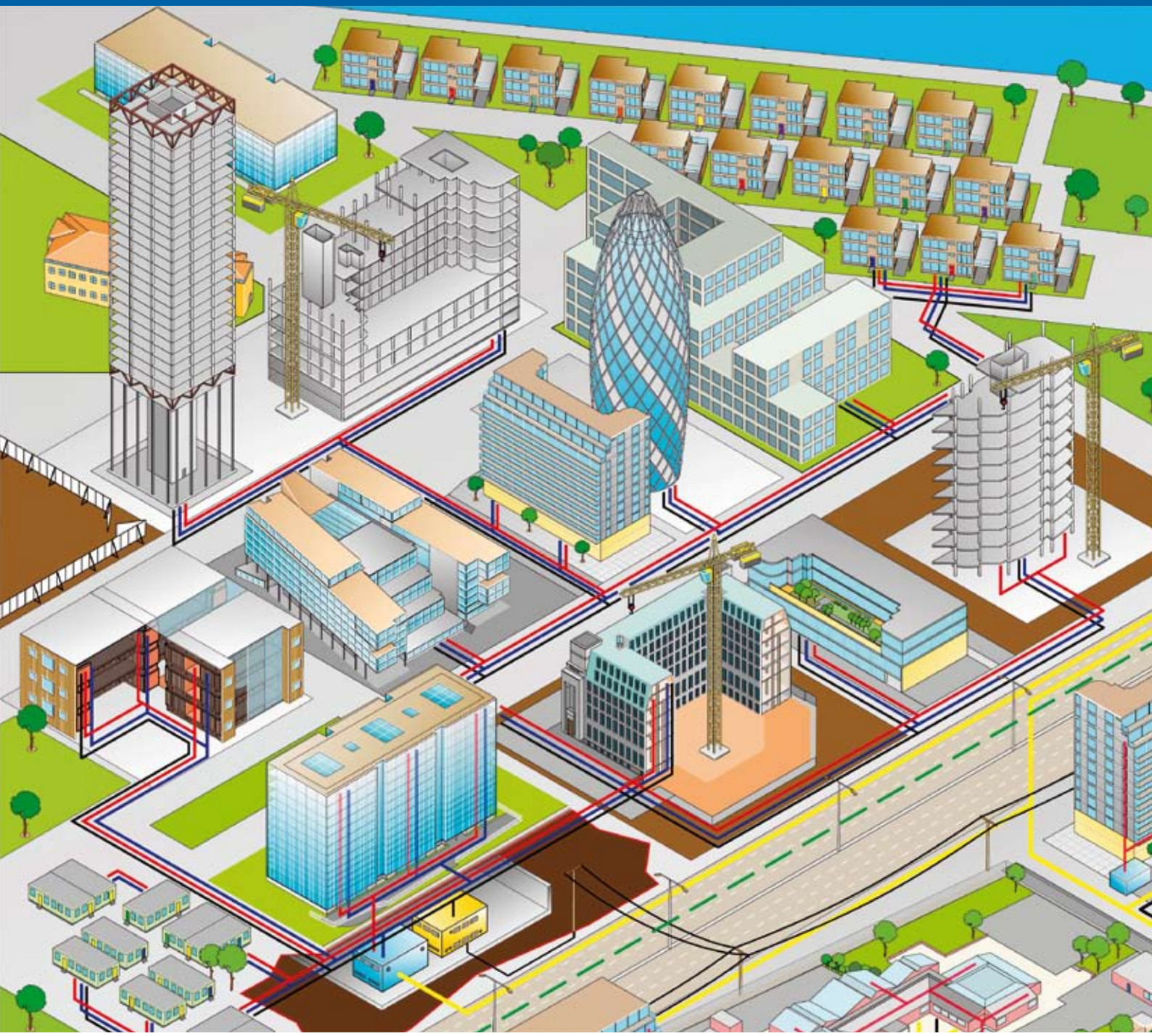
October 2009

Powering ahead

Delivering low carbon energy for London



LONDON DEVELOPMENT AGENCY

London First

LONDON COUNCILS

MAYOR OF LONDON

October 2009

Powering ahead:

delivering low carbon energy for London

This propectus has been prepared with the help and expertise of those listed in the working group below.

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Foreword

The Copenhagen Summit in December 2009 focuses the world's attention once again on climate change. London government and business continue to work together to address the challenge. Energy and carbon reduction strategies seek to reduce the capital's emissions by 60 per cent by 2025. The Mayor has set a target to supply a quarter of London's energy from decentralised sources by the same year. This will achieve an annual CO_2 reduction of 3.5 million tonnes representing a tenfold increase in generating capacity and requiring £5-7 billion of investment.

Decentralised energy on this scale undoubtedly faces commercial challenges requiring high levels of upfront capital. The investment environment is changing as political will is beginning to create a more favourable policy framework for decentralised energy. In the appropriate policy setting, decentralised energy has the potential to generate long-term stable cash flows, creating viable investment opportunities. In London, the public sector is working to remove barriers to success and harness the private sector's financing and delivery capability, to make a robust investment case for decentralised energy.

Delivering the required levels of CO_2 reduction will rely on action to address both London's energy supply and its demand, maximising all of its energy generation assets and supplying its buildings and communities efficiently. London's dense urban environment and diverse energy demands create the ideal circumstances for delivering viable decentralised energy schemes.

Combined with demand side measures, investment in decentralised energy is key to underpin London's 'Low Carbon Capital' status and to support its emergence as a global hub for green industry, knowledge and finance.

Decentralised energy systems are not appropriate in all circumstances but, where they do make sense, the savings can be significant. At the city level, both Copenhagen and Helsinki have been able to deliver heat and electricity efficiently. 95 per cent of Helsinki's heat and over 50 per cent of its electricity are generated through its decentralised system. In London, decentralised energy is now emerging at scale. A new system based at Guy's and St Thomas' hospitals provides one example that is expected to deliver cost savings of £1.5 million per year and reduce carbon emissions by 20 per cent. The initial investment is expected to be recouped through energy savings in less than seven years.

This prospectus has been prepared by experts, from business and from central, regional and local government, as a 'call to arms' to both the private and public sectors. It recognises the crucial role that London's boroughs are playing as facilitators - providing supportive local policies and assembling public heat demand - and it outlines commercial models, the regulatory and policy environment, and the public sector support on offer to unlock the market. It also includes a pipeline of potential projects, with the partners and interventions required to deliver them. Opportunities are characterised into three main types – single site schemes, multi-site mixed-use schemes and area-wide heat transmission schemes. For

simplicity decentralised energy is defined here as Combined Heat and Power (CHP) systems, in combination with district heating where appropriate.

The prospectus is launched one year on from the publication of London First's study 'Cutting the Capital's Carbon Footprint: Delivering Decentralised Energy', which set out the measures needed to decentralise a quarter of London's energy supply by 2025. Overseen by a group of the capital's business leaders, that report made several key recommendations, including the need for further economic incentives, projects of a sufficient scale, approaches involving the public and private sectors, the delivery of energy masterplans and the creation of a public sector centre of expertise capable of working at both the strategic and project levels. Work to implement these recommendations has begun this year in earnest.

As part of its commitment to deliver decentralised energy across London, the London Development Agency (LDA) has allocated up to £16 million for decentralised energy over the next four years (from 2009/10) to identify and facilitate potential projects and to leverage private sector finance on key strategic schemes. It is also expected that a further £64 million will be made available through the Joint European Support for Sustainable Investment in City Areas fund (JESSICA) to unlock the development of decentralised energy in London.

London Councils is working with the LDA on London-wide decentralised energy masterplanning, enabling boroughs and their partners to take advantage of opportunities

Olympic Park's Community Energy Centre

for decentralised energy. The LDA is working alongside boroughs to develop the tools and expertise needed to identify and de-risk schemes. It has also has created a dedicated Decentralised Energy team that has been instrumental in identifying areas where decentralised energy makes the most commercial sense. Crucial to this is the development of a web-based portal called the London Heat Map - an interactive platform displaying information that can be used by policy and decision-makers to facilitate the development of new decentralised energy schemes. The LDA's support, combined with positive policy - provided in particular by the London Plan - have resulted in an increase in the number of planned schemes. A recent study has shown that since 2007, the number of CHP installations proposed as part of planning applications has doubled[2].

Significant decentralised energy projects are emerging across the capital. And construction has begun on the Olympic Park's Community Energy Centre and network, which is groundbreaking in ensuring that London hosts the most sustainable Games. The energy center will continue after the Games to provide a low carbon legacy for the Olympic Park and local communities.

This prospectus recognises the need to ensure London and its businesses emerge stronger from the challenges presented by climate change and current economic conditions. We would like to thank members of the working group named at the outset of this prospectus for their valuable contribution to its creation.

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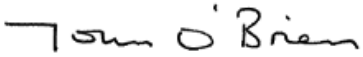


John O'Brien
Chief Executive, London Councils

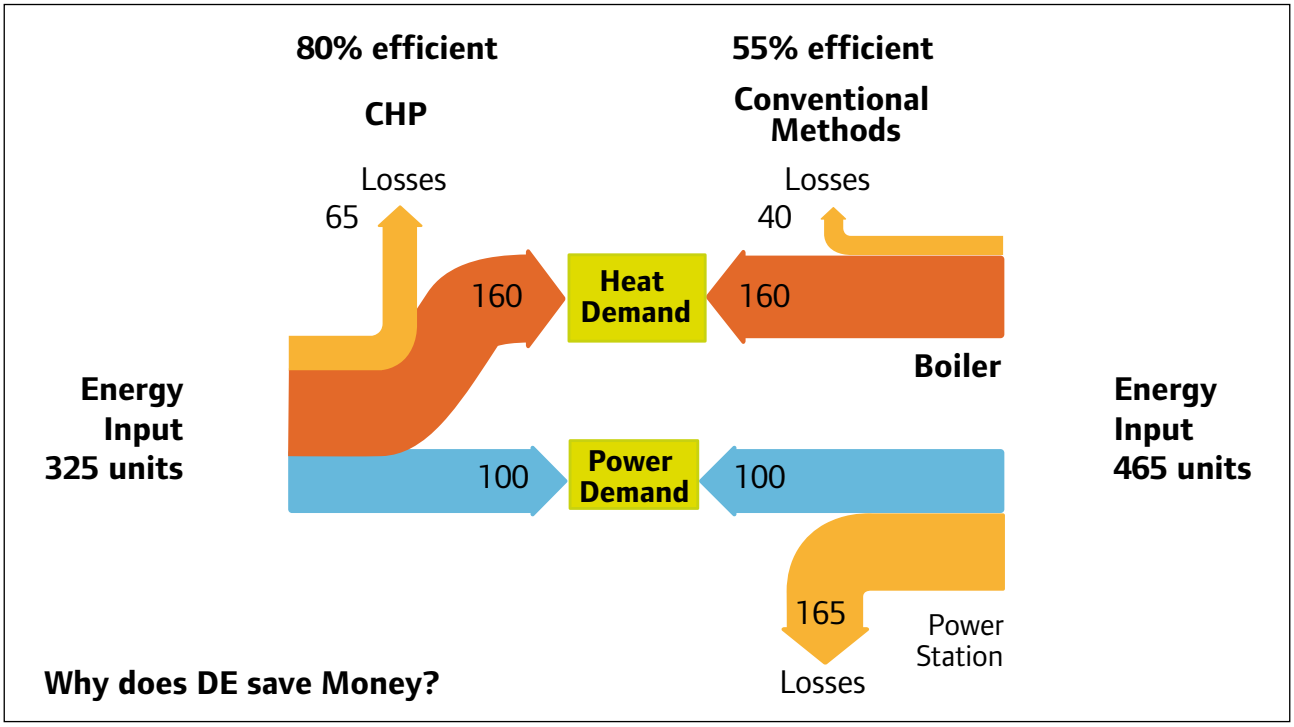
1 The opportunity - London, the place for decentralised energy

The long term vision: creating a low carbon capital

In response to the global challenge of addressing climate change, the Mayor has set the ambitious goal of reducing London's CO_2 emissions by 60 per cent by 2025. Underpinning this target is a strategy to shift the supply of a quarter of London's energy to low carbon, and where possible, renewable, decentralised heat and power networks. High efficiency gas-fired or waste fed combined heat and power (CHP) systems are expected to be the primary source of low carbon heat for decentralised energy schemes. Over time these systems will be augmented by biomass, biogas, and other low to zero carbon energy sources as they become more technically and commercially viable.

Partnership between the public and private sectors could deliver the £5-7 billion of private sector investment required to build the necessary infrastructure. Attracting this level of investment requires the development of appropriate commercial structures against a stable regulatory environment enabling commercial rates of return, as well as effective de-risking by the public sector.

The development of a decentralised energy market presents a growth opportunity for London, delivering not only efficiency benefits but also the expertise and investment to spur other forms of green infrastructure. The LDA has estimated that development of decentralised energy in London could employ about 848



CHP is a more efficient way of meeting local electricity and heating demands compared with the traditional approach of inputting electricity from centralised power stations and the use of local gas-fired boilers.

persons on an annual basis generating approximately 2,500 permanent jobs by 2025[3].

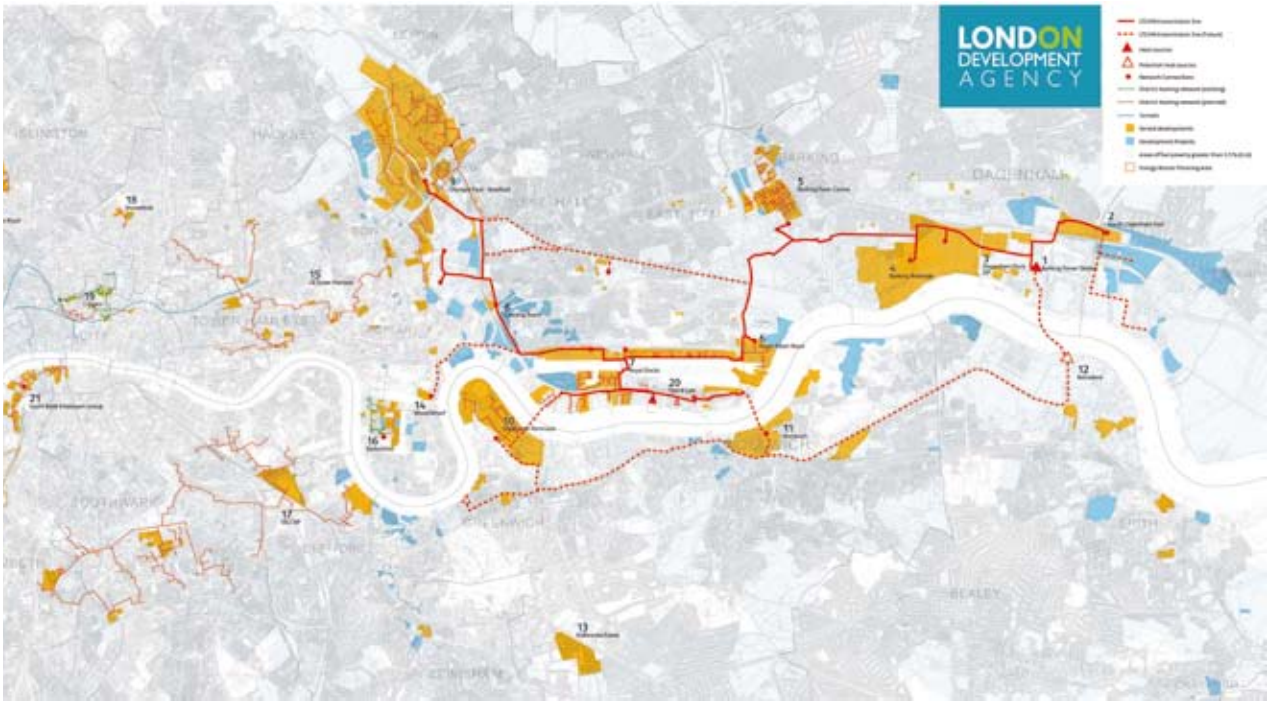
Analysis of the potential of the 'green economy' has estimated that annual global investment could reach £368 billion a year[4]. The scale of this opportunity suggests those cities that move quickly will benefit from significant 'first mover' advantage. The Mayoral focus on the development of decentralised energy could, in parallel with other low carbon strategies, support London's transformation into a leading 'Low Carbon Capital' as it attracts and anchors knowledge, finance and technical expertise.

Public sector support

Critical to delivering decentralised energy is ensuring a positive regulatory and policy context and the public sector's ability to remove delivery barriers. The public sector is working together to unlock the market and deliver London's decentralised energy infrastructure.

National policy changes will have a positive fiscal impact on decentralised energy delivery in London. These policies include:

- the introduction of Feed in Tariffs (April 2010) and the Renewable Heat Incentive (April 2011)
- the extension of the Climate Change Levy (CCL) exemption for indirect sales of CHP electricity to 2023, announced in the 2009 budget
- enhanced Capital Allowances introduced in April 2001 as part of the CCL package that



Proposed London Thames Gateway Heat Network

enable a business to claim 100 per cent first-year capital allowances on its spend on qualifying plant and machinery, including CHP
- good quality CHP schemes fuelled by renewables will attract more Renewable Obligations Certificates (ROCs) compared with an equivalent power-only project
- preferential treatment under the business rates regime for good quality CHP plants.

The Mayor continues to highlight to government the value of high efficiency, low carbon decentralised energy systems and will seek to ensure such systems are not disadvantaged against other positive incentives for renewables. Working with the LDA, the industry and other bodies, the Department of Energy and Climate Change (DECC) and the regulator Ofgem have already made changes to the electricity market system to help remove some of the barriers to decentralised energy schemes realising the full value of their low or zero carbon electricity sales.

Boroughs are identifying and assessing opportunities across the capital, and will be supported by the instigation of heat mapping is being funded by Capital Ambition through London Councils and the LDA. This work will compliment the energy policies in the London Plan and help to inform revisions to the Government's forthcoming combined climate change and renewable energy Planning Policy Statement (PPS) on the role that heat networks can play in achieving national CO_2 and renewable energy targets. Work is also underway on a London District Heating Manual to establish common technical standards to enable DE projects to efficiently and economically connect to large-scale heat networks in the future.

In summary the Mayor is seeking to:

- develop area wide district heating networks
- encourage boroughs to identify existing and potential heat networks through energy strategies and masterplans for key sites, with the support of a London heat map
- assemble existing and future public sector heat loads to provide certainty on project revenues and secure investment
- identify and provide land to accommodate energy centres
- ensure opportunity and intensification areas highlighted in the London Plan are able to incorporate decentralised energy systems where appropriate
- press government for support mechanisms for low and zero carbon energy and heat networks
- ensure a dedicated Decentralised Energy team within the LDA works with developers and boroughs to deliver schemes.

London agencies may themselves create local markets for decentralised energy. For example, London Underground, one of the UK's largest electricity users, has set the objective to secure 30 per cent of its energy needs from renewable sources, up to 450GWh a year by 2025. This level of stable demand equates to the output of a 120 MW power station and represents 250,000 tonnes of carbon savings a year. This transition could begin as early as 2010 and may be delivered through high-quality CHP sources.

2 Commercial models

Partnerships between the public and private sectors will be critical to unlocking the potential of decentralised energy and providing long term, stable returns on investment.

The report recently published by DECC, '*The Potential and Costs of District Heating Networks*',[5] identifies some of the key drivers of risk and cost for decentralised energy projects and the public sector role required to address them. Recognising these drivers, and through the initiatives set out in this prospectus, the GLA and the LDA will seek to remove barriers to delivery and develop a robust investment case for projects in the London environment. The project economics outlined below consider some of the ways in which a market may develop.

Decentralised energy project economics

The diagram below highlights the basic correlation between scale, density and viability.

In essence, commercial viability will increase with scale and energy density. Other important factors are diversity of energy demand (mix), electricity prices and the risks attached to heat load development.

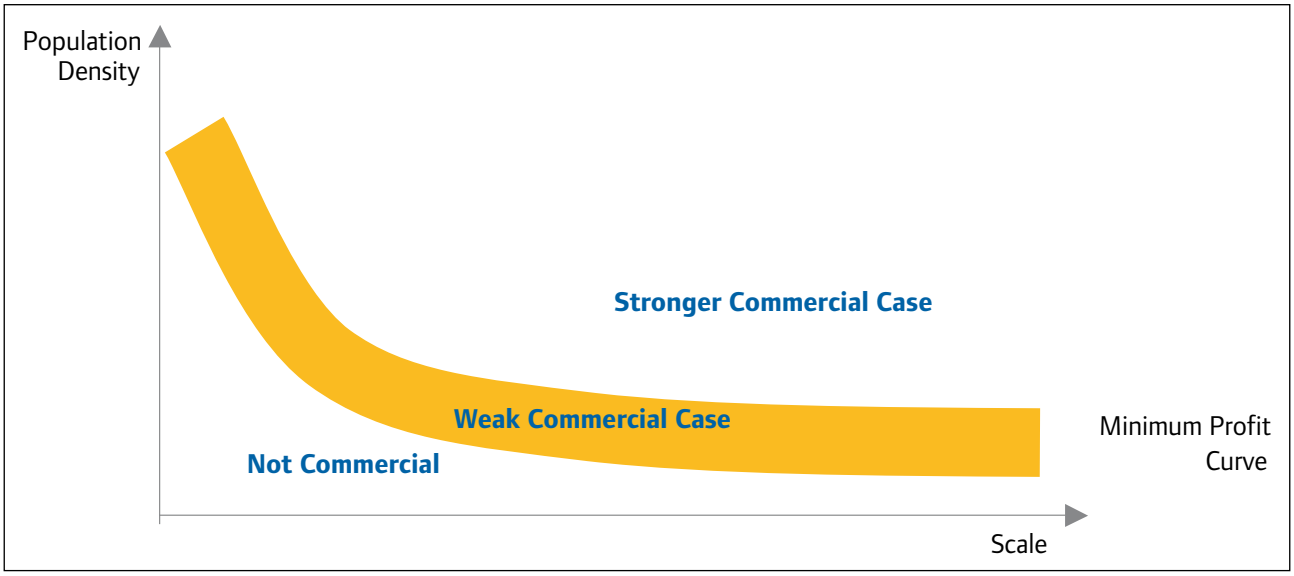
Factors influencing the viability of decentralised energy schemes

Scale

The larger the project, the more likely generation and operational efficiencies will contribute to economic viability. Larger generation technologies are better able to handle lower cost, but more difficult fuels, such as waste, and can achieve higher flue gas emission standards.

Heat density

Higher heat load densities offer better returns as investment costs are lower.



Correlation between scale, density and commercial viability
Source: Arup

Heat load development and risk

Certainty around the development and continuity of a heat load significantly reduces investment risk, particularly in larger decentralised energy projects that need to be sized for potential future heat loads from the outset. The LDA and boroughs are working to assemble and pledge both existing and future public sector anchor heat loads to deliver the certainty required by private sector investment.

Diversity of energy demand (mix)

Decentralised energy schemes that connect consumers with different heat demand profiles have the advantage of levelling out energy demand peaks and troughs consistently allowing optimum CHP sizing and operation at high load factors.

Electricity prices

The current inability of larger CHP schemes to sell electricity at retail (or at least "better than wholesale") prices represents a major barrier to the development of medium sized decentralised energy projects. The standard conditions in electricity supply licences have recently been changed to allow smaller electricity suppliers (typically operators of decentralised energy systems) to sell electricity into the retail market without the constraint of only being able to do so within small private wire systems, and without the need to manage the costs, risks and complexities of fully licensed status (a large burden on smaller suppliers). These arrangements will become fully implemented in 2010 and have the potential to improve the returns decentralised energy providers obtain for electricity exports.

Sizing the opportunity

Decentralised energy schemes typically fall into one of the three types.

Type 1 – single site schemes

These schemes have little or no district heating network. Energy production is based on small or medium CHP units, typically gas-fired engines, with or without biomass boilers according to planning requirements. Based within a building's plant room, these units would supply a single consumer type, or a small amount of mixed use. This type of scheme would serve up to around 3,000 residential units, or the equivalent load. The CHP electricity generating capacity would be in the range of 0.3 to 3 MWe, in addition to an equivalent quantity of heat. The commercial viability of these schemes would be underpinned by minimal district heating infrastructure and the ability to offset the import of retail electricity. Construction costs for single site schemes would typically be up to £10 million. Commercially viable schemes could have a payback period of around five years.

In the past these schemes have primarily been developed by the public sector, but are increasingly being incorporated in planning applications for major development. A forthcoming study based on a sample of planning applications referred to the Mayor since 2007 found that more than 100 CHP installations have been approved. For existing buildings, development would typically be undertaken by owner occupiers where viable economics allow.

Type 1 Single site schemes

Type 2 – multi-site, mixed use schemes

These schemes are significantly larger than single-site schemes and serve more than one site and user type. The energy production plant is based in a dedicated energy centre. The scheme would serve 3,000 to 20,000 residential units or equivalent load, along with a range of commercial, private and public sector consumers. Electricity generating capacity would be between 3MWe and 40MWe based on a range of CHP technologies utilising fuels including gas, biomass and waste.

Multi-site mixed use schemes could evolve through the connection of a number of existing single-site schemes, as this would typically improve the economics for each participating scheme. The timing for the connection of single-site schemes would be partly driven by the need to replace equipment.

The economics of Type 2 projects would benefit from the operational and generation efficiencies associated with the scale and diversity of demand as well as lower cost fuels. The business case would be significantly improved with the ability to sell electricity at retail prices. Construction costs for Type 2 schemes could be up to £100 million, and commercially viable schemes could have pay back periods of six to ten years.

Projects in this type – Southwark MUSCo (multi-utility services company) and the Olympic Site - have been initiated by boroughs and the GLA, and are centred on large scale regeneration schemes.

Other examples of type 2 schemes are the Kings Cross Central project currently under construction and the recently announced linking of the Pimlico District Heating Undertaking (PDHU) with the Whitehall schemes following a grant award of £1.75m from DECC.

Type 2 Multi-site, mixed-use schemes

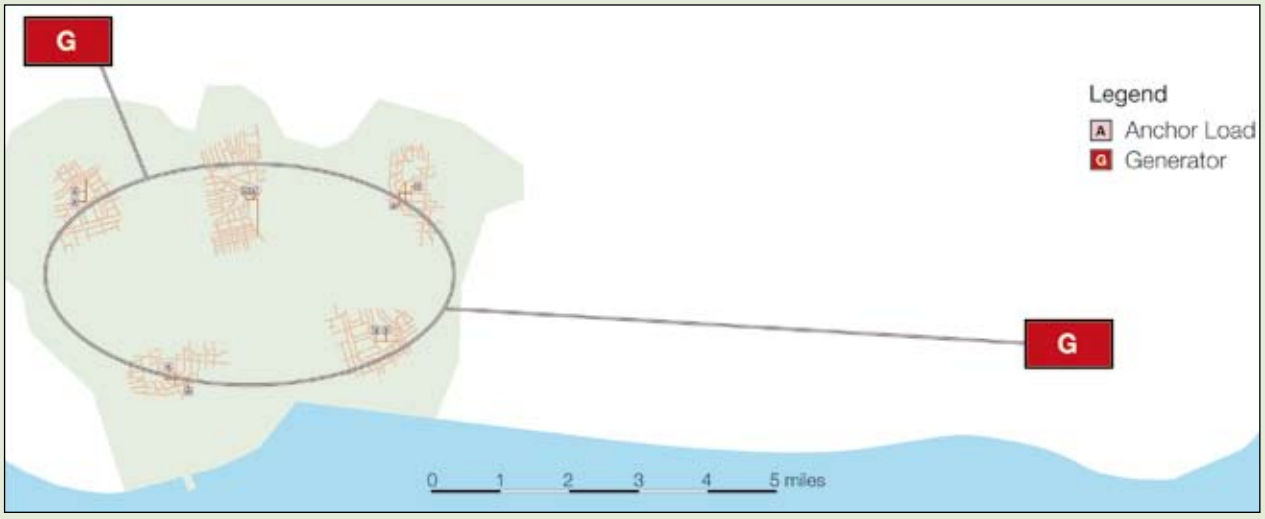
Type 3 – area-wide heat transmission projects

These schemes can be categorised as a 40-year-plus technical life and would consist of extensive heat pipe networks connecting multiple heat producers such as power stations, industrial waste heat or energy from waste facilities. These schemes may serve 100,000 plus units and a large range of mixed public and private commercial facilities.

The opportunities for area wide schemes are limited given the initial requirement for the presence of large-scale heat producers that can be feasibly connected. However, in London there are a number of existing facilities that are currently producing sufficient low-cost, low-carbon heat to act as suppliers for wider, interconnected schemes. Over time, large-scale networks could develop by the interconnection of general multi-site schemes and the consolidation of energy production into fewer larger, more efficient plants.

Capital costs for the pipe network and associated plant could exceed £100 million with paybacks in excess of ten to 15 years but with the potential for steady cash flow and utility type yields. Investment opportunities would be closely related to the source of funding, the construction, ownership and operation of infrastructure and generation assets, as well as the opportunities to provide retail services.

These systems represent strategic infrastructure and could take five to ten years to deliver, but could provide significant carbon reductions at low heat prices by connecting excess and low carbon heat sources to heat loads.



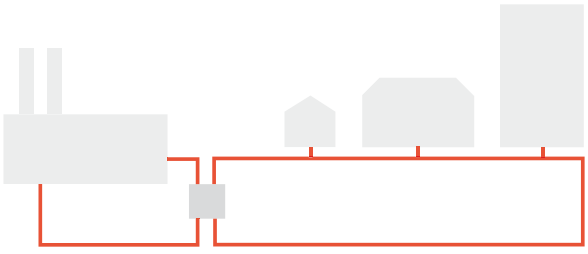
Type 3 Area-wide heat transmission prospects

The following decentralised energy projects are examples of the types of schemes that are likely to come forward in the future.

Type 1 – Cranston Estate regeneration

The Cranston project will connect over 500 residential units to a decentralised energy network consisting of approximately 1km of heat network piping and a natural gas CHP engine. The residential units are split over three estates within Shoreditch: Cranston, Wenlock and Thaxted.

At present, funding for the £6.5 million project is expected from London Borough of Hackney and, potentially, the Community Energy Saving Programme (CESP). The LDA has carried out the pre-feasibility work and continues to support the project's development. This scheme offers significant carbon reductions, not least as a gas-fired CHP engine will replace ageing oil fired boilers located at Wenlock and Thaxted. Once complete, the project will eliminate over 1,200 tonnes of CO_2 emissions a year.



The Network is essentially a series of pipes connecting a variety of low carbon heat sources to homes and businesses.

Type 2 – The Southwark Multi-Utility Services Company (MUSCo)

The Southwark MUSCo decentralised energy scheme is positioned to deliver electricity, heat, hot water, water and communications infrastructure for 9,700 residential units and 38,000m^2 of commercial space including two major urban regeneration sites: the Elephant and Castle and Aylesbury.

The London Borough of Southwark has selected a consortium led by Dalkia to deliver a decentralised network of power, heating, cooling, water and fibre optic communications infrastructure. The electricity, heat, cooling and hot water services will be generated through tri-generation. The scheme will be privately financed by the consortium, which will also be responsible for design, build and operation. Southwark will provide land for the energy centres and will be repaid through a contractual arrangement.

The economics for this project and the ability to privately finance it are driven by the scheme's capacity to guarantee and generate early heat revenues by connecting to existing loads and ensuring early development is fit for connection, as well as to sell electricity to the grid. The project is currently in development; the first early developments ready for connection are due to complete in 2011.

Type 3 – London Thames Gateway Heat Network (LTGHN)

The LTGHN is led by the LDA and Communities and Local Government (CLG) to develop a low-carbon district heating network in Europe's largest regeneration area. The £150 million project will initially create over 200 jobs in construction, 50 permanent jobs and will serve the equivalent of 120,000 homes and other properties, delivering savings of up to 100,000 tonnes of CO_2 per year for 40 years. The system will incorporate heat from a number of sources, including low cost heat from Barking Power Station and heat generated by Tate & Lyle. Heat will be distributed via an extensive distribution main up to 67km long. The project's delivery is expected over a three phase period from 2010 to 2019.

The project will be structured such that a number of existing private heat producers sell heat to a transmission company, which in turn will sell heat to one or more established organisations responsible for selling on to customers. The transmission company will be a Special Purpose Vehicle (SPV) responsible for financing, construction and operation of the heat network. Financing is expected to be through a combination of public sector funding (£60 million) and private investment (£90 million). As the revenue risk reduces to an acceptable level to the private sector, public sector funding will be replaced by a mix of commercial equity and debt.

The evolution of decentralised energy in London

Over time these scheme types will become increasingly integrated and will benefit from improved operational resilience and technical efficiencies. Longer-term connection to large transmission mains - a possible backbone for decentralised energy within London - will deliver further efficiencies. The LDA is establishing common technical standards and a manual for district heating to accelerate this.

Delivering the opportunity

Likely commercial structures are illustrated in the figure opposite with project examples.

Projects with relatively assured revenue streams may be best structured through a commercial vehicle responsible for the design, build, operation and finance of the infrastructure, its generation assets and its sales of energy to customers (for example, as an Energy Services Company [ESCo]). Schemes with less revenue certainty and relatively large capital costs are likely to be structured as a separate vehicle, responsible for the design, build, finance and operation of the infrastructure. In both cases vehicles are likely to be financed through commercial debt leveraged through a combination of public and/or private sector funding where available. Revenues will come from a combination of a distribution tariff, heat sales and connection fees.

Legal entities

A number of different legal entities can be used including limited companies, companies limited by guarantee and Community Interest

Companies (CICs). A given project may use more than one of these entities to cover the generation-transmission-distribution chain.

For example, a limited company might be appropriate for the most commercially viable elements of the project, offering a high degree of flexibility in the scope of its activities and the transfer of interests (changes of shareholders or transfer of assets). It might also be a suitable vehicle for bridging the public sector investments which are then sold on, the proceeds being "churned" into new ventures. However, some public sector entities may have legal constraints limiting the shareholding they could take in such vehicles.

Conversely, a company limited by guarantee is often used in "not for profit" scenarios to limit the liability of participants. Members do not need to make an upfront financial contribution by subscribing for shares, although the company will consequently have less working capital. The role for these companies may therefore be limited for asset based entities.

A CIC is a company set up for community benefit purposes. While it may be an easier vehicle for certain public sector entities to use, it also has restrictions on its activities and its ability to dispose of its assets. As a result a CIC may not be the best choice for the most commercial elements in the chain, nor elements where there is a transfer of assets from public to private sector, but it could have a useful role across distribution or retail elements, where a community benefit is delivered.

The following diagram illustrates how real projects are being structured. There are different structuring possibilities for each scheme type and the appropriate structure would be determined by the requirements of participating parties.

Definitions

Energy services company (ESCo) is a single entity responsible for generation, infrastructure and selling energy to the customer.

Generation company (GenCo) provides generation assets and sells electricity and heat; it is likely to be a commercial entity that remains at arm's length from the decentralised energy infrastructure.

Transmission company (TransCo) owns transmission assets connecting local pipework.

Distribution company (DisCo) - owns and operates local pipework, with the ability to take energy from the GenCo and sell on to customers (in the absence of a HeatCo). A TransCo and DisCo may also be a single entity.

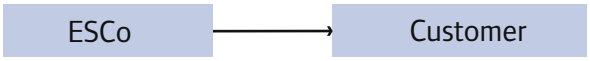
Heat company (HeatCo) - buys heat (and possibly other services) and sells to customers. These might be public sector organisations acting as a front for customers or commercial billing organisations.

Customers - purchasers of heat (and possibly other services).

Project structure examples

Type 1 and 2 Projects

Southwark MUSCo

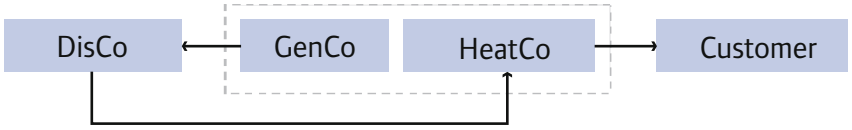


Single entity responsible for generation, infrastructure and selling energy to customer

South East London combined heat and power

Single entity responsible for generation, infrastructure and selling energy to HeatCo who in turns sells to customer

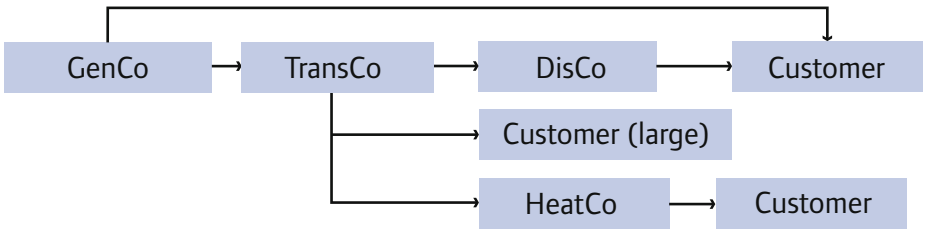
King's Cross Central Development



Two separate vehicles; one vehicle responsible for generating and selling energy and the other responsible for the infrastructure

Type 3 Projects

London Thames Gateway Heat Network



Separate vehicles for generation and transmission with various supply arrangements

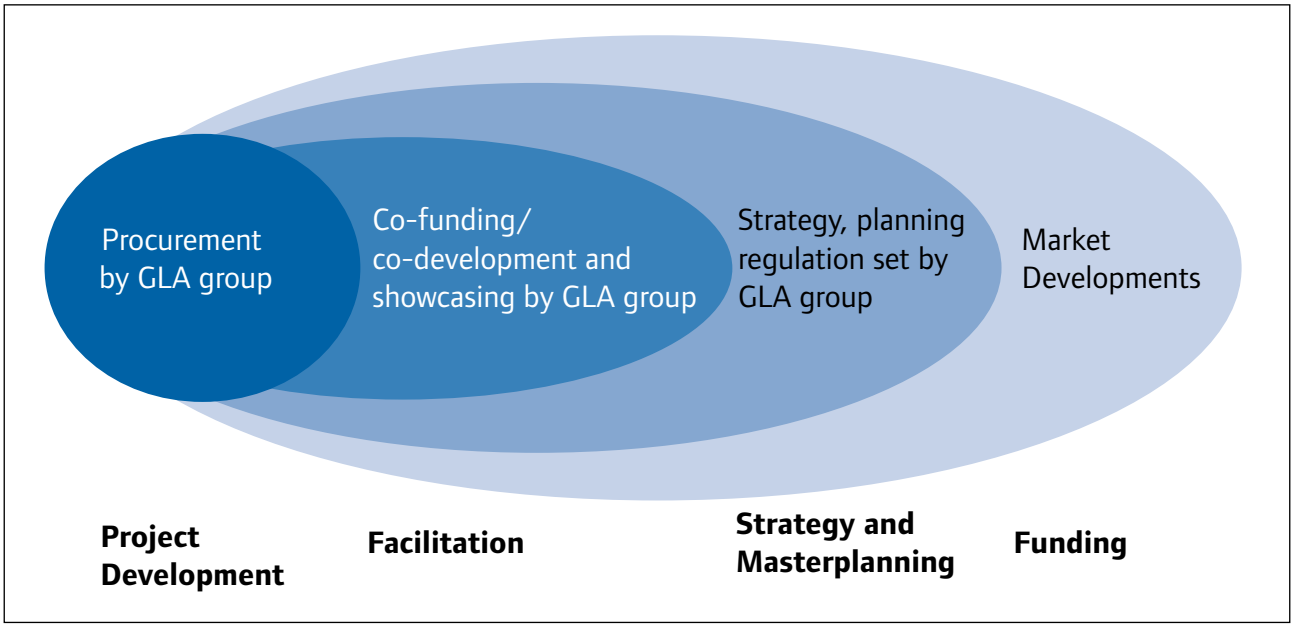
3 Why is decentralised energy happening now, what is changing in the market?

The public sector is willing to invest capital at risk, taking a long term view to help leverage private sector investment. Public funds will target projects which, as a result of underlying levels of risk (including revenue, technical and construction), are unable to attract conventional commercial financing. When the level of risk and revenues become sufficient to secure private sector investment, public sector funding will be withdrawn and re-invested in other projects. As a co-investor, the public sector will work with project partners to resolve risks presented by planning, permitting and licensing.

The LDA is investing up to £16 million to identify, develop and support a number of decentralised energy projects and a further £64 million is expected to be available through the JESSICA fund. Commercial opportunities are being identified and assessed by the LDA in partnership with boroughs, to be procured for delivery by the private sector. Where possible, public sector buildings and facilities will provide long term anchor heat loads, and public sector land will continue to be provided for energy centres.

The LDA is establishing a 'Decentralised Energy Centre of Excellence' providing knowledge and support to boroughs, developing consistent technical and commercial expertise and standards through its Decentralised Energy Delivery team. It has brought together a body of European CHP and district heating experts to develop these technical standards, and is expected to publish initial conclusions in October 2010.

The role of the public sector supporting and de-risking projects is further outlined in the list of potential projects at the end of this prospectus.



1 Project development

The LDA is leading and funding the development of a number of key strategic projects, which will help catalyse and demonstrate the decentralised energy market. These projects include:

- The London Thames Gateway Heat Network (LTGHN)
- Extension of the Olympic Park's Energy Centre heat network to the Stratford High Street area (co-funded with London Thames Gateway Development Corporation)
- Interconnecting and expanding the Pimlico District Heating Undertaking with the Whitehall CHP district heating scheme (co-funded with DECC).
- Euston Road District Heating

Technical and commercial assessments are being undertaken, and robust investment cases are being developed alongside LDA exit strategies. In parallel, soft market testing, lobbying and stakeholder engagement is underway. The LDA will use its own and other funding sources to secure private sector investment in these strategic projects.

2 Facilitation

The LDA will broker the development of speculative projects between private and private/public sector organisations. Its work with the South Bank Employers' Group (SBEG), for example, seeks to understand the current and projected energy consumption of buildings and users on the South Bank, and to explore the opportunities of CHP district heating. The project is intended to encourage proactive low carbon energy supply efficiency throughout the South Bank quarter in cooperation with business.

3 Energy masterplanning

Capital Ambition and the LDA are working together, with London Councils, the GLA and the London Energy Partnership, to offer a comprehensive support package to boroughs to promote the delivery of decentralised energy. Through the LDA's Energy Masterplan Programme (EMP), boroughs will be able to identify and, ideally, bring forward projects of sufficient scale and commercial structure to attract private sector investment and involvement.

The programme aims to build the expertise within the boroughs to ensure that they are:

- aware of key decentralised energy opportunities within their borough
- equipped to bring forward and promote those opportunities and specific decentralised energy projects
- able to address decentralised energy in key policy and planning documents in a consistent manner across London.

Central to the programme is the development of a London Heat Map to help identify decentralised energy opportunities to boroughs, generation companies and developers. It will be web based, fully interactive in GIS format, and comprising data sets that can be continually supplemented. The portal can be found at **www.londonheatmap.org.uk**

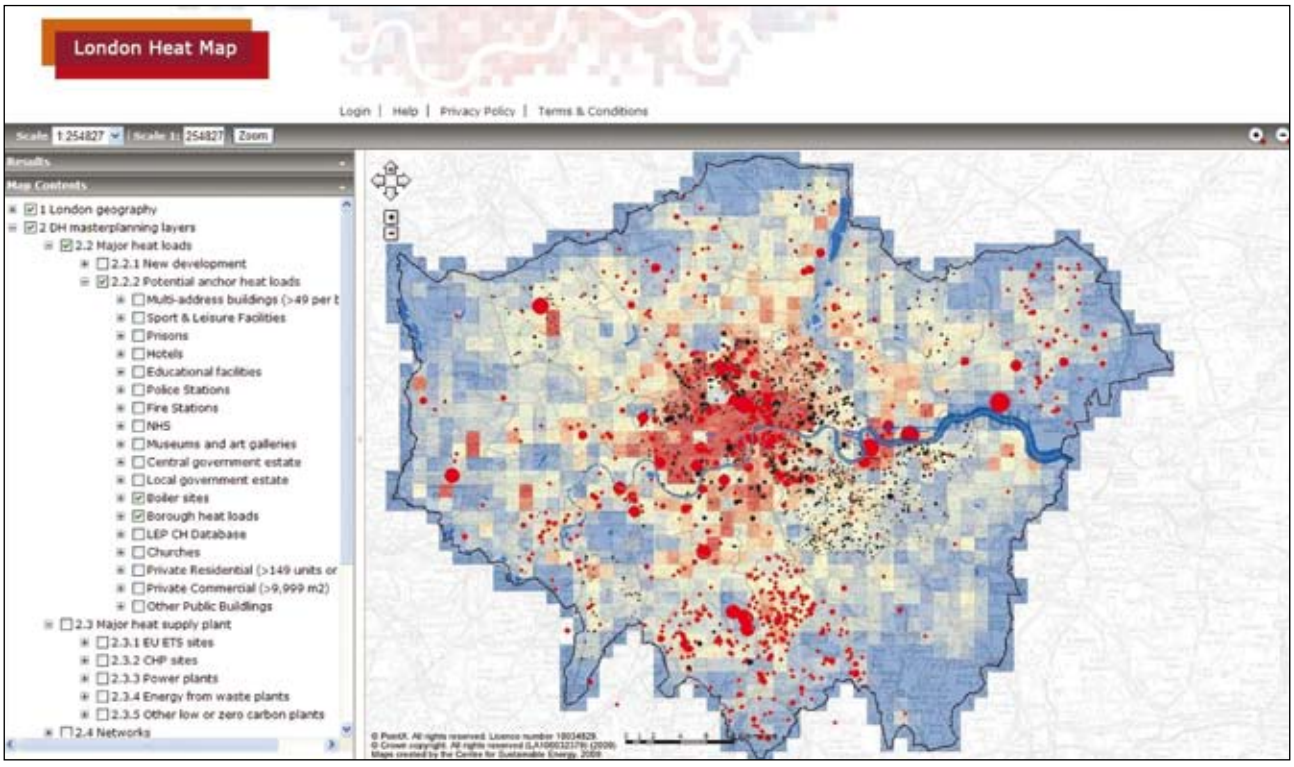
The information presented in the heat map is designed to spur boroughs to undertake feasibility studies in areas of high heat demand where opportunities for the private sector to design, build, operate and finance heat networks may exist or be created.

Opportunity Area energy strategies

In parallel, and over the next three and a half years, the LDA, in conjunction with the GLA Planning and Energy teams, will develop energy strategies for each of the 28 Opportunity Areas (OA) identified in the London Plan.

OAs are identified as capable of accommodating significant commercial and residential development and catalysing regeneration, and as such are areas of strategic importance. Masterplans are currently being developed for the Vauxhall/Nine Elms/ Battersea, Upper Lee Valley and White City Opportunity Area Planning Frameworks (OAPFs). The LDA is also working with the Thames Gateway Development Corporation to develop an energy strategy for the Lower Lea Valley.

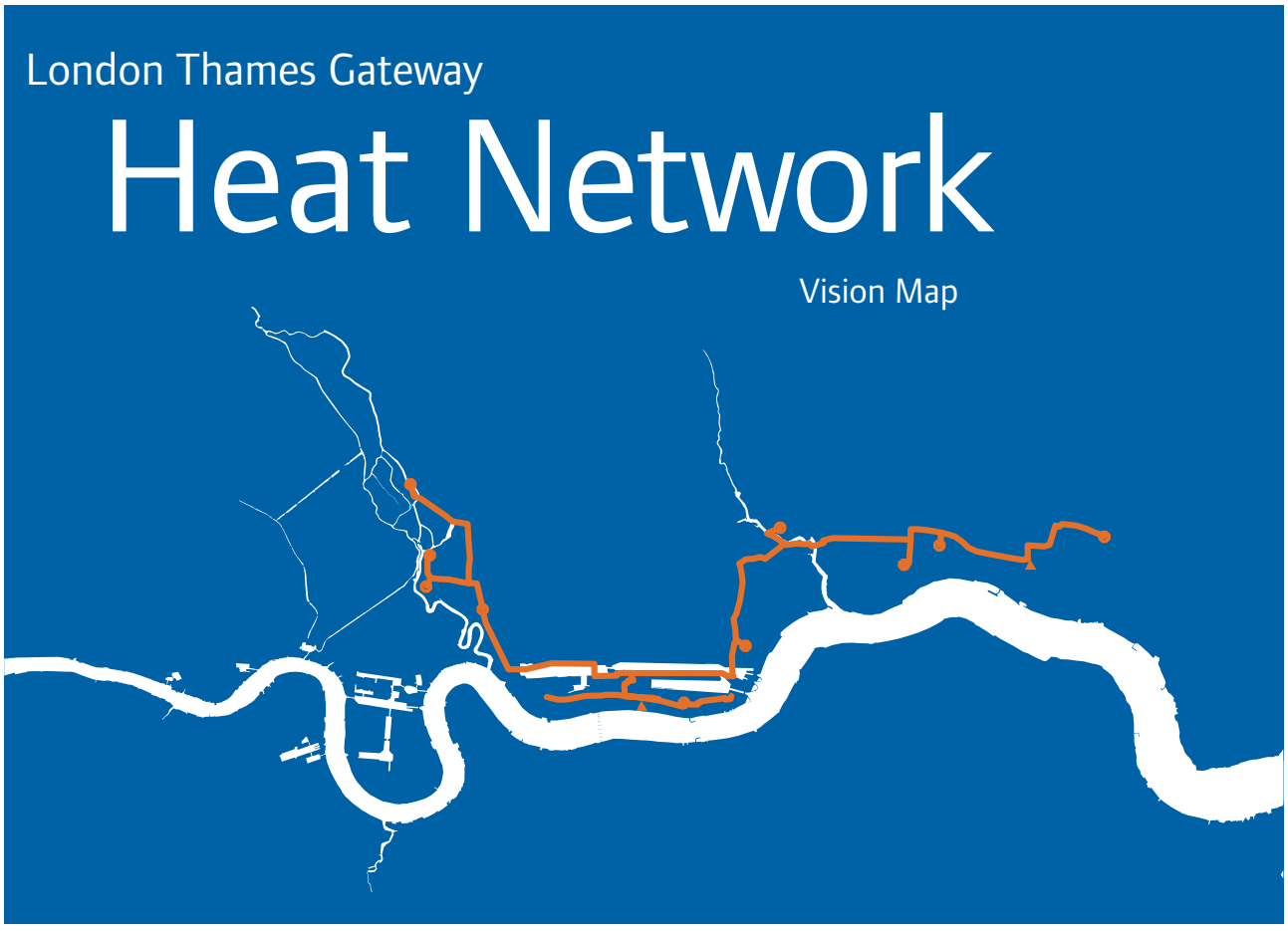
The London Heat Map



The London Heat Map: the following diagram is an actual screen shot from the London Heat Map website at www.londonheatmap.org.uk

Policy change

The changes envisaged for east London as a result of the development of the London Thames Gateway Heat Network will require a supportive policy framework. Local Development Orders (LDOs) create a simplified and streamlined route for new development by allowing boroughs to "pre-grant" planning permission for development on a defined site or for a defined type or class. The LDA is working with boroughs to prepare an LDO that will grant local permitted development rights for decentralised energy networks in east London.



4 Funding

Public sector funding is being applied both to initiate and de-risk projects through the following initiatives.

The London Green Fund

The London Green Fund is a revolving fund that will make investments in initiatives, including decentralised energy, that tackle climate change. The fund structure is expected to allow the creation of commercial templates, spurring markets in new financial asset classes, once the cash flows from investments begin to stabilise. It will do so by investing equity in projects at an early stage of their development, making financing more viable and cost effective.

The fund will take a long term and realistic view on both the scale and timing of financial returns on investment than would normally be taken by markets in the current credit environment. Once projects under a specific initiative have demonstrated a track record and return, the fund will be able to sell down its original investments in part or in full, releasing equity back into the London Green Fund.

Initial seed funding of £4 million from the LDA and GLA will be supplemented by the private sector as the fund becomes more established. The aim is to create a fund size of over £100 million with investment from central government, development banks, sovereign and infrastructure funds. It will be managed by a reputable external fund manager to introduce the required discipline, allowing projects to be fully analysed as to financial and environmental impact prior to commencement. At the same time, it will allow the LDA and the GLA to determine and set the high level objectives for the fund and each initiative, whilst retaining focus on delivery.

JESSICA Fund

The Joint European Support for Sustainable Investment in City Areas (JESSICA) is an initiative led by the European Commission and European Investment Bank (EIB) which gives Member States the option of using some of their EU grant funding to make repayable investments in projects to regenerate urban areas, creating a revolving investment fund.

The £100 million JESSICA Holding Fund will be launched this year, made up of £50 million from the European Regional Development Fund (ERDF) and £50 million match funding. Two 'Urban Development Funds' (UDFs) will then be procured and launched next year - allocating £64 million to decentralised energy and £36 million to waste infrastructure improvements, and inviting potential projects to bid for funds. Funds will be invested in projects in the form of equity, loan or guarantee, and returns arising from successful investments will be returned to the fund.

For more information go to the EIB: **www.eib.org/products/technical_assistance/jessica**

5 Next steps

Policy continues to devlop in support of decentralised energy, and co-ordinated public work is underway to unlock commercial opportunities for private sector involvement in the delivery of decentralised energy schemes. With the LDA's support, boroughs, investors and property owners will be able to help shape decentralised energy opportunities and early entrants will have the most influence and gain the most benefits.

The London Heat Map web portal will provide increasingly detailed information that will help identify decentralised energy opportunities and inform decision-makers. Organisations will be able to upload their information via the London Heat Map web portal and the LDA's energy masterplanning and decentralised energy teams will help co-ordinate data where nearby heat loads give rise to potential projects.

Across London, decentralised energy schemes are being planned and constructed. The project pipeline listed in the following pages describes real London schemes, the challenges they present and the actions required to ensure their delivery.

Successful rollout of these projects will begin to create the backbone of a pan-London district heating network and access to a heat market for all sizes of decentralised energy schemes. The LDA will publish a London District Heating Manual during 2010 that will provide guidance on the standards that can be adopted to future-proof schemes for interconnection.

Contacts

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London Heat Map

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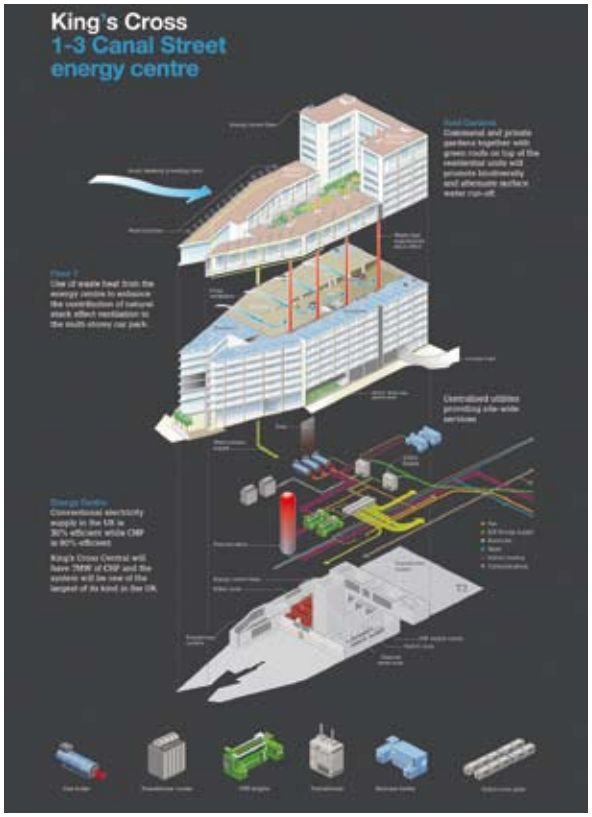


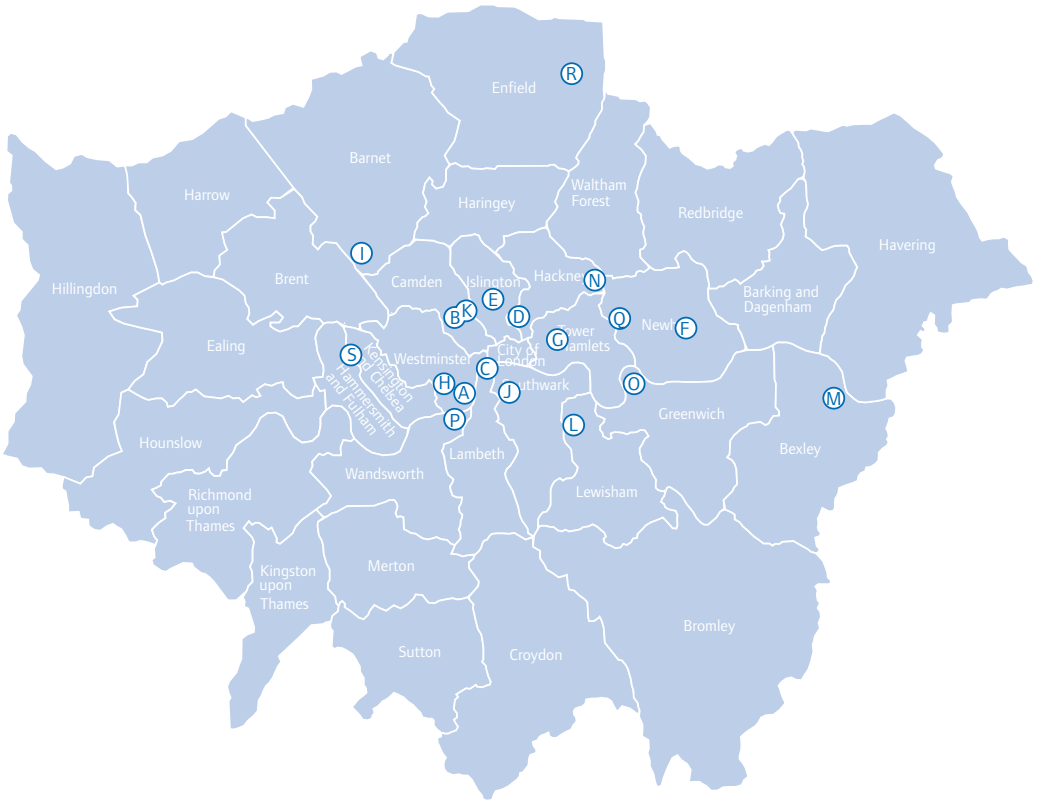
6 Pipeline of potential projects

While the following scheme list is not exhaustive, it has been produced to illustrate the scale, the commercial structures and the role of the public sector in unlocking current opportunities. Where appropriate project aspirations are noted.

Analysis by the London South Bank University on energy assessments accompanying planning referrals to the Mayor indicates there are approximately 100 decentralised energy projects currently in development. Schemes are a mix of Type 1 and Type 2 projects.

For more information on existing projects please refer to the Energy Masterplanning Programme web portal at **www.londonheatmap.org.uk**

Locations of decentralised energy schemes



A - Whitehall and Pimlico
B - Euston Road District Healing Scheme
C - South Bank Employer Group
D - Cranston Estate Retrofit
E - Islington District Heating Schemes
F - London Thames Gateway Heat Network
G - Leopold Estate Regeneration
H - Victoria Transport Interchange (VTI) Scheme Land Securities
I - Brent Cross and Cricklewood, Hammerson and Brookfield Europe
J - Southwark MUSCo
K - King's Cross Central
L - South East London Combined Heat and Power (SELCHP)
M - Riverside Resouce Recovery Limited (RRRL)
N - Olympic Fringe
O - Greenwich Peninsula
P - Vauxhall/Nine Elms/Battersea OAPF
Q - Lower Lee Valley DE
R - Upper Lee Valley OAPF
S - White City OAPF

Scheme	Description
Whitehall and Pimlico	The existing Whitehall and Pimlico (PDHU) district heating schemes are to be connected by a 1.8km interconnecting pipe, delivering improved operational efficiencies and connecting central Government buildings. The interconnector will be built with the capacity to connect other Government departments, and other public and private buildings in the future. Total capital costs for the interconnector are estimated at £3.5 million. DECC will contribute £1.75 million from a government estate energy efficiency exemplar grant. The LDA will be the project manager and is looking to fund the balance of the costs. The scheme will be designed and procured during the current financial year with construction due in 2010/11. The LDA is working with Westminster City Council (owner of PDHU) to establish the procurement, operating and ownership strategies around the new interconnector. This project will create the opportunity for new customers to connect to this low carbon heat supply infrastructure. The Whitehall and Pimlico scheme is looking for: • additional customers that could be connected to the combined scheme.
Euston Road District Heating Scheme	The LDA is leading a stakeholder group responsible for developing and procuring a 2-3MWe CHP scheme serving existing Camden Council estates, nearby public buildings and a number of other commercial buildings, with the potential to connect to the proposed King's Cross scheme and expand along Euston Road. A capital shortfall has been identified, which the LDA will consider meeting. The development is planned for construction start within the next few years and represents an opportunity for private sector investment. Euston Road Scheme is looking for: • private sector partners to build, operate and manage the scheme • additional nearby buildings and sites to join the scheme.

Scheme	Description
South Bank Employers' Group (SBEG)	The LDA is working with SBEG to develop an understanding of current and projected energy consumption patterns in the area and explore opportunities for decentralised energy systems including district heating, CHP and biomass. SBEG will develop a detailed study on delivery options for an area wide scheme with procurement scheduled for 2010/11. Development costs are being jointly met by the relevant stakeholders and the LDA. The private sector will be invited to bid for the supply of a decentralised energy project. The South Bank Employer Group is looking for: • consultants to undertake a detailed feasibility study (to be procured shortly) • additional customers that could be included within the scheme • investment partners.
Cranston Estate Retrofit	The LDA is supporting the London Borough of Hackney (with, in addition, possible capital funding) with the development of a Shoreditch district heating scheme. The Homes and Communities Agency will provide £500,000 of capital. The project is seeking £1 million of gap funding from other sources. Part of the project will be delivered as part of Hackney's Decent Homes Programme over the coming year. The Cranston Estate Retrofit scheme is looking for: • gap funding to support construction of initial infrastructure • development partners that can provide the required expertise, infrastructure and management • additional customers that could be included within the scheme.
Islington District Heating Schemes	The London Borough of Islington is developing two specific district heating schemes that will be comprised of housing and leisure stock. There is a possibility that these schemes could connect to existing networks. The LDA is providing technical and procurement support to Islington as well as initial match funding to cover development costs. Capital for one of the schemes is to be funded through the Mayor's Innovation and Opportunity Fund. Islington District Heating Scheme is looking for: • advice on potential commercial structures • possible generation partners.

Scheme	Description
London Thames Gateway Heat Network (LTGHN)	LDA initiative and development of the largest municipal heat network in the UK serving up to 120,000 homes in the Thames Gateway by connecting existing and future sources of affordable low carbon heat to consumers throughout the London Thames Gateway. Connection to the network will provide developers an opportunity to meet the Mayor's planning requirements and offer a cost effective solution to decarbonise existing developments. The LDA is preparing for delivery through the appointment of engineering, commercial, planning and environmental consultants who will progress the project to financial close. Initially public sector funded, there is the opportunity for private sector investment. The LDA is looking for: • funding partners to support initial construction costs • development partners that can provide the required expertise, infrastructure and management • additional customers that could be included within the scheme.
Leopold Estate Regeneration, Mile End	Poplar Harca, a Registered Social Landlord, will be redeveloping a significant part of its residential estate. Poplar Harca has assessed the feasibility of delivering decentralised energy and has considered possible solutions ranging from installing decentralised energy in only new build sites to including additional nearby heat loads, such as an existing school and a new primary health care unit. Poplar Harca tendered for construction, management and operation of a biomass decentralised energy system and a number of possible consortia members responded. The tendering process has highlighted a short-fall between the costs of construction and future revenues. Leopold Estate is looking for: • funding to improve the viability of the overall scheme • additional significant heat loads that could be connected and reduce per unit costs.

Scheme	Description
Victoria Transport Interchange (VTI) Scheme - Land Securities	Proposals for Land Securities' redevelopment of the area adjacent to the Victoria Underground Station includes the delivery of a decentralised energy system that would provide electricity, heat and cooling for over one million square feet of mixed-use space. The proposal is for a gas fired CHP system within a central energy centre with the potential to introduce new energy generating technologies such as fuel cells when they become commercially viable. Commercial development is planned to begin construction in 2012 following London Underground's redevelopment of the tube station. There is potential scope to link the Victoria scheme energy centre via a 1.5km transmission line to the Whitehall/Pimlico scheme to allow waste heat to be exported, extending the operational efficiency of the CHP scheme and providing added resilience to the wider area network. Victoria Transport Interchange Scheme is looking for: • possible funding support for the 1.5km connection infrastructure • additional customers situated nearby or along the proposed connection route to join the scheme • green policy initiatives to ensure that decentralised energy is promoted alongside purely renewable energy projects.
Brent Cross and Cricklewood – Hammerson and Brookfield Europe	The Brent Cross and Cricklewood CHP scheme is directly linked to the redevelopment of one of the London Plan Opportunity Areas involving a 300 acre development delivering 7,500 homes and 27,000 jobs over an expected 20 year development horizon. The development scheme also aims to turn the Brent Cross shopping centre "inside out" and create a new high street that integrates with the successful existing centre. The overall development concept will deliver at least 60 per cent carbon savings below current building regulations, principally through the delivery of a major waste treatment plant and scheme-wide CHP infrastructure on site. The CHP infrastructure will deliver approximately 16 MWe, which together with the heat product is sufficient to power and heat the complete proposed development through a district heating system. The proposals have been worked up in conjunction with the London Borough of Barnet and the GLA and are in line with both strategic and local planning policy.

Scheme	Description
Southwark MUSCo	The Southwark MUSCo decentralised energy scheme is positioned to deliver electricity, heat and hot water services for 9,700 residential units and 38,000m^2 of commercial space including two major urban regeneration sites: the Elephant & Castle and Aylesbury. The services will be delivered through a CHP facility. The London Borough of Southwark (LBS) has selected a consortium led by Dalkia Plc to design, build, finance and operate the scheme. LBS will provide the land for the energy centres and its land contribution will be repaid through a commercial arrangement with the MUSCo consortium. Key parties in the scheme have been identified and are already on board. Southwark MUSCo is looking for: • green policy initiatives that will incentivise the expansion of already constructed DE networks • change in electricity licensing to allow smaller generators to fully capitalise on generation.
King's Cross Central	As part of Argent's re-development of King's Cross Central (KXC) with London and Continental Railways, and DHL, a decentralised energy system will be delivered powered principally by gas CHP and boilers, but also incorporating biomass and a fuel cell. It will serve the newly developed site and also has the potential to connect with other nearby users. An ESCo has been created to construct the heat generation unit and interface with customers, with a second company owning and operating the heat distribution network. The development consortium will be funding the initial costs and this investment will be repaid as new users are connected and through electricity and heat sales. King's Cross Central is looking for: • nearby developments that could potentially link into the system • green policy initiatives that would favour CHP schemes alongside renewable energy projects.

Scheme	Description
South East London Combined Heat & Power (SELCHP)	The existing South East London Combined Heat and Power (SELCHP) waste energy recovery plant is considering an operational change to re-align the electricity-only production plant into a true CHP, decentralised energy, facility. Veolia, a partial owner of SELCHP, sees the future potential in expansion into the decentralised energy market and aims to increase the overall efficiency of the existing facility through the creation of the decentralised energy network. The proposed scheme will involve the construction of a 2km transmission pipe from the existing Lewisham-based plant to supply heat to a nearby housing estate. The expected heat output will be large enough to expand decentralised energy into other nearby sites or those positioned along the transmission route. Partnership with the boroughs is expected to reduce delivery risks and once the scheme has been approved it could be up and running within 18 months. The overall scheme is expected to be profitable but at a lesser rate than other possible energy ventures, thus there is some degree of market failure that must be overcome. Project profitability is dependent upon at least partial financial support for the initial transmission pipe. The precise electricity and heat outputs will be based upon the most financially advantageous mix. The scheme is being actively de-risked through co-operation with partnering boroughs, the provision of assured demand and Veolia's vast experience in the international decentralised energy market. SELCHP is looking for: • opportunities to expand the scheme into other existing or new developments along the proposed transmission pipe route • financial support to enable construction of the initial transmission pipe • an honest broker that can help to ensure smooth communication with the public sector at all levels • land for back-up energy facilities (small-scale energy centres) • green energy financial incentives that include decentralised energy schemes as well those that are based on strict renewable targets.

Scheme	Description
Riverside Resource Recovery Limited (RRRL)	Cory Environmental is currently constructing a waste to energy facility with a decentralised energy ready turbine. The facility is located in Belvedere, Bexley and should be fully operational in Spring of 2011. In order to utilise the heat generated, Cory would need to construct an enabling/pumping station to transfer the heat into a decentralised energy system. RRRL has the potential to deliver between 30 and 60 MW of heat depending upon local demand requirements and optimal balancing of the electricity to heat ratio. Cory has undertaken extensive surveys of local heat demand and more local demand needs to be established before a viable scheme is ready. However, should a larger scheme be developed within the area then it would make commercial sense to connect to the system. Additionally, the RRRL facility is located in an area that could eventually benefit from the London Thames Gateway Heat Network proposition. RRRL is looking for: • local heat customers • creation of a larger-scale local network that could connect to the RRRL plant • connection to the London Thames Gateway Heat Network • financial support for constructing the heat pumping station or construction of a local transmission network.
Olympic Fringe	Extension of the Olympic Park runs from the Park boundary to Stratford High Street, with a potential low carbon heat supply capacity of 20MWth. 3 MWth is reserved for a new development and 17 MWth will be available for new customers in the area. The LDA has funded the initial feasibility study in conjunction with the London Thames Gateway Development Corporation. The LDA is seeking internal approval to provide capital support for the project. The Olympic Fringe scheme is looking for: • additional customers in the Stratford High Street area that could be connected.
Greenwich Peninsula	The Homes and Communities Agency (HCA) together with the London Borough of Greenwich have successfully attracted funding of £7.8 million to progress a decentralised energy scheme delivering low carbon energy at Greenwich Peninsula. Further funding opportunities are currently being explored with the LDA. The infrastructure would have the potential to supply power and heat to 13,000 homes and significant business users together with the further potential to connect to the proposed London Thames Gateway Heat Network. Together with Greenwich Peninsula Regeneration Ltd, they are exploring practical solutions to facilitate delivery.

Scheme	Description
Vauxhall/Nine Elms/ Battersea Opportunity Area Planning Framework (OAPF)	The Vauxhall, Nine Elms, Battersea Opportunity Area (OA) Energy Masterplan (EMP), developed by the LDA, has determined that the proposed developments will be sufficiently dense and diverse to support a low carbon decentralised energy network. The scheme could initially supply heat to developments in the heart of Nine Elms, the Battersea Power Station (BPS) and the New Covent Garden Market (NCGM), with the potential to expand northwards to the Albert Embankment and west to existing industrial sites. If delivered, this CHP scheme alone could save approximately 18,000 tonnes CO_2 per annum. Electricity and heat could be derived from a mix of low/zero carbon sources, natural gas and renewable biogas and a biomass hot water boiler. Vauxhall/Nine Elms/Battersea OAPF is examining the opportunities for: • developments within the OA to work together with the LDA to develop a viable CHP scheme • developments within the area to show interest in either being a delivery agent or customer for decentralised energy • interested generation companies.
Lower Lea Valley Decentralised Energy Strategy	The LDA is developing an Energy Masterplan (EMP) to assess heat demand and the potential to deliver decentralised energy within the Lower Lea Valley. One option under consideration is the potential to link to the larger-scale Thames Gateway Heat Network. The areas being considered within this strategy include the Lea Valley south of the Olympic Park inclusive of Canning Town, Poplar and Leamouth. The Lower Lea Valley decentralised energy scheme is examining the opportunities for: • developments within the OA to work together with the LDA to develop a viable CHP scheme • developments within the area to show interest in either being a delivery agent or customer for decentralised energy • interested generation companies • links between the upper and lower Lea Valley areas.

Scheme	Description
Upper Lea Valley OAPF	The LDA is developing an Energy Masterplan (EMP) to assess heat demand and the potential to deliver decentralised energy within the Upper Lea Valley Opportunity Area (OA). The OA extends from Hackney Marshes and follows the line of the River Lea north east to the M25. The emerging energy strategy suggests that a core district heating scheme could evolve supplying both heat and hot water. A variety of generation options are being considered, including the use of waste heat from the existing Edmonton incinerator and Enfield Power Station. The LDA is planning and developing the details of the scheme and assessing its overall feasibility and costs. The Upper Lea Valley Scheme is examining opportunities for: • developments within the OA to work together with the LDA to develop a viable CHP scheme • developments within the area to show interest in either being a delivery agent or customer for decentralised energy • interested generation companies • links between the upper and lower Lea Valley areas.
White City OAPF	The LDA is developing an Energy Masterplan (EMP) to assess potential heat demand and the viability of a decentralised energy system within the White City Opportunity Area. Area stakeholders include the BBC, the London Borough of Hammersmith and Fulham, and individual land owners. The White City masterplan is examining opportunities for: • developments within the OA to work together with the LDA to develop a viable CHP scheme • developments or large-scale existing occupiers within the area to show interest in either being a delivery agent or customer for decentralised energy • interested generation companies.

References

1 Current capacity: <200 MW electricity and <500 MW heat; Future capacity: ~1,800 MW electricity; ~3,400 MW heat
2 Monitoring the London Plan Energy Policies (due for publication Nov. 2009 – London, South Bank University (commissioned by the GLA)
3 Prospectus for London, the 'Low Carbon Capital', Ernst & Young, March 2009
4 Ibid.
5 The Potential and Costs of District Heating Networks – DECC, April 2009 http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/distributed_en_heat/district_heat/district_heat.aspx

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Chinese

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Hindi

यदि आप इस दस्तावेज की प्रति अपनी भाषा में चाहते हैं, तो कृपया निम्नलिखित नंबर पर फोन करें अथवा नीचे दिये गये पते पर संपर्क करें

Vietnamese

Nếu bạn muốn có văn bản tài liệu này bằng ngôn ngữ của mình, hãy liên hệ theo số điện thoại hoặc địa chỉ dưới đây.

Bengali

আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি (কপি) চান, তা হলে নীচের ফোন্ নম্বরে বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Greek

Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος εγγράφου στη δική σας γλώσσα, παρακαλείστε να επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυδρομικά στην παρακάτω διεύθυνση.

Urdu

اگر آپ اِس دستاویز کی نقل اپنی زبان میں چاھتے ھیں، تو براہ کرم نیچے دئے گئے نمبر پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

Turkish

Bu belgenin kendi dilinizde hazırlanmış bir nüshasını edinmek için, lütfen aşağıdaki telefon numarasını arayınız veya adrese başvurunuz.

Arabic

إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى الاتصال برقم الهاتف أو مراسلة العنوان أدناه

Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Gujarati

જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.

MoL/Oct09/MR D&P/1372

Contacts

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