



NORTH ENERGY



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Study of potential for wood fired community heating in Appleton le Moors

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Executive Summary

The Appleton and Spaunton Community Energy Group (A&SCEG) are examining options for renewable energy in the village and wanted to investigate the potential for a wood fired community heating scheme in the historic village of Appleton le Moors. The reasons for wanting to use renewables are several and include:

- reducing reliance on fossil fuel, reducing CO₂ emissions (aiming for carbon neutrality) and contributing to national CO₂ reduction targets
- making the village sustainable in the long term by keeping heat costs down, self sufficiency in fuel, empowering local people and creating work in the area
- raising awareness of energy issues in the community.

This study investigated the possibility of installing a wood fired community heating scheme in the village. It found that the layout of the village and the location of an existing building suitable for a boilerhouse/fuel store suggest two main options for layout of a pipe system to the buildings in the village. One of these, taking heat pipes along the back lanes and through rear gardens was quickly discounted due to the pipe distances involved. The second and therefore preferred option is to run the heat mains up the main street of the village. The other major question then is the number of buildings to be connected. A survey of heat use and opinions in the village was carried out by the Energy Group and concludes that about half of householders are definitely in favour or open minded to the idea of wood heating though requiring more detailed information before committing themselves. The study thus assumes two Options:

- Option 1 supplying every house with wood heat via the heat main
- Option 2, supplying 60% of the properties in the village but also installing connection points for the remaining buildings to join in later.

Option 2 is considered to be more realistic than Option 1 and it can be expected that, as other occupiers see the scheme proven and as oil prices continue to rise in relation to wood heat, they will want to join in.

One of the principles of community heat schemes is to maximise the heat load so that the capital and running costs are shared by as large a number of users as possible. Option 2 above, being a smaller heatload, thus does weight the running cost in early years of the project with a larger share of the infrastructure cost, per household. In a village like this with privately owned buildings it is almost inevitable that not everyone will agree to join the scheme on day one. (In an area where all the buildings are in a single ownership it is of course easier to insist that every building is linked to the system at the start.)

Wood fired district heating could be installed in the village though the layout of the village is not ideal. There are a number of issues that should be resolved before proceeding much further:

- Survey of ground conditions - if rock is near the surface of more than 50% of the village this will add even more to the heat main costs which have been
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calculated on the basis of 50% rock, 25% trenching into soil and 25% tarmac/hard surfaces.

- Archaeology - given the age and history of the village, consultations with the county archaeologist should be undertaken to assess the chance of running into areas of archaeological interest and any cost or time implications.
- Buildings ownership - negotiations with the owner of the barn proposed as a boilerhouse/fuel store need to be firmed up at an early stage
- Fuel supplier - Identification of a local person wanting to process and supply fuel is important to the success of the project.

The scheme has been roughly costed and includes a boilerhouse/fuel store (often known as the Energy Centre), heating mains and individual connections (heat exchanger and heat meter) for each building, plus we have allowed for 78 spurs with connection points (including some for use at a later date). These, together with the boiler plant and on-site fuel handling equipment are estimated to cost at least £2,479,460 exc VAT for Option 1 (the whole village) and £2,102,320 for Option 2 (60% of the village). These prices assume a low cost boilerhouse sited inside the existing barn and a back-up oil boiler in addition to the wood boiler equipment. It is worth noting that over £1m of the capital cost is due to the assumption of 50% of the trenching being into solid rock. In reality the cost could be more or less, depending on actual ground conditions.

It is suggested that 60% grant funding may be achievable towards the capital cost but that the Appleton Community Interest Company (CIC) may need to raise the remaining 40% from low interest loan finance for social enterprises. If a higher level of grant could be achieved then the running costs of the scheme would reduce proportionately due to lower loan repayments and this would help to make the 60% take-up Option 2 more feasible and enable heat to be sold more cheaply.

A business could be set up to provide and sell heat provided that the above level of grant towards capital cost can be achieved, however the indicative cash flow illustrates how important it is to have a good number of heat users to share the running costs between. The cash flows show that the only way that the project would break even, in Year 1, is for the whole village to participate and for heat to be sold at around 5.4p/kWh¹ (ie 0.4p/kWh more than the current price of oil heat) for Option 1 and 6.9p/kWh to break even from year one if only 60% of the houses are connected to the scheme (Option 2). At these rates, all the running costs including operation and maintenance are covered and a sinking fund of just over £800,000, not including interest earned, is accumulated, over 25 years, towards replacement of the major components at the end of their life.

However, being realistic, it seems doubtful whether the whole village would participate from day one without any heat cost saving being offered and unlikely that even 60% of householders would want to pay 2p/kWh extra to have wood heating.

¹ Normal practice calculates running costs of group heating as a % of the cost of the pipe installation, however in this case the pipe cost is inflated by the rock and the high trenching cost. We have therefore adjusted the cost comparators and ESCO spreadsheet by recalculating the pipecost as if it were all through soil/tarmac and hard surfaces. Once the trench is cut it is not expected to cause additional costs through the life of the project.

Assuming fairly static oil prices between now and the scheme opening, ideally heat would need to be provided to occupiers for 4.5p/kWh in 2008, cheaper than heat from individual oil or LPG boilers or from electric heating. This rate would not, however, pay back any capital or the cost of borrowing. The business plan could be rearranged to cover a loss in the early years, with higher prices introduced to re-coup it later. If fossil fuel prices rise substantially in years to come, then the heat price could track fossil fuel prices and the income could be well in excess of the predicted amounts. In this event some of the income could be used to further the purposes of the CIC or fed into a community development fund, or heat prices could be lowered to give greater benefit to individual households. Much more sophisticated cost modelling is really needed to predict the long term performance and to determine a realistic price to charge for heat in the early years.

Throughout its life the district heating would provide heat to residents without them having any labour input (though they could continue to also use their own open fires and stoves if desired). Homeowners would avoid annual servicing costs and repairs and replacements to individual heating boilers and fuel tanks. The income from the district heating in Option 1 provides an estimated turnover of over £123,000 in year one, and in Option 2 of £97,000. This covers all the running costs, repairs and eventual replacement of plant and equipment. Buying woodfuel locally gives stable reliable fuel supply and generates the opportunity, either together or separately, for an Energy Supply Company and a fuel supply business. It encourages the improved management of local woodland and ensures the consequent wildlife and bio-diversity improvements as well as providing woodland owners with a better income from woodland than they have had in the past.

The project would need a secondary long term woodfuel depot. This could make use of other underused farm buildings in the area. It will need to provide space for fuel processing and store fuel for several months. For reasons of noise and activity it should be away from housing, but accessible to the village. Such a building, if built from new, could cost up to £100,000 if a stone building is required, or £20 - 25,000 for an agricultural building.

In order to keep heat cost down to benefit the community, the most advantageous fuel supply arrangement is for fuel to be produced locally. A number of fuel suppliers are already set up in North Yorkshire (see Appendix 8) and say that they can deliver fuel to Appleton. However, the charge is likely to be considerably in excess of the cost of supplying fuel from the immediate locality. The choice will obviously depend on availability and willingness of a farmer/forester in the area wanting to take on procurement of timber, processing and delivery of fuel and with suitable buildings and machinery. It is reassuring however that there are alternative fuel suppliers to act in a back up position if there was to be a short period when local fuel supply failed for some reason.

Locally timber for fuel supply is available from under-managed woodland and forestry around the village. As a back up, the Forestry Commission and other landowners are likely to be able to supply any shortfall from nearby forests provided they are given at least one year's notice to dry the timber.

The study summarises the benefits and risks to the Appleton CIC and concludes that even with 60% grant funding, the high capital costs make it impossible to break even

and deliver heat in the early days at a price competitive with fossil heat but installing wood heating would have good benefit for the village and the economy of the area. The local multiplier effect means that money spent on locally produced fuel stays within the local economy and increases in value to the region. If the high cost in early years could be got round then there is potential for the proposed wood heating to provide the CIC with a longer term growing source of income as well as creating a part time job opportunity. A side benefit is the conservation benefit of improved woodland management and probable incentive to plant more trees.

A number of recommendations are made including policy issues and the need to discuss the proposal with one of the existing biomass Energy Supply Companies. It is also suggested that further options on the cash flows should be investigated; perhaps looking at running at a loss in the early years or slow start loans used which can be repaid later in the life of the project.

An alternative for improving the carbon footprint of the village which avoids the high capital cost up front is suggested whereby householders are encouraged to install solar water heating and log or wood pellet boilers as their existing boiler systems come up for replacement. An assessment is really needed to ascertain how this would stack up compared to the district heating option.

Please note that all the financial estimates and costs in the report are prepared in good faith using local or typical information but are indicative only and require further detailed work before action is taken.

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