

Royal Borough of Kingston

**Kingston Detailed District Heating
Feasibility Study**

**Kingston Delivery and Funding
Options Note**

DFON/239585/

Issue | 26 November 2014

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Job number 239585-00

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Document Verification

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Job title		Kingston Detailed District Heating Feasibility Study		Job number		239585-00	
Document title		Kingston Delivery and Funding Options Note		File reference			
Document ref		DFON/239585/					
Revision	Date	Filename	Kingston_Delivery_Model_General_Options_Report_ISSUE_2014-11-26.docx				
Issue	26 Nov 2014	Description	Issue for Council information and comments				
			Prepared by	Checked by	Approved by		
		Name	A Moor	T Briault	S Cook		
		Signature	AM	TTB	SBC		
		Filename					
		Description					
			Prepared by	Checked by	Approved by		
		Name					
		Signature					
		Filename					
		Description					
			Prepared by	Checked by	Approved by		
		Name					
		Signature					

Issue Document Verification with Document



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1 Introduction

Following an energy masterplanning study into the opportunity for a decentralised energy network in the Kingston area, a full feasibility study and business case review for the opportunity has been commissioned. Arup is carrying out this study for the Council of Royal Borough of Kingston, which will seek to establish the technical potential and characteristics of the scheme, as well as the financial requirements.

As part of the investigation into the business case, this note aims to present a clear summary of potentially suitable strategies for the delivery of a complete district heating network.

From the outset of the project, it is important to have a clear view of the various options available for financing, design, installation and on-going operation of the district heating system and related elements. Successful operation, good returns on investment and carbon savings can be eroded quickly with a poor procurement strategy choice.

In their simplest form, heat network developments do not require a specialised delivery vehicle; for example, a heat network can be installed in a social housing development by a local authority that owns it.

For larger heat network schemes that are not wholly owned and operated by the scheme promoter, the scheme often requires “commercialisation”. That is to say, business relationships have to be formed and made legally binding to introduce investors and finance for the project, enable the installation work to be instructed and the risks associated with the establishment of the project to be allocated between the stakeholders involved.

The first step for the Council is to ensure all key internal stakeholders understand this process; upon a full understanding of the process it is then possible to determine the Council’s commercial appetite, capacity to manage risk and desired level of involvement.

The term ESCo (Energy Services Company), which will be employed throughout this report, is often used for commercial entities or companies delivering heat networks. In this report the term will be used generically rather than to refer to a specific business model.

Note: This note does not yet make any recommendations as to the procurement and funding routes to be pursued by the Council. Recommendations will follow further discussion with the Council and a better understanding of stakeholders’ priorities.

2 Procurement Models and Roles

To develop a firm understanding of the process involved, it is useful to define in broad terms the generic models that can be applied, and to describe the various roles to be performed to undertake district heating network design, construction and operation.

2.1 Process Roles

The following list summarises the required process roles:

- Regulator
- Governing body
- Project Sponsor
- Asset Owner
- Operator
- Supply Chain Manager
- Retailer
- Developer

This section will discuss each role in turn, detailing the key responsibilities of that role. It should be noted that one party may undertake more than one of roles described below.

2.1.1 Regulator

As the distributed heat generation market is not currently regulated, some form of regulator would be required for the successful operation of an ESCo at Kingston. The key responsibilities of the regulator may include:

1. Establishing criteria for consumer protection; this is especially important for the domestic customers,
2. Setting operating standards,
3. Establishing planning constraints,
4. Managing the above on an on-going basis.

2.1.2 Governing body

The role of governance of an ESCo concerns the business practices of the company or companies involved in the heat network. The key responsibilities of this role may include:

1. Intervening where necessary to ensure the project remains aligned with the business interests,
2. Be accountable and report to stakeholders during design, installation and operation,
3. Provide high-level supply chain management.

2.1.3 Promoter/Sponsor

The promoter in a project has a time-limited interest in establishing an energy scheme. The promoter's activities may include:

1. Undertaking investment appraisals and securing funds,
2. Managing the business portfolio,
3. Defining and guaranteeing the scale and timing of demand for services,

4. Controlling development,
5. Defining physical nature of the project,
6. Procuring developers, investors and operators.

2.1.4 Asset Owner

An asset management company or a parent company of the operator, the asset owner, secures the long term returns generated by the energy scheme. (The owner of the system infrastructure may be a separate body.) The key functions of the asset owner may include:

1. Arrange finance and provide financial guarantees,
2. Invest in replacement and enhancement,
3. Contract with installers, operators and service companies.

2.1.5 Operator

Responsible for on-going technical and operational aspects of the asset from design through to operation. This role may consist of the following activities:

1. Fuel purchase,
2. Plant availability and network management,
3. Connection of premises,
4. Ensures and guarantees supply quality.

In many cases, the operator may also take on a role of retailer (see below) and the supply chain may be managed by a separate body.

2.1.6 Retailer

Provides end-user services related to energy provision. The key functions of this role include:

1. Metering,
2. Billing,
3. Pricing,
4. Sales,
5. Customer Services.

As mentioned above, in some cases, the retail functions may be managed by the operator.

2.1.7 Developer

Developers generally do not have interest in involvement with energy schemes, at most serving as project sponsors seeking an early exit from the project. Essential functions are as follows:

1. Providing the development opportunity for the energy scheme,
2. Funding through contribution in kind,
3. Managing programme risk.
4. Ensuring the project provides them with the necessary carbon emissions reductions to discharge their obligations under planning and building control regulation.

2.2 Procurement model options

There are broadly three procurement models that can be applied to the development of a district heating system. The purpose of describing these models is to outline how the Council could carry out the procurement of this system.

They are characterised according to which of the roles, outlined in the section above, can be filled by the organisation in question, namely the Council, along with the Council's tolerance to risk, process experience and project involvement requirements.

2.2.1 Option 1: Arm's length

In this model, the Council takes on the regulation and governance roles only.

This model is the lowest cost option for the Council and offers a number of attractive advantages as discussed below.

Table 1. Arm's length approach advantages and disadvantages

Advantages	Disadvantages
Council carries no risk but aids in the delivery of the network	Council has a reactive role; can set strategic objectives but cannot immerse itself in achieving them.
Planning obligations provides confidence to the sponsors and developers	Long term active regulation and intervention required.
Leverages private sector capital.	High risk of the district heating network not being delivered
	If an ESCo has to install the DH network well before heat can be sold through it, their cost of capital will affect the developer contribution and thus may impact land receipts.

This process means the Council will take a very hands-off approach to the whole project. In brief, the process involves the Council preparing a tender and tendering the whole project out and having very little involvement with it moving forward.

Implications for the Council include:

1. Benefits from the system in terms of heat delivery, cheaper energy and carbon reduction within Kingston,
2. Avoidance of many risks inherent with taking on a more hands-on approach,
3. The Council will forgo some network operating revenue compared to a more hands-on approach.
4. The final DH network may not achieve its maximum potential physical extent, as there may be limited incentives or obligations for network operators to extend the network. Extension beyond the network originally secured by the council would depend on the voluntary agreement of the operator and another developer / landowner to contract for the extension of the network and the supply of heat. Kingston

2.2.2 Option 2: Guiding hand

In this model, the Council takes on more roles in the delivery model. The Council's roles in this model would include regulation, governance, project sponsor and, potentially, asset owner (for a limited period). This means the Council has a longer term involvement in the whole process.

A key difference from the arm's length approach is the direct involvement of the Council in funding and procuring the installation of the pipe network. This may be necessary or advantageous where a planned network will have a long build-out period requiring installation of large parts of the network well ahead of the heat loads it will serve.

Where an ESCo finances the network, it will expect a commercial return on its investment (e.g. 12% nominal). As such it will charge connection charges that make the project financial viable, effectively charging a cost of capital of 12%. Given the Council may have a lower cost of capital, it could fund the heat network and then sell or rent it to the ESCo once heat is required. Appropriate design of the heat network, and phasing of construction that is aligned with the build-out profile of the scheme will ensure that upfront costs are minimised.

In order to ensure the heat network is built to the right specifications, it would be recommended that procurement of an ESCo is started early on. The installation of the network should follow the connection timeline of new heat customers and developments to ensure that pipework assets are not installed before they are required incurring higher costs for the scheme.

Table 2. Guiding hand model advantages and disadvantages

Advantages	Disadvantages
Council gets a high degree of creative control of physical / commercial nature of the portfolio.	Potentially higher costs to the Council in the short term.
Leverages private sector capital after initial Council investment	Significant intellectual and capital cost to run to procurement and to set up management structure.
Reduces costs for the ESCo thus reducing connection charges.	Implies long-terms active regulation & intervention by the Council.

Advantages	Disadvantages
	Council carries some risk exposure and is the operator of last resort in the event of ESCo bankruptcy.

What it means for the Council is outlined in the list below:

1. A much more involved process,
2. Full involvement in the pipe-routing and installation process,
3. Contract preparation,
4. Energy centre specifications.
5. Sale of pipe infrastructure once heat is required by developments

2.2.3 Option 3: Detailed involvement

This is the most creative model, but also the longest term, and is likely to require the greatest capital investment. This model also requires the Council take on more roles; these roles are likely to include project sponsor, asset owner, operator, retailer and supply chain manager.

The advantages and disadvantages are outlined below.

Table 3. Detailed involvement advantages and disadvantages

Advantages	Disadvantages
Council gets the most creative control.	Largest intellectual & capital costs to Council.
Relieves the Council of the requirement to regulate and intervene.	Limited use of private sector capital.
Disposal of energy scheme is de-risked and thus more cost effective over the entire lifespan of the project.	Interim ownership risks are potentially significant.
Potential for future divestment once the scheme is operational	Highest risk exposure to the Council

As the option title suggests, this is the most involved of all three options. While it is possible to sub-contract out most of the work, the Council will still be ultimately responsible and take on most of the risk of the whole project.

Should the Council follow this route, it means:

1. It is possible to self-fund the project,
2. A detailed specification for the design + build and operation + maintenance will need to be prepared (although a D&B contract is possible under this model),
3. It will likely require a full time member of staff to be employed to manage this process,
4. Many of the risks and responsibilities will likely lie with the Council,

5. This is potentially the most lucrative option given the Council has the lowest cost of capital.

3 Risks and Opportunities

As evidenced in the previous section, an element of the decision as to how much or how little the Council chooses to be involved in the process comes down to the level of risk tolerance. The process also creates a number of opportunities that could be captured depending again on the level of involvement in the process.

The typical risks and opportunities have been outlined in this section.

3.1 Risk

Identifying, monitoring and managing risk is a core part of a sound approach to this process. Allocating risk, by delegating / taking on different roles in the process is something the Council needs to consider, which is discussed in the previous section. The main risks to consider in this process are as follows:

1. Technology risk: the risk that the installed systems do not perform as required.
2. Plant design risk: the risk that poor design of plant results in higher construction or operational costs. This risk arises during the design phase but may only crystallise during construction or operation.
3. Reputation risk: the risk that damaging customer complaints, poor performance of the system or poor customer service outcomes cause potential new customers to refuse to connect to the service,.
4. Customer credit risk: the risk of non-payment or payment delays by customers.
5. Supply chain risk: the risk that system components, fuel or other critical spares and services are not available when required
6. Demand risk: the risk that planned connections are delayed or existing connections have lower energy demands than forecast. These risks will reduce revenues and weaken the business' cash flow. A critical relationship in planning networks is therefore to minimise the time gap between expenditure on network infrastructure and revenues from heat delivery.

3.2 Opportunities

There are a number of opportunities a project / process such as this will invariably create. These include:

1. Initial plant capital: investment return on initial plant capital
2. Fuel & energy transactions: margins can be made on fuel and energy transactions
3. Plant operation & maintenance; margins on providing a service for the operation and maintenance of the plant and the scheme

4. Achieving carbon targets: providing low carbon heat to customers to meet their carbon reduction targets as part of building regulation or wider carbon reductions within the Royal Borough of Kingston
5. Customer service: the council is an organisation which already has a mission for local customer (ratepayer / voter) satisfaction
6. Revenue collection: the council already has a revenue collection infrastructure which can be used for heat sales.

The allocation of these risks and opportunities to the various stakeholders will guide the required procurement route.

4 Funding Options

A project such as this involves significant capital outlay and therefore may require alternative funding options to be considered. There are various funding options available to the Council; a brief summary of these has been included below for review. Further details on the below funding sources can be found in Appendix A.

4.1 Public Sector Sources

4.1.1 Public Works Loan Board

The Public Works Loan Board (PWLB) is a statutory body of the UK Government that provides loans to public bodies from the National Loans Fund. The PWLB provides loans to local authorities of all types in Great Britain, primarily for capital projects, but also as a lender of last resort.

A few years ago this source of capital was very cheap for local authorities, but its cost has recently been rising compared to other sources of funding as the economy in Europe has improved.

4.1.2 London Green Fund

The London Energy Efficiency Fund (LEEF) is managed by Amber Infrastructure and can fund private and public sector energy efficiency investment, including investment in District Heating.

Often the rates that can be offered are better than Public Works Loan Board (PWLB), depending on the credit rating of the organisation asking for capital from this low interest loan facility. Further details can be found at www.leef.co.uk.

For the purposes of full disclosure, Arup is the technical advisor to LEEF. This role includes introducing potential clients and technical due diligence on the client's proposed use of the loans.

4.1.3 Green Investment Bank

The GIB has been set up under the auspices of the Department for Business Innovation and Skills (BIS). Currently the GIB is in the process of sourcing its project pipeline which could include DE projects.

Funding from the GIB could be in the form of debt or equity instruments however it is mostly likely to be debt. Indicative costs of capital are likely to be marginally lower than the market rate of 2 to 3 per cent above LIBOR.

4.1.4 European Investment Bank

The European Investment Bank (EIB) grants medium to long term loans to energy efficiency and renewable energy projects. It can provide project finance to projects over EUR 25m in value or intermediate loans through credit lines to banks or other financial institutions if projects are less than EUR 25m in value.

The EIB can lend at rates lower than the commercial market: technically, they can lend at the country-specific reference rate to avoid State aid issues

Generally the EIB can only finance 50 per cent of project costs. In rare cases the EIB will finance 100 per cent of a loan granted by an intermediary bank.

4.1.5 Project and municipal bonds

Legislation passed in 2004 allows local authorities to issue bonds for capital projects without permission from central government. However, to date there has been little issuance because bond finance generally has high transaction costs. That said, the finance itself can be cheaper than other types of debt if at sufficient scale because it is secured on typically high credit.

One option for bond finance is to pool multiple investments into a single bond, either as multiple different projects within a single city or a single type of project (e.g. district heating networks) across multiple cities. This is a topic of active discussion among global cities networks (e.g. ICLEI¹ and C40), but there is limited experience in delivery of multi-city bond financing.

4.2 Private Sector Sources

4.2.1 Senior Debt secured against the Council

The project sponsor could take out senior debt from a commercial bank secured on the organisation's assets. Senior debt is generally long term (in excess of 20 years) and interest is generally higher than the public sector loans.

4.2.2 Refinancing

Pension funds and insurance companies are interested in providing very long term finance secured on the assets of district heating networks, for example the primary pipe network, once they have been installed and have a secure income

¹ http://issuu.com/resilientcities/docs/rc2014__congressreport_2014_final

stream. Such a facility can be used to refinance a scheme after it has started operations.

4.2.3 Climate Change / Green Investment Funds

There are some investment funds such as Triodos, Climate Change Capital and Earth Capital Partners that have been established with a specific remit to invest in projects that contribute to climate change reduction such as energy efficiency and renewable energy projects.

These funds tend to be interested only in projects that have relatively high returns (10-20 per cent) and with short investment periods (5-10 years). In addition, they will be looking for projects or project portfolios with a large scale investment potential rather than individual small-scale projects.

For these reasons they may not be appropriate for the majority of DE projects where returns are less certain and scale is small.

4.3 Grants, incentives and subsidies

4.3.1 Allowable Solutions

The UK Government has recognised that achieving actual zero carbon in new development on site is unlikely to be viable in most cases and indeed may not be technically achievable in many cases. It has therefore proposed to implement a system of “allowable solutions” to deliver carbon reductions to offset residual emissions in new development.

Allowable solutions would include low carbon measures away from a new development, for example, standalone renewable energy installations, a district heating network or building retrofit.

It is likely that limited funds will be collected through such a system before 2016. For the time being, the most likely route for developer contributions to be available to fund DE schemes will be through Section 106 agreements or through CIL payments.

4.3.2 Enhanced capital allowances

Tax incentives like ECAs are focused on providing incentives to the private sector to encourage the delivery of energy saving plants, low carbon generation and infrastructure. ECAs will enable a private sector organisation to write off the whole of the capital cost of an investment against taxable profits for the period in which they make the investment.

5 Conclusions and Recommendations

These conclusions and recommendations will be developed following exploratory workshops with the Council and other key stakeholders.

There are three options for the Council’s level of involvement:

- Arm’s length

- Guiding hand
- Detailed involvement

Depending on the Council's appetite, it may be possible to install the majority of the heat transmission network in the early years of the scheme's build-out to maximise the number of connections. This could be timed according to the upgrade / installation of other utilities in the Kingston area therefore sharing the cost of required civils works with other utilities subject to the final network route. As a result two main options arise:

1. Install the network piecemeal as required (it may be more costly but would not require sunk capital from an ESCo)
2. Install all the pipework before full build-out of loads, which may result in infrastructure not being utilised for a number of years. This would lend itself to being funded by the Council given its low cost of capital.

The choice between these two options (or variations between the two) will be informed by the cost model once this has been fully developed.