Centre for Climate Change Economics and Policy

Centre for Low Carbon Futures 2050

Funding Low Carbon Cities: Mapping the Risks and Opportunities

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Main Content

1. INTRODUCTION: WHY FOCUS ON CITIES?

There are compelling reasons for local authorities – and especially cities - to be interested in the low carbon agenda. From an environmental perspective, it is estimated that approximately 70% of the UK's economy-wide emissions are under the influence of UK local authorities[1]. Furthermore, recent research on the economics of low carbon cities[2] has shown that, at commercial costs of capital, cost-effective and cost-neutral investments in energy demand reduction could deliver a 40% reduction in greenhouse gas emissions from cities by 2020, as well as wider benefits such as enhanced competitiveness, increased employment and reductions in fuel poverty. To take one example, this research has shown that for the Leeds City Region, there is a commercially attractive case for £4.9 billion of investment in low carbon options. If made, these investments would reduce the city-region's energy bill £1.2 billion a year, would pay for themselves on commercial terms (at 8% interest rates) within 4 years, whilst creating 4,500 jobs in the low carbon goods and services sector and cutting the city-region's carbon emissions by 36%[3].

Despite these compelling arguments, these investments have not yet been made at the scale required to deliver these benefits. One of the key reasons relates to the level of capital investment required; for example, a city region such as Leeds would require investments in the billions of pounds. This scale of investment dwarfs the amounts of investment that are being proposed in flagship government initiatives in the UK such as the Green Deal[4]

The objective of this Working Paper is to provide a contemporary account of how UK local authorities might approach the question of how to ensure the funding of retrofits and investments in low carbon options, with a particular focus on the major obstacles that need to be overcome and the key financial and non-financial risks that need to be managed.

This research on which this paper is based on a review of the academic and applied literature on financing low carbon cities to identify the models that have been proposed for structuring and securing major scale investments into UK city scale retrofits (with a particular focus on the four key sectors of domestic and non-domestic buildings, industry and transport)[5], and the major barriers that need to be overcome to enable these investments to be made at the scale required. It is also based on the results of a series of interviews with key stakeholders (including local authorities, investors, central government and private companies) and on the results of a an expert workshop - How Can Cities and Regions Finance their Transition to a Low Carbon Economy? - convened by the Centre for Low

[1] Committee on Climate Change (2012), *How Local Authorities Can Reduce Emissions and Manage Climate Risk* (Committee on Climate Change, London), pp. 26-27.

[2] Gouldson, A., Kerr, N., Topi, C., Dawkins, E., Kuylenstierna, J. and Pearce, R. (2012), *The Economics of Low Carbon Cities: Methods and Outcomes of a Mini-Stern Review for the Leeds City Region* (Centre for Low Carbon Futures, Leeds). Available at: www.lowcarbonfutures.org

[3] Gouldson *et. al.* (2012) (Note 2).

[4] The Green Deal is predicted by the UK government to "…kick start £14bn investment over the next decade", with most of this (approximately £13 billion) coming from energy suppliers (DECC (2012), 'Green Deal Finance' at http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/green-deal/3684-green-deal-finance-note.pdf; for a more detailed analysis see DECC (2012), *Final Stage Impact Assessment for the Green Deal and Energy Company Obligation. 11 June 2012* (DECC, London)). That is, the £4.9 billion capital requirements for the Leeds City region alone represent about four years of the Green Deal financing that is expected to be available for the UK.

[5] For a general overview, see Energy Saving Trust and Anthony Collins Solicitors (2011), *Local Authority Large Scale Retrofit: A Review of Finance Models* (Energy Saving Trust, London). Available at: http://www.energysavingtrust.org.uk/england/Publications2/Local-authorities-and-housing-associations/Funding-and-finance/Local-authority-large-scale-retrofit-A-review-of-finance-models

Carbon Futures (CLCF)[6] and the Centre for Climate Change Economics and Policy (CCCEP)[7] in London in May 2012[8]. The workshop attendees included local authorities, central government, institutional investors and private companies.

[6] http://www.lowcarbonfutures.org/
[7] http://www.cccep.ac.uk/Home.aspx
[8] Copies of the workshop presentations (by Andy Gouldson of the University of Leeds, Andy Deacon of the Energy Savings Trust, Christoph Harwood of Marksman Consulting and Emily Smith of the European Investment Bank) and the workshop briefing paper ('How Can Cities and Regions Finance their Transition to a Low Carbon Economy?' by Rory Sullivan, Andy Gouldson and Phil Webber) can be found at: http://www.lowcarbonfutures.org/news/post/131-clcf-and-cccep-workshop-on-financing-low-carbon-cities-was-hosted-at-chatham-house

2. SETTING THE SCENE: UNDERSTANDING THE LOCAL AUTHORITY CONTEXT

Before discussing the process that local authorities need to go through to raise the level of capital that would be required to deliver substantial cuts in their energy bills and carbon footprints, it is useful to put this discussion into a wider context.

Perhaps the most important point to be made is that local authorities are uniquely placed to drive and influence emissions reductions in their wider areas through the services they deliver, and through their various roles including as major employers, as trusted community leaders, as social landlords, as convenors of economic and social networks, as regulators, and as planners and developers. This is not an argument that other actors do not have a role to play. Rather, it is an acknowledgement that local authorities have a critical role to play in enabling other actors (e.g. central government, public and private financiers, the private sector) to make their contributions, and it is also a recognition that local authorities bring a series of unique capacities and competencies to the debate.

Some local authorities are starting to take action at scale on the low carbon agenda. Examples include Birmingham City Council's intention to become the country's first Green Deal provider with a plan to refurbish 200,000 properties by 2026[9], Leeds City Region's commissioning of an assessment of the costs and benefits of taking action on climate change[10], as well as on-going work in Newcastle, London, Manchester, West Sussex and others. The local authority interest has not only been triggered by the low carbon agenda but perhaps more importantly by the potential for the low carbon agenda to contribute to key local authority social and economic objectives such as employment creation, urban regeneration and social/community development, for example through attempts to tackle fuel poverty. While there is great excitement about the potential benefit, it is important to recognise that local authorities have severe financial constraints, which may mean that they are reluctant to commit to significant expenditures on the low carbon agenda at a point when local authority budgets are under significant pressure and frontline services are being cut.

This paper is being written at a time of significant change in the policy environment. First, there are significant changes in the funding regime for domestic energy efficiency with, at the end of 2012, the main UK government policies for energy efficiency – the Carbon Emissions Reduction Target (CERT) and the Community Energy Savings Programme (CESP) – set to be replaced by the Green Deal and the Energy Company Obligation (ECO). The Green Deal will provide finance for investment in energy efficiency measures at no up-front cost to householders with finance secured as a charge on the property to be repaid through the electricity bill over a period of up to 25 years, while ECO will require energy suppliers to deliver emissions reductions to vulnerable and low income groups and to implement solid wall insulation more generally[11]. These changes may also have significant social implications, as the ending of programmes such as CESP and CERT may result in a significant loss of jobs. The second significant policy change is the introduction of the Localism Act 2011 (discussed further below) which, at least in theory, may provide local authorities with greater opportunity to take action on climate change.

Finally, institutional investors – a grouping that includes local authority pension funds – are increasingly interested in the potential for long-term infrastructure type investments to provide the returns they need to meet their liabilities. Investors have identified energy efficiency as one type of investment that may fit into this category of infrastructure

[9] Committee on Climate Change (2012) (Note 1), pp. 35.
[10] Gouldson *et. al.* (2012) (Note 2).
[11] See http://www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx

investment[12]. That is, there may well be a significant source of capital that can be accessed to enable investments at the scale required to happen.

3. DELIVERING LOW CARBON CITIES: A GENERIC PROCESS

Any large-scale local authority-backed programme seeking to invest in a high volume (hundreds of thousands of households and thousands of small businesses) and with large upfront capital costs (which are likely to range from £100m to £10bn) would normally progress through the following generic stages.

Stage	Description
Low Carbon Strategy or Objectives	This involves the local authority making a top level commitment to take action on climate change. Most UK local authorities have already made some sort of commitment in this regard. While making a commitment is, clearly, not the same as taking action, the absence of such a commitment means that it is much less likely that a local authority will take action on climate change.
Concept	This stage should assess whether there is a *prima facie* business case for a city to adopt a low carbon strategy[13]. It should also provide a broad assessment of the costs and benefits associated with such a strategy and identify the most cost-effective emission reduction opportunities.
Feasibility	Building on the concept stage, the more attractive options would require more detailed cost-benefit assessments to be conducted and business plans which clarify possible delivery routes to be developed. The feasibility stage is also likely to involve: • Securing outline agreements (e.g. on financing, on delivery, on risk–sharing) from key investors and key players such as local authorities, government departments, utilities, major retailers and other private sector actors). • Obtaining necessary legal clarification covering issues such as EU procurement rules, state aid and special purpose financial vehicles. While the costs of conducting the concept stage are likely to be relatively modest, the feasibility stage could involve significant outlays. These could, depending on the complexity of the legal, procurement and contractual advice and other support required, be of the order of £5-10 million for an individual metropolitan council. These costs could be reduced if local authorities worked together to share costs and expertise.
Initial Projects (pilot or full scale)	Depending on the outcomes of the feasibility studies, local authorities may decide to initiate some projects. These could be pilot projects (e.g. where some level of financial support or subsidy is needed or where implementation is confined to a narrowly defined geographic area or to a small subset of the available projects) or full scale (e.g. where no financial support is needed and where the aim is to cover a large proportion of the available projects). The initial projects should be used to demonstrate the economic and practical viability of the actions proposed, and to address any practical difficulties or issues. They may also help to generate public acceptance, understanding and interest, provide evidence of the effectiveness of specific energy efficiency measures and provide initial answers to questions such as the greenhouse gas emission reductions likely to be delivered. Clearly, the costs will depend on the exact scope and purpose of the projects. For pilots, it is not inconceivable that up to £20m would be required for one pilot area covering the full range of possible measures or up to £5m for smaller scale trials. For full scale projects, the amount of capital could be significantly higher.
Implementation	The manner in which implementation is progressed would depend on factors such as the availability of capital, the sequencing of investments, the human and other

[12] See, for example, the data presented in Climate Bonds Initiative and HSBC (2012), *Bonds and Climate Change; The State of the Market in 2012* (HSBC, London).
[13] An example of this type of assessment is the mini-Stern review that has been prepared for the Leeds City Region (see Gouldson *et. al.*, 2012 (Note 2)).

	resources required for implementation. Irrespective of how implementation is structured, local authorities will need to consider issues such as: • How to ensure that there is a robust flow of projects at the rate required. • How to structure the financing and the financial instruments that would be used. This may require that separate finance models are prepared for different projects, or that an overall finance package is developed. • How to ensure that the technical and other skills required are available. • How to ensure that the financial and other risks are properly managed. • How to ensure that the end result is an integrated low carbon city, not a patchwork of stand-alone projects that do not deliver on the overarching objective.

There are four points to be made about the process outlined above.

The first is that implementation is not a once-through process from concept to implementation. In fact, it is more likely to be an iterative process, involving a progressive roll out as obstacles are overcome, as confidence is gained and as skills and capacities are developed. Each stage can be seen as a refinement of the previous stage. For example, while the concept stage may provide preliminary estimates of costs and benefits, each successive stage should enable refinement of (financial and non-financial) costs and benefits. Also, inevitably, circumstances change (e.g. changing energy prices or changing policies may make certain actions more or less attractive, technologies may change, public views may change). It is therefore important that each stage is reviewed regularly to ensure that the data and the conclusions remain relevant and robust, and that the implementation process adapts to reflect these changes.

The second relates to the fact that delivering low carbon cities (as opposed to a single low carbon city) is as much a collective as an individual issue. The process outlined above should therefore be seen as both a process map for individual local authorities and as a road map for local authorities in the round. There is much that can be achieved through local authorities working together. For example, local authorities could lead on different pilot projects and then share the lessons and experience, thereby obviating the need for other local authorities to replicate these pilots. This, of course, requires that local authorities are willing to work together, to share knowledge and experience, and to communicate regularly and effectively. Another area of collaboration could be in the development of tools (e.g. standard contracts) and approaches (e.g. financing models) that can be shared with others, and in turn adopted and used by others.

The third is that local authorities will have different capabilities and resources to take action. It may also be that local authorities need to develop new skills such as financial and risk management. Local authorities may find that working with others (not only other local authorities but also central government and the private sector) not only reduces their transaction costs but also addresses their capacity and expertise weaknesses. While skills and capacity are frequently raised as challenges, it is important to recognise that much of the expertise required already exists in local authorities; local authorities will have experience in areas such as urban regeneration, infrastructure development, capital raising, public engagement, communications and so forth. Therefore, for many local authorities the question will be less one of developing new skills and competencies, and more one of determining how best to harness the skills and expertise that already exist.

The fourth is that each stage will require a distinct financing strategy. While the costs of the concept stage may be relatively modest, the costs are likely to increase significantly as local authorities proceed through the stages outlined above. Local authorities may be unwilling to incur these costs, given the other constraints and challenges faced by local authorities. While the focus of this paper is on local authorities, other stakeholders may be better positioned to take certain actions forward. For example, some of the financial resources for feasibility

studies may be delivered through public private partnerships or may be funded by central government or other funding bodies. For example, some of the financial resources for feasibility studies may be delivered through public private partnerships or may be funded by central government (e.g. through the Green Investment Bank) or other funding bodies[14].

[14] See, for example, Note **Error! Bookmark not defined.** below regarding funding from European sources.

4. MAPPING THE OBSTACLES

Despite the potential, it is clear that local authorities must overcome a series of obstacles if they are to make achieving a low carbon city or region a reality. The most important of these are listed below with, our research finding an almost universal consensus that financial issues present the greatest obstacles to progress.

Obstacle	Comments
Financial	Local authorities face significant financial constraints, and this is making them less willing to incur capital or other costs, even if there are potentially significant long-term financial benefits. These constraints may be compounded by insufficient levels of government underwriting or pump priming support, or being unable to match expected returns with private sector requirements. Financial constraints do not only relate to the initial project and implementation stages outlined above but also to the potential for the funding of conceptual and feasibility research. In times of extremely tight local budgets, local authorities may be unwilling to incur even these relatively modest expenditures, and there are relatively few other UK organisations that are interested in and prepared to finance new approaches and business models[15]. Another important obstacle is that many of the benefits of low carbon investments accrue to parties other than the local authority. For example, reductions in unemployment will primarily create revenue savings for central government not for local government[16], and reductions in fuel poverty will reduce health costs for the health authority[17]. That is, while there may be a compelling societal case for investment, the local authority's cost-benefit calculus may not map directly on to these wider societal benefits.
Legal	The Localism Act suggests that local authorities can (or have the potential to) think very differently about issues such as the low carbon agenda. The Localism Act suggests that, so long as lawful and in the interests of the local authority, local authorities can raise money for activities such as low carbon financing and that this can be financed in a variety of ways (tax, incentive schemes, securitised future revenues). That is, localism may allow (or create opportunities for) local authorities to take on more powers and to leverage other sources of funding. Despite the potential of the localism agenda, it is important to recognise that local authorities, as public bodies, have constraints on their actions and behaviour, and that they must comply with other obligations, for example relating to state-aid or to

[15] There is, however, funding available from a number of European Union initiatives, and a number of UK local authorities have sought funding from these sources. These include the European Investment Bank's JESSICA (Joint European Support for Sustainable Investment in City Areas) and ELENA (European Local Energy Assistance) initiatives (with JESSICA allowing EU Member States to use some of their EU grant funding to make repayable investments in projects forming part of an integrated plan for sustainable urban development - see http://www.eib.org/products/technical_assistance/jessica/index.htm) and ELENA covering a share of the cost for technical support that is necessary to prepare, implement and finance investment programmes - see http://www.eib.org/products/technical_assistance/elena/index.htm) and the Intelligent Energy – Europe (IEE) programme which is providing targeted funding to promote energy efficiency, increase the use of new and renewable energy sources, and encourage energy efficiency and renewables in the field of transport (see http://ec.europa.eu/energy/intelligent/).

[16] It is important to note that these investments are likely to have very significant effects given that (a) much of the activity is likely to be carried out by individuals and small companies in the construction, plumbing and electrical trades sectors (where labour tends to be locally sourced and leakage effects tend to be small), and (b) these sectors have very good economic multiplier effects (see English Partnerships (2008), *Additionality Guide: A Standard Approach to Assessing the Additionality of Interventions* (English Partnerships, London).

[17] It is relevant to note that this may change with UK local authorities having greater responsibility for local health outcomes, and greater influence on the deployment of health budgets.

	competitive tendering. Moreover, the specific implications of the Localism Act remain unclear. It is, therefore, likely that many local authorities will choose to wait for clarification or further guidance before significantly changing the way in which they operate.
Views and perceptions	While there is a compelling economic, social and environmental case for low carbon investments, the views held by local authorities may create obstacles. These include: • The perception that climate change is not part of the local authority's core business, or that climate change is a lower priority than other areas of activity[18]. • An unwillingness to take on any financial risk, let alone financial risks at the scale implied by the low carbon agenda • Scepticism about central government's commitment to action on the low carbon agenda. The fact that there have been so many policy changes and policy reviews over the last decade is often used to argue that the long-term support to make low carbon investments economically viable may not be available from government. • Reducing emissions is not high on most people's or companies' agendas; while most see the benefits of reducing energy use, they are often unwilling to take action because of the upfront capital costs, scepticism about the financial benefits, and the perceived lack of robust and reliable information. While these views and perceptions are acknowledged, it is important to recognise that there is significant interest among local authorities in low carbon cities, because of the wider economic and employment benefits that may result. There is much that could be done to address the wider attitudinal and perception issues through public education, through clear messages about the wider benefits (jobs, economic development) of climate change, and through explaining the benefits to individuals of taking action on energy efficiency (e.g. the debate could be framed in terms of 'warm homes' rather than just energy savings or greenhouse gas emission reductions).
Capacity and skills	There are a number of different capacity and skills issues in the system. Local authorities are particularly concerned about the financial characteristics and risks associated with investments in low carbon cities, and about their capacity to manage these risks. Our discussions with local authorities suggest that many of these concerns relate to low carbon cities in particular – e.g. the specific risk return profiles of the investments, the pricing of these risks – rather than large scale investments (e.g. other infrastructure) more generally The other area where capacity and skills were identified related to the construction and related trades industry. There is a major question about whether the construction and related trades industry currently has the capacity to deliver one city-scale low carbon programme. This requires that attention is paid to the sequencing of implementation so that rather than 'trying to do everything at once', implementation should seen as involving discrete activities that are ordered in a manner that ensures that there is no unmet demand for skills and to ensure that there isn't a boom and bust in the local economy.

Finance was seen by virtually all stakeholders as the key obstacle to the low carbon cities agenda. It is therefore worth unpacking this issue a bit further. Many of the concerns relate to the question of how to consolidate the numerous opportunities into a single (or a small

[18] See, for example, recent research from Green Alliance which suggests a three way split between local authorities with approximately one third (37%) deprioritising climate change, one third (35%) remaining firm in their commitment to climate change and believing that action could even increase in the context of localism and approximately one third (28%) narrowing their ambitions to focus on reducing emissions from their estate and ceasing work on wider environmental issues (Scott, F. (2011), *Is Localism Delivering for Climate Change? Emerging Responses from Local Authorities, Local Enterprise Partnerships and Neighbourhood Plans* (Green Alliance, London), p. 2).

number) of opportunities to invest at scale[19]. This, in turn opens up questions about: the legal and other constraints on fundraising or risk underwriting by local authorities; the design of the financing instrument(s), and the allocation of risks between the different organisations involved, and the identification of the right type of finance for each project at each stage of development; the allocation of costs, risks and benefits between the multiple actors (which include central and local government, capital providers, potential delivery vehicles, energy providers and service companies, and the businesses and households that could take up the available capital) that will inevitably be involved; the potential for third parties (e.g. the Green Investment Bank, energy service providers, investment managers) to support or underwrite the raising of finance; and whether there is a flow of projects at sufficient scale to warrant large scale finance-raising.

One of the striking conclusions from our research is that the question of the availability of finance is seen quite differently by different actors. While local authorities, virtually universally, see the availability of finance as the most significant obstacle, the investment community seems much more sanguine about the issue. This reflects views and perceptions about risk, with local authorities looking at themselves as being accountable (financially and politically) for any losses, whereas investors are generally of the view that they would only be committing capital if and when the risk/return profile of the investment was appropriate. Put another way, local authorities see the problem as essentially one as underwriting risk, whereas the investment sector sees such investments as essentially voluntary given that they have a range of alternatives that they can invest in.

This discussion of risks and returns opens up the question of the exact financial characteristics of the investments that would need to be made. Even though studies such as the mini-Stern (Gouldson et al., 2012) point to a compelling case for investment, the headline numbers conceal a wide variation in the financial characteristics of the investment opportunities available. While the overarching case for investing in energy efficiency or greenhouse gas emissions abatement is compelling, the types of returns that institutional investors are likely to look for will depend on whether they see these investments as being at the riskier end of infrastructure investments (where investors, depending on the risk-return profile of the investments, tend to look for annual returns of 10-15%) or whether they see these investments as lower risk (i.e. more akin to utility-type investments) and where they tend to accept somewhat lower rates of return. In either case, it is possible to build portfolios of investment opportunities that can satisfy investors' demands on both risks and returns, although the carbon-saving potential is limited if investments are only made in higher return/lower risk opportunities. It is also relevant to note that these investment risk-return profiles are not static and that returns are likely to increase as energy prices go up and as technologies are deployed at scale, and risks (both actual and perceived) are likely to diminish as experience accumulates. The discussion of risks and returns is compounded by the reality that different actors have different interests. For example, to provide attractive incentives to customers, local authorities and energy companies want interest rates to be kept low and to offer flexible terms for repayments. This may lead to conflict with the requirement of the providers of capital. A further complicating factor is that it is unclear what investment vehicles are best suited to these types of investments, and there is significant work required to map these out and to analyse their suitability, their strengths and their weaknesses.

[19] See also the comments in Kapur, N., Hillier, J., Langdon, R. and Abramson, A. (2011), *Show Me the Money: Energy Efficiency Financing Barriers and Obstacles* (Environmental Defense Fund, Washington DC), pp. 16-17.

5. RISK ASSESSMENT AND MITIGATION

While risks will be specific to the local authority involved and to the needs and interests of its partners, our research has identified ten key risks that need to be managed. These can be divided as follows:

- Market risk (i.e. the impacts of interests rates and energy prices on the economics of low carbon investments) and take-up risk (i.e. that there are sufficient projects available for investment) – are important and very difficult to manage.
- Political risk, policy risk, performance risk, cherry picking risk – are important but can be managed through appropriate risk management strategies.
- Legal risks, the risk of non-recovery of transaction costs, technical risk, default risk – are important to manage but, so long as they are well managed, the residual risks should be reasonably low (i.e. where the consequences are relatively minor and the likelihood of occurrence relatively low).

Risk	Comments
Major Risks	
Market	Markets can have a very significant impact on the economics of low carbon investments. Of particular concern in this regard are: • Changing interest rates, where higher interest rates could significantly diminish the financial attractiveness of many energy efficiency investments. • Energy prices and, specifically, while most predictions suggest that energy prices will continue to increase, if oil prices fall, or if shale gas production leads to rapid falls in gas prices, the economics of investments in energy efficiency will change. Both of these are outside the control of local authorities. The risks associated with both are compounded by the likely life-cycle for low carbon investments where it will take a number of years before investments are made at scale and where investments are then repaid over relatively long (10-15 years) timeframes.
Take-up	Even if investments are secured, there is no guarantee that the funds will be deployed at the scales envisaged or required[20]. This is a major political risk for local authorities. It may be that investors are unwilling to commit capital until they are sure that there is a pool of projects that they can invest into, creating something of a Catch-22 as local authorities may be unwilling to search for projects/investments until they are sure that appropriate capital is, or will be, available. There are a number of measures that can be considered to help address this issue: local authorities could put some of their assets into the mix; there could be an explicit focus on marketing, communication and awareness-raising; local authorities could consider mandating certain energy saving or low carbon technologies; local authorities could share (or pool) their assets thereby enabling efficiencies at scale to be delivered. Irrespective of the exact approaches adopted, the core message is that the development of a project pipeline needs to occur in parallel to the development of financing models and the raising of finance.
High Risks	
Political	Political leaders will have to take some political risks to pursue major scale investments in low carbon options. They may be accused of wasting money or of benefiting particular groups over others. They may – even if all goes well – be criticised for working with the private sector, or even for crowding out the private sector. Some of these risks are inevitable for any large-scale investment but they may be exacerbated for investments that are seen as (or presented in the media as) outside local authorities' core responsibilities. These may make local authority political leaders unwilling to lead and/or less willing to

[20] This is a very real problem in the UK, where there has been historically low take-up of energy efficiency schemes (see, for example, Local Energy Efficiency Project (2011), *Project Information Booklet: Phase 1* (LEEP, London), pp. 3, 11-14).

	maintain this leadership when they come under pressure, or when examples of failings or weaknesses emerge. These types of risks can be mitigated through a focus on economically viable and proven projects, through the selection of projects with more attractive risk return characteristics, through running successful pilot projects and through developing a robust body of evidence around the nature and characteristics of low carbon investments. Local authorities may be able to mitigate risks through partnerships, e.g. having the Green Investment Bank as a project partner, working with other local authorities. This suggests an important role for central government as an active supporter of low carbon cities, not just as a source of funding.
Policy	Many low carbon projects depend on public policy (e.g. emission reduction targets, carbon prices, carbon taxes, subsidies) to make them viable. While these help to support investment in low carbon options at the city scale, the possibility that they could be withdrawn creates investment risk. This dependence on public policy support, in turn, means that investors pay even more attention to public policy in relation to low-carbon investments than when investing in the energy sector more generally[21]. Concerns about policy risk are exacerbated by political uncertainty and changing rules. For example, the UK government's changes to the feed-in tariff regime for solar has been widely highlighted as undermining investor confidence in government policy more generally. Political risks such as these are difficult for local authorities – at least individually – to mitigate and manage. There are, however, two practical measures that local authorities can take. The first is to focus their investments on those areas where there is a robust investment case and where the investment case does not rely on public policy; many energy efficiency investments fall into this category. The second is to work with other local authorities, with local authority collaborations (e.g. the Local Government Association) and other actors with an interest in this area (e.g. institutional investors[22]) to communicate to government the importance of providing a stable and supportive long-term policy framework that enables them to invest with confidence.
Financial performance	There is often a difference between the designed and deployed performance of different options – for example as a result of incorrect assumptions or poor installation. Even small variations in performance can result in significant financial losses. Financial risk in part reflects lack of experience and lack of understanding of specific risk return characteristics of the investments that are being made. It is here that pilot projects are so important, enabling robust analysis of project costs and benefits, as well the identification and management of technical aspects that may affect project returns.
Cherry-picking	There is a risk that only easy to reach projects with short payback periods will receive funding, and that investors will not invest in harder to reach options. Potentially, investors could withdraw after the earlier phases, leaving only harder to reach options and no ability to cross-subsidise. Cherry picking may be addressed through providing a mix of projects within an investment portfolio or through using the cash flows from financially attractive projects to subsidise other low carbon investments, although – given the comments above about the financial characteristics of low carbon investments – it is important that what is offered is a risk-return profile that is attractive to likely investors in the fund (or investment vehicle)
Medium Risks	
Legal and contractual	Local authorities are exposed to a variety of legal risks. The fear of being sued can be enough to stop some local authorities looking into the different possibilities for funding or

[21] Sullivan, R. (2011), *Investment-Grade Climate Change Policy: Financing the Transition to the Low-Carbon Economy* (Institutional Investors Group on Climate Change, London); Sullivan, R. and Blyth, W. (2006), *Climate Change Policy Uncertainty and the Electricity Industry: Implications and Unintended Consequences. Chatham House Briefing Paper EEDP BP 06/02* (Chatham House, London).

[22] See, for example, the policy statements and calls that have been issued by the Institutional Investors Group on Climate Change (http://www.iigcc.org/publications/policy-statements) and, more generally, Pfeifer, S. and Sullivan, R. (2008), 'Public Policy, Institutional Investors and Climate Change: A UK Case-Study', *Climatic Change*, No. 89, pp. 245-262.

	may mean that certain types of funding approach (e.g. those involving long-term partnerships with the private sector) are simply not considered. It is likely that many of these can be addressed through: • Obtaining legal advice on the implications of the Localism Act for their low carbon-related activities. • The development – and wide adoption – of standard contracts and procurement approaches for their low carbon-related investments. • Encouraging a consistent approach across local authorities.
Transaction and start-up	The costs of, for example, contract development or due diligence studies can be significant, and they can occur at a time when many elements of the potential activity remain uncertain (e.g. whether sufficient finance will be raised, whether projects will go ahead). Local authorities may be unwilling to incur these costs if they are not confident that they will make significant progress or deliver significant outcomes, or if they are concerned that they will not recover these costs at later stages in the process. Local authorities can manage these risks through pooled research and capacity, through reduced duplication (e.g. through using standard contracts and procurement processes), through obtaining external funding to help with transaction costs, through sharing experiences and through support from third parties (e.g. government, the private sector).
Technical and technology	Some of the technologies that are being proposed remain relatively unproven. The issues that need to be considered include: whether the technology works at scale, the longevity of the technology, the reliability of the technology reliable, and the environmental and economic implications of wide deployment (e.g. demand for biomass). Many of these questions could be addressed through well-designed pilot projects that to test such technologies at scale with the aims of understanding the technical and financial characteristics of these technologies, and developing strategies (e.g. insurance, contracts) to ensure that they perform as they are intended.
Default	Default risk has two important dimensions: financial and political. From a financial perspective, defaults may affect projected returns (although the exact impact will depend on the assumptions made about default rates at the beginning). There are also a range of risk management actions that can be considered, e.g. strong counterparties, well designed contracts, insurance to cover certain technical and market risks, and the involvement of third parties (e.g. private sector organisations, central government) who can help manage these risks. From a political perspective, defaults may be used as examples of how the low carbon effort has failed, and they may be used as examples of inappropriate behaviour by local authorities (e.g. increasing personal indebtedness). One of the challenges is that this may make local authorities unwilling to provide capital to all but the most credit-worthy of customers or the most attractive energy efficiency investments. That is, by adopting a risk adverse approach, many important investments may not be made.

6. CONCLUSIONS AND NEXT STEPS

We are at the early stages of a comprehensive low carbon cities programme for the UK, and many of the complex legal, political and finance issues are issues are yet to be fully explored, let alone resolved. Yet, as this paper demonstrates, many of the broad parameters of the discussion are starting to take shape, in particular around the scale of the opportunity, the scale of the investment required, and the central role of local authorities in enabling progress to be made. It is also clear that – without in any way underestimating the scale of the challenge involved –many of the obstacles can be overcome and that the risks can be managed, so long as the political will and patience to drive the low carbon cities agenda forward are in place.

There are a number of more specific recommendations that follow from our analysis. These are the actions that are needed over the next 2-3 years if we are to establish the building blocks for the roll out of low carbon cities across the UK.

Local Authority Leadership is Critical: The scale of the investment required, the nature of the obstacles and scale and complexity of the risks to be managed mean that without active local leadership, the vision of low carbon cities – and, indeed, that of a low carbon economy – is unlikely to be realised. Within each local authority, this requires that:

- Local authority leaders are committed to the low carbon cities agenda. Given the scale of the financing required, it is essential that key decision makers are actively involved and have the knowledge and authority to take the decisions that are required.
- The city or region has overarching low carbon objectives, and a strategic plan for the delivery of these objectives.
- There is a clearly defined case for action. Of particular importance in this regard is ensuring that the low carbon agenda is aligned with other local priorities (jobs, economic development, fuel poverty alleviation) and, if there are potential areas of conflict, that these are explicitly recognised and appropriate management strategies in place.

Work with Other Local Authorities: There is a compelling case for local authorities to work together – to share knowledge and experience, to share the inevitable transaction and other costs, and to pool assets (to deliver efficiencies of scale). Local authorities are used to engaging with and working with each other across a range of issues, including on climate change and environmental issues more generally. It is important to recognise that local authorities are resource constrained and supporting the types of joint working that are required will require the commitment of currently quite limited resources. It is therefore important that there is leadership and support to ensure that the resources, e.g. to attend meetings, are available.

Projects have a Critical Role to Play: Pilot and full scale projects can be used to gather the information base required to underpin moves towards low carbon cities, through providing evidence of the effectiveness of specific measures and through providing the financial and other information necessary to inform policy debates. Local authorities should recognise that they do not need to do everything on their own and that different local authorities can conduct projects in different areas (e.g. different sectors, different technologies) and that this can be an effective way of making progress so long as there is effective sharing of knowledge and experience with other local authorities.

Projects and Finance Must Proceed in Parallel: Local authorities need to ensure that financing is available at the time when it is needed for projects and that projects are available for financing at the time that financing is available. While much of the writing on low carbon cities treat financing and project development as somewhat independent (e.g. top down models that start with the question of how can low carbon finance be raised at scale and then effectively deployed, and bottom up models where the focus is on specific project

opportunities), these are in fact closely related. That is, rather than top down or bottom up approaches, hybrid approaches (e.g. where bottom up approaches are used to generate project pipelines that can be funded through top down approaches, top down approaches are used, in the first instance, to seed or catalyse the development of project pipelines) are much more likely to be successful.

There is a Need to Develop Tools and Guidance for Local Authorities: The participants in the CLCF/CCCEP workshop identified a number of areas where practical tools are required (and where the development of these tools could reduce the transaction costs of individual local authorities looking to make progress). These are:

- The development of financing and delivery models for the variety of low carbon activities that will be required to deliver low carbon cities, with a focus on those models that can be widely deployed.
- The development of model (standard) contracts and associated documentation for the low carbon agenda.
- The provision of clear guidance on the implications of the Localism Act for the low carbon cities agenda.
- The provision of clear guidance on the financial risks that local authorities can carry and on the risk management approaches that can be used to manage these risks.
- The development of a procurement framework and associated tools for low carbon cities.

Local Authorities Need to Understand the Private Sector's Views on Finance-related Risk: One of the recurring themes from our research was the potential disconnect between the low carbon cities agenda and the needs and interests of private sector investors, in particular given that local authorities are likely to look to private investors to invest in funds (or other investment vehicles) as part of the long-term financing of low carbon cities. Local authorities will therefore need to engage with these investors to understand what sort of investment vehicles they would be interested in investing in, what sort of investment returns they would expect from these investment vehicles, what sort of risks they would accept in return for these returns and what role local authorities could play in addressing investors' concerns[23]. Within this, there is a potentially interesting role for local authority pension funds, many of whom already have significant investments in infrastructure. While there are likely to be constraints on funds investing explicitly in local projects (i.e. within their own region), there is potentially a significant role for these funds in catalysing these types of investments more generally (e.g. through investing in a UK-wide local authority bond).

Local Authorities Must Monitor and Evaluate Implementation: It is clear that we are at the start of a period of extensive experimentation and implementation on low carbon cities. There will be significant learning and significant risk of duplicating mistakes. It is therefore critical that local authorities consider how they can best ensure that learning and capacity building occur over the life-cycle of finance. This will require: regular feedbacks and reviews to ensure that lessons learned in a timely manner, as well as a structured monitoring and evaluation of local authorities in the round as they progress, or not, on this journey (e.g. to identify key obstacles, identify areas of success).

National Government must do more to support this work at scale. Government already has substantial resources allocated in closely related fields – for example £110 billion for infrastructure improvement[24] and £3.6 billion per annum in fuel subsidies[25]. Early availability

[23] An initial assessment of investor needs and interests has been conducted (LEEP (2011) (Note 20), pp. 8-10) although this is a relatively high level analysis and would need to be further explored through explicit discussion of specific investment vehicles and approaches.

[24] DECC (2011), Planning Our Electric Future: A White Paper for Secure, Affordable and Low-Carbon Electricity (DECC, London), pp. 6, 16, 27.

of Green Investment Bank resources for early city scale energy saving projects could significantly improve the speed and success of a UK wide low carbon roll out.

Next Steps

The Centre for Low Carbon Futures (CLCF) and the Centre for Climate Change Economics and Policy (CCCEP) expect to contribute to this agenda in three ways:

1. Through providing real time evaluation and analysis of the experience of local authorities in taking the low carbon cities agenda forward. The aim will be to ensure that evidence, experience and lessons learned are shared, in a timely manner, with local authorities and other key stakeholders.

2. Mapping the needs, interests and capacities of the different actors onto the generic implementation approach presented above. This will identify areas where interests are aligned and potentially conflict, areas where there is the potential to share capacity and expertise and areas where this is not required, and areas where effective partnerships may be developed and areas where such partnerships are unlikely to be effective.

3. Analysing the implementation and financial models that have been developed to date and considering whether and how these may be extended, either to cover a larger volume of similar projects (e.g. maximising the uptake of domestic energy efficiency investments) or to cover different types of projects (e.g. commercial property).

[25] See OECD (2012), *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels* (OECD, Paris) and associated national data sets at: http://www.oecd.org/document/41/0,3746,en_2649_37431_48813609_1_1_1_37431,00&&en-USS_01DBC.html#publication