CARBON TRUST

Biomass boilers and room heaters

A guide to equipment eligible for Enhanced Capital Allowances

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Introduction

ECAs are a straightforward way for a business to improve its cash flow through accelerated tax relief. The scheme encourages businesses to invest in energy saving plant or machinery specified in the ETL to help reduce carbon emissions, which contribute to climate change.

The Energy Technology List (ETL) is a register of products that may be eligible for 100% tax relief under the Enhanced Capital Allowance (ECA) scheme for energy saving technologies[1]. The Carbon Trust manages the list and promotes the ECA scheme on behalf of government.

This leaflet gives an overview of biomass boiler and room heater equipment specified on the ETL and illustrates the reductions in energy bills that can be realised by investing in qualifying ETL energy saving equipment over non-qualifying equipment.

Background

The ETL comprises two lists: the Energy Technology Criteria List (ETCL) and the Energy Technology Product List (ETPL). The ETCL defines the performance criteria that equipment must meet to qualify for ECA scheme support; the ETPL is the list of products that have been assessed as being compliant with ETCL criteria.

Setting the scene

The market for biomass boilers is estimated to be growing at around 60% per year[2] with several hundred units being installed annually. Biomass boilers offer an alternative to fossil fuelled boilers, in particular oil-fired boilers which are the main option for areas where mains gas is not available.

Biomass boilers produce hot water or steam for process or space heating, or domestic hot water. Biomass room heaters heat spaces directly through radiation and convection. Some room heaters can also heat water for wet heating systems or domestic uses. Products listed on the ETPL provide an alternative to the fossil fuel based heating of water and space. Biomass is considered to be a low carbon fuel. The savings that can be achieved broadly equate to the amount of CO_2 that would have been emitted if a fossil fuel-fired appliance had been installed. Listed products are required to meet defined efficiency levels, thus helping to ensure that the amounts of fuel that are used to meet the heat demand are not excessive.

1 Eligibility for ECAs is based on a number of factors. Visit http://etl.decc.gov.uk/etl to find out more.

2 Based on industry feedback included in the 2007 Technology Review.

Benefits of purchasing ETL listed products

The biomass fuels used in these products are renewable and their use can replace close to 100% of the CO_2 that would have been emitted by a fossil-fuel fired alternative. They are often chosen by companies that wish to reduce their carbon emissions, or who have ready access to a biomass fuel supply. Biomass boilers are available in a wide range of thermal efficiencies; the ECA scheme aims to encourage the purchase of higher efficiency designs.

When replacing equipment, businesses are often tempted to opt for that with the lowest capital cost, however, such immediate cost savings can prove to be a false economy. Considering the life cycle cost before investing in equipment can help reduce costs and improve cash flow in the longer term.

Did you know?

Biomass resources already represent just under 85% of UK renewable energy supply. This is equivalent to approximately 1.4% of total UK primary energy use and there is scope for considerable further development[3].

The ECA scheme provides businesses with 100% first year tax relief on their qualifying capital expenditure. This means that businesses can write off the whole cost of the equipment against taxable profits in the year of purchase. This can provide a cash flow boost and an incentive to invest in energy saving equipment which normally carries a price premium when compared to less efficient alternatives.

Did you know?

When displacing LPG and oil-fired heating, wood fuel delivers emissions savings of 80% to 94%. Even for displacing natural gas emission savings of between 73% and 90% are made[4].

This leaflet also illustrates the reductions in energy consumption, carbon emissions and energy bills that can be realised by investing in qualifying ETL energy saving equipment over non-qualifying equipment.

Important

Businesses purchasing equipment must check the ETPL at the time of purchase in order to verify that the named product they intend to purchase is designated as energy saving equipment. Biomass boiler and room heater equipment that meets the ETL eligibility criteria but is not listed on the Energy Technology Product List (ETPL) at the time of purchase is not eligible for an ECA.

3 Carbon Trust publication *Renewable energy* sources technology overview (CTV010).

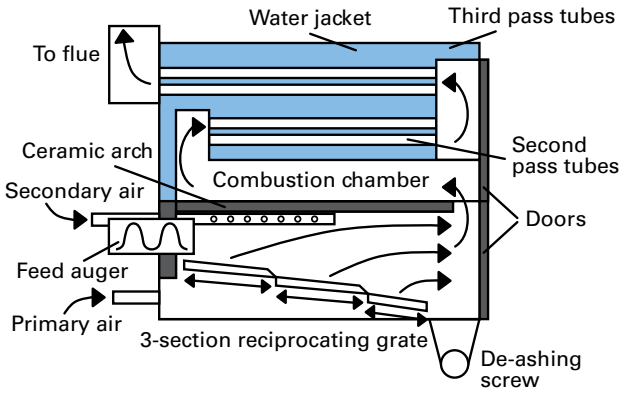
4 www.biomassenergycentre.org.uk/

Biomass boiler and room heater equipment eligible under the ECA scheme[5]

Biomass boilers

The diagram below illustrates a typical example of a biomass boiler package that may be eligible under the ECA scheme.

Figure 1 A typical biomass boiler package



Combustion process

Biomass boiler system equipment is based on established technologies for solid fossil fuels, which have been adapted to cope with the properties of biomass materials. The main types of product available use the following processes:

- Direct combustion of biomass – where sufficient air is supplied to the burning fuel to ensure complete combustion.
- Two-stage systems: Stage 1 – the fuel is either gasified by reacting it with a limited amount of air (insufficient air is supplied to allow combustion, or CO_2 or steam is supplied instead of air); or pyrolysed by heating in the absence of air.

Both processes produce a fuel gas and solid char, and in Stage 2 both of these can be burned to release heat.

The two-stage processes were originally developed for large scale solid fuel thermal plants, but the principles also appear in some biomass boiler designs.

Figure 2 Typical grate fired system by Energy Innovations Ltd (Gilles)

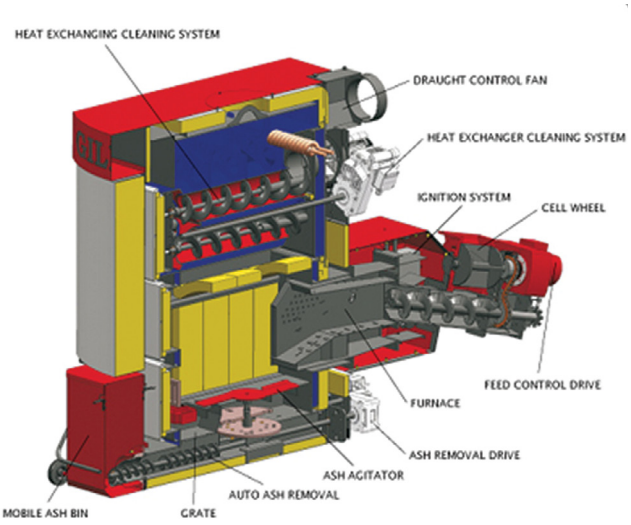


Image courtesy of Energy Innovations Ltd - Gilles Biomass Heating System

Potential annual savings shown are based on installing an ETL listed biomass boiler with a maximum output of 100kW (compared to a simple biomass boiler with a 60% efficiency level), which runs at an average load of 86% for 4,000h/year on wood chips priced at 2.2p/kWh.

- £1,276.
- 58,000kWh.
- 2 tonnes CO_2.

Fuel types

A range of clean biomass fuels can be used in ETL listed biomass boiler systems. The fuel type used will depend upon the specific system design and may include wood-chips, logs, coppice willow and straw. Boilers that are designed for use with pellet fuel are also available. Pellets are a modern form of manufactured biomass fuel that has many advantages. They are free flowing with a low moisture content and a consistent size and geometry. This fuel consists of short cylinders of extruded and compressed biomass, usually sawdust.

[5] The descriptions of the biomass boiler equipment given in this leaflet are examples only. The formal criteria and details governing the ECA scheme can be found at http://etl.decc.gov.uk/etl

Biomass room heaters

Biomass room heaters are products specifically designed to burn wood logs or pellet fuels, for space heating by means of radiation and convection. They may also produce hot water.

Did you know?

Unlike old-fashioned open fires, modern wood-fuelled stoves and boilers burn very efficiently (80%-90%). This is because the supply of fuel and wood to the system can be tightly controlled to ensure efficient combustion[6].

Room heaters are closed combustion appliances typically with a glass door to the front. They heat the room they are placed in through radiation and through convection around the body of the heater. Some models can supply hot water to radiators or domestic hot water cylinders. Room heaters are normally batch fuelled through the front door by logs, however, in recent years the use of automatic stokers using pellet fuel has become increasingly common.

***Figure 3** Some typical room heaters (HETAS)*

Image courtesy of HETAS

Additional considerations for biomass boilers and room heaters

When considering installing a biomass boiler or room heater, there are several issues that need to be investigated. Some of the most important are given below. Detailed advice on technology and project development is given in the Carbon Trust in depth guide CTGO12 Biomass Heating a Practical Guide for Users:

- Fuel sources – is there sufficient, suitable biomass fuel available locally?
- Fuel reception – is there suitable access and space for deliveries of fuel to be made?
- Fuel storage and feeding equipment – is there sufficient space to install all of the necessary equipment?
- Ash disposal – is there a suitable means for the disposal of ash?
- If you plan to use the equipment in a smoke control area, check that it is on the list of exempt appliances (www.uksmokecontrolareas.co.uk/appliances.php).
- If you plan to use the equipment in a smoke control area, check that it is on the list of exempt appliances (www.uksmokecontrolareas.co.uk/appliances.php).

Under the Clean Air Act it is a legal requirement to notify the Local Authority of the installation any non-domestic solid fuel appliance irrespective of whether it is in a Smoke Control Area.

Potential annual savings shown are based on installing an ETL listed 20kW room heater (compared to a unit that only meets the efficiency for a class 3 unit), which runs at an average load of 85% for 1,000h/year on biomass priced at 1.1p/kWh.

- £40.
- 3,300kWh.
- 0.13 tonnes CO_2.

Information for purchasers

For further information about the ECA scheme, the Energy Technology List (ETL) and other Technology Information Leaflets in the series please visit www.carbontrust.co.uk/eca, contact the Carbon Trust on 0800 085 2005 or email customercentre@carbontrust.co.uk

Go online to get more

The Carbon Trust provides a range of tools, services and information to help you implement energy and carbon saving measures, no matter what your level of experience.

Carbon Footprint Calculator

Our online calculator will help you calculate your organisation's carbon emissions.
www.carbontrust.co.uk/carboncalculator

Energy Efficiency Financing

Offers leases, loans and other financing options to all types of organisations seeking to reduce their energy use. For more information see: **www.energyefficiencyfinancing.co.uk**

Carbon Surveys

We provide surveys to organisations in Scotland, Northern Ireland and Wales with annual energy bills of more than £50,000*. Our carbon experts will visit your premises to identify energy saving opportunities and offer practical advice on how to achieve them. **www.carbontrust.co.uk/surveys**

Action Plans

Create action plans to implement carbon and energy saving measures. **www.carbontrust.co.uk/apt**

Case Studies

Our case studies show that it's often easier and less expensive than you might think to bring about real change.
www.carbontrust.co.uk/casestudies

Events and Workshops

The Carbon Trust offers a variety of events and workshops ranging from introductions to our services, to technical energy efficiency training, most of which are free. **www.carbontrust.co.uk/events**

Publications

We have a library of free publications detailing energy saving techniques for a range of sectors and technologies
www.carbontrust.co.uk/publications

Need further help?

Call our Customer Centre on 0800 085 2005
Our Customer Centre provides free advice on what your organisation can do to save energy and save money. Our team handles questions ranging from straightforward requests for information, to in-depth technical queries about particular technologies.

* Subject to terms and conditions.

The Carbon Trust is a not-for-profit company with the mission to accelerate the move to a low carbon economy. We provide specialist support to business and the public sector to help cut carbon emissions, save energy and commercialise low carbon technologies. By stimulating low carbon action we contribute to key UK goals of lower carbon emissions, the development of low carbon businesses, increased energy security and associated jobs.

We help to cut carbon emissions now by:

- providing specialist advice and finance to help organisations cut carbon
- setting standards for carbon reduction.

We reduce potential future carbon emissions by:

- opening markets for low carbon technologies
- leading industry collaborations to commercialise technologies
- investing in early-stage low carbon companies.

www.carbontrust.co.uk

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