

Contents

[THE REASON WHY 1](#_Toc183870449)

[COSTS 2](#_Toc183870450)

[INSTALLATION 3](#_Toc183870451)

[WHO CAN JOIN? 3](#_Toc183870452)

[HOW WILL IT WORK IN PRACTICE? 3](#_Toc183870453)

[WHO HAS CONTROL? 4](#_Toc183870454)

[ENVIRONMENTAL AND SOCIAL IMPACT 4](#_Toc183870455)

[PROJECT FINANCES, AND FOR INVESTORS 5](#_Toc183870456)

[TECHNICAL DETAILS 5](#_Toc183870457)

[DIAGRAMS 8](#_Toc183870458)

BISHOP’S CASTLE COMMUNITY HEAT & WIND PROJECT
FREQUENTLY ASKED QUESTIONS

## THE REASON WHY

1. **Why do we need a renewable energy Heat Network?**

Heating our homes with oil, coal and wood will soon become a thing of the past, because of government pressure to move to renewable fuels. Over the coming decade, the government will make it increasingly difficult to buy replacement oil boilers for homes. Also, pollution from wood stoves causes air quality issues.

Electrical heating is expensive, however it can be made more cost-effective by running a heat pump with electricity. Individual heat pumps (one per home) can work well, but they do not suit many older properties typical to Bishop’s Castle, which can require replacing the radiators and piping to them.

The Bishop’s Castle Heat and Wind project is an exciting scheme designed for the types of homes typical in Bishop’s Castle. It offers community heating using centralised heat pumps powered by renewable energy. It will help to protect users from future price shocks and the inevitable price rise of oil-based heating, and give your homes confidence and resilience of heating supply. It also offers massive carbon reductions to BC’s very high carbon footprint. As well as householders, the scheme will also support SpArC and the Community College plus several of the Town’s businesses.

1. **What are the benefits to the Town’s Householders, Businesses and the wider Community ?**

If this scheme progresses our Community would benefit through:-

1. **Consistent and predictable cost of heating over the coming years**
	* Costs per kWHr similar to today’s oil price, with savings growing over time as oil prices increase in the coming years
	* Protection from future fossil fuel price shocks
2. **A more reliable and simpler heating system for your home**
	* No more boiler services and breakdowns, just local maintenance support,
	* The ability to do away with oil tanks and boilers,
	* Better protection against frost damage,
	* Hot Water cylinders and header tanks can be removed, freeing-up space
	* No need to find an alternative heating source when oil boilers become unavailable,
	* Assistance with fitting energy efficiency measures
3. **Massively reduced impact on our local environment and on climate change**
	* A huge reduction in the Town’s very high carbon footprint, leading to an important step in mitigating the climate and bio-diversity crisis
	* Improved air quality
4. **Improved community resilience and a stronger, more independent Bishop’s Castle**
* Reduced dependency on imported oil and LPG, and on national energy infrastructure
* Support for local businesses, including the College and SpArC,
* Community control on re-investing any surpluses locally,
* The generation of lots of excellent publicity for the Town.
* The opportunity for local people to invest in the Network’s Community Benefit Society,
1. **What impact will it have on BC’s carbon footprint?**It will reduce it significantly with the heating emissions for those who join in falling by around 85%. The total effect will depend on how many people join the network. We will calculate annual carbon emission reductions on an ongoing basis. Further savings could be made in the future by reducing or eliminating the use of the back-up oil boilers.

## COSTS

1. **Will it be cheaper for the householder?**The intention is for prices to be similar to 2024 oil-heating prices, and to remain close to that over many years after, when oil prices are likely to climb much higher. So**,** heating costs should be protected against energy price spikes caused by variations in the global price of oil. Owning our own Wind Turbine gives us this protection, including against electricity price rises, in the future. It will also help with more predictable budgeting.
2. **What will the costs to the householder be?**There are no installation costs for those who join at the start, and they will benefit from no longer needing to pay for replacement or repair of their own boiler. The householder will pay a standing charge plus a metered cost for usage. These charges will cover the system’s maintenance as well as the supplied heat. Customers in smaller properties, or with new boilers, or in financial need, may be entitled to a discount.
3. **What is the Standing Charge for?**This is similar to those charges paid for electricity or gas systems. It will include the maintenance and replacement every 20 years of the heat interface unit (HIU) that connects the Heat Network to the network properties’ existing heating and hot water system. It replaces the householder’s existing costs of maintaining and replacing their heating system. The standing charge ensures that even very low energy users are still paying something for being connected to the network.
4. **How will I pay for my heating and hot water?**This will include the usual payment options, e.g. direct debit, etc. The bills will be based on the metered supply to your property.
5. **How will I pay for my heating and hot water?**We will include the usual payment options, e.g. direct debit, etc. The bills will be based on the metered supply to your property.
6. **Will I first need to spend money on insulating my house?**

No, we will be encouraging and helping people to improve their properties’ thermal performance, but it will not be a requirement of joining the network.

## INSTALLATION

1. **Can you decide to join the network after it’s been installed?**

Yes, as long as there’s a network pipe nearby, but there will be a charge for late joiners.

1. **Will we have to install new radiators and pipes? [**Probably not: the Heat Network is being designed to run at a temperature high enough so that most radiators would not need to be replaced. (c.f Feasibility Study para.1.3)
2. **Will I need to have a Smart Meter**No.
3. **Can I keep my hot water cylinder?**

Possibly, but we discourage it. Having hot water cylinders on the system also leads to higher return temperatures in the network and hence reduced efficiency so we are recommending they are removed. However, if some householders wish to keep their hot water cylinders, that can be accommodated.

1. **Will there be disruption during the installation process?**

The heating pipes will need to be buried in the roads so some roadworks will be needed. This will be phased to minimise disruption. Householders won’t need to change their radiators, and most heat Interface units will go where the existing boiler is so minimising disruption in the home.

1. **What will happen to existing domestic boilers and oil tanks?**

The old boiler will be removed as part of the installation process of the new heat interface unit, but the removal of an oil tank will need to be an extra charge, if carried out by us.

## WHO CAN JOIN?

1. **Which parts of Town will be able to join the network? [See Figure 1** [**DIAGRAMS**](#_DIAGRAMS)**]**
The key factor will be the need for a lot of the buildings in a street to join the network to make pipework installation viable. Much of the town’s social housing already benefits from ground or air-source heat pumps. ‘Expressions of Interest’ will be circulated to house & business owners in September 2024, and the responses will dictate where the network runs. In practice it will be able to pump hot water to any part of the town, though we are targeting the centre of the town initially.
2. **Will businesses be able to join the network?**Yes.
3. **How many houses will the different options supply?**The target of at least 100 houses is the same for all the options**.**
4. **Will listed building have to get special planning permission to become part of the project?**No, not unless structural alterations need to be made. Listed buildings are a key part of our plans and objectives, because they are otherwise hard to heat sustainably and hard to insulate*.* The society will work with Shropshire Council historic buildings team to arrange permissions and minimise the impact.
5. **Is the church included in the planned network?**
It hasn’t expressed an interest, yet. Typically churches don’t use that much heat, since they are infrequently occupied. It is expensive to connect a building to the heat network, so to make the network as economic as possible a reasonable amount of heat needs to be sold to each building~~.~~

## HOW WILL IT WORK IN PRACTICE?

1. **Will it still function in a very cold winter?**Yes. The system will be designed to cope with maximum heat loads. It will still be connected to the grid and have back-up oil boilers, if needed for peak demand.
2. **Will the installation of the network pipes be intrusive?**Roads will have to be dug-up, but this may offer opportunities such as the installation of fibre-optic broadband cables, or the improvement of the water pipes.
3. **What are the cost risks to users once committed to the Heat Network?**The risk profile for heating your home is reduced by having a centrally-maintained supply of heat being delivered from a local, renewable energy source. Heat prices will not exceed the price of oil. We expect oil prices to rise significantly above the level of inflation in the next few years. Heat prices will be inflation-linked so network customer’s savings on heating costs compared to oil should increase annually. Shareholders will be the first to suffer if oil prices drop significantly
4. **What happens if a user moves house?**The new owner can choose to use the Heat Network or install their own system. If they decide not to join the network the HIU would be removed.
5. **How reliable will it be, and what happens when it breaks down?**The system will be maintained and serviced centrally and will have back-up systems.Any problems experienced in connected properties will be dealt with by the Heat Network’s maintenance team.
6. **What happens if I can’t pay my bill?**

The society would seek to help anyone who struggles to pay their bills and there will be a range of options to assist customers finding themselves in difficult financial situations.

## WHO HAS CONTROL?

1. **Who will run and maintain the network?**

The Feasibility Study (para.8) discussed 5 options: i) Set up a new, local, Community Benefit Society (CBS); ii) partner with Shropshire and Telford Community Energy; iii) partner with a community-owned Heat Network society; iv) partner with a local authority; v) partner with a private sector company. The project’s preference is for option i). If there is a new society it will have significant support from others with considerable experience in Community Energy and heating, including Sharenergy, Carbon Alternatives and Shropshire & Telford Community Energy and employ experienced contractors to install and maintain the network.

1. **Could a private company take over the network and increase prices?**
No. the set up of a CBS and ‘Articles of Association’ prevent that.

## ENVIRONMENTAL AND SOCIAL IMPACT

1. **How much noise does the Wind Turbine make?** Modern Wind Turbines are now very quiet and we're ensuring that the Turbine will be at least 500m from any properties. A full noise assessment will be carried out as part of the planning process.
2. **What impact will the sight and sounds of the wind turbine have on wildlife and tourism?**Various studies are being carried out in Stage 2 (April-November 24) which include: an Ecology study, a Bat study, a Bio-diversity net gain report and a full Visual Impact Assessment. The RSPB supports well-sited wind turbines. Wildlife impacts, with a correctly designed and located turbine, are minimal, compared to the huge threats they face from the Climate Crisis. There has been no reported effect on tourism in other areas with wind turbines, such as Cumbria, Derbyshire Peak District and Norfolk. A full scrutiny of the Planning Application will be undertaken.
3. **How many years will it take to pay back the Carbon footprint of setting the project up?**For the wind turbine the return is less than a year. We don’t yet have figures for the remainder of the installation, but it is unlikely to be no more than 4 or 5 years.
4. **Will it create any local employment or make use of local skills, e.g local plumbers, electricians?**We would expect local support and maintenance and other roles will prioritise opportunities for local employment.
5. **Can any mitigation measures be put in place for the loss of vegetation ground cover on access track and turbine footprint?**Yes, a community hedge- and tree-planting initiative can help to off-set these.
6. **Will any checks be carried out to ensure those in most need, or who live in BC all year round, are given priority access to the heat network before second-home owners?**

This should not be needed and would be difficult to implement.

## PROJECT FINANCES, AND FOR INVESTORS

1. **What is the minimum number of houses needed to make this project viable?**A minimum of 100 houses in off gas grid areas is required to attract government funding.
2. **Will it pay dividends to investors?**A fair interest (c.4%) will be paid on the shares but any extra surpluses will be available for Community benefit, not for the shareholders.
3. **What is the time-frame for the project?**Like all local renewable energy projects there are many hurdles to be cleared before work can begin. The project has been running since August 2021 and, in 2024, we are now in Stage 2, during which we are carrying out various ecology and technical studies with a view to submitting a planning application in October/November 2024. The earliest the project could commence would be late 2026
4. **Will the shareholders get interest paid and their capital returned?**

Yes, we aim to do that, though over a long period. Heat networks have a high capital cost and we’ll also need to fund the wind turbine and solar panels. Some of the equipment will also need replacing after 20-30 years and we need to keep the heat price lower than the price of oil heating. Even with the Government grant the scheme will, therefore, take longer to repay the capital and earn surpluses than schemes which are just fitting solar panels or a wind turbine. However over 30 years it has been estimated the project should be able to repay all the capital and pay around 4% interest to the shareholders plus generate surpluses for community benefit. The interest paid in the first few years is likely to be slightly lower till the scheme gets established and capital is likely to be repaid starting around year 15. Delivering this return will require a strong control on initial costs and keeping the scheme well maintained.

1. **What is the total cost of the project, and where is the funding for it coming from?**
Capital funding for the network itself will come from a mixture of Government grants (e.g. *GB Energy* and the *Green Heat Network Fund)* and private investment (which will be paid back over many years), including some money from selling community energy shares. We don’t know the mixture yet, until the new Government’s green energy policies are clearer.
Funding for the **feasibility studies** to date has been obtained by *Shropshire & Telford Community Energy* [STCE] from *the Community Energy Fund* run by the *Midlands Net Zero Hub*.
2. **If there is a profit, where will go to?**
From the system income we will need first to pay all ongoing systems costs, and also interest payments to investors as well as gradually repaying their investment capital. Money left over after that will count as “profit”, and will be returned to the Community in some ways: likely a mixture of reducing the heat and electricity price to the customer, helping to start up new projects in Bishop’s Castle, and maybe some community benefit funds in later years, to be decided by the CBS board and members*.*
3. **Are the landowners of potential sites for the turbine on board with the project?**In principle, yes.

## TECHNICAL DETAILS

1. **Is the Heat Network a closed system?**Yes it is: a closed loop system is much easier to control and maintain. The water flowing from the Energy Centre to homes is returned back to the Centre and does not supply water into homes directly. It is separated from the water flowing through your radiators by a Heat Exchanger (Heat Interface Unit – HIU) in each property.
2. **What does it look like?**See Figure 2[**DIAGRAMS**](#_DIAGRAMS)
3. **If the ASHP’s are delivering 70°C to Heat Exchangers at properties, some at the top of the Town, will pumping this through the town require massive pipes?**Certainly sending a lot of heat through town will require big pipes and/or high water flow. ~~If the scheme progresses~~ *Carbon Alternatives* ~~would, in the next stage~~, will be reporting soon on the selection of pipe pressures, pipe sizing and pipe types for the Heat Network.
4. **How will you size the heating supply for the current proposed solution?**This will be an iterative process, and it depends on the final number and type of properties supplied.  We will need to gather more information gradually as the Network options are refined. We have a fairly good idea of what individual household energy use looks like, and have used this to set our parameters.  If we went into too much detail with individual houses we might come up with a more detailed Heat Map, but it will be nugatory effort if those houses decide not to join the Heat Network.  We will need to size the main pipes of the system to allow for future expansion anyway.
5. **Will we get permission for the wind turbine?**We are hopeful of getting permission, with good reason. We have strong community support for this project. The new Government has policies in favour of onshore wind, and we have a clear rationale why we need a turbine in this particular location, also it would be doing so much more than just generating clean electricity. We have permission to put in a planning application and ecology and other studies are underway on our preferred site. We plan to submit our application in ~~November~~ December 2024 and hear the result by spring 2025.
6. **What is the role of the “thermal store?**
When there is more wind or solar power than needed by the community demand, the excess energy is diverted into the thermal store (a big insulated tank of water which gets hot). It can be stored there for several days, until when the incoming wind or solar power drops below demand: the demand gap can then be plugged by taking heat out of the thermal store. It enables us to keep running without resorting to expensive grid electricity. The thermal store also means a smaller (less expensive) heat pump can be installed: because the heat store can help supply peak demand loads, that are larger than the maximum heat pump output.
Storing energy in the form of hot water is much cheaper, more environmentally friendly, and much simpler than storing it in batteries. Since we are supplying heat, it makes sense to store it in this form. Finally, if ~~even~~ the thermal store runs out of heat when there is high demand, then the backup oil boilers will operate to ensure the heat supply is always maintained.
7. **How will the network pipes be protected from water degradation?**The system will be filled with softened water and have a water softener in the Energy Centre so that any top-up water is also softened.  Getting and maintaining the best water quality in the heat network will help ensure a long and trouble-free life for the pipes and equipment. The customer may be allowed to top-up their heating system from the main heat network system, via a link in the HIU, so the benefit of the better water quality can be had in customers’ radiators etc.
8. **What will be the temperature of the water in the heat network?**
*In summer it will be 65-70°C to ensure customers who need 60°C domestic hot water can achieve this. In winter the temperature may be a little higher, because in some buildings the radiators need to be over 70°C on the coldest days to keep the building warm.*

**Can individuals alter the temperature for their own house?**Each property will have a programmable thermostat to allow room temperatures to be adjusted.

1. **What will prevent serious scaling problems occurring?**HIUs will heat the domestic hot water on demand and these would be set to deliver this at 50°C, which is just below the temperature that most scaling occurs. This should result in minimal scaling in the plate heat exchanger in the HIU.  Many HIUs have been installed in other hard water areas and set at 55° or 60°C and the scaling up has been slow, so the project’s design team are confident that at 50°C DHW temperature the HIUs will have a long life.
Part of the issue of hot water cylinders is that the heating coils are set at 60°C and the movement of water around the coil is slow so the scale precipitates on to the coil which reduces the heat output of the coil. The proposal is that the Heat Network would own and maintain the HIU, so if the heat exchange scaled-up it would be an issue for the Network not the customer.  The Heat Network would not take any responsibility for any existing hot water cylinders.
2. **What effect does using the Heat network have on an individual house’s carbon output?**It will reduce carbon emissions from heating by about 85%.
3. **Is pumping water uphill a problem?**
Not much of a problem. The returning water running downhill creates a siphon effect, so the energy needed to ‘push’ the water uphill is equal to the energy gained as the water falls back down the hill. The height does, however, mean that the water pressure in the pipes at the bottom needs to higher than without a hill. So the pipes and heating plant will need to be designed for this pressure, which potentially adds some cost. Extending the heat network higher than about Welsh St would make this pressure higher than standard cost plant can cope with. So it is technically possible to go higher up the hill but it would increase costs, which ultimately may mean heat supply costs are higher
4. **Is there any role for battery storage for excess energy?**
Possibly, in a Phase 3 scenario, Batteries will be assessed in the next few months to better understand the possible economic benefits. The benefits are likely to be larger if both SpArC and the Community College take power from the wind turbine and PV
5. **How will the network distribute electricity and heat to SpArC and the College?**

Our plan is to supply heat to both the College and SpaRc. We hope to be able to also supply electricity to SpArC. However, it is more difficult to supply electricity to the College but we will explore whether it is possible. The heat network would connect to the SpArC and the College where their boilers currently are.The heat network would supply water at similar temperatures to their current supply so the existing heating systems would need minimal modification. The actual connection would be across a heat exchanger so the water in the heat network would not actually go around SpArC and the college, but the heat exchanger would transfer the heat into the existing circuits that the boilers currently heat. In the same way as to other properties.
If SpArC and the College were to use electricity from the wind turbine and PV, new wires would be installed to connect the energy to the points where SpArC and the College currently receive their electricity. The existing electrical connection would be cut and all electricity would be supplied via the energy centre. When there was insufficient wind or solar energy from our system, electricity would be imported from the grid to supply SpArC and the College

1. **What is the maintenance model to avoid problems if, for example, there is a breakdown on a Sunday?**The Network will be designed to provide back-up to any breakdowns, and 24/7 cover. The heat pump will be very reliable: there are many similar and larger heat pumps in operation across Europe. However if there is a fault on the heat pump then it is likely the knowledgeable engineer will not be local and so would take a while for them to get to Bishops Castle. This is part of the reason to have a number of back-up oil boilers located in the Energy Centre. Oil boilers are very reliable and there will be skills locally to repair them, so there is a very high level of confidence that there will always be boiler heat available as back-up, even at very short notice. The electricity supply to the heat pumps will be supplied through a secure looped buried cable rather than insecure overhead wires.
2. **Would this be an opportunity for installing a second Wind Turbine to supply electricity to enable social housing occupants to transfer from their expensive pre-payment meters?**Probably not: an increase in Wind Turbine installations locally would not be realistic at present. It’s also difficult to feed energy from a Wind Turbine directly into peoples’ homes in the form of electricity. The ‘Energy Local Option’ whereby anyone on the same substation & the same electricity supplier could get a discount on their electricity could be of interest, but people would have to sign up to Octopus or similar to be involved, and it’s not a guaranteed system.

## DIAGRAMS



FIGURE 1: PROPOSED BOUNDARY OF HEAT NETWORK

Figure 2: Heat Network Components