WASTE WOOD FOR PROFIT

A guide

Rural Energy
Engineered low carbon solutions

Waste to Energy

It is possible to burn waste wood to generate heat under current environment agency regulations. If your site generates wood offcuts, packaging waste, demolition waste, construction waste, shavings or even sawdust, you can remove the cost of disposing of your waste wood and generate energy for heating, drying or other industrial processes.

Rural Energy has been distributing and installing biomass heating systems for commercial and industrial sites throughout the UK for over 15 years. We supply and install a range of boilers able to circulate hot water, thermal oils or steam to waste management centres, factories and workshops across the UK. Our industrial boilers and drying equipment is designed to burn Grade A, B and C waste wood. Helping businesses reduce carbon and save on their energy costs, we support our customers from system feasibility and design through to installation, finance and long-term maintenance.

For more information on waste wood classification see page 10

RHI Payments

The Non-Domestic Renewable Heat Incentive (RHI) is a government environmental programme that provides financial incentives to increase the uptake of renewable heat by businesses. Eligible installations receive quarterly payments for 20 years based on the amount of heat generated each quarter. However, it's not just systems running on virgin wood chip or pellet that receive the RHI. It can also be obtained for biomass systems fuelled by waste wood.

The RHI certificate will specify the material you are using in your boiler. Your annual RHI declaration asks whether you have made any changes to fuel or your system. You must be open about any changes you make to your fuel. Not doing so could be regarded as a breach.

Example return based on a 1MW WID boiler burning grade C wood, running 8,000 hours p.a and burning approx 3,000 tonnes of wood.

Drying benefit RDF	£112,000
Transport and disposal savings	£170,000
Guaranteed RHI Payments	£190,000
Total Annual benefit	£472,000
Potential ROI	59%

Providing a complete waste to heat solution

Waste wood can be classified into a number of categories each with their own regulations. We will support you in obtaining the relevant permits, planning permission and product selection to suit your processes:

- Supply and install of a Waste Incineration Directive (WID) compliant biomass boiler – gas temperature >850°C and resident in the chamber for at least 2 seconds.
- Filtration for NOx and SOx particulate removal to guarantee emissions meet the IED Chapter IV (WID) requirements.
- Drying solutions from individual bins to a drying floor or a flow dryer (see page 7).
- Continuous emissions monitoring system (usually required for burning waste woods).
- Supply and installation of a simple enclosed industrial building to house the plant.
- Application for a Part B permit from the local authority to enable Grade A waste wood incineration.
- Application for a SWIP permit from local authority small waste incineration plant in line with schedule 13A of Environmental Permitting regulations for grade C waste wood incineration.
- Guidance on obtaining planning permission for the whole system.
- Assistance with the Renewable Heat Incentive application.
- Independent heat metering reporting and full OFGEM RHI application.

Boilers

In partnership with leading Austrian supplier Herz we can supply a range of highly efficient industrial boilers specifically designed and developed to burn your waste wood fuel.

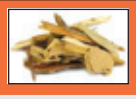
Modular and customised for your needs, the Herz industrial range are WID compliant boilers that are built with combustion systems to suit your fuel type and its water and ash content. Typically running for 8,000 hours per year these robust boilers can be paired with a variety of fuel feed systems from sweep arm agitators to walking floors and augers.

To find out more about our industrial WID boilers, visit the Industrial Boilers product page at www.ruralenergy.co.uk.

Which boiler system do I need?

The boiler type you'll need will depend on the material you have access to and wish to use as fuel.

(See also page 10)

Wood grade	Boiler style required	WID boiler required?
Virgin wood	Commercial or industrial. Refractory not required but advantageous.	No
Waste – grade A 	Refractory lined industrial, heavyweight boiler.	No
Waste – grade B 	Refractory lined industrial, heavyweight boiler.	Maybe
Waste – grade C 	Refractory lined industrial, heavyweight boiler.	Yes

Herz Industrial Boilers – Built to last

- **Well Designed Heat Exchangers**
  Fire tube heat exchangers are highly efficient and are designed to match your heating needs.
- **Fully Automatic High-Speed Heat Exchanger Cleaning System**
- **Boiler Output Capacity Control**
  Air supply and fuel inputs are coordinated to match the actual heat demand using PLC control and Lambda O_2 regulation. When heat demand drops, the unit is operated in part-load mode or is shut down.
- **Capacity & Combustion Control**
  Features a fully modulating computer control with 3 interlinking loops that permanently assess the actual requirement of heat, adjust the fuel feed accordingly, and match it with the continuously variable air supply. Reacts dynamically to changes.
- **Automatic De-Ashing**
  De-Ashing from the combustion chamber and also from the particulate filters.
- **Lambda O_2 Regulation**
  Improves efficiency by automatically reacting to fuel variations and adjusting air intake and fuel supply.
- **Stepped Grate Combustion Chamber**
  Handles high ash content materials and dirty materials that are prone to clinkering.

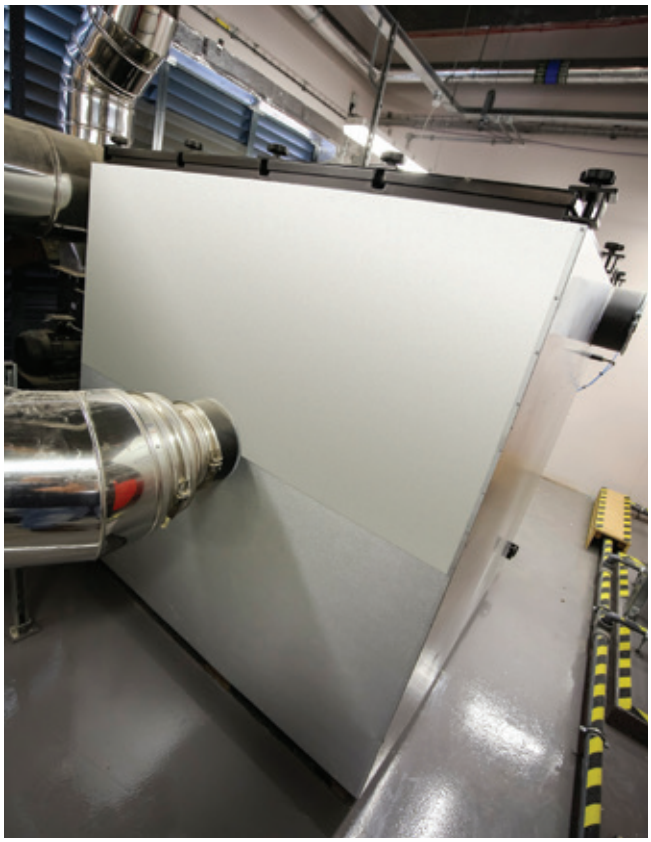
Filtration

In order to ensure your system is WID compliant and complies with legal emissions limits, your boiler must include several filtration systems.

The type you will need will depend on the waste wood you are burning and the location of your site. From electrostatic precipitators to metal sleeve filters, Rural Energy will specify the optimised filtration system suited to your project.

The Rural Energy WID waste boiler packages can include:

- "Step combustion" NOx reduction control
- SNCR NOx filtering (<200mg/Nm^3)
- Particulate filtering (<10mg/Nm^3)
- Lime injection to reduce SOx (<50mg/Nm^3)



Drying Options

If you have wet materials for drying, Rural Energy can provide a drying solution for you. We have solutions for drying wood, waste wood, shavings, compost, plasterboard, sludge, soil, RDF, SRF, MSW, ash and grass. Drying options include the following:

Flow Dryer

Flow dryers are the only solution if you require a guaranteed and consistent final moisture content. For example we can provide equipment to guarantee 8% dry SRF which is just not achievable using fixed bed dryers.

Rural Energy work with a number of leading suppliers to supply highly efficient moving bed dryers that thoroughly mix and dry your material as it moves along the bed. Temperature, speed and bed height can all be adjusted depending on the waste material and drying requirements.

Hook Bins

Hook bins are purpose built drying containers designed with bridge perforated floors to allow even airflow whilst preventing the material from blocking the air inlets. Warm air is pressed through flexible air tubes to the container and passes through the bulk solids. Typical drying time can be approximately 12-48 hours depending on the material that is being dried. The dried material can then be directly transported in the container to the intended location.

Fixed Floor

For those looking for the simplest solution, the static drying floor is the best choice. Rural Energy can design fabricate and install a floor panel system suitable for drive on applications. This system includes perforated panels which channel the air effectively to the entire drying floor.

Fixed floors are only really suitable for drying grain and wood chip and the result can be more variable than with the flow dryers.

Finance Solutions

If you don't have the capital to self-fund we can help. Working in partnership with leading financial providers, we can offer a variety of financial solutions that enable you to invest and reap the rewards of an industrial biomass boiler.

- ✔ Access to specialist finance for green technologies
- ✔ ESCO (Energy Service Company) and Asset Finance available
- ✔ Installation costs can be included
- ✔ No impact on your working capital
- ✔ Fast – credit approval within 24 hours

Asset Finance

(Assets on-balance, typically 5-7 years term)

The finance company purchases the biomass assets on behalf of the customer. In an Asset Finance arrangement, the whole amount borrowed is paid back at a given rate of interest and the finance company retains the title to the equipment until the final instalment is paid, at which point the customer takes the title to the equipment.

- The customer usually pays for infrastructure costs but these may be covered in the financial agreement
- Any capital allowances are claimed by the customer
- Up to 100% of the project value may be borrowed
- The customer benefits from RHI payments
- Admin fee and deposit required to set up
- The customer owns the assets at the end of the term

ESCO

(Assets off-balance, typically 10-15 years term)

- A financial arrangement is made with Rural Energy meaning we fund, supply, install, operate, service and maintain the system. The customer then buys their heating energy directly from Rural Energy over a predetermined period
- Rural Energy covers infrastructure costs
- Any capital allowances are claimed by Rural Energy
- The customer pays a lower price for energy but Rural Energy keeps the RHI payments
- No set-up or ongoing maintenance costs
- The customer can own the assets at the end of the term
- The customer must guarantee a minimum amount of annual heat and/or electricity generation

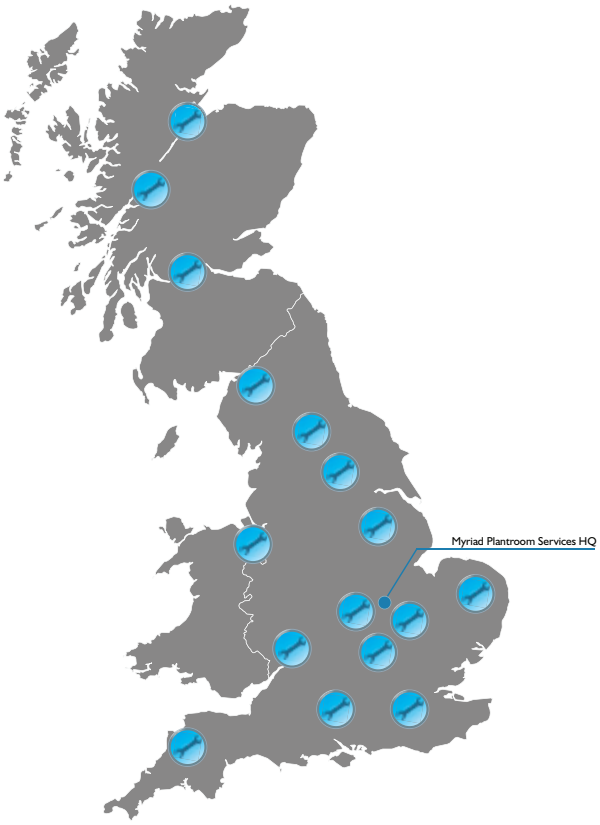
Note: All finance options mentioned are subject to credit approval and contract.

Service & Maintenance

A maintenance package will ensure your biomass system is safe, operating efficiently and minimise any boiler downtime. Our sister company Myriad Plantroom Services can offer a range of service and maintenance contracts tailored to suit your system. These include full service and safety inspections, with a choice of service levels.

Service Level Options	3 Star	4 Star	5 Star
Full Service and Safety Inspection	✔	✔	✔
Interim Service	-	✔	✔
Weekday Technical Phone Support	✔	✔	✔
Boiler Heat Meter Check	-	✔	✔
Flue Cleaning	-	-	✔
Monthly Operator Checks	-	-	✔
Out of Hours Phone Support	✔	✔	✔
Extended Warranty Available	-	-	✔
Discount on Spares & Additional Services	✔	✔	✔
RHI Payments Guaranteed	-	✔	✔

- **Energy Efficiency** - optimises biomass boilers performance, resulting in savings of up to 35% on running costs.
- **RHI** - meet OFGEM's RHI service eligibility requirements.
- **Reliability** - Prevent boiler and system issues by noticing problems before they occur.
- **Longevity** - Ensures your biomass boiler runs efficiently for longer using approved, genuine parts.
- **Safety** - ensure your boiler is operating safely, by checking and maintaining all biomass boiler safety devices.
- **Priority Scheduling** - Guarantee a convenient pre-booked service visit and preference to call-out dates should a breakdown occur.
- **Technical Phone Support** - Quick, expert biomass boiler advice provided over the phone often resolves biomass boiler issues without the need for a site visit.
- **Spare Parts & Labour Rate Discounts**



MYRIAD PLANTROOM SERVICES

Waste Wood Types

When virgin timber is mixed with waste timber or any other waste, the mixed load is classed as waste wood. Waste wood is subject to the Industrial Emissions Directive (IED) regulations and can be anything from offcuts and shavings to chippings or sawdust from the processing of non-virgin timbers.

The Wood Recyclers Association specifies waste wood into Grades A, B, C & D. Each grade is based on a number of characteristics of the wood including composition, contamination and chemical treatment.

Grade A

This is "Clean" recycled waste wood - this is generally packaging waste, scrap pallets and untreated offcuts from secondary manufacture etc. This is suitable for producing animal bedding and mulches.

Grade B

This may include Grade A material plus other waste wood resulting from construction and demolition waste, transfer stations and solid wood furniture manufacture. This is suitable for making panel board.

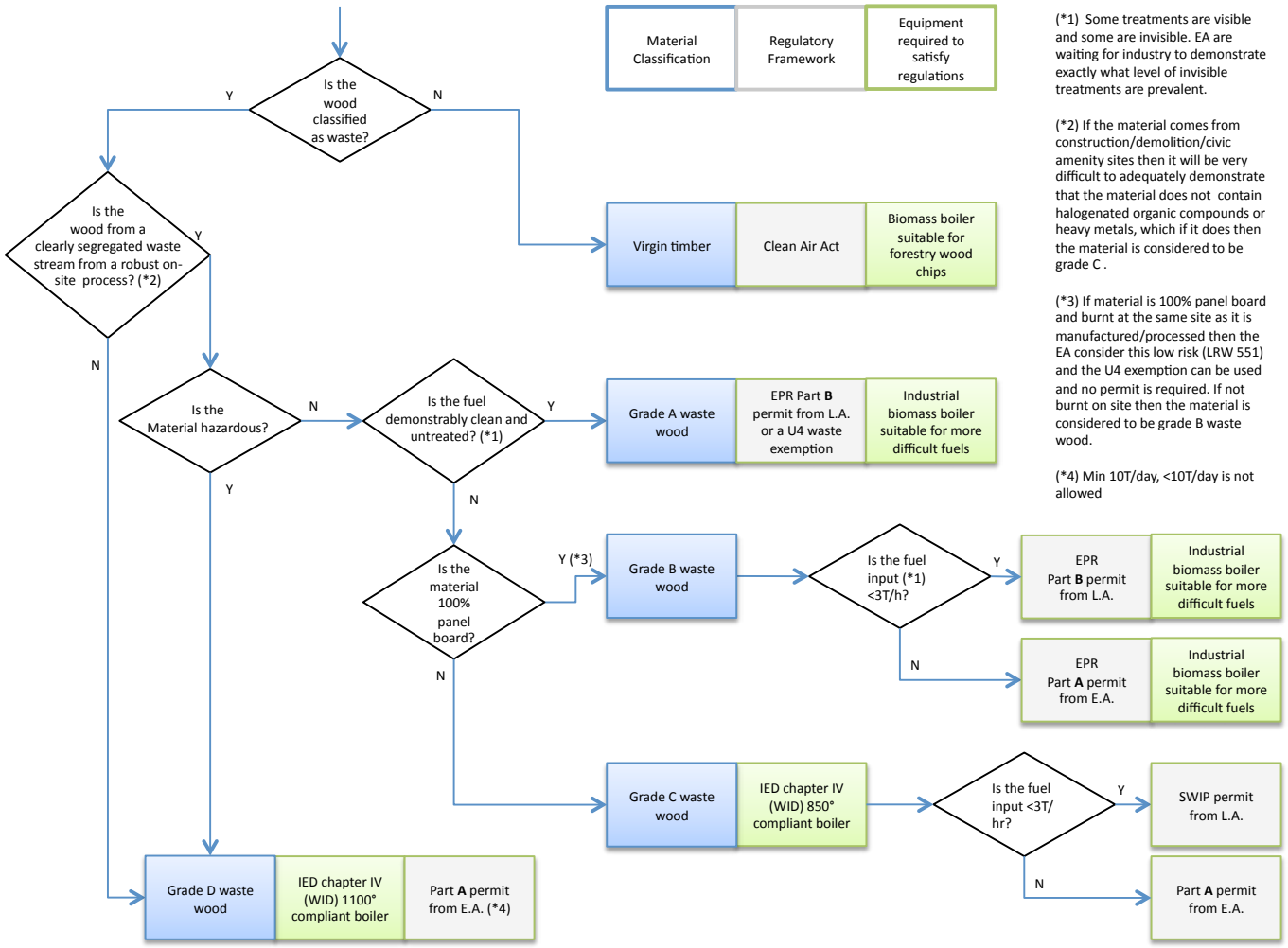
Grade C

This can include all of the above Grade A and B wood plus material that has been treated with preservatives. Generally contains panel products e.g. MDF, panel board and plywood.

Grade D

This is hazardous waste. This includes all grades of wood including treated material such as fencing and trackwork. It has often had chrome, arsenic, creosote or copper applied. It requires disposal at special facilities by incineration or hazardous waste landfill.

Which regulations apply to you



Case Study

The benefits of using a biomass boiler, fuelled by waste wood, to dry Refuse Derived Fuel (RDF) at a UK waste recycling facility.

Disposal Costs
Drying refuse has a number of benefits. The most significant is that dried RDF is a lot lighter and consequently, the cost of disposing of it is considerably reduced. For example, if the typical 'all-in' disposal cost is £100/T, by taking 20% of the water content out by drying, a 25,000T/yr RDF drying plant heated by a 1MW boiler can save the operator in excess of £500,000.

Fuel
When waste wood, separated out of the refuse, is used to fuel the boiler this can almost completely eliminate the disposal cost of that segment of the waste as it is reduced to ash on site. Also, since waste wood will likely always be a component of refuse, this insulates the operator from volatile fuel prices. You use part of your waste as fuel to dry the rest.

Waste wood disposal costs can vary significantly across the country, sometimes it has a value but usually has a disposal cost of £20-£40/T. A 1MW boiler will burn approx. 2,700T/yr saving the operator up to £108,000/yr (@£40/T disposal cost).

Income from the Renewable Heat Initiative
This scheme supports the generation of heat from sources such as waste wood by making a payment for every unit of heat produced for your own use (in this case, drying refuse). A 1MW boiler running hard through the year will generate approx. £180,000/year for 20 years.

Political considerations
Following Brexit, the UK is unlikely to continue to enjoy the full benefits of the EU open market. Consequently, the costs of exporting processed refuse for incineration may face additional tariff barriers. Any increase in the cost of disposal can be offset by drying the refuse and/or processing it into SRF.

Example Cost Benefit Analysis
RDF drying: £500k saving on disposal
Wood consumption: £110k saving on disposal
RHI income: £180k
Total cost benefit: £790k/yr

Other costs to consider:

- The labour needed to ensure continuous feeding of the RDF through the dryer.
- The electrical cost of running 2 x 24kW fans, the boiler (which will consume 8-10 kW/hr) and the dryer itself (9 kW/hr).

The practical and financial benefits of drying waste are clear and considerable - especially when RHI payments are taken into account.

ruralenergy.co.uk

Design / Install / Maintain

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Rural Energy

Engineered low carbon solutions