

Valeswood News

Environmental Technology from Valeswood ETD Ltd.

www.valeswood.com

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Welcome to Valeswood News

Welcome to the first edition of Valeswood News. I hope we can give you an insight into the excellent renewable energy products and services that Valeswood ETD is able to provide. We have a great range of innovative solutions using the very latest in European technology for all your renewable energy needs. See our website for further details.

Our comprehensive range of environment consultancy services will also enable you to feel confident that your regulatory and development issues can be resolved without delay by using a package of solutions developed to meet your individual needs.

In this issue we focus on the Puhdas wood gasification system. This is a great way to cut energy bills while also reducing carbon emissions. This well developed technology has been used successfully in Finland for several years. It is now available in a complete package from Valeswood ETD. Contact us for further details.

John Turner
Managing Director

Valeswood-Chongqing University Cooperation

Valeswood has recently signed an innovative cooperation agreement with Chongqing University to develop environmental technologies in China. Valeswood is leading a group of highly innovative European companies who are all keen to develop a new partnership with environmental companies in south west China.

Left to right: Dr Chris Smith Valeswood Technical Director, John Turner Valeswood Managing Director, Prof He Yulin of Chongqing University, Prof Kevin Kendall, and Dr Waldemar Bujalski of Birmingham University.

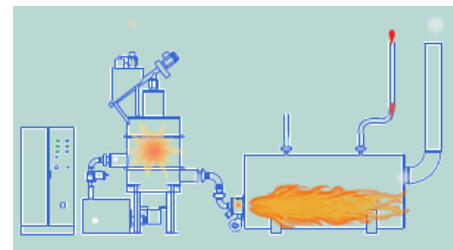


Are your Energy Costs becoming Unmanageable?

A gasification system may be the answer for you.
Retain your energy flexibility by retrofitting the system.
You don't even need to change your boiler.
Valeswood supplies the Puhdas system

What is a gasifier?

A gasifier converts solid biomass fuels into a high-value gaseous fuel in a controlled and optimised way. Turning solid fuel into a clean combustible gas gives the benefits of gaseous fuels and solves problems related to solid fuel usage. The resulting producer gas is burnable in most oil-fired hot water and steam boilers as well as in numerous other industrial applications.



How does it work?

The gasifier automatically adjusts to the load level and only generates the amount of gas that is needed. The system comes equipped with a pellet fuel feed system, but may be readily modified to run on woodchips, briquettes or other suitable biomass fuels. The gas is generated in a container up to twenty metres away from the boiler room. The fuel is fed from a silo into the gasifier, and the gas is led to the burner via an insulated gas pipe. This gas burns with a clean blue flame and produces no harmful NO_x, SO_x, CO or particle emissions.

What kind of fuels can be used in the gasifier?

Most biomass material can be used, when processed to the right particle size and moisture content. For electricity generation and greenhouse gas production the requirements for the fuel are stricter as the gas has to be clean. Generally high quality wood chip is the best fuel. For other than power generation solutions wood pellets offer easy wood handling and logistics. Adding a proper briquette line and dryer to the plant allows using most bio-fuels in all PE applications, as long as they don't contain too much sand or other minerals.

What is the appropriate wood chip particle size?

The optimal size for wood particles is around 50mm x 50mm x 20mm; the maximum size is about 100mm x 50mm x 50mm and the minimum is about 10mm x 10mm x 10mm.

What moisture content is acceptable in fuel for the gasifier?

The gasification process works with up to around 35% moisture content in the fuel; but if the gas needs to be dry, as the case is in power generation, and waste water production is to be avoided, the fuel should be dried to 15% moisture content before the gasification. In the power generation process there is plenty of waste heat available to be used as the energy source for fuel drying.

How much ash is produced and how is it treated?

The gasifier produces about 10 kg ash per one MWh of gas produced. Fly ash and bottom ash are removed automatically. The ash contains around 80% unburned charcoal and can be used to make charcoal briquettes, carbon filter material, etc., offering additional income for the plant. Alternatively, the larger particle size charcoal (around 50% of the ash), can be re-gasified to reduce the volume of unburned carbon. In the latter case 5 kg/MWh (gas) of fly ash needs to be disposed of.

What effect does retrofitting a wood gasifier have on the energy output of an existing gas or oil fired boiler?

Although retrofitting a wood gasifier to an existing gas or oil fired boiler is an attractive solution, with short pay back time, the gas produced has a lower energy density than natural gas or oil, leading to some derating of the boiler when switching to 100% wood gas firing. The amount of derating depends on the boiler type but is usually less than 20%.

What size gasifiers can Valeswood Supply?

The standard size gasifier has a gas output of 1 MW. This is enough to produce around 900 kW process heat in a gas fired boiler, when only heat is desired, or around 300 kW electricity and 500-700 kW heat in a combined heat and power plant. Higher output is achieved by increasing the number of gasifiers operating in parallel and upsizing boilers/engines.

How much wood fuel does a 1 MW gasifier consume?

Using chipped soft wood, such as pine, the gasifier consumes around 0,5-0,6 solid cubic meters (270-300 kg@15% H₂O) per hour, or around 1,0-1,2 loose cubic meters per hour. With 7,500 annual operating hours this would require about 8,000 loose cubic meters (less than 2,250 tonnes @ 15% H₂O) per year.

How much oil can be saved by retrofitting a 1 MW gasifier to an oil fired boiler plant, dryer etc.?

At full operation a 1 MW gasifier produces 1 MWh of gas per hour, which equals 100 liters of light fuel oil per hour. Assuming annual operation of 7500 hours would mean avoiding the cost of 750,000 liters of light fuel oil annually.

What is the heating value and composition of the wood gas produced by the gasifier?

Chemical energy (LHV): 6 MJ/kg. In heat applications the gas from the gasifier is at 500-600 °C and thus the heating value is higher, around 7 MJ/kg. The composition is CO: 23%, H₂: 20%, CH₄: 1-3%, CO₂: 10%, N₂: 45%, H₂O: 10%.

What is the annual availability of the gasifier allowing for maintenance and down time?

Annual availability of 7500-8000 hours can be guaranteed.

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