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LOCAL AUTHORITY ENGAGEMENT IN UK ENERGY SYSTEMS: HIGHLIGHTS FROM EARLY FINDINGS

THE UNIVERSITY OF EDINBURGH

Contents

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Foreword

By Professor Jim Watson
Director UKERC

The UK has pursued a centralised approach to energy policy for many decades. This has remained the case despite the large changes that accompanied the privatisation and liberalisation of the energy sector in the 1980s and 90s, and the more recent changes to policies, technologies and markets that have started to change the face of our energy sector.

Whilst the UK has made good progress towards achieving greenhouse gas emissions targets, there is significant policy uncertainty that threatens to slow down the rate of progress. Local Authorities have played a relatively minor role in the UK's energy transition so far. There is scope for them to do much more, and to help bring decision-making about the direction of this transition closer to the local communities that could share the benefits as well as the costs.

This report highlights some important local schemes in areas of the UK that are making great progress – most notably Scotland, Yorkshire and the Humber, Greater London and the North East. But there is still a long way to go. Although 82% of local authorities surveyed were found to be active to some degree on sustainable energy, almost two thirds were either yet to start, or only just on the starting blocks. There are particularly significant levels of activity in a few areas such as combined heat and power (CHP), heat networks and improving the energy efficiency of buildings. A diverse range of other low carbon options are also being pursued – albeit in smaller numbers – including anaerobic digestion, LED street lighting, low carbon transport and solar PV.

What this report shows, above all, is that where there is commitment and political will, progress can be made. Important drivers for action include an understanding of the economic benefits in terms of growth and jobs, improved council revenues from more energy efficient housing stock, and access to mechanisms such as grant funding or low-cost loans.

But the report also argues that political will at the local level is not enough. The authors make a number of recommendations for action by central government to enable a greater Local Authority role in the energy transition. These include a statutory duty on Local Authorities to develop and implement low carbon plans, including plans for low carbon heat. Crucially, they also include policy proposals that would provide cash-strapped Local Authorities with additional resources to put these plans into practice.

Key research findings

- The majority of local authorities have ambitions for action on sustainable energy, and 82% of those researched are active to some degree
- Local authorities were more likely to have an Energy and Carbon Plan than investment in projects
- Local authority investment in energy was focused on infrastructures for combined heat and power alongside the improvement of energy efficiency in buildings
- Across the UK, Scotland had a higher proportion of leaders in providing low carbon systems – the leading local authorities in England were in Yorkshire & Humber, Greater London and the North East
- The scale of local authority energy projects in relation to overall energy systems remains limited
- Local authorities have very limited capacity for strategic energy management

Key recommendations to enable greater local authority engagement

1. The introduction of a local authority statutory duty to develop and implement area-wide low carbon plans over a set timetable
2. The introduction of mandatory local planning for low carbon heat
3. The introduction of a central energy efficiency fund dedicated to investment in localised energy provision and services, offering low interest long-term loans
4. The availability of targeted funding for business model development and financial planning
5. The devolution of greater powers over local taxes and revenues to local governments
6. Ensure that local authority planning powers are used to prioritise use of residual heat from any new thermal power stations, in line with the EU Energy Efficiency Directorate
7. The introduction of a simpler access route to wholesale electricity markets for smaller suppliers (local authorities, community businesses)
8. The introduction of regional energy agencies with responsibility for strategy development and implementation in partnership with other bodies
9. The introduction of greater local discretion over the use of low carbon incentives
10. The regulation of district energy to build market confidence and reduce perceived risk

Introduction

"Climate change may be the first global problem where success will depend on how municipal services such as energy, water, and transportation are delivered to citizens."

Michael Bloomberg
Why Municipalities Are the Key to Fighting Climate Change

There is a groundswell of support for the idea that municipal governments are key to affordable, secure, low carbon energy futures, with a surge of interest from UK city leaders, central governments and advisory bodies, reinforced further at the COP21 Paris climate negotiations (see e.g. C40 and ARUP, 2015; Larsson, 2015; Vidal, 2015). There is however limited evidence about the capacity and capability of 21st century UK local governments to act, and about the suitability of support from central government policy frameworks. When Michael Bloomberg's article was posted to the UK Carbon Trust's public sector network, responses from hard-pressed officials suggested that, despite support for the proposition that municipal government is significant for mitigation of climate change, new policy and resources are needed to enable effective action. Given the emerging consensus over the value of municipal initiatives, we need to know more about what is being done now, and what could be achieved with more supportive policy, resources and markets.

This research is the first systematic overview of local energy projects across the complete population of UK Local Authorities. Our findings indicate the challenges faced by local authorities in moving from, often ambitious, plans to implementation.

This report presents results from mapping sustainable energy plans and projects in every UK Local Authority, using two indicators of activity:

1. Evidence of a local Energy and Carbon Plan or strategy
2. Evidence of financial investment in energy projects

Stage two of our research examines a sample of plans and projects in more detail through a questionnaire and interview survey with 40 authorities.

Local Energy and Carbon Plans vary in scope, but generally include baseline CO_2 emission data and reduction targets, as well as reporting progress. Evidence of financial investment in energy projects has been compiled from a total of 29 datasets, published by the European Commission, UK and devolved Governments and related agencies (see Appendix). Data was collected in Summer 2015.

Headline findings

The extent of local authority engagement in UK energy systems

The majority of local authorities have ambitions for action on sustainable energy, with 82% active to some degree across 458 projects. Resulting investment in decentralised generation and supply, and energy efficiency, is however small scale and uneven: around 38% of local authorities had both energy plans and investments, while a smaller proportion (13%) had mobilised finance for multiple projects.

Such investments focused on two areas: infrastructures for decentralised heat and power generation and supply, and demand management through improving the energy efficiency of buildings; these two areas account for three quarters of all energy projects.

While ambition and activities are widespread, the scale of local authority projects in relation to the overall energy system remains limited. For example, we obtained quantitative data on combined heat and power (CHP) schemes across 40 local authorities and found none of them supplied more than 1% of local heat demand.

Larger scale contributions from localised energy are likely to require clear direction from central governments, and access to long-term secure and affordable finance. Such policy measures are likely to be cost-effective means to reduce energy demand in buildings, and to improve energy storage, resilient production, waste heat recovery and use, as well as contributing to infrastructure for electrification of transport (Committee on Climate Change, 2012). Increased capacity would in turn enable local authorities to interact more effectively with energy network operators and developers to co-ordinate regional infrastructure planning, demand side response and investment in a low carbon and renewable energy system.

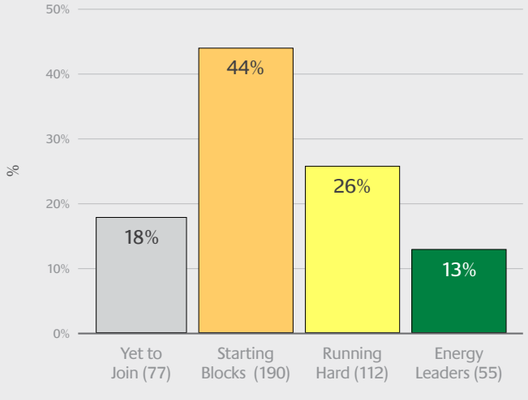
Categorising levels of activity on sustainable energy

Based on evidence of energy plans and investments, and in order to give a sense of the range of activity, we characterised local authority action along a continuum from Leaders in low carbon systems to Runners, Starters, and Yet to Join.

Each local authority was assigned to one of these four categories, giving an overview as follows:

1. 13% of UK local authorities were classified as Energy Leaders with multiple investments in energy projects
2. 26% were Running Hard with at least one or two projects and a strategic energy plan
3. 44% were at the Starting Blocks with one or two projects or a strategic plan
4. 18% were Yet to Join with no accessible evidence of investment in energy projects or a strategic plan

Figure 1
UK Local Authorities According to Level of Engagement in Energy Systems



Extent of energy plans and projects

Local authorities were more likely to have an energy and carbon plan than investments in projects: around three-quarters (72% or 311) had an energy plan; almost half (48% or 208) had mobilised finance for a total of 458 projects.

In the latter group, most authorities (113) had a single project; relatively few had developed four or more projects and just seven authorities had eight or more projects (Table 1).

Authorities with multiple energy investments were also more likely to have a strategic energy plan, as shown in Table 2. The relationship between plans and investments is statistically significant (X^2=13.87, df=2, p=0.0009).

Table 1
Distribution of Local Authorities (LAs) According to Number of Investments in Energy Projects

N investments in energy projects	N LAs	% LAs with investments	% all LAs
0	226	–	52%
1	113	54%	26%
2	40	19%	9%
3	21	10%	5%
4	13	6%	3%
5 to 7	14	7%	3%
8 to 11	7	3%	2%
Total LAs with investments	208	100%	48%
Total LAs	434	–	100%

Table 2
Published Energy and Carbon Plan (ECP) and Number of Project Investments

ECP?		No energy investment	Investment in 1–2 projects	Investment in 3+ projects	Total
No	count (row %) (column %) category	77 (63%) 34% Yet to Join	41 (33%) 27% Starting Blocks	5 (4%) 9% Energy Leaders	123 (100%) 28%
Yes	count (row %) (column %) category	149 (48%) 66% Starting Blocks	112 (36%) 73% Running Hard	50 (16%) 91% Energy Leaders	311 (100%) 72%
Total	Total (row %) column %	226 (52%) 100%	153 (35%) 100%	55 (13%) 100%	434 (100%) 100%

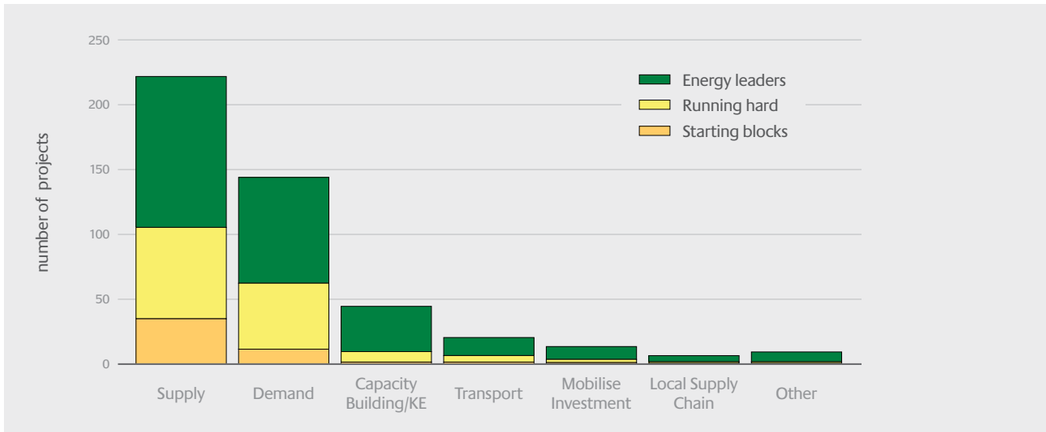
Types of energy projects and their financing

Projects were grouped into six main types: localised energy supply; demand management; capacity building and knowledge exchange (KE); transport; financing; and local supply chain development (Table 3 and Figure 2). Over three quarters of these were concerned with energy supply or demand management; supply projects represented around half of the total.

Table 3
Number of Each Type of Energy Project[2]

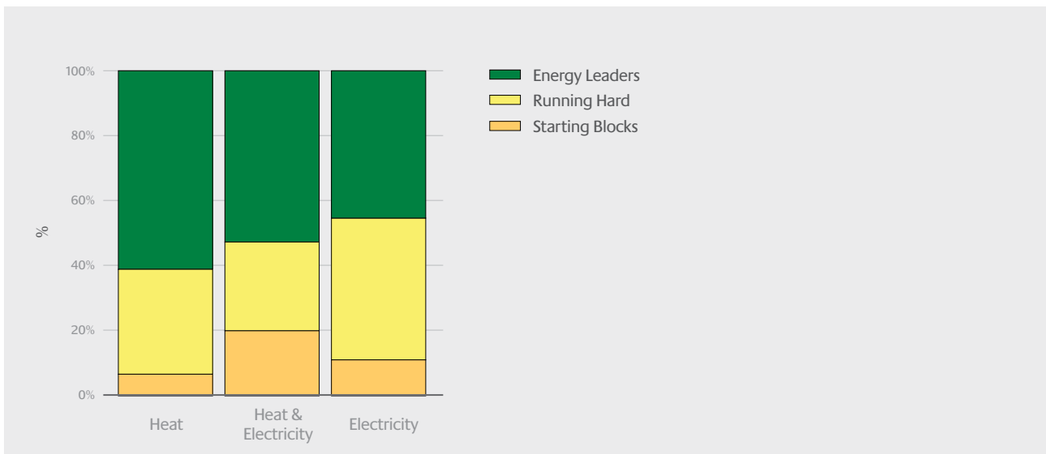
Type of Project	EL	RH	SB	Sum	%
Energy Supply	116	71	35	222	48%
Energy Demand	81	51	12	144	31%
Capacity Building/KE	34	8	2	44	10%
Transport	13	5	2	20	4%
Mobilise Investment in Local Energy	9	3	1	13	3%
Local Supply Chain	4	2	0	6	1%
Other[3]	8	1	0	9	2%
Sum	265	141	52	458	100%

Figure 2
Number of Each Type of Energy Project and Category of Engagement



Most energy supply projects concerned both heat and electricity (136 projects), followed by electricity only (55)[4], or heat only (31). Energy supply projects were distributed between Leader, Runner and Starter authorities, as shown in Figure 3. Starter authorities had greatest representation in heat and electricity projects, accounting for 20% (or 27 projects), compared to less than 10% of heat only projects (2 projects). Those classified as Energy Leaders and Running Hard were equally likely to be active in electricity only projects, with each accounting for approximately 45% (25 and 24 projects respectively).

Figure 3
Proportion of Energy Supply Projects According to Category of Engagement



2 In figures and tables EL, RH and SB refers to the categories of engagement (EL=Energy Leaders, RH=Running Hard, SB=Starting Blocks).

3 'Other' project category includes: 'smart' cities; low carbon skills training/innovation centres; low carbon public engagement; community interest company.

4 Seven of these electricity supply projects also included some aspect of energy demand management.

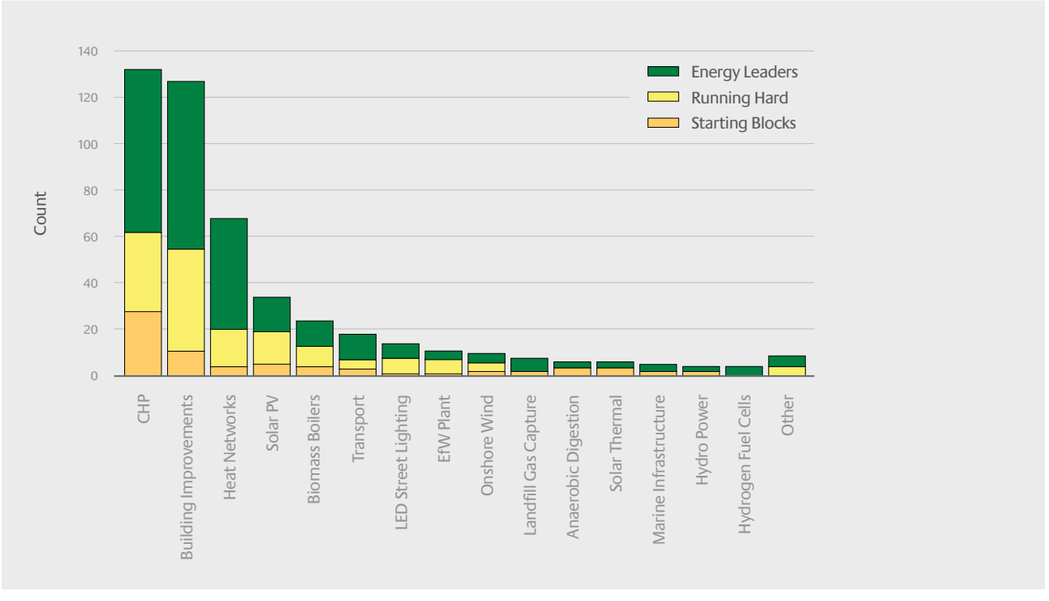
The majority of the 144 energy demand management projects focused on improved energy performance of buildings through energy efficiency in housing. A fifth, however, concerned improving energy management in other organisations, in particular a number of European Regional Development Fund (ERDF) funded projects were working with SMEs. There were also twelve light emitting diode (LED) street lighting projects.

Capacity building projects predominantly focused on development of local authority energy strategies, often as part of European multi-country initiatives.

Projects concerned with mobilising investment involve developing a "pipeline" of low carbon and renewable energy and energy efficiency projects that draw in new investment for local energy. Funding for the projects covers technical support (e.g. feasibility studies, procurement, legal and financial expertise) and organisational capacity (e.g. project delivery units). Projects funded through the European Investment Bank's European Local ENergy Assistance (ELENA) were expected to leverage over £50m investment for a pipeline of low carbon projects, as in Bristol, Birmingham, Manchester and London. EU Intelligent Energy Europe schemes, as in Cambridgeshire and Oxford, were expected to leverage £15m and £20m respectively[5].

The most common technology investments were in CHP and improvements to the energy performance of buildings (almost a third each), followed by heat networks (14%), solar PV (7%) and biomass boilers (5%) (Figure 4)[6]. We found the relatively complex projects were more often undertaken by the most engaged authorities. For example, district heating requires coordination of a heat source, network infrastructure and multiple buildings. Heat networks are part of 18% of Leaders' projects, 11% of Runners' and just 6% of Starters'. Technologies with fewer complexities, such as solar PV or biomass, are more evenly distributed across the categories. Interestingly, CHP comprised 52% of Starter projects, but usually occurred in a relatively straightforward configuration (23 of the 27 Starter authorities' CHP projects were found in leisure centres).

Figure 4
Technologies Used in Local Authority Energy Projects



5 There are multiple projects in London; projects in Cambridgeshire and Oxford include multiple local authorities.

6 376 projects had a direct technology focus of which 83 included investment in more than one technology (e.g. CHP and heat networks, or EE technologies and Solar PV). The total number of technologies therefore exceeds the number of projects that installed energy technologies.

Using available data, it proved possible in the majority of cases to establish whether projects targeted the Council corporate estate or other sectors (Table 5). 131 (29%) projects concerned Council corporate estates, and focused on heat and electricity supply[7]; 204 (45%) projects targeted other sectors. Most of the latter (77%) concerned the residential sector, including Council, registered social landlord and private owned or rented housing; 20% focused on energy efficiency, electricity and heat supply of businesses (sometimes in combination). A small number of projects (32) addressed both the Council corporate estate and other sectors (again predominantly residential and commercial buildings); almost all of these (30) were located within Energy Leaders' of which around two thirds were CHP and heat network projects.

Table 5
Proportion of Energy Projects Which Target Council's Own Estate and Beyond

	EL	RH	SB	Total	%
Outwith Council Corporate Estate (residential and business)	128	61	15	204	45%
Council Corporate Estate	53	47	31	131	29%
Both Council Corporate Estate and Outwith	30	1	1	32	7%
Unknown	53	33	5	91	20%
Total	264	142	52	458	100%

We were able to gather data on financial investment for 182 projects (approximately 40%), showing cumulative investment of approximately £425m. These figures are indicative only, given that in many cases the available data covered only part of a project's funding. The range of finance from each of the recorded sources is considerable, from as little as £4,000 for an Intelligent Energy Europe funded project on behaviour change, to over £63m as partial financing for an energy from waste plant; mean financial investment value is £2.4m, median £388,000.

Table 6
Financial Investment in Energy Projects

Financial Value	Number of projects
Under £100k	29
£100k – £1m	90
£1m – £10m	58
Over £10m	5
Unknown	276
Total	458

7 Due to lack of available data, our database does not fully represent energy efficiency within Council's own corporate estates.

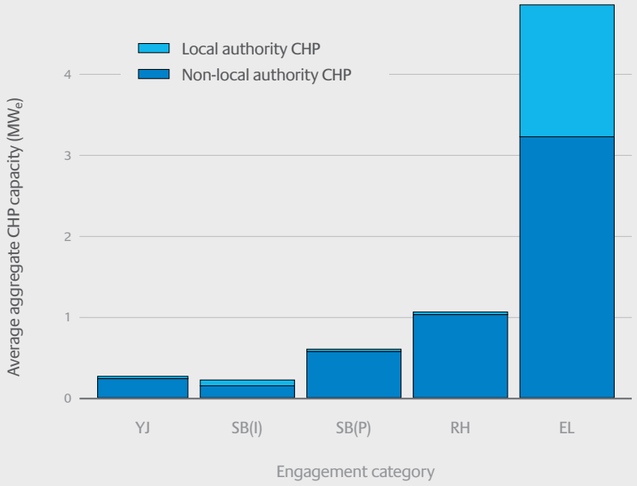
Scenario modelling of local engagement in UK energy systems

Our engagement categories tell us about local authority activity, but what about broader engagement with energy at a local level? We examined the scale of sustainable energy technology deployment in each local authority area, and tested associations with the degree of engagement shown by the corresponding local authority. We looked at two groups of energy technologies. Small scale (under 10MW) renewable electricity generators (from Ofgem's REGO database) and non-industrial CHP installations (from the Department of Energy and Climate Change (DECC) CHP Focus database).

We found a weak statistical association between local authority engagement and renewable energy deployment, but this effect was dominated by two large authorities (Cornwall, with a lot of solar PV, and Highland, with a lot of wind).

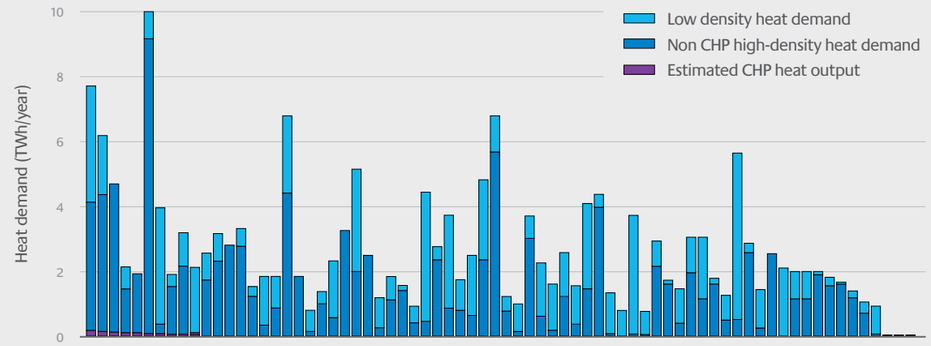
For non-industrial CHP we found a much stronger association (see Figure 5). Average aggregate non-industrial CHP capacity in the Leaders' areas was significantly higher than other categories.

Figure 5
Non-industrial CHP Deployment is Significantly Higher in Energy Leaders' Areas than Other Local Authority Areas



The direction of causality of this association may be interpreted in various ways: perhaps local authorities strongly engaged with energy catalyse others to invest in CHP; or perhaps some parts of the UK are more conducive to sustainable energy than others, and local authorities respond to the same circumstances as other local actors. This is a question we are exploring through more in-depth investigation. However, the relatively minor contribution CHP makes to local heat demand in the Energy Leaders' areas (see Figure 6) suggests that if there **are** local factors that support various actors' CHP development in some areas, these have shaped only a small proportion of local decisions among heat technologies. Our further research will help us understand what lessons can be drawn from these areas for scaling up local energy deployment.

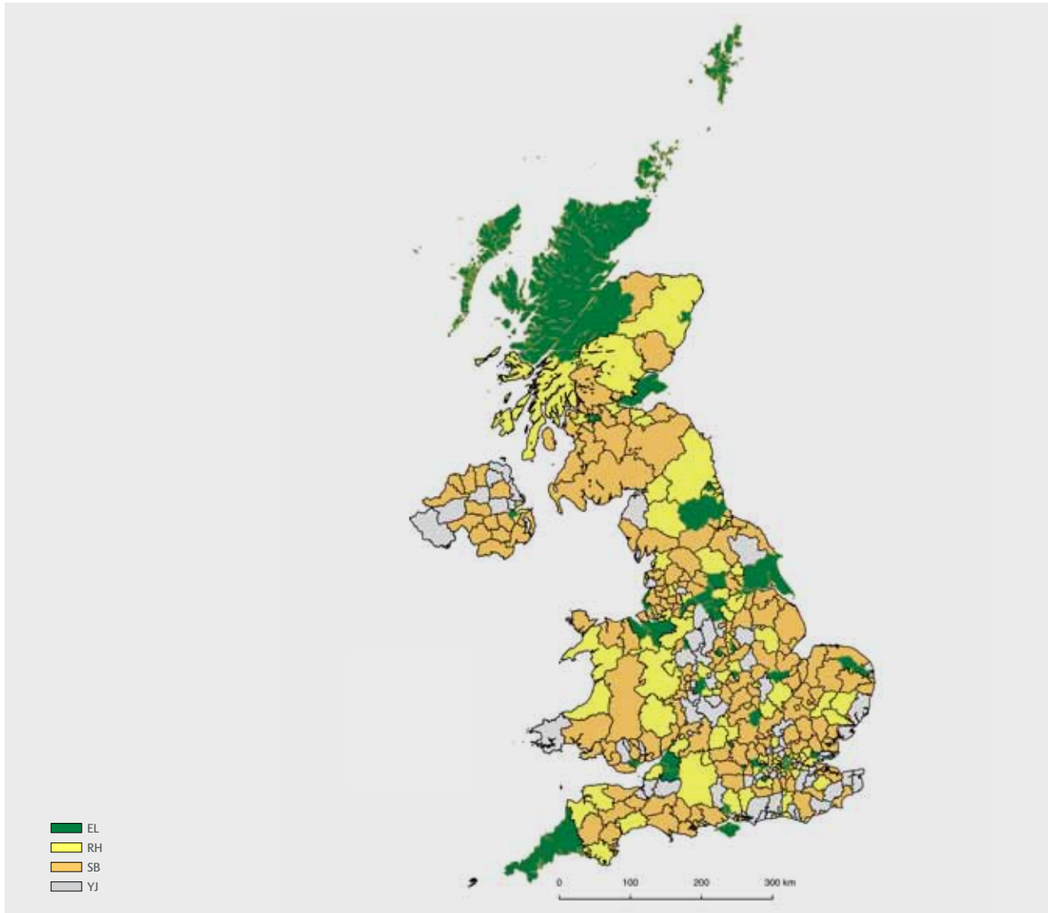
Figure 6
Estimated CHP Heat Output Compared with Overall Heat Demand Across the Energy Leaders' Areas (ordered by CHP heat output)



How is local authority activity distributed across the UK?

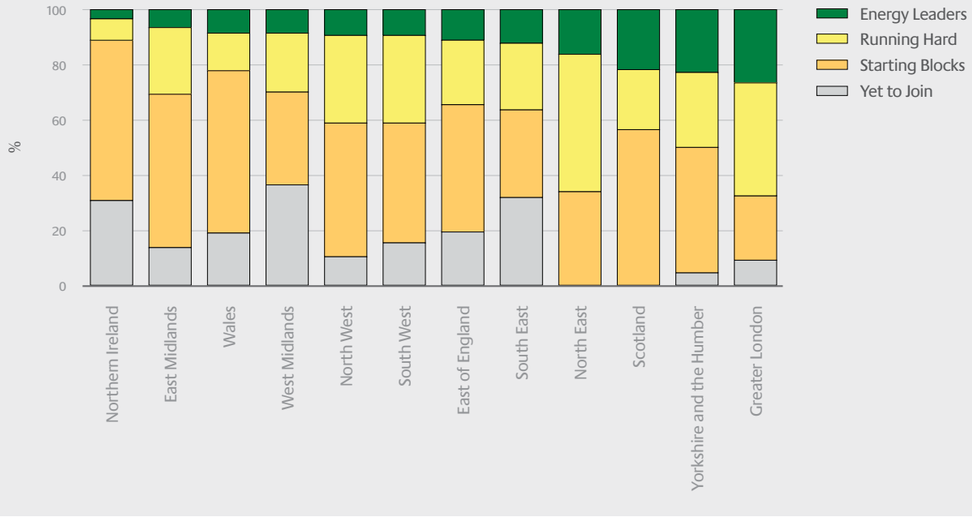
Of the four UK countries, Scotland had the highest proportion of Leaders (22% or 7) (Map 1). Within England, activity was highest in regions of Yorkshire and the Humber, Greater London, and the North East. In these regions over half of local councils were classified as either Energy Leaders or as Running Hard. Scotland was the only country, and the North East the only English region, with no local authorities categorised as Yet to Join (Figure 7).

Map 1
UK Local Authority Engagement in Energy Systems
(map shows unitary and lower tier authorities)



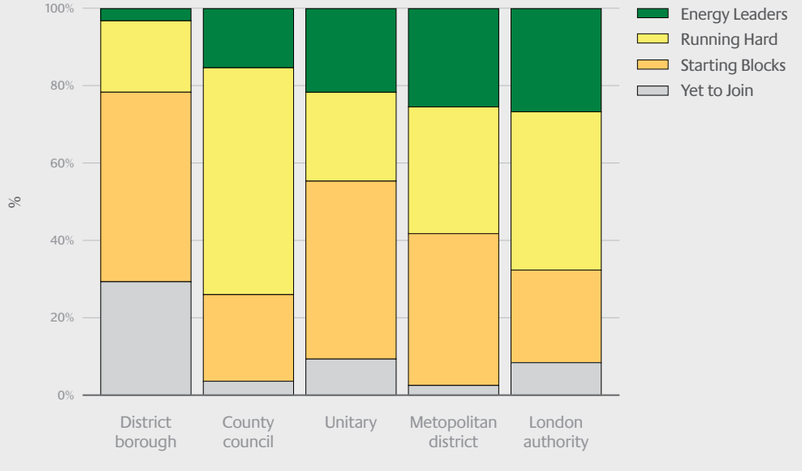
Sources: Contains Ordnance Survey data 2012; 2013; National Statistics data 2013; NIRSA data 2013; NRS data 2013. Crown copyright and database right. Map created using QGIS (QGIS Development Team, 2016).

Figure 7
Regional Variation in Engagement



Considering UK authorities grouped according to their differing responsibilities (Committee on Climate Change, 2012; Sandford, 2016; Slack and Côté, 2014), we found the highest proportion of Energy Leaders among London authorities, followed by metropolitan districts, unitary authorities, county councils and district boroughs. Although county councils had relatively few Leaders (15% or 4), they had the highest proportion of councils categorised as Running Hard (59% or 16), as shown in Figure 8.

Figure 8
Type of Authority Variation in Engagement



Models of engagement in energy

Many leading authorities have multiple models of engagement. These include long-term concession contracts with private sector energy suppliers, joint public-private ventures, non-profit and social enterprises. Cities such as Birmingham for example have long-term private contracts for local heat, cooling and power supply, as well as direct development of heat network connections for social housing and the public estate, and public-private partnerships for domestic energy efficiency retrofit (Webb et al., 2016). Aberdeen Council created a non-profit enterprise to design, develop, own and operate urban heat networks, but also has public-private partnerships for hydrogen economy demonstrator projects (Hawkey et al., 2016). Cornwall council set up Community Energy Plus as a social enterprise to manage cross-sector initiatives, but also has a revolving green loan fund and a long-term private contract with an energy from waste business.

The type and scale of energy projects are equally diverse, ranging from single building retrofit to entire housing estates, and from energy storage, to hydrogen-powered buses, to CHP, heat networks, energy from waste, solar PV, wind turbines and local or regional green investment funds.

Activity remains small scale, relative to current UK energy consumption, but the dispersal of activity and range of projects is indicative of much greater potential. Many projects are consciously framed as "demonstration", signalling intentions that the impacts will extend beyond project boundaries.

Overall the pattern suggests that local authorities have very limited capacity for strategic energy management, in line with their limited statutory powers or duties, and limited budgets for energy provision or services. Energy management is thus located across a range of services within local authority structures, to some extent depending on where initiatives first emerge. Energy strategy may have a direct line to the Office of the Chief Executive and Leader of Council, or may be part of Economic Development and Regeneration, Planning, Property Services, Housing, Environment or Planning. Its location may change, as local priorities evolve, and as opportunities for energy to play a strategic economic role become apparent.

Three different approaches to engagement

These three snap-shot case studies are drawn from material we have published elsewhere (see Hawkey et al., 2016; Webb, 2015; Webb et al., 2016).

Fuel poverty agenda converging with regional economic opportunities

In Aberdeen, local poverty alleviation, tied to the Council's 2002 Fuel Poverty Strategy, was the main motivation for developing decentralised energy; a 'green growth' strategy took shape subsequently around concepts of a regional hydrogen economy.

In 2002 Aberdeen City Council set-up a non-profit community energy service company (ESCo), Aberdeen Heat and Power Ltd (AHP). AHP owns and operates gas-fired CHP and DH networks centred on clusters of multi-storey tower blocks and public buildings. More recently AHP has established District Energy Aberdeen Ltd. (DEAL), a subsidiary established for heat supply to the private sector. Like many district heating networks, including Birmingham (see below) central government grant funding and council borrowing against capital budgets were critical to its development. The networks were part financed through Community Energy Programme (UK Government Defra 2002-2006) grants covering 40% of capital costs for the first three energy centres and networks. AHP has recently borrowed a further £1m from Scottish Government for extension of the systems.

More recently Aberdeen council has been exploring potential for innovation in hydrogen energy, through the 'Aberdeen Hydrogen Project' public-private partnership (PPP), as part of a local sustainable system and to boost regional economic development. The Aberdeen Strategy Framework 2020 and Hydrogen Strategy for Aberdeen 2015-2025 (Aberdeen City Council 2015; 2013), have a strong focus on economic growth. The PPP project converts electricity generated at grid-constrained Aberdeenshire wind farms into hydrogen, and transports it to Aberdeen for use in ten hydrogen fuel cell buses. With a budget of £19m the initiative brings together local, national and international collaborators across the North Sea Region public, private and research sectors.

The Council is also working on a Sustainable Energy Action Plan 'Powering Aberdeen' which is intended for submission to the Covenant of Mayors after public consultation in Summer 2016 (Aberdeen City Council, 2016).

Partnership with private sector for decentralised energy and energy efficient homes

Like Aberdeen, Birmingham City Council is a member of the Covenant of Mayors and submitted a Sustainable Energy Action Plan in 2009. The City has a target for a 60% CO_2 emissions reduction by 2027 from 1990 levels (Birmingham City Council, 2015a). The Birmingham Green Commission was setup to advance local energy and carbon leadership; decentralised energy, low carbon supply, energy efficient homes and sustainable travel are priorities (Birmingham City Council, 2013).

District energy has been a key part of the city's activities. In 2006 Birmingham City Council entered into partnership with Cofely Ltd (now Engie) which saw the creation of Birmingham District Energy Company (BDEC), a subsidiary of Cofely run under a 25-year concession contract. There are three main schemes: Broad Street, Aston University and Birmingham Children's Hospital. £700k of partial funding for the gas-fired CHP district heating in the Broad Street network, like Aberdeen, was provided by the UK Community Energy Programme. District heating has been extended to multi-storey housing, in part through £2.28m support from the UK Government Homes and Communities Agency 2009 Low Carbon Infrastructure Fund. The newly refurbished Birmingham New Street railway station has CHP installed, and has enabled the interconnection of the Aston and Broad Street schemes. The council has also received support from DECC's Heat Networks Delivery Unit (HNDU)[8].

A second ESCo, Birmingham Energy Savers (BES), was created in 2012 as a private-public partnership between the city and Carillion plc, for area-based retrofit of houses and public buildings. Supported with £1.3m European Investment Bank ELENA funding (European Investment Bank, 2012), the aim of BES was to generate around £65m of direct investment. Birmingham was also one of eight cities to receive a share of £10.8m to support development of the UK Green Deal locally (DECC, 2015). In late 2015, however, the decision to terminate the programme was taken in the context of limited local progress and the ending of the Green Deal (Birmingham City Council, 2015b).

The council has also been involved in EU knowledge exchange and capacity building programmes notably CASCADE (Eurocities, 2015) which focused on local energy leadership in renewable energy and decentralised energy, energy efficiency in buildings, and transport (2011-2014).

Long standing political commitment to local action on energy and climate change

Leicester City Council has long been recognised for local political commitment to energy and climate change, being designated an Environment City in 1990 and receiving a Local Government Honours award at the Rio Earth Summit in 1992 (Lemon et al., 2013).

In 1994 the council adopted an ambitious target of 50% reduction in CO_2 emissions by 2025 (1990 baseline) and became European Sustainable City in 1996 (Roberts, 2000), when it formed the Leicester Energy Agency[9]. In 2005 the Council was awarded Beacon status for sustainable energy and joined the Covenant of Mayors in 2009. In 2012 the Council launched their climate change action plan 'A Low Carbon City' (Leicester City Council, 2014).

Like Birmingham and Aberdeen, district heating featured heavily in Leicester's engagement in energy. In the mid-2000s the Council commenced planning for the expansion of a number of district heating networks serving social housing (dating from the 1980s) and in 2010 entered a 25-year concession contract with Cofely Ltd (now Engie) resulting in the creation of Leicester District Energy Ltd. District heating has been extended into the city centre, connecting council buildings and the University of Leicester campus and the older island networks have been upgraded (Cofely GDF Suez 2015; University of Leicester 2012).

8 Now the Department for Business, Energy and Industrial Strategy (BEIS).

9 Leicester Energy Agency uses a range of European funding streams to support energy efficiency improvements by businesses, community groups and householders. Recent programmes to support SMEs on energy and carbon management have been supported via ERDF grants.

Drivers for local authorities engaging with energy and factors shaping leadership

The research suggests multiple reasons behind local governments' interest to engage in local energy developments, whilst several factors shape local leadership in energy systems.

Political drivers

- Local Councillors and political leaders active in climate change mitigation, and environmental and community improvement
- Greater autonomy in energy provision treated as strategic advantage
- Political capital from investment in local energy
- Requirement to comply with national housing quality standards or other statutory and legislative frameworks
- Greater capacity to influence government policy for local resources and inward investment

Economic and financial drivers

- Economic growth and jobs
- Inward investment appeal of a 'clean energy location'
- Income generation opportunities in context of austerity and limited public finances
- Retaining existing local industries and jobs by guaranteeing long-term energy prices
- Grant funding or low cost loans – EU, UK or devolved government
- Avoided costs of energy taxes such as the CRC[10] energy efficiency scheme or waste to landfill taxes
- Improved council revenues from housing stock
- Improved durability of housing stock
- Reducing council energy bills by localising supply and improving energy performance of buildings

Social drivers

- Affordable warmth contributes to better health
- Improved quality of life in the locality/place-making
- Reduced debt for low income households
- Improved public health from reduced traffic pollution
- Community engagement and social capital

Seven factors supporting leadership

1. Political commitment from Leader or Deputy Leader of Council, and/or Chief Executive.
2. Legislation – in Aberdeen the UK Home Energy Conservation Act (1995) resulted in a key appointment which led to considerable investment in housing retrofit, CHP and heat networks.
3. A component of grant funding – the UK Community Energy Programme (DEFRA 2002-07), managed by the Energy Savings Trust with The Carbon Trust, provided funding for up to 40% of capital expenditure for CHP and heat networks and was instrumental in many projects developed by Energy Leaders from the Highland and Shetland Isles in the North of Scotland to Southampton and Woking in the South of England.
4. Other funding has also been critical in many projects. These have included feed in tariffs for solar PV; Renewables Obligation Certificates for electricity generation, energy company obligation funding for community energy saving and district heating, as well as European ELENA funding to attract inward investment in local energy.
5. Carbon or energy taxes such as waste to landfill, or the CRC energy efficiency scheme.
6. Local pressures such as social deprivation, risks to jobs from further loss of industry, high energy bills and shrinking local authority budgets.
7. Local resources such as wind, solar, geothermal or waste heat.

10 From 2018-19 the CRC will cease and will be integrated into a modified Climate Change levy (see UK Treasury, 2016).

Ten measures for scaling up local engagement in energy systems

This research, together with findings from our related Research Councils UK funded research (see Hawkey et al., 2016), suggests that the capacity of local authorities to effect change in energy provisions has to date been limited. UK central and devolved governments have options available to strengthen capacity; these include actions to accelerate investment, to create pathways for scaling up and to avoid a pattern of piecemeal projects that are hard to consolidate. We suggest here a number of measures which could be considered by policy makers.

1. Introduction of a local authority statutory duty to develop and implement area-wide low carbon plans over a set timetable. Local authority experiences in developing Sustainable Energy Action Plans for the Covenant of Mayors (Covenant of Mayors Office, 2016) or 'Low Carbon Zones' (see Centre for Sustainable Energy, 2014) offer lessons for wider low carbon planning. Other statutory requirements may also offer lessons. For example, local authorities responses to the Home Energy Conservation Act were variable, but a small number of authorities used the requirement of a 30% energy saving from social housing to implement affordable warmth strategies and to achieve significant local investment in distributed energy provision (Webb, 2015).
2. Introduction of mandatory local planning for low carbon heat, establishing local authority powers and resources to map heat demand, analyse technical options, and plan areas suitable for heat networks. Complementing area-wide low carbon plans, this should also increase use of national heat maps, and give further impetus to local heat maps already developed with support from the HNDU in England and Wales, the GLA's London Heat Map, the EU Intelligent Energy Europe Stratego initiative in Scotland and Scottish Government heat mapping.
3. Introduction of a central energy efficiency fund dedicated to investment in localised energy provisions and services, offering low interest, long-term loans, and reducing investment risk by supporting a portfolio of projects. The announcement of £300m finance to support heat network infrastructure is an exemplary indicator (DECC et al., 2015). Principles to inform development are likely to be available from local experience with other funds such as the NHS Carbon and Energy Fund, Salix Finance or the Scottish Central Energy Efficiency Fund. These or similar funds could be restructured to include a requirement to maximize impact beyond the public estate.
4. Targeted funding for business model development and financial planning would address the problem of moving from technical and economic feasibility study to procurement. DECC's HNDU, for example, has funded technical and financial feasibility appraisals for district heating, with some support for business planning (CAG Consultants, 2015; DECC and UK Government, 2015).
5. Devolution of powers over local taxes and revenues to local government would allow more secure development of a budget for localised energy. "City Deals" need to integrate local energy strategies where feasible, and could offer a model for future developments (Scott, 2012). The General Power of Competence afforded to English combined authorities in the Cities and Local Government Devolution Act 2016 (Local Government Association, 2016; UK Government, 2011) also offers opportunities for local energy developments, but needs to be backed up with resources.
6. The EU Energy Efficiency Directive provides the opportunity for UK and Scottish Governments to create a strong legal framework for locating all new thermal power stations closer to urban heat loads, and requiring operation in combined heat and power mode. Local authorities could be required to participate in ensuring the use of such heat.
7. Small suppliers such as local authorities or community businesses need simpler access to wholesale electricity markets for power sales and/or balancing services. Participation in electricity markets is challenging for small generators, and the low price typically received for exported electricity tends to reduce financial viability of schemes. Innovations in market access arrangements (License Lite, Electricity Market Reforms' capacity mechanism) have as yet had limited impact. There may be lessons from local perceptions of the relative benefits of active market engagement versus less onerous mechanisms such as Power Purchase Agreements. In addition, changes to the Feed in Tariff for renewable electricity generation have challenged the financial viability of some local schemes. Policy change and uncertainty has contributed to projects stalling whilst business models are reviewed.
8. Introduction of regional energy agencies with responsibility for strategy development and implementation in partnership with other bodies. Our research identifies striking regional effects with high levels of engagement in London, Scotland, Yorkshire and the Humber, and the North East – this may be attributable to current/former development agencies.

9. Introduction of greater local discretion over use of low carbon incentives. Some Energy Leaders expressed concerns that incentives directed at individual building solutions may undermine higher impact shared solutions. These authorities suggested greater local control over schemes including the Renewable Heat Incentive. Consideration could be given to the feasibility of local powers to shape incentives in order to allow best value solutions to be implemented at an area scale through local energy planning.

10. Regulation of district energy is often presented in the UK as stifling local initiative, but development of new district energy systems has typically required a regulatory framework (Norway, for example, operates a licensing regime for district heating designed to operate in a liberalised market (see Hawkey and Webb, 2014)). Regulation can build market confidence and reduce perceived risk, without unduly restricting responsiveness of projects to local conditions.

As the research continues

Mapping the extent of current local engagement in energy is a crucial part of accurately assessing the potential value to society from increasing the scope, scale and pace of local action. It also assists in developing a better understanding of the kinds of policy, financing and institutions which would enable significantly increased local action on energy.

The overview of energy projects and plans in UK local authorities has opened up questions concerning, for example, the relationship between strategic planning and project development, and the likely future directions, variety and scale of local engagement. To address such questions, the current stage of the research is gathering new data in order to analyse strategic energy planning, priorities and investment in sustainable energy projects in a sub-set of 40 of the more active authorities. This will aid our understanding of the capacity and capability of 21st century UK local governments to develop and implement strategies, and will provide insight into specific investments, the commercial structures emerging and the potential for local benefits to be captured. It should also provide insights into the policy options for scaling up local energy initiatives over the next decade.

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Appendix

Datasets used in Local Engagement in UK Energy Systems
Database of Local Authority Energy Projects and Plans 2015

Table A.1
Datasets Incorporated into Local Engagement in UK Energy Systems Database (data was collected in Summer 2015)

Data set name	N. LA energy projects[11]	Type of data	Data source	Operational measure	Type of energy project
Energy Strategy/Plan	311	Energy Strategy/Plan Document	Council websites	Identifiable ECP/ SEAP/equivalent	Identifiable Energy & Carbon Plan (ECP), Sustainable Energy Action Plan (SEAP) or equivalent document which includes carbon emissions reporting, baseline data, reduction targets, monitoring (may/may not have included a project list)
CHP Focus	88	Operational project	UK Dept. of Energy & Climate Change (DECC)	Named organisation	Operating CHP
Green Deal Pioneer Places Fund	40	Investment	UK DECC	Lead organisation receiving finance	Develop GD proposals & fund capital works for domestic EE
Challenging Lock-in through Urban Energy Systems (CLUES)	40	Operational project	CLUES Project, University College London	Named organisation	Heat supply (esp. biomass & solar thermal), electricity supply (solar PV, onshore wind, hydro power), CHP/DH, EE (esp. insulation)
Community Research & Development Information Service (CORDIS)	29	Investment	European Commission	Lead organisation receiving finance	Range of projects, mostly: transport, knowledge exchange/transfer (KE/KT), demand management, strategic energy management capacity building (CB)
Intelligent Energy Europe (IEE)	26	Investment	European Commission	Lead or partner organisation receiving finance	Range of projects, mostly: KE/KT, CB, mobilising other actors' investment
European Regional Development Funds (ERDF) England 2007–2013	25	Investment	UK Dept. for Communities & Local Government (DCLG)	Lead organisation receiving finance	Demand management & EE projects
FP7 (7th Framework Programme 2007–2013)	24	Investment	European Commission	Lead or partner organisation receiving finance	Range of projects, mostly: transport, KE/KT, demand management, CB
Green Deal Communities	24	Investment	UK DECC	Lead organisation receiving finance	Develop GD proposals & fund capital works for domestic EE
Community Energy Programme	15	Operational project	Energy Saving Trust (EST) Scotland	Lead organisation receiving finance	Development of CHP/DH
Ofgem Renewables and CHP Register - RO	15	Operational project	Ofgem	Named organisation	Electricity supply: hydro power, landfill gas, onshore wind, solar PV, bio fuels
ERDF Scotland – 2007–2013	13	Investment	Scottish Gov.	Lead organisation receiving finance	EE, supply chain development
Ofgem Renewables and CHP Register – REGO	13	Operational project	Ofgem	Named organisation	Electricity supply: hydro power, onshore wind, solar PV
Low Carbon Infrastructure Fund (LCIF)	12	Investment	UK Homes & Communities Agency (HCA)	Lead organisation receiving finance	Development of CHP/DH
Equitix Fund	11	Investment	Green Investment Bank (GIB)	Lead organisation receiving finance	LED Street Lighting & Energy from Waste Plant
Interreg IVC	8	Investment	European Commission	Lead or partner organisation receiving finance	KE/KT, CB
Interreg IVB	8	Investment	European Commission	Lead or partner organisation receiving finance	KE/KT, heat supply, electricity supply
Core Cities Project (Green Deal (GD) & Energy Company Obligation (ECO))	8	Investment	UK DECC	Lead organisation receiving finance	Develop GD proposals & fund capital works for domestic EE
GIB	7	Investment	GIB	Lead or partner organisation receiving finance	LED Street Lighting & Energy from Waste Plant
DH Map of Scotland	7	Operational project	EST Scotland	Named organisation	Operating DH (annual capacity ≥1,000MWh)
Renewable Energy Planning Database	7	Operational project	UK DECC	Named organisation	Electricity supply, electricity & heat supply: landfill gas, anaerobic digestion, solar PV, onshore wind, Energy from Waste
European Local ENergy Assistance (ELENA)	6	Investment	European Investment Bank	Lead organisation receiving finance	Mobilising investment in district energy (DE) & developing pipeline of projects
Arbed Phase 1	6	Investment	Welsh Gov.	Housing provider involved in project	Domestic EE
Energy Demand Reduction Pilot Auction	5	Investment	UK DECC	Lead organisation receiving finance	Demand reduction during peak winter hours (LED lighting)
Low Carbon Pioneer City – Heat Networks	5	Investment	UK DECC	Lead organisation receiving finance	Development of combined heat & power & district heating (CHP/DH)
Horizon 2020 (H2020)	4	Investment	European Commission	Partner organisation receiving finance	EE, KE/KT, CB, transport
Technology Strategy Board (TSB) Future Cities Demonstrator Programme	4	Investment	TSB	Lead organisation receiving finance	Large and small scale demonstrator of 'Low Carbon Smart Cities'
ERDF Scotland 2014-2020 'Local Energy Challenge Fund'	3	Investment	Scottish Gov.	Partner organisation for Phase 2 funded projects	Electricity supply, heat supply, low carbon transport
Large scale CHP schemes in the United Kingdom, December 2014 5.11 (Digest of UK Energy Statistics (DUKES))	3	Operational project	UK DECC	LA associated CHP (but may not be operator)	Local Authority-led CHP (≥1MW installed electrical capacity)
ERDF Northern Ireland (NI) 2007–2013	2	Investment	NI European Funding Database	Lead organisation receiving finance	Demand management

11 Number of local authority energy projects after duplicates across the datasets were removed.

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ACCOMPANYING MATERIAL

Local Egagement in UK Energy Systems.
A pilot study of current activities and future impact

http://www.eti.co.uk/library/local-engagement-in-uk-energy-systems-a-pilot-study-of-current-activities-and-future-impact

FURTHER READING FROM THE ETI

Options Choices Actions –
UK scenarios fro a low carbon energy system

http://www.eti.co.uk/insights/options-choices-actions-uk-scenarios-for-a-low-carbon-energy-system

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