CASE STUDY 6 - BIOMASS BOILER
Pembrokeshire Coast National Park Offices

When the Pembrokeshire Coast National Park Authority refurbished their new premises at Llanion Barracks in Pembroke Dock in 2003 they made the decision to include a sustainable biomass heating system. Not only did they want to set a good example to other organisations but they wanted to test the technology.

The 130kw Passat Biomass Pellet Boiler was installed in 2003 by local plumbers Gerald Thomas with a gas powered back up system. It was first fired-up in March 2004. It is used for space heating via radiators and, as the National Park Offices cover 929m2, it made sense to also heat the adjoining CCW building which covers 325m2.

Water heating is powered by 9m2 solar thermal panels installed by Sundance Renewables.

How Does The System Work?

Wood Pellets are delivered by Welsh Biofuels, usually 5000 kg at a time, which are blown into the large hopper outside the boiler room (above right). The hopper feeds the boiler (below) through a pipe containing an Archimedes screw. Once lit the temperature is controlled via a computerised system. The boiler is usually lit in the Autumn and run continuously throughout the cooler Autumn and Winter months. This is because the boiler works most efficiently when it is being run flat out. Unlike a conventional gas or oil fired boiler the biomass boiler cannot be turned off when less heat is required, if the radiators are turned down for example

During other chilly periods heating is provided by the two 60kw gas boilers. When the system was in full operation over winter 2007-2008 52000kg of wood pellets were used.

Occasionally the heat does not leave the boiler and pellets are over-burnt, turning it into clinker. This can create blockages and therefore the boiler needs cleaning twice a week.

PEMBROKESHIRE COAST NATIONAL PARK AUTHORITY

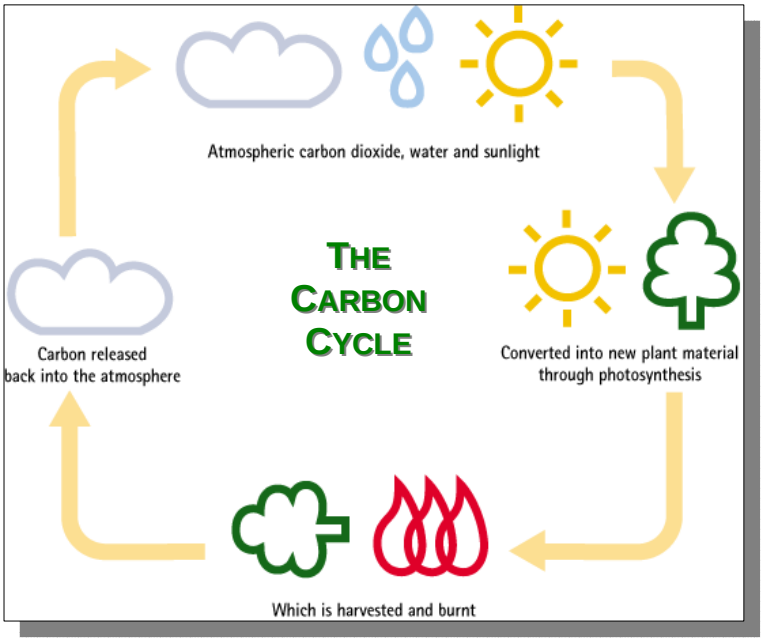
In certain locations excess heat can be stored in a heat sink, usually a tank of water, where heat is stored when radiators are turned down and can be drawn upon if the radiators need to be turned up. Excess heat can also be used to heat swimming pools, and local schools and public pools now use biomass boilers symbiotically. E.g. Crymych Leisure Centre.

Benefits

Biomass Boilers are a sustainable low carbon form of heating, which uses, in this case, waste wood instead of fossil fuels. The CO_2 released when the wood fuel is burned is never more than the CO_2 being taken up by new growth. It is therefore termed 'carbon neutral'.

The temperature produced from a biomass boiler is hotter than the temperature from the equivalent sized fossil fuel boiler.

Potash is produced as a waste product and is a good source of nutrients for garden compost.



Disadvantages

High Maintenance - If this system replaces a gas or oil boiler in a school or public building the maintenance needed from the caretaker will increase as more ash is produced. When the caretaker was employed at the National Park Offices it was stipulated that one of the duties was to maintain the biomass heating system.

The boiler system can go out due to blockages and needs regular cleaning to prevent ash build up. The system therefore requires considerable care and attention, often during anti-social hours, such as Bank Holidays.

The pellets can be shaken up during transportation, and therefore get broken down into sawdust. This effects the efficiency of the boiler and produces more ash. If the pellets are delivered well before the season gets cold enough to fire up the boiler, pellets can get damp in the hopper, effecting the boiler efficiency.

Heating System Costs:

Biomass Boiler £30,000
Pellets per year *(in 07 –08 financial year)* £6,500
Grants from Clear Skies *(now the Low Carbon Building Programme)*..... £22,000

Useful Contacts:

Welsh Biofuels 01656 729714
Sundance Renewables 01269 842401
PCNPA Caretaker, Brian Pratt ..... BrianP@pembrokeshirecoast.org.uk