

Heat Networks Delivery Models Report Summary

February 2024



Introduction

To help understand how the delivery of heat networks in Scotland can be improved, the Scottish Government asked infrastructure specialists the Scottish Futures Trust (SFT), to undertake a review of various delivery models and assess their potential for increasing the pace and scale of heat network delivery.

This paper summarises the findings of SFT's report, [*Heat Networks Delivery Models Report*](#).

What are heat networks, and why do we need more of them?

Heat networks distribute heat or cooling from a central source (or sources), and deliver it to a variety of different customers such as public buildings, shops, offices, hospitals, universities and homes. Economies of scale mean heat networks are also uniquely able to use local sources of low carbon heat which would otherwise go to waste, such as from factories, data centres, the ground or rivers.

Heat networks are very common in a number of European countries. In Sweden for example, heat networks supply more than 50% of all heat supply to buildings. In Scotland that percentage is less than 2%¹.

If Scotland is to meet its ambitious climate change targets, this percentage needs to increase rapidly: heat networks have been identified by the Scottish Government as a key low-regret technology that will help deliver the transition to zero emissions heating systems.

>50%



Heat networks supply >50% of heat to buildings in Sweden

<2%



Heat networks supply <2% of heat to buildings in Scotland

¹ Heat network output in Scotland has been estimated to be around 1.8% of current non-electrical heat demand. Source: [Heat networks – thermal energy target 2035: consultation](#), December 2022

Understanding the challenges

Scotland's heat network challenge lies in delivering low carbon heat networks at the appropriate pace and scale, to ensure there will be enough heat networks to meet future demand (in areas where they are the most appropriate decarbonisation solution).

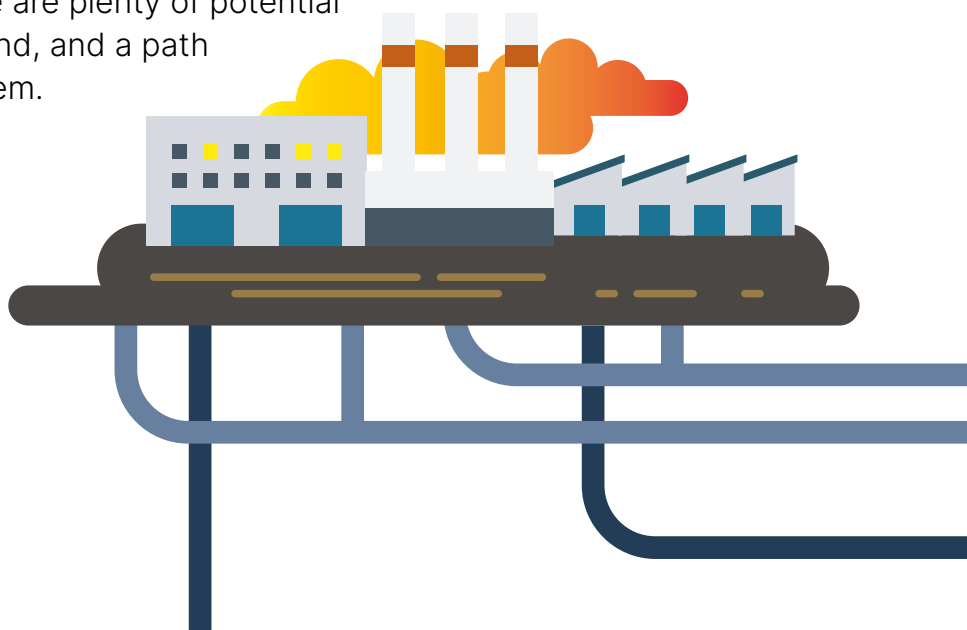
In SFT's Report, key barriers were identified to the delivery of heat networks at scale.

We know from engaging with the market and key stakeholders that there is significant interest and private capital available to invest in heat networks in Scotland. However, opportunities to invest are currently few and far between. Due to the complexity and risk involved in developing heat networks, investors and developers prefer to invest in larger projects (>£50m), which benefit from economies of scale and have potential for growth. Most heat networks developed recently in Scotland have been relatively small scale, and although they are usually designed in a way that will support expansion, in practice projects have struggled to expand and connect more customers.

At present, the public sector (and local authorities in particular) has a key role in bringing these projects to market as the primary initial customer – large public sector buildings offer excellent 'anchor loads' (i.e., buildings with high and ongoing heat demand) which are essential to make projects investable. Buying heat for these buildings usually requires a procurement exercise. However, bringing heat network projects to market can be challenging: identifying the optimum scale of the opportunity; understanding possible technical solutions; deciding how the network will be delivered, procured and managed; mitigating demand risk and demonstrating value for money, are all complex and time-consuming activities. Local authorities can have significant gaps in skills, capacity and resource to undertake elements of this work.

In addition, stakeholders, both public and private, are clear that policy & regulation need to provide greater demand assurance in order to de-risk potential projects and unlock investment at scale.

Despite these challenges, there are plenty of potential heat network projects in Scotland, and a path needs to be found to unlock them.



The Report’s recommendations

SFT reviewed the heat network delivery models currently in use in the UK, and also identified and analysed some potential new heat network delivery models. SFT ran a qualitative evaluation to score the models against a set of agreed attributes, then used the total scores to rank the models. Details of how SFT carried out its evaluation can be found in **section 1.3** of [the Report](#).

1 SFT concluded there is still a significant role for some delivery models already in use for heat networks in the UK, although some are inherently less suitable for the roll-out of heat networks at scale. SFT identified ways in which existing models can be improved upon in the short term, for example by different approaches to procurement.

2 SFT also concluded that some of the potential ‘new’ models, if taken forward by the Scottish Government, could help to drive delivery at much greater pace and scale.

3 SFT also made a series of general recommendations that could support the delivery of heat networks in Scotland. A detailed list of those recommendations are set out in **section 8** of [the Report](#).

Delivery models – recommendations

Role for existing delivery models

Public sector led



Joint Venture between local authority and private sector



Concession



Potential new models for heat networks

A regional energy partnership (RESCO – Regional ESCo)



Scottish Government investment and delivery



Role for existing delivery models

Public sector (non-Scottish Government) in-house delivery

Heat networks which are wholly owned and operated by a public body might be the only viable option in some cases, for example smaller, single site schemes or projects with positive but low returns. However, SFT concluded this model (usually based on self-supply arrangements (e.g., local authority buildings, or a public sector campus) is **not** likely to support delivery at scale, given the level of capital investment required, and the wider context of constrained public sector budgets and capacity.



Concession

In this model, the heat network is owned and operated by the private sector under a long-term service concession that has been tendered by a public body. The public sector offers anchor loads, and the concessionaire finances the capital investment, designs, builds and operates the scheme, and takes financial risk. SFT concluded the concession model continues to offer a successful route to the procurement and delivery of heat networks for authorities which have opportunity areas of a sufficient scale, but are unable to take on any investment risk. However, concessions are usually targeted at specific sites/ areas, and hence can be less effective at delivering multiple subsequent projects from a single procurement. The concession model also gives away a lot of control and value to the private sector – in exchange for the risk transferred to the concessionaire. This risk transfer results in a higher cost of capital, which can make it harder / more costly to secure wider public policy objectives. For example, ensuring the network does not only serve the most profitable connections, but also connects priority areas for the local authority, including areas of fuel poverty. Concession contracts can also prove to be relatively inflexible over the long-term. SFT made recommendations in relation to monitoring actions and development of standardised procurement and contract documentation for concessions.



Joint Venture between local authority and private sector



In this model, a local authority procures a partner and forms a joint venture (JV) to serve an initial project (including one or more local authority anchor loads) and potentially additional projects and/or other types of energy projects within the local authority area. This model offers the potential for developing a strategic, long-term and mutually beneficial relationship with an experienced and competent private sector delivery partner. It also offers procurement efficiencies, because the single procurement of a partner has the potential to unlock multiple projects, without the need for further public procurements. The JV model allows both public and private sector to play to their strengths: the private sector brings investment capacity and delivery expertise, and the public sector brings investment opportunities, relationships with local stakeholders, and, by sharing in risk and return, has an equal interest in making the relationship work. Public involvement can allow a degree of focus on policy objectives to be maintained over the longer term, and support the identification of new projects involving public buildings. However, this model still requires local authority investment that may not be available, or which may become increasingly constrained over time as local authorities balance competing demands for scarce capital budgets. SFT recommended resources are put into the further development /consideration of the JV model, including the preparation of template documents and guidance (which will become available in 2024 from the Heat Network Support Unit), with a view to encouraging its use by local authorities.



Potential new models for heat networks

A regional energy partnership (RESCo – Regional ESCo)



A new model for heat networks which SFT developed and evaluated.

The concept is based on Scotland's 'hub' model, under which five regional partnerships between the public and private sector were established to streamline and improve the planning and delivery of community infrastructure in Scotland. In the 'RESCo' model, local authorities and public sector bodies across a region would jointly procure a private sector partner to develop and deliver heat networks, and potentially other energy or retrofit projects, across the region. The majority shareholding in, and hence ultimate control over, the RESCo would be held by the private sector partner. The partner would bring investment capital, delivery capacity and expertise and a flexible supply chain to the RESCo. Its role would be to work with the participating public sector bodies to identify and develop a strategic, long-term pipeline of projects and deliver them under a suite of standardised contracting structures. Some of the public sector bodies would hold a minority share in the RESCo, including a small share to be held centrally by Scottish Government (or other central entity). The RESCo would respond to requests from the public bodies (e.g., to connect or otherwise decarbonise their buildings), but would also have the opportunity to develop and grow heat networks in the area. Scotland's HubCos offer high levels of transparency and reporting around supply chains, profits and delivery against outcomes (including community benefits). We believe heat networks (and potentially other types of energy projects) would also benefit from this approach. While this model needs further development, SFT believes it has significant potential to support heat network development and wider place-based decarbonisation in all geographies, building on a successful delivery route.

Scottish Government investment and delivery



SFT also reviewed two other new delivery models (for heat networks) which envisaged a greater level of Scottish Government involvement. One model would involve the Scottish Government (or a new central body) making equity investments **alongside** local authorities (instead of, or in addition to, grant funding), in either three-way joint ventures with the private sector, or two-way joint ventures with the local authority. This could help share central expertise more widely and effectively, and give greater confidence to local authorities to make investment decisions, by government sharing in risk and return and being involved in ongoing project governance. The other model envisioned a more practical role for the Scottish Government/new central body in bringing heat network projects to market, in areas where local authorities were not actively procuring partners, concessionaires or suppliers to make heat network opportunities a reality. The most interventionist version of this model could see Scottish Government wholly owning large heat networks. While both models could have significant Scottish Government balance sheet implications, SFT concluded these models have positive features that are worth further consideration.

SFT also made a series of general recommendations that could support the delivery of heat networks in Scotland



Developing a long term 'vision'

There would be value for Scottish Government in going further and developing a 'vision' for how heat networks in Scotland should operate in the long term. SFT suggested this should include future-proofing new heat network development to support potential consolidation of assets in the long term.



Capacity and skills challenge

This is a major constraint for public sector bodies and is slowing heat network delivery. Supply chain capacity is also limited. Public and private sector capacity needs to be deployed as efficiently as possible.



Need for procurement efficiency

There needs to be a move away from procuring one project at a time, in favour of delivery models which enable the delivery of multiple projects from a single procurement exercise. SFT also recommended the use of more efficient procurement routes, in which the private sector's design and delivery expertise is utilised earlier in the process.



Support for demand assurance

Reducing 'demand risk' in heat network projects is key to making them investable. All delivery models SFT evaluated were equally sensitive to this risk, and only a few models offered a reduction in this risk via their design. SFT recommended the Scottish Government should continue to seek opportunities to provide greater demand assurance to all projects, independent of the choice of delivery model.

Next steps

Since the completion of [the Report](#) in May 2023, SFT has been working with the Scottish Government to take forward a number of the recommendations set out in the Report. SFT is planning to undertake further stakeholder engagement on this work during the first quarter of 2024.

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