Department for Business, Energy and Industrial Strategy

Green Heat Networks Fund

Submission from CIBSE

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The Chartered Institution of Building Services Engineers (CIBSE)

CIBSE is the primary professional body and learned society for those who design, install, operate and maintain the energy using systems, both mechanical and electrical, which are used in buildings. Our members therefore have a pervasive involvement in the use of energy in buildings in the UK with a key contribution to sustainable development. Our focus is on adopting a co-ordinated approach at all stages of the life cycle of buildings, including conception, briefing, design, procurement, construction, operation, maintenance and ultimate disposal.

CIBSE is one of the leading global professional organisations for building performance related knowledge. The Institution and its members are the primary source of professional guidance for the building services sector on the design, installation and maintenance of energy efficient building services systems to deliver healthy, comfortable and effective building performance. CIBSE also produce guidance on district heating, including the Code of Practice for Heat Networks (CP1), the upcoming heat network design guide, and guidance notes on domestic hot water temperatures.

CONSULTATION RESPONSE

Our response is structured around themes of the consultation proposals, but we have indicated the specific questions we responded to. Do let us know if you need a document formatted directly against the questions.

NEW VERSUS EXISTING NETWORKS

(Response To Questions 23 & 24)

We understand that BEIS wish to ensure the Green Heat Network Fund (GHNF) scheme will be available to support new and existing schemes and are therefore looking at a few options:

Option 1: A dedicated pot for new build: CIBSE agree with the assessment that this could be difficult to manage and have unintended consequences.

Option 2: A weighting system within the assessment process that seeks to treat existing and new networks on a level playing field in terms of cost per kWh: this could be difficult to create and somewhat arbitrary, and doesn't align with the objective: decarbonise as much heat as possible.

Option 3: Existing networks only to be supported for extensions: **CIBSE do not agree, see below.**

Option 4: Requiring existing network applications to include, in addition to their application, works to improve the overall operating efficiency of the network in addition to decarbonising thermal generation – **of the existing options, this is CIBSE's preferred option, but we think that projects that are purely about plant switching from fossil fuels to low carbon should be supported, as long as**

they meet the same criteria as other proposals. We understand BEIS expect that existing networks will ultimately have to transition due to the policy environment and therefore that this transition will happen regardless of funding. However:

- these policies are not confirmed yet, and could take a while to be implemented. A first step of regulation could be a requirement for existing networks to produce decarbonisation plans, as is being looked at by the Scottish government but not yet, as we understand, by BEIS.
- in preparation for regulation, funding could support the development of expertise and examples, which are currently rare; it could in turn inform future policy and support its feasibility at lesser cost for the rest of the market in the future. Currently, in practice, very few existing heat networks have moved from gas plant to non-fossil fuel plant, or have concrete plans to do so. In addition, the issue is not simply plant replacement, but associated design and operational issues to optimise performance, such as flow temperatures, storage and controls. There can also be legal and commercial barriers e.g. contracts tying heat to the cost of gas, restricting ability to increase heat price to pay for investment, or concession agreements with limited remaining time (e.g. if a concession expires in 10 years this constraints the business case to this timeframe, not the longer term). All of these issues need to be explored and understood before policy can be implemented effectively and at the least cost.

In short, there needs to be support for the low-carbon transition of existing networks, whether or not they have plans to expand.

Funding for this for at least the first few years of the GHNF could significantly help in this transition. CIBSE would be very happy to work with BEIS on gathering lessons from this phase, to be turned into guidance for the wider industry. This will be even more powerful with conditions of data collection, performance evaluation and disclosure for schemes which are funded in this way – see comments in section Monitoring Of Outcomes And Scheme Evaluation. If there is a concern about availability of funding for other networks, there could be a limit on either the funding for these type of projects or on the number of projects eligible for this funding so that it is clearly a pathfinder scheme and is first come first funded.

APPLICATION ASSESSMENT – STAGE 1 GATE METRICS

We support the idea of using pass/fail metrics in the first stage of the assessment. We have more detailed comments on the metrics themselves

(response to Question 10).

Metric 1 - **Carbon emissions savings**, including all emissions (distribution heat losses, electricity for pumping etc), assessed against a counterfactual of air source heat pump with SCOP of 2.5 and marginal carbon emissions factor (starting from 0.245905 in 2022/23, and decreasing afterwards).

We strongly support having carbon emissions savings as pass/fail metric, including all emissions in the assessment (including distribution heat losses, electricity for pumping etc), and having air source heat pump as counterfactual. However:

- The carbon emissions factor used in the counterfactual (i.e. marginal factors) are well above current and expected average grid carbon factors (for example, the annual average factor of

the grid proposed in SAP 10.1 is 0.136 kgCO_2/kWh). This would result in over-estimating emissions from the counterfactual (i.e. over-estimating savings from heat networks) – what is the justification for using these factors? It may be reasonable to assume the counterfactual heat pump would run at times when the carbon intensity of the grid is high for a portion of the year, but it should also be expected to run at times of lower carbon intensity, particularly with the development of measures such as smart energy tariffs, smart controls etc.

- The SCOP of 2.5 seems reasonable, based on evidence from field trials. It could potentially be kept under review as technology improves and data becomes available, so that the performance of a network in 5-10 years is not compared with that of out-of-date under-performing systems.
- How will existing networks be assessed? As per earlier comments, we do not think the GHNF scheme should only support *extensions to* existing schemes.

More detailed comments:

a. Allocating carbon emissions from schemes making use of "waste heat" can be, as BEIS state, complex. We suspect it will be useful to develop more guidance, or more examples, to illustrate the situations where it is considered that the process generating the heat would, or not, have happened without the heat network. It should be relatively straightforward in some cases where the process is clearly already existing and will not stop (e.g. heat from the tube, well-established industrial processes), but in other situations the business cases may become intertwined and make the assessment difficult (or create loopholes).
b. Another important point on "waste heat" is that in many cases this may end up being heat from incineration. This does not align with general policy direction on air quality and the circular economy, and ultimately will need to be addressed as part of the overall policy environment; in the meantime, we recommend much caution before allocating funding to such schemes. One thing is to not regulate against them (yet), another is to allocate public funds.
c. We note that one of the examples provided in the consultation has an ASHP as main plant and gas boiler as "peaking plant". This may seem fine at the assessment stage and meet the carbon emissions criteria, but there is a clear risk that in operation the gas plant would run much more than declared at assessment stage. We recommend to 1) set limits on the capacity of such "peak plant" and 2) monitor such plant once delivered (including metering fuel/electricity/heat input and heat output of all plant) and consider recourse mechanisms should operation not meet initial funding criteria – see also comments on monitoring and evaluation.

Metric 2 – **Cost impact on consumers (residential and micro-businesses),** assessed using p/kWh and £/year, assessed against a counterfactual of air source heat pump for new buildings, and gas boiler for existing buildings.

(response to question 31)

CIBSE strongly support the requirement for heat networks to be registered with the Heat Trust, or equivalent (like BEIS, we are not aware of such equivalents, so they would need to be carefully assessed).

(response to questions 32, 35 and 36)

We strongly support having a pass/fail metric related to protection of residential and micro-business consumers. We also agree with the counterfactual. The methodology will need to be robust, and we recommend involvement of the Heat Trust to advise on the details; this should also be monitored once delivered – see comments in section Monitoring of Outcomes and Scheme Evaluation.

As previously, our question is:

- how will existing networks without extensions be assessed i.e. what will be the counterfactual for existing consumers of an existing network? There is a need for at least some existing networks to be funded to switch because, for policy purposes, the cost implications on consumers and the best options available really need to be understood at the detailed level, to avoid future risks of fuel poverty and generally poor consumer protection, for people captive to a heat network undergoing a switch.

We think the intent is to include all costs, including maintenance and other fixed costs, but were not entirely certain from the consultation document – this needs to be confirmed.

(response to Question 28).

Metric 3 – **Capacity of minimum 2GWh/year.**

CIBSE currently question whether this is required and desirable. The other three metrics are clearly criteria on outcomes, while this seems to preclude solutions (i.e. larger schemes). We note that BEIS expect schemes such as shared ground loops to be supported through the Low Carbon Heat Support Scheme, in which case this metric may be acceptable here. An alternative approach could be that, instead of this metric, the GHNF would not be available if other funding was available elsewhere.

Again, this is very relevant to existing schemes, where for small schemes the capital costs of plant upgrade could, relatively speaking, be significant.

Metric 4 – **Social Internal Rate of Return, assessed by monetising carbon and air quality impacts against a counterfactual of air source heat pumps (for carbon) and gas (CIBSE assume this is boiler) (for air quality).**

We very much support the principle of adopting social value criteria and taking into account the impacts on air quality. This is all the more important given the current electricity : gas price ratio, which does not reflect the impacts of gas on carbon emissions and air quality. In the long run and beyond this Fund, this is a significant market hurdle to heat decarbonisation which needs to be addressed.

We do not agree that the metric should simply use gas as counterfactual when assessing air quality impacts. There is a clear public health need and a policy direction to improve air quality, which a gas counterfactual does not take into account. As a very minimum, we recommend:

- a clear pass/fail criterion that there should be no funding available for combustion in Air Quality Management Areas (i.e. gas, biomass, waste, and any other fossil fuel combustion). Potentially, this may be acceptable for peak / back-up plant, but again with strict limits on running hours, and monitoring of heat outputs and air quality emissions. The combustion of hydrogen has, from chemistry principles, the potential to produce high NOx emissions, as was identified in a recent review for BEIS[1]; this may evolve with technology, and the evidence base is limited, but we recommend that this should be monitored, with similar criteria on polluting emissions from H2 as for other fuels.
- AND
- 2) the gas counterfactual must be best practice low NOx boiler standards.

Following discussions with BEIS at the consultation workshop, we stress the assessment of air quality impacts must take account of emissions from H2 combustion, not only those from H2 production. Not only does H2 combustion lead to high NOx emissions, but it will usually be closer to populated areas than H2 production facilities (whatever these end up being).

As per comments on previous criteria, we would also like to know how existing networks (without extension) will be assessed.

CRITERIA FOR FUNDING – STAGE 3 ADJUSTMENT METRICS

(response to question 29)

The principles of scoring seem broadly sound, however we question the details given the objective of " decarbonising heat as cost effectively as possible" – in this case, carbon saving potential may need to be weighed higher than it currently seems to be from Figure 8. We appreciate however that this will be developed in the next stage, and that deliverability has to be taken into account in funding allocation.

Additional comments

We support the additional scoring for features such as unlocking diversified peak demand, energy efficiency, renewable generation and demand management. We question whether the scheme should support ancillary services such as CHP contracts with the National Grid. This would have to be subject to a carbon assessment, to ensure it does not drive generation when the grid carbon content is lower.

We note that electric boilers as listed among the potential technologies. When the scoring is developed in more detail, we recommend checks on the weightings of the "peak demand" and "demand management" criteria, so that direct electric heating would only be funded if its impact on demand and the electricity grid is acceptable and managed. (We note these schemes may be unlikely anyway due to their impact on costs for consumers, but worth a check).

APPLICATION PROCESS

[1] BEIS Research Paper No 22, H2 Emission Potential Literature Review, E4tech for BEIS, April 2019

Important note on the regulatory regime - where schemes are serving residential buildings in scope of the new building safety regime there will need to be interactions with the new safety case regime. The details of how this will work are evolving but the GHNF should be mindful of it and its gateways. In addition, any scheme that is within the safety case regime will HAVE to adopt the golden thread – which further reinforces the need for monitoring, reporting (including to residents) and disclosure requirements.

In addition, we recommend considering an independent check on the design proposals before funding is confirmed; this could help prevent delivery issues. Full release of the funding should also be conditioned on evidence of best practice commissioning at completion, and evidence of delivery against the design proposals.

MONITORING OF OUTCOMES AND SCHEME EVALUATION

(response to questions 38 and 41)

We strongly support the intent to monitor outcomes at project level. We also strongly support the intent to evaluate the GHNF overall – this is in line with best practice and repeated recommendations from CIBSE and other bodies, such as the National Audit Office, to ensure the best use of public funds and improve policy effectiveness.

The proposed indicators which schemes will have to report against seem to capture essential performance criteria but we would add that in line with the gate metrics, cost impacts on consumers should also be evaluated. A recent example of disclosure requirement which BEIS may find useful is the Greater London Authority's "Be Seen" policy, which will apply to heat networks.

As noted above, we recommend developing proposals for recourse in the case of discrepancies between declared objectives in the applications, and what will be delivered in practice e.g. penalties, reserved portions of funding only released on demonstration of outcomes etc.

We note that the reporting and evaluation details will be developed in the next stage, and would be happy to work with BEIS on this, including data and metering arrangements.

CIBSE would be very happy to provide support for this evaluation, whether in terms of outcomes to be assessed and/or dissemination of lessons learnt.

END

Please do not hesitate to contact us for more information on this response.