Sustainable Heating with
woodENERGY SCOTLAND

Lanarkshire Biomass
Introduction

The Lanarkshire Biomass project was established to provide a commercially viable cluster of automated wood heating plants in North Lanarkshire. It evolved out the recognition that wood heating – although commercially and technically viable in Scotland – had to date not achieved any noticeable market share. This lack of presence was seen as one of the key barriers to market deployment and the project was set up to provide a clear demonstration of the possibilities and hopefully stimulate others to make similar investment decisions.

The costs of wood heating must of course be price competitive with conventional fossil fuels. Securing a woodfuel supply contract, that delivered heat reliably and competitively, was therefore seen as a key outcome of the project.

Other objectives included:

- To successfully retro-fit wood heating plants in a visitor centre, two secondary schools and a commercial greenhouse.
- To demonstrate that the use of fossil fuels in public buildings can be successfully displaced by woodfuel.
- To help develop commercial structures that can be replicated – for example, the development of a 'wood heat supply' contract.

This fact sheet is intended to explain the project and to disseminate the lessons learnt.


Palacerigg Visitor Centre


Drumpellier Nursery


Inspecting a woodfuel boiler

Background

In 1999 a partnership of North Lanarkshire Council, Central Scotland Forest Trust, Scottish Enterprise Lanarkshire, Scottish Natural Heritage and Forward Scotland formed Lanarkshire Biomass, and between 1999 and 2003 a range of project options was explored and dozens of energy users were approached.

During that period, the price of fossil fuels rose and by 2004 the price of oil and gas arrived at a point where the economics of woodfuel heating appeared attractive enough to overcome the natural market resistance to new technology.

A key lesson learnt from this has been that only when the cost of heating a building with wood becomes as cheap or cheaper than conventional fossil fuels will energy users consider converting.

Although many potential customers expressed an interest in renewable forms of energy the actual process of designing and procuring such solutions was complex and specialist. Most customers had neither the time, resources, nor skills to do this. Therefore the provision of a specialist project manager helped to guide the process and was an important aspect to delivering the project.

In addition the creation of Lanarkshire Biomass from a wide range of agencies helped direct action and build confidence. This was perceived to be important, as potential customers were naturally cautious of investing in new technology and fuels to meet essential energy needs.

The notion of a cluster of boilers was also important as this allowed a commercially viable fuel supply contract to emerge. It became clear that a number of suppliers would be interested in supplying woodfuel – but that the scale and terms of that supply contract needed to be attractive enough to justify the effort and investment involved in setting up the fuel supply infrastructure. It was found that, if reliable energy users, in this case NLC, placed a well drafted fuel or heat supply contract in the marketplace, attracting a fuel supplier was feasible.

For further details on this project please contact:

Steve Luker Associates (Project Manager)
44 Queens Drive, Glasgow G428DD
T: 07970 522160 • E: steveluker@hotmail.com

Trevor Blackburn (Woodfuel Information Officer)
Forestry Commission Scotland, Bothwell House,
Hamilton Business Park, Hamilton ML3 0QA
T: 01698 368530 • M: 07747 887907
E: trevor.blackburn@forestry.gsi.gov.uk

Sustainable Heating with
woodENERGY
SCOTLAND

Lanarkshire Biomass

Wood Heat Supply Agreement

The agreement is made between:

A. the Supplier who operates the wood-fired boiler plant

B. the Purchaser who has installed the wood-fired boiler. The Purchaser operates the Premises which require heating and hot water services

The Supplier agrees to operate and maintain the wood boiler plant, including the supply of fuel, and to supply to the Purchaser Heat which the Purchaser has agreed to purchase. By "Heat" is meant heat energy as carried by hot water supplied at a flow temperature from the wood boiler plant of not less than 82°c.

Basis of Supply

In order to provide a supply of Heat, the Supplier shall take responsibility for the operation and maintenance of the wood boiler plant in the Boilerhouse including provision of supplies of woodfuel.

Boiler Operation

The Supplier shall operate the wood boiler plant in accordance with all relevant manufacturers' instruction manuals and any relevant manufacturers' warranties.

Woodfuel Supplies

The Supplier shall fuel the wood boiler plant with chipped woodfuel that confirms to the Onörm standard specification as set out in Schedule to this Agreement.

Quantity of Heat Supplied

The total quantity of Heat provided by the Supplier to the Purchaser shall be measured by means of the Heat Meter such measurements being expressed in megawatt hours (MWh). Payments shall be made by the Purchaser to the Supplier in three forms:

- a monthly Standing Charge to provide for the cost of undertaking the routine maintenance tasks
- *pro rata* payments for Heat supplied according to the Monthly Tally
- *ad hoc* payments for repairs to breakdown or other faults as may be required from time to time

Monthly Standing Charge

The Standing Charge shall be £ per calendar month.

On the 1st January each year the level of the Standing Charge, the Heat Tariff and the Day Rate shall increase in line with the Retail Price Index (RPI).

Contract Start and Duration

This Agreement shall take effect from the date of the Agreement and shall remain in force for a period of five (5) years thereafter.

Project Summary Table

Site	Description	Size of Boiler	Size of fuel hopper	Carbon emissions saved (tonnes) pa	Wood chips used (tonnes pa) (@30%m\c)	Costs of system
Palacerigg Visitor Centre (Cumbernauld)	A visitor centre with a café and offices heated by a oil fired boiler. Back up provided by retained oil boiler as part of the woodfuel heating system.	50kW	20 m^3	19 t	23 t	£60,890
Drumpellier Plant Nursery (Coatbridge)	NLC owned commercial plant nursery green houses used to supply Council bedding plants. Formally heated by aging gas fired boilers. Woodfuel boilers now take about 80% of the load and gas fired boilers have been retained for peak loads and as back up.	220kW	44 m^3	71 t	87 t	£90,359
Calderhead High School (Shotts)	Large NLC secondary school in two nearby buildings each heated from their own dedicated gas fired boiler houses, one of which has been recently removed. One gas fired boiler has been retained as back up and for peak loads and a micro grid has been installed to heat both buildings.	500kW	112.5 m^3	256 t	310 t	£244,405
Taylor High High School (New Stevenson)	Large single building secondary school previously heated via gas fired boiler. Woodfuel system now takes about 80% of heat load with gas boilers retained for peak load and back up.	500kW	112.5 m^3	194 t	235 t	£205,089
	Totals	**1.27MW**	**289 m^3**	**540 t**	**655 t**	**£600,743**

Project Funding Table

Funder - Site	Palacerigg	Drumpellier	Calderhead	Taylor	Project Management	Totals
Bio-energy Capital Grant Scheme	£14,988	£22,296	£51,351	£40,951	–	£129,586
North Lanarkshire Council	–	–	£74,538	£54,562	–	£129,100
Energy Savings Trust	£45,902	£68,063	£118,516	£109,576	–	£342,057
Scottish Enterprise	–	–	–	–	£10,000	£10,000
Central Scotland Forest Trust	–	–	–	–	£5,000	£5,000
Forward Scotland	–	–	–	–	£2,500	£2,500
Scottish Natural Heritage	–	–	–	–	£5,000	£5,000
Totals	**£60,890**	**£90,359**	**£244,405**	**£205,089**	**£22,500**	**£623,243**

Lessons Learned

An ideal customer will already have an older oil or gas boiler and be considering replacing this at some point. There are a number of reasons for this.

- The existing boiler can be retained as a back-up unit to cover maintenance down-time.
- The cost of not investing in a replacement fossil boiler can help justify the investment in the woodfuel boiler.
- Woodfuel boilers do not have the same turndown ratio as fossil boilers. This means they should not be sized on peak loads and so retaining the existing fossil fuel boiler can also serve the purpose of meeting peak load heating.

Retro-fitting wood boilers into existing buildings can provide amongst the best economic circumstances as it means the smallest (and thus cheapest) possible wood boiler can be used, and it can operate very efficiently at near maximum capacity.

It was previously assumed that sites that used natural gas would not be attracted to conversion. This proved to be untrue and it seems to be important to review each site on its merits rather than based upon the fuel. Often the costs of heating are more influenced by other factors such as boiler efficiency.

The process took five years from start to finish and so a key lesson is to allow enough time. In addition, project management costs were incurred and needed to be allowed for.

The fuel supply contract is important and should be designed to tie in with the boiler installation contract so that both end and start as required.

The creation of a cluster of woodfuel users and a critical mass of demand was seen as essential to attracting a reliable woodfuel supply company. In early market conditions fuel suppliers will seek contracts of sufficient size and duration to justify the costs of market entry. The Lanarkshire Biomass project has demonstrated the type of size of project that becomes commercially viable.

Finally, it has become clear that operational costs and capital costs, although important, are not the only drivers for potential wood heat customers. In addition, there was early concern with reliability and continuity of heat supply, and therefore all systems were left with fossil fuel back-up systems in place.