

A consistent supply of fuel is needed for a biomass system (below); Bradfield School in Sheffield (right)



# THE BURNING ISSUE

Has the FM sector realised the true energy potential of biomass? Mark Harrison asks whether a wood-burning system can really be an alternative for energy buyers

**B**iomass may be enjoying a lot of publicity right now, but the idea itself is not new. Since the discovery of fire, man has been burning wood to keep warm. And this ancient concept is at the heart of the most modern biomass systems, used to generate power and heating.

Over the past decade, there has been a definite upsurge in the interest in biomass. Alfred McAlpine (before it was acquired by Carillion) built, installed and maintained a biomass system fuelled from fields of willow, less than ten years ago.

Elsewhere, the Drax power

station in North Yorkshire began a project to source the majority of its fuel from biomass, way back in 2003. The Drax site provides a huge 7 per cent of the UK's electricity, making the site the single largest source of carbon dioxide emissions in the UK. It burns one million tons of biomass fuel, comprised of a variety of sources, such as peanut husk pellets, rape straw, and purpose-grown energy crops, most of which is currently imported from overseas.

Research commissioned in the alternative energy sector by consultancy Sustainable Venture Intelligence, indicates

“Woodchip dust is known to be 1,000 times more flammable than coal dust; clearly, this material has specialist storage requirements”



that medium-sized biomass boilers (200-1,000 thermal kilowatts) will be very attractive for organisations in the public and commercial sector. Social housing projects, and networked district heating schemes, were highlighted as being likely applications. The research suggested that the medium-scale biomass market is then likely to experience a ‘gold rush’ in 2015-17, as falling technology costs coincide with attractive government subsidies, creating a heavily incentivised market. However, government policy at that time remains, quite understandably, an unknown.

**FM  
QUICK  
FACTS**

**2015-17**

The period the medium-scale biomass market is likely to experience a ‘gold rush’

**200-1,000kW**

A typical medium-sized biomass boiler

What is clear is that biomass has proved to be an effective, and in many cases, cheaper option – especially to gas and oil. For some organisations, the environmental drivers are paramount; but none outweigh the commercial imperatives. Hence, the actions of major high-street brands like Marks and Spencer are hugely influential. M&S already has a major green building programme underway for its new stores, which has seen it deploy clean technologies such as biomass boilers, LED lighting and water-saving technologies.

From the facilities manager’s point of view, service providers

must meet the requirements of intelligent clients like M&S, for whom sustainability is high on the agenda. They must anticipate the end users’ desire to save money, while seeking greener power options.

Biomass is not necessarily simple, however. Like any new technology, it needs research and testing, preferably with the equipment it will be used with. For instance, woodchip dust is known to be 1,000 times more flammable than coal dust; clearly, this material has specialist storage requirements – just like any other source of fuel, such as gasoline or jet fuel. It

Bradfield School sources biomass from nearby woods to provide heating



is essential to keep woodchip covered, as dampness will reduce its burn efficiency. Also, the fuel pellets need to be pushed to the middle of the container, because again, dampness can result from prolonged contact with the sides. For this reason, a consistent, reliable supply must be found.

**Bradfield School**

Vinci Facilities took on the challenge of specifying a 350kW biomass boiler at Bradfield School in Sheffield. The school, which has around 1,050 staff on pupils on site, was due to open its new building in October 2012.

Fortunately for Vinci Facilities and Vinci Construction, the team designing and building the new facility had some useful prior knowledge.

Over the past six years, local authorities in South Yorkshire have gained a national reputation for encouraging the installation of new heating systems based on woodchips, for many residential complexes and blocks of flats. There are now 20 such sites in the region.

The local authorities work with Sheffield Wildlife Trust to supply and manage a reliable source of fuel from the local area.

Vinci Facilities staff visited several biomass installations at schools in Sheffield and Leicester, speaking to site staff in charge of maintaining the systems.

Reliability was the issue that came to the fore; foreign bodies in the fuel, or over-sized wood pieces in the storage pits, had found their way into some units, causing damage to machinery, and, consequently, interruptions in performance.

It was clear that a reliable source of fuel would be a top priority for the school.

**Fuel for thought**

Fortunately, Bradfield School's new buildings were adjacent to woodland, already under contract with Sheffield City Council, and ready to be used as a source of biomass material.

A boiler of the size installed at the school requires around 25 cubic metres of woodchip per week at full capacity; this is all supplied

**FM QUICK FACTS**

**25m<sup>3</sup>**  
Fuel requirement of boiler in school, per week

**350 Kw**  
Power output of the boiler

from Grenoside Woods, next to the site. Sheffield City Council provides the woodchip through a partnership agreement with the school, and takes delivery of 30 cubic metres of fuel every week during the winter months.

**Maintenance**

Maintenance is carried out on the equipment by the supplier, on a six-monthly basis.

The fuel is stored in a 55 cubic metres woodchip pit. An augur funnels the chips into the biomass

boiler, and, due to the design, the woodchip tends to be taken from the middle of the pit. As a result, woodchips collect around the sides. To ensure all the fuel gets used, the team rakes the chips manually into the middle of the pit – prior to each weekly delivery – which safeguards against the ingress of damp.

Because the woodchip has low moisture content it burns very efficiently. There is little waste, and if the entire pit burned, it would only produce a carrier-bag's worth of ash, which, being a good fertilizer, is used to encourage grass growth in hard-to-seed areas around the school.

**Conclusions**

As the example of Bradfield School shows, biomass can be an efficient and reliable source of energy. However, key to the success of this project was the effort of the specifiers to seek out advice from those who had used similar systems.

Across the wider sector, there is an opportunity for FM providers to take up a position at the forefront of implementing these systems. However, the challenge will be in ensuring the biomass solution is appropriate, given the specifics of the project. Schools, new facilities on business parks, and some new-build offices are all capable of supporting biomass, with the right infrastructure and supply chain.

Managing biomass within an existing building might be less straightforward. Few commercial premises, for example, are blessed with the space needed for a large storage pit, or indeed, access for frequent deliveries of fuel.

Facilities managers should seek advice before installing biomass systems, in order to take full advantage of the economic and environmental benefits of this increasingly popular fuel type. **FM**

**Mark Harrison** is project manager, Vinci Facilities