



# District heating regulation: workshop report

Scottish Heat Networks Partnership Practitioner Group

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This one-day workshop discussed the question of district heating regulation, an issue of growing interest at both Scottish and UK Government levels. The Scottish Government's draft Heat Generation Policy Statement positions district heating as an important component of future decarbonised energy systems. A group of practitioners active in Scotland (the Scottish Heat Networks Partnership Practitioner Group) discussed regulation. Present were representatives of local government and other parts of the public sector, commercial heat network operators, consultants and utilities. The workshop was split into two sessions, the first focusing on new and emerging regulatory schemes that target district heating activities, the second taking a broader view of important areas of regulation that do or could affect the potential for heat network development in Scotland. An early question in the workshop regarded the scope of regulation that would be discussed, and it was noted that this too is an important question for the Scottish District Heating Expert Commission Special Working Group on Regulation to address.

## 1 Presentations

### 1.1 Independent Heat Customer Protection Scheme

Aimee Betts-Charalambous of the CHPA presented the Independent Heat Customer Protection Scheme, for which the CHPA has been providing secretariat services. The scheme aims to mimic many of the protections afforded to customers of gas and electricity in the UK in relation to the agreement between user and supplier (fault reporting, compensation, etc.), metering and billing issues and an independent complaint adjudication service. The scheme is designed to cover domestic and commercial users with a direct relationship with the heat network operator, and is planned to expand to include users whose relationship is indirect (such as social housing tenants who pay their landlord a heat-with-rent charge). In parallel with the scheme, a web service is under development which will allow heat network customers to compare their heat charges with the equivalent charges they

would face for the same delivered energy service using the most likely alternative energy source (e.g. electricity or gas). The scheme is due to launch early 2015, and will be funded by participating heat network operators paying annual fees proportionate to the number of customers to be protected. Development of the scheme is supported by the Scottish and UK Governments.

## 1.2 Heat Networks Code of Practice

Hanaé Chauvaud de Rochefort, also of the CHPA, presented the Heat Networks Code of Practice developed by the CHPA and the Chartered Institute of Building Services Engineers (CIBSE). The voluntary code will set minimum standards and identifies best practice for heat network development from feasibility studies through to operation and maintenance of working systems. Three aims were presented: cost-competitive heat supply, high levels of reliability, and reductions in CO<sub>2</sub> emissions and primary energy. The code identifies six themes in support of these aims: correct sizing of plant and network, minimising heat network heat losses, using low flow temperatures and achieving low return temperatures, using variable flow principles, maximising the contribution of low carbon heat sources, and safety and environmental considerations across a system's lifecycle. It is intended to contribute to more standardised procurement procedures and be linked to professional training. Compliance will in the first instance be voluntary.

The code of practice theme of correctly sizing plant and network generated discussion among participants. Some were concerned that the "correct" sizing of district heating components was dependent on long term aspirations to bring on more users in future, and that pressure to avoid oversizing could lead to island schemes with insufficient capacity to grow or interlink. Others noted that some heat networks in the UK have significant heat losses because they have been oversized, not as a means of future proofing for subsequent expansion, but because it is not uncommon in the UK for single-building heating equipment to be oversized, with the observation that "no one ever got fired for oversizing a boiler" explaining why some heating engineers take this approach.

## 1.3 Transposition of the EU Energy Efficiency Directive article

Chris Smith of the National Measurement Office (NMO) gave a presentation focusing on the NMO's approach to regulation. The EU Energy Efficiency Directive contains provisions requiring member states to ensure heat networks meter their customers' consumption. The Scottish Government and UK Government have agreed to jointly implement the regulations, which will be funded by government rather than by charges levied against regulated persons (operators of district or communal heating and/or cooling). The NMO is in the final stages of being appointed as the body responsible for enforcing

these provisions, which will shortly be laid before parliament.<sup>1</sup> The presentation highlighted the NMO's principle of proportionality, its risk-based approach to enforcement, and its preference for supporting regulated persons achieve compliance over sanctioning. One aspect of the NMO's risk assessment may be compliance with a voluntary scheme such as those presented by the CHPA. The draft regulations will require operators of communal and district heating systems to notify the NMO of their operation. As well as district heating, this will include multi-user systems within single buildings, the number of which is difficult to estimate as the definition will likely cover, for example, old houses converted into flats with a shared boiler. Following notification an assessment of the technical and financial feasibility of metering will be required. The purpose of metering is to enable accurate and transparent billing, and to support reductions in carbon emissions. The NMO will collect billing information for statistical purposes. It was noted that estimating carbon impacts from billing information is a complex task; government economists are likely to be consulted in relation to proposed .

#### **1.4 Scottish Planning Policy and District Heating**

Michael Westwater of Scottish Government gave a presentation covering the national planning context in Scotland, and ways local development plans in Scotland have adopted district heating policies. The third National Planning Framework states 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" and Scottish Planning Policy requires local development plans to use heat mapping to identify opportunities and formulate supportive policies for heat networks. The Glasgow development plan was presented as an example of such policies, requiring developers to assess the feasibility of district heating and to incorporate into their design where viable. Fife Council's approach to assessing whether new development sites had potential to connect to an existing, or initiate a new heat network was also discussed.

#### **1.5 Regulation of Large Thermal Installations and Thermal Treatment of Waste**

Jacqui Lang of SEPA introduced the new regulation of large thermal installations, transposed from article 14 of the EU Energy Efficiency Directive. In Scotland the regulations are implemented via the Pollution Prevention and Control regulations. "Large" thermal installations are defined as those above 20MW thermal input (of which there are 98 in Scotland). The regulations concern either new installations or existing ones being substantially

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<sup>1</sup> Since the workshop the regulations have been laid and can be found at <http://www.legislation.gov.uk/ukxi/2014/3120/contents/made>

refurbished. Heat networks are also covered by the regulation if the plant serving heat into them is greater than 20MW. The regulations require a cost benefit analysis (CBA) to be conducted for connection of sources of residual heat to a heat network. Currently the Environment Agency in England has led the drafting of a CBA methodology. SEPA is likely to adopt an amended form of this methodology to reflect Scottish regulations and policies.

Ian Conroy, also of SEPA, presented the Thermal Treatment of Waste guidelines that SEPA issue. These were updated in 2014 and apply to all incineration, gasification, pyrolysis and anaerobic digestion of waste. The guidelines require a Heat and Power Plan be produced to show how new plant will meet minimum efficiency requirements (30%-35% depending on size in waste input per year). To obtain a permit, developers have to ensure their plant is CHP ready, and to satisfy SEPA their Heat and Power Plan is robust and feasible. This includes ensuring suitable location and that heat users (including potential users such as new developments) have been identified. The guidelines give operators 5-7 years to achieve their efficiency targets. SEPA's response to any failure to implement the Heat and Power Plan would depend on the circumstances, including the efforts the operator had made to implement the plan.

## **1.6 European Regulatory Frameworks for Heat Networks**

David Hawkey of the University of Edinburgh presented regulatory systems supporting heat network development in Denmark, Norway and the Netherlands. In the wake of the 1970s oil crises Danish local authorities were given strong powers by central government to plan and invest in heat supply systems. Danish district heating businesses are required to offer cost-reflective prices and operate on a not-for-profit basis, with consumer representation in business governance. Norwegian regulation contrasts with Danish in pursuing a liberalised model which envisages various actors (not necessarily municipalities) developing heat networks. Operators of district heating systems over 10MW are required to hold a licence which defines an area within which no other district heating licence will be granted. The licence thus affords the network operator a degree of protection from competing heat networks, and is sized to match the scale of network the developer could realistically build to over a five to ten year period. Prices are capped and the public sector has the option to take over systems when licences expire. Licences are granted only where socioeconomic CBA indicates a heat network is the highest value option. In the Netherlands heat network regulation was first discussed in parliament in 2003, the year after the energy sector was liberalised. Concerned that heat network customers may be exploited, the government introduced regulation capping prices at a level to ensure costs are no higher than using gas, though it was not until 2014 these finally came

into force. Again, a licencing system is used to enforce compliance, and in this case licence holders are required to produce audited accounts for their heating activities (separated out from any other activities the licence holder undertakes) in order for the regulator to monitor the returns district heating companies make.

Five themes emerge from consideration of European heat network regulation. First, Danish and Norwegian regulatory systems afford protection within spatial zones for long term development of heat infrastructure. Second, regulation can support coordination of heat sources with heat networks: in both Norway and the Netherlands minimum efficiency levels for waste incineration (adopted at national and local levels respectively) have created a “heat problem” for waste operators, with heat networks becoming their solution. In contrast, the EU Energy Efficiency Directive only requires large thermal installations to conduct a CBA of the feasibility of supplying heat to a network. Third, European regulations adopt socioeconomic CBA methodologies with real discount rates around 6%, whereas the CBA drafted by the Environment Agency in England has suggested a 12% return (after tax). Fourth, local government continues to be a key actor in heat networks across Europe. Even where regulation is designed to allow other actors to lead heat network development, in practice local government continues to play important coordinating roles given its other responsibilities and activities in local areas. Fifth, regulations balance opportunities and restrictions. While creating considerable powers or protections for heat network operators, they also establish protection for consumers in various forms (prices, returns, service standards, etc.).

## **2 Round table discussions**

### **2.1 Responses to the proposed voluntary regulation**

The voluntary nature of some of the schemes discussed was suggested to be beneficial to industry on grounds that it would allow scope for a period of capacity building. Some commercial ESCo representatives considered their schemes probably already complied with the voluntary schemes so it would be simple for them to participate. Public sector ESCOs saw some problems, one saying they would need to “get their house in order” before joining the IHCPs, another expressing concern that the scheme could create a two-tier system on their network with owner-occupiers protected, but council tenants (who pay for heat indirectly via their council) not. Others were concerned that there might be little benefit to joining the voluntary customer protection scheme given they would already have to comply with the mandatory metering and billing regulations.

Some participants agreed that the voluntary schemes would build confidence among investors and users, with both NHS and housing association representatives specifically identifying benefits to their organisations. Some local government officers suggested the schemes could be improved with more input from local authorities. The CHPA advised that their intention was to engage directly with local authorities and RSLs over the next year to explore how the Scheme can address their requirements. One issue that concerned some was that the customer protection scheme appeared designed for schemes led by the private sector, most of which are in new developments in areas where high land values meaning planners have more scope to impose heat network requirements. These are predominantly in the South of England (particularly London) leading to some concern about how the customer protection scheme would apply to retrofit projects and projects further north. Participants noted that schemes outside the South of England (and some in that area) tend to require public sector support, and that some public sector led business models have been poorly managed. Others expressed the opinion that heat network development is “crying out” for greater public sector involvement, but regulations and a lot of policy appears geared to the private sector as the solution to how to finance heat networks.

## **2.2 Responses to mandatory metering and billing regulations**

There were some concerns about the cost implications of the UK-wide regulation for existing schemes, particularly where existing financial models are marginal. It was suggested that the approach to enforcing the regulations would not seek to penalise existing schemes in the near term, but ensuring that new schemes incorporate metering. A separate concern was raised concerning the impact regulations might have on demand for meters: are supply chains sufficient to keep prices fair, or will the extra demand lead to rising costs charged for meters? A third issue raised was the interaction between the regulations and housing regulations, which are different in Scotland to the rest of the UK.

## **2.3 Sizing, joining up, recruiting users**

The issue of oversizing heat networks and plant was picked up in round-table discussions. Establishing a local plan within which oversizing of early phases could be justified by enabling later expansion was identified as important, but it was stressed that this is more than a technical question. Leadership and economic factors are also relevant. It might be straightforward for a local ESCo to map out heat demand it would like to connect in future, but, in the absence of zoning arrangements such as the European examples presented, much more difficult to have confidence that those loads will be recruited to the network, particularly where multiple organisations are involved.

Participants noted that currently a number of schemes are developing in Scotland, and some local authorities are making efforts to coordinate projects under control of various different organisations. In principle small schemes could in future interconnect, though there were some concerns about how this would happen. From a commercial perspective the capital costs of interconnecting schemes can be difficult to justify on the basis of marginal efficiency improvements, particularly if interconnection simply moves from small CHP-based schemes to larger schemes with the same energy inputs. From other perspectives, interconnection may be regarded as more valuable, with participants suggesting the lower discount rate of the public sector and policy interests in deploying a wider range of low- and zero-carbon heat sources mean government (at some level) may be more willing to make this kind of investment. Some participants thought the voluntary schemes discussed in the morning didn't say enough about linking schemes together.

There were several discussions about organisational differences within the public sector, and difficulties aligning different organisations. One Scottish university did oversize its heat network, but with the intention of expanding to other buildings it owns rather than to other users, and consequently the technical capacity to extend the scheme to other users may be constrained. Another university had sought third party connections to its network, but found the complexity of contract negotiation onerous. Agreeing one connection took six months, and the university decided further connections were unlikely to be worth the effort.

In this context there was some discussion about setting up separate companies to run local ESCOs. Rather than relying on universities to expand their systems to other users a city-wide ESCo would be better able to align with a city-wide strategy, and it was suggested these should operate on non-profit bases. However, the difficult question was *who* this company would be, with some suggesting local authorities and universities are "the only game in town", and others raising the idea of a heat network equivalent of the national grid.

This issue complicates the question of regulation as it suggests some very different schemes may be developed, from city networks with thousands of customers down to little hamlets with a handful of users. The issue is perhaps more pronounced in Scotland than in the rest of the UK – while both are fairly urbanised small towns are a more significant proportion of heat demand in Scotland than elsewhere. From a policy perspective, the challenge is designing regulation that supports development while avoiding insensitive blanket regulation that could potentially stifle the sector. However, ensuring that city networks do grow is important to realising a transition away from gas CHP (suitable in the near-term for building relatively small networks) to

lower carbon sources in future, many of which require large scale heat demand to justify investment.

## 2.4 Coordination of the public sector

Various participants had experience of trying to coordinate among different public sector organisations. Some regarded the incentives to coordinate on implementation of joint projects to be too weak. Others identified different priorities across different public sector organisations as creating barriers to coordination: for example extension of a university network to council buildings may create value for the council in greenhouse gas emissions reduction, but limited financial value to the university.

Other examples of difficulty negotiating an agreement among public sector organisations were discussed, for example challenges linking a hospital to a local authority network. Even where both organisations individually could see value in the joint project, they struggled to align their interests. For example, one side of the negotiation may suspect the package would result in it subsidising the other. While one perspective notes a perversity in this process (“it’s all the same [public] money!”) others suggested the reality of public sector finance, organised into separate cost centres each with duties to achieve best value makes these processes almost inevitable. Some even suggested it might be easier to negotiate with the private sector which is not subject to the same constraints.

It was noted that the Scottish Government’s Heat Generation Policy Statement encourages public sector buildings to act as anchor loads. Some participants were of the view that, this being a voluntary action rather than a mandatory requirement, it would have little impact on public sector decision making. However, a more optimistic view noted that the regulation and standardisation of heat networks through the schemes discussed in the morning may reduce barriers to the public sector signing up to schemes.

## 2.5 Planning

The planning system was seen as an important component in establishing conditions favourable to heat network development, with the London Plan identified as a successful model. However, developer perceptions of increased costs due to compliance with heat network planning policies were thought to be less problematic in London (where land values are high) than in Scotland.

Participants recognised that Scottish Government has embedded heat networks in the National Planning Framework and in Scottish Planning Policy, though there was some concern as to whether this would lead to different planning policy at a local level. National policy was understood as giving councils powers to adopt certain planning policies, but without a



stronger guide from Scottish Government these could easily be overridden by other priorities. Joining up planning policy within a council was already regarded as difficult, and some regarded it as too easy for planners to avoid the difficulty of heat network planning policies. A specific pressure against planning policies requiring new developments to adopt heat networks could be neighbouring areas not making similar requirements, and thereby attracting the development. Participants suggested this could be solved by Scottish Government taking a more directive approach.

## **2.6 Comparison and interaction with other utilities**

The interaction between regulation and planning (broadly conceived) was discussed in relation to the powers of licensed utility companies. Whereas heat network developers seeking to break open streets must apply to local authorities for permission, gas and electricity network operators simply have to notify the local authority that they intend to break streets. A spatial form of licencing, it was suggested, could be used to give heat network operators similar powers, as some projects had experienced considerable delays in waiting for councils' road departments to consider and agree proposed works. (In one case these delays compounded the delay of 30 weeks caused by the gas network operator reaching a conclusion as to whether a connection for a new energy centre would be feasible.)

## **2.7 Fuel poverty**

There was some concern about the interaction between regulatory schemes and fuel poverty. While participants tended to welcome the benefits of regulation they were concerned about the impact of compliance costs on heat prices, particularly in schemes designed to tackle fuel poverty. Costs would relate not only to subscription (in the case of the customer protection scheme) but also potential new liabilities imposed by the regulations for which some projects have not budgeted.

While there were some concerns that the proposed schemes may not have considered fuel poverty, others noted this may be a structural issue. To the extent that heat networks target low income users (for example, by connecting up social housing estates) the costs of customer protection would be borne by relatively vulnerable members of society, in contrast with customer protection in gas and electricity which is shared across a much larger segment of society (users of gas and electricity networks).

## **2.8 Tariffs, pricing and costs**

Participants discussed examples of poorly designed schemes and saw greater standardisation as supporting better practice. Problems due to poor design discussed included schemes which couldn't cover their costs, unknown levels of heat loss where heat is not metered, and overheating due to

inappropriately sized/inefficient building-internal heat network, particularly in new buildings with high levels of insulation.

One local authority officer described a scheme which had been unable to cover its costs because heat demand had been grossly overestimated. As heat network tariffs often cover fixed costs through an energy charge the solution was to increase the energy charge, making the scheme appear less attractive to users. This led to a discussion about what the appropriate costs to include in heat bills are. Particularly in social housing projects, the fixed capital costs of infrastructure may be paid off through rent charges as an alternative to bills. There appears to be some diversity in how costs are recovered across different schemes, with commercial projects more likely to recover capital costs through energy bills. This then raises questions about what constitutes “fair and accurate” metering and billing in compliance with the EU Energy Efficiency Directive.

Some participants questioned the price-comparator approach being developed alongside the IHCPs. Is it reasonable to compare district heating with other energy forms, or should schemes be benchmarked against other heat networks? It was noted that heat network configurations are quite scheme-specific, so comparison across schemes could be difficult. Conversely it was noted that comparing heat network bills with the cost of heating with gas depends on an assumed “maintenance cost” of a gas boiler which can be both variable and contentious.

Participants noted that while price capping was common in the European examples discussed, there is some reluctance in the UK to impose maximum prices. A convention to set prices at 10% below equivalent gas heating costs has emerged, but some participants saw this as arbitrary. From the perspective of one contractor price capping is regarded as difficult, and is only adopted where procuring clients explicitly demand it.

## 2.9 Incentives and economics

It was noted that many heat networks that have been developed in the UK required subsidies at some point. Some participants discussed the politics of subsidies and taxes as means of shaping market activity, noting political pressures in the UK to use subsidies to drive costs down (e.g. through support for renewables) rather than to use taxes to drive costs (e.g. of fossil fuels) up.

The role of the Green Investment Bank (GIB) and Renewable Energy Infrastructure Fund (REIF) in using public money to support development of heat networks was discussed in this context. GIB and REIF are designed to *not* undercut commercial finance, and some participants feel this approach is

unhelpful. Some felt these schemes should try to drive down the rates that banks require.

The emphasis on commercial finance was also linked to the appraisal of heat network schemes. While local authorities do consider socio-economic Cost Benefit Analyses (CBA) akin to those underpinning the European examples of regulation presented in the afternoon, some participants considered this to be of secondary concern to the financial CBA required to draw in commercial finance.

## **2.10 Coordinating heat network development with heat sources**

Following the afternoon presentation, participants noted the challenges of drawing sources of heat into the process of developing heat networks in Scotland. SEPA's Thermal Treatment of Waste guidelines, it was suggested, are the only way regulation creates an imperative for operators of potential heat sources to consider heat networks. There was some discussion about the role the CRC Energy Efficiency Scheme plays in altering the economic calculus for heat producers, though the carbon price under the scheme was considered too low to be effective.

Regulations in Scotland were contrasted particularly with those in Denmark where regulations were considered to be more effective. Scottish regulations, it was suggested, are too "touchy-feely" and too caveated. At the very least this leaves scope for regulated persons to delay implementation. However, individual public sector organisations (local authorities, Scottish Government, SEPA) appear reluctant to impose draconian regulation, and it was suggested this would only be possible with broad support across Scottish society, expressed through the Scottish Parliament.