

Swaffham Prior Community Land Trust VILLAGE DISTRICT HEATING SYSTEM



In response to a number of excellent questions regarding the initial report, we thought that an FAQ would be helpful to answer some of the concerns raised and points made. This list is not exclusive but intended to help inform those who are interested in the project. Our aim has always been to take the village off oil and for the village to leap frog into 21st Century.

We have a long way to go and fully expect to be challenged at each stage. We have no intention of processing a scheme that has a negative impact on the village. Quite the reverse. We want to make the village better for everyone, now and in the future.

1. What is a District Heating System?

A district heating scheme comprises a network of insulated pipes used to deliver heat, in the form of hot water or steam, from the point of generation usually down the road or pavement to an end user and provide a means to transport heat efficiently. Networks vary in size and length, carrying heat just a few hundred metres between homes and flats, to several kilometres supplying entire communities and industrial areas. This type of system is used widely and successfully for over 30 years in many countries like Sweden and Denmark.

A Renewable Heat Network uses a renewable heat source to provide the energy for the system and can be owned and operated in a number of ways, including community-led projects.

2. Why a Community Renewable Heating System?

The aim of the study has always been to identify if there is a more sustainable form of heating for Swaffham Prior homes, at less cost than individual oil boiler systems. It's about leap frogging forward, putting the village on the map and to help future proof the village for 21st century. This is exactly the type of project that Central Government wants to support to help reach national targets and there are significant funds available for this sort of community scheme.

3. What did the first report conclude?

The study shows there is a technical and economic opportunity for a heat network in Swaffham Prior. The business case is not currently economically robust and there are a number of variables that effect the balance of benefits versus costs. The initial work does show there is potential and hence there is value in assessing these variables in further detail, which takes time (and money).

The project indicates there are opportunities for other benefits such as the provision for fibre-optic installation directly to households. The project would remove or at least significantly reduce the reliance of the village on oil and provide heating at a cheaper cost to the customer, that is the goal. The project would also lead to significant carbon savings which is why there is central government support for such schemes. The report recommends that this opportunity is further developed a draws on this central government support.

4. What are the next steps?

There is a lot to do before a finalised community heat project can gain the required consents and planning permission. The report recommended:

- We need to engage the community to ensure the project is understandable and transparent so that we can start to develop commitment from prospective customers to connect
- Develop a community business model that is sufficiently well developed to give confidence to: the potential customers that they can commit to the heat network; potential investors and local partners such as the County Council, the Parish Council and importantly the Heat Network Investment Project (HNIP) run by the Department for Business, Energy & Industrial Strategy (BEIS), such that they will invest in the heat network
- Develop the detail of the technical option, especially improving the understanding of how to best to retrofit the heat network into existing housing
- Improve the estimates of heat demands, for example by working with any residents who have records of their current oil/LPG/electricity consumption. For the study we have used the EPC data but this shows significantly higher

heat demands than the National Heat Map data and it would be good to understand the basis of the Heat Map data.

- Improve the assessment of capital costs – especially the costs with higher uncertainties such as the boreholes for the heat pump and the heat network pipework.
- Progress the required permissions such as Environment Agency and Planning permission for the energy centre
- Make contact with Sun Edison the owner of the Exning PV farm asking if they may be interested in a direct electrical connection to the Swaffham Prior Energy Centre. This could significantly reduce the electricity cost to a heat pump based solution. The size of the solar farm would mean that during all daylight hours there would be sufficient generation to power the heat pumps even on cloudy days. Carbon Alternatives sent an email but no response was received. We would welcome an introduction if anyone locally knows someone involved.

5. How will be funded?

For the next round of work which will ensure a more detailed feasibility and technical design we need around £115,000. We are delighted to announce that we have been working with Sheryl French, Project Director for Mobilising Local Energy Investment at Cambridge County Council together with the backing of Josh Shumann our County Councillor. On 31st January the County Council submitted a bid on our behalf for £77,050 (2/3rds of the money) via HNDU (Heat Networks Delivery Unit in the Department for Business, Energy & Industrial Strategy).

6. Why are you bidding for more government funding?

Central Government is keen to support innovative low carbon heat technologies and encourage their take up to support heat poverty, climate change (reducing CO2 emissions) and fuel security objectives.

HNDU is running a £320m capital investment programme providing support for the capital costs of heat networks. BEIS have well defined and rigorous criteria for gaining support. This project sits very squarely in what they are trying to achieve with this fund but they will look closely at the viability test before awarding funds to our project. If we can prove that this system works at least in principle then, like the

provision of the CLT homes in the village, we make the next scheme somewhere else easier to deliver.

Potential timescales are HNDU funded feasibility study leading to application for HNIP part funding (currently BEIS are saying autumn of 2018 will be the first HNIP application round) HNIP funded commercialisation early 2019, construction over summer / autumn 2019. This timeframe could work for our project, if we can gain funding this spring.

7. Is it viable?

We do though think there is a scheme based on a ground source heat pump that could work but that the initial feasibility study is just to test the principle. The numbers are marginal and very much depend on a range of assumptions that will all need to be nailed down when we have better cost and other data.

Our feeling is if we can keep costs down to a reasonable level, build a robust simple system that is reliable and provides cheap heating (importantly cheaper than oil!) and run it on a community-owned basis then we think enough in the village will be happy to support such a project in enough numbers to make it viable.

8. How does the system work?

The project design taking forward is most likely a ground source heat pump of approximately 800 kW, taking its heat from open loop boreholes into the groundwater within the underlying chalk aquifer. The heat is extracted from the groundwater via an electric heat exchanger and the water is discharged still just as water back to the aquifer. The project will also require a thermal store (like a large hot water tank) to manage the peak demands, shift heat production from day to night and decrease the need for the backup oil boiler.

The heat is transferred in insulated underground pipes through the network and into the homes and other premises within the village.

9. How does the system heat the water from low to high temperatures?

The heat exchangers are very efficient ramping up the heat (like a refrigerator in reverse) but can require a lot of electricity. So as part of the next step we will investigate a private wire connection to the existing solar PV farm on the Burwell Heath Road.

10. Does the water going back into the ground cause an environmental impact?

No, the volume abstracted and then returned once passed through the heat exchanger is not large and the open loop is self-contained so the risk of contamination is designed out. The two boreholes (out and then back into the ground) are nearby so the levels of water within the aquifer are not depressed, except very locally around the abstraction point. The abstraction and discharge would be licensed and monitored by the Environment Agency and there would be a formal consultation process with Anglian Water also.

11. Do you have to continually inject heat into the system?

No, the thermal store means that the heat exchangers can be run at the most economic time (in terms of electricity price) but the process runs in the background most of the time topping the system up.

12. Are individual home boilers more efficient?

Not necessarily, no although running warm water through long lengths of insulated pipes does involve some heat losses.

The key difference is between fuel types with oil not being sustainable in terms of price or security of supply, and where there are known environmental impacts including climate change.

13. Will there be disruption in the village?

There will be some local and temporary disruption to the village as the main network of pipes is laid and there will also work required at each house to connect to the system. Our aim is to ensure that the project if it is to be developed would be designed to ensure the period and amount to disruption is minimized.

In some Scandinavian countries the pipes are placed nearer the surface of the pavement to ensure that footpaths remain frost and snow free for the residents.

14. If so for how long?

Currently, we do not have a firm programme for how the project would be constructed because there are a number of technical elements that need to be refined in the detailed feasibility work before this can be determined accurately. We

recognize that this uncertainty is an issue and so the detailed feasibility will aim to map the network alignment and timeframes for construction.

15. How will it impact on my house?

To enable use of the heat delivered to the village there will be modifications that will be required to be made in each house. District heating requires radiators or underfloor heating to deliver space heating. Where these are available within the home, the modifications required are fairly straightforward. Where there are not radiators currently, their installation will be required and involve more internal work.

For hot water, the heat network can either heat a hot water cylinder or it can deliver Domestic Hot Water (DHW) on demand like a combi boiler does.

16. How will I pay for this work to my house?

We are looking into a range of ownership, governance and tariff arrangements. Our aim is to minimise the amount of upfront costs to each household so as to encourage connections. So installation costs could be rolled into early bills following connection.

17. Do I have to pay upfront to convert my house?

No, we are looking for a finance model that avoids upfront costs if at all possible. The cost would instead be spread in small amounts over time.

18. How many people need to sign up to make this system work?

This depends on the size of the network designed and how the houses wanting connection are distributed through the village. The final design of the network could be tailored to a degree. The study assumed a 75% sign up for the initial appraisal but recognises that this level of sign up is ambitious and in the conclusions it is acknowledged that a connection rate of over 60% is likely to be needed to make the scheme viable.

19. Why does it not include Rogers Road and Lower End?

The pipe network is the most expensive part of the project and the balance of age of housing stock (and therefore how well insulated), distance from the energy centre and density of housing are all factors. Our initial aim was to design a 'whole village' scheme but we are not sure this would be viable; however we have not

given up and will look in more detail at the boundaries of the pipe network again, especially if there are clusters of houses wanting to be connected!

20. Why is oil still part of the scheme?

We have initially chosen an oil based system as we felt that this is what people would feel comfortable with and understand when we are describing how it works. Similarly none of us want to be taking delivery of wood pellets or other biomass (such as straw) and having to work out where to store it in our spare time! The oil can be stored easily and only used when it is needed. Locally we also have oil suppliers and boiler engineers who can maintain the system. This can be changed in the future as and when we see fit. However it is only a back-up system to be used vary rarely.

21. There is not much experience of retrofit projects in the UK why not this do on a new build scheme in Soham?

There are new housing schemes being built with heat networks but it depends on local policy and so much is in London and Scotland currently. Other networks are now being retrofitted to universities and hospital campuses more widely.

However, the existing housing stock is the target for central government support as these are the harder places to reach and influence. In Sweden they have successfully retrofitted these sorts of systems on whole towns and Cities – our village is small by comparison.

Also, we live in this village and we want to help take Swaffham Prior off oil so promoting a scheme in Soham wouldn't really help.

22. Once you are signed up you cannot change to another supplier – why is this?

Because of the long term investment required to make a return, heat network projects historically used long term contracts to tie-in customers once connected. As part of the financial modelling, we will look at the length and terms of these contracts in more detail. We want to ensure the community is not disadvantaged or locked into uneconomic heat contracts. However, initially there may well be a longer term contract while the capital costs are re-paid.

As it is, the reality with oil is that most of us stick to one supplier most of the time.

23. If fewer than 180 households do not sign up what happens? Will it be abandoned?

Not necessarily, Our initial aim was to design a 'whole village' scheme but we are not sure this would be viable, however we have not given up and will look in more detail at the boundaries of the pipe network again, especially if there are clusters of houses wanting to be connected! The final scheme might be tighter and smaller and therefore the number of connections required may be smaller also.

We could then roll out a stage 2, 3 or 4 as demand is shown.

24. Should we spend another £100,000 of government money on the next feasibility study?

The Government is keen to spend this money to investigate and deliver viable heat network schemes across the country. If our project meets their criteria and tests, then they are recognizing that the in principle feasibility of our project is sound.

On 31st January the County Council submitted a bid on our behalf for £77,050 (2/3rds of the money) via HNDU (Heat Networks Delivery Unit in the Department for Business, Energy & Industrial Strategy). We should find out in the next few weeks if our application is successful.

25. Is there any political support locally for this project?

We are delighted to announce that we have been working with Sheryl French, Project Director for Mobilising Local Energy Investment at Cambridge County Council together with the backing of Josh Shumann our County Councilor.

There is interest and support from East Cambridge District Council also. The Parish Council have thus far been happy for the investigations to run but it is clear that we are all looking to see what the viability and design answers are and importantly what they will cost. This is what the next stage report will do.

26. Where will £3million come from to fund the project?

The scheme needs the RHI and HNIP support. This scheme meets the RHI and HNIP requirements. UK Government offers the support to meet its objectives such as reducing CO2 emissions and reducing oil imports from dubious regimes reducing and improving UK's balance of trade.

The key opportunity for funding the construction of the heat network is the Government's Heat Network Improvement Project (HNIP) fund. HNIP has £320 million to spend supporting the development of heat networks in the next 4 years. The next round for applications to this fund is expected to be in autumn 2018 and the requirements, eligibility etc. are still under development.

Funds can be given as a grant or a loan – though probably grants will only be available to the public sector. The loans will potentially have very low interest rates and start of repayment of capital can be delayed. The HNIP is unlikely to cover more than 50% of the capital costs.

We would suggest that a not for profit / co-operative ownership model would be one of the routes to raising the rest of the capital and we are keen to explore in more detail (similar to the Reach solar PV project).

27. Where will it be in the village?

Currently, we are looking at County Council land on Heath Road for the small energy centre (thermal store and controls) and for the boreholes (that are below ground). Otherwise, above ground infrastructure in the village is going to be minimal.

28. Will we see it?

The County Council land for the energy centre (a single storey 'shed') is allocated as employment land and when built out the energy centre will not be obvious. Prior to that, the energy centre will only be noticeable from limited places along Heath Road.

29. Why should we do it?

The aim has always been to achieve a more sustainable form of heating for Swaffham Prior homes, at less cost than individual oil boiler systems. It's about leapfrogging forward, putting the village on the map and to help future proof the village for 21st century. It is easy to not do anything, be negative and maintain the status quo. This project is about helping the village become more sustainable collectively rather than the often more difficult task of tackling sustainability and making a difference on your own.

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