

# Scaling up local energy action: the role of partnerships, networks and policy

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## Keywords

governance, social networks, low carbon transition, community action

## Abstract

The transition to a low carbon society requires action at different levels, from the local and regional to the national and international. Achieving ambitious carbon emissions reductions requires a scaling-up of energy action at all levels.

The UK Government has recognised the contribution and potential importance that local government and Low Carbon Community Groups (LCCGs) can play at a local level in creating the acceptability for, and catalysing changes in, energy generation and end-use (energy efficiency, behaviour change and renewable energy generation). However, issues such as how actors work together at the local level to implement energy action, the barriers and opportunities for effective action and how collaborations emerge and function, are not well understood. This paper aims to shed new light on these issues by assessing the development and implementation of local and regional low carbon and energy action through the story of local actors in Oxfordshire.

We explore the dynamics of action on energy and climate change in the city of Oxford and the surrounding county of Oxfordshire, UK. Over the past twelve years the county has seen an increase in grassroots, bottom-up action, such as the formation of a dense network of LCCGs working at neighbourhood or community levels, wider partnerships working at the middle (meso) level, alongside top-down action directed from central and local government through policy instruments and funding.

We first analyse LCCG's influence on energy governance at a community level, and the role that networking and learning between the LCCGs plays in this context. We then consider how partnerships which bring together different sectors (community, business and public), such as Low Carbon Oxford, arise and how such partnerships can build on local action in order to scale up carbon emission reduction at the community and local levels. We conclude by highlighting lessons about the interactions between national, county and local level energy action.

Our analysis draws on theoretical approaches of network theory, partnership theory and strategic niche management to show how these partnerships can foster the implementation of local and national energy targets.

## Introduction: local energy action and the research gap

The commitment to reduce the UK's greenhouse gas emissions necessitates a transition to a low carbon society. This complex transition involves changes to both energy generation and end-use, and needs to take place within the next couple of decades. It requires national level leadership, combined with the new forms of decentralised energy governance, and the active involvement of community scale groups, small and medium consumers and the public (Eyre, 2013). In the past decade, there has been an increase in the numbers and types of actors involved in local energy governance and action (energy efficiency, behaviour change and renewable energy reduction), which bring new opportunities, but also challenges. Whilst case studies of urban energy decision making sheds light on the processes and interactions between actors (e.g. Koch and Kersting, 2011), not

enough is yet known about how collaborations of local actors including Low Carbon Community Groups<sup>1</sup> (LCCGs) in the UK emerge, function and develop strategies to scale up local energy action. This paper aims to shed light on these processes, and suggest ways to scale up local energy action.

Case studies are necessary to understand these actions and processes at a county level. This paper focuses on cross-sectoral and multi-level low carbon and energy governance<sup>2</sup> in the city of Oxford and the county of Oxfordshire undertaken by LCCGs and local government (LG). We focus on the county scale, as opposed to individual LCCGs, as this can better reflect the meso level, as well as individual and community level, influences, that shape energy practices. These include local infrastructure, and services such as agriculture, education, transport, health, and waste, which are often governed at a county scale. The cross sectoral and meso focus also helps shed light on the flows of social capital<sup>3</sup>, resources (information, 'know how', expertise and funding), and interactions that occur between LCCGs, their wider communities, LG, and intermediaries. We focus in particular on the role of social networks, partnerships and transition management in achieving change on energy action. The focus complements existing and current research on community energy involving LCCGs involved with renewable technologies, (e.g. Walker et al, 1997; Seyfang et al, 2012), local authority action (e.g. Koch and Kersting, 2011) and national scale surveys of community energy from practitioner networks (eg LCCN 2012), NGOs (e.g. Platt 2010).

After a section on the political and theoretical background and research method, the paper presents and discusses the impacts of community level energy action initiated by LCCGs who have developed experience about the effectiveness of concrete initiatives and policy on energy actions, and their interactions with Local Government (LG). It then discusses how new forms of governance have emerged, which scale up and support local energy action through networks, intermediary organisations and local partnerships. Finally it raises concerns about the interplay between local level energy governance and the financial, institutional and structural barriers which still constrain the level of voluntary energy action, and argues for a more joined up approach between local and national energy governance.

## Political and theoretical background and research method

The key drivers behind the growing focus on energy governance at a national level in the UK are energy security concerns (DECC 2009), climate change mitigation (through energy efficiency, reducing energy demand and decarbonising the energy

supply) and the need to tackle fuel poverty (Boardman 2010). These national drivers, along with policies of privatization and localism, are prompting the growing involvement of LG. Peters and Fudge (2008) describe the increasing emphasis placed by successive Local Government Acts, Energy Acts and White Papers on LG to prioritise partnership working on sustainability, climate change mitigation, and more recently, climate adaptation and resilience. However, austerity measures imposed since 2008 are working in the opposite direction and constraining the capacity of LGs to take action and provide services on energy efficiency and fuel poverty.

In contrast, local energy action by LCCGs is often driven by values and concerns of social justice, local resilience, and environmental and community development. It has emerged despite, not because of, what many consider to be an inadequate Government response and regulatory framework to climate change (Moloney et al 2010, Heiskanen et al 2010, CAG Consultants 2010). Funding for community level energy activities (such as behaviour change programs) has undergone a shift, away from end-user defined grants to support existing projects, and towards more strategic 'test bed' funding from the Department for Energy and Climate Change (DECC), which has involved competitive grant-bidding processes by both LCCGs and LG. Evaluations (e.g. Houghton, 2010) show that LCCGs play crucial roles and can be powerful actors in achieving demand reduction and renewable production at a local level, but that action and capacity could be further scaled up.

Despite the financial incentives of Feed In Tariffs (FiTs), which initially increased the installation of renewable electricity generation, and the development of policy instruments such as the Green Deal<sup>4</sup>, there are concerns that barriers, such as cost and a disjointed energy efficiency supply chain, remain which will constrain the level of voluntary household action. Unless these barriers are addressed, there is a danger of creating a well-designed delivery system at the middle level, but with householders still unable to make significant energy reductions because of institutional and structural barriers.

## RESEARCH METHOD

This paper draws on four research projects conducted between 2010–2012 with a range of community energy actors in Oxfordshire. Table 1 shows the data sources and the methods of data generation used, which included desk based background research, semi-structured interviews with core members of LCCGs, social network analysis of LCCGs, and participant observation in networking events and meetings. The research projects drew on partnerships, social network and transition theory. This paper brings together the data and the theories that informed the projects, namely partnerships, social network theory and transition theory.

## PARTNERSHIPS

Local cross sectoral partnerships have grown rapidly in recent years, both in advanced and developing countries and the UK (Selsky and Parker, 2005). This development is alternatively understood as reflecting an institutional shift from government

1. LCCGs can be defined as autonomous groups of individuals, working together in local geographical communities (typically at village, town or city neighbourhood level) to promote awareness and encourage and enable action on energy and carbon reduction issues.

2. The term energy governance in this paper refers to the rules, processes, practices and behaviour that affect the way in which energy is generated and used in a given geographical area. Various state and non-state actors participate in the governance structure. Traditionally, the main actors are government, regulator, the power generation sectors, network operators and energy utilities.

3. In a nutshell, social capital is hidden wealth, the non-financial resources comprised of local skills, trust, know how, useful contacts and care based exchanges. Social capital is somewhat different from human capital, and is often considered as both private and public good (Putnam, 1995).

4. The Green Deal is a UK financing mechanism, enabling people to pay for energy-efficiency improvements to homes through savings on their energy bills. It was introduced in January 2013.

Table 1. Data sources in Oxfordshire and methods.

| Source  | Method   | Data period           |
|---|--|-----------------------|
| Hamilton (2010)<br>MSc dissertation<br>research | Individual semi-structured interviews with two to three core members of six LCCGs in Oxfordshire. Desk based research of community energy LCCGs and intermediary organisations in Oxfordshire. Participant involvement in networking events.             | Nov 2010–<br>Jan 2011 |
| UNLOC research<br>project                       | Semi-structured interviews with one core member each from five LCCGs. Organisational social network analysis of 30 LCCGs in Oxfordshire, and desk based research. Participant involvement and observation in partnership meetings and networking events. | May–Aug<br>2011       |
| EVALOC research<br>project                      | Desk review, semi structured interviews plus focus groups and action research workshops with core members of two LCCGs in Oxfordshire.   | Jan 2011–<br>Dec 2012 |
| Low Carbon Oxford                               | Partnership study of Low Carbon Oxford (LCO) involving 24 semi structured stakeholder interviews with key actors.  | Nov 2011–<br>May 2012 |

to ‘network governance’ or a political restructuring of power relations between state and private sector as part of the neo-liberal project (Geddes, 2006). More concretely, partnerships are understood to form because actors lack specific competencies and/or because they are needed to tackle emerging complex social or environmental issues such as climate change that exceed the scope of any single organisation (Selsky, 2005). There are a number of documented cases studies of comparable local energy partnerships internationally (e.g. Koch and Kersting 2011, 2011) and in the UK a number of local energy partnerships are linked to Local Strategic Partnerships (LSPs).

The specific motivations and incentives for joining partnerships may differ according to the actor. In the UK, LG and other public service providers have been encouraged by government to set up LSPs through guidance and legislation. LSPs are largely overarching non-executive bodies whose task is to support joint initiatives on various issues between the public private, voluntary and community sectors (Geddes, 2006). LCCGs are understood to join LSPs because of the increased leverage over strategic local decisions their involvement offers, while businesses are understood to join because of perceived commercial benefits (e.g. business opportunities) or the opportunity costs (e.g. in terms of their reputation of not getting involved) (Geddes, 2006).

However, partnership approaches, such as LSPs, have also been criticised for weakening democracy and accountability by replacing representative democracy with negotiations between unelected cross sectoral local elite actors, and not including interests such as trade unions (Geddes, 2006). Some research indicates that LSPs have found it hard to demonstrate concrete achievements and impacts (Geddes, 2006), in part because of the complexity and volume of overlapping government initiatives and in part because of the practical difficulties of engaging different sectoral interests (Geddes, 2006). Nevertheless there are examples of local energy partnerships, such as the Kirklees Warm Front scheme<sup>5</sup>, which have achieved significant impacts.

Practically partnerships often generate tensions and contradictions (Waddell, 2000) as partners need to negotiate their

interests, roles and responsibilities and tend to have different views to each other on the discussed issues. Partnerships are seen as posing particular risks for groups, such as LCCGs, due to power disparities (Selsky, 2005), the risk of co-option, and lack of financing for participation. Businesses are often seen as having more power because of their greater financial resources (Ashman, 2000) but others argue that other sources of ‘soft’ power that LCCGs might have, such as the capacity to mobilise a constituency around an issue, are also important (Waddell, 2000).

#### SOCIAL NETWORK THEORY

Social networks are relevant to energy governance at two levels. On an individual level, social networks have been found to be significant in influencing decisions relating to adoption of energy efficiency measures and/or behaviour change (Newman and Dale, 2005; Scott, et al 2001). On an organisational level they are important for building communities of practice, enabling groups with shared interests to build knowledge through regular interaction (Franklin et al., 2009), and for diffusing innovations (Rogers, 2003) e.g. through modelling new behaviours.

However, the characteristics and structure of social networks are only one among a range of individual, interpersonal and structural influences on the flow of knowledge, resources, innovations and behaviours. In addition, much depends on the attributes, (e.g. McPherson et al 2001), power relations and strategies of network actors (e.g. (Dowding, 1995). Moreover, social network theory has little to say about how knowledge, resources, innovations, behaviours are diffused when there is resistance to change. Hence on an individual level, Carrasco et al. (2009) recognises that individuals’ decision-making is influenced and constrained by external structural factors (e.g. income, locations) and responsibilities (e.g. child care, work), their individual characteristics (e.g., age, gender), as much as the attributes of the network itself. On an organisational level, Borgatti et al (2003) suggests the interaction between agency and network structure is important.

Building on Granovetter (1973), Newman and Dale (2005) postulate that to positively influence energy governance, network actors need to maintain a diversity of linkages between

5. <http://www.kirklees.gov.uk/community/environment/energyconservation/warm-zone/WarmZoneReport.pdf>

stakeholders including both bonding links (links among members of homogenous groups) to maintain trust, and bridging links (links between heterogeneous groups) which can help to make resources more accessible.

In order to understand how local energy action can be scaled up, our analysis focuses on inter-organisational networks, and explores the bridging and bonding interactions between LCCGs and wider actors both informally and through partnerships within Oxfordshire, as well as the interaction between actors at different levels of the system, hence the relevance of transition theory.

#### TRANSITION THEORY

Transitions can be defined as “transformation processes in which society changes in a fundamental way over a generation or more” (Rotmans et al., 2001:1). In other words, a transition is a paradigm shift in a socio-technical system. Transitions have been researched over the past decade in the context of persistent, complex problems faced by society, including energy, transport and healthcare sectors. In contrast with traditional linear, step-by-step policy approaches, which tend to seek out optimisation within the existing system, transition theory explores the interlocking political, cultural and economic aspects of system change, and the interactions between different system levels of niche, regime and landscape. The business as usual mainstream has trouble solving complex problems, such as climate change, due to existing institutions and infrastructure, investments and vested interests and cultural barriers. Transition theory therefore highlights the role of *niches* (small networks often outside the mainstream) which can develop social or technical innovations and can become key to systemic change. Questions of how to scale up these innovations are of utmost importance.

Transitions are complex processes that cannot be fully predicted, let alone controlled. Transition theory therefore looks at transition management (TM), rather than a specific transition process. TM requires innovative visioning, steering, learning and experimenting, and can include long-term thinking as a framework for short-term policy. It involves keeping a number of policy options open, visioning and planning at different levels with different actors, and creating or nurturing social and technological niches which offer desirable alternatives (Rotmans et al., 2001, Smith et al., 2005). TM is explorative and design-oriented, with experiments relating to the integration of short and long-term processes, different scale levels, people and stakeholders from various domains, perceptions of the problem by diverse actors, a wide range of possible solutions, a variety of learning processes and different types of instruments (e.g., Loorbach and Rotmans, 2010). One TM tool is the transition arena, a platform for interactions among appropriate actors, which aims to facilitate creative knowledge exchange and leaning among the frontrunners, innovators and strategic thinkers of different backgrounds (Voß et al., 2009, Kemp and Loorbach, 2006). We explore the extent to which local groups such as LCCGs can be seen as niches, and local network hubs, intermediary organisations and partnerships may act as transition arenas. We also investigate interactions between local level innovations and the policy framework.

### Description of local energy action in Oxfordshire: LCCGs, networks and partnerships

#### OVERVIEW OF OXFORDSHIRE LOCAL ACTIVITY AND COMMUNITY ACTION

Oxfordshire is a county in the south-east of England with a population of approximately 653,800. Of these, approximately 152,000 live in the city of Oxford. Oxfordshire has a high density of energy researchers, who are active in the two universities and science parks. There is two tier system in the local government (LG). Both tiers (county and city / district) have different, but complementary interactions with LCCGs. For the purposes of this paper we will consider them both as LG, making distinctions only when necessary.

As shown in Figure 1, Oxfordshire has a tradition of local level activity on sustainability issues spanning at least two decades (see for example Darby, 2006). However, there has been a rapid increase rise in the number of LCCGs since 2001. At the time of writing (December 2012), Oxfordshire has over sixty LCCGs, many of whom take action on energy generation and end-use with their local communities. Although the increase of LCCGs has happened in line with a national rise in awareness and concern about climate change and energy issues, this is one of the densest and most populous county level networks of community energy activity in the UK.

At a local level, one key contributing factor to the growth in LCCGs from 2001 onwards has been the support provided to LCCGs by intermediary organisations, or ‘intermediaries’. Intermediaries can be defined as organisations who fulfil specific roles in the field of local and community energy, and who support and develop action by other actors. These roles include capacity building, improving communication, network and coalition building, scaling up local action, connecting with formal structures, and scaling up local programmes (as detailed in Wade et al 2013). Recent studies on community energy (e.g. Hargreaves et al 2012) have focused on the roles these intermediaries perform at a local and national level. Whilst most intermediaries are social enterprises or charities, many LCCGs and LG also perform some of these intermediary roles at a local level, such as networking and sharing expertise in areas such as community renewable energy generation and energy demand reduction.

As Figure 1 shows, a key example of this was the formation of CAG Oxfordshire. CAG Oxfordshire was initially funded by Oxfordshire County Council’s Waste Strategy to increase community action on waste and recycling, and has provided consistent support to community action groups since 2001. From 2005 onwards many groups expanded to include work on sustainability, climate change and energy, and develop into LCCGs. Capacity, support and networking between the LCCGs was further increased in 2006 with the formation of Oxfordshire ClimateXchange (CXC), a climate change engagement project led by the University of Oxford, which initiated networking and shared learning events between the LCCGs. Between 2007–2010, networking between actors working on climate and energy (CAG Oxfordshire, CXC, county and city councils, energy agencies) was facilitated by Oxfordshire Climate Action Network (OxCAN), a networking and action group consisting of LG and intermediary organisations which aimed to ‘stimulate and support change in the community,

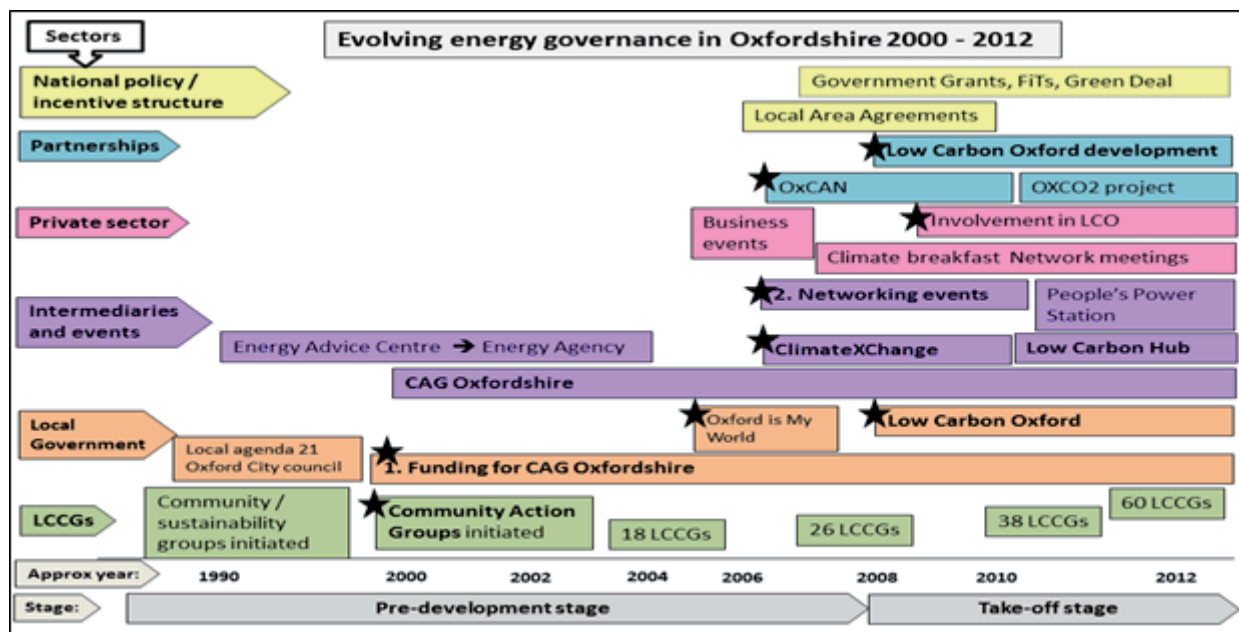


Figure 1. Evolving local energy governance in Oxfordshire.

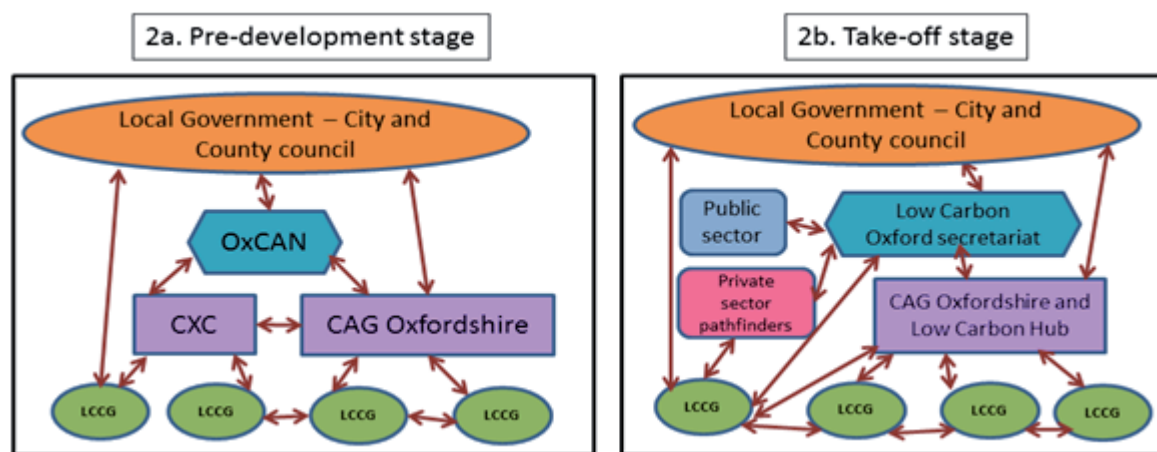


Figure 2. Organisational relations (2.a pre-development stage, 2.b take off stage).

public and private sectors and deliver community action on mitigation<sup>6</sup>. This included providing support to existing intermediaries, increasing uptake of subsidised insulation and facilitating the installation of renewables on Local Government property such as schools. OxCAN allowed a minimum amount of scaling up of activity, through developing joint energy action projects, but it did not have the capacity for long term planning or facilitating direct interaction between LCCGs, LG and the private sector. This was partly due to disparate short-term funded projects, but mainly a lack of capacity to develop and deliver county-wide strategic goals. It also did not have the ca-

capacity to provide technical energy expertise support directly to LCCGs. Other local level factors contributing to the formation of LCCGs includes direct interactions between LCCGs local community planning processes, and the motivation of key individuals within communities. The relationships between the organisations in this stage are illustrated in Figure 2a, the arrows indicating a two way flow of information between the organisations. The national policy incentive framework has also catalysed action by LCCGs. For example funding opportunities from Central Government have enabled a number of LCCGs to realise and scale up their activities which were subsequently shared with the wider LCCG network. The introduction of FiT and test bed funding for Green Deal also catalysed some further action by LCCGs, but has not enabled LCCGs to develop independent funding streams to sustain activities, and has not

6. <http://www.oxfordshirepartnership.org.uk/wps/wcm/connect/occ/OxfordshirePartnership/Partnerships/Environment+and+Waste+Partnership/OP++Part++03+Ox+Environment+WG>

been without its problems (for further discussion see Wade et al, 2013).

Figure 1 illustrates the increasing level of activity and support for community energy activity in Oxfordshire, the overall increase in the community activity that has occurred since 2007 and the range of actors and sectors involved. The key step changes in the development of local energy governance are indicated by the stars in Figure 1 and are further presented in Table 2. These step changes in local energy action occurred largely as a result of interactions between catalytic individuals and organisations active in LG, intermediary organisations, LCCGs, and more recently the private sector.

#### LCCGS INFLUENCE ON LOCAL ENERGY GOVERNANCE

The 60 LCCGs in Oxfordshire are typically initiated by a core group of individuals motivated by social, environmental, development and social justice issues. The majority of LCCGs were initiated over 3 years ago, and involve between 10–50 people in their local community. The nature of their activities varies, but for most LCCGs includes a major focus on energy generation and end-use, with activities such as household energy assessments, renewables and a range of other activities (see Table 3). Most LCCGs are informally constituted as voluntary organisation with a constitution and chair, secretary and treasurer or steering group, but others have formed legal entities such as charities or social enterprises to enable them to achieve more ambitious aims, such as installation of community scale renewables. Most groups are entirely voluntary, but some have paid administrators or staff, the funding raised by the LCCGs themselves.

In Oxfordshire (and the UK), LCCGs influence local energy action in a variety of ways. Whilst much activity is focused on energy and carbon reduction, their impact extends beyond these issues. Drawing on Janda and Parag's (2013) 'middle-out' framework, LCCGs energy action can be grouped as influencing energy action and practices 'downstream' (by influencing households energy use), 'upstream' (by influencing policy and government) and 'mid stream or sideways' (by influencing other LCCGs and organisations for example through partnerships). Table 3 presents example activities of energy initiatives undertaken by LCCGs, alongside examples of outcomes reported by Oxfordshire LCCGs. These illustrate that some have achieved household energy demand reductions of 10 % (Hamilton, 2010) and in some cases more than this (e.g. LCWO cited in Houghton 2010). Whilst the impacts of some LCCGs have been captured in evaluations by DECC and academic research (e.g. Cox 2010, DECC 2012), most LCCGs lack the capacity and resources to monitor and evaluate their immediate impact on energy, let alone assess the wider impacts they achieve.

Alongside the downstream energy actions, such as household energy reduction and renewable energy generation, transport (e.g. initiating car clubs, cycle workshops and lobbying for cycle path improvements); food (e.g. initiating fruit tree planting, food festivals, food co-ops and community allotments); health and wellbeing groups; and swap shops (events where household items and clothes are swapped and diverted from landfill), which attracted wider community participation. Whilst Table 3 shows the influence of LCCGs through specific activities, energy behaviour is also influenced through informal channels, such as community members informally

discussing energy with peers in social networks. Ongoing research through EVALOC is currently investigating the spread of energy messages through informal social networks.

LCCGs also exert influence sideways, to other mid-stream actors such as LCCGs, local government and partnerships. This sideways influence involves shared learning with other LCCGs and other sectors through networking, involvement in local and county level politics, partnerships and/or joint projects. This shared learning is important for the development and dissemination of resources, as it can help LCCGs overcome barriers including lack of resources or expertise. The next section explores the dimensions of shared learning between LCCGs.

Many LCCGs experience limitations in their influence on local energy governance. These include a suite of factors, ranging from householder's motivation to engage with energy issues, to insufficient knowledge and lack of independent advice about novel technology (e.g. Bergman et al 2009), a lack of joined up and trusted supply chain to deliver energy efficiency or renewable energy, or the high upfront cost of achieving energy demand reduction through whole house thermal renovation. Some of these limitations, for example lack of joined up supply chain for household energy retrofits, are symptomatic of national rather than community level problems, thus many LCCGs are engaged in upstream action, such as lobbying policymakers, in order to influence the local and national policy arena.

#### NETWORKING AND SOCIAL LEARNING BETWEEN THE LCCGS

Drawing on the organisational social network analysis and the semi-structured interviews conducted through UNLOC, we know that LCCGs network to share information, expertise, innovations, best practice, and to create and support collective action between the groups. Figure 1 highlights the two significant change points for the networking structures between the LCCGs: 1) the formation of CAGs and regular networking events to bring the LCCGs together; and 2) networking and skill share events from 2007 onwards. These networking events from 2008 onwards typically involved 150 representatives from over 30 LCCGs in a range of discussions, workshops and skill sharing activities. Networking was further aided by weekly email updates from CAG Oxfordshire and CXC, which summarised LCCGs activities, and provided specific information to LCCGs, which further facilitated the sharing and developing of social innovation between the groups, and a sense of belonging to a wider national movement.

Whilst networking events enabled access to knowledge and expertise dispersed within LCCGs, much networking and mentoring also took place bilaterally between LCCGs, and beyond the county geographical boundaries. Participating in a county-wide network was beneficial for sharing information and catalysing learning between LCCGs, but the capacity for sharing best practise and expertise was limited by the available resources and mandate of intermediary organisations, which were funded for focusing on specific geographical area. In addition to the influence LCCGs exert through informal networks at community level, it is important to understand their influence on formal partnerships through exploring the mid-stream, or meso-level, arena of local energy governance. This is illustrated through presenting and discussing the Low Carbon Oxford partnership.

Table 2. Step changes in the development of local energy governance in Oxfordshire.

| Date         | Stage           | Changes   |
|--------------|-----------------|---|
| Pre 2001     | Pre-development | Local community sustainability energy groups established, both independently and linked to Local Agenda 21.   |
| 2001         | Pre-development | Commitment from Oxfordshire County Council to support community level action on sustainability and waste led to establishment of CAG Oxfordshire prompting increase in number of community action groups (CAGs, which are part of the LCCG network).                      |
| 2006–2007    | Pre-development | Many LCCGs formed, coinciding with rising climate change awareness. Oxfordshire ClimateXchange (CXC) established, increasing support for LCCGs. Oxford City Council climate engagement project 'Oxford is My World'.  |
| 2006 onwards | Pre-development | Increase in formation of LCCGs across Oxfordshire and UK, networking and communication between groups through media and more informal channels. Oxford Climate Action Network (OxCAN) established to increase communication and networking between LG and intermediaries. |
| 2009         | Take-off stage  | Low Carbon Oxford (LCO) launched. LCO is a LG led climate change partnership formed from the Oxford Strategic Partnership) involving pathfinder organisations from public sector, private sector, LCCGs, housing associations, University colleges.                       |
| 2010         | Take-off stage  | Increased support capacity for LCCGs. Development of Low Carbon Hub, formed from a joint DECC funded project 'OXCO2' project between Oxford City Council and a LCCG. Introduction of FiT catalyses more interest and uptake in renewables by LCCGs and LG.                |
| 2010         | Take-off stage  | Wider actors and private sector involved through LCO<br>Government LEAF test bed funding in advance of Green Deal prompts increase in household energy assessments by LCCGs.  |

Table 3. Activities and outcomes of LCCG energy action.

| Direction                    | Examples of activities   | Example outcomes from activities  |
|------------------------------|--|---|
| <b>Down stream</b>           | Raising energy and climate change awareness through talks, films screenings.                               | Increase in knowledge and agency for installing solar PV and home energy conservation, and reductions in energy use.  |
|                              | Encouraging and enabling demand side energy efficiency measures through information and household surveys. | Challenge North Leigh contributed to measured electricity reduction of 10 % across the village 2008–2009, maintained in 2010 (Hamilton 2010).   |
|                              | Creating learning and action groups.   | LCWO recorded average household CO <sub>2</sub> reductions initially of 36 % and subsequently of 10 % per annum for participants in their learning and action groups (low carbon living programme).                                     |
|                              | Tailored household energy advice.  | Blewbury Energy Initiative survey self-reported estimated 10 % reduction of household energy 2006–2009 (Hamilton 2010).   |
|                              | Encouraging household level microgeneration.   | Bulk buying scheme for solar PV aided installation of 15 systems in two communities (Hamilton 2010).  |
|                              | Installing community level microgeneration.  | West Oxford Community Renewables installed 222 kWp of solar photovoltaic panels and a 6kWe wind turbine (LCO 2012:31).  |
| <b>Mid stream / sideways</b> | Sharing social innovations, e.g. community share offers.   | a/ Joint project with Oxford City Council funded by DECC enables sharing of Low Carbon West Oxford's renewable energy share offers with four LCCGs; and Low carbon living programme with three LCCGs and Oxford City Council employees. |
|                              | Thermal imaging studies.   | b/ Thermal imaging methodology shared from initiating LCCGs via CAG Oxfordshire and CXC. Over 15 LCCGs have completed thermal imaging studies of homes.   |
|                              | Partnership work.  | Through LCO, LCCGs influencing private sector. Some LCCGs established partnerships with District and City Councils for policy discussion, and delivery of home energy improvements.   |
| <b>Upstream</b>              | Influencing Local and National Government, impacts on policy, supply chain, legislation.                   | Lobbying by LCCGs contributed to e.g changes in government community renewable policy, and the initiation of a Government community energy strategy.  |

### STRATEGIC PARTNERSHIP DEVELOPMENT: LOW CARBON OXFORD

Prior to 2010, OxCAN enabled information sharing between the intermediaries and LG, but lacked capacity for more ambitious action. A step change in the approach occurred with the formation of Low Carbon Oxford (LCO) Partnership. LCO grew out of the Oxford Strategic Partnership climate change committee, led by Oxford City Council, and was officially launched in October 2010, with 15 'Pathfinder Partners' (organisations who participated in the LCO partnership) from the public, private and community sector including two Oxford based LCCGs whose work was already known to the council. Within two years it has grown to include 29 pathfinders (LCO 2012), illustrated in Figures 1 and 2b.

LCO is geographically specific, including cross-city, cross-sector partners with a common goal, who have signed up to the LCO charter to help achieve a target of delivering 40 % carbon reductions against 2005 baseline by 2020 (LCO 2012:6). It enlisted the 'big players' in Oxford, including the two universities (University of Oxford and Oxford Brookes), transport companies, major private sector companies, housing associations as well as the city and county council (as they generate 10 % of city's emissions), together with key LCCGs, and subsequently CAG Oxfordshire. Measuring and monitoring CO<sub>2</sub> reductions is ongoing, but in 2012 all eight pathfinder organisations that reported data for 2010 and 2011 reported a reduction in both gas and electricity end-use with percentage reduction of CO<sub>2</sub> emissions ranging from 5.6 %–17.7 % reductions (LCO 2012:13).

LCO has a loose governance structure, aiming to be bottom-up, with most action coming from participating businesses and other partners. The secretariat plays more of a facilitative rather than a directing role. This structure has helped achieve broad participation and organisational evolution, and has aided the sharing and defining of expertise, joint projects and common interests. Whilst the reputation associated with LCO is important to some, and Oxford City Council's leading involvement in LCO has lent it legitimacy, some private sector partners have difficulty achieving wider change throughout their organisations (Hobson and Bergman 2012). The attitude of trust within LCO has helped to bridge cultural differences between the sectors, contributed to the development of a new mode of governance in the county, and helped encourage pathfinders in their emission reduction action plans. This was enabled by LCO's established principles of collaboration, and helped by the absence of direct competition between partners, and further enhanced through the secretariat including two individuals directly involved with LCCGs, and one with experience of national government.

One early joint project that occurred was when the City Council invited one of the LCCG pathfinders to co-design a grant application to DECC in 2011, aimed at sharing their experience in community energy and behaviour change programmes with other communities, and establish the Low Carbon Hub (LCH). The LCH was launched in December 2011, aiming to train, advise and assist LCCGs in setting up community energy schemes, and provide a more streamlined method of knowledge transfer and strategic development for the community sector, working alongside CAG Oxfordshire (as illustrated in Figure 2b). At present the LCH is focusing on building capacity for the development of community renewable energy,

which has occurred alongside the national level financial incentives such as Feed In Tariffs (FiTs). The same LCCG is now collaborating with LCO secretariat, OCC, and one of business pathfinders to catalyse energy saving action on an industrial and retail estate in their area. Figure 2b shows the relationship between the key actors in the 'Take-off stage', showing an increase in the sectors, and more effective joint delivery of support to LCCGs by CAG Oxfordshire and Low Carbon Hub.

### Discussion: the role of networks, partnerships, and change actors

The considerable practical experience of local energy governance developed by LCCGs and LG has been shared within the county, which has resulted in new initiatives and innovations. However the examples of the wider Oxfordshire network and LCO is only one such county level approach. Supporting the scaling up of local energy action at a national scale could involve similar processes for sharing, learning and developing suitable approaches between district and county level institutions, and upstream with national government.

### NETWORKS AND STRATEGIC PARTNERSHIP DEVELOPMENT

Our findings show that the networks for sharing information, learning and collective action support in Oxfordshire have been important for the development and dissemination of 'niche' socio-technical innovations such as initiating LCCGs, community engagement, projects, community PV installation, or developing learning and action groups such as LCWO's Low Carbon living programme. However, our findings also highlight the importance of actors' strategy in development and disseminating innovations. As noted above, both intermediary organisations and LCCGs played an important role in shaping the structure, functions and content of resource flows in the networks. In the pre-development stage, the involvement of OxCAN provided a forum for joint strategies to emerge, which enabled the growth of LCCGs. However, at that stage there was little capacity to develop a more strategic approach across the county, a mandate for leadership had not been established, and the forum did not have the capacity to develop a long term vision.

The establishment of the LCO partnership created a new forum in which cross-sectoral actors could come together in a joint learning process to reduce carbon emissions. It catalysed the development and joint ownership of a low carbon vision for Oxford and the county through stakeholder involvement and attracted resources to focus the dispersed expertise of different actors on strategic goals of carbon reduction and RE generation, represented in the 'take off' stage of Figure 1. The leadership, long term vision and team work brought to the process has played to the strengths of the actors within the wider network of LCCGs and LG, and developed strong bridging ties with local businesses (as detailed in Table 3 and Figure 2b). This has added capacity and broadened dissemination of social innovations such as behaviour change programs.

LCO could be considered a transition arena, both through bringing together key stakeholders in the public and private sectors in Oxford, and in its loose governance structure, which aims to support and enable projects and networks rather than control and manage a transition. This transition arena, led and

moderated by Oxford City Council (the LCO secretariat), has enabled a scaling up of energy action in Oxfordshire, which draws on tried and tested innovations, and established networks and relationships, such as the project to establish the Low Carbon Hub. Importantly, two of the key moderators involved in the LCO secretariat had personal experience in local community energy projects which meant they were open to learning from and helping disseminate and scale up community innovations.

The earlier activities in Figure 1 (pre-2005) match the transitions theory concept of the *pre-development stage*, where there is uncoordinated experimentation at the niche level but no visible change in the status quo, although in the Oxfordshire case there was already some coordination because of the involvement of ClimateXchange, and OxCAN. In the *take-off stage*, a more coordinated network of niche actors and dominant concept of innovation is expected to emerge, which was enabled in the Oxfordshire case by LCO bringing together LCCGs and various actors from the public, private and third sectors; the emergence of shared innovation concepts in some areas; and the iterative development of an ambitious, long term strategy. Importantly, transition theory suggests that even if take-off is achieved, this does not guarantee that a full transition will occur. However, the ingredients for a transition are all there, with coordinated niches, a transition arena, and increasing pressure for change through climate change, fuel price rises, public perceptions and a changing policy landscape. This suggests that the next steps might be for the LCO secretariat and pathfinders to co-design a joined up strategy for issues which require multi agency approaches such as domestic carbon reduction. It would also be important to expand the transition arena to include national level actors to contribute to the co-creation of a supportive, equitable and predictable policy framework and incentive structure.

#### ACTORS, ROLES AND RELATIONSHIPS

The actors involved in energy action across the county have changed in breadth, scale and relationship to each other. Until 2008, the main actors were LCCGs, intermediary organisations and Local Government. The nature of community action has shifted from waste management to sustainability, then to low carbon activities, including roles previously understood to be solely the remit of council, such as domestic energy action. Some of these role changes have been the direct result of LCCGs own innovations, for example the development of a green lease for community scale renewable energy projects, which have then been diffused to other organisations either directly or via intermediaries. Other role changes such as the early focus on waste or the introduction of simple monitoring and evaluation, have been prompted by local government funding and intermediaries' innovations.

As noted above some of the role changes have been a result of strategic decisions by local actors to scale up and rationalise their approaches. For example the merger between CAG Oxfordshire and the Low Carbon Hub has enabled them to provide a more strategic joined up support role to LCCGs, in addition to their ongoing networking role. The City council is increasingly playing a steering and enabling role in relation to LCO and pathfinder organisation including LCCGs, and has abandoned some of its own previous functions (in part due

to funding cuts) such as delivering household energy advice. These changes are, in part, testament to the establishment of trust and working relationships between actors at the inception of LCO, which helped to reduce possible tensions and imbalances of power highlighted in the partnership literature through the development of shared visions and agreement on working principles. This has enabled new collaborations between pathfinders such as the establishment of the business energy efficiency group, and a recent collaboration between a LCCG and business pathfinder to catalyse energy saving on a local industrial estate in its area. It has also enabled LCO to develop a long term strategic vision, and to secure funding opportunities. This represents a change to the previous more dispersed and short term approach to funding.

While there is a growing shared understanding about the respective roles that different actors play within LCO, tensions about roles and responsibilities are still evident. For example whilst LCO has initiated the mechanisms to enable achievement of many strategic goals by a variety of actors, a mismatch between the expectations of different sectors still exists, which could be addressed through by facilitating further cross-sectoral dialogue. For example, some LCCGs see themselves as a complement to LG, and point out that LG plays important roles in domestic carbon reduction that LCCGs cannot and should not substitute for.

Government financial incentives and policy framework have also catalysed some shifts in roles of local actors. Government test bed funding has enabled LCCGs to scale up activities, and test out specific strategies such as household energy assessments. The FiT has also catalysed further community renewables although LG and LCCGs were already active in this area prior to its introduction. The need for central government action will increase as the energy interventions undertaken by local actors face limits from structural barriers such as socio-economic disparities, infrastructural, consumerist culture, and supply chain issues.

#### Conclusions

There are a number of lessons from the Oxfordshire experience that are relevant for other situations both in the UK and further afield. It provides further supporting evidence that LCCGs can be effective actors in encouraging and enabling local energy action. Importantly, it also shows how long term LG funding and support for LCCG formation and networking via intermediary organisations has helped build one of the densest network of LCCGs in the country and simultaneously contributed to the development of a number of niche innovations by LCCGs. Some of these innovations have subsequently been drawn on and scaled up in the context of the Oxfordshire Low Carbon Oxford partnership.

Whilst Oxfordshire has unique attributes, including the concentration of energy research through the two Universities and energy research centres, the processes and experiences of the Oxfordshire low carbon partnership working are applicable to other situations. A key learning point is how the creation of a local 'transition arena', aided by grant funding, can facilitate the development of a shared vision between a range of local actors and a more strategic overarching approach to carbon reduction. Specifically the arena enables local actors to inter-

act, learn and plan together, and draw on the innovations of a mature network. Nevertheless while LCO has helped develop bridging links between pathfinders, bridging links still need to be built with the diverse civil society and community organisations across Oxford, that do not necessarily self-identify as low carbon.

The LCO experience also highlights the importance of having a transition arena 'moderator', in this case Oxford City Council and the LCO secretariat, to convene participatory forums, and provide leadership, capacity and institutional support to help achieve strategic long term goals. An important attribute of Oxford City Council in this regard has been not just its willingness to support and enable action by LCCGs but also to learn from and help disseminate and scale up their activities. The challenge now is for the 'convenors' to shift from steering and enabling action to leading the design of a co-produced joined up and transition strategy, for example in the area of domestic energy demand reduction, which integrates carbon and social objectives.

It is important to note that transition arenas are normally considered to work at national level, whereas LCO could be considered an attempt at a 'middle-out' transition. A key difference is that local actors and partnerships have relatively limited power compared to central Government which in turn implies the need to consider how local level changes are facilitated or constrained by national policies and financial incentives.

Grant funding (primarily from DECC, but more recently from the European Union) has supported the strategic developments in Oxfordshire but much central government funding is still short term and allocated for capital rather than revenue funding. Both LG and LCCGs have been encouraged to develop independent income streams, but there are no sources of low cost loans and no markets for some needed activities such as behaviour change programmes (Mayne et al, 2013). Most LCCGs therefore continue to rely on volunteers to deliver energy projects, particularly those involved with behaviour change (e.g. Seyfang et al 2012), which limits their reach and effectiveness. LG also lacks consistent sources of revenue funding for its important convening and coordination roles.

The shift in government funding, from end user defined to strategic test-bed funding, has played a role in catalysing LCCG innovation. However, there is a thin line between the Government catalysing and nurturing strategic niche innovations, as per transition theory, and manipulating and exploiting local actors. The latter occurs when grant funding is short term, with tight timescales for spending grants, and/or when one off capital grants locks local actors into on-going delivery without a transfer of budget for running costs (Mayne et al, 2013).

Effective local energy action requires a supportive, equitable and predictable national energy policy framework. Whilst existing and upcoming financial instruments such as the Green Deal offer some potential for this to occur, there is concern that the roles, expertise and networks of LGs and LCCGs are not being strategically resourced. Similarly, uncertainty surrounding national level renewable energy policies and strategy can hamper the development and long term planning of community renewable energy business models.

LCO has helped facilitate dialogue and the flow of information between different actors at a county level, but the relevance

of this institutional learning and strategic planning is not yet being sufficiently considered at national level. Government learning about niche innovations currently tends to be mediated through one-off third party evaluations, select advisory committees, and responses to government designed consultations, rather than through open and fluid bilateral interactions and dialogue between government civil servants and local actor level actors (beyond a small select group of community energy advisors to DECC). Given the step change that occurred in Oxfordshire when LCCGs were involved in strategic planning and leadership, national transition arenas could greatly benefit from including a greater range of actors from county and local experiences in a systematic way. This could enable the more rapid and appropriate scaling up of local energy action as well as the co-design of policy solutions to barriers at a national level.

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## Acknowledgements

This paper draws on research funded by the UK Energy Research Centre (UNLOC) and the UK Research Council’s (RCUK) Energy Programme (EVALOC, Grant reference RES-628-25-0012). The authors would also like to thank all the people involved in local energy action in the UK who generously gave us their time and the benefit of their expertise.