UNDERSTANDING BIOMASS APPLIANCES

This advice guide is part of a series of guides produced by the Association of Plumbing & Heating Contractors Ltd. to provide essential basic information that a homeowner may consider having carried out in their home. This guide is about understanding biomass appliances

Biomass appliances are becoming more and more popular as a fuel burning heating appliance that is both efficient and environmentally friendly. With the introduction of the RHI (Renewable Heat Incentive) customers are looking even closer at these appliances as a viable choice. This guide is designed to give you some of the basic facts around biomass appliances.

What is biomass?

Biomass is a solid fuel derived from biological material created from living, or recently living organisms, like plants or trees. Biomass energy used in our homes comes from plant based material, for example wood.

The difference between biomass and fossil fuels

The most important element of biomass fuel is the fact it is carbon neutral. Keeping the carbon neutrality only works if the wood or fuel crop is managed on a sustainable basis; biomass fuel is harvested as part of a constantly replenished crop with the new growth absorbing CO_2 from the atmosphere at the same time as it is released by combustion of the previous harvest. This maintains a closed carbon cycle with no net increase in atmospheric CO_2 levels.

Benefits of using wood as a renewable fuel

Correctly managed, wood fuel is a sustainable fuel that can offer a significant reduction in net carbon emissions when compared with fossil fuels. It also offers the following benefits:

- Wood fuel can be found locally, from within the UK reducing the need to import fuel.
- Wood fuel can offer local business opportunities and support the rural economy and job creation.
- Sustainably managed woodlands and forestry can provide opportunities for recreation and leisure activities.
- Wood fuel can be CO_2 neutral.
- Wood fuel can redirect woody waste such as packaging from going to landfill.
- Wood fuel can improve the local woodland biodiversity.

What types of biomass appliances are there?

There are different types of biomass appliances for sale, the majority are either stoves, room heaters or boilers. Biomass systems at the domestic end of the market range greatly in terms of specification and cost. At the moment the most commonly installed type of appliance is the small wood burning stove with a

small back boiler. There are some biomass boilers on the market, but these are far less common.

Does it pay to go biomass?

On average, biomass heating and hot water systems cost more than fossil fuel based alternatives to install. Biomass systems can cost up to 3 times that of an oil installation, and up to 5 times that of a gas installation of the same heating output rating. However, the difference in the installation price can be made up from the future cost savings in fuel.

Biomass boiler systems

Biomass boilers are all automatically controlled and, other than the physical requirements of the boiler and the fuel storage, have very little differences from any other type of heating boiler when connected to a heating system. The boilers can be over 3 times bigger than the equivalent oil boiler and 5-6 times larger than the equivalent gas boiler. Plus there is a need for a bunker or hopper to store the fuel which is very bulky and requires dry storage which more often than not rules out outside storage. This often means that a biomass boiler requires its own room or covered store.

The wood burning stove heating system

This type of heater does have some special installation requirements when connecting it to the central heating or hot water. These small stoves have no automatic way of controlling the heat they give out once lit, which if left unchecked, can literally boil the hot water in the heating system they are connected to. This means that special safety and design considerations must be put in place if you are looking to heat your home or hot water with one of these stoves. The main items include:

- A Heat leak radiator – this is a system of pipes and a radiator which can dissipate the unwanted heat from your central heating or hot water system to stop it boiling the system and damaging the stove or central heating components.

- Hot water cylinder blending valve – by law any hot water cylinder connected to a wood burning stove must have a special blending valve fitted to it to stop the hot water coming out of your taps too hot and scalding someone.

- Metallic header tank – The feed and expansion cistern to a biomass stove must be metallic in nature so it can take the high temperatures. If boiling water over spills into a plastic cistern, the cistern will deform and even collapse in these situations, causing a real danger of scalding to people below.

Advantages of biomass

- Biomass is a sustainable fuel source if managed correctly, i.e. trees need to be planted to replace those used.
- It is virtually carbon neutral. There is a carbon cost involved in cutting down the trees, transporting the wood and processing the wood into logs, chips or pellets.
- Biomass fuels are less susceptible to price increases than traditional fuels such as oil and gas.
- If they are well maintained and run they will produce very little smoke.

- If you replace a coal or electric heating system with biomass you can reduce your carbon dioxide by around 9.5 tonnes per annum, less so with other fuel types.
- They are highly efficient.

Disadvantages of biomass

- The boilers are normally larger than a gas or oil boiler.
- Some stove based systems require an additional heat leak radiator to 'bleed off' excess heat when you have no demand for it.
- Only a small number of biomass systems can be used in smokeless zones. If you live in such an area you will need to do some careful research into the various manufacturers to make sure their system is suitable. Plus you will have to use good quality fuel with very low levels of contaminants such as bark, grit etc.
- Currently biomass fuel costs are similar to mains natural gas, but in time gas will become more expensive and make biomass more attractive
- Initial costs are very high compared with traditional gas or oil installations.
- Biomass systems require a lot of space to store the fuel, such as a hopper or wood store, and the fuel needs to be kept dry if they are to burn cleanly and efficiently.
- It is more labour intensive than traditional gas or oil installations as you need to keep the hopper full, plus greater cleaning and maintenance is required.
- You will need a reliable supply of fuel, as all the various types of biomass fuel are not always readily available. The further they have to be transported the greater the carbon footprint and the greater the cost.

In summery

Biomass boilers are not a perfect solution for everyone. As they become more popular the fuel costs may increase, plus in the long term the UK may not physically produce enough timber or biomass crops to fuel them if we all installed biomass systems. However, they do reduce the carbon footprint of domestic heating systems.

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