efficiency measures in community buildings and surrounding households in pursuit of three objectives:

- Save energy
- Generate energy
- Engage the 'wider community'.

IPPR was asked to analyse the energy saving and generation data and to calculate carbon emissions reductions from the community buildings and households involved. IPPR was also asked to conduct interviews and surveys among the members of the groups and households that took part, British Gas employees who were engaged in the challenge, and people in surrounding communities in order to test whether the projects were proving effective and having a 'multiplier' effect by changing attitudes and behaviour more widely.

The projects

The 14 projects were selected in autumn 2009 via regional heats from an initial field of almost 100 entrants. These were as follows:

- Beccles Lido: to improve the energy performance of a community, open-air swimming pool that the group was in the process of restoring and reopening.
- Bradford BMX Bandits: to reduce the energy bills of a floodlit BMX track serving disadvantaged communities across Bradford.
- Casterton Village: to improve the energy efficiency of vulnerable people's homes in their village.
- Climate Friendly Bradford-on-Avon: to use energy efficiency and microgen measures to further the group's wider aim of becoming a zero-carbon community by 2050.
- Eilean Eisdeal: to improve the energy performance of community facilities and homes and raise awareness of energy use on their remote Scottish island.
- Ham and Petersham Green Streets: to engage the local community in energy use and achieve widespread uptake of solar PV (photovoltaic technology) – a council-led project.
- Hyde Farm Climate Action Network: to contribute to the group's wider campaigning and awareness-raising work in a south London neighbourhood, focused on energy efficiency and climate change.
- Ingram Village: to improve the energy performance of a community hall run and managed by the group.
- Llangattock Green Valleys: to become a carbon-negative community within five years by ambitiously deploying renewable energy technologies.
- The Meadows and MOZES (Meadows Ozone Energy Services Ltd): to improve the energy performance of homes and a community building in a highly deprived area of Nottingham.

- Newmill Village: to improve the energy performance of a community hall that the group operated and managed.
- SusMo: to engage a broad cross-section of people from a multicultural suburb of Birmingham in a common effort to reduce energy use and carbon emissions.
- Tackley Village: to improve the energy performance of a community shop and hall that the group operated and managed.
- Transition Town Horncastle: to improve the energy performance of a number of baby and toddler facilities in the town and, through this, to engage children and parents in reducing emissions.

Energy saving and generation results

Using 2009 data gathered from community buildings and households as a baseline, IPPR analysed changes in energy throughout 2010 and into 2011 as technology was progressively installed and energy efficiency measures gradually implemented. Comparing the first three months of 2009 with those in 2011, IPPR found significant levels of energy saved and generated, with comparably high levels of carbon emissions saved. Financial benefits were also received through reductions in energy bills and income from government initiatives to support renewable energy.

By modelling the results observed in the period January to March 2011, when most of the installations had been completed, IPPR estimates that the ongoing annual benefits of the Green Streets community energy challenge across all 14 projects are:

- Total annual savings in energy: 726,450 kWh
- Total annual energy generated: 104,804 kWh
- Total annual CO_2e emissions saved: 215,461 kgCO_2e

The measures implemented in community buildings resulted in:

- Annual energy generated: 46,999 kWh
- Annual CO_2e emissions saved: 25,405 kgCO_2e

The measures implemented in surrounding households resulted in:

- Annual energy savings: 726,450 kWh
- Annual energy generated: 57,805 kWh
- Annual CO_2e emissions saved: 190,046 kgCO_2e

The main driver of energy savings across the Green Streets households, perhaps unsurprisingly, was technology. The number of installations that occurred in each project and the point at which those installations were completed impacted significantly upon the challenge outcome.

In addition to saving energy and carbon emissions, participating groups managed to save money as bills were reduced and many also earned additional revenue as renewable energy installations began generating and groups received feed-in tariff payments. In total, groups will receive £22,792 payments of this kind a year. The total money saved on energy bills by participating householders is estimated to be around £30,000 per year.

Through Green Streets, energy assessments were carried out in 491 households with the average householder being recommended 18 low-cost energy efficiency measures, including energy efficient lightbulbs, standby saving devices and reflective panels that fit behind radiators. The cost of these bundles was approximately £125 and could be expected to deliver £115 of energy savings a year, paying for itself in 13 months. If the Green Streets housing stock is broadly representative of a typical UK home, low-cost measures like these could generate 12.6 MT (million tonnes) of carbon savings, which would contribute a very significant 4.8 per cent to the UK's 2020 emission reduction targets.

Some groups also managed to increase the number of people using community facilities, hours of opening and income from use as a result of the measures installed. For example Beccles Lido believe their range of energy saving measures have led to a reduction in their running costs of 25 per cent for electricity and 15–30 per cent for gas, while the average number of swimmers per month has almost quadrupled.

The community groups were integral to the success of the technology installations, having engaged large numbers of people in their local area to take part in their projects. Many had engaged because they wanted to support their community and be part of an initiative that was happening locally; some were motivated by climate change; others were mainly interested in receiving subsidised measures. Community energy projects can galvanise a wide array of people in pursuit of common goals, which result in emissions reductions.

The projects did bring important benefits for the communities beyond energy and money, including improved community cohesion and local engagement, and new partnerships between existing groups.

Multiplier effect results

Until now evidence that community energy projects can be highly effective catalysts for engaging people in energy issues has been largely anecdotal. Findings from IPPR's evaluation of Green Streets, however, suggest projects, and in particular installations of measures, can reach deep into communities and have pronounced impacts on attitudes towards installing energy efficiency measures and microgen.

IPPR surveyed approximately 1,300 people in households within a distance of, on average, 1.25 kilometres of community buildings that participated in the projects. The respondents were not participants in Green Streets. Forty one per cent of those surveyed were aware of the Green Streets project in their neighbourhood, providing a strong testament to the outreach work by many of the groups. Of those who were aware of Green Streets:

- 30 per cent said being aware of a Green Streets project had changed their attitudes towards energy efficiency and renewable energy.
- 46 per cent had been inspired to take action on energy efficiency and renewable energy. Of these:
  - 50 per cent had been inspired to take action on insulation
  - 23 per cent had been inspired to install a new boiler
  - 11 per cent had been inspired to install solar PV panels
  - Many had been inspired to take smaller actions, such as installing energy efficient lightbulbs and switching off plugs.
- 61 per cent said they would be more likely to take action in the future. Of these:
  - 61 per cent said they would change their behaviours to reduce their energy use.

IPPR researchers were hugely surprised and encouraged by these findings. The energy and carbon savings from the participants in the challenge are significant and important and likely to grow as the final measures are installed and households and groups learn more about the effective use of new technology. Moreover, if even a fraction of those in surrounding households surveyed follow through on their statements, savings could grow significantly. It is unlikely this kind of multiplier effect could have been achieved in any way other than through concerted action on the part of credible local community groups.

Barriers to community energy projects

During the lifespan of the project, participating community groups encountered many difficulties and challenges. These fell into four broad categories, the first two relating specifically to community energy projects, the latter two having broader implications for the wider deployment of energy efficiency measures and microgen.

1. Community capability

Participants in the challenge were drawn from widely different backgrounds and from extremely diverse communities. Some had high levels of organisational capability and knowledge of the different types of interventions available to save and generate energy, while others had very little. Some came from communities with significant financial resources and others from very deprived communities.

IPPR's interviews with the community leaders in the 14 projects show how most have been stretched and challenged by their involvement in Green Streets. But the pre-existing skills and circumstances in some communities – such as the professional background and financial security of group leaders and members – made a clear if not decisive impact on the outcomes of the project. The way in which groups were set up and managed was also important.

All participants required a significant amount of information and advice to help them decide which technologies and interventions to choose for their communities and where and how to deploy them. In some cases, pre-existing notions of what they would spend their share of the upfront Green Streets capital on changed significantly once they began working with British Gas staff – often, more cost-effective and energy efficient solutions were identified.

Without the free and extensive advice provided for the purposes of the challenge by British Gas, many sub-optimal decisions may have been made, which would have been likely to have resulted in fewer savings in energy and carbon and therefore greater expense. In addition, this may have harmed the credibility of some of the projects and in turn have led to a more muted multiplier effect.

2. Availability of finance

Green Streets participants benefited from a share of a £2 million injection of capital by British Gas. Without this, few if any of the projects would have been able to proceed. Access to upfront capital is absolutely essential for community groups in order to meet relatively small costs, such as those associated with obtaining planning permission to site renewable energy technology, to conduct feasibility studies for technologies or even to become properly constituted.

Upfront capital of much more significant sums is also needed for all of the interventions deployed by groups like the Green Streets participants. For instance, while fitting solar PV panels can yield income via the Feed-in Tariff (FIT), a community scale installation could cost £30,000 to purchase and install. Finance is available from private sector installers for some householders and community buildings, but these companies are likely to take the majority of the FIT income. Community groups will often struggle to raise finance as they are perceived as inherently high risk.

3. Solid walled properties and heat pumps

Only one of the participating groups – Meadows and MOZES in Nottingham – opted to spend a proportion of their share of the British Gas capital on insulating local houses with solid walls. This is an expensive intervention with a typical payback period of more than 30 years, yet one-third of all households in the UK are built with solid walls and therefore have poor thermal efficiency. A range of non-financial barriers, including hassle and aesthetic considerations, meant participants in Green Streets were strongly averse to installing this measure.

In part as a result of this, no domestic heat pumps were fitted in the Green Streets community energy challenge. Heat pumps are unsuitable for properties that do not have a relatively high level of thermal efficiency – in other properties, they will operate inefficiently and may not provide the required amount of heat. If Green Streets properties are representative of the national housing stock then the UK's potential for domestic heat pumps is significantly compromised by the number of solid walled properties.

4. Planning

While the majority of domestic microgen installations in Green Streets did not require planning permission, many of the community installations – such as solar panels on schools and church buildings and a wind turbine – did. Different communities had widely differing and often unpredictable experiences as they negotiated their way through the local planning process.

On the one hand, some planning officers and committees with knowledge of renewable energy installations gave permission easily – perhaps, in some cases, too easily. On the other hand, planning officers with little knowledge caused major delays to installations. Often, influential individuals were felt to have affected decision outcomes.

Communities such as Eilean Eisdeal and SusMo found permission difficult to obtain due to challenges from other groups in their communities and, in the case of the latter, had to fight hard to get the go-ahead for solar PV to be fitted to the roof of the community's church.

Conclusions and recommendations

The Green Streets community energy challenge has been hugely ambitious and fiendishly complex. Nevertheless, it has yielded significant and growing energy and carbon savings. It will result in important new revenues for community groups and has had an unexpected and impressive catalytic effect on wider communities.

Participating groups have managed to scale a steep learning curve in order to deploy cutting-edge microgen technologies and important energy efficiency measures. But they have also helped improve community facilities and galvanise local people into taking action on energy, and some have even improved community cohesion in the process.

These wider benefits of approaching the climate and energy challenge at the community rather than the household level are intangible and hard to put a value on. However, through the Green Streets lens, they offer a glimpse of what might be achieved by engaged communities.

For policymakers, community energy projects could help in several ways:

- Government wants the benefits from the FITs to accrue to individuals and communities. Community energy projects are a key conduit for ensuring this happens, and also offer the potential to create 'social returns on investment' in addition to reducing energy use and emissions.
- The success of the 'Green Deal' hinges largely upon its ability to stimulate demand for energy efficiency measures. Green Streets shows that engaged communities, with trusted relationships within their neighbourhoods, can help achieve this, particularly on the back of microgen installations. This suggests FITs could help with delivery of the Green Deal and government should ensure it is thinking holistically across its retrofit policies to take advantage of these synergies. Community groups could also play an instrumental role in supporting the roll-out of solid wall insulation, which would benefit significantly from being delivered into whole communities – cost benefits from delivering at scale could be realised and barriers to being the 'first mover' on a terraced street of solid walled properties could be overcome.
- Major changes to the planning system are in progress. Communities are going to play a more influential role in deciding the future of their local areas. National and local government and communities are going to have to work together effectively to ensure low-carbon infrastructure is successfully deployed, and there are important lessons about how to work with community groups of conflicting interests that can be learnt from projects such as those run as part of Green Streets.

However, for the full potential of community energy projects to be realised the barriers identified above will need to be addressed.

We recommend the following action:

1. Increasing community capacity

Enthusiasm and commitment are not in themselves sufficient: communities need critical, impartial advice to help them choose the right interventions and then implement measures effectively, as well as significant support on how to run an effective project.

- **Government – local or national – should provide *ex ante*, impartial technical advice to communities to ensure cost-effective deployment.** Ensuring communities make the right decisions will be critical to the cost-effectiveness and credibility of their work; government-backed advice would be the first best option.
- **Communities need advice on how to set up and deliver energy projects.** The Department for Energy and Climate Change's 'Community Energy Online' website must become a focal point for provision, and the department should also support initiatives that encourage communities to network and educate one another. Plans to train 'community organisers' to help the community sector achieve more in deprived communities should include support for running community energy projects.
- **Government should seek to better understand the 'social returns on investment' community owned microgen could bring.** The Departments for Energy and Climate Change (DECC) and Communities and Local Government (CLG) and the Big Society team within the Cabinet Office should work together to develop knowledge and methodologies for evaluating factors such as community cohesion and increased participation.

2. Making finance available

Most community groups have limited access to finance. The benefits of renewable energy measures to communities and the benefits of having communities spearhead energy and climate change initiatives will not be realised unless capital finance is available.

- **Government, local and national, should help groups by making loan capital available at concessional interest rates.** The Green Investment Bank might be one avenue through which community groups could access upfront capital at concessional interest rates, for example, through a 'community investment fund'. Green Deal financing could also be made available to community groups. Inclusion of microgen with FITs and RHI payments could support significant levels of up-take.
- **Capital funds for community energy could be derived from private sources, such as housing developers, through a proposed 'community energy fund'.** Up to £1 billion per annum from 2019 could be deposited in such a fund as a result of developers offsetting zero-carbon obligations in new housing developments.
- **Government should consult on introducing differentiated levels of support in FITs and RHI for projects of 'community benefit'.** There are operational challenges to doing this, in particular how to judge 'community benefit'. This could be done through a 'community interest test'.

3. Accelerating the uptake of solid wall insulation

The energy and emissions savings resulting from the Green Streets projects could have been increased significantly had projects opted for more solid wall insulation. However, the cost and non-cost barriers were unattractive to most and are seemingly immovable. These barriers pose a considerable threat to our ability to meet our carbon emission reduction targets.

- **A very concerted government focus is needed if the goal of insulating 2 million homes with solid walls is to be met by 2020.** Without this focus, the roll-out of renewable heat technology will be undermined and the government's carbon reduction targets could easily be missed. Community groups could be the conduit for a push on solid wall insulation, as they could help to achieve buy-in from whole streets or neighbourhoods and reduce costs.
- **Government should launch a solid wall insulation competition to challenge academic and private sector innovators to find a step change in technology.** A step change in the materials used for solid wall insulation is needed to help remove non-cost barriers and thus reduce costs by achieving true scale in the market.

4. Improving the planning process

Existing practice allowing most domestic microgen installations to proceed without planning permission has helped groups like the Green Streets participants enormously. Further simplification and rationalisation of the process is needed.

The introduction of the Localism Bill will mean community groups play a more influential role in local planning decisions. This is to be welcomed. Central government must still ensure that decisions are not made through false assumptions and lack of education on renewable energy, and also that the importance of renewables deployment to the national strategic objectives is fully understood.

- Planning laws should be relaxed with respect to both a wider range of technologies than is currently the case and a wider range of buildings. The government should move to grant permitted development status for an extended range of technologies and for community buildings at the first opportunity.
- The Localism Bill must ensure neighbourhood plans are representative of communities. The government should ensure the number of people required to form a neighbourhood group is towards the higher end of the range being considered (up to 25) and that only those who live in a neighbourhood group area should be eligible to be a member.
- Government should fund an educational outreach programme on renewables for planning officers and local councillors. Such a programme could address the deficit in knowledge about renewable technologies at the local level, while also communicating the national strategic importance of renewables deployment. It is in the interests of both CLG and DECC to co-fund such a programme.

INTRODUCTION TO GREEN STREETS

Green Streets was a competition-based challenge in which 14 community groups across Great Britain led projects that reduced carbon emissions. Each group was given a share of £2 million and technical support from British Gas with which to deliver a project of their own design. In return, they were to accomplish three objectives:

- Save energy
- Generate energy
- Engage the 'wider community'.

Each project involved the installation of energy efficiency measures and microgeneration (or 'microgen') technologies into community facilities and homes surrounding them. The challenge began on 18 January 2010 and ended on 31 March 2011. The community group that best achieves the three objectives of Green Streets stands to receive a prize of £100,000.

This challenge was the second Green Streets competition. The first took place in 2009 and focused solely on streets of houses, rather than community facilities and surrounding households. Green Streets 1 found that having households work together on their energy use and carbon emissions helped them to achieve larger reductions and led to enhanced 'community spirit' (IPPR 2009). This paved the way for Green Streets 2.

British Gas asked IPPR to act as independent evaluator of the challenge and to gather and analyse data on energy savings and generation and emissions reductions achieved throughout its lifespan. IPPR was also asked to evaluate the success of the participating community groups in engaging the communities surrounding their projects and whether this generated a catalytic effect that may lead to further energy and emissions savings.

This report is IPPR's independent evaluation of Green Streets 2 and follows an interim report that was published in September 2010. It provides data and analysis to help answer the following questions:

- What contribution can community energy projects make to reducing carbon emissions?
- Can community energy projects have beneficial impacts on attitudes and behaviours towards energy use?
- Which communities could be mobilised to deliver an energy project?
- What barriers are there to them doing so?
- What barriers are there to the installation of energy efficiency measures and microgen technologies in homes and communities?
- What can policy do to overcome these barriers?

The report details characteristics of the Green Streets participants and projects, analyses project results, and highlights the barriers faced by community groups. It concludes with some recommendations for policymakers on how they could better support community energy projects.

1. CONTEXT

Interest in community energy projects has grown rapidly in recent years. Increasing numbers of communities and local authorities have taken the initiative and set up energy projects. The current UK government has expressed its support for this movement by including a commitment to encouraging community-owned, renewable energy schemes in the Coalition Agreement (HM Government 2010).

The introduction of the Feed-In Tariffs (FITs, see Appendix A) has been instrumental to this growth. They have transformed the financial basis of renewable electricity and created the potential for communities and householders to generate an income from renewable installations. The phased introduction of the Renewable Heat Incentive (RHI, see Appendix B) from July 2010 will create further opportunities in renewable heating.

Advocates say that community energy projects could, in addition to delivering energy use and emissions reductions through the installation of measures, have transformative effects on peoples' attitudes towards energy and create additional value from the government incentives.

Indeed, changing attitudes and behaviour remains a very necessary part of our efforts to reduce emissions. Creating consumer demand for energy efficiency measures, for example, has been notoriously difficult to achieve, and is likely to still pose challenges after the Green Deal is introduced in autumn 2012 (see Appendix C). Public support will also be needed for the wider task of investing in and constructing new energy infrastructure. Community energy projects could, therefore, have an important role to play.

The rise in interest in community energy projects comes at a time when interest in community action in general is high. The government has prioritised its vision for a Big Society, where empowered communities and voluntary social action are widespread. Community engagement with the climate agenda is a very tangible and dynamic articulation of this vision. The complementary aspects of the emissions reduction and Big Society agendas are manifest in community energy projects.

Green Streets process

In October 2009, community groups across Great Britain were invited to submit a project proposal to Green Streets. Ninety six applied. The strongest applications were invited to take part in regional heats, through which the successful 14 groups were identified.

The successful community groups then worked with British Gas to develop their project proposal into something realistic and deliverable. Each was assigned an employee of British Gas to support the delivery of their project.

Decisions on which measures to install were based largely on the outcome of energy assessments carried out by British Gas. The ambitions and wishes of the community groups and the size of their project budgets were also key factors.

Installations occurred throughout the challenge period, along much longer timescales than was originally anticipated. Differences between the projects, the large number of stakeholders involved, the challenges of working with a new range of technologies and issues with gaining planning permission have all played a role. At the time of writing, some installations have yet to occur.

To support IPPR's evaluation, participating householders were asked to submit all of their energy meter readings for 2009 and throughout 2010. The community groups were

primarily responsible for collecting this information. They were also asked to record all of their community engagement activities in a tracker.

Research methodology

IPPR was asked to carry out an independent evaluation of Green Streets and generate learnings for policy. To accomplish this we carried out several pieces of research. IPPR:

- Used bills and estimated meter readings to model the participating householders' energy usage in 2009, creating a baseline against which to measure Green Streets results
- Collated and analysed energy meter readings for all householders throughout the challenge period, modelling usage where readings were not available
- Analysed generation data for all microgen equipment
- Conducted semi-structured group interviews with the 'leaders' of the community groups (the 'community leaders') by telephone in December 2009, and face-to-face in December 2010
- Conducted semi-structured face-to-face interviews with the British Gas employees who managed the delivery of the projects (the 'project managers') in May 2010 and January 2011
- Conducted telephone interviews with 30 participating householders in January and February 2011. They were selected to represent a range of technologies that had been installed and to be broadly representative across the projects
- Conducted a survey of approximately 1,300 people in March to April 2011 to assess the impact of the community groups' community engagement activities on their wider communities.

Full outlines of the research methodologies and caveats are available in Appendix D. The interview discussion guides are available on request from IPPR.

2. PROJECT CHARACTERISTICS

The nature of the community groups and their projects varied significantly. Certain characteristics, such as where they were located, who was involved, the nature of their activities and what technologies were installed all had important impacts on the outcome of Green Streets.

Locations and participants

The projects were selected in locations across Great Britain. A brief description of each of the projects is given in Box 2.1 (over). They reflected a range of rural and urban areas, and socioeconomic conditions (see Appendices E and F). The community groups varied in their constitutional status, the length of time they had been established (see Appendices G and H), the reasons they were undertaking their project, the scale of project they had developed, and the type of 'community' on which they were focused. These characteristics all had important influences on project delivery and outcomes.

- The rural/urban qualities of a project location had implications on the renewable resources that were available and on the amount of space there was to install technologies.
- The nature of the relationships between community members in rural and urban locations can also differ. Rural communities can often be characterised by greater levels of personal interaction, although this need not always be the case. These differences had implications on community engagement approaches.
- Socio-economic conditions influence the human resources a community has available to run a project (Coote 2010, IPPR and PWC 2010). Communities in deprived areas are generally less well resourced, although thriving community organisations can sometimes be present. Several of the Green Streets projects were in highly disadvantaged areas.
- Differences in how the community groups were organised had implications for their ability to make decisions and manage money and for their perceived legitimacy within their community.
- The community leaders' main motivations for taking part in Green Streets varied significantly, from wanting to do something about climate change to wanting to do something of benefit for their community, with most including a degree of both (see Figure 2.1 over). The potential of community energy projects to appeal across these constituencies, mobilising environmentally and community-oriented people in common pursuits, is one of their strongest assets.
- The scale of the projects varied widely, with the number of participating buildings ranging from just 15 in Newmill Village to 100 in Bradford-on-Avon (see Table 2.1 over). This had implications for the amount of budget that could be allocated to each building, as well as the amount of effort the community group could commit to engaging them.
- While the majority of the projects involved a community of people from a geographic area, Beccles Lido and Bradford BMX Bandits involved communities of people brought together through common interests.

Figure 2.1
Community leaders' main motivations for taking part in Green Streets

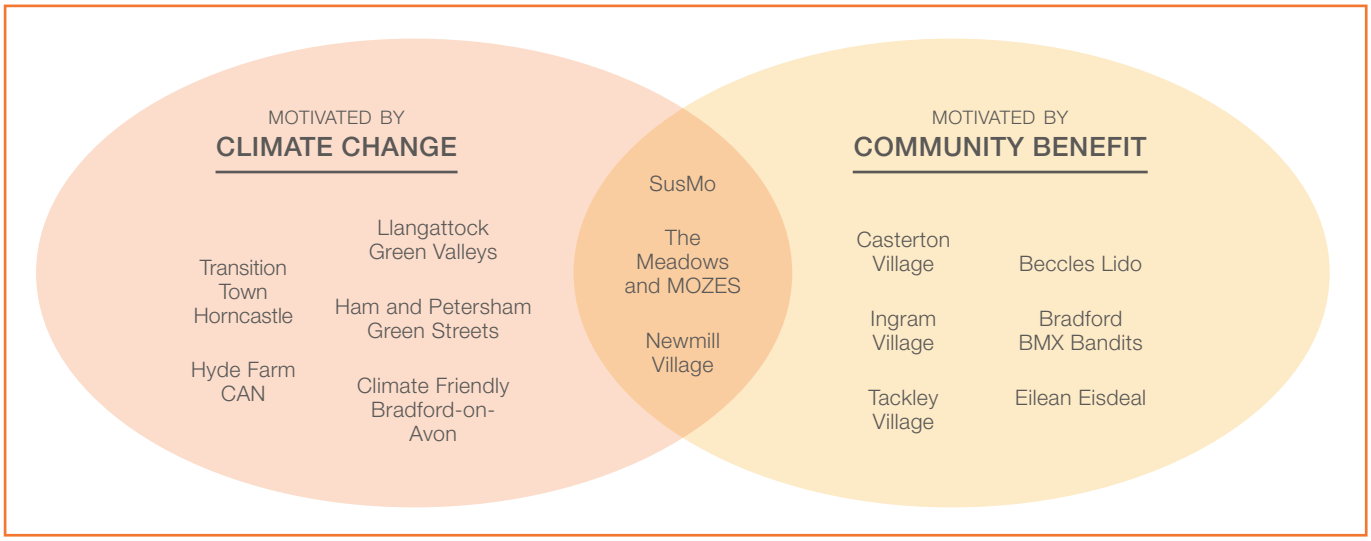


Table 2.1
Scale of projects

Project name	Number of community buildings	Number of households at end of project
Beccles Lido	1	30
Bradford BMX Bandits	1	18
Casterton Village	1	16
Climate Friendly Bradford-on-Avon	6	94
Eilean Eisdeal	2	20
Ham and Petersham Green Streets	4	15
Hyde Farm CAN	1	42
Ingram Village	1	24
Llangattock Green Valleys	4	38
The Meadows and MOZES	1	21
Newmill Village	2	13
SusMo	4	16
Tackley Village	1	72
Transition Town Horncastle	5	26

Box 2.1: Brief descriptions of the community groups' main project aims

- Beccles Lido: to improve the energy performance of a community, open-air swimming pool that the group was in the process of restoring and reopening.
- Bradford BMX Bandits: to reduce the energy bills of a floodlit BMX track serving disadvantaged communities across Bradford.
- Casterton Village: to improve the energy efficiency of vulnerable people's homes in their village.
- Climate Friendly Bradford-on-Avon: to use energy efficiency and microgen measures to further the group's aim of becoming a zero-carbon community by 2050.
- Eilean Eisdeal: to improve the energy performance of community facilities and homes and raise awareness of energy use on their remote Scottish island.
- Ham and Petersham Green Streets: to engage the local community in energy use and achieve widespread uptake of solar PV (photovoltaic technology) – a council-led project.

Box 2.1 continued

- Hyde Farm Climate Action Network: to contribute to the group's wider campaigning and awareness-raising work in a south London neighbourhood, focused on energy efficiency and climate change.
- Ingram Village: to improve the energy performance of a community hall run and managed by the group.
- Llangattock Green Valleys: to become a carbon-negative community within five years by ambitiously deploying renewable energy technologies.
- The Meadows and MOZES (Meadows Ozone Energy Services Ltd): to improve the energy performance of homes and a community building in a highly deprived area of Nottingham.
- Newmill Village: to improve the energy performance of a community hall that the group operated and managed.
- SusMo: to engage a broad cross-section of people from a multicultural suburb of Birmingham in a common effort to reduce energy use and carbon emissions.
- Tackley Village: to improve the energy performance of a community shop and hall that the group operated and managed.
- Transition Town Horncastle: to improve the energy performance of a number of baby and toddler facilities in the town and, through this, to engage children and parents in reducing emissions.

Technologies and FIT payments

Just as there was a wide variety in the project locations and participants, so there was a wide variety of technologies installed and arrangements with regards to FIT payments. This had implications for how Green Streets impacted on energy use and financial benefits to the communities.

The technologies provide the main potential for emissions reductions. The way the community group decided to split their budget affected what technologies were installed where, as did the scale of the projects and the nature of community activities. For example, one chose to distribute its budget equally between participants, and others chose to select households through lotteries to receive different levels of funding. Many of the communities encouraged or insisted that building occupiers part-funded installations, and some used their Green Streets budget to leverage additional grants from other organisations; both methods significantly increased the money available to the project. Tables 2.2 and 2.3 (over) show the technologies involved in each project, at the community scale and in the participating households respectively. Definitions of the technologies are given in Appendix I.

Mirroring what has happened nationally since the introduction of the FITs, solar PV was by far the most commonly installed microgen (DECC 2011). The ease of installation and attractive return on investment for the technology (as it stood at the time of the challenge) were the main drivers of this.

The community-scale energy solutions posed a particular delivery challenge as they needed to be highly bespoke, such as a pool cover, insulating lining for pool walls and new boiler installed at Beccles Lido.

At the household scale, this was less true. The installations were more standardised and focused mostly on improving energy efficiency. Very large numbers of low-cost measures – such as energy efficient lightbulbs, reflective panels fitted behind radiators and monitors which display the energy use of a property in real-time – were distributed. If the Green Streets properties are representative of the national housing stock then huge opportunities for achieving emissions reductions and cost benefits through installing such 'low-hanging fruit' still remain (see Box 2.2, p19).

Table 2.2
Community-scale technologies in each project

Project	Community building	Technologies
Beccles Lido	Beccles Lido	Boiler Pool cover Swimming pool liner Solar PV (6.3kWp)
Bradford BMX Bandits	North View Road Park Building	Solar PV (9.36kWp)
Casterton Village	Casterton School	Solar PV (9.8kWp)
Climate Friendly Bradford-on-Avon	Christchurch School	Loft and/or cavity wall insulation
	Lambert Community Centre	Solar PV (5kWp)
	United Church Hall	Loft and/or cavity wall insulation
	Holt Village Hall	Loft and/or cavity wall insulation
	Fitzmaurice Primary School	Loft and/or cavity wall insulation
	Holt Primary School	Loft and/or cavity wall insulation
Eilean Eisdeal	Easdale Community Hall	*Air Source Heat Pump* *Wind turbine (6kW)* *Solar PV (3kW)*
	Museum	*Metering and monitoring equipment* Loft and/or cavity wall insulation
Ham and Petersham Green Streets	Strathmore School	Solar PV (3.15 kWp)
	Russell School	Solar PV (3.15 kWp)
	Meadlands School	Solar PV (9.85 kWp) *Solar thermal (4 flat plate collectors)*
	Grey Court School	*Solar PV (3.85 kWp)*
Hyde Farm CAN	Henry Cavendish School	*Loft and/or cavity wall insulation* *Solar PV (7.14 kWp)*
Ingram Village	Ingram Village Hall	Solar PV (6.93kWp) Air Source Heat Pump Underfloor heating
Llangattock	Llangattock School	Loft and/or cavity wall insulation Solar PV (4.32 kWp)
	Local woodland	*Air Source Heat Pump*
	Allotments	Log splitter
	Local streams	*Solar powered water pump* *Hydropower system*
The Meadows and MOZES	The Embankment Club	*Solar PV (3.96 kWp)* Boiler Upgraded central heating
Newmill Village	Newmill Village Hall and Primary School	Central Heating System *District Biomass Boiler* *Metering and monitoring equipment*
SusMo	Moseley School	*Solar PV (1.5 kWp)*
	St Mary's Church	*Solar PV (10.56 kWp)*
	Allotments	*Solar PV (1.75 kWp)*
	Hamza Mosque	*Solar PV (6.12 kWp)*
Tackley Village	Tackley Village Hall	*Solar PV (9.18 kWp)* *Ground source heat pump*
Transition Town Horncastle	War Memorial	Loft and/or cavity wall insulation
	Community Centre	Boiler
	Methodist Church	Loft and/or cavity wall insulation
	Horncastle County Primary School	Loft and/or cavity wall insulation *Solar PV (3.85 kWp)* *Solar PV(3.85 kWp)*

Correct as of 1 April 2011. Italicised indicates 'in progress'.

Table 2.3
Household technologies in each project

Project	Energy efficiency measures	Quantity	Microgen technologies	Quantity
Beccles Lido	Boiler Small measures Loft Insulation *CWI*	3 720 14 *1*	Solar PV	1
Bradford BMX Bandits	Boiler Small measures Loft Insulation CWI	4 332 6 2	Solar PV	4
Casterton Village	Boiler Small measures Loft Insulation CWI	6 77 8 3		
Climate Friendly Bradford-on-Avon	Boiler Small measures Solid Wall Insulation Loft Insulation CWI *Boiler*	8 2190 2 23 6 *4*	Biomass stoves Solar PV *Solar PV* *Solar Thermal*	10 1 *1* *4*
Eilean Eisdeal	Small measures Loft Insulation CWI	284	Biomass stove *Biomass pellet boiler*	1 *1*
Ham and Petersham Green Streets	Boiler Small measures Loft Insulation CWI *Small measures*	3 527 4 1 *48*	Solar PV *Solar PV*	3 *1*
Hyde Farm CAN	Boiler Small measures Loft Insulation CWI *Boiler*	5 585 5 0 *3*	Solar Thermal *Solar Thermal*	1 *2*
Ingram Village	Small measures Loft Insulation CWI	120 15 0	Biomass Stove Micro wind Biomass Pellet Stove *Biomass Stove* *Solar PV*	1 1 1 *1* *6*
Llangattock	Boiler Small measures Loft Insulation CWI	7 386 3 0	Biomass boiler Biomass stove Solar PV	1 1 12
The Meadows and MOZES	Boiler Small measures Solid Wall Insulation Loft Insulation CWI	15 524 7	Solar PV*	7
Newmill Village	Boiler Small measures Loft Insulation CWI	1 193		
SusMo	Boiler Small measures Loft Insulation CWI	6 1564 12 0	Solar Thermal *Solar Thermal* *Solar PV*	1 *2* *1*
Tackley Village	Loft Insulation CWI *Boiler*	19 5 *1*	Solar PV	1
Transition Town Horncastle	Boiler Small measures Loft Insulation CWI *Boiler*	11 373 8 1 *1*	Biomass Boiler Solar PV Solar Thermal *Solar PV*	1 2 2 *1*

Correct as of 1 April 2011. Italicised means 'in progress'.
* The Meadows solar PV installations were funded by DECC through the Low Carbon Communities Challenge. They will have affected energy usage within the properties and so have been included here.

While condensing boilers and cavity and loft insulation were installed widely, only small numbers of households received solid wall insulation, and then only onto individual walls rather than whole houses. This was far below the potential identified in the initial energy assessments – achieving widespread uptake of solid wall insulation is a major challenge and is discussed in greater detail in Chapter 4.

A significant number of biomass stoves were installed in households. While their impact on emissions reductions is difficult to quantify, this technology, being relatively low-cost and easy to install, may hold potential.

FITs payments have made material differences to the running costs of many participating community buildings. In addition, several of the community groups have taken a share of FIT payments from a community-scale installation, enabling them to benefit despite not having suitable facilities for their own installation.

For example, Bradford BMX Bandits, after abandoning plans for a wind turbine on its site due to potential health and safety risks and a lower than perceived wind speed, funded solar PV panels on a nearby local authority building. The building will use the electricity the panels generate and the community group will take the FIT payments. This is commonly referred to as a 'roof leasing' or 'rent-a-roof' arrangement. There was just one instance of a similar arrangement at the residential scale.

Box 2.2 An estimation of the national potential for the 'low-hanging fruit' of energy efficiency measures.

Through Green Streets, energy assessments were carried out in 491 households. The average householder was recommended 18 low-cost energy efficiency measures, which included energy efficient lightbulbs, standby saving devices and reflective panels[1] that fit behind radiators, at a cost of approximately £125.

If we assume that the Green Streets properties were broadly representative of a typical UK home (for a comparison of Green Streets properties and the UK housing stock see Appendix J), Table 2.4 shows that householders are likely to be able to benefit from a bundle of low-cost energy efficiency products that could save £115 per year and pay for themselves in around 13 months.

Table 2.4
Estimated benefits to the average householder from installing low-cost energy efficiency measures (average product bundle)

Number of products	18
Costs of products	£125
Annual energy savings	1,203 kWh
Annual cost savings	£115
Annual payback period	13 months (approx)
Carbon savings	488kg

Extrapolated to the national scale,[2] Table 2.5 shows that these measures could generate 12.6 MT (million tonnes) of carbon savings, which would contribute a very significant 4.8 per cent to the UK's 2020 emission reduction targets.

1 Other measures included energy monitors, eco-kettles, hot water cylinder jackets and pipe lagging.

2 Number of UK households calculated as 25,901,000 from national housing statistics for 2009 (www.communities.gov.uk, www.scotland.gov.uk) and 2008 (www.wales.gov.uk).

Box 2.2 continued

Table 2.5
Estimated national benefits from installing low-cost energy efficiency measures

Total number of products	473,075,699
Annual energy savings	31,268 GWh
Annual cost savings	£2,971,000,000
Carbon savings	12.6 MT

In many cases it is likely that householders are unaware they could benefit from these technologies. For example, on average, 6.5 energy saving lightbulbs were recommended per household, despite 89 per cent of participants claiming to already use them.

In addition 21 per cent of all boilers that were inspected were older than 15 years (their design lifetime). If this is reflective of the national picture then there are currently 4,274,000 boilers operating past their design lifetime. Replacing all of these could amount to savings of £1.004 billion per year and around 5.4 MT of carbon emissions, or 2 per cent of the 2020 targets.

Household and community engagement

Engagement was included as a core component within Green Streets to investigate whether energy can be an effective means for engaging a community and whether community groups can act as a catalyst among surrounding households and so encourage uptake of energy measures. The outcomes of Green Streets were affected by how much of a role engagement played in each of the projects and on the engagement approaches used.

A difference emerged between 'campaigning' groups, which were more engagement-oriented and highly motivated to achieve attitudinal and behavioural change on energy, and others that were mainly interested in improving the energy performance of a community facility.

The 'campaigning' groups are identifiable as those that had more than one community building participate in their project. These groups actively engaged with and mobilised the community building occupiers to take part in their project, with the result that energy measures were installed and emissions were reduced. Other groups were themselves the building occupiers, and so did not have to build relationships in the same way.

In an effort to quantify the differences, each community group was asked to maintain a tracker of the activities they undertook engaging their wider community, the results of which are shown in Table 2.6. Some community groups failed to submit any information. This does not mean they undertook no engagement work, only that they failed to complete the related administrative task. For example, evidence from the survey indicated that awareness of the Eilean Eisdeal project was high in its local community and, alongside claims from interviews with community leaders, this suggests that engagement work was undertaken.

Nevertheless, the responses do serve as a proxy measure for how highly community engagement was prioritised within a project. The high number of events recorded by Llangattock Green Valleys and Transition Town Horncastle correlates with the emphasis the community leaders gave to these aspects in their interviews.

Table 2.6
Number of activities engaging their wider communities recorded by each community group

Project name	Number of activities recorded	Project name	Number of activities recorded
Beccles Lido	15	Ingram Village	0
Bradford BMX Bandits	0	Llangattock Green Valleys	275
Casterton Village	0	The Meadows and MOZES	0
Cli. Fr. Bradford-on–Avon	14	Newmill Village	0
Eilean Eisdeal	0	SusMo	17
Ham and Petersham Gr. Sts	16	Tackley Village	0
Hyde Farm CAN	0	Transition Town Horncastle	103

Many approaches to engagement were employed. A common approach was to centre education and awareness raising efforts on visible installations of renewable technologies. For many community leaders, installing these technologies into 'community hubs', such as schools and churches, was a way to engage large numbers of people. As the following quotes indicate, demonstrating the technologies working in practice was thought to be important:

> **'People do want to see things. Things like photovoltaic seem a bit mysterious and intractable until they're actually up there and doing things. Then they'll be saying, "Oh look, it's saving our community this much money and it's all renewable." And that gets people interested – "what is renewable, and how can it help me?"'**
> Community leader

> **'Working with the schools wasn't just about these schools getting help towards their electricity bills ... The children are learning about energy saving, they have the PV on their roof, they are taking that home to their parents.'**
> Community leader

Other approaches included street energy champions, neighbourhood meetings, communicating via social media, emails and newsletters, and loaning out energy monitors. Most of the community leaders suggested that face-to-face communications with community members was a powerful means of engagement and something they were well positioned to do. As one described:

> **'It is important to remember we are a community, we do know one another, we do live near one another, and that the most important conversations are the real conversations, the face-to-face conversations.'**
> Community leader

Several of the communities also engaged with their wider community on sustainability issues beyond energy, such as tree planting, litter picking and reusable nappy initiatives.

3. GREEN STREETS RESULTS

IPPR was asked by British Gas to evaluate how the energy use of the communities changed as a result of being involved in Green Streets, what role the technologies and behaviour change played within this, what financial impacts there were, and what impacts there were from the community engagement.

Energy saving and microgen results

The impacts of the projects should be seen in the context of when measures were installed: the majority of both the community building and household installations occurred towards the end of the project. Appendix K shows when the community building microgen, the smaller household measures and the larger household measures occurred.

At the beginning of 2011, 79 per cent of all installations had occurred. By looking at the energy saved by the householders from 1 January 2011 to 31 March 2011 and by estimating the energy generated during this period we have modelled the annual impacts of Green Streets to be as follows:[3]

- Total annual savings in energy: 726,450kWh
- Total annual energy generated: 104,804kWh
- Total annual CO2e emissions saved: 215,461 $kgCO_2e$

A breakdown of these results is given in Table 3.1.

Table 3.1
Projected annual emissions savings, $kgCO_2e$

	Household savings (extrapolating Jan–Mar 2011)	Household microgen	Community building microgen	TOTAL
Beccles Lido	16098	1023	1143	18264
Bradford BMX Bandits	12232	1959	4387	18578
Climate Friendly Bradford-on-Avon	58061	1208	2177	61446
Casterton Village	-1892	1412	3975	3495
Eilean Eisdeal	8182			8182
Transition Town Horncastle	20195	5063		25258
Hyde Farm CAN	-5349			-5349
Ingram	-22466	2465	2973	-17028
Llangattock	30925	5793	1773	38491
The Meadows and MOZES	11780	9034		20814
Newmill Village	2529			2529
Ham and Petersham Green Streets	7167	1861	4192	13220
SusMo	16377			16377
Tackley Village	4972	1428	4784	11184
Green Streets overall	**158810**	**31246**	**25405**	**215461**

3 As some installations were still to occur at the end of the challenge, actual impacts will be greater than these estimations.

Microgeneration

Ten of the 14 community groups installed microgen on community buildings, which resulted in the savings shown in Table 3.2.

Table 3.2
Emission savings achieved through microgen installations in community buildings

Community	Community building	Microgen installation	kWh generated in last three months (estimated)	Annualised $kgCO_2e$ saved
Ingram Village	Ingram Village Hall	Solar PV	881	2973
Casterton Village	Casterton, Carnforth	Solar PV	1178	3975
Bradford BMX Bandits	North View Road	Solar PV	1300	4387
Llangattock Green Valleys	Llangattock School	Solar PV	526	1773
Climate Friendly Bradford-on-Avon	Christchurch School	Solar PV	645	2177
Tackley Village	Tackley Village Hall	Solar PV	1418	4784
Ham and Petersham Green Streets	Strathmore School	Solar PV	415	1400
Ham and Petersham Green Streets	Meadlands School	Solar PV	347	1170
Ham and Petersham Green Streets	Russell School	Solar PV	481	1622
Beccles Lido	Beccles Lido	Solar PV	339	1143

Ten of the groups installed microgen in households, which resulted in the savings shown in Table 3.3.

Table 3.3
Emission savings achieved through microgen installations in households

Project	Microgen technology	kWh generated in last three months (estimated)	Annualised $kgCO_2e$ saved
Llangattock Green Valleys	Solar PV	1717	5793
Ingram Village	Wind	731	2465
Casterton Village	Solar PV	419	1412
Climate Friendly Bradford-on-Avon	Solar PV	358	1208
Ham and Petersham Green Streets	Solar PV	552	1861
Bradford BMX Bandits	Solar PV	581	1959
Tackley Village	Solar PV	423	1428
Beccles Lido	Solar PV	303	1023
Transition Town Horncastle	Solar PV and CHP	1501	5063
The Meadows and MOZES	Solar PV	2678	9034

The interim Green Streets report (Platt 2010) found that there was huge potential for microgen at both the community and residential scale. At the residential scale, it was estimated that nearly 14 million households could be suitable for solar PV installations and 6.2 million households could be suitable for solar thermal. The potential for biomass stoves was estimated at just less than 5.5 million. Air-source heat pumps were theoretically the most widely suitable heating technology, although its successful roll-out depends on ensuring properties have a high enough thermal efficiency – this, as is outlined further in Chapter 4, is a major challenge for solid walled properties. Our findings suggested that if every house that was able were to install solar PV and a domestic-scale mast-mounted wind turbine, this would generate 20 per cent of the energy required to meet the renewable electricity target in 2020.

At the community scale, we estimated there to be a solar PV opportunity on churches of 543,853 kWp, which could deliver 25,308 tonnes of carbon savings per year and generate

more than £20 million in financial savings, exclusive of payments for the capital costs of equipment.

Household energy savings results

Changes in energy use by the households resulted in the energy and carbon emissions savings shown in Table 3.4.[4] Some of the projects showed an increase in energy use (indicated as a negative figure in the table). This may be because a lot of Casterton and Ingram participants were non-metered fuel users, and so a large degree of modelling had to be carried out on their results, and because Hyde Farm participants received a very small number of installed measures, which our analysis shows were the main driver of emissions reductions.

Table 3.4
Emissions savings achieved by reductions in household energy use

Project	kWh saving in the last three months of Green Streets	Annualised $kgCO_2e$ saving	Annualised $kgCO_2e$ saving per household
Beccles Lido	45403	16098	537
Bradford BMX Bandits	15126	12232	680
Climate Friendly Bradford-on-Avon	102591	58061	586
Casterton Village	-3904	-1892	-189
Eilean Eisdeal	4761	8182	409
Transition Town Horncastle	29914	20195	777
Hyde Farm CAN	-9450	-5349	-127
Ingram Village	-13836	-22466	-936
Llangattock Green Valleys	59990	30925	814
The Meadows and MOZES	18235	11780	535
Newmill Village	18301	2529	195
Ham and Petersham	10297	7167	478
SusMo	26422	16377	963
Tackley Village	3217	4972	69

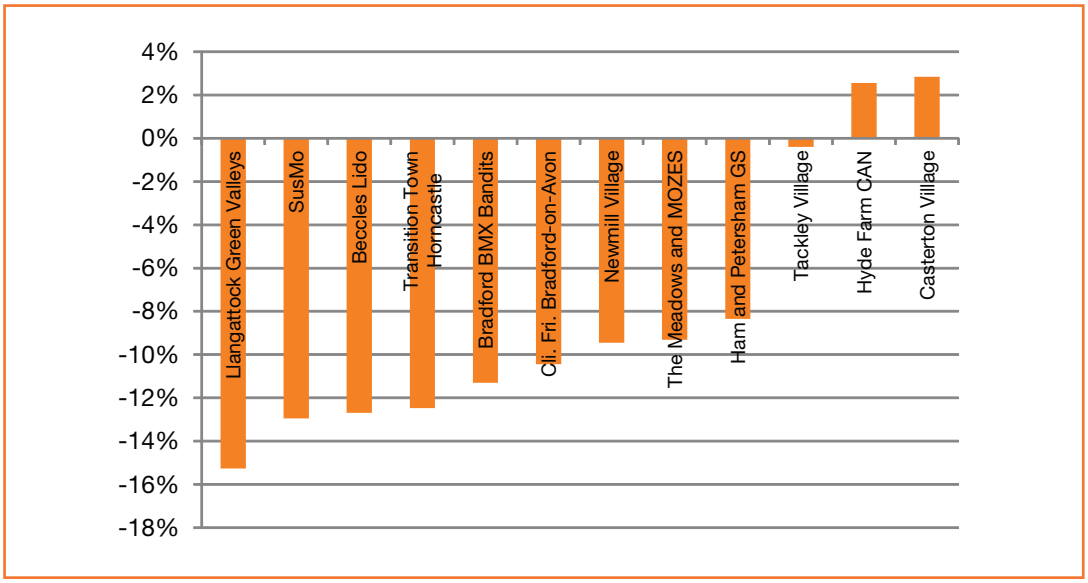
The overall energy saved by the households in the last three months of Green Streets was 6.3 per cent. As Figure 3.1 (over) shows, some of the projects' participating households achieved far greater energy savings than the overall figure. Indeed the majority of the projects achieved savings within the range of 8–15 per cent. Given the data limitations it is likely that the communities in this range were performing at about the same level in terms of energy savings. Casterton and Hyde Farm show *increases* in overall energy use. What appeared to be difficult relationships between members of the community group in Casterton and the fact that very few Hyde Farm participants had measures installed may have played a part here.

The main driver of energy savings across the Green Streets households, perhaps unsurprisingly, was technology. The number of installations that occurred in each project impacted significantly upon the challenge outcome.

Figure 3.2 (over) shows the relationship between the savings of the projects in the final three months of Green Streets and the proportion of participants who had microgen or insulation installed in the projects. It suggests that the greater the proportion of householders who received installations in a project, the greater the overall savings achieved. Therefore, the design of the projects – how many householders were included and how much budget they were allocated – was a decisive factor in the outcome of Green Streets. Casterton and Newmill Village are both outliers with 0 per cent and 100 per cent installations respectively and with small numbers of participants.

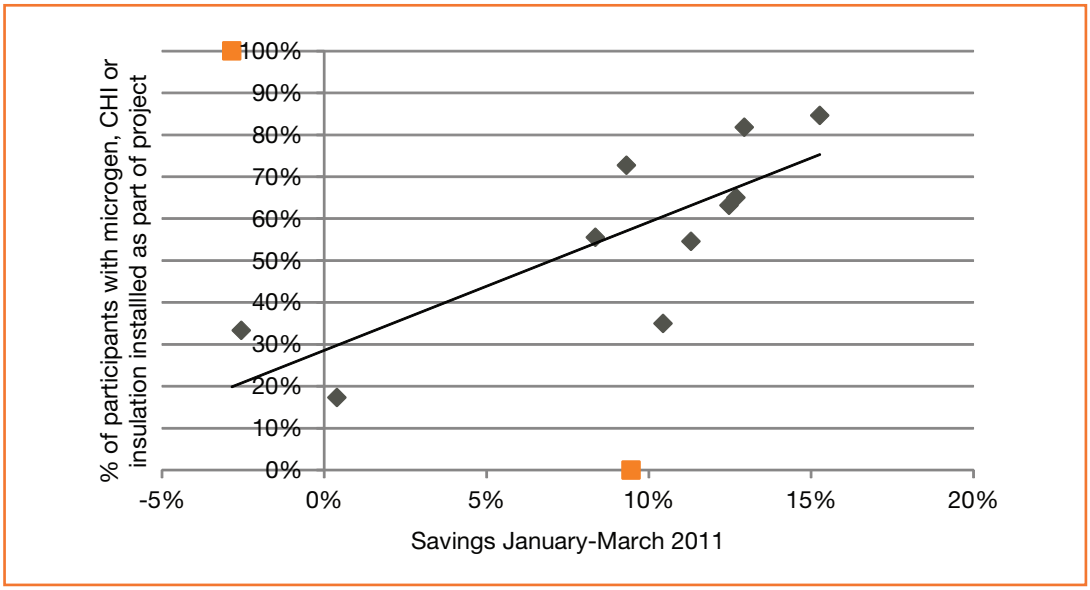
4 CO_2e emissions saved is influenced by both the level of energy savings and the balance of energy saved between electricity and gas, as electricity use emits over twice as much CO_2e as gas. Therefore it is possible to save energy while at the same time increasing emissions, and energy saved does not directly correspond to reduced emissions.

Figure 3.1
Energy savings achieved by households



Results for Eilean Eisdeal and Ingram Village have been omitted from this chart as they predominantly used electricity and non-metered fuels for heating, which generated anomalous results.

Figure 3.2
The relationship between householder energy savings and the proportion of households with measures installed



Projects have also had impacts on energy use besides those achieved by the larger technologies, although these are fairly small.

- Those householders that had no installations achieved savings of 1.4 per cent in the period January to March 2011 (compared with 8.3 per cent for those with installations).
- The estimated effect of the project on behaviour change for energy saving is 2 per cent.[5]

The fact that the community groups had to manage and administer a large number of activities within their projects, far beyond changing participating householders' behaviour, is likely to be a key reason behind these low results. Impacts of the projects in other areas have been more pronounced.

5 Although an overall statistical model of energy savings could not be estimated (models typically explain just 3–5% of the variation in energy saved) regression models that attempted to remove the effect of installations and community-level effects found that the average energy saved after these factors were accounted for was 2%.

Financial impacts

The gains for some of the community buildings have been significant (see Table 3.5). For example, Beccles Lido believed their range of energy measures had led to a reduction in their running costs of 25 per cent for electricity and 15–30 per cent for gas.

In addition, the improvements in comfort felt in some of the community buildings had led to an increase in use. As one community leader described:

> **'The new boilers in the community centre have made an absolutely phenomenal difference to that building. Even yesterday at the beginning of the week I was talking to the Chair of that committee and he was saying he strongly believes that had we not been able to do that they would have fast been losing users because it wasn't possible to carry on any more because they had no heating.'**
> Community leader

This is evidence of increases in economic productivity being decoupled from carbon emissions. This is discussed further in Box 3.1 (over).

These financial benefits made a big difference to many of the community building occupiers and community groups, enabling them to focus less on consistently fundraising to pay energy bills and more on funding other projects of community benefit, as the following quotes describe. The certainty of regular income created by the FIT was particularly welcome.

> **'Getting the solar panels and the feed-in tariff, it's a major boost for the club because it means [the other community leader] and I don't have to go looking for the money for funding any more. We're hoping that will pay for the running of the club.'**
> Community leader

> **'That's the good thing about having some form of income, because all these community groups, halls and whatever are constantly having to fundraise and look for funding.'**
> Community leader

> **'Last year the borough slashed funding of about £2500 for the school, so that's basic for books, stationery, school trips, you name it. So when you start putting an extra £1400 into the kitty it means a lot to them.'**
> Community leader

The upfront capital costs for energy measures, and for renewable technologies in particular, are high and must be factored into any consideration of the financial benefits of a community energy project. These costs remain a key barrier for most communities and are discussed in detail in Chapter 4.

The householders also received significant financial benefits from their installed energy measures: each year they can expect to be £30,000 better off, or £66 per household.

Table 3.5
Financial benefits of community building microgen

Community	Community building	FIT generation	FIT export	Energy bill savings	Total	Projected annual financial benefits
Ingram Village	Ingram Village Hall	£1,985.70	£57.70	£288.48	£2,331.88	£2,667
Casterton Village	Casterton, Carnforth	£511.90	£17.02	£85.08	£613.99	£3,566
Bradford BMX Bandits	North View Road	£1,163.14	£38.66	£193.32	£1,395.13	£3,936
Llangattock Green Valleys	Llangattock School	£189.74	£6.31	£31.54	£227.58	£1,591
CF Bradford-on-Avon	Christchurch School	£345.33	£11.48	£57.40	£414.21	£1,953
Tackley Village	Tackley Village Hall	£511.90	£17.02	£85.08	£613.99	£4,292
Ham and Petersham	Strathmore School	£171.35	£4.98	£24.89	£201.23	£1,256
Ham and Petersham	Meadlands School	£143.23	£4.16	£20.81	£168.20	£1,050
Ham and Petersham	Russell School	£198.61	£5.77	£28.85	£233.24	£1,456
Beccles Lido	Beccles Lido	£93.86	£3.12	£15.60	£112.58	£1,026
Green Streets total		**£5,314.77**	**£166.21**	**£831.05**	**£6,312.03**	**£22,792**

Microgen installation for all communities: Solar PV

Box 3.1: Carbon and energy productivity

Decoupling increases in economic output and productivity from energy use and emissions of carbon dioxide is the holy grail of climate change policy. There is some evidence from the experiences of some of the Green Streets participants that this has been achieved.

The above results show that by implementing energy saving measures in community buildings and installing microgen, communities have reduced energy use and CO2e emissions while maintaining the same level of productivity (for instance, the same number of meetings taking place in the community hall, the same number of pupils in the classroom, the same number of customers in the community shop).

However, in some cases, the measures implemented have facilitated an increase in productivity (more meetings, a higher number of users, more customers and higher receipts) for a reduction in energy use and CO2e, which is evidence of decoupling. For instance:

- By installing solar PV to power floodlights, the Bradford BMX Bandits sessions in Peel Park now take place twice a week all year round, whereas before only one weekend session was possible during winter months. This increased consistency has led to an increase in user numbers per session from around 25 to more than 75. Therefore they have seen an increase in revenue of about 600 per cent during the winter months. Their emissions have fallen dramatically and, because they are benefitting from solar PV and the FIT, their costs have fallen too, enabling them to invest in more equipment.
- Horncastle's community centre, which benefitted from a variety of energy efficiency measures including loft and cavity wall insulation and thus enjoys increased levels of comfort, has also been able to expand its services, with four new groups now using the centre and an increase in private hire for parties and weddings. Again, this has been achieved while making savings in energy use and emissions.
- Before it was purchased by the community, local authority-run Beccles Lido attracted an average of 351 swimmers per week over a 2008 season spanning 25 weeks. After renovation by the community in 2010, which included Green Streets measures to slow down heat loss from the pool with better lining and a cover, in five weeks of operation the pool attracted an average of 1,296 swimmers per week. Productivity and income have increased significantly while energy use and emissions have fallen. Costs have also fallen significantly.

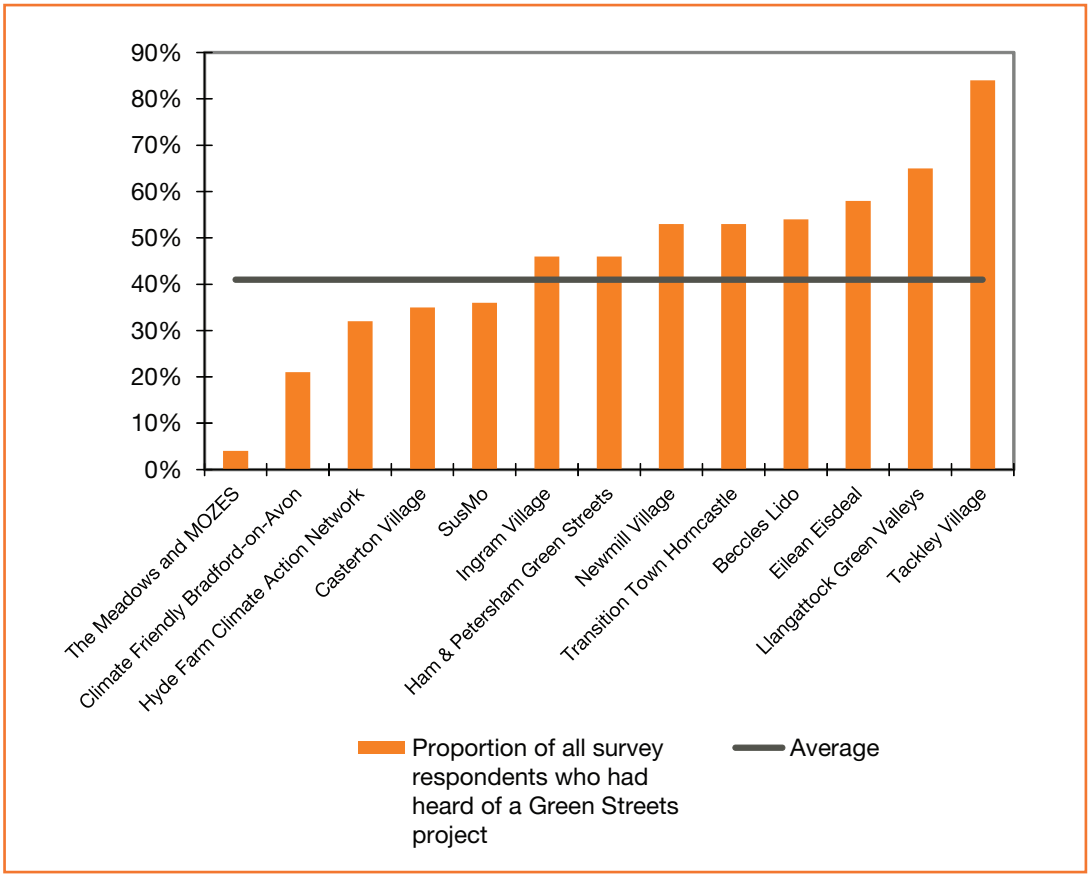
Engagement impacts

Advocates of community energy projects claim they can be highly effective at engaging people and have important impacts on behaviours and attitudes towards energy use. Until now, evidence of this has been anecdotal. Findings from Green Streets, however, suggest these claims are indeed true. The projects have had pronounced impacts on attitudes towards installing energy efficiency measures and microgen in their wider communities.

Forty one per cent of survey respondents were aware of a Green Streets project (see Figure 3.3). The engagement efforts of the community groups were instrumental to this. The most common ways people had heard about a project were via a leaflet (1 in 4), through a community organisation (1 in 4), through word of mouth (1 in 4) and through local media.

The very low level of awareness in the Meadows and MOZES was likely to be because no work had occurred on the community building by the end of the challenge and it was located in an area separate from the households, on the other side of a major road. Climate Friendly Bradford-on-Avon and Hyde Farm Climate Action Network were identified previously as 'campaigning groups' with a strong focus on engagement in their projects. However, they were based in locations with very high population densities and the outcomes of the survey suggest that effective engagement will be harder to achieve in urban areas. The very high level of awareness in Tackley may be due to the high level of connectedness between groups within the village reported by the community leaders.

Figure 3.3
Community awareness of Green Streets projects[6]



Critically, for many, the awareness of a Green Streets project had translated into changes in attitudes towards energy related behaviours.[7] We asked a number of questions solely of those respondents who knew about a Green Streets project and found:

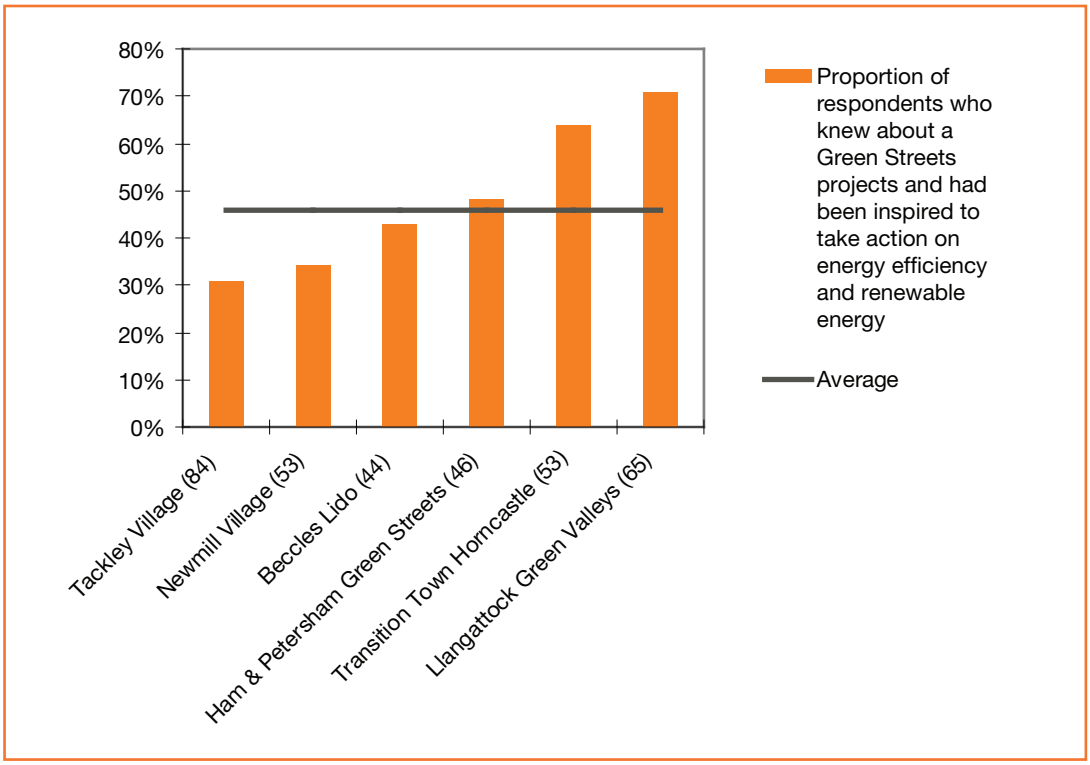
6 The results of Bradford BMX Bandits have been omitted as the survey results were erroneous. The name used for the community building in the survey was not the same as the one used commonly in the area.

7 Stated behavioural intentions will not necessarily translate into actual changes in behaviour, nevertheless, should only a limited proportion of respondents follow through on their intentions then the impacts of the Green Streets projects remains pronounced.

- 30 per cent said being aware of a Green Streets project had changed their attitudes towards energy efficiency and renewable energy.
- 46 per cent had been inspired to take action on energy efficiency and renewable energy. Of these:
  - 50 per cent had been inspired to take action on insulation
  - 23 per cent had been inspired to install a new boiler
  - 11 per cent had been inspired to install solar PV panels
  - Many had been inspired to take smaller actions, such as installing energy efficient lightbulbs and switching off plugs.
- 61 per cent said they would be more likely to take action in the future. Of these:
  - 61 per cent of these said they would change their behaviours to reduce their energy use.

Figure 3.4 shows the proportion of respondents who knew about a Green Streets project and had been inspired to take action on energy efficiency and renewable energy. Project results are limited to those with over 40 responses, enabling cross-comparison. Llangattock Green Valleys and Transition Town Horncastle had the highest proportions. This correlates with the high number of activities they recorded in their trackers, suggesting their emphasis on engagement had paid dividends. While simple awareness of the Tackley Village project was significantly higher than for these two projects, it had been less effective at translating this into changes in attitudes.

Figure 3.4
Impact of Green Streets on attitudes within local communities



Note: Limited to those projects with more than 40 survey respondents to this question.

Our findings also suggest that the installation of microgen measures could have impacts on attitudes and behaviours. As the quotes below show, community leaders and householders reported instances where a community member wanted to see a neighbour install a technology before installing it themselves. This suggests that as increasing amounts of microgen are installed into communities a 'multiplier effect' comes into play and the pace of deployment accelerates.

'Our neighbour is thinking of getting a [solar panel fitted] so we'll probably wait and see how she got on with it because I think where her

house is it would be suitable for it, but I kind of want to wait and see how somebody else got on with it first.'
Householder

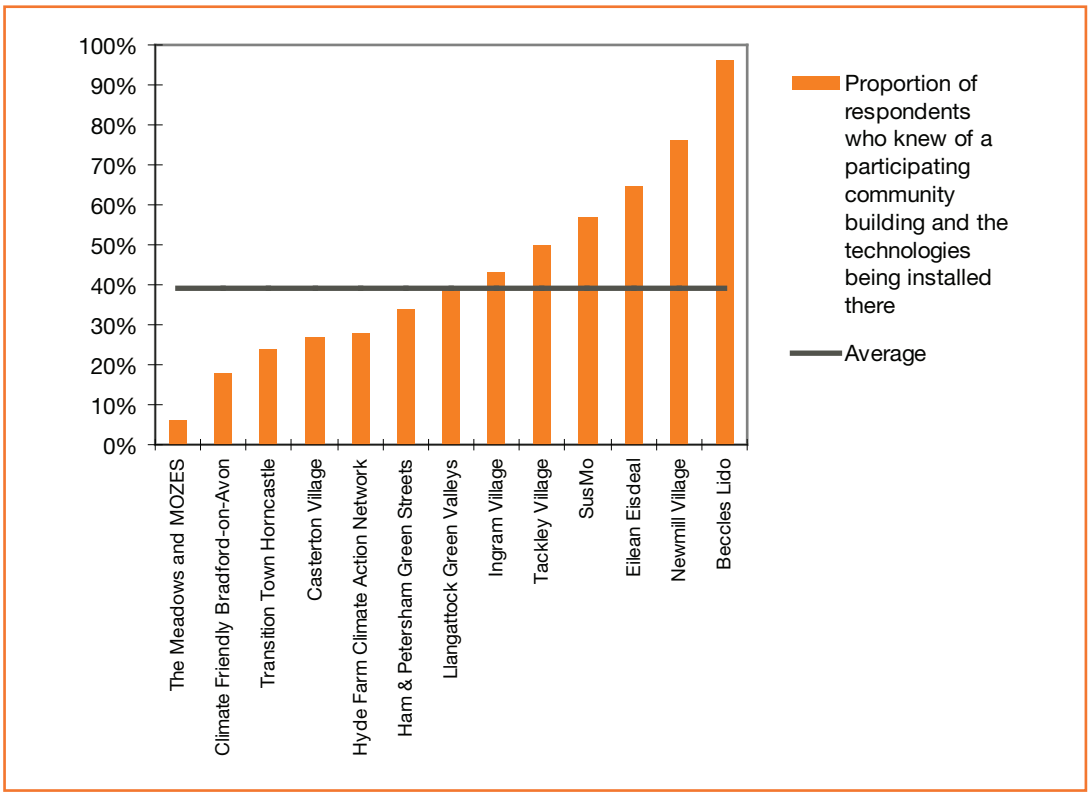
'My father-in-law, he's had solar panels fitted and his neighbours have been in touch with him and said, "What are these? What do they do?" and two of them at least wanted surveys doing.'
Community leader

While this impact was most commonly referred to in relation to household installations (it is likely people want to see a technology working in a similar way to how they themselves would use it) it was also referred to in relation to the community-scale installations:

'The fact they've installed solar panels … at the lido as part of that project has influenced us, yes.'
Householder

This suggests that community energy projects focused on improving community facilities, and not on engagement, could still have beneficial impacts on attitudes and behaviours.[8] As large numbers of people often use or are at least aware of community facilities, this potential may be significant. The average proportion of all survey respondents in each project who were aware of a Green Streets community building was 87 per cent. Of these, 39 per cent also knew about the technology that had been, or was due to be, installed there. This is shown in Figure 3.5.

Figure 3.5
Community awareness of Green Streets activities in community buildings



In addition to influencing attitudes and behaviours, the engagement work of the community groups has directly delivered emissions reductions. They are responsible for recruiting all of the participants in Green Streets, enabling the installation of energy efficiency and micogeneration measures into their properties.

8 Previous research has suggested that microgen can have impacts on attitudes and behaviours but that this is likely to be most pronounced when accompanied by awareness raising and education activities. See Sustainable Consumption Roundtable 2005.

Arguably these participants could have been engaged by other actors. However, the community groups demonstrated their effectiveness at engaging their peers. When bookings were made to carry out energy assessments on the households, in all but two of the projects the community group took responsibility, contacting the householders and making the booking. The success rate for carrying out those assessments booked by the community groups at the specified time was 90.2 per cent. For the other two projects, for which British Gas booked the assessments, a far lower rate of 71.4 per cent was achieved (see Appendix L).[9]

Householders gave several reasons why they had remained engaged in a project, as the following quotes illustrate. The energy and enthusiasm of their local community group was important for some:

'They're really active here … they're superb.'
Householder

'They are a very, very dynamic group … It's been a very impressive initiative.'
Householder

For many, the fact that the project was run by people from the community and would be of benefit to the community was very important:

'[The community aspect] was a very important part … If for example it had been offered just individually to householders or customers of British Gas then it wouldn't have had the same impact and involvement at all.'
Householder

'A lot of my friends were doing it anyway and I've met a lot of other friends through doing it, so [the fact it was run by the community] was pretty much the whole reason I did it.'
Householder

'It's a great opportunity for a place like this.'
Householder

Many householders did believe their project had delivered benefits to their community:

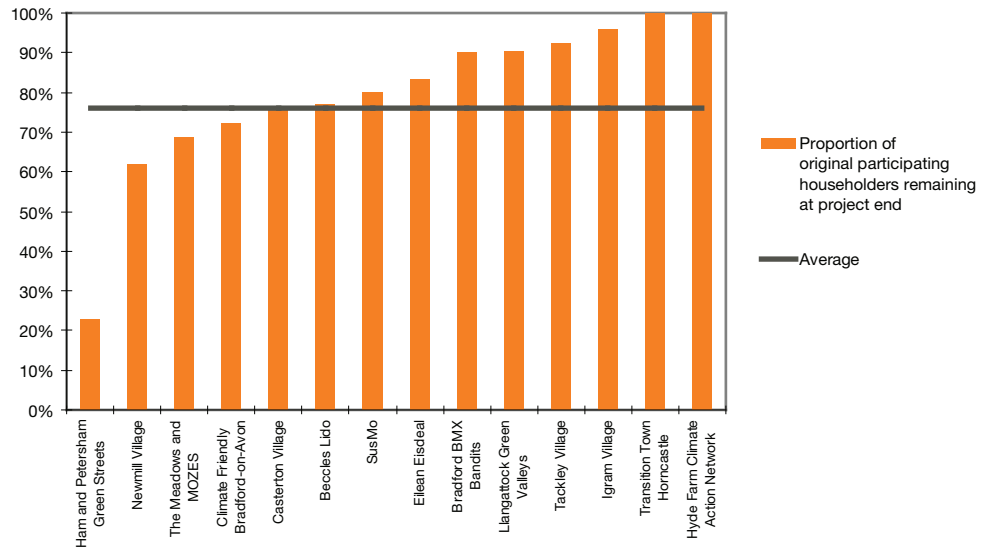
'It's to do with a community project I support which is the Beccles Lido, the open-air swimming pool ... It had been abandoned or it was going to be closed down by the council and it's been very successfully revived by the community project and the contribution that Green Streets has made to that is the most important one.'
Householder

'I think it's done a lot of good for the area and instead of it being guns and knives and killings, it's been positive and that's better for us … Green Streets has improved people's concept of the Meadows and it's also gone and helped with community spirits as well.'
Householder

The engagement work of the community groups was not all successful, with an average of 24 per cent of households dropping out (see Figure 3.6 over). Richmond had almost 80 per cent drop out. Both the community leaders and project manager believed this was due to poor communication by the community group; they were running a 'Low Carbon Zones' initiative in the area at the same time as Green Streets and differences in the remit of the projects meant many householders had signed up believing they would receive free solar panels, only to then be asked for part-funding, which put them off.

9 British Gas normally expects an access rate of around 60%.

Figure 3.6
Levels of householder participation throughout Green Streets



Several leaders believed many households and community building occupiers were involved just to receive free measures and were not interested in engaging further or changing their behaviours. Nevertheless, the installation of measures into their homes may have had impacts on their attitudes and behaviours. The energy monitors and regular submissions of meter readings, for example, were reported by some to have had significant impacts.

4. BARRIERS TO COMMUNITY ENERGY PROJECTS

The results of Green Streets 2 demonstrate that community energy projects hold significant potential to deliver energy savings and emissions reductions (and perhaps increased community carbon productivity), to change attitudes and behaviours towards energy use, and to bring wider benefits to communities. We have identified the capacity of community groups and the availability of finance as the key barriers restricting the ability of community groups to lead such projects. The lack of demand for solid wall insulation and the implications this has for heat pumps, and planning issues have also been identified as important barriers to community energy projects.

Community capacity

The capacity of the community groups to run their projects varied widely and was related to the skills and resources they were able to draw on, the way in which they were organised and whether they were perceived to be legitimate representatives of their community, and their information and advice needs.

Skills and resources

Each of the community groups drew on a range of skills and resources to successfully deliver their energy project.

Time was a primary resource. Those few community groups that included paid employees or people who were able to work full-time on their project unpaid were at a considerable advantage. Wide pools of volunteers supported the delivery of many of the projects. For example, Beccles Lido community leaders claimed that in summer 2010 they had several hundred people helping in one month, contributing an estimated 2,500 volunteer hours.

As the below quotes illustrate, many community leaders reported struggling with the high workload of their project alongside existing work and family commitments.

> **'It's been a pretty full-time job for me ... There have been an awful lot of people to deal with and we've tried to involve so many different things. We've been quite ambitious and we've organised an awful lot of events and that all takes a lot of time and fundraising and so on. It has been a very big-time commitment and it has caused some strain … because it's all voluntary.'**
> Community leader

> **'People are absolutely at their limit if not beyond of what they can do ... It's absolutely not sustainable at this level of input.'**
> Community leader

The capacity to lead emerged as key. Some individuals displayed confidence and entrepreneurial skills, proactively building relationships across their community, engaging different stakeholders and inspiring people to take part in their projects. Diplomatic skills were also reported as important. The following description was given of one community leader by a colleague:

> **'[Our community leader] has got an incredible amount of drive, energy and passion and he takes people with him, and you do need that in anything to make it successful. I think there's always somebody like [him] in a community.'**
> Community leader

Existing professional skills of community group members in fields such as management, finance and PR were all reportedly drawn upon, as was technological expertise relating to energy and construction.

Recent research suggests that skills and resources such as these are unevenly distributed across communities (Coote 2010, IPPR and PWC 2010). While communities at all socioeconomic levels will struggle to mobilise these resources, in general, the barriers for more disadvantaged communities are greater. That being said, some economically deprived neighbourhoods do have active and vibrant voluntary organisations, and strong and successful community leaders, with The Meadow and MOZES being an excellent example of this.

The financial benefits of an energy project can be proportionately bigger in more disadvantaged communities (the lower a person's income, the greater the proportional impact of every pound saved) and so targeted support could play an important role here.

Organisational capacity

The way in which some of the groups had organised themselves emerged as a barrier to effective decision-making, their perceived legitimacy in representing their community and their ability to manage finances.

It was often stated, across the interviews, that large committee structures were ineffective for making decisions. Governance arrangements with clear lines of responsibility were perceived to work better. Clear guidelines on effective models of governance would have been a useful resource for many of the groups. As two of the community leaders commented:

> **'There needs to be some sort of governance or authority, lines and limits of responsibility need to be clear otherwise I think you could easily fall out ... There is always somebody in the group who is bombastic and likes to take over and that is not necessarily the right person and sometimes these groups need facilitating initially to bring people forward.'**
> Community leader

> **'You can't have everybody making all the decisions all of the time, it just doesn't work.'**
> Community leader

This being said, community leaders who had chosen committee structures often believed the openness and transparency that came with this structure was important. Indeed, the perceived accountability of the community group, and its relationship to the wider community, was very important.

Some of the community groups appeared to have encountered resistance from local people to engage with their project because the legitimacy of the group in representing the community's interests was questioned. The length of time the groups had been established was partly a factor here, with community leaders of groups who had been established for longer periods believing they had developed high levels of trust, which worked to their advantage. However, the length of time it had been established did not determine the quality of a group's standing within their community, and some relatively new groups had built strong relationships quickly. The transparency in how a community group is organised and the ability for people to have an influence on decision-making both influence project outcomes.

The constitutional status of the community groups was also a barrier to managing finances. While some of the community groups had set up as a legal structure capable of managing long-term income streams from FIT payments, others had been dissuaded by the challenges they saw in doing so.

In some ways this is a useful safeguard: a community group that is unwilling to establish themselves as a suitable legal entity should not be able to take on the responsibility of managing large budgets. Where this becomes a problem is when the barriers to adopting the appropriate legal form are an inability to access the right information and support on how to do this.

Information and advice
All of the community groups required information and advice on their projects, in particular on technical aspects, which for the most part was provided by British Gas.

The technical aspects of community energy projects can be hugely complex and without expert advice will be beyond the capacity of almost all community groups. Both communities and householders need to know which technological solutions are most appropriate for their specific circumstances. Without specialist support it is likely that expensive mistakes will be made.

For example, the original technology solutions proposed by some of the community groups were altered following the identification of a more cost and/or energy efficient option in the energy assessments and feasibility studies. Also, as the following quote illustrates, many of the participating householders wanted clear guidance on which energy measures to install, but were not always satisfied that they had received this. As one community leader described:

> **'When they came and did the energy audits of the houses they tended to, in this area, because there is lots of potential in the properties, say "you could do any of these things". On my own property they said "you could do a ground source heat pump, you could do a biomass boiler, you could do solar panels, you could do external insulation". Yeah, well, great – all lovely. Now what are you recommending? Nobody is actually saying this is what the best solution is for your property.'**
> Community leader

Advice on the most appropriate energy solution will not always emerge directly from the market. An installer or manufacturer specialising in one technology will often promote this technology, irrespective of other options that may exist. Communities need to be educated about, and assisted in negotiating, these challenges within the marketplace.

There are great opportunities to be found in peer-to-peer learning between communities. Many of the community group leaders wished they had received a greater opportunity to share experiences with each other and also with other groups beyond Green Streets. For this reason, an online social networking facility was set up as part of Green Streets. Nevertheless, some of the community leaders maintained there were insufficient opportunities for sharing experience:

> **'The most useful thing we could have had was a storyboard or something that says "these are the things that are going to happen" so actually learning from someone else's experiences.'**
> Community leader

> **'If there had been someone else who had done a similar project that would have been really useful.'**
> Community leader

Availability of finance

Financing is arguably the fundamental barrier to community energy projects. Ninety six community groups applied to take part in Green Streets. While 14 of these were successful and received funding, 82 were not. They will need to source funds from elsewhere – but their options are very limited.

The costs for gaining planning permission can be problematic. Such costs may cover the completion of land surveys and technology feasibility studies, as well as submitting the application to the planning authority. They are borne at a high risk, as permission may not be granted. This put several of the community groups and participating community buildings off submitting planning applications.

Ham and Petersham encountered such barriers when several schools were unwilling to pay £1,000 to submit their proposed solar PV projects for planning permission. To overcome this, the costs were paid from the Green Streets budget with the understanding that if the application was successful the schools would reimburse the money. If the applications were unsuccessful there would be no obligation on the schools.

Upfront payments for measures where the potential payback is unknown or perceived as high-risk – which, in addition to planning, could include feasibility studies and domestic energy assessments – are always likely to limit uptake.

The capital costs of technologies are also a major barrier. The Green Streets projects had their measures funded, almost exclusively, by a grant from British Gas. If a grant for renewable electricity microgen is provided from a public sector body, in accordance with EC State Aid legislation and government policy as laid out in the FITs statute, it is ineligible for FIT income.[10] Grants from private sector organisations, such as British Gas, do not fall under the same limitations and are eligible for FIT payments. It is for this reason that Christchurch School in Bradford-upon-Avon gave up a £25,000 grant for solar PV panels they had been awarded through the Low Carbon Buildings Programme in favour of a grant provided through Green Streets.

Private sector grants are, therefore, an ideal source of capital for community projects, yet there is little incentive for them to be provided and no formal mechanism for doing so.

Solid wall insulation and heat pumps

Solid wall insulation has an important role to play in our emission reductions efforts. Not only can it bring about significant emissions reductions from a building, it is also vital to enabling the roll-out of heat pumps.[11] In Green Streets, much greater emissions reductions and further energy savings might have been generated had households and community groups fitted heat pumps. However, barriers to the uptake of solid wall insulation restricted this potential.

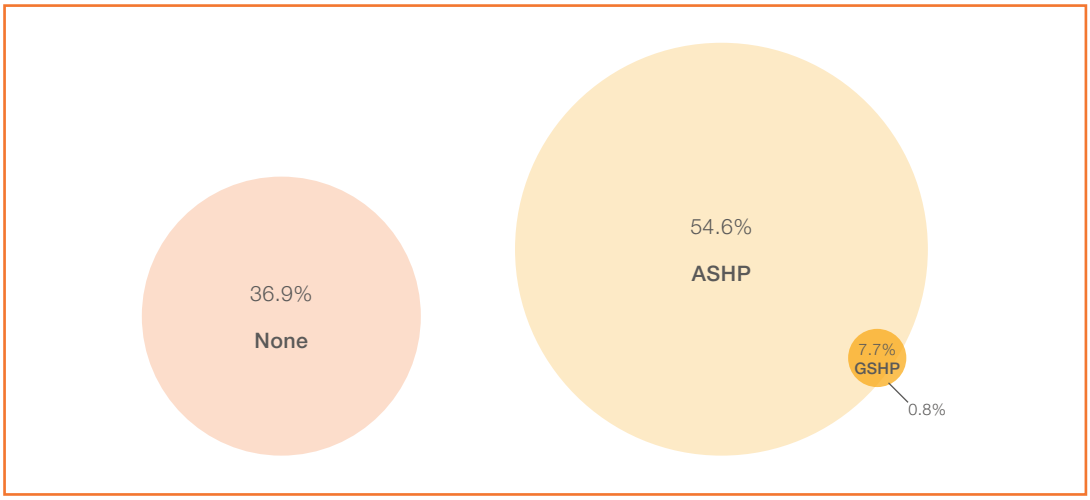
Even with the full grant subsidy available through Green Streets, uptake of solid wall insulation was very low. In total, 59 per cent of Green Streets properties had solid walls and, prior to Green Streets, 89 per cent of these (252) had no insulation. Only six of these received any solid wall insulation through the programme and in each case the installations were only partial, covering specific walls rather than an entire household.

Figure 4.1 (over) shows that half of the Green Streets properties could potentially have had an air or ground source heat pump fitted, as determined by the fundamental building structure (such as the amount of space) and resource availability.

10 Exceptions do apply in a small number of limited circumstances. Further details can be found at http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/feedin_tariff/fits_grants/fits_grants.aspx

11 Solid walls, if uninsulated, can be responsible for up to 40% of the heat lost from a home (EST no date b) and, as such, are a key determinant of a heat pump's coefficient of performance (COP). The COP is the amount of heat energy the pump produces compared to the total amount of electricity needed to run it – the higher the COP, the more efficient the pump. A property with low thermal efficiency will make a heat pump work harder to achieve a specified temperature than a better insulated property. In the worst cases, this could lead to an increase in overall energy use.

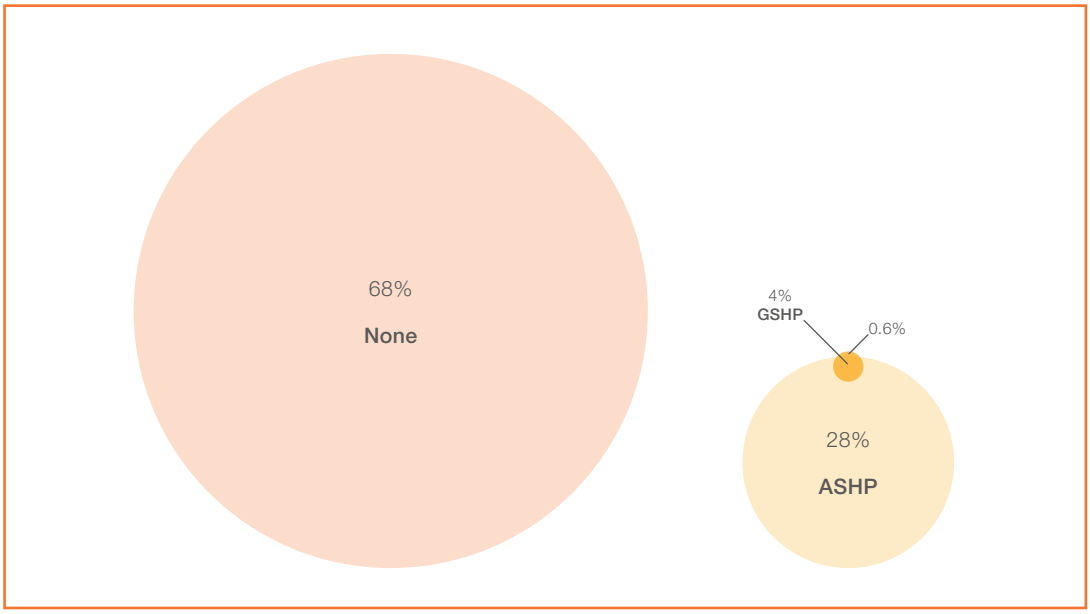
Figure 4.1
Theoretical potential for heat pumps in Green Streets households



ASHP = air source heat pump; GSHP = ground source heat pump

However, if those properties with uninsulated solid walls are deemed ineligible for heat pumps, as Figure 4.2 shows, this figure drops to just a quarter of properties.

Figure 4.2
Theoretical potential for heat pumps in Green Streets households, limited to properties without uninsulated solid walls



ASHP = air source heat pump; GSHP = ground source heat pump

Given that heat pumps are expected to play a major role in our emissions reduction efforts in the period after 2017 and particularly in the 2020s, it is vital that the barriers to installing solid wall insulation are understood and measures put in place to overcome them.

In Green Streets, the low level of uptake was driven by a number of factors. High upfront costs and long payback periods were a major factor: the community groups felt they could get more 'bang for buck' by investing their money elsewhere.[12]

But beyond this, a range of challenging non-financial barriers existed, including concerns about inconvenience and disruption caused by the installation, impacts on the aesthetics of the building, including loss of existing building features, the loss of room space, and not wanting to be the first on a terrace of properties to have external render applied. As several of the householders and community leaders described:

12 Solid wall insulation costs in the region of £12,750 to fit externally and £7,000 to fit internally. The payback period can be in the region of 32.4 years (EST no date b).

'I had somebody in to look at just one wall of our bedroom ... and it would have cost just under 1,000 quid. And you just thought "this is ludicrous, so way off most people's budgets".'
Community leader

'Because of the disruption that was involved, it was something we decided wouldn't be worth the hassle.'
Householder

'If you've got a young family and if you're having it put inside then you've got a lot of disruption inside the house with decorating and everything afterwards and also on the outside because it changes the look of your house.'
Householder

'It is the aesthetics, because they liked the Victorian brickwork, they feel that's why sometimes they've bought Victorian houses. It's also because of the internals – they didn't want to lose room size. I think for the future we've got to seriously look at something that probably goes internally that's no thicker than wallpaper otherwise people are just not going to have it.'
Community leader

'The cost is extortionate, disruptive and with a beautiful stone faced property you don't want to render it.'
Community leader

'[Many of the households] are one-bedroom cottages ... you really can't afford to lose any space in that. It's really very, very small. Just on the grounds of space alone people aren't going to accept that.'
Community leader

'Because mine's a Victorian terrace, for the front of the property it would stick out too much, obviously everyone would have to have it on the front. I don't think it would look nice and it would bring down the area.'
Householder

Furthermore, when householders were asked what they thought of a policy that obliged householders to install solid wall insulation when they rented out or sold a property, there was near unanimous agreement against.

This suggests that both financial and legislative instruments will have only limited impact on solid wall insulation uptake.

Planning

The majority of the residential renewable installations in Green Streets did not require planning permission as they were categorised as 'permitted developments'.[13] Planning permission was required for all of the community-scale installations.

The over-riding insight was how the processes and experiences in applying for planning permission varied significantly between locations. The lack of consistency across locations creates great uncertainty for community groups and developers but, as we can see, it does fall both ways – both expediting and blocking renewables deployment.

13 England and Scotland changed permitted development rights on 6 April 2008 and 12 March 2009 respectively, lifting the requirements for planning permission for most domestic renewables: solar PV and thermal – roof mounted and stand-alone – wood-burning stoves and boilers and CHP, ground source heat pumps and water source heat pumps (EST no date a).

The attitudes of the planning authorities towards renewables were described as very different. Some community leaders believed the planning authority in their area was inherently supportive of renewables; in others, it was the opposite.

While the community groups were mostly happy if they found their authority to have a 'pro-renewables' attitude, concerns were raised that in some circumstances this had gone too far and that insufficient consideration was given to an application. Poor planning decisions, such as granting permission for inappropriate developments, could serve to damage public attitudes towards renewables and undermine their rate of deployment.

Several of the community leaders and project managers suggested a lack of awareness or understanding about renewable technology by planning officers and councillors was a strong inhibiting factor. A 'pass the buck' working culture within a local authority, which may also be related to a lack of understanding of renewable technologies, was also blamed by some. As two of the community leaders described:

> **'[The planning officer] seems to have lots of misconceptions about the renewable technologies and energy saving measures on older buildings in particular. He's got the idea that panels are damaging and very detrimental ... He told me if people phone him with an old building and they ask for advice on what kind of things would be feasible to do as energy saving measures he tells them that old properties are already very eco, just by the nature of how they were built hundreds of years ago.'**
> Community leader

> **'Some of the council employees are so supportive and want to help you but couldn't. Then the other ones were like "It's not my job, I'm not employed to help with biomass boilers, it's nothing to do with me.". It's almost like it's not, "How can I help you?" It's more like, "How can I avoid having anything to do with you?"'**
> Community leader

Arguably, the perception of a planning authority is as important as the reality of its approach for, as was seen in relation to a number of buildings in Green Streets, a perception that permission is unlikely to be achieved will dissuade people from submitting an application and risking the loss of the associated costs. The communities that had the most successful relationships with their planning authorities believed it important to generate and maintain an excellent relationship with them from the outset of an energy project.

Informational requirements and the quality of communication also varied between locations, and is one area in which greater consistency should be achievable.

The independence and objectivity of the planning decisions were sometimes called into question. Some community leaders and project managers were unclear about the basis on which decisions had been taken. In several instances, influential individuals, in particular local councillors, were reported as having affected the outcome of planning decisions, as two community leaders described:

> **'What I think happened is that behind the scenes our local councillor got involved and I think that was probably more influential than anything that our architect did. She went above the planner who was dealing with our application's head.'**
> Anonymous

> **'On the planning committee itself there are people who have conservation interests and there was no way of getting around that. There was one councillor who was from a strong conservation background and that did make it difficult for us to count on them as objective judges.'**
> Anonymous

Again, this fell both ways – with some councillors supporting installations and others moving to block them. This raises concerns about the legitimacy and accountability of the decisions being made. Access to influential individuals is not evenly spread across communities and people with less access, such as the more disadvantaged and minority groups, will have less opportunity to influence decisions.

Finally, barriers to two of the community scale installations came from other people within their community. One objection related to an installation of a solar array on a church; the other, a proposal for a wind turbine on Eilean Eisdeal, resulted in a highly charged stand-off. The community leaders involved in the latter insisted the objectors to their proposal were a very small minority from their community; they reported having undertaken a survey and significant engagement with local people in an attempt to prove they had support for their proposals. The objectors accused these community leaders of misrepresenting the community's wishes. The deployment of wind turbines is a highly emotive issue and challenges to developments through the planning system are common.

If majority community-wide support is not given to a renewables development it is not clear it should go ahead. Community groups leading an energy project can attempt to overcome this barrier by generating and demonstrating support through their engagement work. However, in all the discussions of 'communities' it is important to remember that they are not cohesive units and are often highly contested spaces (Schmuecker 2011).

5. CONCLUSIONS

Green Streets has generated a range of important insights into the contribution communities can make to emissions reductions, as well as revealing how engaging in energy projects can have benefits for communities.

Across the wide variety of different types and locations of Green Streets community projects, measurable energy and carbon savings have been achieved. Primarily these savings have been achieved by installing microgen and implementing energy efficiency measures and, as such, the largest impacts have been seen in the final months, once these interventions have taken place.

Key to the community groups' success has been the generation of demand for technologies beyond that derived from just having funding available, although this has of course been a major factor. Also, the passion of the individuals involved, the ambitions of their projects to benefit the community and the desire of people to take part in something happening locally with neighbours all played important parts. Indeed, many participants, including the community leaders, took part for reasons other than reducing emissions, which shows that these projects have the potential to mobilise a wide array of people.

Moreover, the impacts of the projects have spread widely within their communities, as demonstrated by the survey of residents in nearby localities that found pronounced increases in people's intentions to install measures. If even only a portion of these survey respondents follow through on these intentions, the emissions reductions achieved through the catalytic effect of Green Streets would be significantly increased. The installation of microgen has had a greater influence on these changes than the installation of energy efficiency measures alone.

But the projects have not only achieved emissions reductions. They have also generated significant other benefits for communities.

The participating groups and buildings have benefited financially, both realising savings from reductions in energy bills and also often generating income from microgen installations via the FIT. What might appear as relatively small financial benefits can have big impacts on the operational costs of a community group and consequently support their wider remit of work.

In addition, some of the projects have enabled, through the use of energy technology, higher levels of productivity in community facilities. Not only does this mean more people can benefit for longer and – in theory – at reduced cost, but it also means that for the same or fewer units of energy and emissions of carbon, more community benefit is yielded. At a time when actions to curb climate change are focused on decoupling economic growth from emissions, this is an important story.

The government has repeatedly asserted its desire to see the benefits from the FIT and RHI accrue to individuals and communities, rather than private investors, and community energy projects are a key avenue through which this can be achieved. Due to the benefits of scale the projects offer – both to communities, who can drive down prices, and developers, who can benefit from the close proximity of installations – projects will undoubtedly emerge spontaneously. However, as it is likely this will occur only in better resourced and more capable communities and not where the benefits of community energy and microgen tariffs are needed the most, government intervention is warranted.

In addition, as the design and implementation of the Green Deal progresses, the perpetual challenge to generate demand for measures under the initiative must be kept front of mind; Green Streets demonstrates that communities can make a useful contribution, in particular on the back of microgen installations. This suggests that FITs could help with the delivery of the Green Deal, and so government should ensure it is thinking holistically across its retrofit policies and taking advantage of these synergies. Community groups may be able to contributore particularly for solid wall insulation where, on top of the high costs involved, as was reinforced by Green Streets findings, the non-financial barriers (including the inconvenience posed by the installation, loss of room space and the difference external render makes to the appearance of a property) are a looming challenge.

Green Streets also highlighted some barriers that exist with regard to planning. With important changes in train for the planning process, the role of community groups, with their ability to influence attitudes and mobilise support at the local level, is likely to become increasingly important. Planning will be a decisive influence on the large-scale roll-out of low-carbon energy infrastructure and DECC ministers need to ensure they are prepared for this shift by learning from experiences such as those provided by Green Streets.

Finally, the opportunity the FIT and RHI present to generate a long-term, secure income could play an important role in supporting third sector organisations to become increasingly self-financed. In today's austere times, when opportunities are sought to support the policy shift towards greater voluntarism and engagement from communities, energy projects could be a valuable resource.

In summary, the Green Streets 2 challenge has clearly indicated that:

- Communities want to take energy projects forward. They want to benefit from cheaper energy and capture much needed revenue from FITs, and some want to support action on climate change.
- Communities can play a role in engaging people in energy saving. This is a helpful insight for those planning the roll-out of energy efficiency measures under the Green Deal, and seeking to ensure that those who benefit from the FIT and RHI are those who need its benefits most.
- Community-led engagement is particularly effective in terms of enthusing people about microgen. Previous research has suggested that the impact of installing microgen on attitudes is increased if educational work is carried out alongside it and Green Streets bears out this conclusion.
- Not all communities want to undertake engagement work: they may want to bring benefits to their community simply by improving a community facility. However, a well-designed, installed and run community-scale energy installation can by itself influence attitudes, as well as yielding many direct (energy, carbon and financial) and indirect (increased productivity and efficiency) benefits.
- The government is concerned about renewables subsidies being captured by investors and middle men; Green Streets shows that communities can benefit if they are assisted with access to technology. This offsets the regressive nature of the way the FIT is funded (that is, by energy consumers). It also supports the expansion of the community and third sector.

However, communities face significant barriers when embarking on energy projects.

- Projects are complex and communities need significant human resources to open up opportunities and then capitalise upon them. These resources are not evenly spread and some communities will have better and deeper capabilities than others.
- Financing the purchase of the installations (capital costs) remains a key barrier.
- There are specific attitudinal barriers to the uptake of solid wall insulation that threaten to undermine the UK's domestic energy efficiency and renewable spatial heating roll-out. It will also constrain what community groups can achieve in attempting to act as energy catalysts when engaging with households.
- The planning process has been found to be a barrier in some cases and also highly variable in terms of outcomes.

6. POLICY RECOMMENDATIONS

6.1 Increasing community capacity and widening accessibility

Enthusiasm and commitment are important but insufficient to ensure the benefits of community energy projects are maximised. A range of skills and human resources are required to run projects such as those featured in Green Streets 2. These resources are not evenly distributed among communities and those of greater socioeconomic advantage are likely to be able to benefit more immediately and with less support. But this should not be the determinant of where community energy projects take place.

Communities also need advice on how to establish effective groups, how to work with their local community and how to manage finances. They need expert support on technology and technology-neutral advice. They also want and can benefit from opportunities to learn from one another's experiences.

Government advice for community energy projects until recently was provided by the Energy Saving Trust (EST) through its Green Communities programme. As a result of recent budget cuts, DECC has now taken over this function and has set up its Community Energy Online website.

This resource is aimed at providing support for local authorities to run their own projects, for community groups wishing to run projects, and for local authorities to help community groups. It is welcome but not yet fully functioning, and certain features of EST's support, it appears, are to be dropped: telephone support and individualised support from energy experts. There is a risk that community groups will be left less well served, rather than better.

Recommendations

- Communities need impartial, individual advice and support on the technology decisions they make. This must be provided, *ex ante*, by government.

There is a risk that communities will make the wrong decisions on technologies out of a lack of technological expertise; our experiences suggest people will often prefer a 'flashier' technology, such as solar panels, above energy efficiency measures. While many energy companies are increasingly positioning themselves to provide this advice, the business case for them doing so is not always robust. This is particularly the case for small- to medium-scale commercial properties, which are underserved by current provision: attention is focused on larger commercial properties, which offer higher returns, and the domestic market.[14]

In addition, not all companies can be relied upon to provide advice that extends beyond their immediate corporate interests. Government therefore must be the body for delivering advice to communities and this should be made available either face-to-face or over the telephone and not only through electronic media.

While this may be a costly approach and challenging in times of severe budget cuts, it is possible that at least a proportion of this function could be paid for by the groups themselves in arrears once the financial savings and FIT/RHI payments begin to flow. In principle, good advice should also save money, as it will help groups optimise their choices for technology and their implementation. Poor or no advice is likely to lead to sub-optimal choices and costly implementation.

14 For instance, we have heard anecdotally that large secondary schools can find advice and support for reducing emissions through bodies such as the Carbon Trust, which is unavailable to most primary schools.

- **Communities also need advice on how to run effective projects, including how to constitute themselves, how to manage themselves effectively, how to engage their communities, fundraise and how to manage resources.**

Community Energy Online must become a key resource for communities in this regard. DECC should also support initiatives that enable communities to network and learn from one another.

However, some communities will need help to make the most of these resources. To remedy this, one option is to ensure that 'community organisers', who form the lynchpin of the government's Big Society strategy for increasing community capacity in disadvantaged communities, are educated in the benefits of energy measures and are trained to help groups access these benefits, for example by directing them towards the right advice.

The promotion of energy projects to voluntary and community sector organisations could engage a new constituency in reducing emissions and bring social benefits through the financial benefits they would receive. The goal of reducing emissions is shared across government (in its Carbon Plan 2011). Departments should combine efforts and create resources that can function together.

- **Government should better understand the 'social returns on investment' community owned microgen could bring.**

This report points to the 'social value' that community energy projects can offer, for example by strengthening community cohesion via a mutual interest in saving and generating energy. Microgen may offer a 'social return on investment' above and beyond financial or energy considerations. David Cameron recently expressed his support for taking into account such non-financial returns in policy design (Cameron 2011), and so DECC, CLG and the Big Society team within the Cabinet Office should examine this in more detail.

6.2 Making finance available

The introduction of the FIT and the forthcoming RHI has opened up considerable opportunities for community groups in the field of energy projects. The long-term certainty of revenue these instruments create is of great benefit and can be significant to community-based organisations, but the capital costs of installing the technology required to benefit from payments is a major barrier. Without solutions that make capital financing available, the full benefits of community initiatives on energy will not be realised: projects will either not happen or revenues will be captured elsewhere, other than in communities where they are most needed.

Capital could come from two sources: government or the private sector. Government funds are limited and government appears inclined towards a regime in which installations funded with grants are ineligible for FITs payments – largely this is determined by state aid legislation at the European level, however the UK government appears to have gone further than the legislation demands by recently removing the *de minimis* grant exemption for small-scale projects (Ofgem no date), which could have been useful for community groups. The case with government loans on top of FIT payments is less clear, for while loans provided at concessionary rates would still be classified as state aid by the EC, the government has not issued a clear policy position on this issue. It is our understanding that loans from a public sector body for purchasing renewables provided at concessionary rates could still fall under the *de minimis* exemption and be eligible for FITs payments provided the overall level of support (the amount from FITs payments and the difference in interest to a commercial loan combined) is under 200,000 euros over three years.

Projects funded with a private sector grant capital are eligible for FITs payments yet – Green Streets notwithstanding – such funding is unlikely to materialise on a significant scale unless mechanisms can be put in place to support this. A potential source of capital is money from the 'allowable solutions' provision in the zero-carbon homes initiative.

The government wants the benefits of FIT payments to go mainly to householders and communities, rather than private developers. For these reasons it has brought

forward the fast-track review for large-scale solar PV projects and a full-scale review of all FIT levels, and excluded FIT businesses from Enterprise Investment Scheme (EIS) and Venture Capital Trust (VCT) investor tax relief. But, as well as seeking ways to bar private developers from capturing FIT revenues (which are, after all, funded by consumers), government should adopt measures to help drive revenues in the direction of communities.

Recommendations

- Government and local authorities could assist community groups to overcome this most-significant of barriers by making loan capital available at low interest rates.

Government could establish a community energy investment fund in which projects are bundled up and sold through vehicles such as bonds to raise capital finance (or this could be a function of the Green Investment Bank once it is in full lending mode). As the government would be the guarantor of the lending, interest rates should be concessional: a proportion of revenues would thus be left for groups and to maximise community benefit. Such a fund would also increase the level of incentive the government faces in ensuring that groups have access to good, impartial advice. Transaction costs for assessing the risks across a lot of small projects are high and pose a challenge; proposals exist for how such a fund could be operationalised to overcome these challenges (see Grant Thornton and Co-operative Bank 2011)

- Provisions for 'allowable solutions' in the forthcoming zero-carbon homes initiative could be used to provide private capital for projects.

A forthcoming report from the Zero Carbon Hub will introduce the proposal that property developers are able to offset emissions reductions that are not feasible in new developments by paying money into a fund that would, in the first instance, be used to support community energy projects contained in local authorities' plans. The report estimates that such a scheme may be able to leverage sufficient additional private sector capital to yield up to £1 billion per annum from 2019, when the rate of build of zero-carbon homes is expected to ramp up.

- The government should consider the introduction of differentiated levels of support in FITs and RHI, with projects of 'community benefit' receiving higher tariff levels than private enterprises.

A number of challenges would exist to such a move, in particular how to determine whether a project is of 'community benefit'. One option would be to introduce a 'community interest test' that looks at the constitutional status of group leading a project, for instance, whether they are a limited company, a charity or a Community Interest Company, and where the profits from the project are going. However, such a test would create additional administrative burden both for Ofgem and for the communities, and may create a new barrier to projects. To ascertain levels of support among stakeholders, the government should include a question about introducing differentiated levels support in the upcoming consultation on the full-scale review of the FITs.

6.3 Accelerating the uptake of solid wall insulation

Green Streets 2 energy and emissions savings could have been increased significantly had projects opted for more solid wall insulation. However, the cost and non-cost barriers were unattractive to most and are seemingly immovable.

In the UK, 6.1 million homes are constructed with solid walls, making up a massive 31 per cent of the nations' housing stock. To achieve the targets laid out in the Climate Change Committee's (CCC) Extended Ambition Scenario[15] 2.2 million solid wall homes will need to have been insulated by 2022.

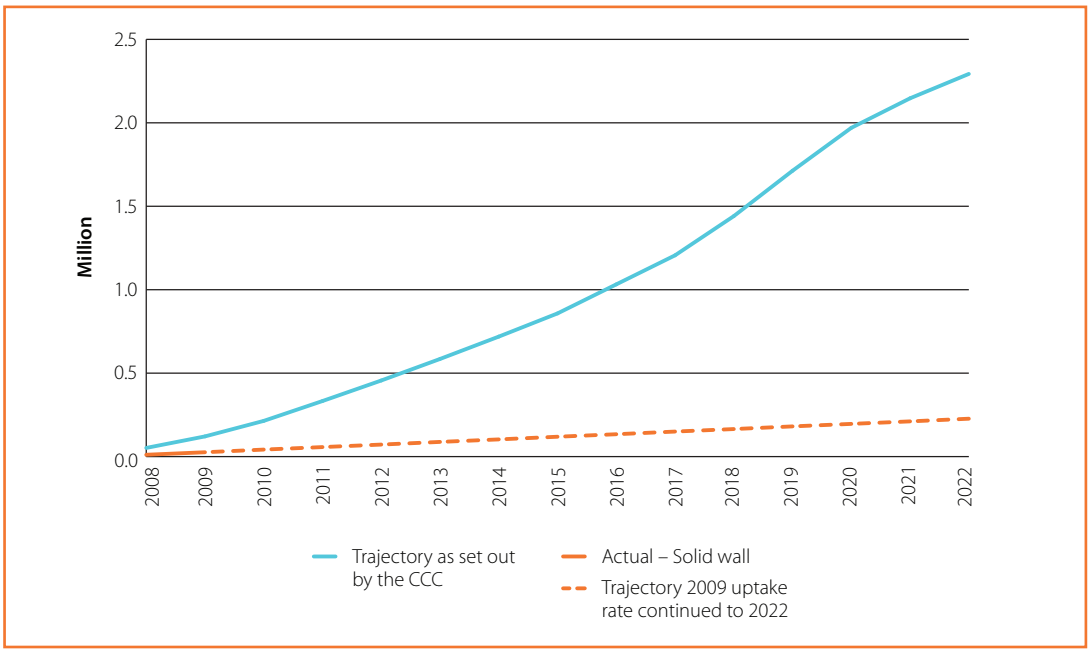
Progress to date has been slow, with only 15,000 properties upgraded in 2009 (CCC 2010). Furthermore, this has largely occurred in the social housing sector, where large-

15 The Extended Ambition Scenario was laid out in the first three carbon budgets and is broadly in line with current government policies. The committee has also laid out scope for an 'intended' emission cuts trajectory which would stem from a 30% cut being legislated at the EU level. This is something the government has recently been lobbying for at the EU level.

scale installation contracts can be more readily arranged with landlords. The far more challenging deployment, into privately owned housing stock, is yet to take place to any significant extent.

To meet carbon targets, the UK needs to achieve around 200,000 installations per year. The CCC expects the rate of installations to increase as costs come down, but interviews IPPR held with stakeholders involved in retrofit pilots found that costs are unlikely to fall significantly and are one of a multitude of barriers constraining uptake.

Figure 6.1
Solid wall insulation, 2008–2022



Source: Reproduced from CCC 2010: 90

Failure to meet these targets will result in additional carbon emissions in the period to 2022 (that is, missed targets) or in the need to find more savings in other sectors. Critically, failure to solve the problem of solid walled homes will also undermine the UK's roll-out of renewable heat technology, especially heat pumps.

Government has indicated that, due to its high cost, solid wall insulation will receive specialist support from autumn 2012 through an aspect of the forthcoming Green Deal called the Energy Company Obligation (ECO). Exact details of how this will work are yet to be formulated: it is clear from our findings and from wider intelligence gathering on progress in solid wall insulation that it will be desperately difficult to make installations conform to the Green Deal's golden rule and incentives will have to be significant.

However, some cost savings could be achieved and some resistance by homeowners removed by locally trusted community groups embarking on whole-street projects as part of the kinds of initiatives seen in Green Streets 2.

Recommendations

- A concerted and major government focus on solid wall insulation – a very British energy efficiency problem – will be required if household energy efficiency and carbon emissions targets are to be met.

Costs can be reduced in current methods of solid wall insulation in two ways: by achieving site-by-site scale (not insulating single homes, but whole streets, which reduces hard costs such as scaffolding) and by reducing labour costs, which can be achieved through the development of easier to fit materials (a move already underway among manufacturers). Neither of these approaches will transform the costs, but they will help and the ECO should focus on achieving maximum benefit in both respects. Community groups may be able to play an important role supporting the first of these aims by getting buy-in from whole neighbourhoods to carry out installations at the same time.

- Government should challenge UK energy innovators and house builders to achieve a step change in solid wall insulation materials by launching a nationwide solid wall innovation competition.

There is currently no step change innovation on the horizon but narrower internal insulation materials and a push for new materials for exterior application could massively increase uptake (which could, in turn, unlock more cost reduction). Reducing the costs of solid wall insulation will significantly reduce the costs of the UK's decarbonisation as a whole. There is also an opportunity for the UK to become a world leader in advanced processes.

6.4 Improving the Planning Process

At the domestic level, one change which has already been implemented means that planning permission is now not required for a range of straightforward projects. This classification of some renewable installations as 'permitted developments' significantly expedited the installation process for many Green Streets communities.

A government consultation has been held on extending permitted development rights to micro-wind and air source heat pumps on domestic buildings, and to wind turbines, ground and air source heat pumps, water source heat pumps, solar panels, and flues for biomass systems and combined heat and power systems on non-domestic buildings, but a response has yet to be issued. Clearly, the outcomes of this could be significant for community energy projects.

Many community scale energy projects however still require permission and typically encounter a wide variety of different planning experiences in different locations, sometimes being obstructed by or benefitting from the involvement of individuals influential in the planning process. Many planning officers and councillors involved in the projects demonstrated limited knowledge of energy projects or the policy frameworks that make them possible.

Guidance for local authorities on the government's renewable energy policies are laid out in Planning Policy Statement 22 (PPS22) (ODPM 2004). Authorities are intended to have regard to this when preparing local development documents and taking planning decisions. With the abolition of the Regional Development Agencies and Regional Spatial Strategies, the overarching strategic drive on renewables deployment for local authorities will be lessened.

The Localism Bill was introduced in April 2011 and is expected to be enacted in autumn 2011. It will bring major changes to the planning system that are likely to impact on community energy projects (CLG 2011). The bill is likely to enable communities to have a much greater say in local planning decisions, to allow small groups of between three and 25 people[16] to develop a 'neighbourhood plan' that will have a strong influence on decisions, and to make people eligible to contribute to a neighbourhood plan if they live or, as we understand it, 'want to live' in an area.

These developments are important as communities are contested spaces and planning is critical, not only as a means to ensure project quality but also as a process by which projects are formalised and made legitimate and thus disputes are resolved. Different groups with different interests and views will not necessarily agree on what is best for their area, meaning energy projects can be controversial.

There is lack of clear departmental responsibility for planning for renewables in government: it falls directly under the remit of CLG but is a crucial component of DECC's capacity to deliver low-carbon energy infrastructure. Green Streets has demonstrated how community energy projects can bring benefits to communities and it is therefore in the interests of both departments to work together and ensure planning policies are effective.

16 The Localism Bill as proposed specifies three people. This number has been a matter of considerable debate during the reading of the bill in the House of Commons and, while final decision has yet to be made, numbers of up to 25 have reportedly been considered.

Policy recommendations:

- Planning laws should be relaxed with respect to a wider range of energy and energy efficiency technologies than is currently the case and to a wider range of buildings.

The relaxation of planning requirements for many domestic renewable energy projects made many of the Green Streets installations a great deal more straightforward. This approach should be extended to other technologies: the government should move to publish quickly its response to the consultation and grant permitted development status to an extended range of technologies at the first opportunity.

- The Localism Bill must ensure neighbourhood plans are representative of communities.

The government's moves to empower communities in the planning process through the Localism Bill appear likely to assist communities with ambitions to develop energy projects. Its design – inevitably supportive of decisions taken at a neighbourhood level – may lead to a greater variability and uncertainty of outcome. It may even mean some local authorities and communities become less supportive of renewables. But where ambitious local groups exist – like those that have participated in Green Streets – the bill may provide support and impetus for their plans.

However, it is vital to ensure that the planning process is a resilient forum for negotiating and resolving disputes between groups with conflicting views within a community. The government should ensure the number of people required to form a neighbourhood group is towards the higher end of the spectrum of those being considered (up to 25) and that only those who live in an area should be eligible to be a member.

- Government should fund an educational outreach programme on renewables for planning officers and local councillors.

Planning officers and councillors need to know more about the benefits of renewable technologies as part of community energy projects so that their decisions are not distorted by a lack of information or incorrect perceptions.

In addition, with the loss of the Regional Spatial Strategies, and the emphasis on housing above sustainable development in the Localism Bill, it is important that government communicates the national strategic importance of renewables deployment to those at the local level.

Both of these needs could be addressed through an educational outreach programme for planning officers and local councillors. Lessons from previous initiatives should be learnt, including that a critical mass of people within a local authority, as opposed to a sole 'champion', needs to be educated if outcomes are to be improved.

While budgets are admittedly under pressure, this is important work to carry out. There is a risk that because responsibility for renewables planning falls across departments it will be overlooked. We think this risk should be turned into an opportunity. Green Streets has shown the benefits that can arise from community energy projects for both DECC and CLG: they should recognise this fact, pool resources, and co-fund an educational initiative.

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APPENDICES

A. Feed-in Tariffs

Feed-In Tariffs (FITs) for renewable electricity were introduced from 1 April 2010. Installers of small scale technologies, up to five megawatts (MW), are now entitled to receive payments for the electricity they generate and the electricity they sell back to the grid. A range of technologies, including wind, solar photovoltaics (PV), hydro and anaerobic digestion, are eligible. The tariff rates were calculated to deliver an approximate return on investment of 5–8 per cent and are linked to the retail price index, and installations are eligible for periods of up to 25 years.

There was widespread support for the introduction of FITs, although concerns have been expressed about the regressivity of the instrument (it is paid for by energy companies and so ultimately ends up as increases in consumer energy bills) and the fact that only people able to afford the upfront capital for the technologies are able to benefit. The cumulative cost to customers is anticipated to be £3.1 billion to 2020 and £6.7 billion to 2030. This would convert to an increase in annual household electricity bills averaging approximately £8.50 (1.5 per cent) over the period 2011–30.

In the October 2010 Spending Review, the government announced a cap on the amount of budget that would be available through FITs with the aim of saving £40 million in 2014–15.

On 7 February 2011, in response to unanticipated levels of deployment of solar PV, particularly at larger scales financed by institutional investors, the government announced its intention to carry out a comprehensive review of FITs. The government wants to ensure that money from FITs ends up in the hands of homeowners and communities. A fast track review of FITs for solar PV projects above 50 MW was begun immediately and has recently concluded. A review of all FIT levels is due to be completed by the end of 2011 with tariffs remaining unchanged until 2012.

B. Renewable Heat Incentive

The Renewable Heat Incentive (RHI) is similar to the FIT, only for renewable heat technologies. These include biomass boilers, air source heat pumps, ground source heat pumps and solar thermal. RHI will be funded out of general taxation and so it is a more progressive policy than FITs, although questions about who has access to capital for the upfront technology costs remain.

Cumulative subsidy costs of the policy are estimated at £22 billion; in addition to this there will be 'gross resource costs' which are estimated at £11.5 billion over the lifetime of the policy (30 years).

The scheme will be introduced in two phases. The first, beginning in autumn 2011, will introduce long-term tariff support for the non-domestic sectors, with some grant support being available for some households through a Renewable Heat Premium Payment. The second phase, which is expected to be introduced in October 2012 alongside the Green Deal, will see some form of long-term tariff support introduced for households, although details of how this will operate are yet to be determined.

C. The Green Deal

The Green Deal is a flagship policy of the Coalition government aimed at radically accelerating the installation of energy efficiency measures into the UK's housing stock. It is due to be introduced in October 2012.

At its core lies a financing mechanism that will allow consumers to pay for energy efficiency measures out of the savings those measures deliver to their energy bills. Measures will need to satisfy the 'Golden Rule', whereby the expected financial savings after installation must be equal to or greater than the costs attached to the energy bill. Critically, if a consumer moves out of a property and ceases to be the bill-payer then the financial obligation does not stay with them but moves to the next bill-payer.

The Green Deal is a market-based mechanism and as such does not involve direct public funding of energy measures.

The Green Deal will also include an obligation upon energy companies known as the 'Energy Company Obligation'. This will be directed at lower-income households, where the low level of energy use makes it very difficult to satisfy the Golden Rule, and also for properties that require very expensive measures, in particular solid wall insulation.

D. Research methodologies and caveats

Energy data analysis

Domestic energy savings were estimated by comparing energy consumption during the Green Streets period (January 2010 – March 2011) with energy consumption during 2009. Energy consumption was measured in most cases by participants submitting readings from their energy meters. This was supposed to take place on a monthly basis, but some communities and participants found it challenging to do so, and in almost all cases a full set of meter readings was not provided. Where meter readings were missing, energy use was modelled on the basis of prior period energy use. In order to ensure accuracy in the readings, professional meter readers conducted meter readings of participants twice during the project and once at the end. This report has focused on the readings from the last three months of the challenge.

Obviously some detail of 2009 consumption was required in order to create a profile of 2009 consumption, so those participants who could not provide any 2009 consumption data are not included in the analysis – this excluded 25 per cent of those still involved at the end of the project. Only 35 per cent of participants were able to provide full consumption data for 2009 so, in most cases, 2009 consumption had to be modelled on the basis of the partial year data that was provided, using industry standard techniques that match energy consumption with weather conditions. Similarly, in order to compare 2010 and 2011 consumption with the 2009 profile, the same technique was used to adjust for weather differences between the years. It should be noted, however, that 2010 and 2011 experienced particularly cold winters that may not be fully adjusted for – this should be borne in mind when interpreting the figures.

Estimating the savings in this way is dependent on the 2009 profile being accurate. This cannot be guaranteed for individual cases, but would be expected to reflect energy consumption on average.

The overall project analysis was undertaken for all participants for whom energy savings were available. The individual project savings figures were based on discounting the top and bottom 10 per cent of savers – this was to ensure that outliers did not skew the results for individual projects. The savings estimates are only a measure of the change in energy consumption between the 2009 consumption pattern and the consumption during Green Streets: they are not indicators of the overall energy efficiency of participants or projects. Indeed, those that came into the project already taking steps to save energy are likely to have found it more difficult to make additional savings.

All microgen data was submitted by British Gas to IPPR at the end of the challenge period.

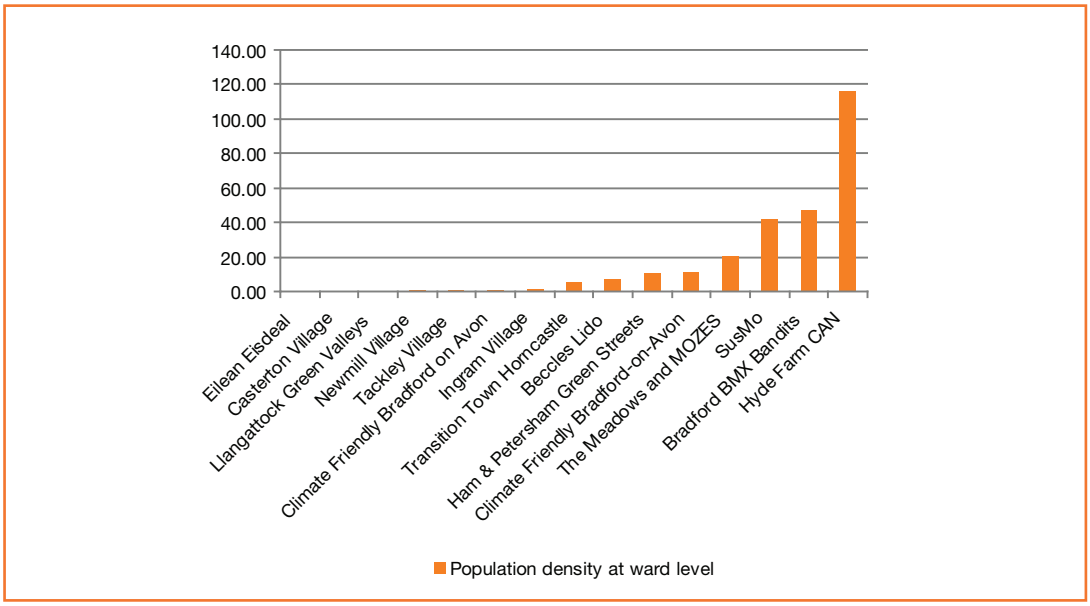
Qualitative research

In each case a semi-structured interview form, based around a discussion guide, was used. Interviews were transcribed and coded using an Excel grid format to identify themes, with quotes also being identified.

Community engagement impact survey:
We identified a central point between all the community buildings in each project area (using postcodes and then by eye) to function as a proxy for the mid-point of the local community. The Bradford-on-Avon project involves community buildings spread across two distinct settlements so two mid-points were identified. A circle was drawn around the centre point with a radius that was big enough to (a) include all community buildings, and (b) include a minimum of 300 properties (the number required to get 100 survey responses). Eilean Eisdeal was an exception, as the community is so highly rural that extending the radius to include 300 properties would have included properties that were so far away they would clearly have had no relationship with the community and community buildings. We extracted all of the addresses for each of these geographical areas using software 'AddressList' by Arcenciel, which is based on the Post Office's postcode address file. The order of these addresses was then randomised and interviewers went door to door to conduct the survey, with the aim of achieving 100 responses in each location.

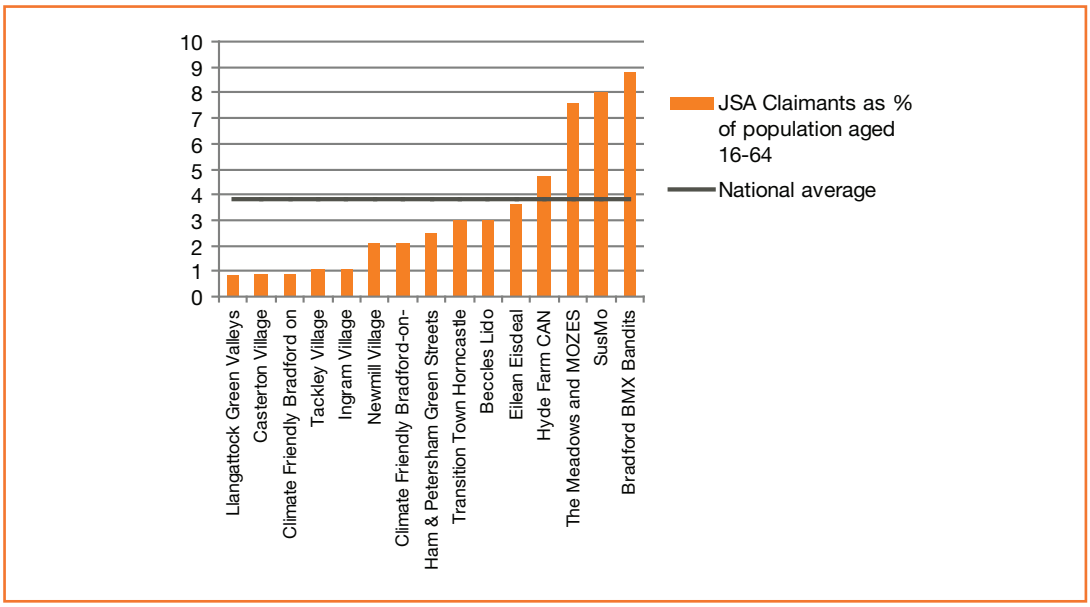
E. Rural/urban communities

Figure A
Population density of project locations, as a proxy for their rural or urban nature



F. Socioeconomic conditions

Figure B
Proportion of respondents claiming Job Seekers Allowance in the project locations, as a proxy for socioeconomic conditions

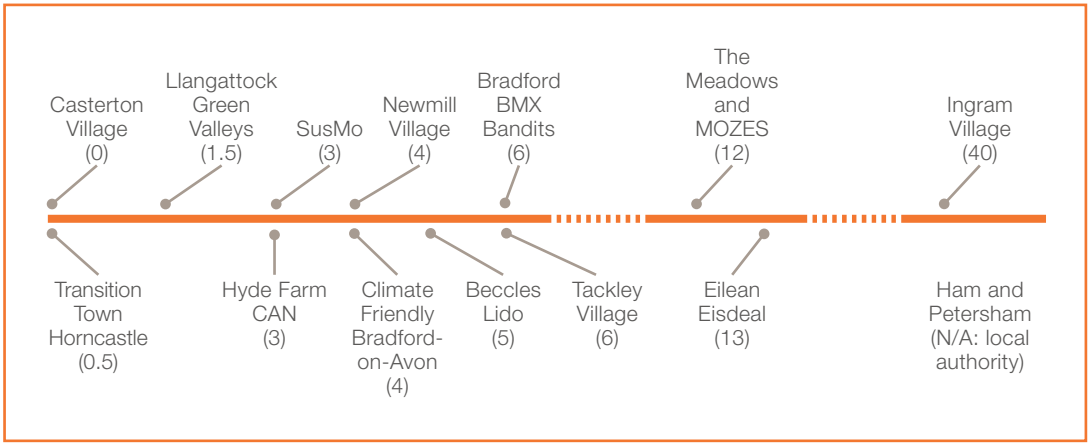


G. Organisational status of participating community groups

Organisational status	Community group
Informal groupings	
Unconstituted	Casterton Village
Constituted	Bradford-on-Avon Hyde Farm CAN SusMo Transition Town Horncastle
Registered charity	
Unincorporated	Ingram Village
Incorporated	Bradford BMX Bandits Newmill Village Tackley Village Beccles Lido Eilean Eisdeal
Community Interest Company	Llangattock Green Valleys
Limited Company	The Meadows and MOZES
Local Authority	Ham and Petersham

H. Age of community groups

Figure C
Timeline showing the length of time the community groups had been established



Numbers in brackets denote years since establishment.

I. Brief definitions of microgen technologies

Definitions taken from EST 2011.

Biomass – Biomass boilers are space heating systems for entire properties that are powered by fuel such as wood logs or pellets. Biomass stoves are used to heat individual rooms.

Heat pumps move heat energy from one place to another, such as from the ground, water or air to your central heating system and from a lower to a higher temperature.

Hydroelectricity systems generate electricity from running water, usually a small stream.

Micro CHP stands for micro combined heat and power. This is a heating technology which generates heat and electricity simultaneously, from the same energy source.

Solar PV (photovoltaic) panels convert sunlight into electricity.

Solar Thermal panels use sunlight to heat water.

Wind turbines at the domestic scale can be integrated into the local electricity grid or operate as off-grid devices and charge batteries when excess electricity is generated.

J. Comparing Green Streets participants with the UK housing stock

Figure C
House type of Green Streets participants

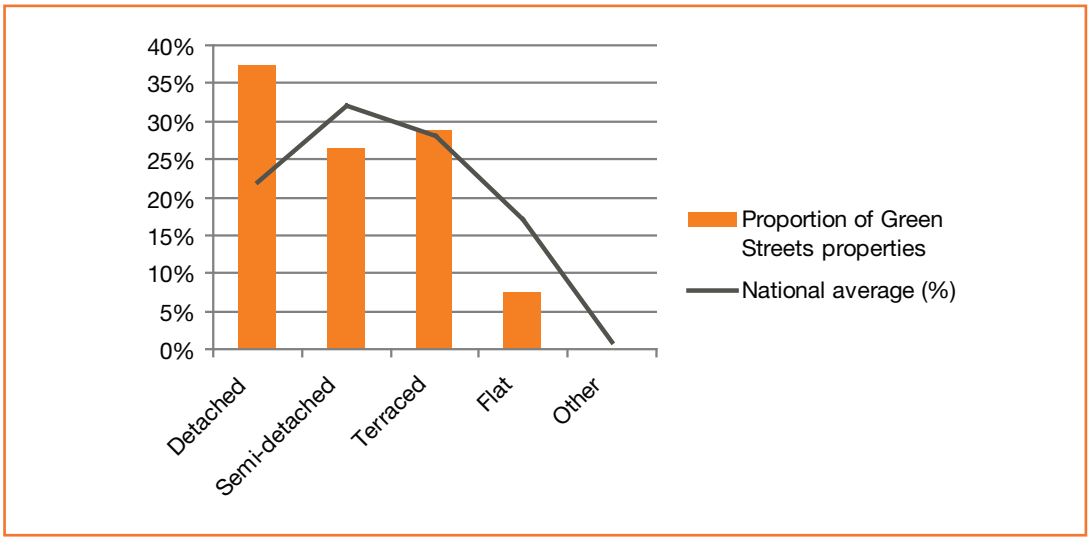


Figure D
Housing tenure type of Green Streets participants

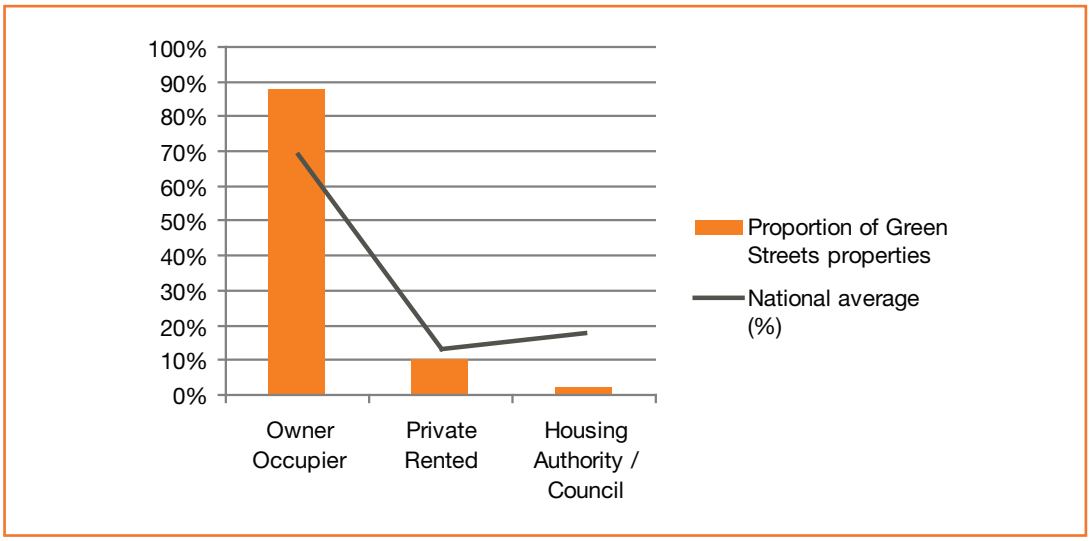
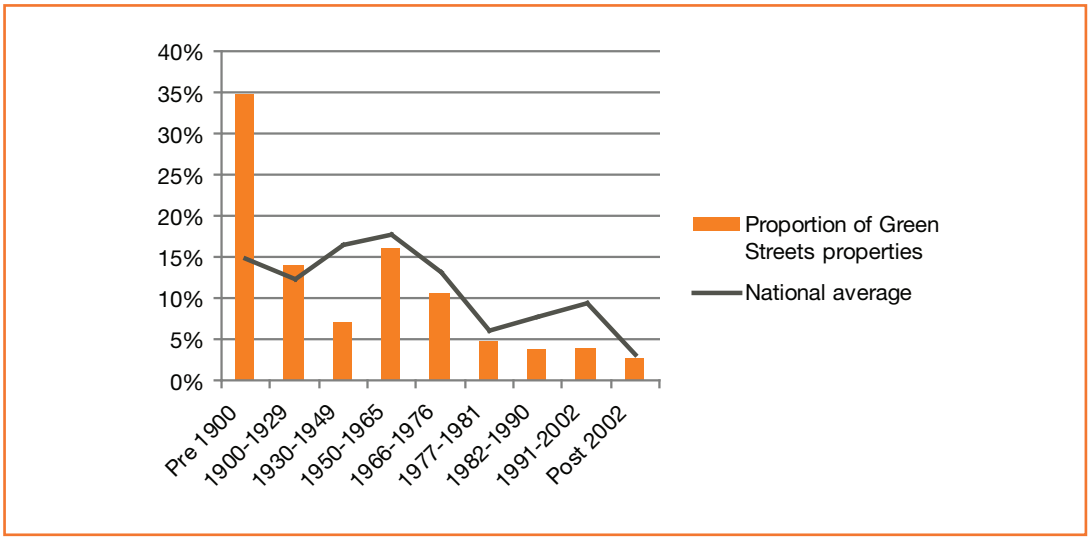


Figure E
Distribution of Green Streets households by year built



K. Installation dates of measures

Figure F
Community scale microgen

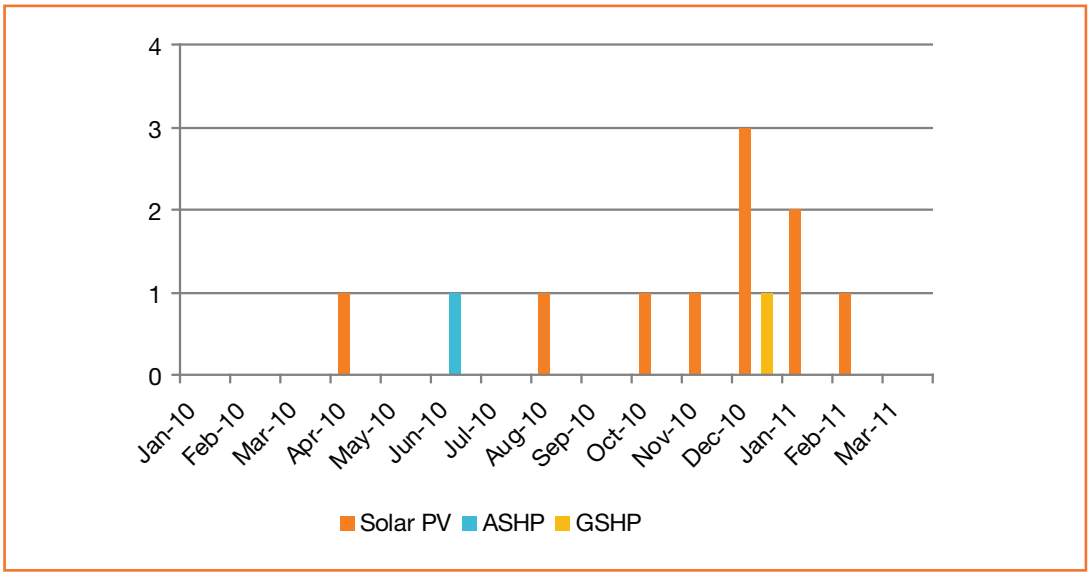


Figure G
Smaller household measures

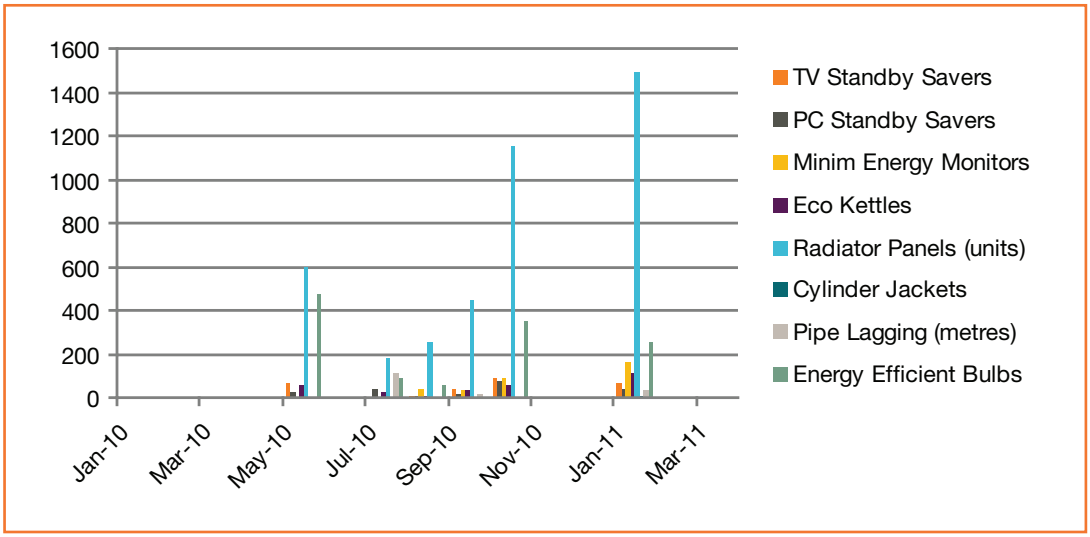
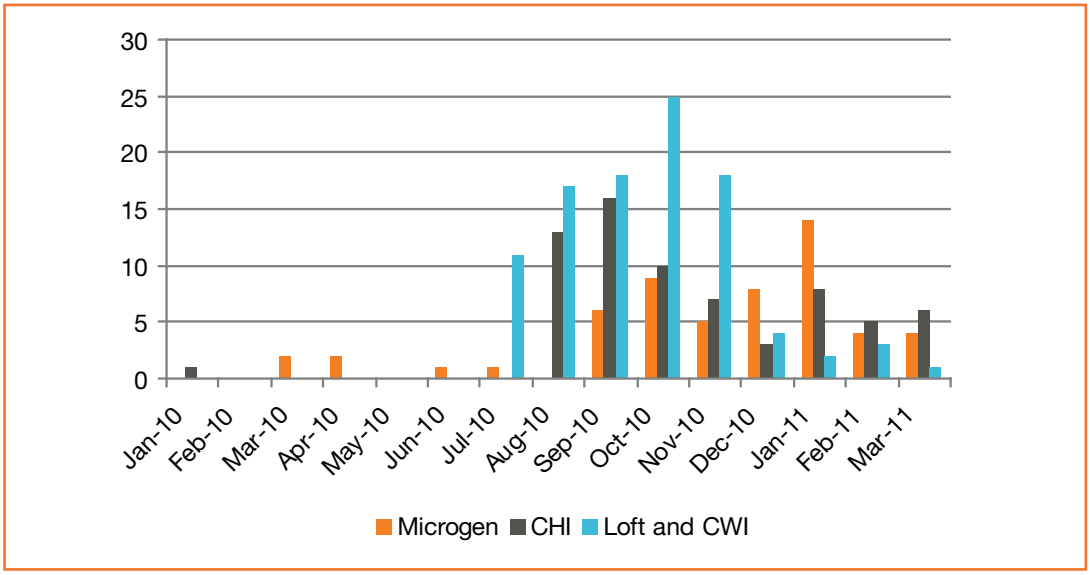


Figure H
Larger household measures



L. Access rates for carrying out energy assessments

Figure I
Access rates for carrying out energy assessments