Low Carbon Communities Challenge

Evaluation Report

A Synthesis Report by DECC, drawing upon independent evaluation research

The research findings are drawn from independent evaluation reports by research agencies, and therefore do not necessarily reflect the views of the Department of Energy and Climate Change (nor do they reflect Government policy).

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Executive Summary

The Low Carbon Communities Challenge (LCCC) was a £10 million, two year programme to provide financial and advisory support to 22 test bed communities[1]. Its aim was to fund, and learn from, community-scale approaches to the delivery of low carbon technologies and engagement activities. It was funded and supported by the Department of Energy and Climate Change (DECC), the Department of Enterprise, Trade and Investment (DETI) in Northern Ireland, the Welsh Government and Sciencewise-ERC.

Background

The LCCC deliberately focused on established organisations with a track record of taking action on energy and low carbon issues on a community scale. It offered capital infrastructure funding for carbon emissions reduction and free advice and support through a partner consortium (the "Specialist Support Team", or SST). Alongside the funding of infrastructure, and to ensure integrated approaches, projects were also required to deliver local engagement and behavioural change activities. The average LCCC award was £450,000, of which a minimum of 90 per cent was allocated for expenditure on capital measures.

The projects

The projects were diverse, representing a range of communities, delivery models and technologies. However, three characteristics were intended to be common to all projects:

- They would be geographically targeted, area-based initiatives;
- They would involve integrated packages of measures;
- They would draw upon sociological models of behaviour that emphasise the potential for social norms to nudge and trigger community-wide change.

They also represented two main 'types' of community-scale delivery: projects led by community groups ('community-led') and projects led by existing agencies (e.g. local authorities, Third Sector organisations) and targeted at communities ('community focused').

Evaluation

The purpose of this report is to provide a synthesis of the key learning from the LCCC. It draws on five evaluation strands, each undertaken by independent researchers and evaluators, that were designed to explore the LCCC from different perspectives (i.e. from the perspective of the projects themselves, the households living in the LCCC areas, and stakeholders across Government and the community energy sector). More detail on each strand is outlined in the introduction to the main report but, in summary, they were as follows:

- **Strand 1:** The carbon saving potential of the installed measures - involving a calculation of the theoretical carbon savings achieved through the installation of low carbon technologies.
- **Strand 2:** The Householder Experience - involving a household survey in the LCCC areas and detailed case studies with eight households.
- **Strand 3:** The community practitioner experience - involving a programme of co-inquiry and shared learning to facilitate local discussions with a view to consensus building and practical actions and steps going forward in each community.

[1] Four of the projects were not able to complete their projects to the LCCC timetable.

- **Strand 4:** Social Enterprise Action Research - involving support for projects on social enterprise (which was then in turn evaluated).
- **Strand 5:** Process Evaluation - involving an evaluation of the LCCC's management and a final capture of key learning, via interviews with projects and stakeholders.

The LCCC programme also provided a number of opportunities to share learning between and beyond local project teams including: an eight week pilot of an online portal, four thematic workshops bringing together practitioners with policy makers, a national conference and two pilot 'customer closeness' visits (whereby DECC staff visited LCCC communities to see installed measures and speak to occupants about their experiences of the technologies).

The evaluation was centrally managed by DECC and standardised across the programme to ensure valid comparisons between communities. It also included, for some of the strands, five comparison communities and national benchmarking. It is subject to a series of limitations, as follows:

- The evaluation was designed to test change across the whole community, not to longitudinally track the small group of direct recipients of LCCC technologies.

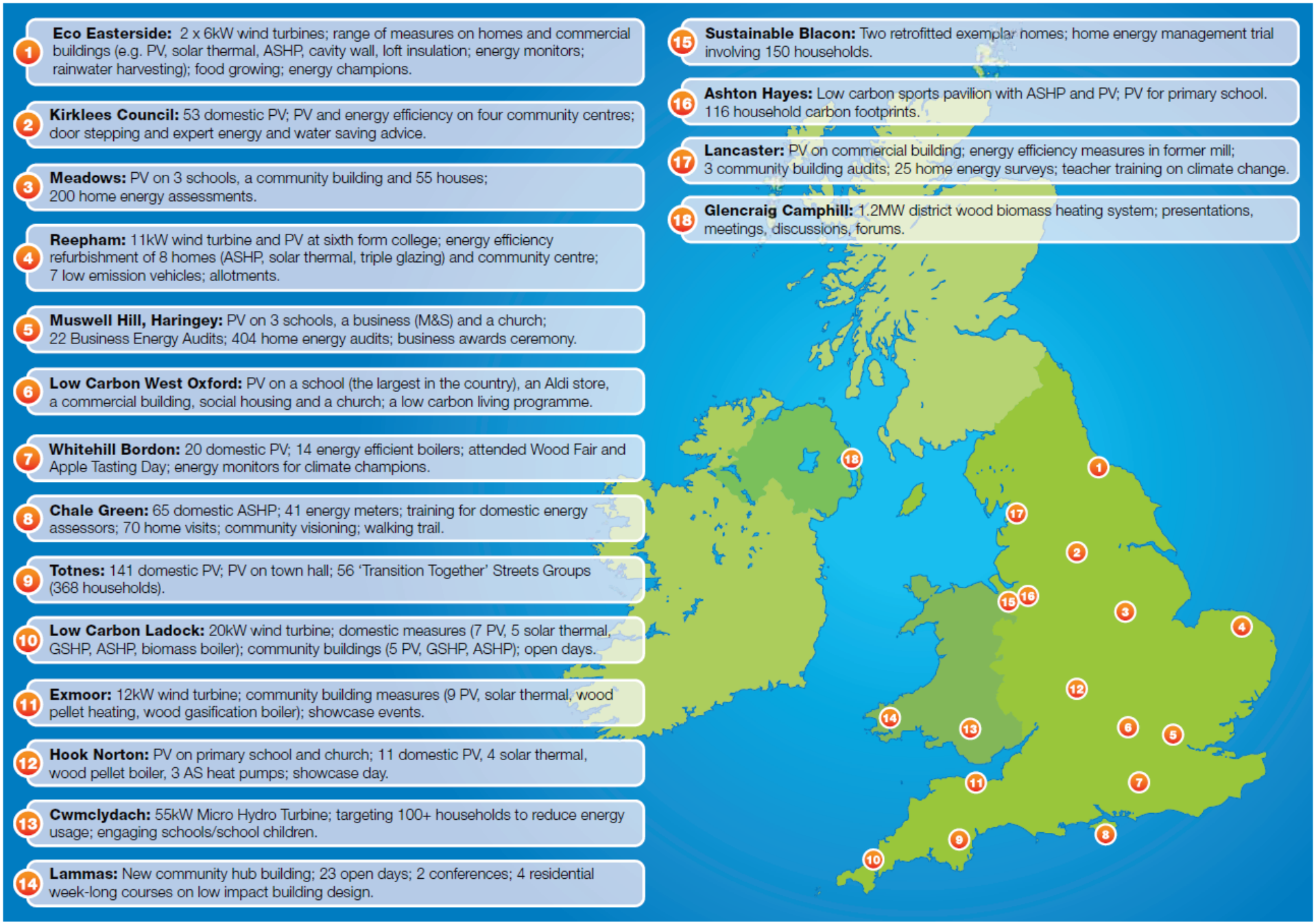
- There are some key questions around attribution which the evaluation cannot definitively answer, particularly in relation to what would have happened in the absence of the LCCC, and what projects would have done without the funding. This is particularly relevant to the LCCC given its deliberate focus on projects which were already established and already seeking funding streams to pilot initiatives and/or scale up existing initiatives.

Key Findings

1. Outputs

A total of 8,206 low carbon measures were delivered in LCCC areas (EST, Strand 1), ranging from low energy light bulbs and boiler jackets to a 1.2MW biomass district heating system. The measures were installed on a range of building types (e.g. domestic, commercial and community). Some projects also incorporated additional measures, such as low carbon vehicles and car clubs, allotments and - in one project - a rainwater harvesting system. Projects also undertook a range of engagement activities. The measures installed by the 18 projects that were able to complete their project to the LCCC timetable are summarised overleaf[2].

[2] Four of the original 22 projects - Awel Aman Tawe, Ballymena, Berwick and Cwm Arian - were not able to complete their projects to the LCCC timetable.


1 **Eco Easterside:** 2 x 6kW wind turbines; range of measures on homes and commercial buildings (e.g. PV, solar thermal, ASHP, cavity wall, loft insulation; energy monitors; rainwater harvesting); food growing; energy champions.
2 **Kirklees Council:** 53 domestic PV; PV and energy efficiency on four community centres; door stepping and expert energy and water saving advice.
3 **Meadows:** PV on 3 schools, a community building and 55 houses; 200 home energy assessments.
4 **Reepham:** 11kW wind turbine and PV at sixth form college; energy efficiency refurbishment of 8 homes (ASHP, solar thermal, triple glazing) and community centre; 7 low emission vehicles; allotments.
5 **Muswell Hill, Haringey:** PV on 3 schools, a business (M&S) and a church; 22 Business Energy Audits; 404 home energy audits; business awards ceremony.
6 **Low Carbon West Oxford:** PV on a school (the largest in the country), an Aldi store, a commercial building, social housing and a church; a low carbon living programme.
7 **Whitehill Bordon:** 20 domestic PV; 14 energy efficient boilers; attended Wood Fair and Apple Tasting Day; energy monitors for climate champions.
8 **Chale Green:** 65 domestic ASHP; 41 energy meters; training for domestic energy assessors; 70 home visits; community visioning; walking trail.
9 **Totnes:** 141 domestic PV; PV on town hall; 56 'Transition Together' Streets Groups (368 households).
10 **Low Carbon Ladock:** 20kW wind turbine; domestic measures (7 PV, 5 solar thermal, GSHP, ASHP, biomass boiler); community buildings (5 PV, GSHP, ASHP); open days.
11 **Exmoor:** 12kW wind turbine; community building measures (9 PV, solar thermal, wood pellet heating, wood gasification boiler); showcase events.
12 **Hook Norton:** PV on primary school and church; 11 domestic PV, 4 solar thermal, wood pellet boiler, 3 AS heat pumps; showcase day.
13 **Cwmclydach:** 55kW Micro Hydro Turbine; targeting 100+ households to reduce energy usage; engaging schools/school children.
14 **Lammas:** New community hub building; 23 open days; 2 conferences; 4 residential week-long courses on low impact building design.
15 **Sustainable Blacon:** Two retrofitted exemplar homes; home energy management trial involving 150 households.
16 **Ashton Hayes:** Low carbon sports pavilion with ASHP and PV; PV for primary school. 116 household carbon footprints.
17 **Lancaster:** PV on commercial building; energy efficiency measures in former mill; 3 community building audits; 25 home energy surveys; teacher training on climate change.
18 **Glencraig Camphill:** 1.2MW district wood biomass heating system; presentations, meetings, discussions, forums.

2. Outcomes

The LCCC led to a range of valuable outcomes in very different communities, summarised below. However, the reader is reminded that outcomes were largely self-reported by the projects themselves. Furthermore, and given the lack of a counterfactual in some cases, there are difficulties in attributing outcomes directly to the LCCC and understanding what would have happened in the absence of LCCC funding.

Outcomes at programme-level:

- Allowed the projects to accelerate and/or scale up existing activities, as well as trial new ideas (Strand 4, NEA). The LCCC operated like a catalyst fund in this respect, rather than a start-up fund.
- Installed low carbon measures that collectively represent a theoretical annual carbon saving of 3,062,091kgCO2/year (Strand 1, EST).
- Established a learning test bed of community energy projects (Strand 5, OPM).

Outcomes for the projects:

- Enhanced the credibility of projects within their communities, increased volunteering activity and improved relations with local stakeholders (e.g. councillors) (Strand 5, OPM).
- Enabled greater levels of partnership working, in turn increasing the projects' access to skills, resources and ideas (Strand 4, NEA).
- Led to new organisational structures, typically forms of mutual such as Community Energy Companies, Community Interest Companies or Social Enterprise (Strand 4, NEA).
- Supported several projects to develop new mechanisms (e.g. revolving funds) to convert one-off LCCC grant funding into a sustainable income stream (Strand 3, DbyD).

LCCC has led to the following outcomes in the communities:

- Increased awareness in the community about local action on energy and climate change, from 35% of households to 42% (Strand 2, GfK NOP).
- Led to greater recognition of low carbon measures, with 77% of households in LCCC areas noticing at least one or two solar panels in their local area, up from 46% pre-LCCC (and over and above the increases seen nationally) (Strand 2, GfK NOP).
- Supported the normalisation of low carbon lifestyles, with an increase (48% to 55%) in the proportion who consider 'reducing your carbon footprint' to be normal (compared to an increase from 40% to 43% seen nationally) (Strand 2, GfK NOP).
- There is little evidence of widespread change in attitudes, behaviours or the take up of low carbon measures. However, uptake of specific measures was evident in some communities – for example, households in West Oxford were more likely to have installed loft insulation (51% in 2010 to 61% in 2011), and those in Chale Green were significantly more likely to have installed both solar PV to generate electricity (1% to 15%) and air source heat pumps (0% in 2010 to 7% in 2011) (Strand 2, GfK NOP).

- Some projects contend that their most positive outcomes were social, with a range of new activities emerging (e.g. residents' associations, community cinemas and orchards, etc.) Community-scale installations also acted as symbols of modernisation and 'things getting better' in the area (Strand 5, OPM).

3. Programme management

The LCCC offers a number of key learning points about managing a community fund:

- *Lack of time* was frequently cited, both in terms of the application process and project delivery (Strand 5, OPM). This had knock-on implications for projects' ability to undertake engagement and shared learning. Some projects, however, said that the LCCC provided a focus and forced them to prioritise their time.
- *The minimal administrative bureaucracy* associated with the LCCC was welcomed by projects, particularly in light of the amount of time that projects needed to dedicate to other aspects of project management and delivery (Strand 5, OPM).
- DECC's *'Hands-off' approach* was welcomed by some projects who felt it aligned with a 'bottom up' ethos and signalled a degree of trust. Others, however, equated it to a lack of support, particularly in relation to the challenges around State Aid (Strand 5, OPM)[3].
- The premise of the *Specialist Support Team (SST)* was considered sound but the nature of the support fell short of the requirements of LCCC projects (who tended to require more practical, bespoke and advanced levels of support) (Strand 3, DbyD).
- *The LCCC Steering Group* was considered an important forum with a diverse membership. Some felt that it could have been more effective with a rotating chair, an opportunity for non-DECC members to set the agenda and a clearer Terms of Reference (Strand 5, OPM).
- Some stakeholder and project interviewees felt that the LCCC *lacked a clear focus* and did not articulate exactly what it was designed to achieve - particularly in relation to the eight 'Big Questions' (Strand 5, OPM).
- Most comments on the *LCCC evaluation* were neutral and, in relation to the DbyD co-inquiry strand, many projects felt the engagement support added value (Strand 5, OPM).
- Most projects valued the opportunities to *share learning*, although some activities were considered more useful - particularly those that brought practitioners and policy makers together (e.g. customer closeness visits, thematic policy workshops) (Strand 5, OPM).

4. Key learning

Delivery

- Projects dedicated considerable time to project management, more than they had anticipated (Strand 3, DbyD). Those that were able to draw on existing resources were more likely to 'hit the ground running' (Strand 5, OPM).

[3] Some projects initially did not understand the legal requirements in relation to State Aid, which was relevant particularly to those looking to generate and sell energy. In some instances this caused delays and required some projects to adjust delivery models

- Local authority and third sector-led projects tended to be better resourced and had easier access to guidance on specific issues (e.g. planning), although they sometimes found community engagement to be resource intensive and challenging (Strand 5, OPM). Community groups, on the other hand, felt that they had a 'licence to speak' to their community and could bring about behaviour change by embedding local ownership of both the low carbon assets and the project as a whole. They did, however, feel more exposed to risk - particularly in relation to legal and planning issues.

- Projects reported a series of external barriers, typically with the planning system, legal agreements and procurement (Strand 5, OPM).

- All projects needed access to professional support services - particularly legal support in relation to (a) social enterprise, (b) ownership and transfer of capital measures (e.g. renewable technologies) and (c) generated income (e.g. feed-in-tariffs). Projects felt that a 'light touch' toolkit would be valuable resource for future funds (Strand 4, NEA).

- Many projects benefitted from working in partnership (Strand 4, NEA), which often meant that specialist skills or infrastructure services could be accessed in-kind or at a lower cost.

- Regardless of their organisational model or 'state of preparedness', all projects described a *steep learning curve*. Many did note, however, that it had encouraged them to innovative and that - with an effective programme of dissemination/peer mentoring - other projects could benefit from their experiences (Strand 5, OPM)

- Some interviewees noted *cultural differences* in the way in which Government and community organisations operate which led to some tensions (Strand 5, OPM).

Technology

- Several projects favoured technologies with a visual appeal and which were eligible for FITs, both of which diverted projects' focus away from energy efficiency (Strand 3, DbyD).

- Projects learnt a lot about the performance of low carbon technologies and their appropriateness for different building types (Strand 3, DbyD).

- Some households flagged concerns about their new measures (particularly the usability of the control panels), while those with air source heat pumps had to psychologically adjust away from seeing radiators as a focus for heat (Strand 3, DbyD).

Community engagement

- Several projects faced resistance in their community - something they believe might have been avoided had they consulted from the outset (Strand 3, DbyD). The perceived 'fairness' of the distribution of benefits across the community emerged as a key issue.

- While financial savings were an important initial 'hook' to engage their local communities (i.e. extrinsic motivations), once involved people were motivated more by a sense of community and social interaction (i.e. intrinsic motivations) (Strand 3, DbyD).

- Visible measures sparked interest and instilled confidence (Strand 2, GFK NOP), with some households reporting that they explored solar panels after seeing neighbours, or 'people like them', install it. Households also cited the importance of 'trusted local advisors' or 'go to' local residents who had already had the measures installed.

Conclusions: Did LCCC achieve its objectives?

1. Does community delivery drive uptake of low carbon technologies and lifestyles?	There were very few community-wide shifts in attitudes, behaviour or the uptake of low carbon measures although there were some locally-specific increases in uptake. Projects appear to have been more successful in influencing some of the antecedents to change (e.g. awareness, community conversations). LCCC activities also supported the normalisation of renewables (e.g. solar panels) as well as the notion of low carbon lifestyles more broadly, and several projects appear to have been successful in influencing partners (e.g. in Chale Green the project influenced Southern Housing Group to commit to rolling out renewable technologies across its housing stock).
2. Does a community focus change people's attitudes in relation to larger renewable energy solutions?	Attitudes to solar panels and wind turbines were already positive and the LCCC appears to have had only limited impact in this respect. No change was detected in attitudes to wind turbines, although sentiment towards solar panels did shift from 'fairly' to 'very' positive.
3. Are community scale solutions scalable and replicable?	There appears potential for scale up, given that several of the LCCC projects were themselves a scaled up version of previous smaller pilots. However, there is no evidence about the potential for replication (e.g. another organisation adopting an LCCC approach). Some questioned how easy it would be for others to follow in the LCCC projects' footsteps, whereas others felt that learning from LCCC projects is replicable to others so long as adequate funding and dissemination/learning opportunities are available.
4. Do community solutions enable joined up deployment of government's policies/programmes?	There is a lack of evidence to fully address this question.
5. How can community delivery be supported and sustained?	The organisations funded by the LCCC were resourceful, independent and did not require (or want) significant hand holding. Indeed, a defining feature of several projects was their focus on converting a one-off grant payment into a sustainable income stream. However, projects still identified a series of areas for support, particularly access to financial and legal support, business planning and dissemination/mentoring.
6. What are the wider environmental, social and economic impacts of community delivery?	There is insufficient evidence to determine the wider environmental and economic impacts of community delivery. However, some projects contend that their most positive outcomes have been social.
7. What are the implications of the LCCC for the way national government designs and delivers programmes related to local action and the community sector?	• The challenging timescales of the LCCC were a frequently cited barrier. • DECC's interest was valued by the projects and they would like them to stay involved • More could be done to ensure that learning feeds into policy teams (e.g. along the lines of the customer closeness visits and thematic policy workshops). • Even though 'local' plays a critical part in terms of knowledge, trust and confidence, the role of partners like local and central Government provide a badge of legitimacy, a range of financial and non-financial resources, and the means to brand local initiatives in the context of a collective effort.
8. Did the LCCC as a programme create a buzz or stimulate delivery beyond the LCCC?	At the level of the communities, the LCCC stimulated participation and improved relationships (e.g. with elected officials). At a national level, interviewees felt that the LCCC had led to the development of new community initiatives (e.g. LEAF).

Contents

1. Introduction

This report outlines the key evaluation findings from the Low Carbon Communities Challenge (LCCC), a £10 million, two-year programme from 2010-12 to provide financial and advisory support to 22 test bed communities[4]. Covering 100,000 people living in 64,000 households across England, Wales and Northern Ireland[5], the LCCC was designed to learn from community-scale approaches to delivery that combine low carbon technologies and measures (e.g. solar PV, air source heat pumps, insulation measures) *alongside* engagement and behavioural change activities.

The LCCC was funded and supported by the Department for Energy and Climate Change (DECC), the Department for Environment, Food and Rural Affairs (DEFRA), the Department of Enterprise, Trade and Investment (DETI) in Northern Ireland, the Welsh Government and Sciencewise-ERC[6].

1.1 Background

The LCCC originated out of DECC's *Big Energy Shift*, a large-scale public dialogue involving nine energy fora across England, Wales and Northern Ireland. Each forum was comprised of 25-30 members of the public working alongside a number of stakeholders. This highlighted the potential benefits of providing households with integrated 'packages' of low carbon measures and support, delivered locally in the community.

In response, the LCCC was designed to focus on communities that were already taking action (e.g. they may have been a Warm Zone, eco-town or low carbon community, or a potential candidate for a wind farm, electric cars or community-scale retrofitting of homes). It sought a broad 40:60 split between 'first mover' communities (i.e. those already recognised as exemplars for their carbon reduction plans) and 'second movers' (i.e. with less experience but clear intentions and emerging plans of action for cutting carbon emissions and increasing sustainability). The LCCC offered these communities:

- Capital infrastructure funding for carbon emissions reduction to stimulate partner and community investment in the area. This could be used, for example, for a community wind turbine, biomass district heating pumps in the village hall/school, or a programme of street-by-street housing retrofits. The funding came from the Low Carbon Investment Fund (LCIF).

- Introductions to potential third, public and private sector services through a partner consortium - the "Specialist Support Team" (SST) - offering free advice and support. The SST comprised a core team of primarily third sector organisations including WRAP, Energy Savings Trust, Global Action Plan, Carbon Leapfrog, The Carbon Trust and Salix, and the Community Energy Practitioners Forum (CEPF) representing a group of third sector organisations.

[4] Four of the original 22 projects –Awel Aman Tawe, Ballymena, Berwick and Cwm Arian - were not able to complete their projects to the LCCC timetable.
[5] Estimates based on official population estimates from the Office for National Statistics for each LCCC area. Analysis undertaken by GfK NOP, on behalf of DECC, as part of their Strand 2 household survey evaluation work.
[6] The Sciencewise ERC programme, funded by the Department for Business, Innovation and Skills (BIS), helps policy makers to understand and use public dialogue to inspire, inform and improve policy decisions around science and technology.

- A common framework to share learning (outlined in more detail under 1.4).

Objectives

The LCCC was expected to provide the following:

- A better understanding of the scale of reduction in carbon emissions and energy demand that can be achieved within local communities from the development of integrated community support packages, and the contribution that this can make to delivering carbon reductions of 34% (by 2020, relative to 1990 levels) and the UK's renewable energy target that 15% of energy comes from renewable sources by 2020.

- A better understanding of the nature of the blueprint or support packages required to achieve these reductions. These will inform policy development and delivery in relation to the carbon budgets and renewable energy delivery at the community scale.

- Some understanding of the broader social and economic impacts of these community support packages – for example through reduced fuel bills or other household savings, effects on inward investment and social enterprise, and improved social cohesion and community leadership.

In turn, it was designed to address eight cross-cutting questions, as follows:

1. Does community delivery drive uptake of low carbon technologies and lifestyles?
2. Does a community focus change people's attitudes and beliefs in relation to larger energy solutions (e.g. acceptability of wind farms?)
3. Are community solutions scalable and replicable?
4. Do they enable joined up deployment of government's policies and programmes?
5. How can community delivery be supported and sustained?
6. What are the wider environmental, social and economic impacts of community delivery?
7. What are the implications of the LCCC to the way national government designs and delivers programmes related to local action and the community sector?
8. Did the LCCC as a programme create a buzz or stimulate delivery beyond the LCCC?

Eligibility

Applicants were eligible to apply for LCCC if they:

- Were a local authority/council, local strategic partnership or legally constituted third sector organisation;
- Were applying on behalf of a community in England, Wales or Northern Ireland that is already taking action, or facing change, as a result of infrastructure development or behavioural measures that could achieve carbon reductions;
- Had the skills and resource to build on this action and develop integrated proposals for carbon reduction, involving both infrastructure alongside community and household-level behaviour change;
- Had demonstrable support from grassroots community leaders and local partners in the area, and included them in the governance structure overseeing participation in the challenge; and

- Were fully committed to evaluation and the role that research and co-inquiry provides in assessing both the carbon impact of the initiatives and the valuable learning that can be gained and spread to others.

Selection process

An invitation to apply for the LCCC was published by DECC in September 2009 and widely promoted through community networks. Applicants were assessed by a selection panel (comprised of policy staff from DECC, the Welsh Government and DETI and representatives from Sciencewise-ERC and community organisations). Top scoring projects were visited by representatives from the Building Research Establishment (BRE) which was contracted by DECC to undertake an onsite assessment. The programme was divided into two phases:

- **Phase 1 ("first movers")**. DECC received 56 applications by the deadline (27th November). The top 14 scoring applicants were visited by BRE and 10 projects were announced on 21st December. Projects had until the end of March 2010 to deliver their capital spend.

- **Phase 2 ("second movers")**. DECC received 239 applications by the deadline (30th December). The top 14 scoring applicants were visited by BRE and 12 successful projects were announced on 4th February. Projects had until the end of March 2011 to deliver their capital spend.

Financial grants

The LCCC awards varied from £250,000 to £970,000, with an average award of £450,000. A minimum of 90 per cent of the funding was allocated for expenditure on capital measures while up to 10 per cent could be converted to fund project management and/or engagement and behaviour change activities. In most cases the LCCC was the primary funding source for projects. However, and although match funding was not a specific requirement criteria, several projects also secured funding from other sources, such as London's *Low Carbon Zones* programme and Nesta's *Big Green Challenge*.

Governance

A Steering Group was formed with a diverse membership including Government[7], Sciencewise-ERC, community organisations and a selection of the LCCC projects. The Steering Group met regularly - initially every two months - with meetings convened by, and held at, DECC. The meeting agendas were developed by DECC, which also chaired the meetings, and covered an update on the programme from the DECC project manager, an update on the evaluation and a longer discussion based around specific delivery issues or challenges. A Delivery Team group was also formed, comprised of the DECC policy lead, the DECC project manager, an evaluation manager and an engagement specialist from Sciencewise-ERC. This group met on an ad hoc basis to discuss progress as well as address any key issues and challenges.

[7] DECC, DEFRA, the Department for Business, Innovation and Skills (BIS), the Northern Ireland Executive and the Welsh Government.

1.2 The LCCC projects

LCCC projects were diverse. They represented a range of delivery models, focused on different low carbon technologies and measures, and undertook a range of engagement activities. They also represented two main 'types' of community-scale delivery: projects led by community groups ('community-led') and projects led by existing agencies (e.g. local authorities, Third Sector organisations) and targeted at communities ('community focused').

The communities in which the LCCC projects were delivered were likewise diverse, whether in terms of geography (i.e. north and south; urban and rural), levels of affluence, or local characteristics (e.g. housing stock). For example, the GfK NOP household survey (see 1.3) revealed differing levels of fuel poverty across the LCCC areas, ranging from close to one in five (19%) households in The Meadows (Nottingham) to one in fifty (2%) in Totnes.

A pen portrait description of each project is set out in Appendix 1. Appendix 2 sets out how each of the LCCC projects varied according to population size, urbanity/rurality and the type of lead organization. In summary, it demonstrates that LCCC projects were operating in communities with populations that ranged from 500 to 16,000, and that more Third Sector organisations were active in suburban or rural settings.

In spite of this diversity, three characteristics were intended to be common to all projects:

- They would be geographically targeted, **area-based** initiatives;
- They would involve **integrated packages** of measures;
- They would draw upon **sociological models of behavior** that emphasise the potential for social norms to nudge and trigger community-wide change.

Furthermore, one of the defining features of LCCC projects was their maturity relative to other community initiatives. Many already had experience of delivering low carbon initiatives, for example Low Carbon West Oxford (through NESTA's *Big Green Challenge*) and Kirklees Council (through its established track record on energy efficiency). As noted above, this was a specific aim of the LCCC programme in light of the timescales and the size of the grant, both of which favoured established organisations that could rapidly manage the deployment of funds in their local area. The headline outputs for each project are summarised in Chapter 2 and set out in more detail in Appendix 3. They are listed in full under separate cover as part of the Strand 5 (OPM) report).

1.3 Evaluation

The purpose of this report is to provide a synthesis of the key learning from the LCCC. It draws on five evaluation strands, each undertaken by independent researchers and evaluators, that were designed to explore the LCCC from different perspectives (i.e. from the perspective of the projects themselves, the households living in LCCC areas, and stakeholders across Government and the community energy sector).

The evaluation was centrally managed by DECC and standardised across the programme to ensure valid comparisons between communities. To help us understand whether any observed changes were the result of LCCC activities (as opposed to other influences), a series of five comparison communities were selected for some of the strands, with each comparison paired

with a LCCC community (according to its size and socio-demographic characteristics[8]). National benchmarking was also undertaken.

The design and conduct of the evaluation was informed by the 'Requirements for Evaluating Sciencewise-ERC Projects'[9]. These include embedding evaluation principles such as clarity of purpose, scope, approach and limits, proportionality of resources and depth of the research required to meet the evaluation objectives and transparency around approach and process.

The evaluation is subject to a series of limitations and caveats. For example:

- The evaluation was designed in parallel with the selection process and was, therefore, necessarily based on a series of assumptions about the nature of the projects that would subsequently be selected (including their size, focus and choice of measures). The most significant assumption was that all LCCC projects would focus on *community-scale* changes, and that any technological installations (focused on a small sub-group of buildings) would be a means of catalysing change across the community and encouraging widespread take up of low carbon measures and behaviours. Therefore, the evaluation was designed to focus on community-wide/population-level change, not the experiences of only those households who were direct beneficiaries of the LCCC (e.g. via a longitudinal study with the same group of individuals).

- There is an important caveat concerning attribution and the fact that it is very difficult, in a real world context with multiple influences, to identify a stable counterfactual. In practice, this means that there are key questions - which the evaluation cannot definitively answer - about what the projects would have done without LCCC funding. For example, would communities have made things happen using local resources if the grants had not been made available? Would they have sought other grants? This is particularly relevant to the LCCC given its deliberate focus on projects which were already established and already seeking funding streams to pilot initiatives and/or scale up existing initiatives.

- Much of the source material for this report, including the physical outputs and some of the outcomes, is based on self-reporting by the projects themselves.

- There are some subjects which the evaluation was not able to gather sufficient information about to provide a robust or systematic analysis. For example, the evaluation has little to say on the subject of value for money, nor does it present a detailed or controlled trial of different models of community delivery. Such a question could only feasibly be answered if the LCCC selection process and criteria had been specifically set up to design a series of research questions and experiments and select projects on that basis.

Strand 1: Carbon Saving Potential of the installed measures

Projects completed an audit tool at the end of the programme to report on the number and type of low carbon measures installed, as well as the engagement and behaviour change activities that they had undertaken. The Energy Savings Trust (EST), on behalf of DECC, used these responses to calculate the theoretical carbon savings of the projects. In addition, the DECC statistics team undertook bespoke analyses of national datasets to calculate the electricity and

[8] Because the paired communities were chosen according to general, rather than precise, matching we refer to them as 'comparison groups' as opposed to 'control groups'.

[9] http://www.sciencewise-erc.org.uk/cms/assets/Uploads/Project-files/SWP07-Requirements-for-Evaluation.pdf

gas consumption of each LCCC community. However, at the time of publication, the data for the entire LCCC period is unavailable (due to an 18 month time lag in the collection and processing of the data). The data will be analysed when it becomes available.

Strand 2: The Householder Experience

Two pieces of research were conducted by GfK NOP with households living in LCCC areas:

Quantitative Household survey

The research comprised:

- Face-to-face, in home surveys at two stages: one 'pre' and another 'post' LCCC interventions. In 2010, the pre intervention household survey covered 4,977 interviews across 17 LCCC areas[10] and in 2011, the post intervention survey covered 4,208 interviews across 14 LCCC areas[11].

- Face-to-face surveys were also carried out in 5 comparison areas which were matched as closely as possible to LCCC areas by size and demographic profile.

- A national survey of around 2,000 interviews was also carried out each year.

The comparison areas and national surveys help to inform our interpretation of whether any changes are likely to be the result of LCCC activity or of broader activity. If significant changes are observed in the LCCC areas which are also observed at the national and local area levels, this will suggest that they have been caused by factors not related to LCCC activity. However, if significant changes are observed in LCCC areas which are not observed at the national or local area level, this may suggest the influence of LCCC activity. As with other research of this kind, a direct causal relationship cannot always be concluded, since the influence of other non LCCC factors and activities in the local area cannot be ruled out.

A summary of the GfK NOP key findings are included in Annex 4.

Qualitative case studies:

Detailed qualitative research was conducted in eight LCCC areas to gain a deeper understanding of the LCCC's outcomes. There were two variants:

- *Household experience*: this involved six case study households, each in a different LCCC area, which had been beneficiaries of LCCC measures locally. The households were asked to chart their experiences of the LCCC over a six month period, which began and finished with an in-home depth interview. Online interactions and diaries were used to capture experiences in the interim.

- *Community experience*: this involved two case study communities and explored the collective experience of the LCCC. A 'snowballing' methodology was used, beginning with a mini-focus group with six participants who were actively engaged in the project and then

[10] Five areas were excluded at the baseline for reasons ranging from concerns about local residents being over-surveyed to where the project was a technology led solution, for example small scale district heating, and had no plans to engage residents in behaviour change.

[11] An additional three areas did not take part in the post intervention survey because they were at earlier stages of development and had not completed the level of capital work necessary for the purposes of the survey.

branching out to undertake depth interviews with residents who had less direct exposure to the LCCC. Both sets of participants were also reconvened into a final workshop.

Strand 3: The Community Practitioner Experience

Dialogue by Design (DbyD) was appointed by DECC to provide projects with support on community engagement and instigate a programme of co-inquiry. This process was intended to facilitate local discussions with a view to consensus building on practical actions relevant for each community, and to develop a better understanding of the specific barriers, opportunities, decision making and delivery processes experienced on the ground. DbyD delivered two main types of support:

- **Engagement planning support** - Each project was assigned an experienced facilitator who accompanied them through the engagement planning process to produce an engagement plan, outlining how they would ensure the involvement of the wider community in their low carbon projects. The engagement plans also identified the resources and support needed to achieve the engagement objectives. Defra provided a £100,000 fund to the LCCC projects to help support the delivery of their engagement activities - funding of up to £4,500 per community was provided on submission of an application alongside the engagement plan.

- **Review meetings** - facilitators organised meetings to review progress and key lessons. These involved the project team and, in many instances, community members who had participated in the project. Phase 1 projects had their first review meetings in Autumn 2010, and around half had a second meeting early in 2011. Phase 2 projects had one review meeting in late 2010.

Most community groups were in touch with their DbyD facilitators on a regular basis during the delivery of their project. The facilitators helped groups to understand the importance of meaningful community engagement and to set up community meetings and deal with unforeseen situations. They also had a role in making sure questions and feedback from communities would find their way to the central coordination team at DbyD or to DECC.

DbyD facilitators were involved with the LCCC projects from January 2010 to March 2011.

Strand 4: Social Enterprise Action Research

National Energy Action (NEA) was commissioned by DECC and the Office of Civil Society's Social Enterprise Action Research programme to assess the advice and support needs of LCCC communities in relation to the social enterprise models. The work included the provision of support and guidance delivered - face-to-face and by telephone - by Warm Zones' Community Interest Company (CIC), which was then evaluated by National Energy Action (through an online survey and telephone depth interviews). The project involved the development of some introductory written guidance by Warm Zones CIC for LCCC projects. NEA and WZ CIC delivered these elements with the support of the Ideas Mine CIC, an action research consultancy and social enterprise.

Strand 5: Process Evaluation

OPM was commissioned by DECC to undertake a process evaluation of the LCCC's management and processes (e.g. which aspects worked well and less well), as well as capture the final outputs and key reflections at the end of the programme. The work involved:

- Site visits and interviews with 18 LCCC projects[12];
- Gathering output data for each LCCC project through the EST audit tool which then used this to calculate the potential carbon savings of each project); and
- Interviews with 14 stakeholders, including members of the Delivery Team, Steering Group, DECC policymakers and representatives from the community sector.

A survey of unsuccessful LCCC applicants was also carried out, by KR Social Research, to understand how they found the application process. A total of 218 organisations were invited to complete an online survey and 126 responded (a response rate of 58%).

Academic Research
In addition to the LCCC evaluation a number of academic projects - funded under the auspices of the UK Research Councils *Energy and Communities* fund[13] - are currently working with a few of the LCCC communities. Although this has not formally been part of the evaluation plan, it will considerably strengthen the evidence base emerging from the programme. A summary of this Fund is included in Annex 5.

1.4 Dissemination and shared learning

A number of learning opportunities were supported by the LCCC to enable projects to share learning with each other and with policy makers and stakeholders. This included the following:

- **LCCC launch event (Feb 2010):** this was attended by all 22 projects and included an introduction to the DbyD facilitators and the Specialist Support Team who introduced the advice and guidance that they could offer the community projects.

- **Feedback from the evaluation strands:** DECC fed back emerging findings from the evaluation to LCCC projects, including the results from the household survey (setting out the results for their community compared to the LCCC and national average), the Strand 1 energy consumption data and an Interim LCCC evaluation report.

- **Online portal:** Community Central was commissioned in February 2011 to pilot an online portal for 6-8 weeks. A web manager stimulated forum discussions and gave each project an ‘orientation’ session. Four webinars were delivered on key topics (e.g. ‘community share offers’, ‘working with lawyers’).

- **Communities and Climate Action Alliance (CCAA) conference (Jan 2011):** this event, part funded by DECC, was attended by a range of national and local organisations to discuss the role for communities in tackling climate change. The majority of LCCC projects attended, and the event included a private networking event specifically for LCCC projects.

- **Four thematic policy workshops:** These were held early in 2011 to bring together ‘like’ projects and consider key challenges alongside DECC policy leads. The LCCC projects were paid for their time and travel expenses. The workshops were:

  - *Community scale renewables* (Bristol, 04/02/11) - 7 LCCC projects and 2 DECC staff;

[12] Excluding the four projects which were unable to complete their projects within the LCCC timetable
[13] http://www.esrc.ac.uk/news-and-events/press-releases/3400/using-communities-to-find-the-answers-to-energy-demand-problems.aspx

  - *Fuel poor communities* (Nottingham, 01/03/11) - 4 LCCC projects and 3 DECC staff;
  - *Domestic energy efficiency* (London, 08/03/11) - 3 LCCC projects and 5 DECC staff;
  - *Domestic microgeneration* (London, 08/03/11) - 5 LCCC projects and 4 DECC staff.

- **'Customer closeness' visits:** DECC staff visited two local projects (Hook Norton and West Oxford) in December 2011. The visits were designed to demonstrate a range of low carbon measures and retrofits to staff and allow them to hear from households/occupants about their experiences of the new technologies. Projects were paid for their time. DECC has plans to continue these visits throughout 2012.

1.5 This report

The purpose of this report is to provide a synthesis of the key learnings and evaluation evidence, drawing on the reports from each of the five evaluation strands. It is structured around five main chapters:

- Outputs
- Outcomes and impacts
- Programme management and processes
- Key learning
- Conclusions – did the LCCC meet its objectives?

The following suite of supporting reports are the source documents for this overarching synthesis report:

- LCCC Interim Report[14] – bringing together the key evaluation and learning from the first full year of the LCCC
- Findings from Engagement Support (Dialogue by Design, 2011)[15] – this outlines the findings from engagement work with community practitioners. This project has been supported by Sciencewise-ERC.
- REAP Petit Analysis of LCCC – this looks at carbon emissions across LCCC Communities.
- Support to low carbon communities setting up social enterprises and the implications for policy and practice (NEA, 2011)[16] – Strand 4 Final Report;
- Evaluation of the processes and outputs of the LCCC (OPM, 2012)[17] – Strand 5 Final Report
- Evaluation of the processes and outputs of the LCCC: Interim Report – views on the LCCC application process among unsuccessful applicants (KR Social Research, 2010).

[14] https://www.decc.gov.uk/assets/decc/11/tackling-climate-change/saving-energy-co2/2538-lccc-interim-report-2010-11.pdf
[15] http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/saving-energy-co2/2403-lccc-findings-final-report-july-2011.pdf
[16] http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/saving-energy-co2/2537.NEA-social-enterprises-lccc-report.pdf
[17] http://www.decc.gov.uk/en/content/cms/tackling/saving_energy/community/lc_communities/news/news.aspx

Reports were also produced for both of the GfK NOP strands of work with households (2a - quantitative; 2b - qualitative). A summary of the household survey is set out in Annex 4 of this report.

2. Outputs

This chapter summarises the key outputs for each of the LCCC projects. It does not attempt to represent the full range of projects' achievements (which are captured through the following chapters), including those delivery models and mechanisms that projects deployed to establish long term income streams (which in turn should lead to a range of additional outputs over time). Nonetheless, it is useful to outline what has been achieved to summarise the diversity of activity on the ground, as well as introduce each project.

2.1 Low carbon measures and technologies

A total of 8,206 low carbon measures were delivered in LCCC areas (Strand 1, EST)[18], ranging from low energy light bulbs and boiler jackets through to a 1.2MW biomass district heating system. Some projects focused on a single/small number of community-scale technologies, some on a single domestic-scale technology that was installed in a large number of households, and others on a range of technologies on a mix of domestic and community buildings. A summary table is outlined in Annex 3 and the comprehensive list of the measures for each project is appended in the Strand 5 (OPM) Final Report. In summary:

- The most commonly installed energy-generation measure was solar PV, which was installed on homes, community centres, schools, churches and commercial buildings. Solar thermal systems were also installed, although less frequently;
- Air source heat pumps and, in one project, ground source heat pumps, were installed in both domestic and community buildings;
- About a quarter of projects installed wind turbines, of varying sizes;
- Several projects installed biomass heaters/boilers, of varying sizes;
- One project installed a 55KW micro hydro turbine; another installed a 1.2MW biomass district heating system.

A range of energy efficiency measures were also installed, including:

- Heat-loss reduction measures such as cavity wall and loft insulation, draught proofing and double/triple glazing. There were, however, very few instances of solid wall insulation;
- Energy efficient boilers and appliances;
- Small measures such as shower timers, boiler jackets and powerdown plugs;
- Energy metering or monitoring devices.

Some projects also incorporated additional measures, such as low carbon vehicles / car clubs, allotments/orchards and - in one project - a rainwater harvesting system.

2.2 Engagement and behaviour change

The main engagement and behaviour change activities undertaken by LCCC communities are as follows (and summarised in Table 1):

[18] Either exclusively funded through the LCCC or part funded, with the remainder coming from match funding/other programmes (e.g. London's *Low Carbon Zones*)

- Training sessions for professionals and local residents, who then acted as energy assessors and community champions, respectively;
- Small groups of residents who met over a series of meetings (sometimes with a formal workbook);
- School visits and teacher training;
- Open days to showcase the technologies;
- Business, home or community building energy audits;
- Door knocking, leafleting, visits to homes, posters and displays;
- Community events, arts projects and fairs.

A more detailed and comprehensive list of the engagement and behaviour change measures is appended in the Strand 5 (OPM) Final Report.

Table 1. Summary of engagement activities (EST, based on the LCCC projects' audit tool responses).

Community	Film/ Showing *(Film showcases, creating films, film festival events)*	Media/ Theatre *(Marketing, leaflets, social media, PR activities)*	Workshop/ Training *(Case studies, training, workshops, solution introductions)*	Festival/ Event *(Festivals, open days, fairs, awareness days, celebrations)*	Survey/ Audit *(Home audits, market reseach, technical surveys, carbon auditing)*	Meeting *(Conferences, project meetings, parish meetings)*	Green Travel *(Green travel events, promotions, awareness events)*	Nature Events *(horticulture, local produce, sustainabiltiy, alotments events)*
AAT	2	1	5	1				
Ashton Hayes				1	2	1		
Blacon	1	2	17		3	5		
Chale Green			4	1	1		2	2
East Hampshire		3	1	1				
Exmoor		2	2	9				
Glencraig Camphill		11			2	6		2
Hook Norton				2				
Kirklees			5	1	1	3		
Ladock	1	1	3	3	1	8		
Lammas			7	3				
Lancaster		3	1	1	2	1		
Middlesborough			5	4			4	8
Muswell Hill		9	12	7	2	1	1	1
The Meadows				3	1			
Reepham	1	4	4	10		2	1	
Totnes						7		
Cwmclydach					1			

3. Outcomes

This chapter outlines the main outcomes of LCCC according to three categories:

- The LCCC programme (3.1)
- The LCCC projects (3.2); and
- The community (3.3).

As a general caveat, the reader is reminded that, given the lack of a counterfactual in some cases, there are difficulties in directly attributing outcomes to the programme. No information is available, for example, to explore what the LCCC projects would have gone on to do in the absence of the LCCC. Furthermore, much of the evidence is self-reported, either in terms of the householders responding through surveys or the projects feeding back their key achievements, challenges and key learning.

3.1 Outcomes for the programme

The LCCC has enabled a range of valuable activities across a diverse collective of communities (Strand 3, DbyD). Not only were the projects diverse in terms of geography and socio-demographic characteristics, but also in terms of where their communities were starting from in terms of their attitudes and behaviours (Strand 2, GfK NOP). With a deliberate focus on existing organisations at a relatively advanced stage of development, the LCCC allowed projects to continue with existing activities or to develop new dimensions that would not otherwise have been feasible (Strand 4, NEA) and, as such, operated more akin to a catalyst or incubator fund (as opposed to a start-up fund).

The physical measures installed as a result of LCCC funding (either exclusively or in combination with other funding) represent a total potential annual carbon saving of 3,062,091kgCO2/year (Strand 1, EST). Further analyses of the actual electricity and gas consumption in LCCC areas will also be undertaken as part of the on-going Strand 1 evaluation work (unavailable at the time of writing, given the 18 month time lag in obtaining and analysing the data).

A total of 295 applications to the LCCC were received from a range of community and Third Sector organisations and local authorities. Both successful and unsuccessful applicants reported that they considered the LCCC to be relatively novel in terms of its explicit focus on community scale delivery (Strand 5, KR Social Research). While the LCCC succeeded in attracting applications from across England, there were fewer applicants from Wales and, in particular, Northern Ireland.

The LCCC has created a strong legacy in multiple ways, including:

- *The installed measures and technologies* themselves.
- *The engagement materials created using LCCC funds*, e.g. Totnes report that at least 25 other transition communities - in the UK and around the world - have asked for the Transition Together project materials, which the project openly shares (Strand 3, DbyD).
- *Key learning about community-focused delivery,* outlined in Chapter 5 of this report, alongside a more general demonstration.

- *The potential for scale up and diffusion*, i.e. projects going further and faster and/or potentially inspiring others to adopt similar approaches. For example, Reepham has already held open days to demonstrate the technologies and showcase green buildings; while Chale Green reports that, based on their involvement in the project, Southern Housing have increased their commitments to roll out renewable technologies across their housing stock (Strand 3, DbyD).
- *A collective of community-scale projects* - on which DECC and others can draw. For example, interest in learning from LCCC projects has already been expressed by DECC's Smart Metering team, the Office for Renewable Energy Deployment (ORED) and the Green Deal (Strand 5, OPM).

Projects were highly tailored to the specifics of their geography, demographics and other parameters. As an illustration, where Lammas in Wales aspired to achieve a high degree of self-sufficiency for a small rural eco-community, Easterside in Middlesbrough promoted low carbon measures as part of an approach to tackle fuel poverty in a disadvantaged urban community. Besides demonstrating the varied nature of LCCC projects, these examples - and thus the LCCC programme more generally - highlight the wide variety of community approaches to achieving carbon reductions in the UK (Strand 3, DbyD).

3.2 Outcomes for the LCCC projects

The LCCC has delivered a number of important outcomes for projects, as follows:

Enhancing credibility

Being part of the LCCC enhanced the credibility and legitimacy of projects within their communities (Strand 5, OPM). Some interviewees felt that the community had greater respect for the skills and capabilities of the project team, while others felt that local opposition was less likely since national government had been seen to 'rubber stamp' the project. Many projects also noted improved relationships with their local council / elected members.

Increased participation

Many projects saw an increase in volunteer activity (Strand 5, OPM). The scale of the projects meant local project teams were able to draw in new types of support and they had a project through which people could actively participate giving the project team a "boost".

Encouraging change in partner organisations

The LCCC encouraged local partners to 'adopt' the low carbon agenda into their own working remit (e.g. the Rotary Club in Reepham) or to set their own ambitious targets. For example, Chale Green reports that the Southern Housing Group is looking to roll out renewables to its housing stock nationally (25,000 homes), as well as encouraging other social landlords on the island to do the same (LCCC Interim Evaluation Report). An aspiration has since been set to install 2,000 solar PV panels island-wide by the end of 2012, and Chale Green believes that this is unlikely to have happened without the catalytic impact of the LCCC.

The development of new organizational structures

Many of the LCCC projects set up a new social enterprise in response to the LCCC (Strand 4, NEA). Some projects adopted a legal structure that supported the delivery of their project, others a structure to support their sustainability in the longer term. Projects typically chose one of the many forms of mutual (e.g. Industrial & Provident Societies, Community Energy Companies, Community Interest Companies, Social Enterprises). In its report, NEA identified

three main functions for these structures: operating in support of the parent organisations' objectives; a holding company into which income generated from project-owned assets can be held; and involvement in other income generation practices (e.g. share offers).

Long term sustainability

A defining feature of many of the LCCC projects was their focus on establishing income streams in order to achieve self-sufficiency and independence from short term grant funding (Strand 4, NEA). The projects recognised and responded to policy initiatives such as FiTs and RHI and, accordingly, developed mechanisms to access these income streams.

> *"The project has raised interest across the community and sparked debates on how we might use FIT incentives to borrow money on the commercial market to fund new renewable projects that might generate revenue for other sustainability activities in the village".* Ashton Hayes

One of the most innovative examples has been the development of "revolving funds" whereby a stable income (e.g. from FITs) is re-invested in future activities (Low Carbon West Oxford refer to this as a 'double carbon cut' - one for the technology itself and another for activities that the income from that technology can fund). Another variant on this approach was the use of loans in Hook Norton to help households pay the upfront costs of low carbon measures. The re-payments in turn funded other loans, with the interest payments used as income to fund other projects. These loan and revolving fund schemes show great potential as mechanisms to transform one-off funding into self-sufficient community funds (Strand 3, DbyD).

A key legacy of the LCCC, therefore, is a cohort of organisations that not only have the intention to grow (which they already had prior to - and irrespective of - the LCCC), but also have an income mechanism / a broader footing to do so. Given the criticism that has been levelled at the 'culture of grant funding' (i.e. organisations perpetually moving from one grant fund to the next), this is a significant finding.

3.3 Outcomes for the communities

Increased awareness

The Strand 2 household survey (see Annex 4 for more information) demonstrates that, across all LCCC areas, the number of people who had heard of any action on climate change/energy saving in the past year increased significantly from 35% at the baseline to 42% in the post intervention survey. A significant increase in awareness was seen at Blacon (15% to 30%), Chale Green (39% to 55%), and Whitehill Borden (29% to 49%). In contrast, some communities recorded very high awareness at baseline which remained high at follow up[19]. In Totnes for example, awareness was fairly stable at 75% at baseline and 72% at follow up. After hearing a description of the LCCC activity in their area, half (50%) of all LCCC respondents said they were aware of the LCCC activity in their area.

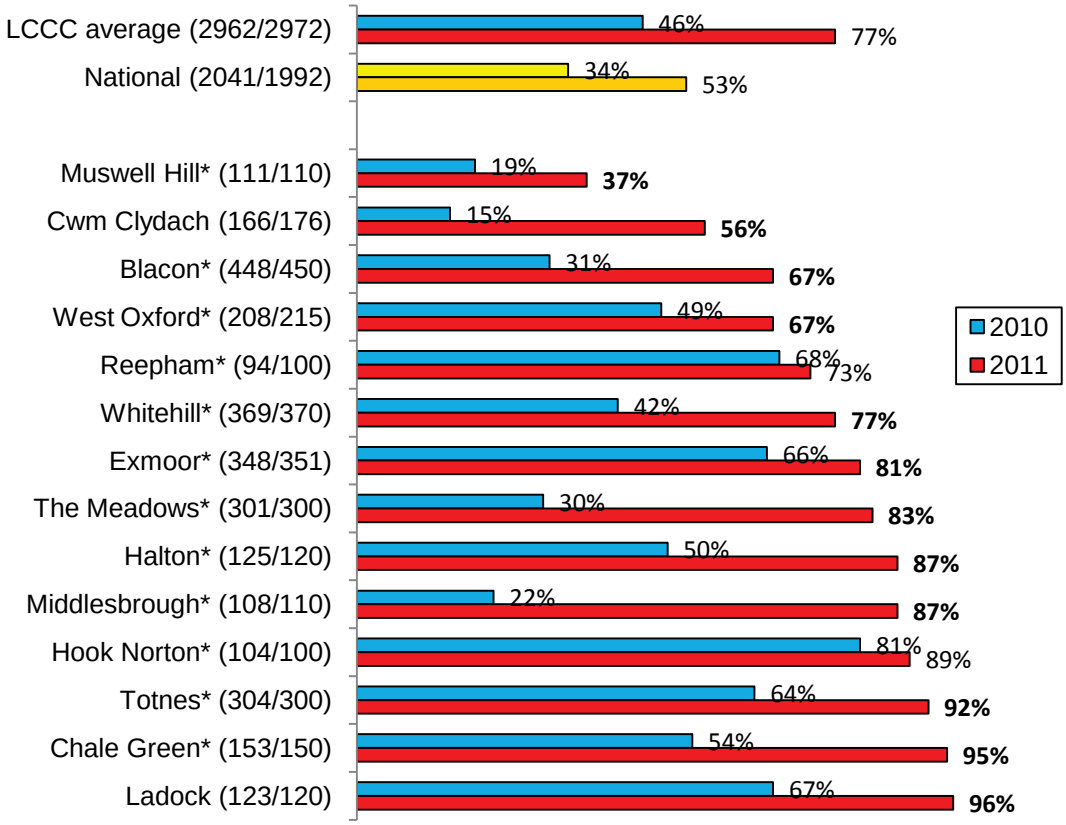
Recognition of low carbon measures

More than three quarters (77%) of all LCCC respondents had noticed solar panels on buildings in their local area in the post intervention survey (Chart 1), a significant change since the baseline (46%). Increases were also seen in most of the comparison groups and nationally but, as these were not as great as the increases seen in LCCC areas, it is likely that the LCCC did increase awareness.

[19] To the extent that there may have been limited opportunity for additional impact because awareness was so high at baseline.

Furthermore, the changes in LCCC areas were especially marked in terms of the proportion who said they had noticed “a lot” of solar panels (1% to 15%, vs. 1% to 4% nationally).

Chart 1. All who have noticed at least 1 or 2 solar panels on buildings in their local area



Comparison of change in comparator areas and their paired LCCC areas between 2010 and 2011										
Area	Meadows (301/300) †	**Berridge (301/301)**	Blacon (448/450)	**Newton (300/300)**	Totnes (304/400)	**Paignton (297/301)**	West Oxford (208/215)	**East Oxford (191/202)**	Hook Norton (104/100)	**Charlbury (124/132)**
2010	30%	5%	31%	44%	64%	37%	49%	41%	81%	67%
2011	83%	27%	67%	41%	92%	60%	67%	41%	89%	82%
Percentage point difference between 2010/11	+53	+22	+36	-3	+28	+23	+18	0	+8	15

Base: all respondents

Note: An asterisk (*) denotes where LCCC included installation of solar panels; † bracket figures show sample size in 2010 and 2011.

A smaller but significant change occurred in the proportion of respondents seeing large wind turbines locally (16% to 24%) across the LCCC areas. Large increases were noticeable locally in Reepham (20% to 66%), Middlesborough (28% to 73%), Cwm Clydach (57% to 85%), Ladock (61% to 83%), Exmoor (12% to 32%) and Halton (86 to 96%). In all but Cwm Clydach, wind turbines had been installed as part of the LCCC activity.

Perceptions of low carbon measures

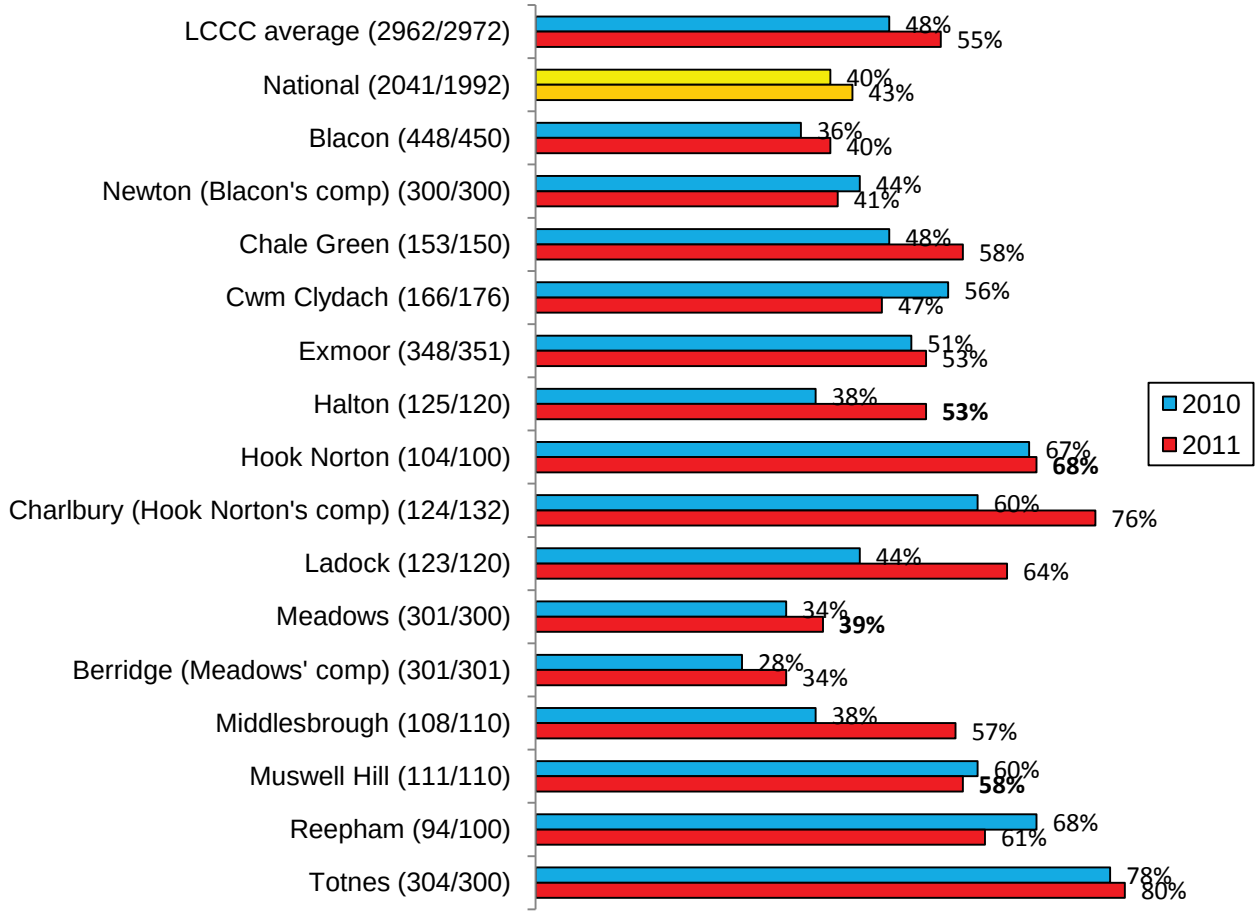
Attitudes to solar panels and wind turbines were already largely positive prior to LCCC - only 7% and 15%, respectively, considered them to have a negative impact on the local area. The impact of LCCC on these attitudes varied according to each technology. With solar panels, the LCCC had little impact on the overall balance between those who were positive and those who were negative, but it did increase the proportion who were 'very positive'. In contrast, there was no change in attitudes to wind turbines in response to LCCC.

Normalisation of low carbon lifestyles

There was a significant increase in the proportion who agreed with the statement 'in my area, trying to reduce your carbon footprint is the normal thing to do' - Chart 2 - from 48% to 55% (compared to 40% to 43% nationally). In some of the communities (e.g. Totnes, Hook Norton) this was already very high at baseline and remained so at follow up; in other communities - notably Whitehill Borden, Middlesbrough, Chale Green and Ladock - there was a marked change. In Ladock, for example, the proportion who agreed with the statement increased from 44% at baseline to 64% at follow up.

Chart 2. All who agree strongly or tend to agree that in their area, trying to reduce your carbon footprint is the 'normal' thing to do

Comparison areas (shaded) are presented alongside related intervention areas in the table below



Comparison of change in comparator areas and their paired LCCC areas between 2010 and 2011										
Area	Meadows (301/300) †	**Berridge (301/301)**	Blacon (448/450)	**Newton (300/300)**	Totnes (304/400)	**Paignton (297/301)**	West Oxford (208/215)	**East Oxford (191/202)**	Hook Norton (104/100)	**Charlbury (124/132)**
2010	34%	28%	36%	44%	78%	32%	53%	40%	67%	60%
2011	39%	34%	40%	41%	80%	44%	60%	48%	68%	76%
Percentage point difference 2010/11	+5	+6	+4	-3	+2	+12	-7	+8	+1	+16

Base: all respondents

† Figures in brackets show the sample size in 2010 and 2011

Impacts on attitudes, behaviours and the take up of low carbon measures

With the exception of some specific changes in attitudes, particularly in relation to how 'normal' low carbon lifestyles are perceived to be, the survey recorded few community-wide shifts in either attitudes or behaviours. For example, there was no recorded change in the proportion who think about energy use in the home, nor any change in the proportion who are concerned about climate change and/or think it is caused by human activity.

However, the survey does suggest that local LCCC activities may have influenced some of the precursors to change. For example, of those aware of the LCCC project in their local area, half (50%) had gone on to talk to friends and family as a result of seeing or hearing about it. Furthermore, evidence from the qualitative work suggests that a degree of behaviour change did occur among the case study households (i.e. direct beneficiaries of measures). For example, one household made a decision to turn their thermostat down by two degrees as part of a 'carbon pledge' (which involved changing some basic practices such as sharing blankets while watching TV), while another began to change their use of appliances to coincide with times of the day when they had excess solar energy from their new solar PV system.

As well as few changes in attitudes and behaviours, there was also no measured change in the wider community in the take up of renewable or energy efficiency measures. While there was an increase in the proportion of people who had been offered large energy efficiency improvements (from 25% to 33%) there was no significant change in the proportion who had actually made some physical changes to their homes to make them more energy efficient. However, this aggregate finding - for the LCCC areas as a whole - masks some significant changes at the community level. For example:

- Households in West Oxford were more likely (51% in 2010 to 61% in 2011) to have installed loft insulation;
- Households in Chale Green were significantly more likely to have installed solar thermal to generate hot water (2% in 2010 to 12% in 2011) and more likely to have installed solar PV to generate electricity (1% to 15%). They were also the only area where a significantly higher proportion of households installed air/ground source heat pumps (0% in 2010 to 7% in 2011);
- Whitehill Borden respondents were significantly more likely (47% in 2010 to 58% in 2011) to have installed cavity wall insulation;
- Ladock and West Oxford households were more likely than they were in 2010 to have installed solid wall insulation (7% to 17% and 4% to 11% respectively);
- Households in three communities were more likely to have switched to a green energy tariff: Chale Green (4% to 14%), Cwm Clydach (2% to 8%) and the Meadows (2% to 6%).

When respondents were asked directly whether specific activities or changes made to their home resulted from the LCCC, almost four in ten (39%) of those aware of the LCCC said that some of the broad range of activities they had been engaged in on energy efficiency or the environment over the last 18 months had been a result of seeing or hearing about the LCCC project in their community. This equates to 18% of all respondents.

For some particular environmental activities the proportion of those in the wider community who had carried them out as a result of the LCCC was more than 50%. These included installing an air/ground source heat pump (9 out of the 12 people who had done this said it was

a result of the LCCC), installing solar panels to generate electricity (40 of the 55 people who did this said it was because of the LCCC), joining a local group who take action on climate change/energy saving (60% because of the LCCC) and attending a meeting about tackling climate change/energy saving (58% because of seeing or hearing about the LCCC project).

Social outcomes

Some of the projects contend that their most positive outcomes have been social (Strand 5, OPM). They report that they have engaged a wide range of community members, and that new initiatives have sprung up alongside their LCCC activities (either as direct offshoots or forming out of a wider groundswell of activity in the area). Examples include a community shop, a community cinema, community orchards, food markets, recycling schemes, eco-conferences, walking tracks with disabled access and cycle paths. Some projects also have further plans, such as for a café, a craft shop and a crèche. The GfK NOP qualitative research (Strand 2) also suggests that visible installations on community buildings acted as important symbols of modernisation and 'things getting better', often generating local pride and ownership.

4. Programme management

This chapter outlines key findings in terms of the LCCC's programme management.

Timescales

The short timescales associated with the LCCC were frequently cited by projects (Strand 3, DbyD; Strand 4, NEA; Strand 5 OPM) and considered a significant challenge in four main respects:

- *The application process*: projects felt that the timescales were unrealistic given the sums of money and pre-planning involved. The survey of unsuccessful applicants suggests that, while community and Third Sector organisations were keen to apply, some felt at a disadvantage because they lacked time, expertise and experience of grant applications.
- *The selection process*: several Steering Group interviewees felt that the timescale did not afford all panel members a role at all stages of the decision making process.
- *The choice of low carbon measures*: although the groups had a variety of reasons for selecting specific low carbon measures, some of the decision-making was dominated by practical considerations with regard to time and budget restrictions.
- *Delivery*: projects in both Phase 1 and Phase 2 felt that the tight timescales impacted negatively on their delivery and had knock on implications for their ability to undertake behaviour change activities and participate in the shared learning[20]. Some projects, however, noted that the deadlines also served to focus attention on delivery.

Minimal bureaucracy

Most projects felt that the claims procedure and administrative requirements were simple (Strand 5, OPM). This was appreciated given the timeframe within which projects were operating and the Project Management challenges that they were facing in delivering the wider project (see Key learnings, Chapter 5).

Specialist Support Team (SST)

Even though projects and stakeholders believed the principle of the SST to be sound (and projects noted how they would have benefitted from a resource to support or advise them), there was a notable mismatch between the support available and the needs of the projects (Strand 5, OPM). Projects tended to want and require more practical, bespoke and advanced levels of support. The SST was perceived to be a 'one size fits all' approach that was not able to respond to the bespoke needs of the projects. This latter point was echoed by one policy interviewee who asserted that there needs to be greater understanding of communities' different 'stages of development', with support tailored accordingly.

[20] While the timescales for Phase 1 projects was tight from the outset, Phase 2 projects - in theory - had substantially more time than Phase 1 projects to deliver. However, the impact of the General Election in May 2010, in terms of both the purdah period and the subsequent change in administration, delayed the dispatch of LCCC grant offers, squeezing the delivery timescale for Phase 2 projects.

The 'hands-off' approach of the Delivery Team

Some projects welcomed the LCCC's 'hands off' approach as it aligned with a 'bottom up' ethos, allowed them to find their own solutions and signalled that government trusted them to deliver (Strand 5, OPM). However, for other projects it equated to a lack of support, particularly in relation to challenges around State Aid and FITs[21].

The LCCC Steering Group

The diverse membership of the Steering Group was considered a 'brave move' by DECC and it was an important forum to bring together experts from within and outside of Government (Strand 5, OPM). However, some interviewees suggested that it could have been more effective had there been a rotating chair / a chance for non-DECC members to set the agenda, and had there been more clarity about roles and responsibilities through a clear Terms of Reference.

Clarity of objectives

A recurring theme among interviewees was a sense that LCCC lacked a clear focus and did not articulate exactly what it was designed to achieve (Strand 5, OPM). Some, for example, felt that there was a mismatch between what local projects were aiming to achieve and the LCCC's 'Big Questions'.

Co-enquiry

Views among projects were mixed about the value of both types of meeting delivered under Strand 3:

- *Engagement planning* - many of the projects, despite some initial scepticism, felt that this added value to their ideas about how to engage their communities (particularly in terms of groups that they had not engaged with previously, such as young teenagers in the case of one project). However, a few other projects saw the support as more limited, either because the timing was problematic (distracting attention away from delivery of the capital measures), or because they felt they already were experts in engaging their community.
- *Review meetings* - a few projects were positive about the value of the review meetings, particularly as a way to gather feedback from members of the community and to think about 'what next'. However, others considered the meetings to be less about supporting co-inquiry and more a means for DECC to extract key learning.

Overall, the intention to adopt co-inquiry as a central approach in the delivery of the LCCC was not fully realised (Strand 5, OPM). The short timescales narrowed the immediate focus for many projects on the delivery of their capital measures, diverting them from the original intention of taking their initial project plan out to the community, pre-delivery, to co-design it with local residents and stakeholders.

Opportunities for learning and dissemination

Most projects were aware, and appreciative, of the opportunities in the LCCC to share learning (Strand 5, OPM). However, some learning strands were considered notably more useful than others:

[21] Some projects initially did not understand the legal requirements in relation to state aid, which was relevant particularly to those looking to generate and sell energy. In some instances this caused delays and required some projects to adjust delivery models

- *CCAA conference* - the projects considered this a valuable opportunity to share learning with a wider group of colleagues, peers and stakeholders. In particular, they valued the chance to discuss their technologies and challenges with 'projects like theirs'. The face-to-face element of the event was considered particularly important.

- *Thematic policy workshops* - projects felt the four thematic policy workshops provided them with a valuable opportunity to network around a specific issue and to share their learning (once again with 'projects like theirs'). They also highly valued the opportunity to meet face-to-face, and share learning, with DECC policy makers.

- *Customer closeness visits* - the visits were highly valued by those communities which had them, and the basic principle was positively received by those who had not. They were seen as a valuable opportunity for policy makers to understand 'how things work on the ground', and for communities to feed their own ideas back into policy. They also signalled DECC's commitment to community-scale initiatives.

- *Online networking* - perceptions were mixed and uptake was relatively low, in spite of proactive efforts by a web manager to engage projects and run webinars on key issues of interest[22]. The main reasons cited by projects were both poor timing (projects were still preoccupied with delivery; the forum was not available at the start of the programme) and a perceived lack of momentum/conversations to maintain interest.

As a general finding, several projects cited barriers around the cost of participation in learning events. These comments were made in spite of the fact that the LCCC covered travel expenses for the CCAA event and - in the case of the four thematic policy workshops and the customer closeness visits - also paid projects to cover staff time. Time commitments also presented a barrier, particularly those furthest away from London, given that most project team members had work commitments and/or were heavily focused on delivery.

The evaluation highlights projects' continued appetite for shared learning beyond the LCCC programme. Peer mentoring, in particular, was highlighted by many of the projects. It was noted that the informal peer-to-peer support between some projects during LCCC helped to build capacity across groups, and several interviewees suggested that DECC might support further opportunities for mentoring. They also noted, however, that projects should not be overburdened - through a mixture of careful planning and/or funding.

[22] This included: average 25 min orientation conversations held with each project; the creation of working group pages for each of the communities; 40 community energy documents posted; 30 links to webinars or relevant websites created; and four webinars held with average of 12 attendees each (including administrators).

5. Key learning

This chapter summarises the cross-cutting and key learning from the LCCC, presented according to four themes:

- Community delivery (5.1);
- Low carbon technologies (5.2);
- Community engagement (5.3); and
- Behaviour change (5.4).

5.1 Community delivery

The evaluation highlights nine key lessons regarding the delivery of community scale projects:

Project management

Projects reported that they had dedicated a considerable amount of time to project management, which in many cases they had underestimated (Strand 3, DbyD) at the outset. Projects that were able to draw on existing resources found it easier to deal with the tight timescale and were able to 'hit the ground running' (Strand 5, OPM). The LCCC projects recommend that other projects on this scale make arrangements for paid staff and that providers of funding should recognise the importance of - and adequately fund - administrative activities.

The strengths and weaknesses of different community models

The evaluation does not allow for a systematic appraisal of the different kinds of community delivery models. Nor did it attempt to look at whether certain models were more effective than others. However, local authority and third sector-led projects (which accounted for approximately one third of LCCC projects) tended to be better resourced and had easier access to guidance on specific issues such as planning regulations (Strand 5, OPM). Community groups, on the other hand, felt they represented a 'truer' model of community led delivery and this model encouraged local ownership which would lead to longer-term behaviour change.

Different perceptions of, and attitudes to, risk were evident across the different kinds of organisations. For example, a number of the community-led projects felt that their activities had been put at risk because they lacked the support to resolve some of the difficulties they faced, particularly those associated with legal or planning issues. Many also felt that the project exposed them - individually or collectively - to a level of risk that was daunting for them.

There was a strong view among community and local Third Sector organisations that they were well placed to help deliver community-scale energy because of their 'licence to speak' to their communities, which is rooted in their relations with community members (Strand 3, DbyD). In contrast, two local authority-led LCCC projects acknowledged that engagement with their communities was quite resource intensive because they were starting from a position of needing to access and engage the communities for the first time (Strand 5, OPM).

Skills sets and support needs

Access to skills, capital and start-up revenue funding is a frequent barrier to community action (Strand 4, NEA). Projects identified the need for access to business planning and professional services (e.g. finance, planning, surveying, legal and commercial services), legal support in relation to social enterprise, ownership and transfer of capital measures (e.g. renewable technologies) and generated income (e.g. feed-in-tariffs).

There was consensus among projects that a 'light touch' toolkit would be a valuable resource for future funds, including e.g. legal templates, a 'key challenges/hurdles' section, and signposting to available advice and support (Strand 5, OPM). The thematic diffusion packs produced by Local United[23] (via Nesta funding) were noted as a potential template.

External barriers

Projects reported a series of external barriers (Strand 3, DbyD; Strand 4, NEA; Strand 5, OPM), commonly in respect of the planning system, legal agreements and procurement:

> *"Legal costs are expensive and contracts were needed between us and the city for the social housing as well as between the householders and the installers".* The Meadows

In addition, two significant and unexpected barriers for projects were delays (caused by constraints in issuing grant offer letters around the time of the General Election) and, more so, confusion amongst communities around their eligibility for FITs. This was especially challenging for those projects that had specifically designed their 'business model' on the premise of being able to claim a stable income stream through FITs (Strand 5, OPM).

Partnership working

Many projects found significant benefits from working with local partners to deliver their project (Strand 4, NEA). Establishing closer working relationships with partner organisations, such as a local county or district council or a local co-operative, meant that specialist skills or infrastructure services could be accessed in-kind or at a lower cost. In the case of the Haringey & Muswell Hill LCCC project, the initiative derived considerable value from access to the financial and administrative services of their local authority, the London Borough of Haringey.

None of the projects expressed a view that they could, or wanted, to work alone. They did note, however, that partnership working requires significant time and effort and many conceded that they had underestimated this (Strand 5, OPM). Some spoke off the nuances between 'bottom up' and 'top down' approaches and asserted that the key was to achieve the right balance between the two.

> *"The National Park Authority has provided significant officer time to Carbon Neutral Exmoor, providing support to the community groups involved. The blend of "top-down" assistance in support of "bottom-up" efforts has been critical to the success of the project to date".* Exmoor

[23] http://www.localunited.net/

Learning curves

Regardless of their organisational model or 'state of preparedness', all projects described a steep (and often painful) learning curve (Strand 5, OPM). Nonetheless, many noted that this had encouraged them to innovative and that - with an effective programme of dissemination / peer mentoring - other projects could learn from the LCCC projects' experiences and bypass some of the challenges that they faced (e.g. around legal issues, organisational structures and income streams).

Collective action

Some of the projects report benefitting from the credibility and confidence of being part of a national programme (Strand 5, OPM), with the LCCC providing the national 'brand' to give projects and participants a sense that they are part of something bigger (i.e. collective action).

Government and communities working together

In terms of the specific relationship between the LCCC projects and DECC (or Government departments more widely), some interviewees noted 'cultural differences' in the way in which Government and community organisations operate (Strand 5, OPM). For example, several projects were resistant to the evaluation programme (considering this an imposition) whereas for Government this is a core requirement. Likewise, projects wanted more support from DECC - in respect of challenges around State Aid and FITs - which was necessarily constrained in the support it could provide (i.e. it could not, for example, advise projects on how to "get around" European law on State Aid). Such differences in expectations and roles can, in such circumstances, lead to tensions between partners.

Beyond FITs

In addition to providing a clear financial benefit to the projects themselves, FITs also proved to be a benefit to several of the projects in other respects - for example, in promoting awareness of, and interest in, low carbon technologies among households. Part of their significance, it seems, is not only in the financial means they generate but also in the psychologically important notion of getting returns from the (community) investment (Strand 3, DbyD). Therefore, and when deployed in a community context, FITs appear more powerful when they are demonstrably shown to benefit the wider community (rather than just the organisations hosting the PV).

5.2 Low carbon technologies

The evaluation captured three key lessons about the technologies themselves:

Projects' choice of technology

Projects faced a trade-off between measures that would deliver the largest carbon saving and those that would deliver the best 'community result' i.e. in terms of raising awareness, triggering interest and making low carbon technologies seem 'normal' (Strand 3, DbyD). Given the wider objectives of LCCC to focus in part on engagement and behavioural change, several projects favoured the latter and chose to invest in measures with a visual appeal, such as solar PV. Furthermore, the potential income from specific technologies (i.e. via FITs) guided many projects' choice of technology (again favouring solar PV). Both factors tended, to some degree, to divert projects' focus away from energy efficiency measures.

Performance

The projects report that they learnt a considerable amount about how low carbon technologies work 'for real' and the appropriateness of technologies on different building types and in different settings (Strand 3, DbyD):

> *"Our project has found the following about different technologies:*
> - *Most photovoltaic panels working better than anticipated; solar thermal panels all working well and householders very pleased with savings made.*
> - *The wind turbine has only achieved about 40% of expected output (Cornwall has been less windy than usual).*
> - *The log boiler in residential house works well: installation has halved oil use.*
> - *The dry lining of the Village Hall has been a great success and led to much greater use".* Ladock

Living with low carbon technologies

The GfK NOP qualitative research explored what it was like for households to 'live with' new low carbon measures. Given the small number of households (six) involved it is difficult to state with certainty that these represent an exhaustive list of potential issues, but they do nonetheless provide some interesting insights.

- **Installation**: in most of the case study households the installation process was straightforward. There was, however, one exception with the Hook Norton family which suffered significant, lengthy and unforeseen disruption as a result of their whole house retrofit. Delays due to the poor weather and missed delivery dates meant that by the end of the research - six months on - the work was still not fully complete.

- **Usability:** some problems started to appear once measures were installed and households were left alone to 'live with it'. Several of the households in Chale Green with air source heat pumps felt that they were not provided with sufficient information and guidance about how to manage their new measures (e.g. control panel settings). This meant that households were initially disappointed with the performance of the measures and/or took steps that inadvertently decreased its efficiency (e.g. turning the heating up).

- **Adapting expectations and routines**: there was an assumption that low carbon technologies would be 'the same' as existing technologies. The Chale Green project reported that recipients of air source heat pumps took time to get used to the new systems because the radiators do not get very hot (like traditional systems) which led them to think that the system wasn't working. Households also had to psychologically adjust away from seeing radiators as a focus for heat and adjust clothes drying habits (e.g. over the radiators). Likewise, many recipients also had to change electricity tariff to achieve the promised financial savings - they had previously been on dual rate tariffs and were initially spending more on their energy bills (as the heat pumps mostly use day-time electricity).

- **Aesthetics and noise**: several of the households were surprised to find that solar PV makes noise, which impacted on the Whitehill Borden household who had positioned the panels on the roof above their bedroom. There were also issues about the aesthetics of solar PV, particularly the visibility of cables. For example, it was only post-installation that the Whitehill Borden household realised that the panels were not as visually discreet as they had promised their neighbours, causing one to complain.

5.3 Community engagement

The evaluation captured six key lessons about community engagement:

Recognising the benefits of wider community consultation

While there was already widespread recognition among projects about the value of community engagement, the LCCC enabled them to put this into practice - often in the face of some specific local challenges (Strand 3, DbyD). For example, several projects met with a degree of resistance in their community once their project was up and running, something they believe might have been avoided had they consulted with the community from the outset. Furthermore, some projects found through community engagement that their assumptions and expectations did not match those of the wider community, which led them to make important changes to their approach. One specific issue that was underestimated by some projects was the need to ensure that the distribution of benefits across the community was perceived to be 'fair'.

Specific engagement strategies

Projects self-report (Strand 5, OPM) that the following, in their view, positively influence engagement:

- Face-to-face, personal approaches such as door knocking, using either trusted local residents or local councillors;
- Being physically present in a community for the duration of a project means that those involved are visible, accessible and part of the 'local scene';
- Training energy or community champions to spread awareness and knowledge in the community and provide residents with 'go to' points;
- Involving schools in a project to raise awareness and engender support (e.g. one project felt that getting the school 'on side' would help to prevent local opposition to the project);
- Having a well-known local person to champion the work. For example, Kirklees enlisted the support of a local councillor to go door knocking over a weekend;
- Getting the strongest and loudest opponents on side - one project, with plans to install wind turbines, worked hard to secure the support of their most vocal opponent.

Motivations for involvement

A key finding from the evaluation is the importance of *different kinds* of motivations, including both those that provide the initial 'hook' as well as those that embed longer term commitment. In terms of initial motivations, financial savings are powerful whereas environmental considerations are relatively weak (or at least limited to specific groups) (Strand 2, GfK NOP; Strand 3, DbyD). Other motivations included comfort, health, home improvement and quality of life:

> *"In deprived areas the key driver is primarily cost savings and the potential for job creation (in the case of the community enterprise). Residents may support the low carbon agenda in principle but if being green costs more then it is likely to be of a low priority".* Eco-Easterside

> *"Messaging is key and mentioning 'low carbon' may not be the best way to engage with people. People do care about sustainability, but they care more about their wealth, their health, their families and enjoying themselves so sustainability feels like*

an add-on, an indulgence for the better off, the bigger picture is too 'big' and too remote for them to prioritise it". Chale Green

However, projects such as Totnes found that, once involved, participants were motivated less by financial savings (i.e. extrinsic motivations) and more by a sense of community and social interaction (e.g. intrinsic motivations). For example, many participants enjoyed the 'experience' of their local project, the social aspects helped them to feel a greater connection with the local community, and having a 'fun' side to talking about low carbon living was unexpected (LCCC Interim Evaluation Report).

Visibility, confidence and trust

There is qualitative evidence from the householder case studies (Strand 2, GfK NOP) that new and visible low carbon measures, particularly solar PV, sparked interest amongst others, and identified two households who went on to investigate similar technology for their own home (citing the fact that seeing their neighbours doing it had "given them the confidence" to follow). Likewise, the Totnes household applied for solar PV because they were able to see similar houses with the technology installed and were able to talk to people 'like them' about it, which meant that they no longer considered the decision "unusual" or "daring". This suggests that visual and social cues can lead to some level of wider uptake in the community (even if the level was insufficient to be detected by the household survey).

Other LCCC projects also reported this effect (Strand 5, OPM; LCCC Interim Evaluation Report). For example, seeing a community building in Reepham successfully install triple-glazing gave households reassurance about adopting the measures for themselves. This led to triple-glazed sash windows becoming so popular in Reepham that there was a six month waiting list. Furthermore, in the Meadows, visual evidence of 'stuff happening' played a key role in countering cynicism:

"Initially when the PV was offered free we had very little take up but then, as the PVs physically started going up on peoples' roofs, we had an avalanche. This was because people were distrustful to start with - they felt they were being offered something for nothing. Until they went up onto houses (where we had contact with the householders and trust already established) we found it difficult to convince people that it wasn't a con". The Meadows

The evaluation suggests that trusted local advisors also played a key role. For example, the case study households (Strand 2, GfK NOP) found the guidance offered by their LCCC project to be invaluable (e.g. to identify technologies and installers). This advice was often *trusted more* than information offered by external organisations, because participants felt that the advice was tailored to their needs and impartial (i.e. not biased by a need to sell a product or service). In the Hook Norton case study, the household chose a local architect who had installed the measures on their own home and was trusted in the community as an 'early adopter'. In turn, the case study household themselves became 'go to' points on low carbon issues having installed the measures.

Variations by sub-group

The household survey results (Strand 2, GfK NOP) varied across the population, with three groups in particular more likely to be aware of, and engage with, their LCCC project: residents who feel that they 'belong' to their local area; those concerned about climate change, and residents aged over 35. The former, in particular, was a powerful predictor of engagement, which suggests that social capital leads to better outcomes.

5.4 Behaviour change

The majority of projects' efforts on behaviour change - at least within the timeframe of the LCCC - were predominantly at the engagement/awareness raising end of the spectrum (Strand 3, DbyD). This was a function of the delivery timescale pressures and the funding split (i.e. only 10% allocated for non-capital activities, which some projects took as a cue that behaviour change was a second order, or future, priority).

Nonetheless, several projects deployed specific behaviour change measures such as peer-to-peer learning and competition. Others trained community champions with the aim of establishing a broader network of low carbon mavens. Totnes was noteworthy in that they segmented their audience into four groups and designed their materials accordingly (LCCC Interim Evaluation Report). These included 'settlers' (interested in neighbourliness/home improvement), 'prospectors' (interested in income/property value), 'pioneers' (interested in sustainability, social justice and community), and low income households (interested in debt/bill reduction).

Two additional observations about behaviour change are also evident:

- **Impact on family dynamic** – the qualitative research (Strand 2, GfK NOP) suggests that the initial interest from case study households was often instigated by a single individual (who was typically interested in, and responsible for, environmental issues and chores). However, several of the case study households felt that the presence of the LCCC (and taking part in the research) had made talking about 'green issues' as a family more acceptable. The household roles changed, with other individuals becoming more involved, particularly children within the household (who were often assigned specific energy saving tasks).

- **Behavioural rebound** – there is some tentative evidence (Strand 2, GfK NOP) that some of the installed low carbon measures did not necessarily result in lower consumption and/or financial savings. For example, and as already noted, there were some issues - regarding the control panel and general level of instructions - that meant that some of the recipients of air source heat pumps in Chale Green did not 'get the best' from the technology (at least not initially). Furthermore, one of the case studies also simply chose to heat the home for longer / to a higher temperature to enjoy the thermal comfort of the new measures, as opposed to the carbon and cost savings.

6. Conclusions: Did the LCCC achieve its objectives?

This final section considers, in summary, whether the LCCC delivered against its original objectives in the form of the eight cross cutting 'big questions'.

1. Does community delivery drive uptake of low carbon technologies and lifestyles?

There were very few community-wide shifts in attitudes, behaviour or the uptake of low carbon measures. However, looking from a broader perspective:

- Projects appear to have been successful in influencing some of the antecedents to change (i.e. establishing the conditions in which future change may be more likely). For example, awareness of local initiatives increased (from 35% to 42%) and, among those who were aware, half of those aware of their local LCCC project went on to discuss it with others. LCCC activities also supported the normalisation of renewable technologies like solar panels and wind turbines, and it led to an increase (from 48% to 55%) in the proportion of households who considered low carbon lifestyles to be 'normal'. Furthermore, and even though it is not apparent when looking at the findings for all LCCC communities in aggregate, there were some local community-wide increases in specific low carbon measures (e.g. loft insulation in West Oxford).
- The qualitative research with case study households suggests that some specific household routines and practices did change among *direct recipients* of LCCC measures (which remains an important finding even if the LCCC did not catalyse community-wide change as much as had originally been hoped).
- Several projects have been successful in influencing cultural change among partners. In Chale Green, for example, the project influenced Southern Housing Group to commit to rolling out renewable technologies across its housing stock.
- Trust was a key ingredient of effective household engagement, and the community-led projects felt that this was one of their key advantages. The evidence from the GfK NOP qualitative research, albeit based on a small number of case studies households, lends support to this argument with participants expressing a preference for local, independent and often informal advice (i.e. from people 'like them' living in homes 'like theirs').

2. Does a community focus change people's attitudes and beliefs in relation to larger renewable energy solutions (e.g. acceptability of wind farms?)

Attitudes to solar panels and wind turbines were already positive and the LCCC appears to have had only limited impact in this respect. Among those residents who had seen wind turbines in their local area, no change was detected in attitudes. Sentiment towards solar panels, however, did shift from 'fairly' to 'very' positive. However, some projects reported that they have engaged those individuals in their community who are vocal opponents and attempted to get them 'on-side'. While such approaches - based on local intelligence and persuasion from within the community - are potentially significant, there is no evidence at the current time as to whether they lead to a different outcome.

3. Are community scale solutions scalable and replicable?

There does appear to be potential to scale up community-scale solutions, given that several of the LCCC projects were themselves scaled up version of previous work that they had undertaken (i.e. on a smaller/pilot scale). There is no evidence at this time about the potential for replication (i.e. a LCCC community taking their approach to another area; or another organisation adopting a LCCC approach).

Some interviewees questioned how likely it is that other communities will be able to follow in the LCCC projects' footsteps, given that they were already relatively mature and advanced. However, others felt that there is nothing unique to LCCC projects and that learning from these 'first movers' could be readily transferred to others, assuming that adequate funding and dissemination/learning opportunities are available, and that key challenges (e.g. risk, access to support/professional services) can be overcome.

4. Do community solutions enable joined up and integrated deployment of government's policies and programmes?

There is a lack of evidence to fully address this question. However, the experience of the LCCC suggests that projects were attuned to the national policy frameworks and were keen to translate these locally in terms of delivery on the ground. Several projects, for example, provide useful test cases for current DECC policy initiatives including smart meters, Green Deal and the Office for Renewable Energy Delivery.

5. How can community delivery be supported and sustained?

The organisations funded by the LCCC were resourceful, independent and did not require (or especially want) significant hand holding. Projects were often faced with significant challenges and, in response, adapted their approach and, in doing so, demonstrated their capacity to innovate and find solutions to barriers presented by current policy and institutional frameworks. In particular, a defining feature of many of the LCCC projects was their focus on establishing income streams in order to achieve self-sufficiency and independence from short term grant funding. However, projects still identified a series of areas for support, particularly access to support services (e.g. finance, legal services, business planning) and support for dissemination/mentoring.

6. What are the wider environmental, social and economic impacts of community delivery?

There is insufficient evidence to determine the wider environmental and economic impacts of community delivery. However, and in terms of social outcomes, some projects contend that their most positive outcomes were social, with a range of new activities springing up (e.g. allotment groups, a community cinema, food markets). The research also suggests that community-scale installations acted as important symbols of modernisation and 'things getting better' in the area.

7. What are the implications of the LCCC to the way national government designs and delivers programmes related to local action and the community sector?

- *Timescales* - the challenging timescales of the LCCC were a frequently cited barrier.

- *Staying involved* - DECC's expertise and interest was valued by the projects and they would like them to stay involved in community initiatives. They also asserted that better outcomes would be achieved if policy makers understand how their work translates into work 'on the ground'. In this vein, DECC plans to continue working with LCCC communities to arrange further 'customer closeness' visits for staff.
- *Ensuring demand from policy teams* - there is anecdotal evidence that learning fed into (or will be feeding into) policy teams, although this may have been more coherent if there had been a clear demand from policy teams for answers from the LCCC. Many interviewees were especially positive about the opportunities in the LCCC to bring practitioners and policy makers together (e.g. thematic policy workshops).
- *Top down and bottom up* - LCCC supports the contention that 'local' plays a critical part in delivery in terms of knowledge, trust and confidence. However, it also cautions against underestimating the role of partners like local authorities or central Government, who provide, variously, a badge of legitimacy in the eyes of participants, a range of financial and non-financial resources, and the means to set/'brand' local initiatives in the context of a wider, and collective, effort.
- There is a case for having an integrated approach, where there are clearer central objectives and related goals (including ones that are easily measurable) combined with locally set and measured goals.

8. Did the LCCC as a programme create a buzz or stimulate delivery beyond the LCCC?

At the level of the communities, the LCCC has stimulated participation and improved relationships (e.g. with elected officials). At a national level, views were mixed about the impact on policy and programmes. However, interviewees felt that the LCCC had created a 'buzz' around community-led delivery, and had led to several important developments (e.g. LEAF).

Appendix 1. LCCC Project Descriptions

ENGLAND

Ashton Hayes Parish Council, Cheshire: In 2011, with the help of an LCCC grant, Ashton Hayes built a low carbon sports pavilion with a bank of solar photovoltaic (PV) panels that are used to help charge a community owned electric vehicle (EV), the Nissan Leaf. The building has extremely low energy use and will serve as an exemplar to the many visitors to the village and be used to help educate children on the practicalities of renewable energy systems - air source heat pumps and solar power plus intelligent building control and insulation. The EV will be managed via the Common wheels system that also enables village residents to access fuel efficient cars when travelling around UK. The aim is to enhance rural transport for people 18 and over and encourage residents to save money by owning fewer cars while encouraging them to purchase more EVs. The community has also worked with the primary school to improve the school building's efficiency and constructed two new low carbon classrooms complete with PV arrays that will help to power the school and feed into the village microgrid. This innovative microgrid project is supported by Scottish Power Networks in conjunction with EA Technology Ltd and the University of Chester and will focus on demand side management and associated behavioural change. Many local firms and organisations have supported the community since the 'Going Carbon Neutral Project' started in early 2006 - notably the RSK group, M&M Associates and the Carbon Leapfrog Charity. The local council has also given its full backing, installing a 'carbon neutral inspired' footpath linking Ashton Hayes to the nearby railway station - resulting in a four-fold increase in rail use. The village is now being seen as a working example of the Big Society - a 23% reduced carbon footprint, thriving community owned shop, one of the country's most active 'Timebanks' and a new community owned recreation field and playground. The very active Parish Council is now working with residents to try to purchase the local pub and transform it into a sustainable meeting place.

Chale Community Project, Isle of Wight: This project is bringing an entire rural off-gas community out of fuel poverty, with an integrated approach to reducing carbon focused around the intensive renewables retrofit of 67 homes on a 1970s housing estate using a mix of air source heat pumps and solar PV panels. Additional funding is being provided by the social landlord, Southern Housing Group, to ensure all properties are upgraded to Decent Homes+ standard, specifically targeting improved windows and loft insulation. The performance of the renewables technologies will be closely metered and monitored over different time periods. It is estimated that as a result of the project, an additional 2,000 solar PVs will be installed on housing association and private properties on the Isle of Wight by the end of 2012. To maximise the impact of the project, the Ellen MacArthur Foundation is coordinating project management and communications, as well as supporting the provision of free consultancy on energy efficiency to all homes in Chale and a training programme for people interested in careers in the renewables and energy efficiency sector. The entire village will also benefit from a revolving community fund generated from the Feed-in-Tariff on a number of PV installations which will be used for future sustainability-related projects in the village.

Exmoor National Park, Somerset and Devon: The LCCC funding is being used by Carbon Neutral Exmoor to fund a range of exemplar sustainable energy projects including insulation, wood heating, solar PV, micro-hydro and wind power in villages that have been participating in community sustainable energy planning (Dunster, Parracombe, Porlock, Roadwater, Wheddon Cross and Wootton Courtenay). Using other funding sources, these villages are also working with others. For example, they have supported Dulverton, Timberscombe, Challacombe and Lynton in developing projects. A Low Carbon Communities Officer has been recruited by Exmoor National Park Authority to provide support to villages in developing local, low carbon plans to engage the community in making the transition to low carbon living, A revolving fund has been set up so that a proportion of the income generated by projects

can be used to fund future low carbon initiatives. A knowledge sharing framework is being developed, which alongside the revolving fund should leave a lasting legacy for this project, enabling Exmoor to achieve carbon neutrality.

Haringey Council, North London: This project is an integrated approach involving a diverse range of interventions and partner organisations. Muswell Hill Sustainability Group provides strong community leadership with Haringey Council providing support and resources. The project includes solar PV installations on four schools to be used as a learning tool and to encourage behaviour change, a sustainable learning eco-cabin, innovative cycle parking, an eco-house display stand for public engagement events, and a community renewable energy company that has gained funding to generate income for carbon reduction measures in the community. LCCC projects are building on action already taking place within the Muswell Hill Low Carbon Zone.

Hook Norton, Oxfordshire: The project is funding innovations across the 2500-strong community, including the local primary school (i.e. solar PV and solar thermal panels to provide hot water to different parts of the school, a heat recovery system, and upgrade of the roof insulation); households (i.e. interest free loans for a whole-house retro-fit of six homes); insulating and installing renewable technologies such as wood pellet boilers, air source heat pumps, solar PV and thermal panels on a further 20 homes and the village shop; the local brewery (i.e. installing a bio-diesel tank to supply bio-diesel fuel for the vehicles of 50 households and also to fuel the 3 diesel car pool cars for the community); and a community wind turbine (i.e. installing a 40m Meteorological Mast to measure wind speed and a small 10-20kW wind turbine as part of exploring the potential for a larger community turbine). All these activities will provide income back in to a rolling low carbon fund so that the community can continue to take action for the next 10-20 years. www.hn-lc.org.uk

Kirklees Council, Yorkshire: Greening the Gap in Hillhouse has retrofitted PV systems and other energy efficiency measures onto 53 domestic properties and four privately run community centres in one of the most deprived, ethnically diverse communities in the UK. Using the assignment of FIT revenues brought in through the project a Community low carbon fund will be created to ensure further work of a similar nature can be completed in future years. The project has also: delivered multiple training initiatives supporting energy efficiency to community centre operatives and householders; delivered installer training to several groups and been a catalyst for a green handyman training scheme; improved membership of the landlords and private rented property accreditation scheme. The project has built upon strong multi-agency partnerships aimed at carbon reduction and social wellbeing, with a team that has very successfully communicated best practice widely.

Lancaster Co-Housing, Lancashire: Halton is looking to install a hydro turbine into the River Lune, and three solar roofs; and incorporate carbon saving measures in the renovation of Halton Mill, which will provide office and workshop space for local businesses. The profits, generated from the government's clean energy cashback scheme, and from rents, will be ploughed back into further carbon reduction projects such as Halton Energy Network which will help households reduce their domestic carbon emissions.

Low Carbon Living Ladock, Cornwall: The project is a retrofit programme to upgrade homes, schools, community halls and businesses with a combination of energy efficiency measures and microgeneration technology, alongside the installation of a community-owned wind turbine. A community managed fund has been set up to ensure that the income generated is retained as a rolling resource that will benefit the wider community through further low carbon investment. In addition, a carbon sequestration project has seen over 500 fruit and nut trees planted to naturally absorb and hold carbon while providing a boost to local food production. The initial delivery of the project was led by the Cornish sustainable energy charity Community Energy Plus.

The Meadows, Nottingham: The Meadows Ozone Energy Services is a company formed by local people in the Meadows and has aspirations to change an inner city area with multiple deprivation levels to become an exemplar to other similar inner city communities. The Meadows has a housing stock of

approx 4000 houses with a mixture of housing types including over 1000 Victorian terraced houses that are hard to insulate. The project seeks to demonstrate that low carbon savings can help reduce fuel poverty. They have installed solar PV panels on 25 social houses, 21 low income family houses and eight where the resident has paid fifty per cent of the costs themselves. They have also put installations on a local community garden building and three local primary schools to ensure that the learning and the value is spread across the wider community as there are over 30 languages spoken in the community so the children need to help the parents and share their learning from the schools. An energy assessor has worked with over 100 families who have experienced fuel debt to install an energy cost meter and advise them on how to save energy. The three local schools are also with the support of British Gas, becoming flagship schools for British Gas' *Project Green*.

Middlesbrough: This projects is in a mixed tenure estate of 3250 people which is among the top 20% of disadvantaged areas in England. The LCCC funded Eco-Easterside project will save residents money on household bills by reducing energy use. Two wind turbines will be installed in the grounds of Easterside and St Thomas More primary schools, and other demonstration renewable technologies will be fitted to two community buildings, which will in turn generate income for the community from the government's clean energy cashback scheme. 150 homes will be fitted with energy monitors, and householders will be helped to make sure their homes have adequate insulation. Renewable energy systems – solar hot water and air-source heat pumps – will be fitted to 20 homes. Residents will also be encouraged to reduce carbon emissions by using sustainable modes of transport and growing more of their own food.

Reepham, Norfolk: LCCC funding has supported 18 community groups in the town to develop and deliver low carbon projects covering nine activities: increased thermal performance of buildings, renewable heating and hot water, low energy lighting, renewable energy, sustainable transport, local food, energy efficient appliances, recycling and water projects. The projects cover the full range of technologies and solutions including: insulation, air source heat pumps, ground source heat pumps (bore hole and horizontal), solar thermal and solar PV, underfloor heating, energy efficient boilers, biomass boilers, biofuel (from used cooking oil) for heating, low energy and LED lighting, wind power, low emission car club vehicles, electric vehicles, allotments and energy efficient appliances. These projects have been completed across housing trust properties, schools, churches and community buildings. Reepham LCCC projects are co-ordinated by a local community interest company. The projects have been developed and delivered by existing local organisations and community groups, with each community group having a community champion. www.reephamchallenge.org

Sustainable Blacon, Cheshire: Sustainable Blacon aims to generate a model sustainable urban community with focus on green spaces, transport energy and social enterprises. There are two strands to the programme which aims to assist people cut their fuel consumption and emissions by 20% by concentrating on behavioural change and in particular household energy expenditure: *Two Demonstration Houses* – so adults and school children in particular can see and touch improvements that they can make to their home and lifestyle and talk to local volunteers with support from paid staff and supporting advice organisations (e.g. Energy Saving Trust and Cheshire West and Chester Council); and the *Energy Management Programme* - a community-based education programme focussed on energy reduction and supported by the latest low carbon energy technologies. 150 households have been recruited to attend the 12 month programme at the end of which an optional energy efficiency makeover is available. The 150 is subdivided into three groups of 50 households each. One group has no additional energy technology ('control' group), the second has a real time device ('passive' group) advising on electricity use, the third has technology which permits programming of heating and electrical appliances ('active' group). The programme is also examining the social capital gain from this approach.

Transition Town Totnes, Devon: 'Transition Streets' involves 44 streets across Totnes (each with eight households), chosen to represent the demographics and housing stock of Totnes. Participating households undertake a programme of behaviour change called 'Transition Together' which helps them reduce their home energy bills (and also looks at water, waste, local food and transport). Participants

are then eligible to apply for subsidised solar PV systems, with low income households harnessing feed in tariffs to enable the repayment of low-interest loans from the local authority.

Whitehill-Bordon Eco Town, East Hampshire: The funding is supporting a programme of energy efficiency advice and interest free loans to support in-home energy saving improvements such as the installation of PV, double glazing and boilers. Under a separate project, loft and cavity wall insulation is provided free of charge to householders. The loans have proved so popular that the scheme is now oversubscribed with 27 applications. Members of the Eco-town team provided information and discussed energy-saving techniques with residents at popular local events (e.g. 'Wood Day', 'Apple Tasting Day' and the Christmas Festival) to raise awareness about the loans and encourage behaviour change. The community project worker has also visited schools and community groups (e.g. Brownies) to talk to pupils about how they can make their homes more sustainable. The Environment Centre has also visited schools, distributed energy monitors to energy champions and provided energy savings tips to members of the community. The Eco-town team is in the process of leasing a shop in the shopping centre where they will set up an exhibition and provide a drop-in service for residents and businesses where they can come and chat about energy-saving measures.

WALES

Awel Aman Tawe: Planning consent has been secured to put two wind turbines with a capacity of 4MW on the Mynydd y Gwrhyd mountain, 20 miles north of Swansea. The LCCC money will help towards the capital costs with the rest coming from other grants and 80% from the banks. The wind farm will sell electricity and use the income to fund low carbon community regeneration in the 12 villages which surround the windfarm. The community also has plans to open a zero carbon cafe, allotments and a biodiesel pump.

The Cwmclydach Community: The Cwmclydach Community Blaenclydach is a former mining village and is one of the most deprived areas in Wales. The money from LCCC will help pay for one small hydro turbine in the nearby Cambrian Country Park that will feed the national grid and, under the government's Renewable Obligation Certificate scheme, will generate an income for the Cwmclydach Community Development Trust to ensure the long term sustainability of two community buildings. The Trust is already working with key organisations including schools to reduce energy use and its partner the Cambrian Village Trust, has secured extra funding to extend their Café/ Bar plus install a rainwater harvesting system, PV panels and solar water heating.

Lammas Community: The funding is focused on the development of a community hub building which will serve as a hub for the village and a centre for education on low impact living for the wider world. The outcome is expected to be a replicable, integrated rural sustainable development model. The project will be delivered using a combination of green technologies (hydro electricity generation, passive solar gain, thermal mass stores, biomass heating), permaculture cultivation methods and natural building techniques.

NORTHERN IRELAND

Camphill Community Glencraig: This LCCC project is in the process of installing a 1.5 km biomass district heating system for 21 mixed buildings which includes some domestic houses, some large life sharing households for children, young adults and adults with a learning disability and their carers, as well as workshops, school buildings and cultural buildings. Fuel will be locally sourced low quality virgin wood with moisture contents up to 65%. This will reduce wood waste in the area and will help to reduce bills and dependence on fossil fuels. Engagement with the wider community is well underway creating a buzz in the area and further afield. Other Camphill Communities in Scotland and England are eagerly awaiting the outcome of the Glencraig project with the intent of benefitting from the learning and subsequent replication of the scheme. www.glencraig.org.uk or Facebook (Glencraig Biomass Project).

Appendix 2. Project characteristics

Community	Population (2009)	Urban/rural			Lead Organisation Status	
		Urban	Suburban	Rural	Local Authority/Council	Third Sector
Ashton Hayes	1,000			✓	✓	
Awel Aman Tawe	13,500		✓			✓
Berwick	12,000			✓		✓
Sustainable Blacon	16,000	✓				✓
Glencraig Camphill	500			✓		✓
Chale Green	9,524			✓		✓
Cwmclydach	3,307	✓				✓
Whitehill Bordon	14,000		✓		✓	
Exmoor	10,863			✓	✓	
Lancaster	2,360			✓		✓
Hook Norton	2,500		✓			✓
Kirklees	1,590			✓		✓
Low Carbon Ladock	1,530		✓			✓
Lammas	N/A			✓		✓
Meadows	9,000	✓				✓
Eco-easterside	3250		✓		✓	
Muswell Hill	4,446	✓			✓	
Reepham	2,600			✓	✓	
Totnes	8,500		✓			✓

Appendix 3. Measures installed

Heating Measures

Community	Solar PV	Air Source Heat Pump	Ground Source Heat Pumps	Solar Thermal	Wind Turbine	Biomass Boiler	Gas Connection	Boiler replacement	Heat Recovery Unit
Ashton Hayes	✓	✓							
Awel Aman Tawe					✓				
Berwick									
Sustainable Blacon	✓							✓	
Glencraig Camphill						✓			
Chale Green	✓	✓							✓
Cwmclydach									
Whitehill Bordon	✓					✓	✓	✓	
Exmoor	✓			✓	✓	✓			
Lancaster									
Hook Norton	✓	✓		✓		✓			✓
Kirklees	✓							✓	
Low Carbon Ladock	✓	✓	✓	✓	✓	✓			
Lammas									
Meadows									
Eco-easterside	✓	✓		✓	✓				
Muswell Hill	✓							✓	
Reepham	✓	✓	✓	✓	✓			✓	
Totnes	✓								

Heating Measures (continued)

Community	Chimney Balloon	Radiators	Slim Line Electric Storage Heaters	Waste-oil biodiesel	Radiator Panels	TRVs	Heat Pump/Solar System	District Heating Pipes	Heat Transfer Stations
Ashton Hayes									
Awel Aman Tawe									
Berwick									
Sustainable Blacon		✓	✓			✓			
Glencraig Camphill								✓	✓
Chale Green									
Cwmclydach									
Whitehill Bordon		✓			✓				
Exmoor									
Lancaster	✓								
Hook Norton				✓					
Kirklees									
Low Carbon Ladock									
Lammas									
Meadows									
Middlesbrough									
Muswell Hill	✓	✓							
Reepham			✓						
Totnes									

Insulation Measures

Community	Cavity Wall Insulation	Loft Insulation	Solid Wall Insulation	Hot water Jackets	Double Glazing	Energy Efficient External Door Frame	Pipework Insulation	Draught Proofing	Secondary Glazing
Ashton Hayes									
Awel Aman Tawe									
Berwick									
Sustainable Blacon	✓	✓	✓		✓	✓	✓	✓	
Glencraig Camphill									
Chale Green	✓	✓			✓				
Cwmclydach									
Whitehill Bordon					✓				
Exmoor	✓	✓	✓						✓
Lancaster									
Hook Norton	✓	✓	✓		✓			✓	✓
Kirklees	✓	✓			✓				
Low Carbon Ladock	✓	✓							
Lammas									
Meadows									
Eco-easterside	✓	✓							
Muswell Hill	✓	✓		✓				✓	
Reepham	✓	✓			✓				
Totnes									

Energy efficiency measures

Community	Low Carbon Building	Computer/TV Powerdown	Standby Switches	Low Emission Vehicle	ECO beata	Energy Monitors	Home Automation	LED Lighting	Low Energy Lighting	Energy Monitors	Energy Efficient Domestic Appliances
Ashton Hayes	✓			✓							
Awel Aman Tawe											
Berwick											
Sustainable Blacon			✓			✓		✓	✓	✓	✓
Glencraig Camphill											
Chale Green						✓		✓		✓	
Cwmclydach											
Whitehill Bordon											✓
Exmoor											
Lancaster	✓										
Hook Norton							✓	✓	✓		
Kirklees											
Low Carbon Ladock											
Lammas											
Meadows											
Eco-easterside		✓				✓				✓	
Muswell Hill	✓		✓		✓	✓			✓	✓	
Reepham	✓			✓					✓		
Totnes											

Energy Efficiency/Sustainability measures

Community	Tap Aerators	Shower Heads	Save-a-flush	Dual Flush Conversion	Hose Triggers	Shower Timers	Rain Water Harvester	Nut Orchard
Ashton Hayes								
Awel Aman Tawe								
Berwick								
Sustainable Blacon								
Glencraig Camphill								
Chale Green								
Cwmclydach								
Whitehill Bordon								
Exmoor								
Lancaster								
Hook Norton								
Kirklees								
Low Carbon Ladock								✓
Lammas								
Meadows								
Eco-easterside							✓	
Muswell Hill	✓	✓	✓	✓	✓	✓		
Reepham								
Totnes								

Appendix 4. Summary of the Household survey

1. Introduction and approach

The household survey component of the LCCC evaluation was commissioned to help determine whether LCCC activities reached and influenced the wider community (who did not participate directly in the project); and whether it encouraged broader change among those directly involved in the projects. The aim of the research was to measure any changes in awareness of environmental or low carbon activity, engagement with such activity and any impact on behaviours and attitudes.

The research comprised:

- Face to face, in home surveys at two stages: one 'pre' and another 'post' the LCCC interventions. In 2010, the pre intervention household survey covered 4,977 interviews across 17 LCCC areas[24] and in 2011 the post intervention survey covered 4,208 interviews across 14 LCCC areas[25].

- Face to face surveys were also carried out in 5 comparison areas which were matched as closely as possible to LCCC areas by size and demographic profile.

- A national survey of around 2000 interviews was also carried out in each year.

Interpretation of findings

The comparison areas and national surveys help to inform our interpretation of whether any changes are likely to be the result of LCCC activity or of broader activity. If significant changes are observed in the LCCC areas which are also observed at the national and local/comparison area levels, this will suggest that they have been caused by factors not related to LCCC activity. However, if significant changes are observed in LCCC areas which are not observed at the national or local area level, this may suggest the influence of LCCC activity[26]. As with other research of this kind, a direct causal relationship cannot always be concluded, since the influence of other non LCCC factors and activities[27] cannot be ruled out.

There was a great deal of variation in LCCC areas, both in terms of the characteristics of the communities themselves, (e.g. size, urban vs. rural etc.) and in terms of the activities that took place as a result of the LCCC. These considerations are important when interpreting the findings from these surveys.

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[24] Five areas were excluded at the baseline for reasons ranging from concerns about local residents being over-surveyed to where the project was a technology led solution, for example small scale district heating, and had no plans to engage residents in behaviour change.
[25] An additional three areas did not take part in the post intervention survey because they were at earlier stages of development and had not completed the level of capital work necessary for the purposes of the survey.
[26] In reality it is difficult to draw conclusions about the overall impact of LCCC as the findings differ for the different paired areas.
[27] This may include, for example, the influence of local media activity, the role of education, peer group influence and other organisations targeting local areas to make energy efficiency improvements.

Two factors in particular should be taken into account:

- Levels of awareness of activity on climate change/energy savings were high in LCCC areas at baseline. This is reflective of the fact that in some areas substantial amount of activity was already occurring in response to previous initiatives, which the LCCC may have replaced. In these instances it would be difficult to show any additional impact resulting from the LCCC. Furthermore, due to timing pressures some LCCC baseline surveys took place as projects were beginning to deliver/promote their projects. Therefore it is possible that the baseline figures are higher than they would have been under a pure baseline scenario (i.e. no LCCC interventions or local media coverage about LCCC award).

- The LCCC projects were diverse and varied in their focus on different low carbon technologies and measures and a range of engagement activities. Consequently, some of the aggregated findings of the activities across all LCCC areas mask significant changes at the community level.

2. Awareness of LCCC activity

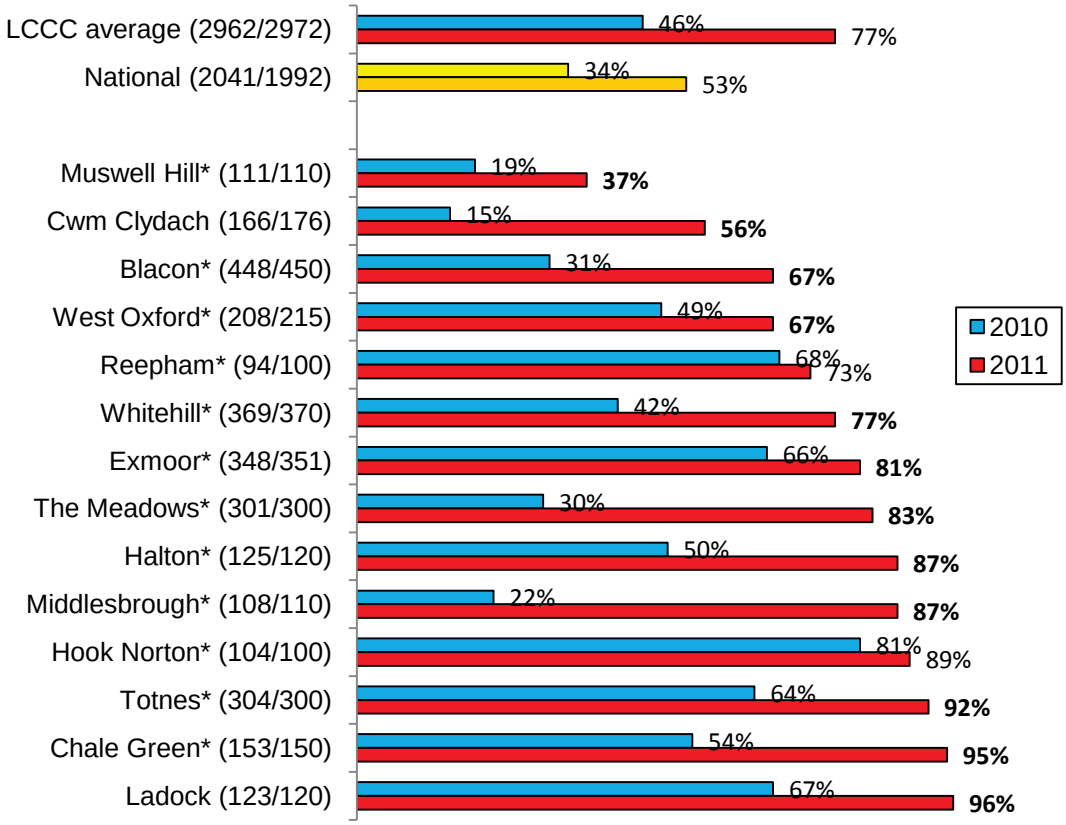
Across all LCCC areas, the number of people who had heard of any action on climate change/energy saving in the past year or so increased significantly from 35% at the baseline to 42% in the post intervention survey[28]. A significant increase in awareness was seen at Blacon (15% to 30%), Chale Green (39% to 55%), and Whitehill Borden (29% to 49%). In contrast, as mentioned above some communities recorded very high awareness at baseline which remained high at follow up. In Totnes for example, awareness was fairly stable at 75% at baseline and 72% at follow up.

Levels of awareness of LCCC activities were fairly high. After hearing a description of the LCCC activity in their area, half (50%) of all LCCC respondents said they were aware of the LCCC activity in their area. Of those, half (25% of all respondents) said they talked to friends and family as a result of seeing or hearing about it.

More than three quarters (77%) of all LCCC respondents had noticed solar panels on buildings in their local area in the post intervention survey, a significant change since the baseline (46%). Increases were also seen in most of the comparison groups and nationally but as these were not as great as the increases seen in LCCC areas, this suggests the focus on installing solar panels in many LCCC areas is likely to have influenced some of the increased awareness.

[28] This question was not asked in the national baseline but 7% of respondents had heard of action in the local area on climate change / energy saving at the national level in 2011

Chart 1. All who have noticed at least 1 or 2 solar panels on buildings in their local area



Comparison of change in comparator areas and their paired LCCC areas between 2010 and 2011										
Area	Meadows (301/300) †	**Berridge (301/301)**	Blacon (448/450)	**Newton (300/300)**	Totnes (304/400)	**Paignton (297/301)**	West Oxford (208/215)	**East Oxford (191/202)**	Hook Norton (104/100)	**Charlbury (124/132)**
2010	30%	5%	31%	44%	64%	37%	49%	41%	81%	67%
2011	83%	27%	67%	41%	92%	60%	67%	41%	89%	82%
Percentage point difference between 2010/11	+53	+22	+36	-3	+28	+23	+18	0	+8	15

Base: all respondents

Note: An asterisk (*) denotes where LCCC included installation of solar panels; † bracket figures show sample size in 2010 and 2011.

There was a significant increase in the proportion noticing solar panels across most of the communities. Where a significant change was not observed there had been high awareness of solar panels at the baseline (see Hook Norton and Reepham), so installing more solar panels may not have lead to any significant increase in awareness. Furthermore, the changes in LCCC areas were especially marked in terms of the proportion who said they had noticed "a lot" of solar panels – which increased from 1% to 15% at follow up (vs. 1% to 4% nationally).

A smaller but significant change occurred in the proportion of respondents seeing large wind turbines locally (16% to 24%) across the LCCC areas. Large increases were noticeable locally in Reepham (20% to 66%), Middlesborough (28% to 73%), Cwm Clydach (57% to 85%), Ladock (61% to 83%), Exmoor (12% to 32%) and Halton (86 to 96%). In all but Cwm Clydach, wind turbines had been installed as part of the LCCC activity.

Perceptions of solar panels and wind turbines

Attitudes to solar panels and wind turbines were already largely positive prior to LCCC - only 7% and 15%, respectively, considered them to have a negative impact on the local area. The impact of LCCC on these attitudes varied according to each technology. With solar panels, the LCCC had little impact on the overall balance between those who were positive and those who were negative, but it did increase the proportion who were 'very positive'. In contrast, there was no change in attitudes to wind turbines in response to LCCC.

3. Behaviours and engagement in activities

The proportion of respondents undertaking environmental and habitual energy saving behaviours (such as not boiling the kettle with more water than you are going to use; washing clothes at 30 degrees or lower etc.) did not change significantly between the baseline and post intervention surveys, so LCCC does not seem to have affected this.

There was a *perception* among communities that LCCC had a positive impact on behaviours. Six out of ten (64%) of those who were aware of the LCCC project agreed that the LCCC had 'encouraged people to think about making changes to help the environment'. Half (51%) agreed that LCCC had the ability to 'encourage people to actually make changes'.

Across all LCCC areas, there was an increase in the proportion of people who had been *offered* large energy efficiency improvements (from 25% to 33%) but there was no significant change between the baseline and post intervention surveys in the proportion who had *actually* made some physical changes to their homes to make them more energy efficient. However, significant changes were evident at the community level for several of the measures/activities considered[29]. As outlined in the introduction the fact that there was no change at the aggregate

[29] West Oxford was more likely (51% in 2010 to 61% in 2011) to have installed loft insulation; Chale Green respondents were significantly more likely to have installed solar (thermal) panels to generate hot water (2% in 2010 to 12% in 2011) and more likely to have installed solar (photovaltaic) panels to generate electricity (1% to 15%); Chale Green was also the only area where a significantly higher proportion of people installed air/ground source heat pumps (0% in 2010 to 7% in 2011); Whitehill respondents were significantly more likely (47% in 2010 to 58% in 2011) to have installed cavity wall insulation; Ladock and West Oxford respondents were more likely than they were in 2010 to have installed solid wall insulation (7% to 17% and 4% to 11% respectively); three communities were more likely to have switched to a green energy tariff: Chale Green (4% to 14%), Cwm Clydach (2% to 8%) and the Meadows (2% to 6%).

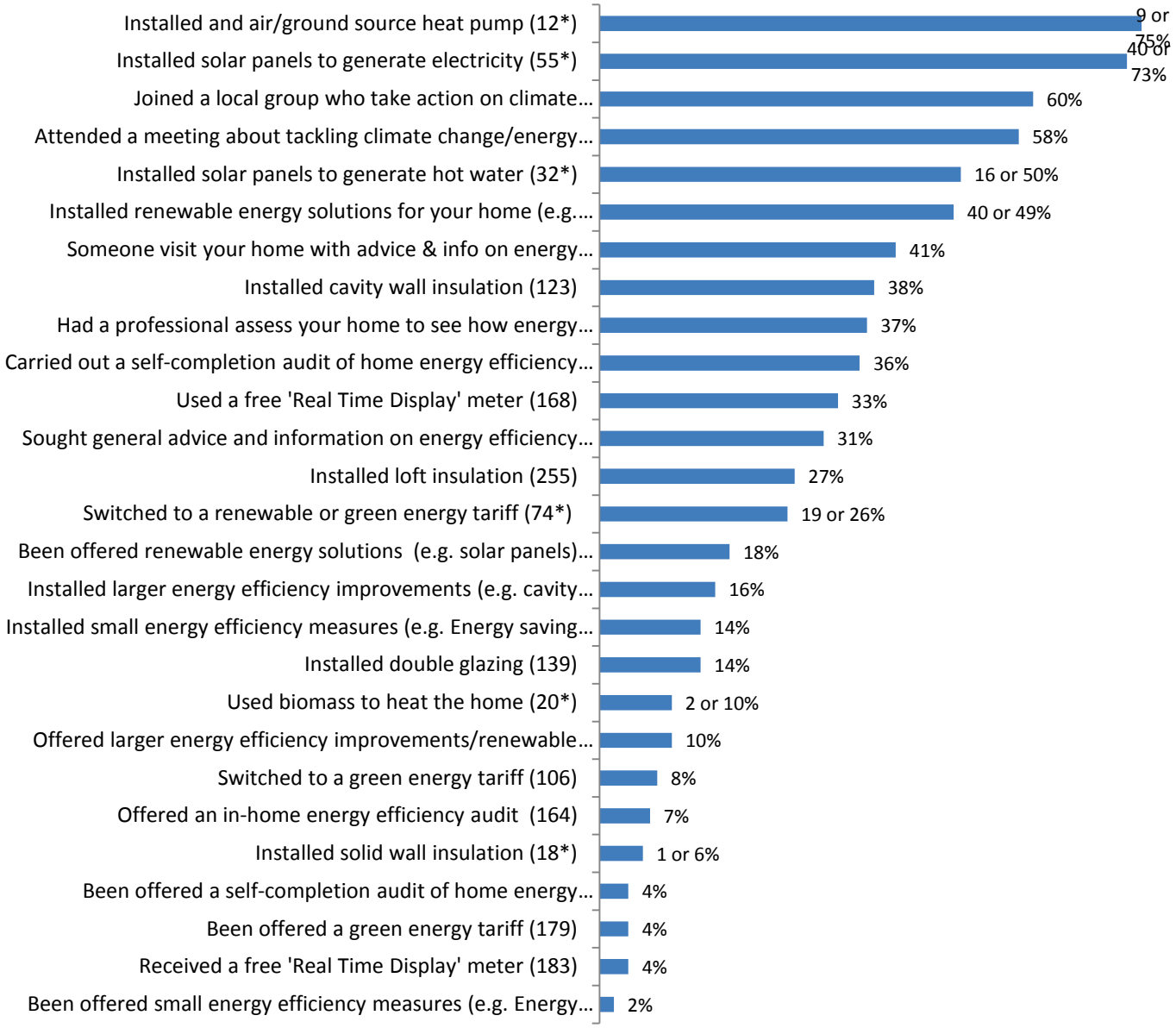
level could be explained by the fact that different communities were focusing on different measures/activities.

When respondents were asked directly whether specific activities or changes made to their home resulted from the LCCC, four in ten (39%) of those aware of LCCC said that some of the broad range of activities they had been engaged in on energy efficiency or the environment over the last 18 months had been a result of seeing or hearing about the LCCC project in their community. This equates to 18% of all respondents.

Chart 2 outlines the proportion of respondents reporting that changes made or activities undertaken in the last 18 months were the direct result of the LCCC. In some instances, as the base number of respondents is very low, the number of people attributing the change to LCCC is given as well as the percentage.

For some specific environmental activities, the proportion of those who had carried them out as a result of the LCCC was more than 50%. These included installing an air/ground source heat pump (9 out of the 12 people who had done this said it was a result of the LCCC), installing solar panels to generate electricity (40 of the 55 people who did this said it was because of the LCCC), joining a local group who take action on climate change/energy saving (60% because of the LCCC) and attending a meeting about tackling climate change/energy saving (58% because of seeing or hearing about the LCCC project).

Chart 2. Which of the following things that you said have occurred in the last 18 months, were a direct result of the project[30]



[30] This question was asked to all household survey respondents who had experienced any of the activities included in the graph over the last 18 months (**not** necessarily to individuals directly involved in LCCC)

4. Satisfaction with changes resulting from LCCC and potential wider impact among the community

Seven out of ten (69%) respondents who had undertaken environmental action as a result of the LCCC said that they were very (40%) or fairly (29%) satisfied with the action.

Six out of ten (62%) respondents who undertook environmental action as a result of LCCC said that they had recommended the actions they had taken to people they know. One third of respondents (33%) had not spoken to anyone about it.

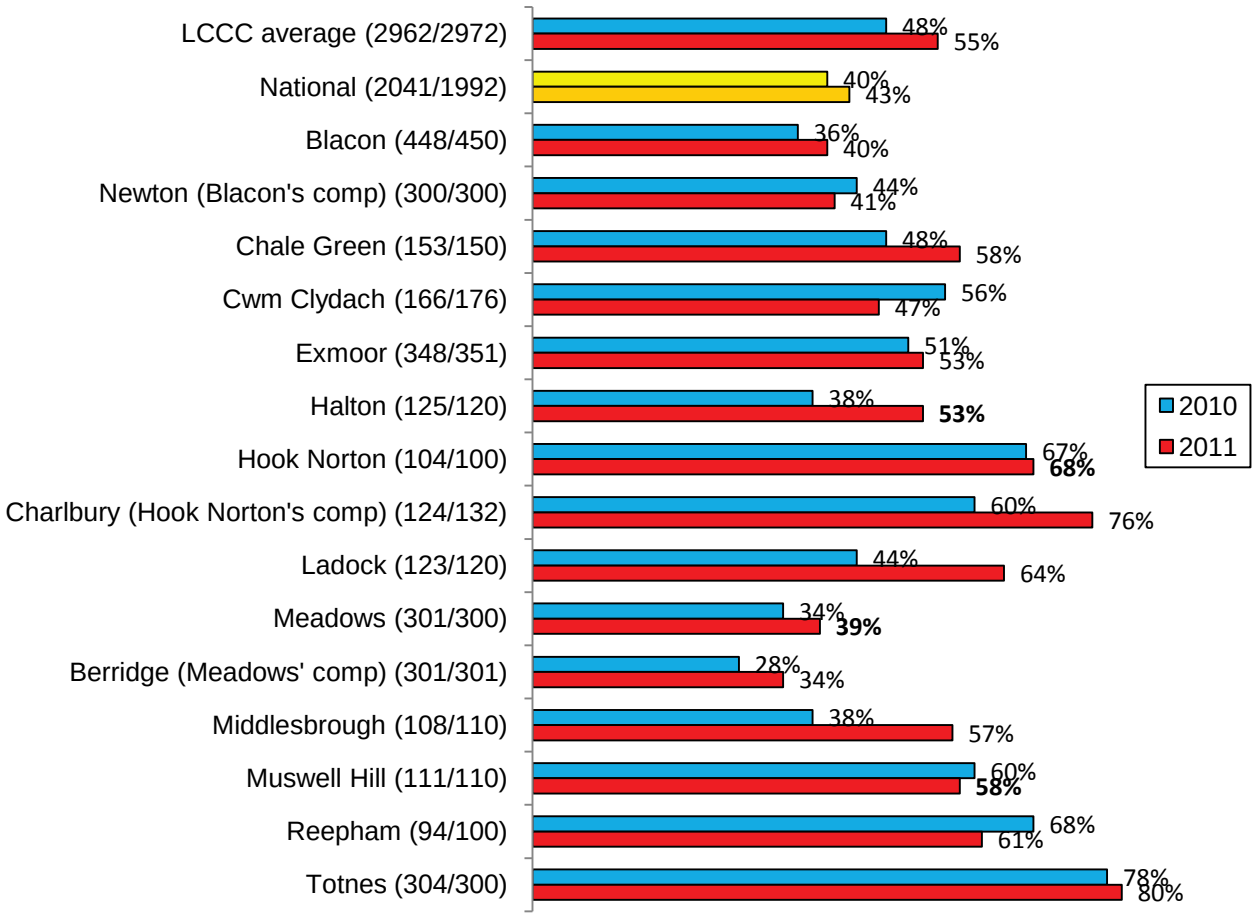
5. Wider attitudes toward energy and climate change

Attitudes towards future energy prices were measured. A change was observed in relation to attitudes to energy prices. In LCCC areas, the proportion very concerned that energy prices will rise steeply rose from 58% in the baseline to 66% in post intervention survey. There was no equivalent increase in concern at the national level. Analysis of the areas that drove the change locally shows increases in concern in comparator groups, suggesting that the concerns were unlikely to have been influenced by LCCC activities.

There was a significant increase in the proportion who agreed with the statement 'in my area, trying to reduce your carbon footprint is the normal thing to do' - from 48% to 55% (compared to 40% to 43% nationally). In some of the communities (e.g. Totnes, Hook Norton) this was already very high at baseline and remained so at follow up; in other communities – notably Whitehill Borden, Middlesbrough, Chale Green and Ladock – there was a marked change. In Ladock, for example, the proportion who agreed with the statement increased from 44% at baseline to 64% at follow up. Blacon is the only LCCC area where agreement with the statement increased more than in its comparator area but the increase was not statistically significant.

Chart 3. All who agree strongly or tend to agree that in their area, trying to reduce your carbon footprint is the 'normal' thing to do

Comparison areas (shaded) are presented alongside related intervention areas in the table below



Comparison of change in comparator areas and their paired LCCC areas between 2010 and 2011										
Area	Meadows (301/300) †	**Berridge (301/301)**	Blacon (448/450)	**Newton (300/300)**	Totnes (304/400)	**Paignton (297/301)**	West Oxford (208/215)	**East Oxford (191/202)**	Hook Norton (104/100)	**Charlbury (124/132)**
2010	34%	28%	36%	44%	78%	32%	53%	40%	67%	60%
2011	39%	34%	40%	41%	80%	44%	60%	48%	68%	76%
Percentage point difference 2010/11	+5	+6	+4	-3	+2	+12	-7	+8	+1	+16

Base: all respondents

† Figures in brackets show the sample size in 2010 and 2011

6. Difference between subgroups

There was some variation in views across groups. Three groups in particular were more likely to be aware of, and engage with, their LCCC project: residents who feel that they 'belong' to their local area; those concerned about climate change, and residents aged over 35. This suggests that the impact of LCCC projects may be greater among individuals or communities that have these characteristics.

7. Conclusions

Levels of awareness of LCCC activities were fairly high, with half of those interviewed aware of them. A good proportion of people (39%) who heard about or saw LCCC activity did something as a result of it, ranging from attending meetings on tackling climate change and seeking advice on energy efficiency, to installing solar panels, air source heat pumps and insulation. There were also high levels of satisfaction with actions taken under LCCC.

There were few community wide shifts in attitudes. However, low carbon lifestyles were considered as more 'normal'.

The level of changes overall mask some significant changes at the local area level. It is not possible to entirely attribute these changes to LCCC projects because we cannot rule out the influence of other external factors (e.g. other local initiatives or the influence of media) on people's attitudes and behaviour.

As outlined in section 1.1. observing some of the additional impact of LCCC through these surveys is made difficult because in some communities LCCC funding replaced or ran in parallel with existing initiatives, continuing a well established record of implementing low carbon technologies; and because some baseline measures took place as areas were beginning to promote/deliver their projects.

The findings from this research should be considered alongside the fuller evaluations of LCCC where data corroborated from a number of sources may help to build up a better picture of the programmes impact.

Data tables containing the full set of results from the LCCC household survey are published as an Annex to this report.

Appendix 5. Related ESRC Research – Energy and Communities

In addition to DECC's LCCC evaluation, a number of academic projects - funded by the UK Research Councils' *Energy and Communities* Fund - are currently working with LCCC communities. Although this has not formally been part of the evaluation plan, it will considerably strengthen the evidence base emerging from the LCCC.

The £4 million investment from the Economic and Social Research Council (ESRC) and the Engineering and Physical Sciences Research Council (EPSRC) is expected to have significant impact within the communities they are working with and beyond, to other communities looking to address energy demand reduction in the context of increasing challenges in energy security and equity.

Led by the EPSRC, the Energy Research Programme brings together the work of the EPSRC and that of the Biotechnology and Biological Sciences Research Council (BBSRC), the ESRC, the Natural Environment Research Council (NERC), and the Science and Technology Facilities Council (STFC).

The successful applicants working with LCCC projects are as follows:

Dr R. Gupta, Oxford Brookes University, Evaluating the Impacts, Effectiveness and Success of Department of Energy and Climate Change (DECC)-funded Low Carbon Communities on Localised Energy Behaviours (EVALOC), £1,373,831

The project seeks to assess, explain and communicate the changes in energy use due to community activities within six selected case study LCCC projects – Blacon, Hook Norton, Awel Amen Tawe, Eco-Easterside, Kirklees council and Low Carbon West Oxford. These low carbon community projects are evaluated in terms of their impacts on changing individual, household and community behaviours, effectiveness on achieving real-savings in energy use CO2 emissions and success in bringing about sustained and systemic change.

Through the research, the EVALOC project aims to generate evidence about:

- The role, effects, impacts and limits of the six low carbon communities in motivating energy reduction and renewable investment amongst local residents.
- The importance of informal learning within and between communities.
- The role of energy monitoring for individual and community wide energy reduction. This evidence will be used for community benefit, and to help influence policy.

In addition to the academic focused outputs, the research will produce:

- Materials and guidance for community energy projects, covering engagement, methods and evaluation.
- Community energy monitoring data, materials and map based tools.

Professor G. Smith, University of Southampton, The Role of Community-Based Initiatives in Energy Saving, £945,833

The project adopts a mixed-methods approach and is a collaboration between social scientists and engineers. The main element of the project is an innovative field experiment: a matched case and control trial in which households in both treatment and control groups receive cavity wall and loft insulation. In the treatment group, the insulation is delivered as part of an ongoing community project promoting low-carbon lifestyles. The energy use of the households will be monitored over four heating seasons to discover if the community-based initiative has any significant impact on net energy savings.

Regular surveys and selected semi-structured interviews with participants in the treatment and control groups will provide insights into changes in participants' attitudes and practices, including their broader consumption patterns. Both intervention and control groups are located in Hampshire. A second strand of research offers a comparative dimension: comparing the experimental results with the activities and impact of a wider range of community initiatives focused on domestic energy reduction across the UK.

Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.decc.gov.uk

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