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Squaring the circle: assessing the potential of biomass in rural Scotland

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Abstract

During 2003, SCARF (Save Cash and Reduce Fuel) obtained funding from the Energy Savings Trust to commission a study into the potential for locally sourced wood fuel to provide a means of increasing fuel choice and addressing fuel poverty in Perth and Kinross Council area. The study aimed to demonstrate demand-side potential and issues through an attitude survey of residents on off-mains gas communities in the area and to consider the level of interest in developing a local market. This paper examines the findings from the Perth and Kinross Wood Fuel Project and assesses the potential for developing a wood fuel market in Perth and Kinross, linking supply and demand and thus squaring the circle.

Introduction

The use of biofuels, including wood, is well established in some parts of the world such as Scandanavia and North America. In Sweden, for example, wood is used extensively in district heating schemes and it supplies almost 16% of the country's energy demand. In Scotland in contrast, limited use is made of wood products for heating purposes at the present time, whether in the commercial or domestic markets. Recent developments in a number of areas have led to a review of the issues involved, and this may in time change the situation. These include concerns with climate change, the likely increase in conifer timber supply, commitments to creating local sustainable development and a desire to eradicate fuel poverty.

In response to the Kyoto summit held in 1998, the UK Government set demanding targets for the reduction of emissions from greenhouse gases. Its long-term goal is to achieve a 60% cut of CO2 by 2050. To meet this goal, the Government is seeking to promote renewable energy with a national target that by 2010 10% of energy needs will be met from renewable sources. The Scottish Executive has set a higher target for Scotland, aiming for a 40% reduction in CO2 by 2020. While in the past, most attention has focused on developing wind, wave and hydro technologies, there is now a growing interest in the use of biomass as a source of renewable energy in Scotland.

Over the next two decades, the supply of timber, particularly from conifer forests, is expected to almost double from 6 million tonnes to 10 million tonnes as a result of the harvesting of the commercial forests planted in the 1960s and 1970s. And yet the industry is facing a poor economic outlook, with falling timber prices and strong international competition. It is increasingly being recognised that the development of the wood fuel market in Scotland could provide a valuable alternative market, particularly for co-products such as sawdust, wood chips and bark.

The Scottish Executive has made a clear commitment to pursuing a strategy of sustainable development. The Coalition Partnership Agreement (Scottish Executive, 2003) states that: 'We want a Scotland that delivers sustainable development; that puts environmental concerns at the heart of public policy and secures environmental justice for all of Scotland's communities' (Scottish Executive, 2003). In the most recent statement of policy towards rural development in Scotland this objective is re-affirmed (Scottish Executive, 2004). Developing the wood fuel industry can contribute to achieving these objectives. Local jobs can be created, not only in the forest sector but in sales and maintenance of heating systems, and the money that is spent on fuel is kept within the local area.

The Scottish Executive has also made addressing fuel poverty a high priority. The Scottish Fuel Poverty Statement, published in 2002 (Scottish Executive, 2002), identified three main factors causing fuel poverty: low incomes; poor energy efficiency and high fuel prices. Measures, such as the National Minimum Wage and New Deal are aimed at tackling low incomes, while funding through Warm Deal and the Central Heating Programme are helping to improve the energy efficiency of peoples homes. In relation to the operation of the market, the introduction of competition into the electricity and gas supply industries is having a positive impact on energy prices in these sectors. However, it is recognised that many parts of rural

Scotland do not have access to mains gas and there remains a need to increase fuel choice in such areas. Wood fired heating systems provide one answer to the problem of fuel poverty, particularly for families living in areas without access to mains gas. Wood is used as a source of fuel by many of those living in off-mains gas communities, typically in the form of logs. However, significant storage space is needed to allow logs to dry, and open fires and wood burning stoves are labour intensive to operate. Wood pellets offer an alternative, convenient fuel source that is particularly suited to the domestic market.

Wood pellet fuel

Wood pellets are a processed form of biomass fuel. They can be made from a variety of biomass materials, including forest residues, straw, specially grown energy crops, recovered wood such as recycled pallets and sawmill co-products, in the form of cut-offs, wood chip, bark and sawdust. The production process, undertaken in a pellet mill, consists of three stages. First, a hammer-milling machine is used to produce sawdust of a consistent size and, depending on the moisture levels of the source material, drying may be carried out. The prepared sawdust is then fed from a hopper into the pelletising machine, where it is compressed and extruded at high temperatures. The natural lignin in the wood acts as a binding agent. Finally, the pellets are prepared for distribution, either in 15kg bags for domestic customers or in bulk container lorries for larger users.

A range of domestic pellet appliances are available for the domestic market (3G Energy, 2003). They take two main forms: stoves or room heaters and central heating boilers. Stoves are available in a range of sizes, from 5kW to 15 kW and all contain a hopper for the pellets with the capacity to last from 3 to 5 days, which makes them larger than equivalent log stove. They also contain a convection fan, which helps distribute hot air into the room. The central heating boilers have a higher energy output than the stoves and are also larger in size, primarily due to the larger hopper capacity. All the appliances have electronic ignition, are thermostatically controlled and have automatic feed, which makes them relatively convenient to use.

Advocates of wood pellet appliances argue that they offer a number of benefits over alternative fuels. Pellets are clean and efficient. As the moisture content is low and they burn at a high temperature, pellets produce few emissions and very small quantities of ash. Pellets are environmentally friendly, as they are produced from a renewable resource, which is carbon neutral. Where the manufacture of pellets makes use of local sources of timber it can assist the local economy. Although dependent on the choice of appliance and the characteristics of the property, wood pellet stoves and boilers are generally more expensive than comparative systems. However, under the Scottish Communities and Householders Renewables Initiative (SCHRI) grant scheme householders can apply for grants of up to 30% of the total installed costs.

The UK experience

Until very recently, the use of wood pellets for fuel was largely unknown in the UK. In 1999, the Department of Trade and Industry, with support from the European

Commission's ALTENER programme, commissioned a project to help establish a wood pellet industry in the UK. The project, which was carried out by Renewable Heat and Power Ltd, was a proactive one, tasked with examining various pellet industries abroad, notably in Scandinavia, USA and Canada, and advising on the promotion of pellet supply and pellet fired heating systems in England and Wales. The examination was comprehensive, covering supply-side issues from wood harvesting to sale of pellets, as well as a survey of reactions to pellet-fired heating. The economics of the whole process were also examined and cost comparisons made between wood pellets and with other available fuels. The study found that pellets compared favourably in price with LPG and oil but could not compete with mains gas. In addition, three separate trial pelletisation processes were analysed. Using data from the USA, a figure of £500,000 was estimated as the cost of a pellet mill producing 5 tonnes of pellets per hour.

As part of the project, a survey was conducted at events where presentations about wood pellets were made and appliances demonstrated. This revealed that a large percentage of the people asked had never heard of wood pellet fuel and did not realise that wood pellets are a major fuel source in many other European and North America countries. There was an almost universally positive reaction to the idea of pellet fuel and pellet burning appliances, based on the automatic and convenient nature of the appliances, the environmental benefits of wood as a fuel, and the fact that it could directly help the economy. The main negative reaction was the higher capital cost of the equipment compared to, for example, oil-fired boilers. This is seen as a major barrier, since the savings made on fuel will generally only off-set the higher capital cost over an unacceptably long time-scale (DTI, 2001).

There are currently only two pellet manufacturers of significance within the UK. These are Welsh Bio-fuels at Bridgend, Glamorgan in South Wales and Premier Waste at County Durham. Both supply pellets for large scale customers, with the domestic householder market accounting for a very small part of their business. Welsh Bio-fuels started their operation, incorporating the manufacture of pellets through to the supply, installation and maintenance of boilers, about three years ago. The pellet mill, which has a throughput of 5 tonnes per hour, was capitalised largely through grant funding. When contacted, a company spokesperson suggested that the market was exceptionally buoyant at present, as evidenced by the increasing numbers of registered installers within the Clear Skies Programme an increased for demand heating systems and a resulting knock-on requirement for fuel. Welsh Bio-fuels current markets are for industrial users and district heating schemes of 70kW and above.

Premier Waste Management at County Durham currently produce 200 tonnes of pellets per week, supplying industry and larger domestic users, such as public buildings, schools and district heating schemes. Their spokesperson suggested that the potential UK market was huge in that the production of some 3 million tonnes of pellets could easily be sustained. The concept was seen as too new to the UK and therefore there was a lack of infrastructure. It was suggested that some government intervention was necessary both to increase manufacturing capacity and to promote and advertise the benefits of pelletised wood fuel.

A third company, Envirogen Lincolnshire, had intended entering the pellet production market in 2003, mainly to supply local power generation. However, a number of co-investors had pulled out of the venture and the development did not materialise. The company remain optimistic about the future for the pellet industry, however, and are hoping to begin smaller scale production by early 2005. For this they intend to operate a small plant, producing 4000 tonnes per annum, at an estimated cost of between £250,000 and £300,000. The company spokesperson suggested there was huge potential for a pellet industry throughout the UK, with small units spread geographically and supplying local markets.

In Scotland, interest in wood pellet manufacture emerged during 2002. A seminar was held at New Lanark in January of that year, which was coordinated by the Scottish Forest Industries Cluster and the Office for Promotion of Energy Technologies (OPET-Scotland), with valuable inputs from OPET-Finland. The seminar explored how the more mature wood fuel market in Finland could provide lessons for the formation and operation of such a market in Scotland. The report arising from the event, sets out the requirements for establishing a wood fuel industry in Scotland and but highlights the major barriers (Scottish Forestry Industries Cluster, 2002). 'There is an embryonic wood fuel industry in Scotland in that there is the timber resource…..However there is currently no marketplace. No customers means that investors will not create the wood fuel supply infrastructure; there are no Scottish manufacturers of wood fuel boilers and associated equipment and very few in the UK. No fuel supplies and no marketing effort from equipment suppliers means that potential customers will look to other forms of heating'. It was also noted that 'creating a wood fuel industry needs demonstration projects in Scotland'.

A subsequent report, entitled 'Renewable Energy from Wood: An Opportunity for Scotland' and funded by the EU ALTENER Programme and the environmental charity The Freshfield Foundation, was prepared by Bidwells (2002). This puts the case for encouraging significant uptake of this already well proven technology (wood fuel) as part of Scotland's energy policy for the 21st century. It provides a cogent argument for the adoption of medium scale heating systems, citing positive examples from Sweden. It also suggests that some forms of 'simple help, possibly in the form of readily accessed capital grants to help with the costs of installing wood fired boilers, could open up whole new markets and encourage entrepreneurial activity, both in the fuel supply chain and the supply of hardware'. Indeed the system could be 'kickstarted by the installation of biofuel boilers working alongside existing conventional fuel boilers in government buildings, schools, hospitals, sports halls swimming pools etc.'.

Building on the very positive message contained in these reports, a further study was commissioned to investigate the commercial prospects for developing a wood pellet manufacturing plant in Scotland. Reporting late last year, this found that the case for establishing such a pelletising plant is marginal. 'While technically possible to produce pellets of suitable quality and price for export to Sweden and Denmark or for UK markets, the margin for profit appears to be low'. The study estimated capital and annual running costs to establish a pelletiser in Central Scotland, using dry residues with 10% moisture content ie no further drying required and compares the same factors with establishing a pellet plant in the North of Scotland using green

sawmill co-products. For the Central Scotland plant capital cost of £375,000 is assumed with annual costs of £1,120,000. The plant is estimated to produce 15,840 tonnes/year and this would require an ex works price of £72.60 per tonne to allow for a 20% internal rate of return. The mill in the North of Scotland is estimated to cost £1,000,000 with annual costs of £1,749,000 and producing 26,400 tonnes/year. This in turn would require an ex-works price of £68.13 per tonne to produce a 20% internal rate of return. Market opportunities primarily identified within the report were those of exporting pellets to Denmark and Sweden. However it was suggested that delivered prices to these markets would have to be in the range of £60 - £75 tonne. Since the plants would be operating at these limit prices prior to any transport costs then the viability of such proposals are called into question.

The authors do suggest, however, that market potential does exist for a home market but that a number of factors would need to be considered. 'The UK market is currently in its infancy. There is currently no established market or infrastructure, prices for pellets are fluid and aspirational and only competitive with fossil fuel in niche markets. Potentially there are significant markets in both the domestic and commercial areas, and increasingly support and incentives are becoming available which will catalyse this market. Within Scotland there could be a potential market for pellets in the rural domestic areas and for institutional and commercial heating'. 'Residents who are not connected to mains gas would also make a suitable target audience for wood fuelled heating. Rural homes and developments are ideally suited to wood fuelled use. They are potentially located close to source, and can therefore save costs on transport. It is often the rural areas that have limited access to gas, so these may overlap'.

Despite the cautious economic analysis, moves are underway to stimulate the supply side of the industry. The Forestry Commission has applied for European funding under the ALTENER programme to purchase and trial a mobile pelletiser from Sweden and the Scottish Forest Industries Cluster recently sponsored a visit to Austria to examine the wood fuel supply industry. The group visited power-plants; district heating schemes and saw the whole wood fuel infrastructure in operation.

Perth and Kinross Wood Fuel Project

The Perth and Kinross Wood Fuel Project sought to examine the potential for developing a wood pellet industry in Perth and Kinross, which would provide an alternative fuel choice for residents in off-mains gas communities while, at the same time, result in economic and environmental benefits for the area. The methodology adopted for the study included a review of recent academic and other publications, the collation and mapping of data on off-gas households, a survey of representatives from the wood fuel supply chain and an attitude survey of a sample of residents. With regard to the attitude survey, a number of different approaches were considered including questionnaires, telephone interviews and focus groups. While each of these has comparative strengths and weaknesses, it was decided to use focus groups for the following reasons: existing knowledge of modern wood fuel heating systems is likely to vary considerably across the population: the focus group will allow some orientation on the topic to inform the debate; focus groups allow the participants to influence the agenda, raise issues and insights which might not otherwise emerge; this approach is economical in terms of time and resources; data

protection issues in obtaining complete information about off-mains gas households. While focus groups can generate a large amount of information, it is recognised that the views expressed cannot be considered representative of the off-mains gas community in Perth and Kinross as a whole. Five focus groups were held in different parts of the Council area.

The population of Perth and Kinross in 2001 was 134,949, consisting of 58,323 households, with the majority of residents living in the main settlements of Perth, Blairgowrie, Kinross, Auchterarder, Crieff, Pitlochry and Aberfeldy, all of which are connected to the mains gas network. Approximately 15% of households, mainly in the more remote parts of the area, do not have access to mains gas as a source of heating fuel.

A picture of house condition and energy efficiency of dwellings can be obtained from the Scottish House Condition Survey (Communities Scotland, 2002), which involved a sample of over 20,000 households across the country. The survey consisted of a social interview, covering topics such as household composition, tenure, heating use, and housing costs; and a physical inspection which focused on dwelling type, materials, amenities, heating systems and insulation. The SHCS used a version of the National Home Energy Rating (NHER) for calculating energy efficiency profiles. This produces an energy rating on a scale of 0 (poor) to 10 (excellent) based on the total energy costs per square metre of floor area required to achieve a standard heating regime. The findings for Perth and Kinross showed that the 23% of dwellings were rated poor, a figure higher than the Scottish average; 69% of property which is privately owned falls in NHER bands 1-5 compared with 53% for Scotland; the majority of pre-war property falls into NHER bands 1-5; and overall 22% of households in Perth and Kinross are considered to be fuel poor (2002 definition)

Local agencies in the area are taking action to tackle fuel poverty. The Affordable Warmth and Fuel Poverty Strategy, prepared by the Council in partnership with NHS Tayside, SCARF and Perth and Kinross Energy Efficiency Advice Project, was published in draft form in January 2004. The main aim of the Strategy is to meet the target set by the Scottish Executive to eradicate fuel poverty as far as practically possible by 2016. The document seeks to identify the households where fuel poverty is an issue, raise awareness of the issue of fuel poverty throughout the community, maximise the introduction of energy efficiency improvement measures to the housing stock in the area, influence fuel choice, ensure take up of benefits and ensure access for all to impartial energy efficiency advice.

The local authority has also made a clear commitment to the pursuit of sustainable development. The Perth and Kinross Structure Plan, which was approved in June 2003, states that 'support will be given to measures which promote an integrated, flexible and innovative approach to rural development which encompass economic, social and environmental considerations and which maintain or enhance local employment opportunities; promote diversification; help sustain viable rural communities and services; and introduce new technologies and renewable energy schemes'. The plan supports the development of renewable energy schemes, particularly where they are community based. Forestry in an important activity within area. GIS data obtained from the Forestry Commission Forestry Research Unit

showed that there are 43,403 hectares of forest, the majority of which is conifer planting. The forest industry employs approximately 600 people.

Attitudes to wood pellet fuel

The focus of the study is the off-mains gas communities within Perth and Kinross Council area. Five locations were chosen for focus groups following discussion with the project partners. The villages, Abernethy; Blair Atholl; Kinloch Rannoch, Muthill, and Stanley, are well distributed across Perth and Kinross and all contain publicly-owned housing stock, owned by either Perth and Kinross Council or Perthshire Housing Association, as well as owner-occupied and privately rented accommodation.

Ideally focus groups should consist of between 4 and 12 participants. To achieve this, contact was made with the community council in each village, meetings were organised in a suitable local venue, posters were displayed and invitations were sent out to a sample of residents living in different housing tenures. Free energy efficient light bulbs were offered to all participants. Each meeting was chaired by one of the research team and the discussion was recorded. At the start of each event, residents were be asked to complete a short questionnaire, covering factual information relating to their house type, tenure, current heating arrangements and heating costs. This allows the comments made to be contextualised. The subsequent discussion was structured around a set of questions, which sought to explore residents' attitudes in relation to current heating systems, wood as a heating fuel, modern wood pellet systems; and wider community schemes.

The meetings were held between 16 February 2004 and 3 March 2004. A total of 45 residents participated with attendance ranging from 13 to 2. Additional views, in the form of a modified questionnaire based on the topics discussed at the focus groups, were received from a further 5 residents who had expressed an interest in the project but were unable to attend the meetings.

The questionnaires provide a picture of the nature of properties and current heating systems used by participants. The vast majority of properties were owner-occupied, with only a few falling into the local authority and private rented categories. Over half of properties date from before 1919, although all age ranges were represented. The dominant house type was the detached property. With regard to heating arrangements, over half have wet central heating systems, consisting of boilers and radiators, approximately a third have electric storage heaters and the remainder use room heaters or fires. There was some variation in the main heating fuel used, with the largest categories being oil and electricity. However, coal, LPG and wood were also recorded. A significant proportion indicated that there annual heating bill for last year exceeded £ 400, although a small minority spent less than £100.

The discussion at each meeting was organised to address four main issues: the degree of satisfaction with current heating systems; current attitudes to wood heating systems; views on the use of modern wood pellet systems; and the level of support for community or district heating schemes fuelled by wood.

Views on existing heating arrangements were extremely varied at each of the meetings, depending on personal circumstances and experiences. It became clear from the discussion that most people have more than one source of heating, with electric fires, wood or multi-fuel stoves supplementing their main fuel. A significant proportion of participants were unhappy with their existing arrangements. The criticisms that were made fall under two main headings: cost and efficiency; and convenience. A selection of responses are given below:

Cost and efficiency:

- *I have LPG which is really, really expensive. Most new houses use oil. My wife doesn't want to consider using wood as it is too messy and so we stick with LPG*
- *Electricity is expensive - it doesn't react quickly to changes in the weather – the response is 24 hours after the weather has happened.*
- *My house contained storage heaters when I bought it. They are not cost effective.*
- *I have oil-fired central heating and I would like a different system as the current one is costly*

Convenience:

- *I have a new house with electric storage heating and a coal fire but I only use the storage heaters as the fire is too much work*
- *I currently have a woodburning stove but it is not programmable and the stove and chimney need cleaning out*
- *I have oil central heating, a wood burning stove, and an open fire. The stove is a lot of hassle and messy. You can't keep it going if you are out all day.*
- *I live in an x-council house and have storage heaters and I also burn wood. There is no heating during the day as I am out. I like an open fire. Convenience is important and I like being able to heat up the room quickly in the evenings.*

Despite the largely negative comments, some participants were content with their existing arrangements.

- *I have a multi-fuel stove which is fantastic. I've had it for 20 years. It is cheap to run as I work with the Forestry Commission and have access to an endless supply of timber. I do also burn coal as it lasts longer - you don't have to restock so often and it gives a better heat.*
- *I have a wood burner plus oil fired central heating and I am satisfied with this.*
- *I have oil fired heating and an open fire. The central heating is programmable and practical. I enjoy using wood though.*

Interestingly one individual, who is currently building a new house, has decided to install a ceramic woodburing stove which will heat the whole property. He was influenced by visits to Switzerland and by concerns over the possible impact on oil supplies of the political situation in the Middle East. The system will be very efficient, with high levels of insulation.

The discussions suggested that the factors that were most important in regard to heating systems were the cost of fuel, ease of use and ability to programme to suit daily lives.

Participants were asked to consider their current attitude to wood heating systems and a number of alternative descriptions were used to elicit a response: 'clean and cheap', 'old fashioned and dirty' 'inconvenient', 'uses local fuel and helps employment and the forest industry'. These descriptions were similar to those used in Chipping and Downham study in Lancashire (Wood Energy, 2003).

There was a mixed response with no clear agreement. Most seemed to assume that wood fuel meant logs and their experience related to burning in stoves that could also burn coal.

The discussion then progressed to look at possible reasons for using wood fuel heating systems. Discussion was prompted by a number suggestions put forward by Reforesting Scotland. For many economic factors are the most important ones, but there was support for the environmental factors too. There was a great deal of interest in the fact that wood is carbon neutral and wood was perceived as 'natural and totally non-polluting'. There was a level of awareness about the types of wood grown for fuel. The fact that wood can help support local jobs was generally supported. Safety did not seem to be an issue. There was limited awareness that grants might to available to householders or communities to assist with the costs of installing wood burning systems although was seen as positive.

- *Carbon neutrality and local availability is important to me*
- *Being a renewable resource is important – but we mostly burn hard woods not conifers.*
- *Usually burn wood as an extra to another system. I am not concerned that dry wood is safer to store than oil or gas. .*
- *The availability of grants sounds good.*

Information was provided to the groups on wood pellets as a fuel source and details were circulated about wood pellet stoves and boilers that are on the market. A sample of pellets was passed around. Only one person had seen pellets before. In each focus group, a lively question and answer session followed, covering issues such as comparative costs, delivery, compatibility with existing wood stoves, ease of conversion, security of supply, size of boilers, and maintenance. Generally, there was a positive reaction to the potential for wood pellets if they could be supplied locally at a reasonable price. Cost was a critical factor.

- *As people become busier, they want systems that are more controllable - and as you get older people are less able to stoke traditional stoves. This is a great idea but I would favour larger pellets and stoves that could burn a variety of fuels. What happens if the supply of pellets runs out and you have no other source of heat?*
- *Depends on the price*
- *Perhaps we have to think of what is sustainable. If you kept an open fire box as well as the pellet boiler, it would allow you to burn logs as a stand by.*

- *Convenience certainly would be a bonus and if it is cleaner it is certainly worth looking into but I would need more details on the economic and environmental benefits.*

There were a number of reservations, however, particularly relating to the need to replace existing heating with systems, which are relatively unknown in Scotland.

- *It would be good to talk to people who have these installed to see what they are doing and to hear about the downside.*
- *I would be more interested if I was carrying out serious renovation of my house now rather than 30 years ago. Now I am looking for minor adaptations eg introducing a new stove without removing the present system.*
- *What about the re-sale value of houses. If a pellet system is all you are relying on and someone new comes in, will they accept a wood fuel system?*

A few people remained unconvinced of the merits of pellet systems.

The final part of each meeting asked for views on the possible use of wood fuel in community buildings in off-mains gas communities and whether district heating schemes using wood should be considered or promoted.

There was broad support in all the meetings for the use of wood fuel to heat community buildings such as schools. It was felt that such schemes could result, not only in efficiency gains over other systems, but also lead to employment opportunities. Those at the Kinloch Rannoch meeting were aware of the proposal for the new Breadalbane Academy and were strongly in favour of this. It was suggested that council buildings should be considered as demonstration projects. It was felt that the government could play an important part in stimulating such schemes perhaps through the tax regime. The possible development of district heating schemes was discussed and there was agreement that this would make sense when new communities or groups of houses were being built. Several people were aware of such schemes in Europe.

To complement the attitude survey, a sample of 6 off-mains gas properties in Perth and Kinross was examined, including modest Council properties and owner occupied cottages. Generally, the houses investigated had limited space for the installation of wood pellet boilers and storage hoppers although most have satisfactory road access for delivery vehicles.

Conclusions

Although well established as a technology in Europe and North America, the use of wood pellets as a domestic fuel is very new to the UK. Indeed, as recently as 2001, there were no major pellet manufacturers operating in this country and the majority of appliances were imported. Experience from several recent studies into the industry highlight an apparent 'catch 22' situation: without identifiable demand for wood pellets, the industry is unlikely to invest in the necessary equipment to manufacture the product, while at the same time, without reliable supplies, demand will be limited. This issue was addressed in the 2001 DTI study, which concluded that central government intervention was needed. It is against this background that

this study sought to examine the domestic demand potential for wood pellets, in Perth and Kinross.

Forests cover a significant part of the land area of Perth and Kinross Council and forestry as an industry makes a contribution to the local economy. Given the projected increase in softwood production over the next two decades, it is clear that the industry must examine potential new markets. Manufacturing wood pellets for use as fuel is an important option to be considered. Although wood pellets can be made from a range of biomass materials, the principal source of supply is likely to be from sawmill co-products. In terms of supply there appears to be the potential to support a pellet manufacturing facility in this area, although a more detailed economic analysis is needed.

In relation to demand issues, experience from South Wales and North East England shows that establishing a number of relatively large scale commercial or local authority customers was critical to the decision to develop pellet mills. Demand from the domestic market in each case has been limited. It seems logical to conclude that a similar scenario would apply in Perth and Kinross.

The attitude survey of domestic fuel users found that wood was commonly used in off-gas communities, as supplementary heating in the form of logs. Participants in the focus groups felt positive about using wood, with many recognising the environmental benefits associated with such fuel. With regard to choice of heating fuel, it became clear across all the groups that the three main factors were cost, convenience and programmability. There was very limited awareness of wood pellets as a source of fuel for domestic heating. While a majority indicated that they would be prepared to consider wood pellets as a potential fuel if a local supply became available, it must be recognised that such a change would only be considered as and when their existing system needed to be replaced. There was a strong call for demonstration projects, to allow residents to see wood pellet systems in operation and to discuss the experience of using them. The chances of individuals changing to a new product is greatly enhanced if they are exposed to it, as shown by the resident installing a ceramic wood boiler after a visit to Switzerland.

There is a vast range of house types within the off-gas communities in Perth and Kinross and a small sample only were examined. This revealed three main issues that need to be addressed: space to accommodate wood pellet stoves or boilers; the appropriate type of flue; and the need for storage. It would appear that there may be issues in finding appropriate locations for wood pellet boilers and fuel stores in small houses, including some council properties. This is not such an issue in larger properties. While a flue is needed for wood pellet boilers, according to manufacturers installation instructions, these need not be to the specification required for conventional wood or multi fuel stoves. This is a distinction not recognised in the current Building Regulations.

The study recognises that the potential exists within Perth and Kinross to develop a wood pellet industry but that the ‘catch 22’ situation relating to supply and demand will only be overcome through intervention. Market uncertainty appears to be deterring entrepreneurial initiative in this field at present and, as a result, a fillip from

the public sector may be required to kick-start demand. This could take place at various levels.

Some actions can only be taken by central government, for example the introduction of national taxes on fossil fuels, as occurred in Sweden. In the Scottish context, there is currently a great deal of interest in the development of a wood fuel industry, both using wood chips and wood pellets, with projects being progressed in different localities by the Scottish Forest Industries Cluster and a number of local authorities. It is important that this activity takes place within an appropriate framework at the Scottish level, allowing experience to be shared and activity to be coordinated.

Action can also be taken at the more local level, and here the local enterprise company and local authority have vital roles to play. Perth and Kinross Council have made a clear commitment in its Structure Plan to support the development of sustainable communities as well as the promotion of renewable energy use. The use of new technologies, such as wood pellets systems, should be encouraged in new housing developments. It will be important to work closely with the development industry if this objective is to be achieved. The recent feasibility study into the use of a wood fuel system in the new Breadalbane Academy is welcomed (Bidwells, 2003). Perth and Kinross Council are urged to demonstrate leadership in the development of renewable energy schemes in council buildings where ever possible.

The study revealed the importance of demonstration projects in moving towards greater use of wood as a fuel. Projects are clearly needed to persuade members of the public of the benefits of wood pellets. It would be very helpful however, if such schemes incorporated all types of housing tenure, extending beyond Council properties, thus allowing owner occupiers and private tenants to become more aware of wood pellet systems. Targeting of a range of house types, including those classed as energy-inefficient, would also help strengthen the case for wood pellet heating systems.

The Perth and Kinross Wood Fuel Project was charged with examining wood pellets as a potential source of fuel to help alleviate fuel poverty. However, it is clear from the results that the development of a wood pellet industry in the area will not provide a short term solution to the issue of fuel poverty facing many residents of the off-gas communities. This can best be achieved by improving the energy efficiency of existing properties. Existing grants are available and these need to be promoted throughout the area.

In conclusion, the response to wood pellets as a new source of fuel for heating was encouraging. Positive comments were made by residents living in off-gas communities in the area, representing potential demand. Such positive attitudes suggest that, with the necessary support, the creation of a wood pellet industry in Perth and Kinross could become a reality.

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