

Chipping Community Energy

Rural Community Energy Fund: Stage Two

Summary of project outputs

August 2023

Decarbonising heat in and around Chipping

Summary of work Outputs

As part of the feasibility study the following core work items have been completed.

- [Chipping Community Energy](#) website and supporting information, including FAQs, Logos, and system illustrations.
 - See **Website material**.
- On-line energy survey to establish interest in community heat and confirmed that there is interest within the community for such a scheme. To date **73** properties have noted interest and provided sufficient details to be included on the project interest database.
 - See **On-line Energy Survey results**.
- Completed energy surveys on 20 dwellings, the school and the Community Hall.
 - See **Building Energy Surveys**.
- Hosted a well-attended community engagement drop-in session and presentation.
 - See **Open day** material.
- Undertaken a desktop assessment of the geology around Chipping, drilled a test borehole, thermally tested its heating capacity and confirmed the suitability of the geology in Chipping to support ground source heat pump-based heating systems.
 - See the **Borehole reports**.
- Developed the conceptual design for a wider scheme covering a range of property archetypes within Chipping.
 - See **Design Pack**.
- Developed a range of project management details for the project including a project delivery risk log and various project delivery route maps.
 - See **Project Management pack**.
- Developed a series of legal agreements in draft that will facilitate the operation of a heat network, including Heads of Terms, lease and easement agreements.
 - See **Legal Pack**.
- Engaged key stakeholders who may impact such a scheme, including Lancashire County Council, Ribble Valley Borough Council, Electricity North West Ltd (ENWL), Triple Point, The Department of Energy Security and Net Zero, Onward Homes, and project delivery contractors.
- Sourced a thermal camera to support Chipping homeowners in looking to improve their insulation levels.
- Supported a series of strategy workshops for CCE.

Project aims

The feasibility study has investigated the viability of developing a network of boreholes, financed and owned by the community, to provide heat to ground source heat pumps (GSHP) in individual homes, as part of a package of measures to reduce the cost to homeowners to transition to low carbon heating. Our aims are to develop a community scale solution that can:

- Help to reduce the costs of transitioning to low carbon heat.
- Provide an alternative to air source heat pumps (ASHP) or electric heating, where these may not be the most optimal solution, for example because of space or cost constraints.
- Reduce peak load & improve flexibility on the NW electrical grid, to help maximise the capacity of the local grid to support the transition to net zero, which requires the electrification of both heat and transport.

Summary of project findings

The feasibility study has allowed the project team to better understand the issues and challenges that need to be resolved to develop a community owned low carbon heat network for Chipping. These are summarised below.

Technical - can heat pumps heat older building?

The study and existing installations show that provided the GSHP heating system is designed to meet the existing heat demand in the property (including an accurate assessment of current heat loss including ventilation & air change losses), and is designed around the optimal working temperature for a heat pump (which will be lower than that for an oil/LPG or electric system), then the system can effectively heat most properties. However, most properties would also benefit from measures to improve fabric insulation and air tightness.

Technical – Is Chipping suitable for a GSHP based solution using ambient loop boreholes?

The trial borehole and subsequent thermal response tests have indicated that the ground conditions are expected to be suitable for a borehole based ambient loop heat network in Chipping, with a typical 200m deep borehole being able to supply up to ~12KW of heat.

Planning and consents – are their significant constraints?

As most of the infrastructure (borehole and pipes) and equipment (heat pump, water tanks, etc) are either buried in the grounds of, or within the property, a planning application is unlikely to raise planning concerns that could not be resolved.

The notable issues will likely relate to impact on listed buildings and external equipment in the conservation zone. Though other projects, like Swaffham Prior (Cambridgeshire), have successfully managed to address these issues.

If the design requires pipes or boreholes in the public highway, the project will also need the consent of the Highway Authority, but as far as possible we are hoping to avoid this by keeping the pipes & boreholes out of the public highway.

Legal agreements between operating organisation and homeowner.

The contractual provisions between the homeowner and the community organisation will need to be defined to protect the mutual interest of the development organisation (and its funders), and the homeowner. The agreement could effectively be summarised by a high-level agreement (as set out in the Heads of Agreement document) between the parties, but detailed terms and conditions would likely need to underpin this detailed terms and conditions.



Landownership – is this likely to be a constraining factor?

Our priority is to place the borehole in the garden of the property's converting to heat pumps where possible, to reduce the requirement to place boreholes in, or build facilities on land owned by third parties, although we may need to in a limited number of cases. This will however likely introduce the right to have in place a formal legal agreement between the community organisation that owns the borehole and the homeowner, which could be problematic if the formal requirements set out by HM Land Registry are seen as overly complicated/restrictive by homeowners or mortgage providers. If it is not possible to put in place a formal lease/easement, then alternative options to mitigate this risk would need to be considered, which could include the option of placing the borehole on the very edge of the public highway, or on third party land.

Electricity NW grid – is this likely to be a constraining factor?

ENWL has confirmed that most properties where interest has been noted could be accommodated by the existing grid network. However, there are some larger properties with high heat loads, where further investigations will be required by ENWL.

Typically, properties with a peak heat load of 16kW or less should be accommodated on the existing electrical supply, providing the supply is rated at 100amp.

Green Heat network funding (GHNF). Is GHNF likely to be available for the project?

Extensive discussions with key stakeholders with regards to the GHNF have identified a number of challenges with developing and submitting a compatible and competitive bid to the GHNF. Notably:

- The GHNF requires that heat networks comprise a series of connected pipes, which, whilst not specifying the number or size of any ambient borehole network, does create the requirement that such a network is hydraulically linked. In the case of Chipping where ~1in6 properties have noted interest, this obligation will likely require the installation of significant levels of pipework in the public highway in order to connect properties that are not close to or adjacent to each other.
- The competitive nature of the GHNF, which requires projects to bid for grants based on the cost of heat delivered (£/kwh delivered), means that retrofit projects (like Chipping), will be competing with new build high density urban projects, or projects able to utilise low cost waste heat. Whilst the GHNF will fund up to 0.45p/KWh, they make clear that to be competitive they are expecting projects to be bidding significantly below this threshold.
- Taken together, the requirement to develop out a higher cost hydraulically linked networks in a dispersed rural community and the requirement to compete with higher density urban networks, will make it very challenging to secure GHNF.

Boiler upgrade scheme

It is understood that homeowners seeking to take part in the scheme will be able to access the boiler upgrade grant for a GSHP (£6k), providing the funding is not duplicated with grant from other sources.

Are there other funding sources for the project?

Prospus, and project partners eQuality Homes and Cybermoor have successfully secured Demonstrator phase funding through the Green Home Finance Accelerator (GHFA) grant fund, distributed by the Department of Energy Security and Net Zero (DESNZ).

The GHFA project provides a platform, through the Pilot Phase of the project to develop a community financed platform and delivery model for CCE to develop out, own and operate a smaller scale pilot project.

Costs – is such a project viable?

The one-off costs required to replace an oil/LPG or electric heating system with a heat pump can be high as they generally require changes to plumbing and radiators in the house as well the installation of the heat pump. Whilst there are grant schemes for heat networks, an initial assessment of the project in Chipping indicates it would likely be challenging to raise capital funding through the GHNF (as set out above). This means that any pilot project should target those homeowners that are most incentivised to transition. This could be for a variety of reasons, including: the level of savings available to homeowners to convert to a heat pump-based solution are influenced by the type of heating system currently installed and the requirement on the homeowner to replace their current heat source due to its age / performance.

- Homes looking to reduce heating costs because they are currently utilising high-cost electric heating.
- Homes having to replace heating systems shortly and incur costs regardless.
- Homeowners looking to reduce carbon emissions.

Revenue generation – can a project heat network project generate sufficient revenue to be viable?

Initial modelling has shown that in order to offer consumers a cost of energy that is no higher than their current energy source (after accounting for any standing charge), any business model based around an annual standing charge (of ~£1 - £2/day), will be challenging for a small scale project where the entity developing the organisation has to cover all the operating, admin and governance costs of the entity (accounts/audit/insurance/mgt/wider professional fees etc), and does not benefit from wider revenue sources.

The modelling also indicates that additional revenue from sources such as solar PV generation can cross subsidise the operating costs for the development vehicle and also help reduce the average unit cost for consumers within the community, if supplied through an Energy Local or similar type arrangement.

Finance – can the project be financed?

Non-grant-based/institutional finance is available for community heat schemes, providing a robust business plan can be developed, but history shows that many of the most successful community projects have been developed using community raised finance e.g. as used by B4RN.

The GHFA project offers a platform to develop the necessary business model and put in place the enabling works to raise the community finance to build, operate and maintain a community owned heat network.

Whilst recent months has seen a significant increase in the cost of capital to such projects, stakeholder engagement has indicated that a smaller scale community Pilot Project should be able to access community finance at a lower cost than would be available for a larger scale, higher cost project.

Summary

Decarbonising heat in off-gas grid communities like Chipping poses a real challenge for the UK and Chipping is at the forefront of work in developing an effective, community solution.

Given the challenges identified to date, the Chipping Community Energy Working Group have concluded that the project should focus effort in developing an initial smaller Pilot Phase project focused on those houses that seek to make the transition to low carbon heat, either because they are currently on electric heat, because they need to replace their exiting fossil fuel based heating system, or because they wish to transition off carbon based heating fuel.

The modelling completed indicates that it is possible to finance, build, own and operate a community network of boreholes & pipework serving ground source heat pumps for individual properties, where in return for not paying the capital cost of the boreholes and pipework, the householder pays a standing charge on-going, at a cost of between £1 and £1.90 per day, depending on the house size.

However, in order to attract community investment to cover the high capital costs of installing the boreholes and external pipework, without capital grant, the community of Chipping will need to cross subsidise the project costs with revenue generated from roof-top solar projects, and other low carbon energy-based solutions that will benefit the community, such as electric vehicle charging stations and local energy storage systems.

By facilitating and delivering a community wide energy solution, Chipping can target economy of scale benefits that would not be possible at an individual householder level, making a community scale project viable, where individual projects would not be.

We will shortly be issuing a further community survey to establish the appetite for members of the community to invest in a community based low carbon energy project.

We are also looking at wider opportunities to support decarbonisation in the community, the level of appetite for community owned electric vehicle recharging stations, or opportunities to reduce the cost for energy for high energy consuming businesses.