

WOODFUEL SUPPLY CONTRACT OPTIONS



THE SPECTRUM OF SUPPLY OPTIONS

There is a wide spectrum of business models for supplying woodfuel to a boiler or combined heat and power (CHP) installation.

At its simplest, the supplier uses specialist machinery to convert the client's own feedstock into woodfuel. Another common setup is where the supplier delivers fuel they have produced from feedstock grown elsewhere.

The most complex business model is that of an Energy Service Company (ESCO), where the company owns the boiler, operates, maintains, services and supplies fuel to it – the company then sells energy, usually in the form of heat, rather than by weight or volume.

In this document we explore the advantages and disadvantages of the various business models. We look at methods of quantifying fuel supply, and describe the important features of a fuel supply contract or service agreement.

FUEL CONVERSION SERVICE – CHIP AND LOGS

This is the simplest form of contractual fuel supply: The contractor provides equipment and specialist labour to convert the boiler owners' woody feedstock into fuel. It is a common setup, which particularly appeals to large landowning institutions and privately-owned estates with woodland portfolios suitable for conversion to woodfuel. A fuel conversion service also appeals to sites such as sawmills, which need heat for buildings or to condition timber, and which produce a co-product which can be converted into fuel.

The attraction of this approach for boiler owners is that it provides an additional market for their woodland produce and they can maintain control over the price of their feedstock. There is also no necessity to invest capital in specialist chipping machinery which may only be required for relatively short periods.

Contractors usually supply machinery with trained and insured operators. Hiring machinery without operators – bareback hiring – is rare and many contractors would be wary of this approach as there is a significant risk to untrained operators using chippers. In addition the owner of the equipment cannot control the quality of material being fed into the chipping unit, and so risks damage to the equipment which in turn may invalidate any warranty or insurance. There is also the risk that the business renting the equipment will not suitably maintain or care for the equipment.

A contractor may charge for the provision of machinery and labour in three ways: by the hour or day; by the volume of material to be converted, or by the volume of the finished product. If based on the quantity of material to be converted, this can be in the form of a stack measure based on Forestry Commission formulae for determining the volume of solid material in a stack, or be based on the number of loose cubic metres of woodchip produced. The formula for measurement must be agreed in advance. If based

on the number of loose cubic metres of chip there must be some way of successfully measuring either a cone of finished chip or a squared off volume.

The contractor should, by correct use and maintenance of the equipment, be able to guarantee the size of the particles when chipping roundwood. However, it can be difficult to do so when chipping minor branch wood, slabwood, and arboricultural arisings due to the variability of the feedstock. These sources will also produce a much more variable fuel quality and the boiler owner needs to be aware of how this might affect the performance of the boiler. Similarly, under a conversion only contract, it is the customer's responsibility to manage the moisture content and cleanliness of their fuel by correct storage and by holding stocks for the correct period of time.

Where the contractor is to be paid on a piecework rate based upon volume converted or produced, the layout, presentation and preparation of the material to be converted is critical. This is a potential pitfall for the contractor who would lose money if faced with material that is poorly stacked and arranged, necessitating additional handling before conversion. The timber must also be of suitable dimensions and proportions for manual or crane feeding, and be able to pass through the chipping equipment. Where these circumstances arise the contractor is likely to offer his services on an hourly rate. Subsequently the advantage of a relatively low cost fuel can be lost very easily and it is critical for both contractor and boiler owner alike to make sure the detail of the logistics are worked through carefully.



Source: Forest Fuels



Source: Forest Fuels

CASE STUDY

Kernock Plants, Cornwall

Binder Boiler 3MW
Annual fuel consumption 2500 tonnes

As the largest boiler installed in the UK at the time, the owners of Kernock Plants were rather ahead of the local fuel supply chain. Consequent concerns from security of supply, the need to limit costs and to retain careful control over the finished fuel, led the owners to buy in slabwood which is stored on site for conversion to woodchip on a contract basis.

Above
Slabwood stockpiled on site for drying prior to chipping.

CASE STUDY

Clinton Devon Estates, East Devon

Binder Boiler 50kW
Annual fuel consumption 40 tonnes

Clinton Devon Estates manage a large portfolio of woodland across Devon, and as part of the development of their own estate head office, a wood fired boiler was installed. This allowed the estate to demonstrate its commitment to a low carbon future and act as an exemplar to other estates on the potential for woodfuel. In addition, Clinton Devon has worked in partnership with Forest Fuels to develop a woodfuel distribution depot on its East Devon estate.

Above
Chipping directly into the woodfuel store through shuttered openings along the length of the barn. Note the careful arrangement of the sheeted timber parallel to the fuel store. This permits the chipper and tractor to pass between thus minimising handling.



Source: Forest Fuels

Warehouse size fuel store and boiler house walking floor and ram fed fuel delivery mechanism – capacity 500 cubic metres – annual usage 8–10,000 cubic metres.



Source: Forest Fuels

Loading barn stored G30 chip at 19% moisture content for delivery.

FUEL SUPPLY ONLY CONTRACTS – PELLETS AND CHIP

There are several different ways of supplying fuel only, depending on the point in the supply chain at which the fuel is sold, and whether the price is for fuel or for energy.

Point of sale

There are three options for point of sale, however in practice most suppliers are involved in the latter two:

1. Material can be sold ex-yard. It is processed and prepared to the correct specification at a depot, haulage is arranged by the contractor or by the boiler owner, and the fuel is sold at the yard gate.
2. Material may be sold on a delivered-in price.
3. Post-boiler usage, i.e. the material is sold by the kilowatt hour to the boiler owner, or is a 'sale of energy' (for the determination of calorific values refer to tinyurl.com/6773f2).

Measurement

It is important to agree not only the point of sale, but also the point of measurement of the product. For example, chip and pellet sold by loose volume will settle between loading and delivery. The volumes and energy values vary through all the production stages, from solid timber through processing to delivered product or energy.

Sale by kilowatt hour

When pricing energy to be sold by the kilowatt hour, the contractor must take into account the loss of energy within a boiler: Most modern chip, pellet or batch type log boilers operate at 85 to 92% efficiency. It is therefore important that both the end user and fuel supplier take this into account when assessing the volume of fuel required and the cost penalty of the inefficiency losses. A contract should include a statement or quantification of the boiler's efficiency, and how issues of poor efficiency should be resolved. It should also set out annual and routine maintenance procedures.

Sale by volume or weight

- bagged pellets (25kg–1 tonne)
- tonne
- loose cubic metre of processed fuel
- solid cubic metre of timber

Selling woodchip by weight is not ideal because the weight will then include the water content of the fuel. The end user generally wants the fuel to be as dry – and therefore as light – as possible. Selling by the tonne is only a sensible option for woodchip supplied to high moisture content combustion processes and installations.

Sale by the loose cubic metre is an acceptable method for both chip and pellet where material is delivered to site and can be measured in a square sided (and therefore easily calculated) lorry or tipping vehicle. It is also important that the end user/contractor specifies the moisture content of the material and that if necessary this moisture content is sampled on a per load basis (see Appendix 3).

Woodfuel (primarily woodchip) can be sold by the cubic metre of timber. This works well on more industrial installation sites where the timber can be hauled in roundwood form. As roundwood has roughly twice the density of finished chip, the fuel supplier is able to halve the number of vehicle movements and therefore reduce haulage costs. It is most effective in this case to sell based upon standard Forestry Commission roundwood stack volume calculations and conventions.

Alternatively, as the majority of timber lorries now weigh their loads, it is also possible to sell the material by weight, delivered in pre-chipped form. Again moisture content will be a key question for the roundwood buyer.

Whether material is brought on-site in solid or loose form, it can also be measured as a finished product in the fuel store. If using this method, the fuel already in the store must be levelled in order to measure its volume before adding the new fuel (fuel extraction systems do not usually leave a flat, square level of material in the fuel store).

The conversion ratio from feedstock (solid) volume to woodfuel (chip) volume can vary from 1.7 to 2.7 times the volume. Although this subject awaits more detailed research a useful guide is to assume that there is an increase of approximately 2.2 times the volume. This is likely to vary between different chipping machines, different amounts of compaction (as a result of settling or blowing into a truck or store) and possibly even between different tree species and moisture content.



Source Forest Fuels



Source Forest Fuels

PELLET CASE STUDY

West Devon BC

Opened in March 2007 the Tavy Business Centre at Pitts Cleave is heated by a state of the art 25kW pellet boiler. The Centre, is made up of 11 offices and four workshops as well as communal facilities including a reception, conference room and kitchen. It is owned and managed by West Devon Borough Council and was funded by the Council, the South West RDA and the European Regional Development Fund. In this situation a trouble free fuel delivery system that requires limited input from the end user is essential. The fuel supplier is simply informed of the delivery date and the suppliers blowing vehicle arrives on site and connects via a universal coupling to the in-feed to complete a delivery.

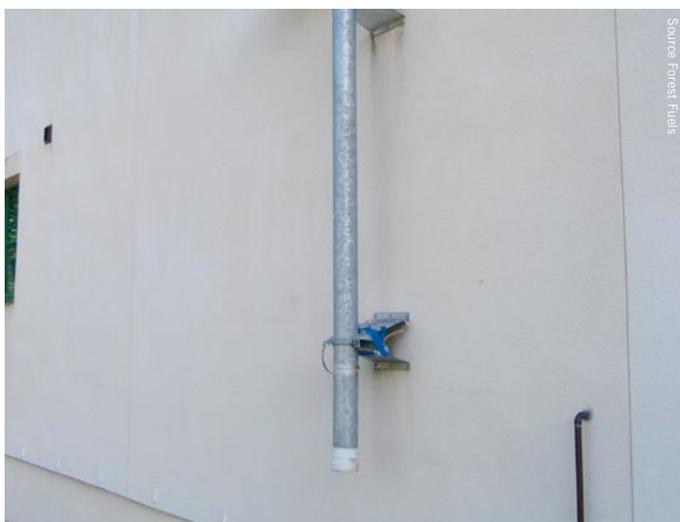
Above
KWB Pellet boiler and galvanised fuel store

WOODCHIP CASE STUDY

Paignton Zoo

Recently opened Crocodile Swamp – state of the art and innovative exhibition space for reptiles. The owners require a simple “clean” consumer only solution that is quick and requires minimal staff involvement in the long term. The boiler installed is a KWB 100kW with an anticipated annual fuel supply of 100 tonnes.

Above
Subterranean fuel store – Bulk delivery by eight wheeler (9 metre body length, tipping height 11.5 metres) delivery volume 28 cubic metres – delivery process completed in less than 10 minutes. Note lip height of store presents a potential problem for tipping vehicles.



Source Forest Fuels



Source Forest Fuels

Feed pipe and nylon coupling for blown pellet deliveries direct into the fuel store

High specification fuel store being cleaned before first fuel delivery.

ENERGY SERVICE COMPANY (ESCO)

An ESCo comprises a company or group of investors who own and install the boiler, or CHP plant, and are responsible for its long-term maintenance, operation and fuel supply.

The ESCo makes the capital investment, and rather than leasing the equipment to the client the boiler remains the property of the ESCo. The client is then billed for the energy at a price, which reflects the costs of operating and maintaining the boiler, the amortisation of the initial capital cost, and the fuel supply cost.

As, in most cases, there is no capital investment for the energy user, an ESCo model will only work where a competitive energy price can provide sufficient incentive for the user to switch energy providers. Woodfuel ESCos may simply contract to undercut the alternative fossil fuel price for the user and thus ensure maximum profit margin.

As the energy user buys heat, the fuel purchase arrangements are between the fuel supplier and the ESCo. All the methods and points of sale described above will still apply, however the customer is now different.

OTHER SUPPLY MODELS

There are a number of other supply models but these are largely variations of those described previously. A summary of the contractual arrangements between clients and the boiler installer, which also outlines the impact on fuel supply, can be found at:

www.wood-fuel.org.uk/how_contract.php



External pellet fuel store, similar to external oil tank. Capacity 1.5 tonnes.

CASE STUDY

Sheffield Road Flats, Barnsley

Innovative district community heating system, providing heating to 166 flats across three tower blocks. The system was retrofitted in 2005 under an ESCo model set up and run by Eenergy to deliver heat at a given price. The ESCo retains responsibility for boiler operation, maintenance and fuel supply. Heating is provided through two Fröling Turbomat boilers operating in parallel providing a maximum output of 470kW but with the ability to turn down capacity as demand requires.



Source Eenergy



Source Eenergy

Fröling Turbomat Boilers



Source Eenergy

Woodfuel bunker with hydraulic lids, fuel is delivered using a high "scissor lift" trailer.

CASE STUDY

Worcester County Council

Worcestershire County Council were at the very leading edge of the development of woodfuel when they agreed a 10 year "ecoheat" renewable energy supply contract. The 700kW Compe Compact boiler provides heat for County Hall in Worcester. A dual hookbin system is used to deliver around 500 tonnes of woodchip per annum.



Source Eenergy

Worcestershire County Council – Headquarters



Source Eenergy

Compe Compact C70DHV Boiler 700kW



Source Eenergy

Dual 35 cubic metre hookbin fuel delivery system

FUEL SUPPLY CONTRACTS AND SERVICE LEVEL AGREEMENTS

The development of formal contractual arrangements provide benefits to both end user and fuel supplier. A fuel supply contract provides the end user with a clear statement of their requirements and how they expect the agreement to be fulfilled.

From the contractors' point of view, a long term contract allows the supplier to put in place both the investment in plant and machinery and the logistical arrangements necessary to comply with the contract terms. For example, for a "dry" woodchip boiler operating at less than 35% moisture content, timber stock needs to be held up to a year or more in advance to permit sufficient drying.

For complex long term contractual arrangements, a service level agreement (SLA) helps to set out in more detail the processes required to deliver and manage the contract. The language of the SLA is pragmatic and less formal than that of

the contract and can be regarded as a working document for regular reference. In particular it will help new employees get up to speed on the step-by-step process of fuel supply for a certain site. The contract is vital: in conjunction with the fuel standards described in Guidance Document 1.

It underscores the professional and reliable reputation of the fuel supply industry, and reassures consumers that the contractor will provide the fuel or service they require, and that the contractor does not merely view biomass as a useful way of dumping waste or co-product.

Below we present a series of standard headings together with suggestions for the terms and conditions of a fuel supply contract. However, it is advisable to seek formal legal advice when drawing up a standard contract. The contract should seek to be transparent, quantifiable, endeavour to cover unforeseen circumstances and provide an equitable balance from the point of view of both parties.

STANDARD TERMS AND CONDITIONS

Preamble

The document should open with details of the parties to the contract including: company registration details: VAT status, company contact details and site address information.

Contract

Make a basic statement of what the contract relates to, for example fuel supply for an installation at a certain address, and a brief outline of what the parties are responsible for.

The end user and fuel supplier should agree the parameters of the fuel supply, contract length, delivery method, vehicle type, and may even include more specific parameters such as the setting of a geographic limit on the sourcing of material (entirely inappropriate for pellet).

Biomass Specification

The contract should state the exact specification (Austrian ONORM or CEN) of the fuel to be supplied as per the boiler manufacturers recommendations. For pellets, diameter and length; for woodchip, moisture content, particle size and the parameters of particle size, etc.

It is also helpful to provide a description of the boiler and to set out the key details pertinent to the boiler performance.

Quantity

The contract should describe the anticipated volume of supply, and the end user should ensure the contract states a guarantee of fuel supply over a set period, including any exceptions, and what indemnities should be in place in the event of the failure or for example where the supply company can no longer trade.

It is important for the end user to identify the potential consequential loss associated with making alternative arrangements for energy, liability for loss of use of a public building (school, leisure centre, etc.) or interruption of business.

From the suppliers view, fixed annual costs can be covered either by agreeing the minimum annual requirement of fuel or energy to be supplied, or by using a stepped charging system similar to electricity accounts, where the first units are charged at a higher rate in order to cover these fixed costs and after a certain consumption rate the price per unit decreases.

It also gives cover against the site shutting down for any reason outside the supplier's control, such as a boiler malfunction, or where the end user stops trading leaving the supplier holding stock.

STANDARD TERMS AND CONDITIONS CONTINUED

Duration of the contract

For a very long contract, anything over three years, it is wise to set an annual review period when the logistics of fuel supply, any changes to the boiler set up etc can be discussed and issues resolved.

Set a renewal date prior to the termination of the contract to ensure that the contractor can acquire satisfactory stock to feed the boiler (i.e. for chip 1 year).

Price

Clearly state a unit price by the tonne, kilowatt hour, loose cubic metre, solid cubic metre, etc. Detail how units are to be measured, and how and when parameters such as moisture content, particle size and volumes will be verified.

For longer-term contracts there should be some link to either CPI (Consumer Price Index) or RPI (Retail Price Index) to allow an annual price increase in line with both inflation and rising labour and fuel costs. Confirm the rate of value added tax (VAT), for industrial consumers VAT is charged at the normal rate of 17.5%. For fuel delivered to a domestic property the reduced VAT rate of 5% applies.

Sources

The end user may wish to specify a geographic range for the supply and wish to state what material is acceptable. Unless the end user is in a position to partially/fully self supply the raw material it is preferable that the chosen contractor is the sole supplier of fuel.

This guards against the possibility of the end user buying/sourcing fuel from elsewhere and adding it to the fuel store. Should this fuel be sub-standard or contain contaminants that damage the boiler it may result in a dispute between the parties to determine responsibility. Where the end user has material they wish to put into the supply chain for their boiler it is better to ask the fuel supplier to incorporate this into their processing chain, so the supplier can control quality.

The contract can set out the detail of this process and expected volumes for incorporation and any credit or payment required. Where the end user prefers a more “ad hoc” approach the supplier should ensure that the contract indemnifies against any resultant problems.

Terms of payment

State the terms of payment, what penalties might accrue if the fuel is sub standard, when invoices are expected to be paid, and whether interest is chargeable after this period. It is also helpful to clarify the invoicing process, requirements for order numbers, receipts, delivery notes and self billing invoices

Consider stating at which point the material is transferred to the customer. Does the fuel remain under the ownership of the fuel supplier whilst in the store until combusted? i.e. in the case of payment by the kilowatt hour.

Delivery of biomass fuel

The fuel delivery should be described, stating responsibilities for opening and closing the fuel store, ensuring the agitator is activated during delivery, disconnecting and reconnecting hydraulics when using hookbins and other crucial details.

This might be best left to the Service Level Agreement if one is to be drawn up. In audit terms, the times of delivery and to whom the delivery driver should report to and obtain a receipt are key details to describe.

The anticipated delivery schedule should be set out and whether it will be the contractor’s obligation to profile the boiler’s use, or if it will be the client’s responsibility to check the fuel store and ensure satisfactory residual security levels of fuel are maintained.

A minimum notice period for ordering fuel should be described and any potential penalties within the time period the contractor is required to deliver. The process of emergency deliveries should be described, and whether an additional charge should be made and in what circumstances.

Standard Terms

Detailed proposals relating to health and safety responsibility on site, together with insurance details, i.e. product liability insurance, transport and ownership liability should be stated

The contract should include a dispute resolution process which should cover all aspects of the contract performance, setting out what actions are deemed as a “breach of contract” and the termination process.

Miscellaneous detail

If sale is by the kilowatt hour, the contract needs to set out how the boiler and monitoring machinery will be maintained.

Often ash removal is included in fuel supply contracts and it may be appropriate for the supplier to remove ash at the same time as making a delivery.

Include a specific clause to cover the contractor in the event of boiler shutdown outside the contractor’s control and any costs incurred by the contractor as a result. In addition the fuel supplier would be wise to include a clause covering failure to commence the operation of the boiler. Boilers may be proposed but not go into operation due to issues beyond the contractor’s control, leaving the contractor holding stock.

A generic contract template has been developed by Regen SW as part of the package of support for the development of these Guidance Documents. A template will be available online at www.southwestwoodshed.co.uk

CONCLUSION

When considering the best business model for a new fuel supply operation, mitigating risk and ensuring realistic commitments should form the basis of early decisions.

To mitigate risk, a detailed risk assessment of the full business model should be undertaken. This should highlight particularly weak areas and those sensitive to external factors. One example relates to the potential, and very likely, prospect of diesel prices increasing. Where profit margins may already be small, increases to the operational costs of fuel processing and haulage may make supply to smaller energy users not viable. Such questions may include: can the business absorb these losses, or potentially increase the woodfuel price to redress the difference? A problem such as this may highlight the need for allowance within the suppliers contract to increase woodfuel price if the fossil fuel price increases by an agreed factor.

To ensure realistic commitments the fuel supplier must comprehensively understand what the customer requires and be confident that it can be provided once an agreement is entered into. Failures by fuel suppliers to meet their contractual requirements may result in the energy user citing breach of contract and purchasing fuel from elsewhere. Where capital investment on specialist equipment has been made, any loss of revenue will seriously effect the viability of the business. It is therefore in the fuel suppliers' best interest to only agree to undertake what is achievable and be transparent regarding potential risks.



Mus-max blower, useful for transferring woodchip fuel upwards or into awkward spaces, noise, additional power supply, slow delivery rate resulting in increased costs are potential pitfalls with this approach.



Fuel store agitator, pressure plate and in-feed auger.

This document is part of a series – other guidance documents available include Woodfuel Standards, Woodfuel Processing, Woodfuel Storage and Woodfuel Distribution

Further Information

Biomass Energy Centre
www.biomassenergycentre.org.uk

British Standards Institute
www.bsi-global.com

The South West Woodfuel Advice Line
08450 74 06 74

The South West Woodshed
www.southwestwoodshed.co.uk

References

Forest Mensuration – A handbook for practitioners
Matthew.R Mackie 2006

Refer to pages to 11, 128 for details on stack measures and conversion factors.

Refer to pages 130 and 131 for description of the process of determining the moisture content of woodfuel on both a dry and wet fuel basis

Woodfuels Basic Information Pack 2000

Credits

Bent, E – Midlands Wood Fuels
Brook, R – Ecowoodfuels
Hogan, G – Biomass Energy Centre
Halcro-Johnston, A – Regen SW
Riggett, D – Econergy
Cotton, R – Wood Energy
Rickwood, D – Forest Fuels
Whatmore, S – Forest Fuels
Wilding, J – Clinton Renewables

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