

AET Combustion System

The most important decision in the design of a well-functioning biomass-fired plant is the choice of combustion system. The AET Combustion System is based upon the AET Spreader Stoker and AET Bio-Grate.

The Fuel Challenge

Some biomass fuels have ash content with a strong tendency to slag and block the heat transfer surfaces. Others contain foreign matter that requires special measures in the fuel handling process to protect the equipment and in the combustion process to protect the environment.

The AET furnace, boiler and combustion system design is based on more than 25 years of experience in combustion of many different types of biomass, varying widely in fuel quality and properties. AET has experience with wood chips, demolition wood, waste wood, sawdust, sander dust, railway sleepers, cuttings from forestry, olive stones, shea nuts, bark as well as straw, poultry litter, compost, sludge, meat and bone meal etc.

Full Control of the Design at AET

AET has many years of design experience with combustion systems for biomass, experience from maintenance of many plants as well as operation and maintenance (O&M) experience at [Western Wood Energy Plant](#).

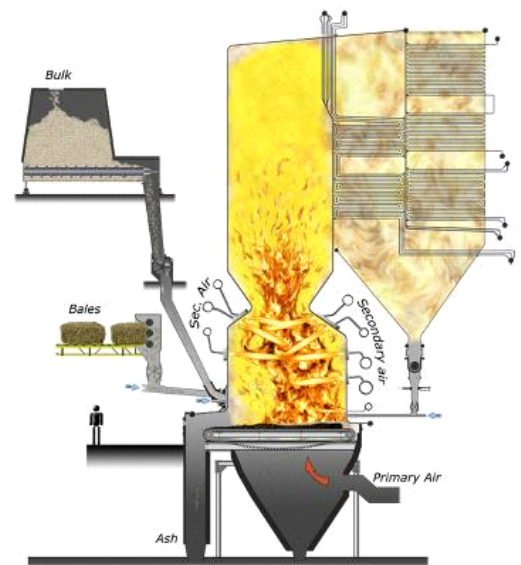
AET has always had in-house design of the [AET Biomass Boiler](#):

- | Furnace
- | Primary and overfire-air system
- | Superheaters
- | Economiser
- | Air preheaters
- | Ducting
- | etc.

The emissions were previously acceptable, but there were also opportunities for improvement. Therefore, many years ago, AET decided to in-source, with considerable success, the functional and detailed design of the major combustion components:

- | Dosing bin
- | Rotary valves for fuel
- | Spreader stoker (single fuel or more fuels – combi- spreader)
- | Dust firing system
- | Travelling grate
- | [SNCR DeNOx](#)
- | Re-injection of fly ash
- | Integrated coarse ash separator.

The AET Combustion System has improved emissions, availability and the maintenance costs significantly.



A view of the AET Combustion System.



Olive stones can also be utilised as fuel in a biomass-fired plant

As an example, AET is now able, through these in-house design products to fulfil the most stringent emission criteria for clean wood without secondary measures. At the same time, it simplifies the responsibility to one point only.

Our References All Show Long-Standing High Availability

Some of the most important qualities of the AET design are:

- | Significantly low flue gas emissions
- | Very high availability
- | Extremely long operating time (>8000 hours) between shutdowns for manual cleaning
- | Robustness towards foreign objects (stones, metal, glass) in the fuel
- | Low power consumption
- | Good air distribution
- | High combustion efficiency
- | High boiler efficiency
- | Low maintenance costs.

AET Has Chosen The Right Technology For Biomass Utilisation

The fuel is pneumatically transported into the combustion zone using the AET spreader stokers for wood chips and, if necessary, using the AET dust firing system for pulverised fuel. Small particles burn in suspension while larger particles land evenly on the grate, forming a fast-burning layer of fuel.

The grate, which forms a "floor" in the furnace, is an AET-BioGrate travelling grate. The continuously-moving grate carpet slowly transports the burning fuel layer towards the boiler front where the ash falls into the ash pit. The grate speed can be adjusted to account for variations in fuel quality and ash content.

Approximately 50% of the combustion air (the primary air) is led to the grate and flows through small air nozzles in the grate bars. The secondary air is injected into the combustion zone through several rows of air nozzles, strategically placed to ensure an efficient mixing of air and combustion gasses. This staged combustion enables low NOx emissions to be achieved.

Unlike other combustion technologies, which has separate zones for drying, gasification, and carbon combustion, the spreader stoker operates with a more evenly distributed combustion over the entire grate.

The optimal combustion temperature is obtained by low excess air ratio, air preheating and/or flue gas recirculation.



Western Wood Energy Plant in Wales has a very high boiler efficiency and one of the best availabilities in the United Kingdom.

LATEST COMMISSIONED PROJECTS

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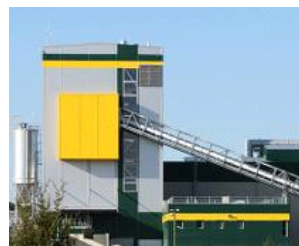
Rothes CoRDe Ltd is a biomass-fired cogeneration plant in Scotland fuelled by a whisky by-product and clean wood.

[Read more about Rothes CoRDe.](#)



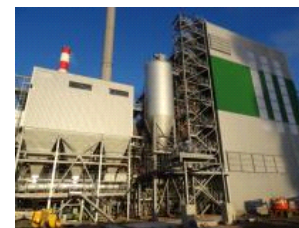
The SODC Orléans cogeneration plant supplies district heating to 15,000 homes, equivalent to 27% of the city of Orléans.

[Read more about SODC Orléans](#)



In Landes, France, a 50 MW biomass-fired plant was successfully delivered to Cofely Engie (former GDF SUEZ) in May 2015.

[Read more about BES VSG.](#)



The Biolacq Energies project, in Lacq, is a biomass-fired CHP plant of 54 MW, that utilises forestry wood, and clean, uncontaminated residues from wood processing.

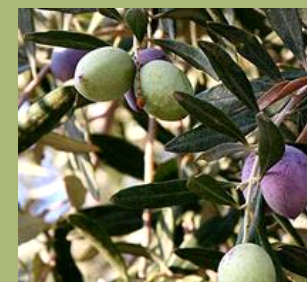
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Zignago Power s.r.l.–successfully producing Green Energy in Italy

The 49 MW Zignago Biomass power plant in Italy, owned and managed by Zignago Power s.r.l., belonging to the Marzotto family empire, has since its installation in 2013 been running with a very high availability (98.8%). The plant utilises wood residues and agricultural waste such as straw, miscanthus and maize. [>Read more](#)



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