**[Local Authority]**

**District Heating Strategy**

**xxxx 2015**

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**Prepared by [XX]**

**With support from the Heat Network Partnership**

**Date: [XXXX]**

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**Approval: [XXXX]**

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**Contents**

[**1.** **Dashboard and executive summary** 4](#_Toc421278161)

[1.1 Dashboard 4](#_Toc421278162)

[1.2 Executive summary 5](#_Toc421278163)

[1.3 What is district heating 6](#_Toc421278164)

[1.4 Key benefits of district heating 8](#_Toc421278165)

[1.5 Carbon savings 9](#_Toc421278166)

[1.6 District heating in [my local authority] 9](#_Toc421278167)

[1.7 Policy context 9](#_Toc421278168)

[1.8 Vision for district heating in [my local authority] 12](#_Toc421278169)

[**2** **Module 1 - Stakeholders and other project participants** 13](#_Toc421278170)

[2.1 Internal Stakeholder 13](#_Toc421278171)

[2.2 Internal stakeholders 13](#_Toc421278172)

[2.3 External stakeholders and potential customers 14](#_Toc421278173)

[2.4 Stakeholder engagement strategy 15](#_Toc421278174)

[2.5 Project team 15](#_Toc421278175)

[2.6 Resources and budget 15](#_Toc421278176)

[**3** **Module 2 - Opportunity assessment of district heating loads** 16](#_Toc421278177)

[3.1 Identification of initial potential clusters 17](#_Toc421278178)

[3.2 Assessment criteria, weightings and hierarchy 17](#_Toc421278179)

[3.3 Risk appraisal 17](#_Toc421278180)

[3.4 Opportunities for expansion and interconnection 17](#_Toc421278181)

[3.5 Quantified outputs 17](#_Toc421278182)

[3.6 Potential Heat Network Opportunities 18](#_Toc421278183)

[3.7 Overlaid mapping of heat supply and demand 18](#_Toc421278184)

[3.8 Quantified assessment of combined opportunities 18](#_Toc421278185)

[3.9 Identify primary opportunities for further assessment 18](#_Toc421278186)

[**4** **Module 3 - Planning** 19](#_Toc421278187)

[**5** **Module 4 - Business, commercial and financial model** 22](#_Toc421278188)

[5.1 Project delivery 24](#_Toc421278189)

[5.2 Risk appraisal 25](#_Toc421278190)

[5.3 Delivery vehicle required? 25](#_Toc421278191)

[5.4 Form of delivery vehicle 25](#_Toc421278192)

[5.5 Financing options and sources of funding 25](#_Toc421278193)

[5.6 Project governance 26](#_Toc421278194)

[5.7 Procurement (infrastructure, operation and maintenance) 26](#_Toc421278195)

[**6** **Project delivery and next steps** 26](#_Toc421278196)

[**Appendices** 27](#_Toc421278197)

[**7** **Further information** 28](#_Toc421278198)

[**8** **Case studies** 30](#_Toc421278199)

[8.1 Case study 1: Copenhagen 30](#_Toc421278200)

[8.2 Case study 2: Aberdeen 30](#_Toc421278201)

[8.3 Case study 3: Sheffield 30](#_Toc421278202)

[8.4 Case study 4: Nottingham 30](#_Toc421278203)

[8.5 UK district heating installation map 30](#_Toc421278204)

[**9** **Glossary of terms** 32](#_Toc421278205)

# **Dashboard and executive summary**

## Dashboard

*Summary dashboard inserted here to include:*

***Contextual map*** *of the Local Authority Boundary indicating characterisation of areas by rural/urban, heat density, etc*

***Contextual map*** *of the Local Authority Boundary indicating all identified Project Locations*

***Summary*** *of KPIs for district heating across the Local Authority area, in particular:*

*- Cost; Carbon and fuel bill Savings*

*- Number of district heating opportunity areas identified*

*- Potential heat demand to be met by district heating*

*- Number of jobs created*

*Total anticipated investment costs associated with networks identified*

***(This box to be deleted from the final document)***

## Executive summary

[INSERT TEXT]

*A one or two page summary of the key points to be made in the strategy document.*

*Include:*

*The vision for district heating in your local authority;*

*The important strategies and policies that district heating can deliver;*

*The key benefits that district heating can deliver in your local authority;*

*Brief statement listing stakeholders and project participants;*

*Principal planning issues identified to be addressed at local development plan level;*

*Description of possible appropriate delivery models;*

*Description of possible finance solutions;*

*Key actions: next steps, timelines, etc.*

*Generic information about DH and the typical benefits can be found in documents and reports listed under ‘Further Information’ at the end of this document…*

*This section should include reference to the key drivers for developing DH in your LA, and an illustration of how district heating can support the delivery of local and national policies and strategies.*

*The section should conclude with a proposed ‘vision’ for district heating and the role it can play in your authority.*

***(This box to be deleted from the final document)***

## What is district heating

A District Heating Network is the distribution of heat in from a central source to multiple customers, as defined in the Heat Network Regulations 2014:

Heat Network (Metering & Billing Regulations) 2014

Definitions

“district heat network” means the distribution of thermal energy in the form of steam, hot water or chilled liquids from a central source of production through a network to multiple buildings or sites for the use of space or process heating, cooling or hot water;

“communal heating” means the distribution of thermal energy in the form of steam, hot water, or chilled liquids from a central source in a building which is occupied by more than one final customer, for the use of space or process heating, cooling or hot water;

Heat may be generated in an energy centre using any of a range of technologies, or can come from industrial or commercial processes (waste heat). District heating networks can facilitate the use of low carbon sources of heat such as geothermal, aquifers, rivers, heat from sewers, and/or heat pumps which use electricity to extract heat from low grade heat sources. The use of heat can improve the efficiency of electricity generation through cogeneration by combined heat and power (CHP) plants. Buildings may have an associated energy centre which at some times provides heat to the building, but at other times feeds heat into the network. As the district heating network expands, high levels of efficiency and resilience are achieved through multiple heat sources supplying multiple and varying demands.

In some situations, heating may be combined with cooling (using the heat to drive an absorption cooling system). Modern district heating networks allow heat to be efficiently transferred for 30km or more from the heat source and with multiple heat sources, district heating networks (such as those in continental European countries) can be hundreds of kilometres long. In some northern European countries more than 50% of the building stock is connected to a district heating system. Putting in place the infrastructure for heat networks can also be combined with other utilities such as electricity and data.

A number of delivery structures models can be used for the development of district heating networks, normally operated by an entity that operates the network, some of the heat generating plant, and manages billing and service quality. A number of public and private sector delivery models are in operation in Scotland, as covered in **Module 4** (see Section 5). .



Diagram of a district heating network (CIBSE)

## Key benefits of district heating

|  |  |  |
| --- | --- | --- |
| Well planned and designed district heating can deliver a number of benefits. The table below is adapted from the London Heat Map Manual, setting out the potential benefits to consumers, developers and local authorities: | **Benefits of a district heating network** | **Potential benefits of a strategic wide network** |
| **Consumer** | * Small space requirement and safe operation;
* Easy to control and operate;
* Affordable cost and long term price stability;
* DE systems can also help address fuel poverty and give peace of mind to vulnerable populations by:
* ensuring the efficient management of heat provision;
* providing more stable prices;
* offering lower prices: district energy schemes can offer lower costs than microrenewables in achieving low or zero carbon energy supply.
* Resilient design to provide secure heat;
* Modern DISTRICT HEATING schemes are metered: consumers therefore only pay for what they individually consume.
 | * A genuine heat market may develop allowing competition and lower costs;
* Greater security of supply as multiple heat sources supply the same network.
 |
| **Developer** | * Lower cost solutions: a heat network may provide a lower cost method of achieving carbon targets than the equivalent deployment of microrenewables;
* District Energy networks can be set up as an attractive ESCo offering, adding development value or removing the developer’s need for long term engagement in the project
 | * The opportunity to extract more value from existing energy centre assets. If a CHP engine can supply a greater heat load then it will generate a better return;
* If the energy centre economics have been eroded through market or technical advances then a heat network connection will allow cheaper heat to be bought from elsewhere on the network than from a stranded asset on a small network;
* The potential to decommission the energy centre plant, and have consumers on the network supplied fully by another energy supplier. This would reduce costs and would free up space for alternative uses.
* Heat intensive industries have the potential to sell excess or waste heat and improve competitiveness
* The market for heat can help heat intensive industries improve the economics of their operations through supply of heat to het networks.
 |
| **Local Authority  and the Environment** | 1. Flexibility for fuel changes, possibility to optimise fuel mix;
2. Lower CO2 emissions;
3. Potential for low carbon economy;
4. District Energy, together with Combined Heat and Power, is the most energy efficient way of providing heat to buildings.

District heating can also offer local authorities the opportunity to lower fuel poverty levels by providing lower cost heat to consumers. | * As networks are connected together greater use of more efficient plant can be made, reducing emissions and lowering carbon; Step changes in energy production efficiency can be made as new and lower carbon heat sources become available and are less site specific;
* Incentive to make better use of waste heat through energy from waste plant;
* District heating systems have the potential to help to address fuel poverty by providing secure heat at prices lower than alternatives
 |

Adapted from London Heat Network Manual 2014

## Carbon savings

As described above, through economies of scale and for other reasons district heating systems deliver carbon savings when compared to conventional heating systems. Combined Heat and Power systems offer further carbon savings. And interconnecting district heating systems into a wider network can offer opportunities to make still greater savings. Quantifying these savings does require some degree of specification, so that a specific existing heat supply can be compared with a specific district heating based supply.

*Include any examples of carbon savings calculated for DHNs in your local authority (feasibility studies and implemented schemes). If no local examples are available, use case studies of schemes in similar areas.*

***(This box to be deleted from the final document)***

##

## District heating in [my local authority]

[INSERT TEXT]

*Outline any existing DHNs in your local authority area, and any sites where feasibility studies have been carried out.*

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## Policy context

[INSERT TEXT]

*Set out how the development of DHNs is supported by national and local strategic policies. At a national level these would include Scottish Government’s Heat Policy Statement.*

***(This box to be deleted from the final document)***

Scottish Government policies

In 2009, the Scottish Government introduced the [Climate Change (Scotland) Act 2009](http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/climatechangeact), to set targets to reduce Scotland's greenhouse gas emissions by 80% below the 1990 baseline in 2050, with an interim target to reduce emissions by at least 42% by 2020. The Scottish Government has set linked targets, including by 2020:

* an energy efficiency target to reduce total final energy consumption in Scotland by 12% (against a baseline of the average final energy consumption in 2005-7)
* delivery of 11% of non-electrical heat demand by renewable sources.
* the equivalent of 100% of Scotland’s electricity demand to come from renewables.

Heat Policy Statement

Reducing the carbon intensity of heat is central to achieving these targets. In order to focus and drive pace of change, the Scottish Government published its [Heat Policy Statement: Towards Decarbonising Heat: Maximising the Opportunities for Scotland](http://www.gov.scot/Publications/2015/06/6679) on 11 June 2015, following [a public consultation](http://www.gov.scot/Topics/Business-Industry/Energy/Energy-sources/19185/Heat) in 2014. The Statement sets out the Scottish Government’s future policy direction for addressing the three key aspects of the Heat system:

* how we use it (heat demand and its reduction)
* how we distribute and store it (heat networks and heat storage)
* where our heat comes from (heat generation.

Each of these aspects of the heat system is addressed by three specific objectives as set out in our Heat Hierarchy: reducing the need for heat; supplying heat efficiently and at least cost to consumers; and using renewable and low carbon heat. The Heat Policy Statement sets out the actions being taken by the Scottish Government, working in partnership with public, private and community groups to tackle the challenges to:

* largely decarbonise its heat system by 2050, to reduce greenhouse gas emissions;
* diversify its sources of heat generation and supply to reduce our reliance on fossil fuels, and therefore support a resilient heat supply;
* reduce the pressure on household and business energy bills through reducing heat demand and providing affordable heat, in particular supporting the fuel poor; and
* seize the sizeable economic opportunities that this transformation offers through the development of new heat generation, distribution and demand reduction programmes.

Housing Policy

Addressing climate change and fuel poverty are key priorities for Scottish Ministers. Local authorities, through both their strategic role and wealth of local knowledge and action, have a significant part to play in ensuring that people live in warm, dry, energy efficient, low carbon homes which they can afford to heat. A [Sustainable Housing: Fuel Poverty and Climate Change Advice Note](http://www.gov.scot/Topics/Built-Environment/Housing/supply-demand/deliveryframework/lhs/Advicenote) was published in 2014 to provide additional information and advice to assist Local Authorities take forward work to address fuel poverty and climate change in their Local Housing Strategies. It relates to and supplements the Local Housing Strategy Guidance.

District Heating Policy

The Heat Policy Statement set out the Scottish Government’s level of ambition on district heating: to achieve 1.5 TWh of Scotland’s heat demand to be delivered by district heating and to have 40,000 homes connected to district or communal heating by 2020. Other key actions in Heat Policy Statement are:

* Publication of the Scotland Heat Map in April 2014, a powerful tool for local authorities enabling better strategic and local planning of district heating and identification of unused excess heat, reducing heat demand and ensuring more effective heating supply.
* A review of the opportunities for district heating networks associated with the public sector estate, using the Scotland heat map, published in March 2015. This work developed a mapping tool to support the identification and quantification of opportunities to support a strategic approach to implementing district heating.
* An increase in funding for the District Heating Loans Fund, making a total of £8 million available over the two years 2014 to 2016. Since 2011, the Scottish Government has committed £11 million in loans to 33 projects.
* Publish planning guidance. National Planning Framework 3 and Scottish Planning Policy published in June 2014 both strongly support the roll-out of heat networks.

These actions build on the [District Heating Action Plan](http://www.gov.scot/Publications/2013/06/7473), published in 2013 in response to recommendations from the Expert Commission District Heating, and an update on progress was published alongside the Heat Policy Statement in June 2015. As one of the key actions, the Scottish Government set up [the Heat Network Partnership (HNP)](http://www.districtheatingscotland.com/). to bring together the support already in place for heat network development across Scottish Government programmes: the Energy Saving Trust, Resource Efficient Scotland, Scottish Enterprise and the Scottish Futures Trust (SFT).

HNP support for project development has been fully integrated with the £76 million [Low Carbon Infrastructure Transition Fund](http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP) launched in 2015. The HNP is focussing on early feasibility and strategic development to continue to build on the existing pipeline of projects, which can now access additional development support to take projects to investment stage through the LCITP. The HNP’s also bring together guidance and best practice, for example comprehensive advice to public bodies on legal and financial models for supplying, procuring and delivering heat and roll out of the District Heating Strategy Support Programme for local authorities.

The HNP also engages with a range of stakeholders including COSLA, the Association for Decentralised Energy (ADE), Scottish Renewables and Edinburgh University’s Heat & the City. The HNP has also worked with Heat & the City to set up the Scottish [HNP Practitioners Group](http://www.heatandthecity.org.uk/about/workshops/scottish_heat_networks_partnership_practitioner_group_-_workshop_on_regulation_november_2014) to provide a forum to share best practice.

District Heating Planning and Regulation

As set out in the Heat Policy Statement, the Scottish Government recognises the need to develop appropriate regulation, commensurate with the scale of the heat market. New regulatory measures and planning policies introduced in 2014 were:

* The updated [Scottish Planning Policy](http://www.gov.scot/Topics/Built-Environment/planning/Policy/Subject-Policies/low-carbon-place/Heat-Electricity/renewables-advice) published in June 2014 states that local development plans (LDPs) should support the development of heat networks in as many locations as possible and should use heat mapping to identify the potential for co-locating development with a high heat demand with sources of heat supply (cover in more detail in **Module 3** - see Section 4).
* [Heat Network (Metering & Billing) Regulations 2014](http://www.gov.uk/heat-networks) - The regulations aim to improve consumer protection, give heating, cooling and hot water customers greater control over their consumption, and support the development of the heat networks sector in Scotland. All heat suppliers must register their district heating or communal heat networks with the National Measurement & Regulation Office by the end of 2015.
* [The Pollution Prevention and Control (Scotland) Amendment Regulations 2014](http://www.gov.scot/Topics/Environment/waste-and-pollution/Pollution-1) - The Scottish Government introduced a requirement under the regulations for electricity generation and industrial installations to carry out a cost benefit analysis on the use of excess heat.
* Commitment to report, at the end of 2015, the findings of our National Comprehensive Assessment and Cost Benefit Analysis, establishing the potential for high efficiency CHP (Combined Heat and Power) and efficient District Heating in Scotland, as required under Article 14 of the EU Energy Efficiency Directive.

Voluntary initiatives to improve consumer protection and standards for district heating include the [Heat Trust](http://www.heatcustomerprotection.co.uk/), formally established in March 2015 after two years of collaboration between industry, consumer groups and government. Heat Trust establishes a common standard in the quality and level of protection given by heat supply contracts and offers heat network customers an independent process for settling disputes. The Scheme is GB wide (England, Scotland and Wales).

The Association for Decentralised Energy (ADE) and CIBSE are also developing a [Code of Practice for Heat Networks in the UK](http://www.cibse.org/heatnetworksconsultation), which seeks to set minimum standards and best practice for district heating as a key step to provide greater confidence for specifies and clients. It covers all the stages of a project from preparation and brief, feasibility, design, construction, operation and maintenance up to customer expectations, and is applicable to all size of networks, both in new build and existing buildings. Following a public consultation process in Autumn 2014, the Code of Practice is due for publication later in 2015.

To explore the options and need for further regulation, the Scottish Government set up the Special Working Group on Regulation of the Expert Commission on District Heating. The Group is due to report on its advice to Government in late summer 2015.

Regional and local policies

[INSERT TEXT]

## Vision for district heating in [my local authority]

[INSERT TEXT]

*Draft a vision statement for DH in your local authority. Consider running a workshop for senior officers and/or council members, and other stakeholders. Aim to get the vision statement agreed at the highest level in your local authority. This may be an opportunity to also identify and engage DH champions at officer and member level.*

***(This box to be deleted from the final document)***

# **Module 1 - Stakeholders and other project participants**

## Stakeholder Engagement Strategy

[INSERT TEXT]

*The complexity in district heating projects and programmes is typically most apparent in the number and variety of stakeholders, all of whom need to be engaged and committed to a project. For your project to succeed you will need a sound understanding of the stakeholders and their drivers, a robust strategy for engaging with them and gaining and retaining their commitment to the project.*

*In the UK, successful development of large-scale district heating may require a convergence of drivers such as social and environmental interests, as well as technical and economic feasibility.*

*Consider:*

* *Who are the internal and external stakeholders for district heating project(s)? What are their motivations/drivers?*
* *Who will ‘champion’ the project at different levels (Members, Senior Officers, etc.)?*
* *Who will be the main project sponsor and what resources will they need to supply?*
* *What is the appetite in your council for participation in this project (support, facilitation, delivery, ownership)?*

*You may also be able to share knowledge and best practice with other practitioners through existing networks such as the Sustainable Scotland Network, SEON, etc.*

***(This box to be deleted from the final document)***

## Internal stakeholders

[INSERT TEXT]

*Consider:*

* *Council Members*
* *Chief Executive and senior officers*
* *Finance*
* *Planning*
* *Estates and facilities management*
* *Legal and corporate services*
* *Housing*
* *Regeneration*
* *Highways*
* *Energy and sustainability*
* *Enterprise and economic development*
* *Procurement*

***(This box to be deleted from the final document)***

## External stakeholders and potential customers

[INSERT TEXT]

*Consider:*

* *Universities and colleges*
* *Schools*
* *Hospitals*
* *Sports centre operators*
* *Community organisations*
* *Businesses and business forums*
* *Property developers*
* *Housing associations and tenants’ organisations*
* *Heat intensive industries(as heat user or supplier)*
* *District heating suppliers*
* *Etc.*

***(This box to be deleted from the final document)***

## Stakeholder engagement strategy

[INSERT TEXT]

*Draft a strategy for engagement with stakeholders. This might prioritise different stakeholders and propose appropriate levels of engagement. It should consider communications channels and opportunities for consultation and feedback.*

*You may want to consider whether the Strategy can be taken forward with existing external stakeholder groups such as Community Planning Partnerships.*

***(This box to be deleted from the final document)***

## Project team

[INSERT TEXT]

*Describe the project team that will be required to deliver the project, initially and in the longer term. Will the team consist of internal staff, secondees, new appointments? What skills, expertise and/or experience will be required? Will staff be full or part time? Will you need to use external advisers (e.g. technical, legal and financial)?*

***(This box to be deleted from the final document)***

## Resources and budget

[INSERT TEXT]

*Consider the budget required for the different phases of the project(s) – see the diagram ‘Steps in delivering a DH project’ below. What budget will be required for staff costs, professional advice (technical, financial, legal), communications, etc?*

***(This box to be deleted from the final document)***

# **Module 2 - Opportunity assessment of district heating loads**

[INSERT TEXT]

*This Chapter focusses on identifying opportunities for heat networks based on an assessment of demand – it intentionally does not consider heat supply to avoid influencing decisions. Heat supply can be combined in a subsequent stage.*

***Data Collection*** *– Individual property heat demand from Scotland heat map data and enhanced with other public data sources. Characterisation of the Local Authority area into a spectrum from rural to urban based on a combination of property type and heat density. Include future development zones from Local Development Plan.*

*Statement on the internal processes to maintain and continue to improve the Scotland heat map dataset.*

*The statement should reflect the methodology described on the heatmap website:*

*www.gov.scot/Topics/Business-Industry/Energy/Energy-sources/19185/Heat/HeatMap*

***Data Collection*** *– utility networks information including existing district heating networks, gas and electricity.*

***Identify*** *- potential opportunity areas of high heat density and new developments in the area where potential heat networks may be viable for local DHN projects.The Heat Network Partnership opportunities assessment tool can be used as to give a high level appraisal of a heat network.*

***Strategy*** *– Overview of Local Authority area to consider the wider potential for interconnection.*

***Quantify*** *– Generate quantitative criteria (e.g. heat density, clustering of heat demands, IRR/NPV, carbon savings, energy security, fuel poverty, economic development, etc.) that can be weighted, and against which potential opportunity areas can then be scored to establish an indicative project hierarchy.*

***Report*** *- Populate project opportunity dashboard with quantified data.*

***(This box to be deleted from the final document)***

## Identification of initial potential clusters

[INSERT TEXT]

## Assessment criteria, weightings and hierarchy

[INSERT TEXT]

## Risk appraisal

[INSERT TEXT]

## Opportunities for expansion and interconnection

[INSERT TEXT]

## Quantified outputs

[INSERT TEXT]

## Potential Heat Network Opportunities

 [INSERT TEXT]

*This section should consider existing natural resources for heat supply but should not rule out low and zero carbon solutions that could be applied more generally (i.e. biomass boilers)*

*Mapping of existing and potential fuels (natural gas, electricity, biomass, hydrogen) and heat sources (waste process heat, geothermal, solar, EfW, sewage, surface and ground water, etc.).*

*Quantification of the potential capacity and cost of generation for heat supply opportunities identified.*

***Report*** *- Populate project opportunity dashboard with quantified data.*

***Overlay*** *demand and supply maps to identify where existing heat resources overlap with demand and generate long list of opportunities.*

***Identify*** *suitable alternative heat resources where demands exist in the absence of supply opportunities.*

***Technical appraisal*** *of opportunities to identify spatial network extent, heat generation plant sizing.*

***Economic appraisal*** *to assess the potential of the identified opportunities to generate benefits against the stated assessment criteria (e.g. cost savings, carbon saving, fuel poverty).*

***Comparative Assessment*** *of long list of scenarios to generate short list.*

***Report*** *- Update dashboard with quantified data.*

***(This box to be deleted from the final document)***

## Overlaid mapping of heat supply and demand

[INSERT TEXT]

## Quantified assessment of combined opportunities

[INSERT TEXT]

## Identify primary opportunities for further assessment

[INSERT TEXT]

# **Module 3 - Planning**

[INSERT TEXT]

*Your document should discuss how local planning policies and guidelines are critical to the successful development of DHNs.*

*Consider whether there are existing energy policies or strategies in place to facilitate district heating within local development plans or guidance. Are there timescale issues between the preparation of the Local Development Plan or Supplementary Guidance within your area and any heat strategies proposed? Will work have to be done in time for the next cycle of the Development Plan’s preparation? What are the likely requirements for local planning permissions and building warrants, permission to undertake work in roads and streets, and any potential requirement for permits (for example in the case of a biomass energy centre where a SEPA permit may be required)?*

*(This box to be deleted from the final document)*

National Planning Framework and Scottish Planning Policy

The Scottish Government’s [Third National Planning Framework](http://www.gov.scot/Topics/Built-Environment/planning/NPF3-SPP-Review/NPF3) sets out a vision for Scotland as a low carbon place, contributing to efforts in reducing the carbon impact of our built environment and energy infrastructure. The document also places a specific role on the cities as “exemplars of low carbon living and a focus for essential energy infrastructure.” District heating is recognised as contributing to a broader energy mix within National Planning Policy and sets a requirement that “new development should be future-proofed to ensure that connections to existing or planned heat networks are taken forward as soon as they are viable.” There is also specific reference to Grangemouth where “there is potential for use of any available excess heat…to provide heat through a district heat network”.

The National Planning Framework acknowledges the role of individual small-scale heat projects in rural areas which can collectively help to reduce fuel costs for homes and businesses. Scottish Planning Policy (SPP) sets out the policy context to support the spatial strategies defined by the Framework. SPP states that “local development plans should use heat mapping to identify the potential for co-locating developments with a high heat demand with sources of heat supply. Heat demand sites for particular consideration include high density developments, communities off the gas grid, fuel poor areas and anchor developments such as hospitals, schools, leisure centres and heat intensive industry.”

The SPP states that Local Development Plans should:

* support the development of heat networks in as many locations as possible, even where they are initially reliant on carbon-based fuels if there is potential to convert them to run on renewable or low carbon sources of heat in the future,
* identify where heat networks, heat storage and energy centres exist or would be appropriate and include policies to support their implementation.

And that policies should:

* support safeguarding of pipe runs within developments for later connection and pipework to the curtilage of development,
* give consideration to the provision of energy centres within new development,
* Where a district network exists, or is planned, or in areas identified as appropriate for district heating, policies may include a requirement for new development to include infrastructure for connection, providing the option to use heat from the network.

Local policies

In response to the policies defined by the NPF3 and SPP a number of planning authorities have begun preparing policies and strategies for their local areas. The key considerations for the planning authority should be to:

* Once heat maps have been used, identify where there are existing or proposed major heat sources or heat networks within their area;
* Consider the proximity of these sources to those areas being allocated or considered for new development;
* Consider whether or not there would be constraints in linking new development areas to the heat sources/networks;
* Consider the scale and mix of uses of new development areas, and whether the development type, or scale, might make heat networks viable without the need to connect to an existing heat source from the outset,
* Spatially identify those opportunities most likely to be delivered within or over the plan period, monitoring the situation in the five year plan cycle;
* Importantly, consider a longer term view of how the heat networks within an area could viably grow and develop into a linked network over a 10-20 year period and facilitate this within the development plan using supportive policies.

Examples include:

* The Proposed **Glasgow City Plan 2** identifies zones with potential for district heating using a concept diagram, and is considered within the context of the overall plan’s sustainable spatial strategy. The associated planning policy states:

*“The Council will support proposals to develop District Heating networks based on low carbon and renewable sources, or that facilitate the more efficient use of heat from existing energy generation or other processes. Figure 13 provides an initial indication of those parts of the City considered to have greatest potential for District Heating networks, based on an initial assessment of demand. This position will be updated through heat mapping to more accurately identify the potential for co-locating developments with a high heat demand with sources of heat supply, and Supplementary Guidance will be brought forward to identify the areas with greatest potential. In these areas, in particular, the Council expects that the feasibility of delivering district heating/connecting to existing schemes, and the potential to extend such a system to adjacent uses/sites, as part of a local heat network, will be fully evaluated by the developer during the design of new development and incorporated into the design where viable. The Council will support proposals by developers who wish to connect to existing district heating schemes.”*

* The proposed **Midlothian Local Development Plan** (Policies NRG1 and NRG2) states that:

*“Wherever reasonable, community heating should be supported in connection with buildings and operations requiring heat, aided where necessary by co-ordination across sites.”*

The plan will presume in favour of district heating at two specific sites, and the Supplementary Guidance will indicate other sites and scenarios where there is likely to be a need for justification of the choice of approach if it is uncertain that the applicant has shown sufficient support for district heating. In Midlothian consideration of technical feasibility and financial viability will be required to include:

* identification and assessment of other existing and potential heat requirements in the area which might be served in combination with the proposed development;
* discussion with the owners of existing and potential heat loads, other developers in the area, and community heating industry/ public bodies;
* exploration of fiscal and other incentives that are available; and
* reference to best practice in considering the technical feasibility and financial viability of community heating.
* The **Aberdeenshire Proposed Plan** contains a Climate Change diagram that identifies Low Carbon Heat Energy Sources, obtained through use of the heat map for the area. The related planning policy states:

*“In the case of major development proposals, an assessment of the feasibility of meeting the standards, in part, through a district heating scheme will be required. Infrastructure for heat networks will be needed for all major developments. As a minimum all new major developments must include appropriate infrastructure from the edge of the development site to a location adjacent to the rising main of each property to allow for the future installation of metered heat. In areas not served by mains gas, consideration should be given to hot rock geothermal or biomass sources as a means of achieving these standards…*

*…An Energy Statement should be submitted at the planning application stage to demonstrate how the proposed development will satisfy the requirements of this policy. Suspensive conditions may also be used to deliver this policy to avoid any unnecessary delays in processing planning applications.”*

# **Module 4 - Business, commercial and financial model**

***Review*** *the project opportunities, the stakeholders (who may be other potential project participants) and customers identified above, so as to select a particular project or projects to prioritise.*

***Consider*** *the LA’s aims and objectives for district heating and how these may impact the choice of delivery structure.*

***Consider*** *the LA’s legal powers to take the identified project(s) forward, and note the need to consider legal powers for any other public sector project participants (other than at customer only level).*

***Prepare*** *a project risk matrix, covering the risks associated with procurement, construction, commissioning and subsequent operation and maintenance, metering and billing of a DHN project.*

***Taking account*** *of the risk matrix, discuss and agree the LA’s appetite for direct participation and its attitude to risk (consider “control versus risk”).*

***Taking account*** *of that analysis, consider how the project(s) may best be delivered, bearing in mind that other stakeholders may also be involved in delivery.*

***Consider*** *whether a delivery vehicle will be required, such as an ESCo and, if so, what type of legal entity it should be.*

***Review*** *financing and incentive options for the project.*

***Consider*** *project governance, including interfaces with any other stakeholders and with any ESCo which may be established.*

***Consider*** *procurement options for the project – design and build of DHN energy centre and infrastructure, and subsequent operation and maintenance, metering and billing.*

***(This box to be deleted from the final document)***

* **Development** – large scale district heating projects are typically successful where a phased approach is adopted. Where a larger scheme is envisaged, procurement will typically include the delivery of a small number of initial phases with the opportunity to develop and deliver future phases;
* **Delivery** – responsibility for implementing the various elements of the project (generation, transmission, management - as described above); and
* **Funding & financing** - the funding and financing requirement for the project will be dependent on the commercial viability of both the initial phase(s) and the overall project.

A variety of structures have been successfully deployed to deliver heat networks in the UK. These reflect the diversity of drivers, objectives and constraints that characterise schemes. The main ones are illustrated in the table below.

|  |  |  |
| --- | --- | --- |
| **Delivery Structure** | **Description** | **Relevant examples of DISTRICT HEATING schemes** |
| Public led, public sector ownership | Public sector organisation leads the development of the project and takes full financial risk. Elements of the construction and operation are outsourced to the private sector through turnkey asset delivery contracts.  | Aberdeen Heat and Power LtdDunfermline Community Energy SchemeLondon Borough of IslingtonPimlico District Heating Undertaking |
| Housing association led scheme | Residential Social Landlord led project, with RSL making a financial contribution and taking financial risk for the project. Elements of the construction and operation are outsourced through turnkey asset delivery contracts.  | Cube Housing Association (Glasgow) |
| Public led, private sector ownership | Public sector procures a private sector partner under a long-term service concession agreement. Concessionaire develops, owns and operates scheme(s) in a defined area for the term of the concession agreement. Assets may or may not revert on expiry.  | LeicesterBirmingham |
| Private led, private sector ownership | Private sector led – developer procures a long-term private sector ESCO partner to develop, own and operate a scheme on the developer site under a long-term concession. Ownership of the assets sits with the ESCO.  | Kings CrossCranbrook / Skypark |

The development of an appropriate delivery structure will be strongly influenced by the objectives of the lead organisation. The process is iterative rather than sequential, and requires the careful balancing of these objectives against a number of other factors, including:

* the degree of control (usually exercised either by ownership of assets or through a variety of contractual mechanisms) that the lead organisation wishes to exercise over the development and operation of the scheme;
* the risk appetite of the lead organisation and other key stakeholders;
* the scale and type (e.g. new build / retrofit) of scheme;
* phasing of the scheme;
* the required return on investment and the overall commercial viability of the scheme;
* the capacity and capability of the lead organisation to develop and operate the scheme;
* availability of funding and access to finance;
* impact of legislation and regulation; and
* exit strategy.

As part of the Heat Network Partnership, Scottish Futures Trust has produced guidance on various subjects related to the delivery of heat networks. The guidance, which includes a number of detailed case studies, is primarily aimed at the public sector in Scotland, and is highly relevant to local authorities. The subjects covered include[[1]](#footnote-1):

* guidance on delivery structures for heat networks;
* legal guidance on the powers of Scottish public bodies to generate, procure and trade heat and electricity, and the legal, regulatory and administrative constraints on these powers; and
* legal guidance on energy service companies (ESCOs), including the rationale and process for establishing ESCOs, types of structures that can be used, and governance arrangements.

## It is recommended that this guidance is consulted to assist with developing appropriate delivery structures for individual projects

## Project delivery

[INSERT TEXT]

## Risk appraisal

[INSERT TEXT]

## Delivery vehicle required?

[INSERT TEXT]

## Form of delivery vehicle

[INSERT TEXT]

## Financing options and sources of funding

[INSERT TEXT]

***Review*** *the project economic viability, and the interrelationship with the aims and objectives of the project.*

***Consider*** *the potential support mechanisms that may be applicable for the chosen technology and heat users including but not limited to:*

* *Renewable Heat Incenstive (RHI) / Feed in Tariff (FiT)*
* *Energy Company Obligation (ECO)*

***Consider*** *the project viability and potential financing options that might be applicable, including but not limited to:*

* *Green Investment Bank*
* *Low Carbon Infrastructure Transition Programme*
* *European Funding: ELENA, EEEF, Horizon 2020*
* *District Heating Loan Fund*
* *Community and Renewable Energy Scheme (CARE)S*
* *Renewable Energy Investment Fund*
* *SPRUCE*

***Prepare*** *a detailed financial model for the project incorporating the potential support funding and chosen financing route.*

***Taking account*** *of the potential risks associated with the implementation and operation of district heating networks undertake sensitivity testing to determine the quantitative impact on the project economic viability.*

***Review*** *the compatibility of the chosen delivery approach and funding and financing approach.*

***(This box to be deleted from the final document)***

## Project governance

[INSERT TEXT]

## Procurement (infrastructure, operation and maintenance)

[INSERT TEXT]

# **Project delivery and next steps**

[INSERT TEXT]

# **Appendices**

Opportunity Summary sheets

# **Further information**

*This list can be left in the document for reference. You should add any local documents and references to the list.*

***(This box to be deleted from the final document)***

**Business Case**

Scottish Futures Trust guidance (delivery structures, establishing an ESCo, legal powers of public bodies to generate, procure and supply heat and electricity): <http://www.districtheatingscotland.com/content/procurement>

Assessment of the costs, performance and characteristics of UK heat networks, Aecom for DECC, 2015: <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/418807/DECC_Heat_Networks.pdf>

**Heat Map**

Scotland Heat Map and supporting information: [www.scotland.gov.uk/heatmap](http://www.scotland.gov.uk/heatmap)

**Standards**

CIBSE and CHPA: Heat Networks Code of Practice for the UK: Raising Standards for Heat Supply: <http://www.cibse.org/getmedia/37b074a1-517b-4868-89aa-88947d8ced44/draft-HeatNetworks-Code-of-Practice-for-the-UK.pdf.aspx>

Scottish House Condition Survey 2012: [www.scotland.gov.uk/Publications/2013/12/3017](http://www.scotland.gov.uk/Publications/2013/12/3017)

**Masterplanning**

Decentralised Energy Masterplanning - A Manual for Local Authorities (Ove Arup & Partners Ltd 2011): <http://www.londonheatmap.org.uk/Content/uploaded/documents/EMP_Manual_lo.pdf>

**Programmes**

Heat Network Partnership: <http://www.districtheatingscotland.com>

Heat and the City: [www.heatandthecity.org.uk](http://www.heatandthecity.org.uk)

District Energy Vanguards Network Newsletter: [www.heatandthecity.org.uk/newsletter](http://www.heatandthecity.org.uk/newsletter)

The Association for Decentralised Energy: <http://www.theade.co.uk>

Scottish Planning Policy 3: <http://www.gov.scot/Resource/0045/00453827.pdf>

United Nations Education Programme “District Energy in Cities” (2015): <http://www.unep.org/energy/districtenergyincities>**Policy**

Scottish Government draft Heat Generation Policy Statement: <http://www.gov.scot/Publications/2014/03/2778>

Electricity generation policy statement: <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/EGPSMain>

Heat policy statement: http://www.gov.scot/Publications/2015/06/6679The London Heat Network Manual: <http://www.londonheatmap.org.uk/Content/TheManual.aspx>

**General**

Background Report on EU-27 District Heating and Cooling Potentials, Barriers, Best Practice and Measures of Promotion: <http://setis.ec.europa.eu/system/files/JRCDistrictheatingandcooling.pdf>

Improvising innovation in UK urban district heating: The convergence of social and environmental agendas in Aberdeen, Jan Webb, Energy Policy, December 2014: <http://www.sciencedirect.com/science/article/pii/S0301421514006685>

The ADE map is at: <http://www.theade.co.uk/installation-map_790.html>

# **Case studies**

## Case study 1: Copenhagen

The Copenhagen district heating system is one of the most extensive and well developed systems in the world. In the early 1970s the Danish Government launched a comprehensive heat planning process including passing the Heat Supply Act in 1979. The district heating network in Copenhagen now extends to 150 kilometres, and links 20 heat distribution networks. Heat is produced in four CHP plants (gas, biomass and coal-fired), three Energy from Waste plants, and 40 backup boiler plants.

The Copenhagen system cuts CO2 emissions by 40% to 50% compared to oil or gas, and supplies heat to meet 98% of the heat requirements of the city. In 2009, Copenhagen Energy estimated that the efficiencies in district heating mean that district heating costs approximately 45% to 55% less than oil or gas for a typical home.

## Case study 2: Aberdeen

Aberdeen Heat and Power is an ESCo that provides heat and water to over 2,000 residences and 13 non-domestic properties using combined heat and power in a network which is increasing by the day. The system currently generates 2.5Mw of electricity which will increase to 4.3Mw by the end of 2015. As a not-for-profit entity, the company makes a surplus which is ploughed back into the network at the same time as successfully alleviating fuel poverty.

## Case study 3: Wick

Glenshellach District Heating Scheme serves a new social housing development (Glenshellach Housing Phases 2 and 3) which comprises 89 domestic properties. These are villas, semi-detached two-storey houses and flats (four-in-a-block type). All the homes include energy efficiency measures and sustainable features such as local timber and sun porches. Properties are placed within the site to maximise solar gain. They are heated by a single 650kW woodchip boiler. <http://www.gov.scot/Publications/2009/03/20155542/33>

## Case study 4: Small scale estates

Forestry Commission guide on wood fuel practice on farms and estates. <http://www.usewoodfuel.co.uk/media/349434/fcs_farms_and_estates_sector_a4_screen_090312.pdf>

## Case study 5: Sheffield

Sheffield’s City Centre District Energy Scheme is an award-winning community heating scheme that meets the heating and hot-water needs of some 140 buildings in the city centre. The network serves offices, public buildings, hotels and around 2,800 residential households, most of which use smart meters. The scheme saves an average of over 21,000 tonnes of CO2 a year.

Hot water for the Sheffield community heating scheme is provided from an energy recovery plant fuelled by non-recyclable waste from both domestic and business premises. This is waste which would otherwise go to landfill, and shows how community heating can work in conjunction with a city’s wider environmental strategy.

## Case study 6: Nottingham

Nottingham’s community heating scheme serves around 5,000 homes and more than 100 businesses. Similarly to Sheffield, the scheme’s heat is produced by the Eastcroft Energy from Waste plant. The scheme is reducing fuel poverty and residents’ energy bills, and 27,000 tonnes of CO2 emissions are offset by the network each year.

Nottingham’s community heating scheme aims to tackle fuel poverty in the city. The scheme has been able to achieve this by also implementing metering and billing services which have helped residents to better manage their consumption and cut their energy bills.

# **Glossary of terms**

(Based on District Energy Vanguards Network Newsletter)

Produced in association with

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AC – air conditioning

ACEEE – [American Council for an Energy-Efficient Economy](http://aceee.org/)

AD – anaerobic digestion

ADE – [the Association for Decentralised Energy](http://www.adb.org/)

AREA – [Air Conditioning and Refrigeration European Association](http://www.area-eur.be)

ASPs – [air source heat pumps](http://en.wikipedia.org/wiki/Air_source_heat_pumps)

CDM – Construction, Design and Management

CERO – [Carbon Emissions Reduction Obligation](http://www.osborneenergy.co.uk/energy-grants/CERO.html)

CCHP – combined cooling, heating and power

CHP – combined heat and power

CSCO – [Carbon Saving Community Obligation](https://www.gov.uk/government/publications/carbon-saving-community-obligation-rural-and-low-income-areas)

CSP – [Concentrated Solar Power](http://en.wikipedia.org/wiki/Concentrated_solar_power)

CTF – [Clean Technology Fund](http://www.climatefundsupdate.org/listing/clean-technology-fund)

DCLG – [Department for Communities and Local Government](https://www.gov.uk/government/organisations/department-for-communities-and-local-government)

DECC – [Department for Energy and Climate Change](https://www.gov.uk/government/organisations/department-of-energy-climate-change)

DE – decentralised (or distributed) energy, often used to refer to electricity as well as heat networks.

DES – district energy system

DEA – [Danish Energy Agency](http://www.ens.dk/en)

DH – district heating

DH&C – district heating and cooling

DHN – district heating network

DUKES – [Digest of UK energy statistics](https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes#2014)

EBRD – [European Bank for Reconstruction and Development](http://www.ebrd.com/pages/homepage.shtml)

ECCC – [(Commons) Energy and Climate Change Committee](http://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-change-committee/publications/)

ECO – [Energy Company Obligation](https://www.gov.uk/government/policies/helping-households-to-cut-their-energy-bills/supporting-pages/energy-companies-obligation-eco)

The three obligations under ECO are:

CERO - Carbon Emissions Reduction Obligation

CSCO - Carbon Saving Community Obligation

HHCRO - Home Heating Cost Reduction Obligation

EED – [the EU Energy Efficiency Directive](http://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive)

EEEF – [European Energy Efficiency Fund](http://www.eeef.eu/)

EIB – [European Investment Bank](http://www.eib.org/index.htm)

EPC – [Engineering, Procurement and Construction](http://www.epcengineer.com/definition/132/epc-engineering-procurement-construction)

ESCo – [Energy Service Company](http://en.wikipedia.org/wiki/Energy_service_company)

EGS – [Enhanced Geothermal System](http://en.wikipedia.org/wiki/Enhanced_geothermal_system)

EfW – [Energy from waste](http://en.wikipedia.org/wiki/Waste-to-energy) (aka WtE)

EU ETS – [EU Emissions Trading System](http://ec.europa.eu/clima/policies/ets/index_en.htm)

GHG – greenhouse gas

GSPs – [ground source heat pumps](http://www.designingbuildings.co.uk/wiki/Ground_source_heat_pumps)

GTCC – [gas turbine combined cycle](http://en.wikipedia.org/wiki/Combined_cycle)

HNDU – [Heat Networks Delivery Unit (DECC)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/364231/HNDU_FAQs_Oct2014.pdf)

IBRD – [International Bank for Reconstruction and Development](http://www.worldbank.org/en/about)

IDEA – [International District Energy Association](http://www.districtenergy.org/) (US)

IEA – [International Energy Association](http://www.iea-dhc.org/home.html)

ITT – Invitation to Tender (European equivalent to RFP)

JV – Joint Venture

LEED – [Leadership in Energy and Environmental Design](http://www.leed.net/)

LEEF – [London Energy Efficiency Fund](http://www.leef.co.uk/)

MSW – municipal solid waste

Ofgem – [Office of Gas and Electricity Markets](http://www.ofgem.gov.uk)

ORC – [Organic Rankine cycle](http://en.wikipedia.org/wiki/Organic_Rankine_cycle)

OTEC – [Ocean Thermal Energy Conversion](http://en.wikipedia.org/wiki/Ocean_thermal_energy_conversion)

PV – Photovoltaic

PV-T – [Photovoltaic-Thermal](http://www.solimpeks.com/pv-t-hybrid-collectors/)

QUEST – [Quality Urban Energy Systems of Tomorrow](http://www.questcanada.org/)

RDF – [Refuse-derived fuel](http://en.wikipedia.org/wiki/Refuse-derived_fuel)

READY – [Resource efficient cities advanced smart city solutions](http://www.smartcity-ready.eu/)

RHI – [Renewable Heat Incentive](https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi)

RT (or TR) – [Refrigeration Ton](http://en.wikipedia.org/wiki/Ton_of_refrigeration)

RTH – Refrigeration Tonnes per hour

SDC – Seawater District Cooling

SRF – [Solid recovered fuel](http://erfo.info/What-is-SRF.68.0.html)

STES – [Seasonal thermal energy storage](http://en.wikipedia.org/wiki/Seasonal_thermal_energy_storage)

TR (or RT) – [Tons of Refrigeration](http://en.wikipedia.org/wiki/Ton_of_refrigeration)

TSB – [Technology Strategy Board](https://www.innovateuk.org/)

TSE – Treated Sewage Effluent

UKERC – [UK Energy Research Centre](http://www.ukerc.ac.uk/support/Home)

WtE – [waste-to-energy](http://en.wikipedia.org/wiki/Waste-to-energy) (aka EfW)

WADE – [World Alliance for Decentralized Energy](http://www.localpower.org/)

WWTP – [wastewater treatment plant](http://en.wikipedia.org/wiki/Wastewater_treatment_plant)

1. Available at: <http://www.districtheatingscotland.com/content/procurement> [↑](#footnote-ref-1)