

Socio-economics of woodfuel:

Does it all stack up?

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1. INTRODUCTION

This paper considers the economic and “non-economic” factors which determine whether or not woodfuel is likely to be considered a justifiable heating option for a range of different customers.

The opinions reflected in this paper are based upon the experience gained by the Forestry Commission in Wales through the delivery of the Wood Energy Business Scheme. Through this scheme Forestry Commission Wales has had the opportunity to examine closely the motivating factors behind a wide range of woodfuel heating and supply chain projects.

This paper does not consider woodfuel for electricity generation. It also does not consider traditional log burning stoves, open fires and solid fuel ranges.

2. FRAMEWORK FOR ANALYSIS

If we were to consider whether woodfuel stacks up on purely economic grounds we would be able to undertake a fairly straightforward life cycle comparison between woodfuel heating and the cheapest available alternative - which tends to be oil or gas in most locations. However, from our experience across a range of projects, economic grounds alone rarely determine whether a particular customer chooses to proceed with a woodfuel heating installation.

This paper initially considers the economic and non-economic factors which influence different kinds of customers for wood fuel. It then considers the economic and non-economic factors influencing fuel suppliers. It is only when adequate numbers of fuel suppliers and customers are persuaded, that woodfuel development take place.

3. THE CUSTOMER PERSPECTIVE

3.1 Economic factors

The economic analysis for comparing woodfuel with any alternative heating fuel is a simple one, but one which can only be undertaken on a case a by case basis for each site and each customer. There is no generic answer which applies for woodfuel as a whole.

Whether woodfuel is economically justifiable can only be determined by considering the installation cost and the ongoing running cost.

Installation costs

Automatic woodfuel heating is very expensive. Across a range of projects of various sizes our experience indicates that the average price of a woodfuel heating installation is £600 per kw installed. However, this figure disguises a huge range of between £100 and £2,200 per kw installed. Rough estimates for fossil fuel alternatives are of the order of £40 to £120 per kw installed for oil or mains gas.

Whilst there is variation in cost between one make of woodfuel boiler and another, the main cause of variation between one project and another tends to be the associated infrastructure; namely fuel stores, heat distribution pipework and hot water storage.

Running costs

Running costs are made up of the fuel cost and other operating costs. For the purposes of this analysis I have not included operating costs as these are likely to be site specific.

The fuel costs for chip and pellet are compared to fossil fuels in Table 1:

Fuel	Cost	p/kwhr equivalent
Wood pellets	£120/tonne @10% moisture	2.53p/kwh
Wood Chip	£50/tonne @30% moisture	1.4p/kwh
Oil	32p/litre	3.32p/kwh
Gas		2.3p/kwh

As can be seen above, wood chip tends to be about half the cost of pellets. Chip tends to be significantly cheaper than oil, and depending on the gas price of the day (and who the customer is) it is now often cheaper than gas.

The critical question from an economic point of view, is whether your savings in fuel costs over a given period of time are adequate to justify the additional investment to install the appliance. The key associated question is over what time period you make this calculation. Some commercial customers expect a three to five year payback whereas a domestic customer may be willing to take a twenty year view – based on the life expectancy of the appliance.

The key variable in answering this question for most customers is the running hours on the boiler. The longer the running hours the greater the fuel cost relative to the installation cost in the lifecycle analysis. Therefore the more likely it is that woodfuel will become economically justifiable.

This is why we have a general rule of thumb that process heat users (factories, leisure centres), will be the most economically attractive sites for woodfuel. Individual homes

and offices have very low running hours and are therefore much less likely to find woodfuel economically justifiable.

3.2 Non-economic factors

Desire to be green

The principal non-economic factor in favour of woodfuel is the desire to be green. For many individuals or companies this may be an ethical matter driven by personal choice. However, increasingly it is becoming a requirement for planning and building regulations. Part L of building regulations is attempting to drive down the carbon footprint of buildings. Woodfuel heating is the cheapest form of carbon-neutral heating.

If a customer is considering woodfuel in order to meet planning and building regulations he or she will still be looking to do this in the most cost-effective manner and economic considerations will ultimately determine their choice. However, for those customers driven by their own ethical considerations, we are seeing economic considerations being given very little consideration (these tend to be for relatively small installations of less than 100kw).

Attitude to risk/ perception of woodfuel

The principal non-economic factors militating against woodfuel tend to be perceptions of risk and inconvenience. There are some justifiable perceptions that woodfuel may be difficult to get hold of and be inconsistent in quality. There are also less justifiable perceptions that woodfuel heating technology is new, innovative, risky and unreliable.

From our observations concern about fuel quality is a genuine issue – one which we are all working hard to overcome. Concerns about the technology itself may be justifiable but this tends to be due to poor system design due to a lack of experience in the market than it does about any underlying unreliability in the equipment itself.

Perceptions about inconvenience are also real. Even with the most sophisticated pellet systems there is a much greater degree of customer involvement with the heating system than would be the case with oil or gas. This is a personal and cultural issue which again we have a collective responsibility to address. We therefore tend to find that those who do proceed are comfortable and familiar with “handling wood” or have experience with other solid fuels.

Local economic development

There are many other local economic benefits associated with adopting woodfuel heating. These include increased local incomes, job creation and fuel security. From our observations most customers who proceed are aware of these benefits but these are unlikely to be deciding factors. The exception may be Local Authorities who have an economic development responsibility.

Sustainable forest management

Estates, farms and other woodland owners are a particular section of the customer base that have a strong interest in woodfuel. They often tend to have extensive, poorly insulated buildings with high heating requirements, and a surplus of low quality wood from their own woodlands. Many such customers see a virtuous circle in sourcing their own fuel from their own woodlands as a means to both heat their buildings but also to bring their woodlands under better management.

4. THE FUEL SUPPLIER PERSPECTIVE

4.1 Economic factors

From our observations most fuel suppliers will wish to see an economic return on their investment in capital and labour, as you would expect to see in any business.

From our observations we would also say that there is no shortage of entrepreneurs interested in fuel supply, but whether or not it is economically justifiable for them to establish themselves will depend upon a range of factors.

Start-up considerations

The first barrier will be whether or not there is a customer to supply. We have found that high quality fuel suppliers can spring up around the smallest of installations – often self-suppliers will seek to supply others.

The next barrier will be whether or not the business already has much of the equipment and buildings required. Many rural businesses (in particular farms, sawmills and waste transfer stations) have tractors, trailers, loaders, delivery trucks, timber handling equipment, hard standing and covered storage. These are expensive and essential elements to a quality fuel supply operation. Such businesses also tend to have the engineering skills to adapt existing equipment for woodfuel use.

The one piece of equipment which usually needs to be purchased specifically for woodfuel production is the chipper. Suitable machine can be purchased from £10,000 upwards. For a start-up business the upfront investment costs would be a barrier to entry. However, for many existing businesses the cost of diversifying into woodfuel is relatively small.

Costs of production

Having invested capital in processing capacity, any fuel supplier has then to source raw material, which comes with an associated cost. Once again, many rural business have waste wood on site as a by-product from some other operation – usually sawmill co-product, tree-surgery or waste transfer. From our observations fuel suppliers will seek a

diversity of supply to spread the risk and allow for growth. They therefore tend to supplement their own material with round wood to ensure quality and reliability of supply.

Once sourced, the wood needs to be processed into fuel. This will involve drying and chipping. Once chipped the fuel then needs to be stored (kept dry), and delivered to site. The final delivered cost of the fuel needs to cover all the investment costs in plant and machinery, the labour and maintenance cost of processing and delivery, the time cost of storing wood on site, and profit.

If the delivered price of wood is cheaper than fossil fuel alternatives then there is a basis for a sustainable operation.

4.2 Non-economic factors

For a business to be successful and sustainable it must be driven by economic principles rather than environmental ones. However, from our observations, there is most definitely an environmental “feel good” factor which most fuel suppliers experience. Such a feeling may be enough to see a business through start up difficulties, and will give fuel suppliers a particular perspective on potential for future growth. It also helps suppliers to market their product. An informed fuel supplier needs to understand customers’ desire to be green as much as what price he needs to charge.

Conclusions

Justifying woodfuel heating will always be done on a balance of economic and non-economic considerations. Different customers will place different weighting on the economic versus the non-economic.

There are however some broad statements which can be made. Even the most environmentally motivated customer wants to justify woodfuel on economic grounds and there will be limits on how much they are willing to pay to be green.

For woodfuel to become mainstream it has to be able to sell itself increasingly on economic rather than environmental grounds

At present, for most sites, the capital cost of woodfuel heating is too high for customers to proceed. Grant support from government can reduce this barrier but this is expensive. What we also need to see from installers and equipment suppliers is a reduction in the costs of installations – particularly for smaller sites with low heat loads where the installation cost is a high proportion of lifecycle costs.