Solid Fuel Biomass Boilers

Biomass boiler technology is a good fit for the red meat processing sector for several important reasons. Firstly, meat processors tend to be located in non-metro areas and pay a premium for traditional energy sources such as electricity and natural gas. However, their regional location almost always means that they are situated near a dependable, long-term source of biomass that is within an economical transport distance.

Additionally, meat processing facilities tend to have high uptimes (typically 24/5) and moderate temperature and pressure requirements (8 to 12 bar wet steam). These process conditions overlap nicely with optimal operating conditions of biomass boilers (ideally 5,000+ hours per year) and the levels of temperature and pressure that they are best suited to deliver (<21bar steam, <170ºc hot water).

How the technology works:

Types and configurations:

The Justsen biomass boilers all use a solid biomass fuel (wood chips, sawdust, straw, agricultural residues, etc) to generate combustion and heat in the form of steam or hot water.

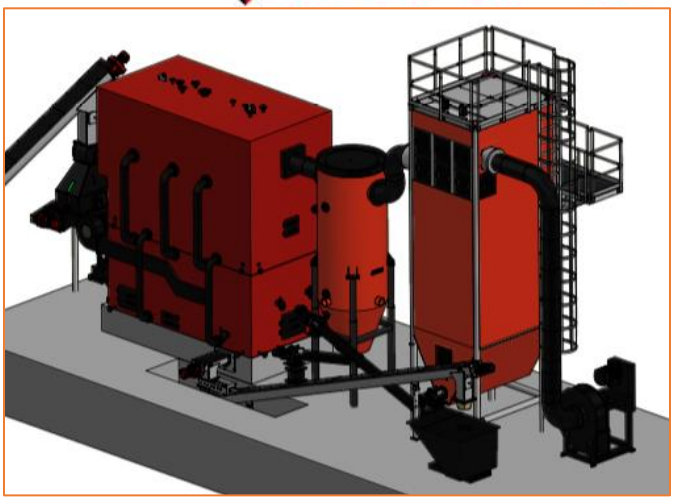
The boilers themselves are fed from a fuel storage system that can be fully automated and integrated with the boiler: there is no need for human involvement to generate thermal energy once the fuel has been delivered into the storage area. The boiler will command the fuel be fed to it depending on the demands that are, in turn, being placed on it from moment to moment.

The whole system can be remotely monitored and activated through wi-fi connection to devices or computers at the client's site.

Value proposition:

Transitioning your thermal energy system to a biomass boiler is simple (technically and operationally), environmentally responsible (using a carbon-neutral biomass fuel source) and, most of all, financially compelling as the unit cost of heat from biomass it typically 50% less than a natural gas systems).

Moreover, there is consensus in the energy sector that sooner or later carbon pricing will return. A biomass energy system future-proofs a large part of your operating expenses from such an eventuality as well as insulting your business from the gas market.



Life expectancy:

Justsen boilers are manufactured to a standard whereby, if properly maintained, a 25-year lifespan can be expected.

Maintenance:

Boiler maintenance activity focuses on cleaning of fire tubes, combustion chamber and water quality. If fuel quality is high, then maintenance requirements are very manageable. Eight days per year is, in most cases sufficient to complete maintenance activities (including the annual shutdown required for steam boilers).

A service agreement with Justsen Pacific can cover all parts and labour related to maintenance, and also open the option of extending the warranty on the boiler system out to 10 years.

Skills required to own and operate:

Because the system offered is a fire-tube system a staff member with an Advanced Boiler Operator ticket should be on site at all times. Otherwise, biomass boilers require similar operator skills levels as natural gas fired units.

What is needed for the technology to be attractive at a red meat facility:

An optimal business case exists when a red meat facility is:

1. Using LPG as a fuel source as the relative cost of LPG (typically $25 to $35/GJ) compared to biomass (typically $4 to $7/GJ) are very different.
2. Paying more than $10.00/GJ for natural gas.
3. Consuming more than 120,000 GJ/year of natural gas for thermal energy.
4. Is operating more than 100 hours per week, ideally 50 weeks a year.
5. Requires steam at below 20bar and/or hot water at below 170ºc.
6. Has space on site to allow for the biomass boiler and the fuel handling system.

Lead time:

The lead time from date of purchase to final commissioning is in the order of 10 months.

Pre-feasibility study requirement:

Full pre-feasibility study is not required, however detailed analysis of the fuel for the project is highly recommended to confirm cost savings.

Additionally, we recommend that the EPA approvals process be completed in advance of final purchase (or final purchase of the boiler made contingent upon the supplier obtaining all required permissions). This ensure the client has comfort around the approvals process before entering into a contract.

Legislative and regulatory requirements:

The primary requirements that pertain to a biomass boiler system are the state-based air emissions levels. Suppliers should have a good understanding of what's requirement in every state of Australia and have confidence their equipment can meet or exceed those requirements. Also, some states have specific requirements around acceptable types and sources of biomass fuel. Again, suppliers should have a clear understanding of these requirements to ensure end users are set up with a reliable, compliant long-term solution to meet their thermal energy needs.

Buyer check list:

As stated above, biomass boilers perform at optimum when they are run constantly. If your facility has "peaking loads" (for example 20% - 90% output increase over 10 minutes), or if you're opearating your thermal plant much less than 100 hours per week, biomass boiler systems may not be a good solution.

Ensure you can contract a suitable supply of biomass fuel and if unsure Justsen Pacific does and can deliver fuel options for your boiler system.

Finally, your site should have sufficient space to accommodate both the boiler (which will have a similar footprint to a gas boilers) *and* the fuel storage area. Depending on the quantity of energyy you consume and the amount of reserve you want on site at any one time, this can be a space of up to 30m x 15m.

This fact sheet has been prepared by Justsen Pacific Pty Ltd in association with Smart Business Hub in 2018.