Next steps for district heating in Scotland: workshop report

Scottish Heat Networks Partnership Practitioner Group

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This one-day workshop brought together practitioners and policy makers across the public and private sectors to discuss the development of district heating strategies, and to explore solutions to challenges confronted in implementing projects. The workshop combined presentations (including from Scotland's largest and smallest mainland council areas) with round-table discussion, drawing on the wide range of expertise within the group. This report summarises key points.

The focus on "next steps" reflects the progress since Scottish Government made district heating a "discrete policy area" in its 2010 Energy Efficiency Action Plan. Aspects highlighted in the workshop included Scottish targets for district heating, the creation of the national heat map, advice from the District Heating Expert Commission, exploration of district heating regulation, a number of finance and funding programmes and an unusually consensual debate in the Scottish Parliament. Awareness of these developments within the group was high, and resources created by the Heat Networks Partnership are being drawn on and extended by local government, particularly the heat map and opportunity assessment tool. However, a common theme running through discussions was a perception that local project teams seek clearer and more consistent support from UK and Scottish governments.

1 Key messages from the workshop:

The following points were raised by participants through presentations and discussion. These messages are expanded on in the rest of this report.

1. District energy projects sit at an intersection between national energy systems and the development of local sustainable, liveable places.
2. The Heat Networks Partnership has produced effective resources which local project teams use to identify and develop opportunities.
3. However, local project teams seek clearer and more consistent guidance from central and Scottish Government.

4. Projects are currently being driven by commercial models rather than planning or regulation, and local authorities' capacities to coordinate a user base are weak. This leads to fragmented piecemeal development.
5. A step change in heat decarbonisation will require a shift from stand-alone projects to a more comprehensive programme of system change.
6. Local authority work is still largely driven by enthusiastic individuals who take on additional tasks. Funding dedicated officers was suggested as one way of Scottish Government supporting skills and capacities within local authorities.
7. Cuts to local authority budgets shape the way district energy is appraised, and can make it difficult to take on projects with long-term financial models.
8. Risk management/mitigation was a consistent theme running through discussions, and suggestions included: longer-term assurance of development funding and infrastructure finance for district heating; accounting for risk across the public sector collectively; and commitment of resources to high standards of technical design.

2 Morning session – District Energy Strategies

The morning session focused on strategic approaches, considering both how heat networks can support other strategic priorities, and how effective strategies for developing heat networks can be developed.

2.1 Presentations (presenters' names link to their slides)

Paul Steen from Ramboll and the Low Carbon Infrastructure Taskforce argued that district heating networks should be understood as part of a wider approach to re-engineering sustainable, liveable places. At a local level this means moving away from a project-by-project approach and taking a holistic systems view of infrastructure development. Such an approach would integrate different systems (such as waste, energy and transport) and find opportunities for cost sharing. Laying heat pipes and electricity cables during other development (such as construction of tram networks) was discussed as one such opportunity. In the absence of clear plans for future infrastructure, however, such integrated decision making is difficult and opportunities have been missed. In the opinion of the Low Carbon Infrastructure Taskforce, Scottish Government is yet to align its approach to infrastructure with its energy and climate targets, risking development that locks-in greenhouse gas emissions. The taskforce has drawn up a long-list of national infrastructure projects the Scottish Government could take forward, and is currently asking people to vote on which they prefer, before narrowing down to three recommendations.

Mark Workman of the Energy Research Partnership also explored systemic impacts of decentralised energy, emphasising the relationship between the specificities of local opportunities and their aggregate impact on national energy systems. He argued that in parts of the UK local energy is already having a significant and disruptive impact on centralised systems such as electricity transmission, and that management of a transition to more decentralised technologies requires closer coordination across levels. Local authorities play a crucial role, mediating between national and local developments. Mark argued that local authorities need an institutional presence within central and devolved energy policy making (perhaps a "Cities and Energy Unit"), and additional resources. However, the budget position of many local authorities is very challenging as UK government austerity policies continue.

Allan Crooks, Resource Efficient Scotland, described the 2015 Heat Networks Partnership Local Authority Strategy Programme. One aim was to ensure feasibility studies supported by the partnership were considered in the context of local opportunities and priorities. Jackie Sayer from Highland Council then reported on her authority's experience engaging with the programme. Highland aims to extend the heat map to include other energy issues, making it a Heat, Energy and Renewables Opportunities (or HERO) map. Highland has used the district heating opportunity tool to prioritise towns for further feasibility analysis.

2.2 Discussions

There was general agreement that local strategies for district heating, supported by the Heat Networks Partnership tools and resources, are beneficial. However, a number of challenges to local strategy development and effectiveness were also discussed.

Echoing the morning's presentations, participants described district heating projects and strategies as embedded in, but poorly coordinated with, broader systems, programmes and policies. One of the most consistent and repeated observations was that UK and Scottish government commitments to district heating development need to be more robust:

- The current approach to district heating is resulting in patchy progress as projects are taken forward only where they stack up commercially. Developments currently aren't being driven by either the planning system or by regulation (for example, support for district heating in the Scottish National Planning Framework 3 was described as woolly). In a context of cheap gas this tends to result in small scale niche projects.
- District heating strategies were discussed in relation to the significant competing commitments faced by local authorities. One participant

claimed "we have [heat network] plans coming out of our ears, but it sits on the sidelines." Two issues were raised in connection with local authority powers: the absence of a statutory mandate for district heating and the relative weakness of local authorities' capacities to build a user base mean that it remains a marginal activity, particularly in comparison with Northern European countries.

- While Scottish Government policy articulates a long-term vision for buildings to be decarbonised, some felt what is lacking is a short-term plan. Coupled with this were requests to Scottish and UK governments to accommodate the potential for mistakes to be made as district heating becomes more widespread. Without such reassurances, local authorities and other stakeholders will continue to be excessively risk-averse, and when projects do run into difficulty this will prompt abandonment of strategies rather than learning.
- Local authorities are being relied on to mediate between national visions and local development, but their overall resources continue to be cut. This makes heat networks a difficult proposition as not only are capital costs high, but development also requires high levels of skill and commitment from multiple parts of a council. Where local authorities have engaged with district heating in Scotland this has largely been driven by enthusiastic individuals who take it on as their "weekend job". One suggestion was to fund dedicated district heating officers in each local authority, as recommended by the District Heating Expert Commission.
- The funding and financing landscape for district heating is complex and subject to disruptive change within the development timescales of most heat network projects (particularly the Energy Company Obligation and the Renewable Heat Incentive). It was argued this makes it difficult for local authorities to develop long-term strategies, and holds back investment.

Local authorities are taking varied approaches to strategy development with one model discussed being to pursue a single project initially, and expand into an area-wide strategy subsequently. For one local authority the initial project was construed as "testing the water" whereas for another the area-wide approach emerged as a response to challenges that threatened their first project. However, there appeared to be a consistent ordering of objectives for district heating across local authorities: cost reduction/revenues, followed by carbon abatement, then delivering affordable warmth to households, and finally economic development (particularly attracting new businesses to the area).

Budgetary pressure on local authorities was widely recognised, though interpreted in different ways. Some participants argued local authorities would only consider district heating if they felt it had a high Internal Rate of Return (IRR). Others suggested IRR is less relevant than payback, with authorities keen not to tie up capital for long periods. (There was some discussion in the afternoon as to whether public authorities could recycle their capital by refinancing schemes once they are up and running.) Local authority officers working on district heating may not, however, be aware of what financial criteria a scheme must meet – local authorities regard themselves as democratically mandated, and elected members discuss a range of merits of particular schemes. In some cases this can mean they will accept projects whose value lies outwith their financial returns, as, for example, means of tackling fuel poverty. However, external stakeholders can find the deliberative decision making procedures of local government slow. In addition it was argued that repeated cuts to local government have damaged morale, exacerbating defensive attitudes to new capital projects.

Participants discussed multi-stakeholder strategic planning as beneficial in principle, though the few examples of it being attempted in practice were regarded as having made little progress. Different priorities and attitudes to risk across organisations (including between different parts of the public sector) were cited as reasons for this being difficult.

3 Afternoon session – Solving challenges

The afternoon session moved on to discuss how project-level challenges can be addressed. The division between strategic and project-level issues is not absolute, and in practice many of the issues discussed overlapped.

3.1 Presentations

Ken Brady, Energy Saving Trust, drew on his long experience working with district heating schemes at various scales to discuss issues relating to finance, knowledge and risk. He identified a wide range of funding sources tailored to different circumstances and priorities, and highlighted some knowledge resources such as forthcoming Warm Homes Fund project reports and Resource Efficient Scotland's consultancy framework. Further research across household experiences of district heating development, including building on the Heat and the City project's findings, would also contribute to knowledge development. Ken argued that perceptions of risk often include a degree of misunderstanding and can be alleviated through information, but that actual risks remain. Commitment of sufficient resources to design work is one important way of mitigating risk further down the line, a point echoed in several subsequent discussions. Other options to mitigate risks include

ensuring a system has robust backup heat generation (to handle technology risk), development of CHP power purchase agreements, and some form of hedging mechanism to handle price risks in energy markets.

The next four presentations were bite-sized insights into a variety of project challenges and solutions.

- Rebecca Bell from Clackmannanshire Council described the challenges that arose when a large industrial heat producer withdrew from a proposed scheme. The council's response was three-pronged: engaging with the heat producer to explore bringing them back into the project; examining the possibility of continuing the project with an alternative heat source; and using the national heat map to appraise alternative heat network possibilities.
- James Palmer, Buccleuch Property, gave an overview of the Shawfair development on the outskirts of Edinburgh where a nearby energy from waste plant could potentially serve a heat network for the new community. A decision has yet to be made by the developers. While they would regard not using heat from the waste plant as a missed opportunity, James described several issues that make the decision difficult, including concerns about potential unreliability, the added expense of a third energy infrastructure (alongside gas and electricity networks), different assumptions about programme delivery between developers and local authority, and reluctance on the part of house builders.
- Roddy Yarr, currently at Strathclyde University but previously in the estates team at St Andrews University, discussed several decisions universities make in relation to heat networks. Special Purpose Vehicles are a common delivery mechanism as they provide tax advantages. Energy prices have risen and fallen in recent years, and one motivation for universities is to achieve greater price certainty. Technology choices are important in this respect, particularly the right choice of pipework as low cost systems can lead to greater costs down the line. Roddy also described the work done at St Andrews to develop local supply chains, including identifying land owners with problematic woodland shelters for whom supply to the university would be a solution. This was an interesting practical example of the capacity of local actors to develop solutions that might not be apparent from a more remote perspective.
- Billy Ferguson from Glasgow University described the conversion of the university's old steam-based system to a modern district heating network, including a CHP generator. He explained how he and his team were ensuring the transition from a complex engineering project

into business as usual operations, and emphasised the importance of working together with their contractor and ensuring end user needs are clearly understood and represented throughout the project.

3.2 Discussions

Afternoon discussion focused on identifying challenges experienced or anticipated by practitioners and discussing solutions.

Technologies. While gas-fired CHP is commonly regarded as a low-risk approach to district heating, other technologies were discussed with interest, including the use of large heat pumps to extract heat from water sources. In addition to rivers and lochs, water source heat pumps could be used to extract heat from sewers whose temperature is consistently around 15–20ºC. There was even some discussion of using existing sewers to move heat around cities: heat extracted in one location could be used to raise temperatures in a sewer a small amount (5–10ºC), and then upgraded with a heat pump at another location. There was also discussion of the potential for data centres to provide heat; locating them near heat loads and network opportunities would help this.

Procurement. While some argued that procurement rules need not prevent a wide variety of approaches to district heating it was recognised as a complex process which required considerable expertise and resource. For local authorities, writing effective tender specifications often requires input from various internal specialisms and can take time – which can lead to difficulties when there is external pressure to complete quickly. Local authorities that recognise the importance of securing high quality design work to avoid costs later are emphasising the quality of tenders, weighting this at between 75% and 90%, with cost consequently making up a relatively small proportion of the decision between competing bids.

Finance. Participants focused on the different approaches taken by different organisations to financial appraisal of proposed schemes. Some felt that local authorities commonly allocated capital spending to service provision without generating a return (such as building a school) making it difficult for them to handle long term investments on the basis of consequential income or savings. Others discussed ways in which differences across public sector approaches to financial management and accounting rules created challenges in working together.

Multi-stakeholder projects. Participants emphasised that while multi-stakeholder projects are difficult they reflect the different interests in society and attempts to accommodate them. The morning's call for a clearer commitment to supporting district heating from UK and Scottish

governments was echoed, and it was suggested that this could help simplify what are currently very complicated negotiations among stakeholders.

Keeping projects on track when challenges emerge. Key points included early risk appraisal to inform contingency planning if difficulties emerge, and ensuring buy-in from senior colleagues. The significance of different challenges was thought to vary across projects and organisations. For example a developer whose primary objective is low carbon energy may take a different view of cost impacts than one whose primary objective is profit.

Business models. Participants discussed a wide range of factors that influence choices between business models, and agreed that there is no one-size-fits-all approach. Guidance from Scottish Futures Trust on different approaches was also mentioned. One challenge associated with business models is the perception multi-stakeholder public sector projects can entail shuffling risk within the public sector. It was suggested that progress may be facilitated by a methodology for risk accounting across the public sector collectively.

3.3 Heat Trust

Bindi Patel from Heat Trust gave an overview of both the Heat Networks Code of Practice and the Heat Trust scheme. The code of practice aims to establish minimum technical standards and clarify responsibilities across the chain of heat network development, delivery and operation. The Heat Trust launched on the 25th of November with three initial members who operate a number of heat networks including the Wyndford scheme in Glasgow. The Heat Trust approach to self-regulation asks members to provide similar customer protections and compensation schedules to those offered to gas and electricity customers, and currently covers domestic and small business connections where the user pays the heat network operator directly (rather than, for example, through a heat-with-rent mechanism).