Agenda Item No: 4

A DEMONSTRATOR PROJECT FOR LOW CARBON COMMUNITY HEAT IN SWAFFHAM PRIOR

To: Commercial and Investment Committee

Meeting Date: 23 November 2018

From: Graham Hughes, Executive Director - Place and Economy

Electoral division(s): Burwell, All

Forward Plan ref: 2018/063 ***Key decision:*** Yes

Purpose: To propose working in partnership with the Swaffham Prior Community Land Trust to develop a detailed business case for a community low carbon heat scheme, using the Council's land to help facilitate the delivery of the Scheme.

Recommendation: Members are asked to:

a) support the submission of an application to Government requesting a total project development grant of £290,000 to bring forward a detailed business case and implementation plan for a low carbon community heat scheme for Swaffham Prior;
b) agree a Council development budget of £95,700, which constitutes a match funding contribution of 33% to the project to draw down the £194,300 government grant;
c) approve detailed consideration of the use of the County Farm Estate land at Swaffham Prior, currently identified in the local plan for commercial development, to host an energy centre for the benefit of the community and the Council;
d) undertake detailed discussions between the Council, the Swaffham Prior Community Land Trust, Cambridgeshire and Peterborough Combined Authority, the Government's Heat Network Delivery Unit and others to identify delivery models for the community heat scheme;
e) approve the use of materials produced and lessons learned from this Project to support other communities to move from oil based heating systems, to more sustainable, low carbon options.

	Officer contact:		***Member contact:***
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1. BACKGROUND

1.1. In March 2017, the Council approved its Corporate Energy Strategy. The strategy includes a vision to help *"build energy resilient communities through aligning the Council's assets and the potential for energy generation with local needs".* A key objective of the strategy is to *"work with all partners and the local community to identify and facilitate low carbon energy projects using the Council's assets to bring benefits to all partners."*

1.2. The Department for Business, Energy and Industrial Strategy (BEIS) sponsored the development of a Local Energy Investment and Delivery Strategy. Cambridgeshire is covered by this strategy, which identifies that working with communities on heat networks is a key area for development.

1.3. The Council's energy work to date has focused on reducing energy consumption in its offices and schools and developing larger energy projects on its land assets to generate income. More recently, its bid submission to Innovate UK to deliver a smart energy grid for Cambridge has looked to facilitate transformational change in the way energy is generated, stored and managed locally and to deliver Government ambitions for Clean Growth and Smart Cities. However, a key area of work, yet unexplored by the Council until now, is how to support our rural communities to positively adapt and change in the face of a new low carbon and smart energy agenda. Exploring how to do this and working with a proactive community to bring about change, is the subject of this report. This is an opportunity for the Council to think differently about the use of its assets, develop new partnership business models with the community and bring financial, social and environmental benefits to both the community and the Council.

1.4. In December 2017, Swaffham Prior Community Land Trust (SPCLT) approached the Energy Investment Unit to share a feasibility study for a community heat scheme for the village and to request support to submit a grant application to BEIS's Heat Network Delivery Unit (HNDU). The details of the initial feasibility study along with the results of an energy survey with Swaffham Prior residents can be found here http://www.swaffham-prior.org.uk/pc/CLT/study.pdf

1.5 The Council and SPCLT was awarded, BEIS Round 7 funding of £40,200 in March 2018 with the requirement to secure match funding of £19,800 to make a total budget of £60,000. The Cambridgeshire and Peterborough Combined Authority agreed to provide the initial match funding on the understanding that this work can be replicated to benefit other communities keen to take this new energy journey. The aim of the grant and match funding was to develop a techno- economic study for the community heat scheme and develop heat supply template agreements. The latter would facilitate engagement and interest in the scheme with Swaffham Prior residents.

1.6 In August 2018, the Council and SPCLT commissioned Bouygues Energies and Services to deliver the techno-economic study using the County's Refit 3 procurement. Lawyers, Sharpe Pritchard LLP were procured in October 2018 to develop the template heat supply agreements in partnership with the community. Both Bouygues and Sharpe Pritchard LLP are scoping the next stage of financial, technical and legal work to inform a second, Round 8 grant application to HNDU, by 30 November 2018.

1.7 Swaffham Prior is a village of just over 300 homes in South East Cambridgeshire. Its main heating fuel for homes is oil and residents are seeking to move away from oil onto more sustainable and cleaner fuels for heating whilst also seeking to manage the cost of their energy bills.

2. MAIN ISSUES

2.1 *The techno-economic study* conducted by Bouygues Energies and Services Ltd covered the following:

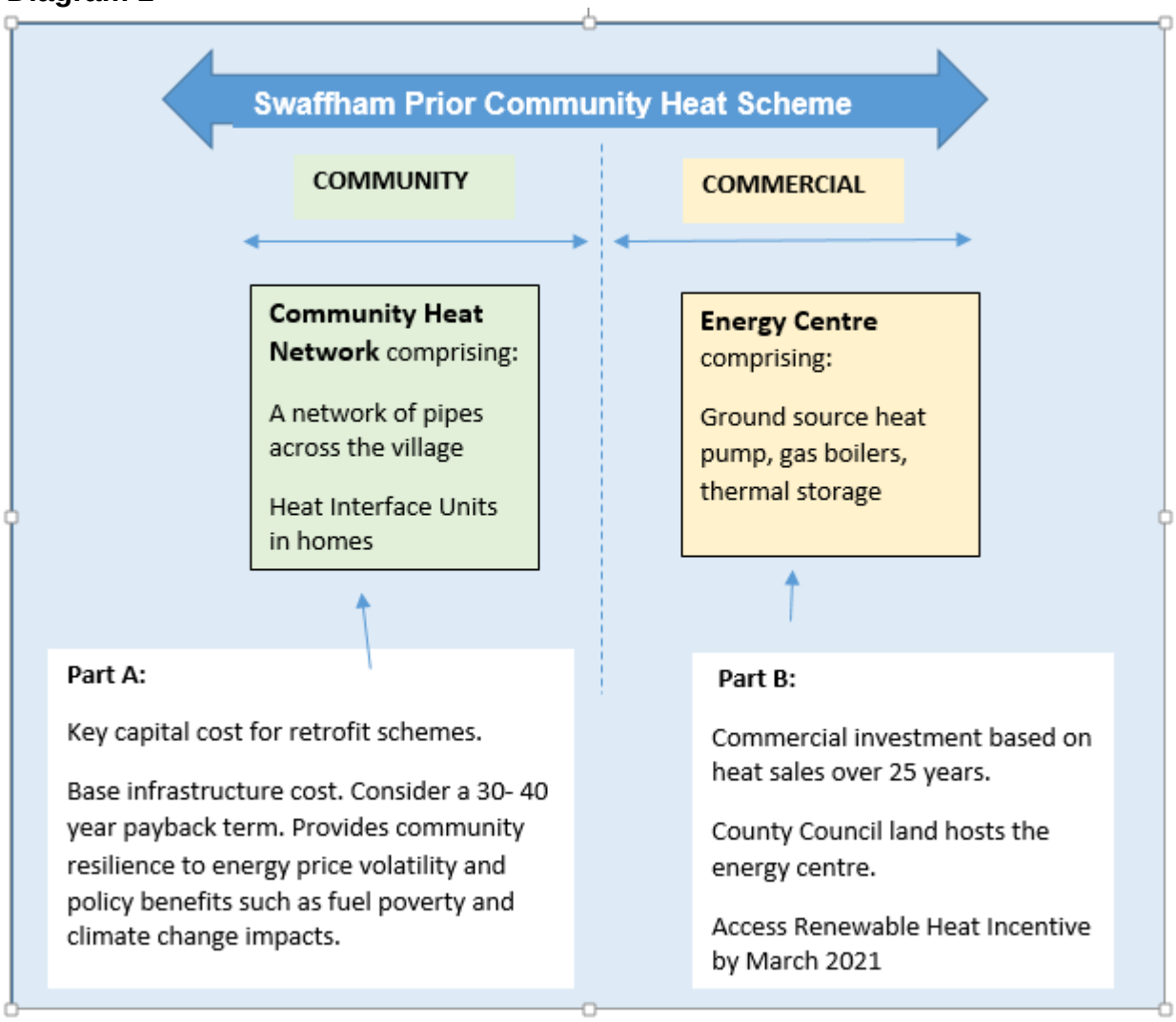
- A review of the assumptions and outputs from the initial feasibility study commissioned by the Swaffham Prior Community Land Trust in 2017 for a heat network with a significant ground source heat pump;
- Energy modelling for the village, to understand the heat demand of the homes plus the application of different technology options to determine the best fit for the scheme. Please see Appendix B, a RAG status of the technology combinations;
- Building a finance model for the scheme in accordance with HNDU templates to inform a further application for BEIS Round 8 HNDU funding; and
- Scoping of key risks and significant tasks to inform the Round 8 funding submission. Please see Appendix C.

2.2 As a result of the financial modelling, there is consensus between the SPCLT, the Council and BEIS HNDU that there is a potential investment case for Option 1 in Appendix B which merits further exploration. Option 1 comprises a 1500KW ground source heat pump with gas boilers, a thermal store and heat network. The heat network comprises underground pipes carrying hot water at 70 degrees Celsius (ºC) from the energy centre to homes via a heat interchange unit. Appendix A sets out the proposed energy centre location and diagrams representing the main technologies for the community heat scheme.

Please see the letter of support from BEIS attached as Appendix D.

2.3 The capital costs for the scheme can be broken into two key areas. Broadly, the heat network could cost up to £3million and the energy centre £2.5 million. Please see Diagram 1 below. The broad intention will be that the heat network seeks to recover costs and the energy centre is funded on a commercial basis to benefit from Renewable Heat Incentive (RHI).

Diagram 1



2.4 The HNDU supports the development of a project through four key stages of development. See below. These stages can access grant support provided they demonstrate a viable project at each stage. Once a project is ready for investment the HNDU will consider gap funding under the 'Heat Networks Investment Project' if schemes pass at least one of the additionality tests. These tests include the case where project financials are positive but are not attractive enough to enable funding or where, additional technical or commercial features come with capital costs that create a barrier.

Stage	**Detail**	**Swaffham Prior Community Heat Scheme**
Heat mapping and master planning	Identification of heat network opportunities	✓ via the initial feasibility study
Feasibility Study	Technical feasibility and options appraisal for a scheme plus detailed energy and financial modelling	✓ Successful Round 7 grant application
Detailed Project Development	Development of the business/commercial model and financing options, scheme design, procurement strategy and detailed business case	Applying for Round 8 grant funding to be submitted by 30 November 2018
Commercialisation	For example, development of customer agreements, tariff structures and land access arrangements.	

2.5 *Heat supply contracts*. On 22 October 2018, a small focus group of Swaffham Prior residents met with the Council and lawyers, Sharpe Pritchard LLP. The aim of the session was to understand residents' concerns signing up to a community heat supply agreement and becoming early adopters of the scheme.

2.6 Three key areas of concern were raised by residents including:

- **Contract term**. The heat supply agreement is likely to be a long-term contract. Residents expressed initial concern at signing up to a long-term contract with a heat supplier in a monopoly position who had the ability to change prices throughout the term. Sharpe Pritchard LLP explained that an appropriate cost comparator would need to be developed to give residents comfort as to the transparency and appropriateness of their bills. Further development of who the heat supplier will be will also assist this analysis and residents felt comforted that the intention was for there to be some level of community involvement. This is an area that will be explored formally in the next stage of the project but initial discussions have been encouraging.
- **Upgrades of home heating systems and their ongoing maintenance**. Residents were concerned at the potential cost of upgrades to their home heating systems to connect them to the heat network. This issue was identified as a priority for the next stage of development and, in particular, it was identified that it was critical to understand the scale of this issue and its cost. The intention of the scheme is to supply heat at 70ºC to reduce the likelihood of significant internal reworks.

- **Incentives to fix the scheme if things go wrong.** Residents felt that the template heat agreement should include significant penalties for the heat supplier if the scheme is not operational due to unplanned breakdowns as a mechanism to incentivise the scheme to be fixed as quickly as possible.

3.0 Next steps

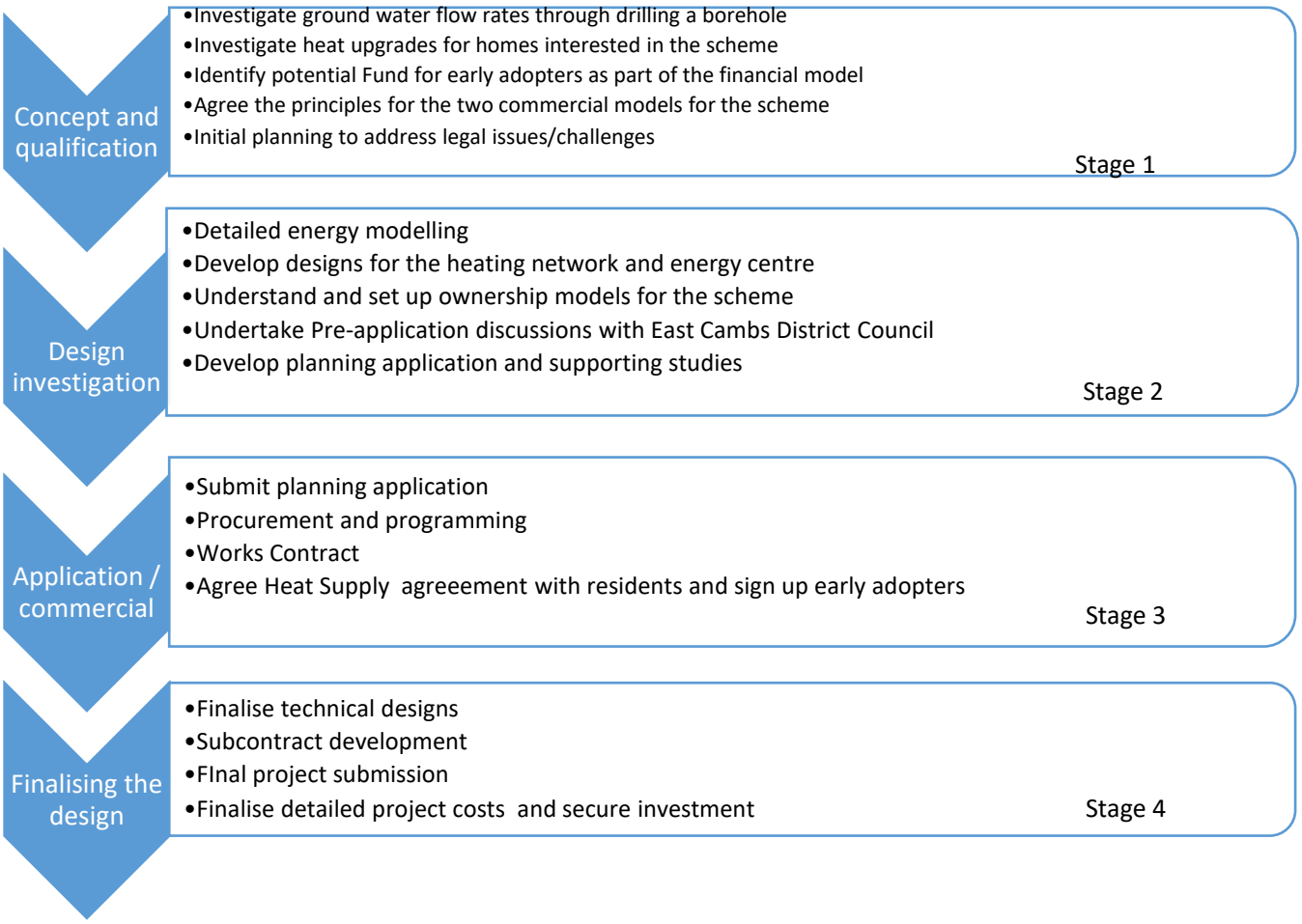
3.1 To progress the proposed community heat scheme a project development budget is required. This will provide the opportunity to assess key risks and develop the detailed business case for the scheme.

3.2 HNDU Round 8 project development grant is now open for bid applications. (September – November 2018). Match funding of 33% of the total cost is required to draw down the development grant. The project has a potential commercial interest for the Council and therefore it is proposed that the Council match funds this work.

3.3 The application will look to request a total of £290,000 project development, of which £95,700 must be match funding. The project development will cover the following:

- the assessment and selection of where a test borehole is drilled, planning for and drilling a borehole, to assess groundwater flows (1x borehole @£30,000). This is a key priority and first step for the project.
- an assessment of residents homes to identify the scale of upgrades required to connect to the heat network and to inform the finance model (approximate value £5,000);
- development of a detailed business case for the heat network and energy centre including archaeology investigations and securing planning permission (approximately £190,000);
- legal advice for the set-up of different ownership models for the two commercial models that make up the district heat scheme (approximately £30,000);
- external finance support, including the commissioning of a Market Economic Operators Report (MEOP) (estimate £20,000); and
- project management of the scheme and engagement with Swaffham Prior residents (Approximate £15,000).

3.4 Our development approach will be to split the ‘Project Development’ into four phases as described in Diagram 2 below. The intention is to obtain the maximum level of certainty and security at the earliest stage, providing gateways to the next stage based on the findings. This will limit our cost exposure on the development budget.



4. ALIGNMENT WITH CORPORATE PRIORITIES

4.1 Developing the local economy for the benefit of all

Communities reliant on oil-based heating systems, will, over time, pay more for their heating costs compared to homes on clean energy and gas. The Swaffham Prior district heat scheme will provide a better opportunity for the village and its residents to manage future heat costs. It will also provide a blueprint for other communities to work together and move away from oil heating.

4.2 Helping people live healthy and independent lives

Utilising Council's assets to help the community to reduce greenhouse gas emissions and improve local air quality for residents.

4.3 Supporting and protecting vulnerable people

Without a strong focus on upgrading energy infrastructure for rural communities and developing local energy markets, the cost of energy will become unaffordable putting more homes and people into fuel poverty.

5. SIGNIFICANT IMPLICATIONS

5.1 Resource Implications

Should the Round 8 funding be approved, the Council's match funding will be needed to draw down the grant monies.

Project management capacity is included in the grant submission to cover the delivery aspects of the scheme.

The project development grant must be continually assessed for compliance with HNDU grant conditions.

5.2 Procurement/Contractual/Council Contract Procedure Rules Implications

The Council procured Bouygues Energies and Services Ltd during 2017 as part of a mini-competition under the Greater London Authority and Local Partnerships Refit 3 Framework. The Council has used this procurement to develop the BEIS HNDU techno-economic study as this area of work falls within the remit of the procurement.

5.3 Statutory, Legal and Risk Implications

State Aid compliance will need to be assessed and agreed with HNDU for grant funding. Section 3.3 above includes the development of a MEOP to support these discussions.

Ownership/delivery/corporate models for the community heat scheme will be explored in partnership with the SPCLT and local residents.

Risks identified in Appendix D including legal and financial risks will be managed through our development approach described in Diagram 2.

5.4 Equality and Diversity Implications

There are no significant implications in this category. Local residents are engaging in the scheme as they could benefit from more sustainable and cleaner fuel for heating, and from improved local air quality. This project could have a positive impact on people in rural locations relying on oil-based heating seeking to manage the cost of their energy bills. The learning from this project will be shared with all communities and guidance provided to other communities looking to set up district heat schemes.

5.5 Engagement and Communications Implications

A project Board has been established comprising Members of the SPCLT, Cambridgeshire and Peterborough Combined Authority and County Council officers from the Rural Estates team and Energy Investment Unit. HNDU provides guidance to

the Board on the conditions of the Round 7 grant and provides best practice guidance and support from their experience working with other projects across the UK, developing community heat schemes.

Local residents have been engaged through social media, a newsletter and requests to provide energy bills and photos of their heating systems. More recently, a joint presentation from the SPCLT, Bouygues and County Council was given to the community on 2 October 2018, to share initial scheme ideas and assumptions. This offered residents the opportunity to ask questions about the community heat scheme. As a result, a small group of residents agreed to work with Sharpe Pritchard LLP, see 2.5 and 2.6 above.

5.6 Localism and Local Member Involvement

The Local Member for Swaffham Prior has been briefed on the project and the Parish Council has been engaged in the project via the SPCLT with updates provided at meetings in September and one planned for December 2018.

5.7 Public Health Implications

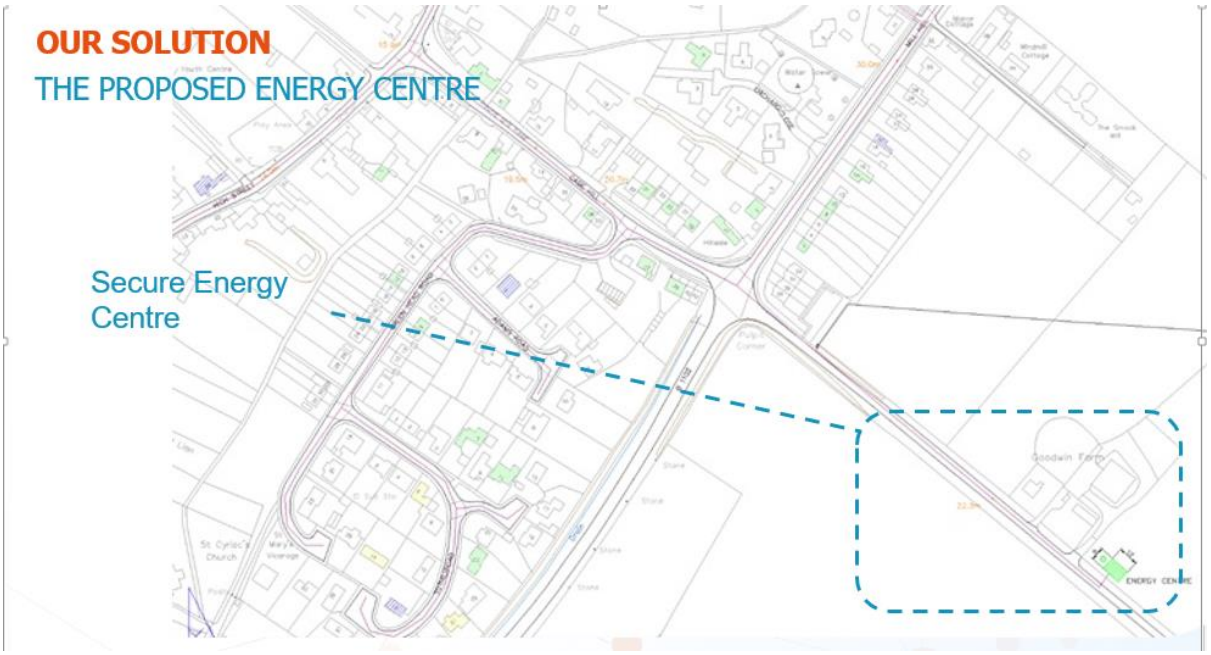
This project will help mitigate climate change, improve local air quality in the home and should provide more cost effective heating for homes over the longer term providing long term health benefits to the community.

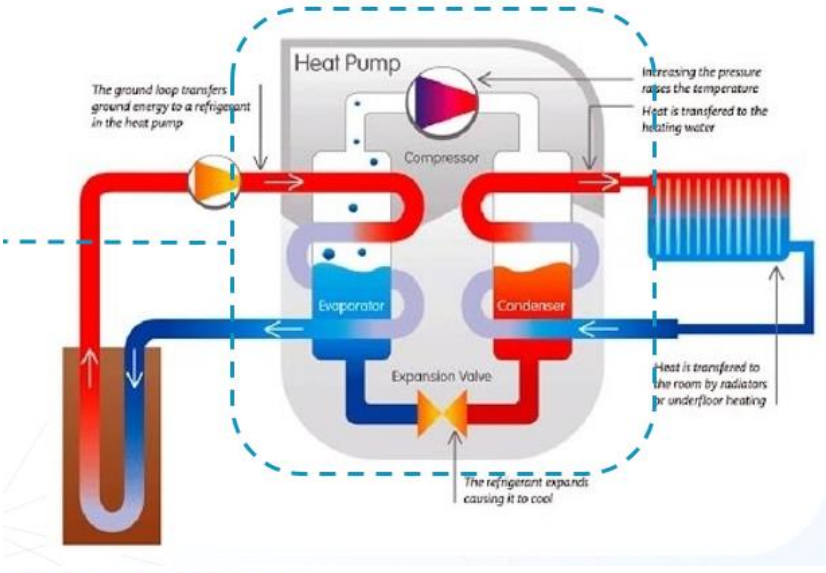
Source Documents	**Location**
The Council's Corporate Energy Strategy	https://www.mlei.co.uk/section-1/ccc-energy-strategy/
Swaffham Prior District heat scheme, Feasibility Study, December 2017, Bioregional and Carbon Alternatives	http://www.swaffham-prior.org.uk/pc/CLT/study.pdf
Memorandum of Understanding with BEIS, HNDU for Round 7 grant funding	EIU network folders
Delivering Financial Support for Heat Networks, Heat Networks Investment Project	https://www.gov.uk/guidance/heat-networks-overview
Proposal for a Community Heat Scheme for Swaffham Prior, Community Presentation and FAQ, 2nd October 2018	http://www.swaffham-prior.org.uk/pc/CLT/study-FAQ2.pdf
Draft techno-Economic Study for the Swaffham Prior Community Heat, October 2018	EIU network folders

Tri-LEP, Local Energy Investment and Delivery Strategy, October 2018	EIU network folders

Implications	**Officer Clearance**
Have the resource implications been cleared by Finance?	**YES** Name of Financial Officer: Sarah Heywood
Have the procurement/contractual/ Council Contract Procedure Rules implications been cleared by the LGSS Head of Procurement?	**Yes** Name of Officer: Paul White
Has the impact on statutory, legal and risk implications been cleared by LGSS Law?	**Yes** Name of Legal Officer: Debbie Carter-Hughes
Have the equality and diversity implications been cleared by your Service Contact?	**Yes** Name of Officer: Elsa Evans
Have any engagement and communication implications been cleared by Communications?	**Yes** Name of Officer: Joanna Shilton
Have any localism and Local Member involvement issues been cleared by your Service Contact?	**Yes** Name of Officer:
Have any Public Health implications been cleared by Public Health	**Yes** Name of Officer: Stuart Keeble

Appendix A: Proposed Energy Centre on Council's land and diagrams representing the main technologies for the community heat scheme and residents homes





Ground source heat pump

Appendix B

Table 1: Modelling of four technology combinations

Technology models (all include the community heat network)	**Technical feasibility**	Commercial **viability**	**Constr'n risks**	**Operation al risk**	Decrease in CO2 reductions	**Overall RAG status**
1. 1500KW ground source heat pump, gas boilers and thermal store	A	A	A	G	G	A
2. 600KW ground source heat pump,gas CHP, gas boilers and thermal store	A	R	A	G	G	R
3. 260KW ground source heat pump,gas CHP, gas boilers and thermal store	A	R	A	G	G	R
4. Commercial air source heat pump, gas boilers and thermal store	G	R	A	A	G	R

Key points:

Technical feasibility includes an assessment of (i) modelled groundwater flow rates for the heat pump (ii) whether sufficient and consistent heat can be supplied at peak demand to dwellings

Commercial viability was assessed on the basis of whether the techno-economic modelling identified a positive IRR for the project. The key issue for option 4 is that commercial air source heat pumps attract a lower level of RHI which impacts commercial viability.

Construction risk includes the challenges of working in an area of historic and landscape interest aswell as managing traffic flows through the village whilst progressing works.

Operational risk includes ongoing management of health and safety of the heat scheme. For example, commercial air source heat pumps use ammonia for heating and cooling as it achieves high energy efficiency due to its thermophyscial properties. However, ammonia is a toxic fluid and requires strict standards for the construction and operation of ammonia mainly to prevent uncontrolled ammonia emissions.

Decrease in CO2 emissions is measured simply against the 'do – nothing' scenario. The RAG status does not differentiate which of the technology models 1-4 reduces the most CO2.

Overall RAG status – if commercial viability is red the overall RAG is assessed as red.

Appendix C: The key technical risks associated with the community heat scheme

Key technical (T), financial (F) and legal (L) Risks	Mitigation strategy
T1. Insufficient ground water flow rates in the Greensand Aquifer to supply the heat demand in the village	Test boreholes are drilled to establish flow rates early in the next steps. Once confirmed, options include planning for additional boreholes and/or greater capacities of backup heat from the gas CHP/boilers dependent on the findings.
T2.Costs and delays incurred due to artefacts of archeological and historical interest being found whilst drilling boreholes or digging trenches.	Archeological evaluation work will be required at pre-planning phase for the vertical ground source heat pump and energy centre to understand what is likely to be there and to consider mitigation as part of the design of the scheme.
F1. The finance model for the scheme is not workable.	BEIS has set up 'The Heat Network Investment Project' (HNIP) to provide gap funding support for eligible heat projects. This support is conditional on the successful completion of the Project Development Phase and the agreement of the financial viability of a technical solution with the HNIP.
F2.Insufficient homes sign up early and commit to the district heat scheme	50% of all homes must commit upfront to join the scheme with additional connections reaching 298 homes by year 5 of the operation of the scheme to secure its viability. It is proposed that (i) the SPCLT recruits community champions to work alongside themselves to support residents to understand the benefits of the scheme; and (ii) early adopters are incentivised to sign up through no upfront upgrade and connection charges (later adopters to pick up own upgrade and connection costs.)
F3.Costs of upgrades to existing radiators and pipework in homes to connect to the scheme is a barrier to participation in the scheme	An assessment of all homes will be undertaken to identify upgrade requirements for individual properties to commit to the project. In addition, the finance model will look to consider whether a Fund allocation per home to support radiator and pipework upgrades for early adopters can be developed.
F4. Costs of decommissioning and disposal of oil boilers and tanks impacts project viability	Identify specialist contractors to undertake this work and get costs for removal and disposal. Apply for BEIS/HNDU grants or other finance options to cover all or part of the removal and disposal costs.
L1.Undertaking works to Consumers' Properties	The mitigation under F3 will assess the upgrade requirements for homes. This will also allow solutions as to how to provide upgrades to homes to be developed. Options include (but are not limited to) setting up call off contracts for residents to support the works required in their homes.
L2.Minimum duration of the Heat Supply Agreement and Consumer's ability to terminate	Continue dialogue with Swaffham Prior residents to agree the minimum duration of a contract and still comply with Consumer rights. This links with F2 above as the investment challenge is securing a sufficiently stable customer base.
L3.Consumer selling their property	Develop options including whether the connection to the heat scheme can be tied to a property and not a person, subject to consumer rights.
L4. Future changes in law which create technical challenges	It is likely that additional regulation of district heat networks is imminent. Continued engagement with BEIS is essential to help mitigate any risks regulation could bring to the project.

Appendix D: Support letter for the Swaffham Prior community Heat Project from BEIS

Department for Business, Energy & Industrial Strategy

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Commercial and Investment Committee
Cambridgeshire County Council
Shire Hall
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Our ref 104211_FES

05 November 2018

To the Commercial and Investment Committee,

The Department for Business, Energy and Industrial Strategy (BEIS) recently published the Clean Growth Strategy, setting out how the UK can continue its economic growth and prosperity whilst meeting our legally binding decarbonisation targets.

We've made huge progress on the transformation of our power sector and recognise that heat is the next big challenge, accounting for almost half of energy use and around a third of carbon emissions. With millions of homes and businesses across the UK and a need for heat to be close to zero carbon by 2050 to meet these targets, we recognise the scale of the challenge.

The Clean Growth Strategy makes it clear that heat networks will play a vital role in the long-term decarbonisation of heating. It demonstrates a strong commitment to significantly expanding the sector. In each of the Strategy's three illustrative pathways to 2050, heat networks could meet 17% of heat demand in homes and up to 24% of heat demand in non-domestic buildings. The Strategy also has an ambition to phase out the installation of high carbon fossil fuel heating in new and existing off gas grid residential buildings (which are mostly in rural areas) during the 2020s.

Heat networks are one of the most cost-effective ways of reducing carbon emissions from heating. They present an opportunity to exploit larger scale renewable and recovered heat sources, can mean lower bills for consumers and have an increasing role in playing a part in our dynamic energy system.

To help Local Authorities across England and Wales understand the opportunity for heat networks in the local area, identifying the benefits which could be delivered to local residents and businesses and the role of local government, BEIS formed the Heat Networks Delivery Unit in 2013. The team consists of technical, commercial and financial specialists who have provided support and funding of over £17m to a third of Local Authorities.

The village of Swaffham Prior in Cambridgeshire has an exciting opportunity to develop a heat network utilising heat available from groundwater in their area. Efficient heat pumps would be used to elevate the temperature of the water to a level assessed to be suitable for residents, thus requiring less intrusive retrofit requirements to existing buildings. The scheme should bring a number of important outcomes:

- Radically decarbonise the village, moving residents from oil to highly efficient electric heating benefiting from heat available in the groundwater;
- Act as catalyst project that we hope could be replicated for other similar rural off-gas grid villages;
- Significantly reduce the cost of heating (both space heating and domestic hot water) for residents; and potentially
- Provide residents the opportunity to be co-investors in their own local energy resilience.

There are certainly challenges ahead but I believe that this project has the potential to be an exemplar to other off-gas grid rural villages faced with the very pressing challenge of affordably decarbonising homes whilst remaining resilient to future changes in energy prices.

I very much hope that you will support the application to BEIS by agreeing to provide match funding for the project should the application prove successful.

Kind regards,

George Robinson
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