Tri Village Heating Project Workshop 1 | March 2021
Community Q&A

Answers provided by Element Energy and LineUndrawn

1. **Would it be possible to install fibre to property at the same time?**
   That is something that could definitely be explored, the Swaffham Prior project has included fibre in its installation.

2. **Is there a very rough cost estimate already for this system?**
   The feasibility study currently in development will give a first review on whether a heat network could be technically and financially viable. After this a full feasibility study on the preferred option is required, this then leads to the third project stage 'Detailed Project Development' which would give a good cost estimate.

   What is the current capital cost of the Swaffham Prior project and how many houses does this supply?
   The total capital investment for Swaffham Prior is £12m, supporting 330 homes, it is based on a sixty-year business plan.

3. **There are numerous providers offering to 'give' air source heat pumps worth in the region of £10k to householders. Can you be confident that a decision can be made as to the future of this project before these incentives are no longer available?**
   These companies don't 'give' you an Air Souce Heat Pump (ASHP), you handover the ongoing Renewable Heat Incentive (RHI) revenue to those companies. This offer will only be available until April 2022 because RHI is ending after this time. It is unlikely that we will be able to know if our project will go-ahead by that date.

4. **Who owns the heat interface unit? If there is a failure of one of these then who will be responsible for its repair/ replacement/ insurance?**
   A Heat Interface Unit (the kit that replaces your boiler) is typically owned by the operator of the heat network. The typical contract is comparable with getting a mobile phone on contract, if the phone is faulty then the supplier is responsible. If you drop or break the phone, you would be responsible for the repair. General maintenance is normally included within the tariff costs, and there would be various insurances clauses in cover damages. What type of heating you have is not typically a priority concern for household insurers.

5. **Are there any environmental side effects of using the proposed technology? e.g. refrigerant leakage.**
   The technology to be used by the project has not yet been determined, when it is, any environmental side-effects will need to be considered. The project design will have to meet strict health and safety standards, and pass environmental assessments required for a planning application.

6. **What is the level of interest within the three villages so far?**
   It is too early to say! We will need to find out from residents what their feeling is on the project in June. We hope for a positive response, so that we can prove to funders we are a good investment to make, to see this project develop.

7. **Matching the price of oil concerns me, as this fluctuates throughout the year, it is going to change as less systems use it.**
   This is an issue we will have to look at if the project reaches the 'Detailed Project Development' stage. There are a lot of different price indexes that a tariff could be tied to, some projects use gas, some use oil, and in the future electricity may be the right comparison to make. There is also a Heat Network Bill under development in the UK, which may provide guidance on this before our project comes to be! In any case, there is a requirement on heat network designs to avoid "customer detriment", which ensures heat is delivered to homes securely and at cost-competitive rates. As noted above, this analysis will come later in the project.

8. **Once installed there'd be no possible option to switch.**
   It is likely that the contract would provide a way to leave the heat network contract. In Swaffham Prior this has been made quite simple, there is only a charge made to cover the costs of removing the Heat Interface Unit.

   A retrofit heat network in the villages, is a very different situation from new build apartment blocks, where installing an alternative heating system would be very difficult, or even prohibited by the property's leasehold agreement. You should have the freedom to leave and choose your preferred heating type.

9. **How are you able to say that costs will never be higher than oil?**
   The UK Gov funding schemes that could support the project, require that there be 'no customer detriment'. That means we need to design the project in comparison to the costs you pay today, which for most of the village means oil. The price relationship to oil can be managed through the customer contract, in Swaffham Prior the energy pricing is indexed to domestic fuel indices that inform the UK Governments Consumer Price Index (CPI).

10. **Please explain how a heat unit can be a direct replacement for a conventional boiler. Heat dynamics are very different to drive legacy radiators**
    The temperatures supplied to your home via the heat network would match those of your current heating system. This way, there would be no need to adapt or modify your existing radiator system to accommodate the connection to the heat network.

11. **Exactly what home improvements would we need to do (what is "retrofitting" referring to)?**

Future Heating Type	Retrofit Required
High Temperature System	None essential, some retrofit preferable
Low Temperature System	Significant retrofit potentially required
No heating system!	EnerPhit or PassivHaus standard retrofit

    The heat network project proposed, would aim to deliver a 'high temperature' system. This would minimise the need for retrofitting, because the temperature would be similar to that produced by your boiler today. However, reducing heat loss in your home has other advantages for the climate and paying less energy bills.

    A 'low temperature' system, may require further improvements to your home. This type of 'retrofit' could include upgrading to double or triple glaze windows, ensuring draught exclusion throughout the property, and perhaps installation of further insulation. It may also necessitate more, or larger radiators in specific rooms.

    The highest level of energy efficiency commonly sought for older homes is EnerPhit, which aims to make a home extremely airtight. Upgrading a home to this standard would necessitate further installations such as extractor fans across your home to ensure good inside air quality and to avoid mould formation due to the airtightness. Check out information available on the Energy Savings Trust website to learn more.

12. **Given the basis of the proposal is for a centralised system that then feeds outwards to individual houses, I assume this technology is robust and reliable to prevent large areas of heating outage in the event of a breakdown?**
    The pipes used are robust and come with very long-term product guarantees, 40 years plus. Often 'smart' pipes are used, these can detect leaks and send a message to shut down flow to any effected area.

The technologies that generate the heat are themselves reliable and well-understood, they will be designed to what is known as a "N+1" arrangement. This means that, for example, if 2 heating units ("N") are required to serve the heat network, an extra unit ("+1") will be added in case one of the other units breaks down. This arrangement is true for all equipment needed for the heat network, providing confidence that heat can be delivered uninterrupted.

13. **How does the proposed system work with changes in seasonal demand and operate efficiently?**
    Typically, low-carbon heating technologies are most efficient when working flat-out, not switching on and off constantly. In winter this will clearly not be a problem (as heat is almost constantly needed), however in summer when heating use is low this could lead to less efficiency overall in the system (as heat use is more intermittent). To counteract this, the system will use what is known as "thermal storage" tanks, which are essentially large vessels for storing hot water over many hours (not dissimilar to those in some of your homes, but on a larger scale). This will allow the low-carbon technology serving the heat network to operate during the summer at full-whack for longer, thus improving overall efficiency of the system.

    Additionally, the temperatures on the heat network can be "corrected" seasonally. In the summer for example, the temperature of heat delivered to your home could be lower than in the winter, as you will only have need for hot water (ca. 50-60°C) rather than needing to warm your home (ca. 70°C or higher). This temperature correction reduces the amount of heat lost from pipes when it is being pumped to your home, thus improving overall system efficiency.

14. **From what you know so far, what do you expect to be the biggest obstacle to this project being viable?**
    There are many obstacles involved in the project, these include:
- Obtaining grant funding, through competitive processes
- Engagement with Anglian Water, an important relationship for local infrastructure development
- A sound business case
- Free installation of ASHPs on offer today, could reduce the overall demand for a collective project
- Level of community interest and sign-up in the project

15. **Would there be extra costs if an unadopted Road or our local brick pattern roads?**
    There will be no additional cost to a single consumer, but the overall project cost may increase marginally. The local brick pattern roads have an existing services strip available for installations such as this pipe network. A full range of routes could be considered for the project design, using either roads, fields, gardens or public paths.

16. **How much will be spent in feasibility studies etc to get to the go/no go point?**
    To date the Parish Council has received a £38,000 grant to develop the feasibility study currently underway. There are further grants available to develop additional studies required, if match funding is needed, we will look to Cambridgeshire County Council for support. The project will need to pass through many gateways, before we reach an ultimate 'go/ no go' point.

17. **How does a heat network obviate retrofitting (eg larger radiators) given the lower temperatures in the pipes/radiators?**
    The heat network can be designed to supply temperatures of up to 70°C, this temperature is similar to that produced by a standard boiler. This means that radiator replacement can be avoided.

18. **Does the efficiency of the system decrease for properties at a greater distance from the heat source?**
    There is a small level of heat loss across the pipe network, however, the system could be designed to guarantee the temperature delivered to your home. In Swaffham Prior, a temperature range of 70-75c°C has been guaranteed in the customer contract.

19. **Do you have to have pipework connected to your property, if so who pays this cost?**
    The pipework is required to connected the Heat Interface Unit installed in your home to the energy centre. The costs of installation would be delivered through the project, so costs are not directly charged to individual households.

20. **How does the heat network cope with peaks and troughs in demand?**
    The system will be designed to meet the peak heat demand of all properties connected. Automated control systems ensure the right amount of heat is generated and delivered to each property, even in peak times.

    Similarly, to the answer in question 14 above, the use of thermal storage will help the system efficiently supply heat in low-demand periods, e.g., summer.

21. **Is the go ahead on a high percentage take up of the scheme?**
    The project in Swaffham Prior required a 50% village sign-up across the village to progress the project. The results of the feasibility study will give us an indication of how many households would be required to make it happen.

22. **It was mentioned that a normal boiler runs at 70 degrees but the proposed system outputs at 45-50 degrees?**
    Heat networks are capable of producing temperatures of 70°C+, we think that a high-

temperature solution like this is more appropriate to our villages, as this would limit the retrofit required to homes.

23. **As a general principle radiators need 50c between flow and return. (I.e., input temp of 70°C). That contradicts with the suggested 50-60 input temp of a heat network.**
    Typically, temperature differences between flow and return for radiators is closer to 10-12°C. The 50°C difference you refer to is more likely to be between the radiator and the surrounding air within your home (i.e. radiator = 70°C, air = 20°C).

    The temperature proposed by a heat network could be up to 70°C, this means that radiators can operate as usual. As you describe, the important thing for radiator operation is the 'Delta-T' that is the temperature drop that happens between heat entry ('flow') and exit ('return').

24. **How does this proposal compare to people installing solar to their homes and using electric heating systems?**
    There are a few difficulties with solar PV use for heating:
    1. There is less sun, when you need heating the most in winter!
    2. It is not the most efficient approach: PV is only 15-20% efficient in converting solar energy to electricity. Whilst electric radiators would then use 100% of the energy received, a heat pump could convert that to 300%!
    3. The benefits of electric storage heating is that you take advantage of "Economy-7" electricity tariffs, i.e. charge up the store overnight for use in the day. Solar PV generates in the day, so the two do not match up well!
    4. If you are referring to "direct" electric heating, then again the use of solar PV is not favourable cost-wise versus heat pumps.

25. **Are there any environmental drawbacks from this GSHP system such as removal of geothermal reserves?**
    Ground Source Heat Pumps (GSHP) are one of several§ energy sources being considered for the project; no selection has yet been made. An assessment of the environmental impacts for whatever technology is selected for the project will be required.

26. **How would creating domestic hot water be done. I have a storage tank which is serves both as a DHW storage and solar tank, would these be made redundant?**
    Connection to the heat network would not require any changes to your current central heating and hot water system.