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To what extent is the Heat Network Delivery Unit successful in its support of local authorities?

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Abstract

In order to move towards provision of low-carbon efficient heating through DH, longer-term strategic planning and coordination from local authorities is thought to be needed to allow more widespread connections. However, historically, they have had little involvement in energy system development. The main support in England and Wales for local authorities to take on this new role is through DECC's Heat Network Delivery Unit (HNDU) that funds local authorities to commission heat mapping and feasibility studies for projects; effectively providing a greater resolution of information upon which to base investment decisions.

This paper examines whether the HNDU approach of improving the information and data that local authorities have at their disposal is effective for supporting them to strategically facilitate DH development. Three interviews with case study local authorities in England were drawn upon to provide some early insights into how local authorities are using, or plan to use, the information from HNDU supported studies.

The results are used to discuss the possible opportunities for the HNDU to improve its support of local authorities for facilitating greater district heating development in the future. A methodology is proposed for exploring these research questions in more depth.

1. Introduction

Heat made up 44% of energy demand in 2011 in the UK (DECC, 2013). Although energy efficiency measures such as insulation will play a critical role in reducing this demand, limitations of existing building stocks and industrial processes will mean that a significant heat demand will remain in the foreseeable future (Connolly et al., 2014). The publication of the UK heat strategic framework (DECC, 2012) recognised that a mix of technologies would be needed to meet future demand for low carbon heating in the UK. District heating (DH) or heat networks are seen as a key technology within this mix, particularly in cities. This represents a significant change from the status quo within the UK energy system where heat is provided predominantly to buildings via building-level gas boilers or electric heating. Only 2% of heat demand is currently supplied via DH (DECC, 2013). Introducing new DH networks, in the context of little experience or knowledge of the technology across UK suppliers and consumers, is a challenging and complex process.

Local authorities are increasingly looked to for local leadership in energy system development, from encouraging take-up of energy efficiency measures in houses and buildings, to strategic coordination of the deployment of new low carbon technologies such as solar PV, solar thermal, and district

heating networks (Bulkeley and Kern, 2006). For district heating development, the case for involvement of local authorities is particularly strong, with their connections to local actors, wide ranging local responsibilities such as social housing provision, and commitments to wider social concerns such as fuel poverty reduction and carbon reduction. Bush et al.(2014) highlighted the range of motivations that local authorities expressed for developing DH, which differed widely between different authorities . Despite these strong drivers, the complexity of DH development, alongside an energy system history where local authorities have not traditionally played a role for several decades, makes this a challenging prospect for local authorities in the UK.

The Heat Network Delivery Unit (HNDU) was set up with the aim of growing local authority capacities to facilitate DH development. After 18 months of the unit's operation it is time to start assessing its successes and where it should go in the future.

2. Background

The barriers facing local authorities in their work specifically on DH development are well documented (Hawkey, 2012, Bush et al., 2014, BRE et al., 2013) and research continues to grow on this issue. Bale et al (2013) point out the financial and structural barriers to LAs taking on role in energy system planning, which requires them to use expertise and input from multiple departments simultaneously from planning, waste, finance, legal, and procurement (Bale et al., 2012). Local authorities are also taking on the role of coordinating the range of local actors and interests who need to cooperate to allow the creation of a feasible business case upon which to base the upfront investment and offer some long term certainty of heat sales. The opportunity also exists for the local authority to invest directly in a scheme themselves and potentially to take on an active role supplying heat as an energy company to customers and generate income for the local authority. In the context of recent cuts to local authority budgets and staffing levels they face constraints in terms of knowledge, experience, and staff time. Financial resources are limited for procuring feasibility studies and other consultancy services, legal advice, and the significant upfront capital costs of networks (BRE et al., 2013).

There is not a 'golden bullet' that enables projects to succeed in the context of these multiple and complex barriers. However, Hawkey et al. (2013) make the observation in their case study work of DH projects in the UK that the successful projects consistently feature the presence of a key 'champion' who drives forward the project (Hawkey et al., 2013). These champions, who were sometimes located in-house within the local authority or sometimes within private sector partners involved in developing the scheme, were able to mobilise local actors and resources to find ways around barriers. The social capital provided by the presence of such a champion is clearly an important factor to be considered when building capacity of local authorities to deliver DH locally.

2.1. Local authority approaches to DH development

In practice, local authorities are still in the early stages of learning how to develop DH in the UK and this is apparent in their current approaches to the challenge. A study (Bush et al., 2014) undertaken in the early months of the HNDU (September 2013 – March 2014) sought to gain a snap-shot of the motivations of 6 case study local authorities for engaging in this new role with DH and the approaches they were using to develop and facilitate new schemes. The work offers an indication of the approach of local authorities before the work of the HNDU became fully embedded.

The study found three general approaches to DH development:

- **Funding driven approach:** Local authorities seek available funding sources to cover all or part of the capital costs of a project, usually through the Energy Company Obligation (ECO) or European funding. Early planning for such projects was geared towards meeting the criteria set out by the available fund.
- **Commercial approach:** Local authorities construct a business case for a commercially viable scheme in order to attract an investor. Business cases are constructed on the basis of creating financial profit for the investor (most likely private investors, but could potentially be the local authority).
- **Mixed approach:** Schemes that aim to enable the maximum expansion of heat networks across a town or city. This may involve a form of “cross-subsidy” between the most commercially viable sites with high heat demand densities and other sites that offer wider benefits i.e. social and environmental benefits, either by recycling of profits or use of larger heat loads to act as anchor loads for wider expansion of the network in the future. This was clearly an ambition for many of the city-based local authorities in the study to allow future strategic expansion, keep heat pricing affordable for residents and to retain profits where possible within the authority.

(Bush et al., 2014)

3. Overview of the Heat Network Delivery Unit (HNDU)

In this context, HNDU was set up by DECC in March 2013 as a means for supporting local authorities in England and Wales to facilitate DH development. It particularly looks to tackle the issues of “capability and capacity” faced by local authorities taking on the new role in the energy system (page 4, DECC, 2014). It offers guidance support and funding to local authorities through a team of technical and commercial professionals. Local authorities can apply for a section of £7 million to support work on all aspects of DH development up to the investment stage of a project (See Figure 1). This includes heat mapping, energy master planning and feasibility studies as well as detailed project development work such as technical design, financial modelling and exploration of possible business models. It does not include capital or operational costs, internal staff costs, or stakeholder events. The HNDU guidance to local authorities states that bids to the fund are assessed on “local authority capacity and commitment and whether the project is likely to become a credible prospect for commercial/ financial development.” (Page 14, DECC, 2014). Demand for funding from HNDU has been high. Over 50 local authorities were awarded funding through the first two rounds of the HNDU grant programme and round.



Figure 1: Stages of the DH development process that are eligible for HNDU funding support (Page 7, DECC, 2014)

The approach of the HNDU clearly supports the commercial development approach that was identified in the work by Bush and Bale (2014), where it is envisaged that investors will be attracted through the development of detailed business cases for schemes. This would move away from the funding drive approach which was vulnerable to fast changes in policy and meant that longer term strategic planning was difficult. However, it did not necessarily give support to the underlying motivations of local authorities to use DH to reduce fuel poverty and improve the quality of their social housing stock which were often expressed by projects using the funding driven approach. The mixed development approach, expressed as an ambition for the city-based local authorities interviewed, has the potential to be realised through effective support from the HNDU. Since the HNDU is currently funded until March 2015, this is therefore an opportune time to investigate how it is best to assess the support they have offered to local authorities and how it might be improved.

3.1. Research questions

This paper makes some initial investigations and proposes a methodology to further assess the effectiveness and success of the HNDU. It will make some early conclusions based upon the following research questions:

- 1) What do local authorities want from the HNDU?
- 2) What support do local authorities get from the HNDU?
- 3) Does this support meet local authorities' needs and how could it be improved?

4. Methods

Thematic analysis (Braun and Clarke, 2006) of three semi-structured interviews is used to make conclusions on the perceptions of the HNDU from the perspective of the three local authority stakeholders. These case study interviews are based upon follow-up conversations with the same stakeholders interviewed under the study mentioned in section 2.1 (Bush et al., 2014). They are all

located in the north of England, and are made up of representatives from a large city (Local Authority 1), a small town (Local Authority 2), and a local enterprise partnership formed of 10 local authorities (one of which is Local Authority 1). All three have interacted with the HNDU, with two of the interviewees already having received funding and one planning to apply. The local enterprise partnership received funding through the Low Carbon Pioneer Cities fund for its initial stage of work, which acted as a pre-cursor to the HNDU. The interviews were conducted between May and September 2014, over a year after the formation of the HNDU. It should also be noted that the focus of two the interviews were conducted more generally on the role of heat mapping and planning tools and peer learning through the Core Cities network (Roelich and Bale, 2014) rather than the general support offered by the HNDU.

This paper acts as a precursor to a wider piece of work undertaken in partnership with a project called iBUILD. More detailed data collection will be carried out in mid-October. Therefore, these initial interviews are used as a scoping exercise to form initial hypotheses for the wider situation. Future research questions and methodologies are described here with the aim of exploring these themes further.

5. Results

There is clear demand for support from national government on district heating development and support from the HNDU was welcomed by the interviewed local authority stakeholders. The interviewees recognised that they do not have the in-house knowledge or skills to drive forward development without this extra support.

“We haven't got the expertise in house, you know, it's quite specialist” (Local Authority 2)

Their restricted resources and capacities were also reflected in the development approaches identified by Bush and Bale (2013), where local authorities were often reliant on national government support mechanisms such as ECO funding; unable to facilitate project development within their existing capacities. The HNDU aims to change this situation to enable greater uptake of DH. The three case study interviews clearly saw benefit from the support that HNDU.

5.1. Support received by HNDU

Case study 1 – Local Authority 1

Local Authority 1, as a large city, and a member of the Core Cities group and a part of a regional local enterprise partnership, had several sources of support for its work on DH. It was in receipt of funding from HNDU to carry out energy master planning and feasibility studies on 2 projects.

The interviewee identified peer support as an important dimension of support from HNDU. Although they were able to work closely with cities through the core cities group, its contact with HNDU had enabled them to pick up new contacts that they did not know about before.

“the things we are looking for are examples from other local authorities, what they've done.” (Local Authority 1)

Case study 2 – Local Authority 2

Local Authority 2 was in the process of applying for funding and support to the HNDU. It had previously carried out a mapping exercise several years before the formation of the HNDU. However,

this had not resulted in any developments in the intervening time. Despite this, due to a new development taking place within the city, DH was of interest as a way of making this development “as sustainable as possible” (Local Authority 2). The support from HNDU was seen as a way of exploring this opportunity through the commissioning of a feasibility study. Similar to Local Authority 1, the role of peer learning was again recognised as important:

“So I've got no experience. So we'll be relying on examples of what other councils have done.” (Local Authority 2)

It was clear that the scheme would not take place unless it had clear economic benefits for the project developers and the council. The scheme was not seen as part of a bigger low carbon heating strategy in the town, but instead as a way to make a specific new development happening in the area more sustainable. In the local political context, the interviewee was clear that the scheme would not be included unless there was a strong economic case.

Case study 3 – Local enterprise partnership

The local enterprise partnership (LEP), working on behalf of 10 local authorities, was using funding initially from the Low Carbon Pioneers Fund and later the HNDU to commission consultants to carry out high level heat mapping, energy master planning for areas with potential, and detailed feasibility studies for projects that were identified as being “uniquely investable”¹. In contrast to the HNDU funding, the Low Carbon Pioneers Fund enabled the resourcing of a full time member of staff to coordinate the heat mapping and energy master planning project across the 10 local authorities. This position, although initially set up as a secondment from a local authority has since been made permanent after the initial injection of funding enabled the LEP to see the value of this staff resource for the initial project.

This case study had interacted with HNDU on multiple stages of DH development due to the range of local authorities that they were representing. The coaching and personal support offered by HNDU was felt to be very useful and the interviewee gave a tangible example of where their support had added value to their own work by enabling them to better align the criteria used in the down-selecting process of projects between heat mapping and feasibility studies, to the drivers of the local authorities they are representing.

Stakeholder engagement at an early stage with key heat demand and supply owners was another aspect that was strongly advocated by this interviewee.

“...because if they are not there that obviously has a knock on effect when it comes to project economics.” (Local enterprise partnership).

Support was sought for the process of stakeholder engagement by looking for this to feature within tender calls to consultants put out by local authorities during energy master planning. The inclusion of this work into the remit of consultants is potentially an indicator of where resource and capacity issues of local authorities are still not addressed by the work of HNDU.

¹ A “uniquely investable opportunity” was defined as requiring an internal rate of return of greater than 4%. This was set on the basis that the local authority public loan rate would require 4% interest.

5.2. Does this support meet local authorities' needs and how could it be improved?

The two case studies, Local Authority 1 and the local enterprise partnership, who have already received funding and coaching from the HNDU, identified areas that they felt were particular problems or were in need of greater support.

The first issue related to staffing resource internally within local authorities for working on DH development. HNDU was not able to provide funding to support the internal local authority staff resource. The process of managing the consultant studies and acting on their recommendations required staff time, and more was needed to act effectively on their recommendations. For example, the local enterprise partnership identified that Local Authority 1 (from case study 1) was "the only one within the 10 in the [local enterprise partnership] that could resource project management [for developing DH]. Whereas the rest of them would need some resource, some help, to bring somebody in." (Local enterprise partnership). It was felt that work was being carried out by consultants external to the local authority where it would have greater value and capacity building if it was delivered internally.

"I do understand for the really early stages and the very specific bits of work that you want to work with consultants who know how heat networks operate but we just want to use our project management team to project manage this so that we've got a) the project management expertise from Leeds and the understanding of where our procurement rules are but also to build that expertise that would then allow us to do more in the future." (Local Authority 1).

The second issue was the availability of qualified consultants in the UK for providing the work for local authorities being driven by HNDU funding awards. Although many expertise exist across Europe, in the UK this knowledge is more limited:

"There are a number out there in the market that will say they can do this work, but I think there is only a handful that can actually do it well." (Local enterprise partnership).

Further to this, the level of knowledge and expertise within local authorities on district heating did not necessarily allow a sense-check on the assumptions and calculations used in the reports of consultants. It was also unclear to what extent the HNDU was providing this scrutiny through their coaching support. The local enterprise partnership interviewee recommended that the HNDU could produce a list of recommended consultants to ensure that local authorities would get good quality support through the commissioned work.

6. Discussion

It is clear that the HNDU is enabling new activities to take place on DH development. All of those interviewed saw the initial heat mapping as an important first step before moving on to more detailed feasibility studies of specific projects and the funding of HNDU was enabling this to happen where it would have otherwise potentially not have done. Peer learning facilitated by HNDU also came out in all three case studies as important for the interviewees. With their view across the range of activities in England and Wales, HNDU was able to facilitate connections between local authorities that did not exist before. But is this support enough to enable development of the capacities and resources that are needed to proceed through the complex DH development process? This section explores some of the possible implications of the findings of these case study interviews

and, given the limited number of case studies analysed here, proposes research questions for areas in need of further exploration.

Internal staff resource vs. use of consultants

The importance of internal staff resource came out strongly within the case studies and would benefit from further understanding on the role that it plays in enabling project development. As has already been highlighted, local coordination and facilitation are important for developing an understanding and appreciation of the potential of DH amongst local stakeholders. The approach of HNDU to encourage wide-spread commissioning of reports from consultants is succeeding in bringing in expertise on DH, but is not building the capacities within the authorities for long term activities². Given the seeming importance of key 'champions' for driving forward scheme developments (Hawkey et al., 2013), it is possible that, without addressing the problem of staff resource alongside enabling access to consultants and expertise, the extensive heat mapping and feasibility studies will not lead to project delivery.

Peer learning

As well as the need for greater internal staffing resource, the importance of peer learning across local authorities was consistently highlighted as being important. There is a need to understand to a greater extent how the support offered by HNDU through coaching and connecting local authorities for peer learning is impacting on the successful development of projects and whether this form of support could be enhanced further.

How does HNDU work support longer term development of low carbon heating?

The scale of uptake of HNDU funding demonstrates that there are clearly drivers for local authorities to work on DH. The current work of HNDU focuses on delivery of projects today regardless of the longer term plans of the local authority. This acts as a starting block to enable network extensions and develop supply chains and capacities locally. However, it was not clear from these interviews the extent to which HNDU is encouraging projects to be thought of within a longer-term, local strategic energy plan. For example, Local Authority 2 saw their potential project as a standalone scheme that would not feed into a wider scheme over time. An area of further research would be to understand whether local strategic energy plans for low carbon heating might impact on the rate and scale of new DH deployment.

7. Methodology for further work

This work has made an initial attempt at assessing the work of HNDU's support to local authorities work on DH. Going forward, it is the author's intention to explore this in more depth through use of a novel methodology called a decision theatre.

A decision theatre aims to gain a deeper understanding of complex decision making processes. It uses data and case studies to simulate a situation and asks a group of research participants, ideally made up of a broad range of key stakeholders involved in the process in reality, to discuss the issues

² In contrast to HNDU's approach in England and Wales to focus on local level consultant reports, the Scottish Government has developed a heat planning map for the whole of Scotland. Local authorities in Scotland can therefore access the heat mapping information without needing to commission a consultant's study. However, similar to England and Wales, the capacities and resources available to local authorities are still constrained for using this information to deliver new schemes.

surrounding the situation and come to a decision. The process is designed to allow the research participants to explore the process from the perspectives of the other members of the workshop alongside their own, offering them an opportunity to learn from each other as well as contributing to the research project.

The methodology was originally developed in Arizona State University and was used to investigate complex sustainability issues such as water management and response to heat waves (e.g. Sampson et al., 2011) as a way of developing cooperation and mutual understanding between practitioners. Uptake of the methodology was slow because, as pointed out by Walsh et al (2013), “it was technology rather than user driven in the first instance” (Walsh et al., 2013). Since then it has been developed further by Newcastle University and used to explore flood risk management and response with local stakeholders in the Newcastle area.

This work proposes to adapt the decision theatre methodology to explore the multiple dimensions of the DH decision making process at the local level, from how tools such as heat maps are used, to the process of engagement with local stakeholders. Instead of asking direct questions in one-to-one interviews, the impact of existing support from HNDU and areas in need of further help can be identified through facilitating the interaction of multiple stakeholders working together through a simulated case study. The workshop will seek to explore some of the issues highlighted within this paper in greater detail including:

- The barriers to translating the information from consultant reports into delivery of projects;
- The impact of the use of consultants vs the internal staffing capacity;
- The process of peer learning between local authorities.

The workshop, due to take place in October 2014, will include representatives from a number of local authority officers involved in DH development; some of which are at the very early stages and some who have already successfully delivered projects. It will include representatives from a private energy company involved in DH, energy managers from a large heat demands such as a hospital and a university, and representative from a community-run DH scheme. Three loosely structured discussions will be facilitated which cover the general phases of DH development:

- Pre-planning and heat mapping phase
- Feasibility studies and stakeholder negotiations
- Business model development and finance

Finally, a discussion will cover issues that run throughout the whole process of conception of the idea, to supply of heat to customers. Of course, there are key stakeholders who are not present within the workshop who play a key role in reality in supporting the decision making process around, including the national government and the HNDU. Participants will be encouraged to refer to the role of these stakeholders, but their presence was omitted to ensure that participants could discuss issues honestly with each other without feeling restricted or worrying about offending people. This novel methodology will provide new insights into the interactions that take place between local actors forming new working relationships to enable new DH schemes; highlighting areas where stakeholders are encountering barriers related to institutions, lack of information, or lack of internal capacity.

8. Conclusion

The Heat Network Delivery Unit is providing a welcome support mechanism to the many local authorities interested in the opportunity that DH development could present in their area. It's funding for consultants, and offers of coaching, are enabling the injection of DH expertise into a sector where experience and knowledge have not often existed in the past. It also provides an important role connecting up local authorities to enable peer learning and support.

Three case study interviews were used to conduct an initial scoping exercise for where local authorities require further support or new solutions for their work on DH. The work highlighted several areas: Greater internal staff resource was clearly thought to be essential for enabling effective delivery. Internal capacity would build better relationships across the multiple internal departments that need to work together through a DH project. It allows the formation of longer term relationships with external stakeholders who may offer heat loads for making a scheme viable. It also enables longer-term project development beyond the timeframe of the initial HNDU support. The quality of consultants was another issue that was highlighted.

Further research questions have been posed to explore these aspects and a 'decision theatre' methodology is described to explore these themes and questions in more depth.

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