

Report of the Strategic Director of Corporate Resources to the meeting of Corporate Overview and Scrutiny Committee to be held on 27th July 2023.

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NOT FOR PUBLICATION

The appendices are marked 'Not for Publication' on the grounds that they contain exempt information within paragraph 3 (Information relating to Financial or Business Affairs) Schedule 12 A of the Local Government Act 1972 (as amended) and the public interest in applying this exemption outweighs the public interest in disclosing the information.

Subject:

DISTRICT HEAT NETWORK – UPDATE ON THE PROPOSALS TO MOVE TO PRE-PROCUREMENT FOR HEAT ENERGY FROM A DISTRICT HEAT NETWORK

Summary statement:

This report is to provide an update to the Corporate Overview and Scrutiny Committee on the district heat network for Bradford and the proposal to move to market testing tender process for heat energy from a district heat network. To gain an understanding of the availability, strengths and weaknesses of the market and to develop the specification and best value procurement and contractual approach.

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**Overview & Scrutiny Area:
Regeneration and Environment**

1. SUMMARY

This report presents a summary of the progress on developing and supplying low carbon heat as part of a district heat network for our city centre based Civic buildings.

2. BACKGROUND

Bradford Council has a target to be net zero carbon by 2038.

In 2010, Bradford Council agreed to reduce its carbon emissions from its own activities and for the District by 40% by 2020.

CO₂ emissions from scopes 1 & 2 (direct and indirect) have decreased by 57.5% from 2014-15 to 2021-22 going from 49,000 tCO₂e to 20,844 tCO₂e. The CO₂ emissions due to heating were 6,949 tCO₂e.

The decrease has been achieved by changing standard fluorescent lighting to LED lights, replacing gas boilers with more efficient models, replacing gas boilers with lower carbon alternatives such as biomass and CHP units, energy efficiency measures and small scale deployment of renewable energy technologies. A key part of this success has been a much higher level of control through Building Energy Management Systems (BEMS) where the Energy Team have direct visibility and can control and manage 90 of our buildings.

In conjunction with the net zero carbon target Bradford Council have deployed a Clean Air Zone which aims to reduce NO₂ emissions by 35% and CO₂ by 147,000 tonnes. This has an impact on the heating technologies that can be deployed to reduce carbon emissions, without increasing NO₂ emissions. Biomass boilers which were considered as one of the alternatives to gas, and which are relatively straightforward to act as direct replacements, were therefore meeting one emission requirement but impacting negatively on the other.

Air and Ground Source Heat Pumps which meet both emission requirements and can be highly efficient, require a large outside open space to operate efficiently, however can be quite noisy. On this basis this excludes them from being used in most of the city centre buildings where easily accessible outdoor space and noise will not impact on other building users or the general public.

District Heat Networks (DHN) offer an opportunity to reduce the district's carbon emissions significantly without a large impact on users and the general public. It is one of the few technologies that after initial installation work and some possible disruption, has a relatively low impact on the building users and general public.

The UK government has identified DHN as a significant contributor to reducing UK greenhouse gas (GHG) emissions and as a component in the transition to low carbon energy. The Department for Business, Energy and Industrial Strategy (BEIS) now the Department for Energy Security and Net Zero (DESNZ) has made financial and technical resources available to support DHN project development across the country, including Public Sector Decarbonisation Scheme (PSDS) funds.

The majority of previous work conducted by the Energy Team was focused on the council owning and operating a heat network, including an energy centre. This included extensive

economic modelling and thermal modelling which formed the basis for the application for PSDS funding.

The council and its employees have limited experience or expertise in developing and operating heat networks.

In 2021-22 the option for a potentially more viable route working with a private sector organisation, that had experience in developing and operating heat networks, was explored. This is currently the option that is being followed.

The council buildings being assessed for connection to the heat network are;

- City Hall
- Britannia House
- Margaret McMillan Tower
- Sir Henry Mitchell House
- St Georges Hall
- Alhambra Theatre

The basic premise remains the same, the setting up of an energy centre near Bradford City centre which feeds an extensive heat network that supplies heat to 6 of the city centre council buildings and a range of other users. The council and users would then purchase heat from the heat network gaining the benefits of low carbon heating with a reduction in carbon emissions but without the cost of setting up and managing the energy centre and heat networks.

In general, the major difference between gas fired heating systems and heat supplied via a heat network is that the temperature flow rates are different. Gas fired systems typically supply at between 75-80 degrees Celsius whereas its lower for heat networks which typically operate at 60 degrees Celsius. Generally older heat emitters (radiators) struggle to work effectively and efficiently at lower supply temperatures and it is normally recommended to replace all heat emitters and pipework to be able to operate effectively.

The PSDS application included complete replacement of the heat emitters (radiators) and associated pipework in the 6 main council buildings on the basis that they are quite old and were deemed unsuitable for use with a lower temperature flow through them.

This was all based on theory previously and had not been physically tested in the 6 council buildings until February 2023. Due to the level of control offered by the extensive BEMS deployed in these buildings, it was possible to conduct temperature lowering tests to replicate the effect of being connected to a heat network. The building temperatures were closely monitored to measure the impact of operating the existing heating systems on lower temperatures.

The results were that the heating systems worked well with suitable timing adjustments and that building temperatures were maintained at set levels. This indicated that the current heat emitters and pipework might not need to be replaced, which would be a large saving in costs and time to deliver the project.

The domestic hot water system did not cope so well and in the event of a change to a heat network the hot water system in these buildings will need considerable improvement or replacement. This is mainly to reduce the risk of legionella, as the required water

temperature of 60 degrees Celsius could not be maintained consistently.

In the light of the recent successful tests replicating the flow temperatures of a heat network, external consultants reviewed the works that they believe will be required to provide optimum energy efficiency and user comfort for the council buildings. This work was completed for the six city centre council buildings and those of other main users. As a result of this work there was a recommendation that the refrigerant be changed to one that would allow temperature flow rates of 75 degrees Celsius. The impact of this being that current heat emitters and hot water systems in most buildings would not need replacing, however, changes to current heating and hot water systems where gains in efficiency can be achieved are recommended.

The original PSDS funding application, which was based on all 6 city centre buildings as a group, was declined at the beginning of July 2023. New applications will be made in Autumn 2023 but on an individual building basis, which it is felt will have a better chance of success.

3. OTHER CONSIDERATIONS

3.1 Carbon Emission Reductions

As previously noted the current level of carbon emissions from the gas heating in council buildings is 6,949 tCO₂e against a total for scopes 1 and 2 of 20,844 tCO₂e.

The work carried out by external consultants calculates that there will be reductions of about 1,016 tCO₂e from the deployment of the DHN for the 6 city centre council buildings. This is a 14.6% reduction against heating carbon emissions and 8.2% against scopes 1 and 2.

This is a significant reduction in carbon emissions through one scheme.

3.2 Economic – Capital Costs

The original PSDS application would not have covered all the work that was at that time deemed to be required and therefore Bradford Council would have had to provide a percentage of the funds required to complete the works. In the light of the recent successful tests replicating the flow temperatures of a heat network, external consultants reviewed the works that they believe will be required to provide optimum energy efficiency and user comfort for the council buildings. This work was completed for the six city centre council buildings and those of other main users. As a result of this work there was a recommendation that the refrigerant be changed to one that would allow temperature flow rates of 75 degrees Celsius. The impact of this being that current heat emitters and hot water systems in most buildings would not need replacing, however, changes to current heating and hot water systems where gains in efficiency can be achieved are recommended. This significantly reduces the capital costs of the modification and connection works from £10.8 million to around £5 million. Final figures are still to be determined and the market testing tender process is key to obtaining accurate figures.

The capital costs can be broken down into two areas;

- Connecting to the heat network
- Preparation of the heating and hot water systems in the council buildings

Further details can be seen in appendix 1.

3.3 Economic – Operational Costs

There will be ongoing costs to be supplied heat from the network and these will be important in determining whether ongoing operational costs will be higher or lower than currently. Typically, operational costs will be split into standing charges per kW capacity and heat supplied in kwh.

The main variable will be for the heat supplied which is determined by the costs of running the energy centre which is planned to be heat pumps powered by electricity. The ratio of efficiency of the system then determines the profitable level that heat can be sold to those on the heat network.

Indications are that costs will be at best neutral and most likely higher than those currently paid for gas, however, the current gas market is highly volatile and it will not be possible to fully understand the operational cost implications until a full market testing tender exercise is done.

It should be noted that as all current boilers will be removed as part of the connection to the heat network there will be a reduction of between £30-40k in service and maintenance costs.

It should also be noted that bulk purchase of gas through the YPO framework may also be affected and any cost variations here will have to be accounted for.

Moving to a heat network will also reduce BMDCs Carbon Change Levy costs by between £20-30k per year.

Current energy efficiency work, as stated in the heating plan, using a higher level of control has seen significant decreases in the use of energy for heating in the target buildings, up to 20% for City Hall and Britannia House.

Trials of innovative energy efficiency products are also currently ongoing. If successful they will further reduce the energy required by between 15-20% to heat these buildings and further reduce the volume of heat supplied by a heat network.

Further details can be found in appendix 1.

3.3 Project Delivery

The nature of UK government funding streams is that they tend to be short term, with short delivery times for completion of projects. If subsequent PSDS funding applications for Autumn 2023 are successfully obtained, then projects will generally have to be fully delivered within a set timescale which could be 12 months with a prior period of planning.

This would be a considerable task if full replacement of the heat emitters and pipework is required, however, more achievable if they are not, and with considerably less disruption to the users of the buildings, especially with the run up to the City of Culture activities in 2025. Works in the various buildings will have to be carefully timed (Alhambra and St Georges Hall in particular) and planned.

3.4 Next Steps

There is a degree of pressure on timelines due to the funding criteria the UK government have set for their next stage funding. We will not allow this to influence our decisions and a formal market testing tender process is being recommended to be implemented.

This will be presented at the PAG meeting in July 2023 for a decision on releasing the allocated reserve fund into the capital fund.

There will be a market testing tender process. This will provide the detail on capital and operational costs that are needed to make a fully informed procurement decision. It will not be a binding process to procure heat energy for a fixed term, but will enable an informed procurement decision to be made in the future.

4. FINANCIAL & RESOURCE APPRAISAL

4.1 Finance

The main portion of the funding for developing the council buildings to be ready to connect to a heat network will come from the success of PSDS applications. It is possible that the review by external consultants on what works will be required will show that the PSDS funds will cover all the costs. There is a capital budget of £1.4 million, currently in reserves, for delivery of this project alongside PSDS funding applied for. The intention is to take an updated costing of the proposal to the PAG group to seek approval for the scheme and funding to be moved from reserves to the live list, subject to success in obtaining PSDS funding.

If funding applications are not successful then it may be that with the support of external organisations it may be possible to obtain funding from alternative sources or indeed have the connection fees included in the overall heat energy contract. Through the market testing tender process these alternatives will be included in the tender criteria and thoroughly evaluated prior to a final purchase decision.

4.2 Resource

This project will require a significant amount of preparation and project management by many parts of the council, but with a particularly heavy impact on the Built Environment department and the Energy Team.

This project, if it goes ahead, will require dedicated resource for the planning and then the delivery year. This will include project management, individual building leads, leads on controls and funding applications.

5 Corporate governance and Risk Management

5.1 Corporate Governance

It is proposed that a District Heat Network board is formed with relevant officers appointed

to oversee the project for the procurement process and full timescale of the preparation and delivery years.

5.2 Risk Management

There is a robust process for assessing the technical aspects of the project, especially the internal building heating system performance with varying supply temperatures. This is monitored constantly and reviewed weekly.

The application process for PSDS is robust with external support being used to develop the application documents, especially the technical requirements and costings using industry standards. This was a significant piece of work. The review and modification is also being undertaken by external specialists.

6. LEGAL APPRAISAL

Under contract standing order 7.2.3 market engagement is permissible pre-procurement, to allow for engagement with the market (including talking to suppliers, clients and other stakeholders) to understand the availability, strengths and weaknesses of the market and to develop specifications for best value procurement and contractual approach. This must however be done in such a way that subsequent procurement process remains open, fair and transparent with no supplier gaining an unfair advantage which would distort competition.

7. OTHER IMPLICATIONS

7.1 EQUALITY & DIVERSITY

N/A

7.2 SUSTAINABILITY IMPLICATIONS

Reduction of carbon emissions of 1,016 tCO₂e per annum.

7.3 GREENHOUSE GAS EMISSIONS IMPACTS

Reduction of carbon emissions of 1,016 tCO₂e per annum.

7.4 COMMUNITY SAFETY IMPLICATIONS

7.5 HUMAN RIGHTS ACT

There are no Human Rights Act issues identified

7.6 TRADE UNIONS

7.7 WARD IMPLICATIONS

There are no Ward or area implications identified.

7.8 AREA COMMITTEE ACTION PLAN IMPLICATIONS

There are no implications relevant to area committees.

7.9 IMPLICATIONS FOR CHILDREN AND YOUNG PEOPLE

There are no implications identified.

7.10 ISSUES ARISING FROM PRIVACY IMPACT ASSESSMENT

There are no data protection or information security implications arising from this report.

8. NOT FOR PUBLICATION DOCUMENTS

Appendix 1 is commercially sensitive, and to be regarded as 'Not for Publication' and therefore exempt from disclosure in accordance with paragraph 3 of schedule 12a (financial or business affairs) of the Local Government Act 1972.

It is considered that in all the circumstances, the public interest in maintaining the exemption outweighs the public interest in disclosing the information.

9. RECOMMENDATIONS

That the update report and proposed pre-procurement process is noted.

10. APPENDICES

Appendix 1 – Financial Model for Connecting to an External Heat Network