

From wood to steam

Biomass heating is not usually associated with steam production. But with the right combination of expertise there could be major opportunities ahead, believes *David Branch*

Boilers for industrial steam applications have been fired on fossil fuels. This has been the established wisdom. Although this predominantly remains the case, there is increasing interest in the use of biomass to generate steam. The Renewable Heat Incentive (RHI) scheme has increased the growth rate of biomass installations, particularly in hot water applications.

In industrial steam applications, biomass can be part of an integrated solution, but not the whole solution. Biomass-fired boilers work best in situations where there is a steady load, which is more often the case with hot water applications than it is with steam. In a process steam application, there are usually peaks and troughs in demand, which a biomass-fired boiler will struggle to cope with. The recommended approach is to use a biomass boiler to output at a constant level and meet peaks in demand via a conventionally fuelled boiler.

The general lack of experience in operation and maintenance of industrial biomass boiler plant is one of the big challenges facing the market, especially when it comes to achieving the necessary levels of efficiency, reliability and safety. However, biomass remains popular and will continue to be chosen by many energy users.

Biomass improves fuel security through diversification. Fuel costs are also reduced and, with the continuation of the RHI, the payback period is short. Companies find their carbon footprint can be reduced by up to 95 per cent which helps them meet sustainability targets and enhances their environmental credentials.

Higher initial investment

However, investing in biomass requires careful consideration. The initial capital investment and resource to operate and maintain biomass installations are higher than they are for a conventional plant. A biomass plant should only be installed if the load demand



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and profile is appropriate. It should be engineered to optimise operation, not to maximise the RHI payments. Ideally it should be located to ease integration with current conventional boiler and distribution systems. A biomass system is expected to last 20 years or more, so it is important to consider the quality and availability of the fuel over the expected life span. The right technology provider will help to negate any of the associated risks.

The footprint of biomass plant is similar to any other boiler, but consideration must be given to the size and accessibility of the fuel storage as well as access for large trucks to deliver and tip the fuel. The product of combustion of biomass is ash, which must be removed from site as part of general maintenance.

Historically, the suppliers of biomass plant have had limited experience of steam and conventional fossil fuel plant. Cochran has limited experience of biomass, but a wealth of experience in conventional fossil fuel boilers and steam systems. In order to be able to offer complete integrated solutions, Cochran has partnered with specialist Scot Heat & Power, a distributor of

Kohlbach biomass boiler systems, as well as being an independent biomass fuel supplier.

An example of how this partnership works can be seen at Queen Margaret University (QMU), Edinburgh. The campus is a flagship for sustainable development and achieved the highest BREEAM rating for any UK university.

QMU campus has a 1.5MW Kohlbach biomass boiler which is operated and maintained by Scot Heat & Power. This is the lead boiler

for the campus heating system. The Kohlbach product was selected due to its flexibility in handling a wide range of fuel moisture (up to 60 per cent) and variable sizes, coupled with the high quality of its design and manufacture. The system has a peak demand of 4.8MW, so the biomass boiler has been integrated with two 2.4MW gas fired boilers. The gas-fired boilers top up output at peak times and offer full back up during maintenance periods.

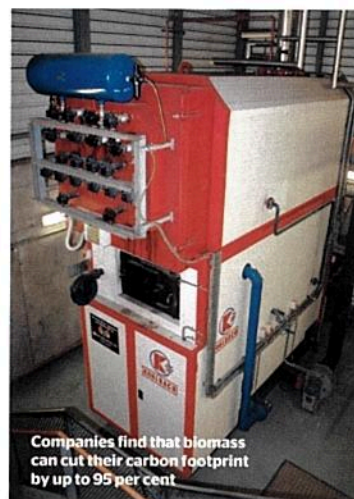
Optimising fuel delivery

The system is monitored to optimise performance and system efficiency, as well as optimising fuel delivery quantity and routes to minimise the whole carbon footprint. This is important because plant typically requires approximately 3,500 tonnes of wood per annum. The system provides QMU with approximately 7,000MWh of renewable energy per year which reduces their carbon footprint by approximately 1,400 tonnes of carbon dioxide equivalent. Biomass has reduced QMU carbon footprint from its heating operations by 90 per cent.

This installation was commissioned in 2008 (pre RHI) and its payback was calculated at 5-7 years. If RHI had been in place, the payback would have reduced to 3-4 years. Even at 2015 fuel prices, QMU is saving £82,000 from its fuel bill with its integrated biomass heating system.

Biomass has an increasingly important role to play in the industrial energy market, but to maintain and enhance its reputation it requires expert suppliers. The right supplier will make or break the project. Businesses need to look for a supplier who is able to make a success of every stage, from the supply of equipment, fuel supply, financing, installation and integration with conventional systems through to after-market care packages.

Partnerships, like the one between Cochran and Scot Heat & Power, that bring together expertise in all relevant areas are expected to increasingly become the way forward.



Companies find that biomass can cut their carbon footprint by up to 95 per cent