

CASE STUDY: COMBINED HEAT AND POWER (CHP)



425kW CHP (Combined Heat & Power) Plant installed at Edge Renewables

An annual savings of around £160,000 has been achieved with the installation of a 425kW biomass-fuelled CHP system providing up to 165kW electricity and 260kW of thermal heat.

Edge Renewables have installed the first Burkhardt CHP system for providing both electricity throughout the site to power the lighting and machinery such as our onsite chipping plant, and thermal energy to be converted to warm air for drying wood chip to supply our many customers.

Recognising the benefits that CHP offers, coupled with the availability of the Government’s Renewable Heat Incentive (RHI) and Renewable Obligation (RO) payments - which pay a site’s owner for the heat produced by eligible renewable technologies (such as biomass wood-chip fuel and electricity generation) over a 20-year period – the company decided to invest in the CHP system to cover the sites ever growing demand.

The system has been operational for several months, running smoothly and efficiently with greater than 92% uptime.



Above – Control interface for the CHP, operated both manually and remotely.

Headline Figures:

- Total capacity of 425kW
- Total electrical capacity of 165kW
- 20 year estimated savings of £3-4m
- Payback within 4 – 5 years.
- Annual Scheme Income of £375,000
- Annual wood-fuel costs of £175,000

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System Information

The system's total installed capacity of 425kW is achieved through a biogas Gasifier and a CHP Engine. It provides heating for the wood chip drying equipment and the electrical requirements of the lighting and plant machinery. Any electricity not consumed is sent back into the grid.

Wood pellets are fed into the gasifier at a measured rate to create a gasification reaction. The complete reaction takes place somewhere between 350 – 1100°C in the top third of the chamber. The gas produced is cleaned and cooled before being sent to the engine to drive an electrical generator. Hot water produced from cooling both the Gasifier and CHP is taken off at 90°C to power the water to air heat exchanger used to dry wood chip.

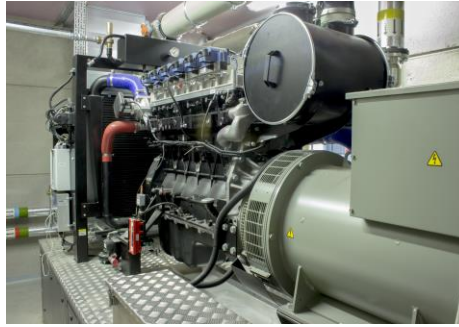
Below: The Gasifier Unit



Fuel

The new system burns Grade 1 wood pellets, that conform to the EN 14961-2 specification with a moisture content of below 10% when delivered to site.

Pellets are loaded into a trough auger and fed horizontally and then vertically into the pellet store before finally being augered into the Gasifier's reaction chamber.



Above - The CHP Engine and Pressurised Engine Room.

The Renewable Heat Incentive (RHI)

Following the commissioning of the project in July 2015, the installation was approved for the UK Government's non-domestic Renewable Heat Incentive (RHI) scheme and Renewable Obligation (RO) payment scheme.

These schemes are designed to encourage the uptake of renewable technologies such as biomass boilers and CHP units which pays the owner of a qualifying installation to generate renewable energy for a period of 20 years.

The savings will pay back the cost of the installation in around five years thereby making a sound financial investment, which will provide a comfortable return on the client's capital expenditure over the 20-year period.

Carbon Savings

As the system uses a sustainable wood fuel, which has absorbed carbon dioxide whilst it was growing, burning it in a highly-efficient gasifier results in large savings in carbon emissions – when comparing it to the traditional alternatives using fossil fuels such as fuel oil, LPG and natural gas.



About Edge Renewables

Formed in 2011, the company specialises in the design and installation of renewable energy technologies- such as biomass boilers, combined heat & power and solar PV systems for homes, farms and businesses. In addition the company also produces biomass in the form of wood chip, a 'green', renewable fuel that is helping reduce the UK's dependence on fossil fuels.

Opportunity

For many industries, particularly those with a sufficient heating & cooling demand, CHP offers the most significant opportunity to reduce energy costs and improve environment performance. Overall the system efficiencies of 95% far outstrip traditional efficiencies of 45% for oil heating and grid electricity.

Find out more

To find out more, please call 0845 603 3833, email sales@edgerenewables.com or visit the website www.edgerenewables.com

