



Heat Networks: Applicant Guidance

This guidance will outline what supporting information would make a high-quality heat network application.

Heat networks generally involve four main components and processes: heat generation, heat distribution, heat transfer and heat metering.

1. Heat generation

The energy centre is where heat is generated and supplied to the network. Heat generation sources include combined heat and power (CHP) plants, boilers, renewable sources (e.g. heat pumps) or waste heat recovery from industrial processes, data centres, or incineration centres.

2. Heat distribution

A network of insulated pipes that transport hot water/steam from the energy centre to various buildings. Pipes must be insulated to minimise heat loss during transportation and improve system efficiency.

3. Heat transfer

Substations are located at the entry points of buildings, where plate heat exchangers transfer heat from the distribution network to internal heating systems.

4. Heat metering and control

Heat metering systems measure the thermal energy used by the consumer, allowing for accurate billing. Control systems will include flow and return temperature control and BMS to ensure flow rate can be regulated and temperature delivered to the building, as well as managing heat demand efficiently, and ensuring comfort and energy efficiency.

Heat network requirements

A connection to a heat network requires a wet heating system to be in place with a centralised heating source and distribution network for all buildings. The design conditions of both the network and the building/site heating systems need to be known.

The adaption work required to connect a site to a heat network will depend upon the heat network flow and return temperatures which cannot be assumed to be the same in all instances. If an old site with multiple, different heating systems was to be connected to a heat network, then works would be required to connect the plant rooms on site together to form a single system or create multiple connection points to the network.

Where a heat network supplies lower temperatures than the existing system, it is necessary to replace or upgrade existing wet heating systems (including radiators). The lower the mean temperature in the heating system, the more radiators need to be oversized. If heat

network flow and return temperatures are not known, then it is not possible to be certain that a building is “heat network ready”.

The work required to upgrade any existing system will depend upon:

- The grade of heat provided at present (the flow temperatures)
- The grade of heat to be provided by the network
- Site specific factors limiting works – e.g., a working hospital or prison

Additional side notes:

1. For a heat network to provide heat to a site which currently uses steam, the equipment to be replaced will depend upon each site and will need a detailed site survey to have been carried out
2. If a heat network distributes heat at temperatures which are insufficient to heat water to 60C in a hot water supply system, a separate means of heating the water is required for legionella purposes for DHW

PSDS Criteria

New building connections to district heat networks are an eligible low carbon heating system for the individual building being connected.

- ‘Connect to existing district heating’ should be selected in the Application Form for all buildings where a new connection to a district heat network will provide the building’s heating.
- ‘Connect to onsite heat network’ should be selected in the Application Form for buildings where a connection is made to an existing energy centre on site.

In either case, there is no requirement for changes to be made to the energy centre that supplies the network with heat. Energy efficiency measures can be installed in the newly connected building to meet the ‘whole building’ approach.

Improvements to the current network will not be eligible unless accompanied by the installation of a low carbon heating system in the energy centre, replacing an end-of-life fossil fuel heating source.

For example, a whole heat network de-steaming project will require a low carbon heating system to be installed in the network’s energy centre to meet low carbon eligibility criteria. De-steaming of the rest of the system can then be entered as ‘pipework improvement’ in the energy efficiency and enabling measures section of the Step 4 Support Tool. Other energy efficiency measures can be combined with the new low carbon heating system in any building connected to the network.

Eligible costs that can be claimed through PSDS funding include the one-time connection fee. This is charged by the heat network operator and includes costs of connecting the building to the network; other costs can include laying of the pipes, installing heat exchangers and connecting the network to the building’s internal heating system. Any post connection costs including unit rates and standing charges cannot be claimed under PSDS funding.

Commented [CS1]: Can we mention eligible costs here?
This is always a common question from potential applicants

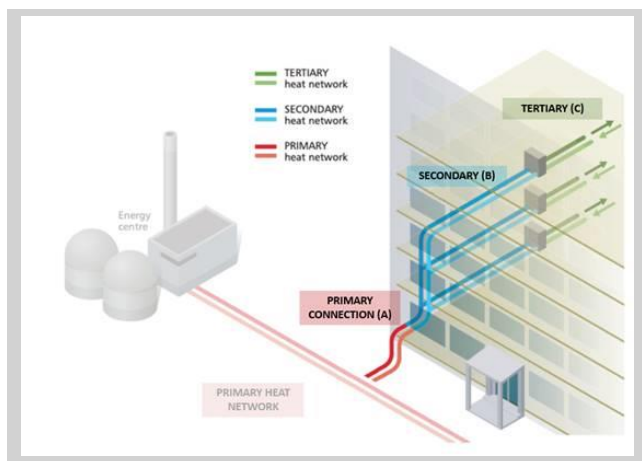
Commented [AG2R1]: added a para on the bottom of this section

Different Heat Network Connections

There will be different costs associated with a heat network connection depending on how a site is connected. It is important to identify which connection will be used in your application:

- (A) Primary Connection: A connection made between the primary network and the building.
- (B) Secondary Connection: Pipework within the building up to the heat exchange.
- (C) Tertiary Connection: Pipework from the heat exchanger onwards.

Figure 1



Information you will need to provide with your application

Provide background information on what system is being replaced and what existing infrastructure is going to be used to connect to the heat network? Please refer to checklist below:

Key checks and supporting information required for Heat Network Applications

1. Details of the heat network you intend to connect to.	<input type="checkbox"/>
2. Which generation of heat network is being used?	<input type="checkbox"/>
3. Details of the building fabric showing that it is suitable for this measure.	<input type="checkbox"/>
4. Heating system sizing calculation based on building peak heat loss.	<input type="checkbox"/>
5. Calculations evidencing the heat loss figures for the primary pipework connecting the building to the energy centre.	<input type="checkbox"/>
6. Schematics and drawings of existing and proposed system.	<input type="checkbox"/>
These network design drawings should clearly demonstrate the pipelines to be funded by the Public Sector Decarbonisation Scheme.	<input type="checkbox"/>
7. Flow and return temperatures for existing and proposed system.	<input type="checkbox"/>

8. Water flow rate for existing and proposed system.	<input type="checkbox"/>
9. Show that the proposed pipework and pumps are suitable for the required flow rate.	<input type="checkbox"/>
10. Show that the heat emitters have been sized for the flow temperature set out <ul style="list-style-type: none"> • Details of current heat emitters • Details of proposed heat emitters 	<input type="checkbox"/>
11. Bespoke carbon factor calculation for the Heat Network.	<input type="checkbox"/>
12. Design considerations for how thermal losses across the network will be minimised, including pipe insulation.	<input type="checkbox"/>
13. Cost evidence including connection fees, standing charges and variable fuel rates.	<input type="checkbox"/>
14. Consideration of how legionella will be controlled.	<input type="checkbox"/>
15. Evidence that the new connection will be operational by the grant end date.	<input type="checkbox"/>
If you are also including heat pumps as part of your heat network, please refer to the heat pump guidance. You will need to complete the check list for heat pumps as well as heat networks if your project includes both measures.	<input type="checkbox"/>

Show that the building fabric is suitable for your proposed heat network connection for any systems proposing lower flow temperatures than the existing system.

The building needs to have a reasonable level of insulation and air tightness so that it is possible to heat it sufficiently using low temperature hot water for heating.

Please provide details of the existing building thermal envelope including areas and U-values i.e. floor, walls, roof, windows and doors.

Sizing New Heating System

The peak heat loss of the building needs to be calculated. This can then be used to size the new heating system.

- The peak heat load of the property needs to be calculated by measuring all the fabric and ventilation/infiltration heat losses for the coldest day of the year based on geographic location. As per CIBSE guides.
- Estimate of air change rates can be used for ventilation rate estimate.
- The calculation should account for the areas of the walls, floors, roof, windows and doors and their U-values.
- When retrofitting heat networks to existing buildings, heat demands can often be estimated using actual fuel use data.
- The peak kW rating of the connection needs to match the peak kW heat loss of the building.

Domestic Hot Water (DHW)

Please specify how you propose to meet your DHW demand. This needs to be considered when sizing your heat pump/heat network if it is also providing DHW. If you are planning to use another method to provide your DHW then please provide details of this installation and the same level of supporting information as for you proposed heating system

Survey for Existing Heat Emitters

A survey of existing heat emitters needs to be completed for any systems proposing lower flow temperatures than the existing system.

The lower flow temperatures of heat pumps require larger heat emitters than tradition boiler systems to allow the heating system to provide the set point temperature in the building. A survey needs to be completed to see whether existing heat emitters are large enough for the proposed flow temperature. If some or all the heat emitters are not large enough then they will need to be replaced to allow the heating system to heat the building to the desired set point temperature.

Survey for Existing Pipework

A survey of existing pipework needs to be completed for any systems proposing higher flow rate than the existing system.

The pipework needs to be compatible with the new flow rates. Systems with lower temperatures differences between the flow and return water temperature require higher flow rates to meet building heating demand. Heat pumps/heat networks generally have a lower temperature difference between flow and return temperatures when compared to fossil fuel systems and therefore need higher flow rates. If the old pipework is too small in diameter for the new flow rates required by the heat pump, then it needs to be replaced.

Appendix

Heat network customer responsibilities

A successful heat network depends on the co-operation of the heat customers. The following is a list of responsibilities that should be known by heat customers who wish to exist within a functional heat network. Customers should:

- Recognise the importance of return temperatures and ensure that their system operates as designed, as well as accepting and acting on advice provided by the Heat Network Operator.
- Not interfere with the system and should not touch the valves or any parts of the system except designated user controls. Lead seals should be used where possible.
- Understanding that by virtue of it being a heat network, there are likely to be multiple customers affected when issues occur within the system.
- Pay any charges levied in accordance with the contract between the customer and the Heat Network Operator in a timely manner.
- Respect unauthorised access and not use heat network plant rooms for storing other equipment.