PRESS RELEASE

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DISTRICT HEATING: HAS ITS TIME TO SHINE ARRIVED?

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According to the Association for Decentralised Energy, the continuing growth in the use of district heat networks in the UK has reached an estimated 2 per cent of the overall UK heat demand across the domestic, public, industrial and commercial sectors. District heating is now being used in over 53,000 UK homes and shows strong signs of continuing its upward trend as the benefits for those in multi-occupancy buildings – and for the environment – become more apparent.

The district heating concept comprises one or more central heat sources instead of individual boilers. By pumping hot water or steam through a network of pre-insulated underground pipes it delivers heat from the point of energy generation to the end user. Generating heat in one central plant can be more economical than production in multiple smaller ones (such as individual households), which is one of the reasons why district heating is growing in popularity in the UK. Labour and maintenance costs are lowered and carbon emissions can also be reduced, particularly if renewable energy sources are used.

With the latest stage in a £320 million programme to encourage the mass rollout of heat networks, launched by the Department for Business, Energy and Industrial Strategy (BEIS) in October 2018, and grants and loans available to network developers under the Heat Networks Investment Project (HNIP), first-round applications are currently being assessed.

All this means an increased focus on district heating systems, particularly in densely populated areas where they are most suitable – delivering heat more efficiently, more cheaply and with lower carbon emissions. Such systems can work particularly well using a mix of residential and non-residential users, creating a more stable heat load profile.

Getting the fundamentals right

The Code of Practice for Heat Networks published by CIBSE in 2015 provided a guideline for industry to deliver more efficient and overall more reliable heat networks (www.cibse.org/CP1). It divided the process of delivery of a heat network into phases, such as the feasibility assessment covering essential checks to ensure the scheme makes technical and commercial sense, the design, construction, commissioning, operation, handover and maintenance phases with detailed performance requirements for each.

The Code introduced two performance levels for each phase, the minimum requirements and the Best Practice requirements. It emphasised the importance of getting the brief right at the start to deliver any district heat network successfully. This means effective client and stakeholder meetings to agree the scope, scale and priority of the heat network, as otherwise stakeholders can be left dissatisfied and the projected overall carbon savings will not be achieved.

Building on experience

Now, with practical experience of using the Code, it has been updated and is expected out soon. There are three significant steps forward in the new edition: checklists to support the quality of delivery; estimation of actual heat demand of existing buildings; and a more detailed section on polymer systems, reflecting the growth in use of these for this application.

Quality of delivery

So, how does a client know their heat network has been delivered according to the Code? The update includes more detailed checklists for each phase to raise the quality of delivery even further, and provide reassurance to developers and stakeholders that a heat network has been delivered and is being operated in compliance with the Code of Practice.

Heat demand in existing buildings

Another significant addition is the establishment of actual heat demand of existing buildings to be connected to a heat network in more detail. With new buildings, the energy requirements are pretty well known, but this is usually not the case with an existing building. People simply assume the energy demand for heat, and as a general consequence tend to over-estimate it. Oversizing the system – including pipe sizes – never leads to the most efficient system and as a result projected savings may not be realised. Under the revised Code of Practice, there will be a requirement to monitor the energy demand of an existing building first, to ensure over-engineering and over-sizing are minimised.

Water temperatures in the distribution pipework can also play a vital role in achieving a good overall efficiency. Traditionally, water is circulated at flow temperatures of between 70 and 90 degrees, directed through heat interface units in each apartment, which basically replace a domestic boiler, and returned to the energy centre at temperatures above 50 degrees.

These traditional water temperatures have continued to decrease over recent years with a larger drop between flow and return temperatures bringing down the return temperatures to levels below 40 degrees. This means the overall temperature profile of the heat network is considerably lower, which in turn leads to lower network losses and a more efficient network. Debates on the 4th and 5th generation heat networks are already underway, which will potentially see even lower temperature profiles. The consultant has to make an informed decision about these temperature arrangements, considering not only individual parts of the network. Finding the best set of operating parameters must always take into account all network sections and include the type of central heat source, the heat distribution and type of installed heating system inside the connected buildings, and of course the selected distribution pipework with its associated losses. The consequences and impacts of these early decisions need to be understood in great detail.

Polymer pipes

With technological advances in polymer pipes and a drive for real innovation, polymer based solutions have demonstrated many advantages over traditional steel systems. For example, polymer pipe systems require fewer joints than steel, taking away the need for weld joints every six or 12 metres. As a consequence there are much fewer health and safety measures required and no welding tents to keep the jointing area dry. There are many more installation advantages, all of which reduce the installation time and trench excavation cost significantly, delivering the project at lower cost.

Flexibility of pipes is key in inner city installations or in areas where the ground conditions are not fully known. Large numbers of service pipes such as gas, telecoms, water, electricity, sewerage pipes, all present a major challenge when installing a heat network.

Particularly in inner city areas, space is always at a premium and the potential for existing services to derail a project is great. 3D ground penetrating surveys can eliminate a fair portion of the risk, but steel pipes will always require special customised joints made up on demand as and when obstacles are encountered during the pipe laying – adding to the project cost. Polymer pipes provide sufficient flexibility to lay them around obstacles without the need for customised fittings and can even be laid using trenchless installation methods. They also accommodate ground movement over time much better than more rigid pipes.

The revised Code of Practice has a more detailed section on how to size polymer systems. It is welcomed by the BPF Pipes Group as the emphasis is on checking and getting the application right. This will ensure that heat networks of the future operate more efficiently, leading to consumers ultimately paying less for their energy usage.

The BPF Pipes Group provides more specific, complementary guidance on key aspects of design codes, distribution pipework, British and European Standards and designing, installing and commissioning district heating systems using polymer pipes. It is available at https://www.bpfpipesgroup.com/support-downloads/technical-guidance/

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