

A guide for consultants and others wishing to incorporate biomass heating into building design



This guide is issued free of charge to consultants and others who have contacted Econergy Ltd with specific projects for advice on installing Econergy biomass heating systems. No warranties or guarantees are given as to the accuracy of the information supplied and all designs should be passed to Econergy Ltd for verification prior to approval.

Introduction

There is increasing concern about climate change and central and local government, companies, organisations and the public in general are all looking for solutions. It is now generally accepted that the main cause of climate change is the increasing emission of carbon dioxide from the burning of fossil fuels.

The first step to making changes is to take simple energy conservation measures. This will help reduce emissions at least cost. There are many guides on how to do this.

Energy for space heating in buildings is a large component causing fossil fuel emissions. Again simple measures to reduce heating requirements are the best starting point. These include increasing insulation levels such as in the loft, draught proofing, and lowering set temperatures, improving heating system controls and installing thermostatic radiator valves.

New buildings are subject to increasing legislation to improve energy efficiency and reduce heat losses. It is likely that in the not too distant future, little or no space heating will be required in some buildings as temperatures can be maintained by solar gain, waste heat from other sources such as computer equipment and body heat of occupants. However both in existing building stock and many new buildings there will remain a significant requirement for domestic water heating and space heating that is cost effective and sustainable.

At Econergy we have focused our efforts on providing biomass-heating solutions for the future. We have searched for solutions both in the UK and nationally and have taken the best from those that have been developed and tested over many years. We have established links with six leading manufacturers and suppliers, mainly in Austria, and have used their designs as the basis for our business.

We have also worked to develop fuel supplies so that when we install a system, we can be sure that our customers have support right through from design to installation, operation, and service backup.

I hope you find this guide helpful. It is intended to act as a rough guide to designing biomass systems. More detailed design information is given in the detailed design solutions. I will be pleased to receive any comments or advice to improve it.

Mike Webb
Head of Marketing
30 December 2006

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1. What is biomass and why use it for heating?

Biomass can be derived from:

- Forestry residues and co-products
- Other clean woody material – joinery waste and arboriculture arisings
- Agricultural by-products, e.g. straw
- Energy crops – Short Rotation Coppice (SRC), miscanthus
- Generally material derived from any animal or plant

There are three common forms of biomass currently available: -

Logs – These have to be cut and split to suit the appliance being used and should be seasoned for one to two years until the moisture content drops below 30%. Logs are used where the customer does not mind manual intervention.

Pellets – Compounding sawdust to produce commonly 6mm diameter pellets for small domestic systems and 8mm pellets for larger systems produces these. They are more expensive but occupy less space and are easier to use in automatic systems.

Wood chips – This is more cost effective fuel for automatic systems and chips are produced to ÖNORM M7133 comprising two numbers as follows: -

G 30 (fine grade):

Cross section of max. 3 cm²

Use in small size plants up to 150 kW heat power

G 50 (middle grade):

Cross section of max. 5 cm²

Use in middle size plants

G 100 (coarse grade):

Cross section of max. 10 cm²

Use in large plants only

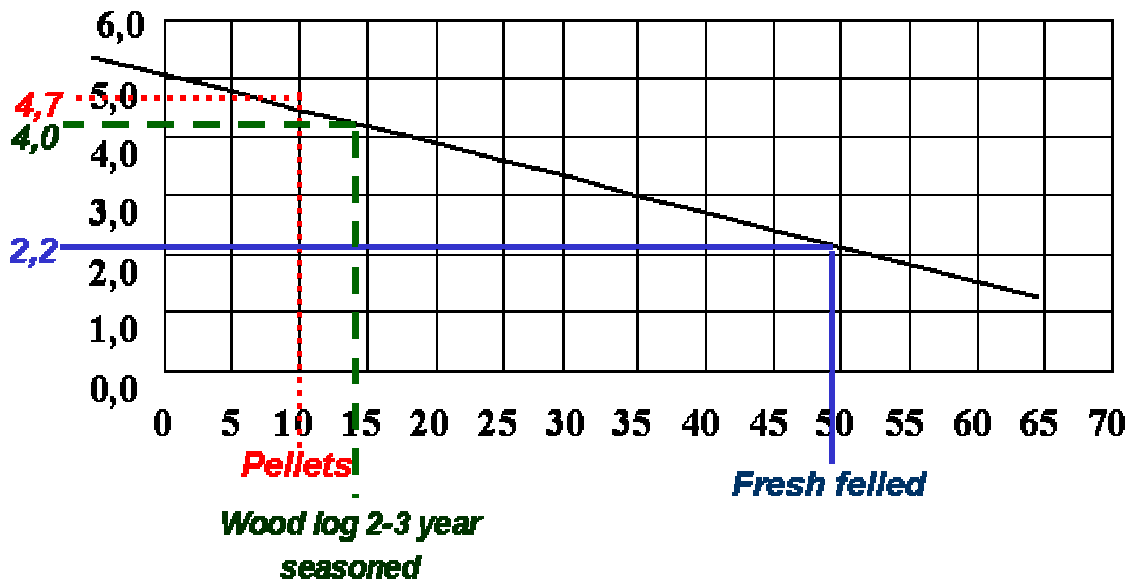


Durability

- W 20 well seasoned chips
- W 30 seasoned chips
- W 35 limited durable chips
- W 40 wet chips (not durable)
- W 50 just harvested chips (not durable)

In principle use dried and durable wood chips only ($W < 30$ %-wt). When wetter fuel is used, more fuel will be required.

Energy in kWh/kg varying with moisture content



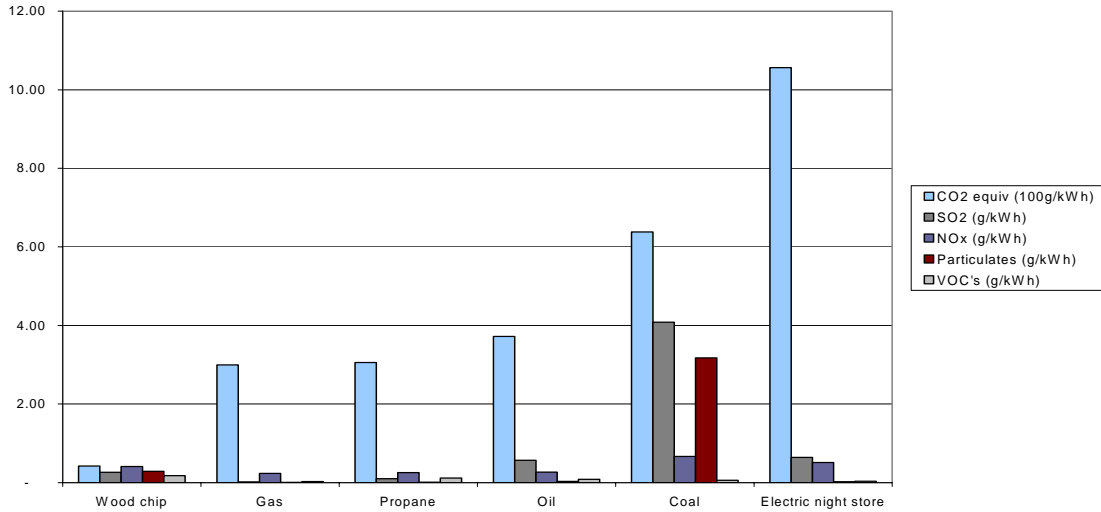
Conventional fossil fuels such as gas, coal and oil have been locked up in the earth's crust for millennia. In the last few hundred years, their exploitation has caused large quantities of carbon dioxide to be emitted, which it has now been proved causes climate change. If this continues unchecked, it will lead to unacceptable changes in the Earth's temperature.

Biomass, which can be plant or animal matter, but which is generally derived from wood, is considered to have no climate change effect since it is derived from carbon already in the environment. In this country, we use the following figures for emissions of carbon dioxide: -

| Fuel | Emissions – grams/kWh |
|-------------|-----------------------|
| Electricity | 430 |
| Coal | 350 |
| Oil | 300 |
| Natural Gas | 190 |
| Biomass | 0 |

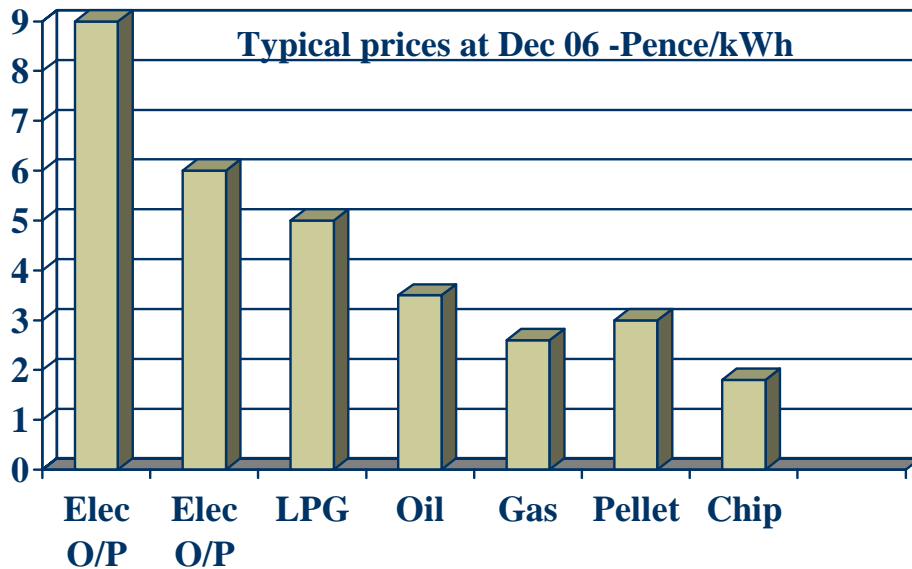
On the Continent, they take the gross value for emissions including mining, drilling, pumping etc. The following table is typical and it also takes account of the emissions to produce wood fuel.

Emissions from heating installations



With recent increases in fossil fuel prices, biomass for heating can be much cheaper and prices and availability will not be subject to political issues beyond our borders. While the capital cost of biomass boilers is greater than fossil fuelled systems, a simple payback on investment can generally be achieved within 5 to 10 years.

After implementing energy saving measures, biomass is likely to be the most cost effective means of reducing fossil fuel carbon emissions, with systems such as photovoltaic panels and wind power costing several times that of biomass per tonne of CO₂ saved.



Other reasons for using biomass include: -

- Diverting waste biomass from landfill
- Adding value to local resources
- Avoiding importing fossil fuel
- Improving woodland management
- Creating rural jobs
- Can offer agricultural diversification
- Can help meet planning requirements (Merton Principle)
- Can help meet Part L of the Building Regulations and avoid high costs to meet the new standards of insulation particularly for extensions and refurbishments.

2. Basic system design

a. Deciding the fuel type

It is implicit that biomass boilers require a supply of fuel and this should be a starting point in deciding the design. Answers to the following questions will define the fuel type and fuel reception: -

Biomass systems are more expensive than traditional fossil fuel fired systems. What is the main driver to installing a biomass system?

- ***To reduce fuel costs – logs and wood chips are only around two-thirds the price of pellets and depending on the application, a payback of from 5 to 10 years is common.***
- ***To reduce environmental impact – while pellets may require more fossil fuel to produce than wood chips or logs, their environmental impact is generally considered to be the same i.e. zero.***
- ***Pellet systems are less costly since the fuel storage and extraction systems are smaller and less complicated but the fuel is more expensive.***
- ***Pellet systems are more suited to installations below 100kW or in conurbations.***

Does the client wish to have a fully automatic system or are they prepared to attend the system regularly.

- ***Log boilers require filling and lighting daily***
- ***Kindling boilers require regular attendance to ensure they are operating correctly***

- **Fully automatic boilers (wood chip or pellet) require a minimum of a weekly visual inspection and periodic (once per week or less frequent) emptying of ash.**

Does the clients have a supply of timber such as from their own woodland or uncontaminated timber such as from tree surgeons waste?

- **Using their own timber will generally reduce their heating costs well below fossil fuels**
- **They will generally be limited to logs or wood chip fuel.**
- **If they have agricultural equipment such as tractors, trailers, barn storage and a chipper (although they could hire this), they may be more inclined to use wood chip.**
- **If using logs, they will have to cut and season timber for one to two years and ensure a continuous supply.**
- **If wishing to burn waste, see appendix X**

Can wood chips be stored or is fuel to be produced and burned at a continuous rate?

- **Wood chips above 30% moisture content cannot be stored for any period of time as they will heat up and degrade.**
- **The standard normally used for boilers below around 300kW is G30W30 (below 30mm particle size and below 30% moisture content).**
- **Larger particle sizes and higher moisture contents are generally reserved for specific locations where the fuel production is tailored to the boiler installation.**

If they do not have a supply of timber, is there a local supplier of wood chip fuel or can one be set up?

- **Wood chip fuel should not be transported further than necessary (generally 10 miles) due to the environmental impact of the transport. Econergy can help identify local suppliers of fuel.**
- **Wood pellet fuel can be successfully transported further and is more ideal for city centres and less wooded areas such as conurbations. Again Econergy have arrangements with wood pellet suppliers that cover the country.**

Is there vehicular access and space for delivery of fuel?

- **A tractor and trailer or a tipping truck generally delivers wood chips. One delivery would generally consist of around 35cu. m. or 7 tonnes.**
- **Wood pellets can be delivered either in bulk with a rigid HGV tipping truck and blowing equipment (20 tonnes) or bagged in 15kg palletised (1.2 tonne) or one tonne hippo bags.**
- **See appendix X for vehicle turning requirements**

What sized fuel store will be required?

- **Wood chip fuel has a density of about 200kg per cu. m. (depending on species and moisture content)**

- *Wood pellet has a density of around 650kg per cu. m.*
- *One tonne of typical high quality wood chip at between 25 to 30% moisture content is equivalent to 3500kWh*
- *One tonne of wood pellets is equivalent to around 4700kWh*
- *One cubic metre can hold 3055kWh of pellets or 700kWh of wood chips, a factor of 4.36 to one. Hence pellet fuel is denser and fewer deliveries are required than for chips or logs*
- *It is suggested that deliveries of pellets be limited to either full loads or a minimum of 5 tonnes.*
- *It is preferable to plan for full load deliveries of wood chips or a minimum of one months supply in the heating season.*

b. Specifying the boiler

Is it intended to have a back up fossil fuel boiler or to leave an existing boiler to act as a backup?

- *Commercial installations such as schools, offices etc are generally designed to have more than one boiler to give some back up redundancy. Where two boilers are installed, then they are each generally rated at around 70% of design heat load.*
- *Since it is cheaper to install a fossil fuel back up boiler, generally we aim for a biomass boiler rated at 70% of design heat load with a back up oil or gas boiler rated the same way.*
- *The biomass boiler should act as lead boiler. The back up boiler would run very infrequently and would probably account for less than 10% of the heat delivered from the system.*
- *Modern fully automatic biomass boilers can be very reliable and with highly insulated modern buildings, a single biomass boiler can be installed with back up either considered unnecessary or in emergencies, electric space heating could be used temporarily.*
- *Domestic installations, even large houses, would generally have only one biomass boiler.*

What types of biomass boiler are there? There can be confusion over the types and features of biomass boilers that can lead to inaccurate comparisons. The following illustrates the development and features of biomass wood chip boilers

- ***First generation** – Used for incineration to dispose of waste wood and provide some usable space heating especially in the woodworking industry. These may be direct air heating systems or boiler systems.*
- ***Second-generation** – Kindling boilers that operate on wood chips and remain alight, even when heat is not required. The boiler is kept alight by periodic small movements of the feed auger acting rather like a pilot light in a gas appliance. These boilers can be operated without a buffer tank as they do not cool down but they are less efficient and can be prone to requiring more attention such as manual ash and boiler tube cleaning.*
- ***Third generation** – These boilers have been developed over a number of years particularly in Austria where there is the greatest biomass*

expertise and longest experience. They typically include the following features:

- 1. Automatic lighting**
- 2. Vertical boiler tubes reducing the floor plan**
- 3. Automatic boiler tube cleaning with baffles to remove particulates and maintain high efficiency**
- 4. Automatic ash removal to a bin**
- 5. Lambda sensor to adjust the oxygen level and maintain high efficiency with varying fuel quality**
- 6. Simplified robust and trouble free fuel extraction systems**
- 7. Full on board computer control to maintain optimum boiler control and control heating circuits.**

How are biomass boilers different from solid fuel boilers?

- The design of solid fuel boilers has not changed for many years since oil or gas boilers have generally superseded them.**
- Biomass boilers produce a fraction of the ash when compared to solid fuel boilers (less than 0.5% of fuel input)**
- Biomass is a clean fuel with none of the dust and grime associated with solid fuel.**
- Biomass boilers burn a much greater percentage of hydrocarbons released as the wood fuel is heated. This requires a large amount of secondary air during combustion leading to high burning temperatures and high efficiency.**

C Designing the system

What are the options for designing the system? We have segmented our installations as follows: -

- Under 150kW – standard designs with installations offered through our distributor network**
- 150kW to one megawatt – standard designs project managed and installed by our in house staff.**
- Above one megawatt – bespoke designs by our in house staff**
- Demountable installations including Energy Cabin – simple off the peg solutions**
- District heating systems – bespoke designs by our in house staff**

Why use a buffer tank?

- It provides a means of storing unwanted heat when the heating system suddenly requires less heat.**
- It ensures a quick delivery of heat when required, giving the biomass boiler time to reach full output**
- It improves system efficiency since the boiler will cycle less on partial loads**
- Buffer temperature can be used as a means of control allowing the boiler to work efficiently on very low loads**
- It can increase the system output to above the rating of the biomass boiler for short periods helping to minimise the size of biomass boiler required or the fossil fuel used by the standby boiler.**

- ***A buffer tank is not essential on all systems but is to be advised especially on all but small domestic installations and kindling boilers.***

D Flues

Flue systems are designed to run at a negative pressure so as to avoid any risk of escape of gasses. Since the boilers are high efficiency, the flue gas temperatures are low (generally in the range 140 to 190 degrees C). It is therefore essential to design a flue to efficiently remove the fumes. These are generally twin walled HT stainless steel insulated flues that will be required to meet Building Regulations. Basic design information is given in appendix XX

E Control

Boiler control is specific to the type of boiler being installed and more detailed information can be obtained from the detailed solutions. However, as a general rule, control can be divided into two elements, control of the boiler and control of the heating system.

In general heating systems are controlled in the conventional way with time and temperature control applied to a number of circuits. Modern third generation boilers have the capacity to carry out this function if required; however there are a host of proprietary controllers that will do the job.

Fully automatic third generation boilers have computerised controllers that manage all the functions within the boiler. These are set up during commissioning to optimise performance and generally require little attention during normal operation. The boiler is initiated by a temperature signal from the buffer tank when the buffer temperature drops below a specified temperature. A further temperature sensor indicates when the buffer is up to temperature and turns the boiler off.

F Fuel reception

The fuel reception is one of the key items to establish when designing a system. The following comments may help: -

Log boilers – Cutting timber, stacking it to season and feeding the logs to a boiler can involve a great deal of handling unless the operations are planned. Try and keep handling to a minimum and stack logs close to the boiler in a sunny airy position for easy loading.

Small pellet boilers/stoves – These are generally fuelled using bagged pellets. These can be delivered in 15kg bags in bulk on pallets containing around 1.2 tonnes. The bags can be stored in a convenient preferably dry location and with around 75kWh per bag, it is likely that around a bag per day will be used.

Larger Pellet boilers – A separate store with a sloping floor feeding an open auger at the base can be constructed. Other solutions include frame mounted

terylene bags or hoppers or underground containers. The fuel is generally delivered either by blowing as for animal feed or in one tonne hippo bags that would have to be emptied into a top opening store. See the detailed solutions for more information.

Wood chip boilers up to 110kW – This size of wood chip boiler poses the greatest challenge. It can be difficult to make a financial case for smaller sizes of wood chip boilers and so there is pressure to keep the cost of the fuel reception to a minimum.

The easiest solution for deliveries is tipping. This could be for example via an old coal delivery chute into a basement. Alternatively try and make use of a slope in ground level and create a bunker into which the chips can be tipped. Since the fuel has to be kept dry, this solution can be expensive, as the bunker must be designed to remain dry.

If the boiler and fuel reception are housed in a low cost agricultural type of building, then the fuel can be tipped within the building if there is adequate roof height or on to clean hard standing and shovelled into the store on to a rotary stirrer fed auger. A temporary retaining wall can be created at the front of the store by using timber battens slotted into a frame.

Wood chip fuel blowers are now becoming available. This can help reduce on site costs by allowing the use of cheap external metal hoppers. However if using this solution, it is essential to ensure that there is a back up means of delivery should the blowing delivery vehicle fail or not is available.

Larger wood chip boilers- the following common solutions are available:

Hook lift bins with scraper floors

Below ground bunkers with scraper floors

Above ground stores for tipping either on to a scraper floor or a stirrer fed auger.

3 Environmental health and other issues

General requirements under the Clean Air Act are "Not to emit dark smoke". Solid fuel boilers above approximately 300 kW output are to be fitted with "grit arrestment" equipment. Modern log, chip and pellet boilers have no problems at all with these requirements.

Within Smoke Control Zones (i.e. defined areas subject to Smoke Control Orders made by the Local Authorities under powers of the Clean Air Act) the general rule is that visible smoke should not be emitted (except during start up and shut down periods) and that usually only exempted appliances should be installed.

However, local interpretation is variable and it is possible for Local Environmental Health Officers to satisfy themselves that a particular boiler is suitable for installation in a Smoke Control Zone, even though it may not be formally exempted. In addition Local Authorities may themselves make formal amendments to local smoke control orders to allow particular models / ranges / classes of boiler to be installed within a particular smoke control zone.

This is important because the current exemption procedure relies upon test protocols which are rather out of date and which are not compatible with the test protocols of the modern European standard for wood boilers, EN303-5. It can therefore be very time-consuming and expensive to have a boiler range exempted, even though, as is the case with modern boiler ranges, the emissions are about one fifth of the level to qualify for exemption.

It is often the case that only older, rather out of date boilers are exempted while some new modern European boilers are not yet formally exempted.

This is slowly changing, and the KWB USV and USP ranges are exempt with other makes following. There is some hope now (via the REA) that the whole exemption process may be streamlined to come in line with modern standards.

For other than virgin timber, for example reclaimed timber from pallets, then this can generally be used in boilers with a capacity below 1,000,000 BTU or about 300kW without difficulty. Some materials such as MDF may invalidate the boiler guarantee, as the ability of the heat exchanger to resist corrosion may be unknown for fuels other than virgin timber.

Boilers larger than 300kW must be fitted with full monitoring equipment to comply with waste incineration legislation if they are to burn other than virgin timber. This can be prohibitively expensive.

4 Requirements for Planning, Building Regulations and other design issues

An increasing number of planning authorities are requiring that a percentage of energy used on new developments shall be from renewable resources. Merton Council that requires 10% renewable energy first used this but other councils are using increased figures. This can be difficult particularly in inner city locations as generally wind power, solar and ground source heat options are very restricted and they can also be very costly. This can often leave probably the most cost effective and often the only option of biomass for heating.

Developers will often put pressure on designers to keep the cost of any sustainable solutions to the minimum. Since 50% of heating requirements in modern highly insulated domestic buildings can be for domestic hot water, the lowest cost solution can be to use a biomass boiler rated to deliver the hot water requirement with gas boilers to deliver any additional heating requirement that cannot be delivered after diversity and the use of a buffer

tank. This can reduce the biomass boiler capacity to between 33% and 50% of the maximum heating requirement and yet it can still deliver the required percentage of energy through sustainable means for most planning requirements. Capital costs and space requirements can be trimmed further by using wood pellets since the fuel is more dense requiring less storage space and the extraction equipment is less complicated and lower cost.

Part L of the 2005 Building Regulations sets minimum insulation standards. The 2006 version increases the requirement to reduce fossil fuel derived carbon emissions by a further 20%. This can be done by further increasing insulation levels. However, this can prove expensive and with refurbishments of existing buildings it can prove impossible. This is where the use of renewable energy can help.

Options can include solar photovoltaic or solar hot water, wind power, combined heat and power or ground source heat pumps. These are all generally more expensive than biomass systems and can present difficulties due to lack of suitable location and space, noise or visual intrusion. Ground source heat pumps while ideal for under-floor heating, are not suitable for domestic hot water since water temperatures are too low and there can be difficulties with "legionnaires" bacterial infection in the system. Biomass for heating generally represents the most cost effective solution.

5 Maintenance and service requirements

As has been explained, first and second generation boilers require more maintenance than fully automatic third generation boilers. Boiler tubes generally have to be manually cleaned and ash has to be manually removed. More attention may be required to maintain satisfactory kindling in standby mode.

Fully automatic third generation boilers require little additional attention when compared to oil or gas boilers. Generally they require only one service per year or this may be based on full load operating hours (generally about 1500 hrs) when the boiler will indicate an alarm when the service is due.

Once the boiler has been commissioned and the settings have been applied specific to the site and the fuel being used, then little alteration will be required unless the system or fuel specification is changed. Boilers should be fitted with a Lambda sensor that will enable the boiler to automatically carry out alterations to the combustion air if the fuel quality changes.

Most modern boilers are fitted with automatic ash removal systems that only require a bin or hopper to be emptied occasionally (from once per week to around once per 3 weeks).

Log boilers are reasonably straightforward and service and maintenance can be based on a simple annual service. Provided the client is reasonably adept, they may wish to carry this out themselves and rely on telephone support if they get into difficulties. Alternatively our distributor network partners will be happy to carry out this work for a reasonable charge.

For wood chip or pellet boilers one of our distributor partners or we should always carry out an annual maintenance and service. For better peace of mind we recommend entering into a service agreement. This offers: -

- An annual maintenance and service of the equipment
- Telephone support during working hours if in difficulty
- In the event of breakdown, a priority visit from our service engineer. This would be free of charge if the installation were under guarantee or chargeable if outside the warranty period.

Other special arrangements are available. For instance we can fit automatic alarm systems that will send an SMS text message to one of our or the clients engineers so that they can attend more quickly. We also offer remote diagnostics.

6 Fuel supply contracts, heat contracts and ESCO's

Fuel can be purchased by weight or volume. This may be reasonably satisfactory for wood pellets where the energy content of the fuel is consistent and can be guaranteed.

Where a client has their own timber and has it chipped for their own supply, then there will be little concern to quantify the timber used. However where a client has to purchase wood chip fuel, then the energy content can vary with moisture content and species. This makes it difficult for a client to know if they are getting value for money if they buy fuel by volume or weight.

It is therefore preferable to fit a heat meter to the boiler output. This measures the temperature change between input and output and integrates it with a flow measurement to calculate the heat transferred. The fuel supplier can then supply fuel and be paid based on the actual heat delivered. This will be his supply rate divided by the seasonal efficiency. This will give incentive to the fuel supplier to provide high quality fuel since it will reduce the amount of fuel they have to deliver. This is called a heat supply contract.

However, the fuel supplier may be reluctant to agree a figure for seasonal boiler efficiency with the client as he may not agree to assumed boiler efficiencies. The fuel supplier will only do this if he is confident of the agreed figure and that efficiency will be maintained by for example regular maintenance. If he is not confident then he may err on the side of safety and increase his charge rate.

The following will help a supplier to agree a heat supply contract: -

- Knowledge and confidence in the type of boiler being installed
- That a service contract is in place to ensure the boiler is kept maintained

- Review procedures where he can log the fuel delivered against the heat supplied and verify the assumed seasonal efficiency.

Where a fuel supplier requires more assurance that they will receive the value for the fuel they deliver, then the best solution is for the boiler installer to enter into a full service and heat contract with the client. The installer will purchase fuel from the fuel supplier and sell it on to the client in the knowledge that they can control the efficiency of the boiler and the fuel supply and are best placed to deliver best value.

This can be taken a stage further by adding a supplement to the heat supply figure to cover repayment of capital for the purchase of the plant. This is called an ESCo or Energy Supply Contract.

7 Making the financial case for biomass

While the case for biomass for heating is compelling for the reasons given above, it is often necessary to convince finance managers, accountants and quantity surveyors of the business case. All too often, biomass projects have foundered when project costs begin to overrun and expensive sustainability elements are removed.

One method of comparing biomass-heating systems with alternative fossil fuel systems is to use the net present value (NPV) function in an Excel spreadsheet. The following is an example: -

Case study - Biomass Boiler comparison with an oil boiler over 20 years

| Option | Nett present value | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---------------------------------------|--------------------|----------|--------|---------|----------|----------|----------|---------|----------|----------|----------|
| Biomass boiler | | | | | | | | | | | |
| Capital | | | | | | | | | | | |
| Boiler flue etc | | 22956 | | | | | | | | | |
| Heat main | | 1248 | | | | | | | | | |
| Buffer | | 1122 | | | | | | | | | |
| less grant | | 5000 | | | | | | | | | |
| Nett cost | | 20326 | | | | | | | | | |
| Biomass heat based on 1.5p/kWh | | | | | | | | | | | |
| | | 1333.333 | 1360 | 1387.2 | 1414.944 | 1443.243 | 1472.108 | 1501.55 | 1531.581 | 1562.213 | 1593.457 |
| | | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Totals | £36,985.97 | 1,333 | 1,360 | 1,387 | 1,415 | 1,443 | 1,472 | 1,502 | 1,532 | 1,562 | 1,593 |
| Oil boiler | | | | | | | | | | | |
| Budget capital cost | | 10,000 | | | | | | | | | |
| | £53,542.38 | 2800 | 2912 | 3028.48 | 3149.62 | 3275.60 | 3406.63 | 3542.89 | 3684.61 | 3831.99 | 3985.27 |
| Oil at 31.5p per litre or 3.15p/kWh | | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% |
| Assumed annual oil consumption £2800 | | | | | | | | | | | |
| Based on past usage patterns | | | | | | | | | | | |

For nett present value use function =NPV(5.5%,C11,C16,D16,E16,F16,G16,H16,I16,J16,K16,L16,M16,N16,O16,P16,Q16,R16,S16,T16 where 5.5% is the interest rate

This example is based on oil at 3.15p/kWh and biomass at 1.5p/kWh with 2% escalation for biomass and 4% escalation for oil. While the oil boiler costs only half that of the biomass boiler, the whole life cost over 20 years converted to a figure at the present day based on an interest rate of 5.5% is nearly double.

Further cost advantages of biomass heating can be: -

The ability to leave gas installations out of new developments thus reducing infrastructure costs and the whole lifetime cost of installation maintenance and health and safety checks.

An ability to retain designs to part L of the 2005 Building Regulations and still achieve the 20% carbon reductions required by the 2006 Part L. This can save on the cost of additional insulation and in some cases a complete redesign to incorporate for example double cavity walls to accommodate increased insulation.

8 Grants

The position with grants is complex and ever changing. The following is a summary that is correct at the time of writing.

1) Bio-energy Capital Grant phase 2 (Big Lottery - existing)

This is available directly via Eenergy or our partners Midland Wood Fuel, Dulas and Highland Wood Energy.

2) Bioenergy Capital Grant phase 3 (DEFRA - announced 29 Dec 2006)

Applicable to commercial, public sector & industrial; all renewable technologies

Min claim £25,000; min size 50KW

Up to £7.5 million, which may be awarded via installers (max individual project size £100,000; max grant claim £1 million) or end customers (grant claim up to £1 million)

Closing date mid March

<http://www.aea-energy-and-environment.com/index2.htm>

3) LCBP phase 1 stream 1

Domestic - still open

<http://www.lowcarbonbuildings.org.uk/how/>

Community - now closed & referred to LCBP phase 2

4) LCBP phase 1 stream 2A & 2B

<http://www.lowcarbonbuildings.org.uk/how/stream2/>

Applicable for commercial, industrial & public sector across UK, all technologies

- Phase 1 Stream 2A

£5.6 million to be allocated over 7 funding rounds; max grant of £100K or 40-50% of total costs (excl. VAT)

1 step application process

- Phase 1 stream 2B

£11 million to be allocated over 3 funding rounds; max grant of £1 million or 40 to 50% of total costs

Bi-annual deadlines; Onerous 2 step application process requiring energy savings from building redesign also

5) LCBP phase 2

There is £4 million available for biomass to RES, British Gas & EON for installations up to 45 KW thermal for public and not for profit sector only
There is uncertainty about whether the 45KW limit will be rigidly enforced.

<http://www.lowcarbonbuildingsphase2.org.uk/>

The following information is available in separate files: -

Small domestic and commercial solutions to 110kW

- Rika pellet stoves and stove/boilers
- Froling FHG 3000 log boilers (to 70kW)
- KWB Easyfire pellet boilers from 10kW to 30kW
- KWB Multifire USV chip and pellet boilers from 15kW to 100kW
- Froling Turbomatic chip or pellet boilers from 28kW to 110kW

Solutions from 150kW and above

- KWB Powerfire TDS chip or pellet boiler – 150kW
- Froling Turbomat chip or pellet from 150kW to 500kW
- Froling Lambdamat from 500kW to one megaWatt
- Compte 500kW to 5 mW

District heating

Demountable solutions

Case studies

Enquiry form

Econergy Sales Regions – 150kW and above

Distributors and service areas – 110kW and below