Combined Heat and Power

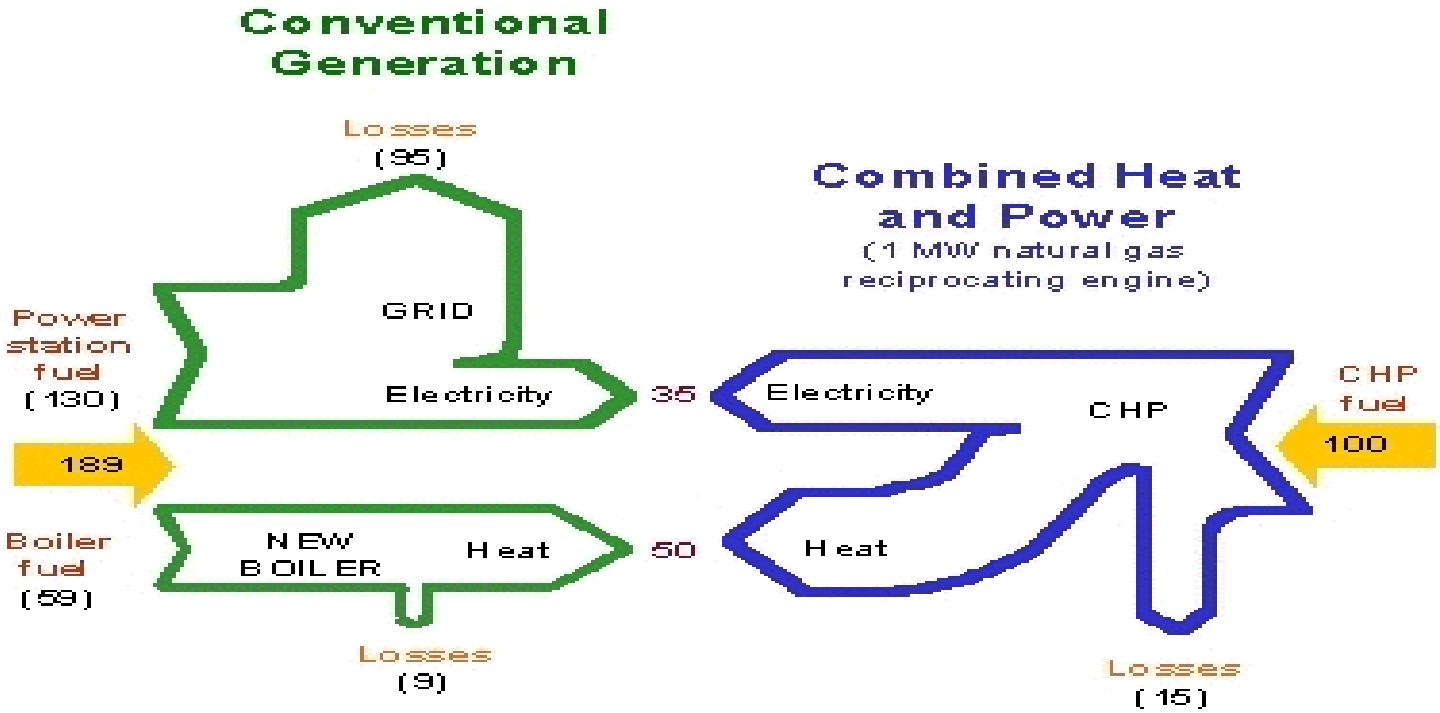
energy by nature...

Bioenergy *Technology Ltd.*

Combined Heat and Power

Conventional power generation is typically less than 23% efficient and below - that is most of the energy generated from burning the fuel is wasted as heat lost to the atmosphere as illustrated by the large cooling towers associated with Power Stations. Generation of heat from boilers is a much more efficient process with about 80% of the thermal content of the fuel being typically converted to useful heat.

Separately, electricity and heat production are in the region of 45% efficient, together the efficiency rises to above 80% with consequent fuel savings and reductions in harmful emissions.

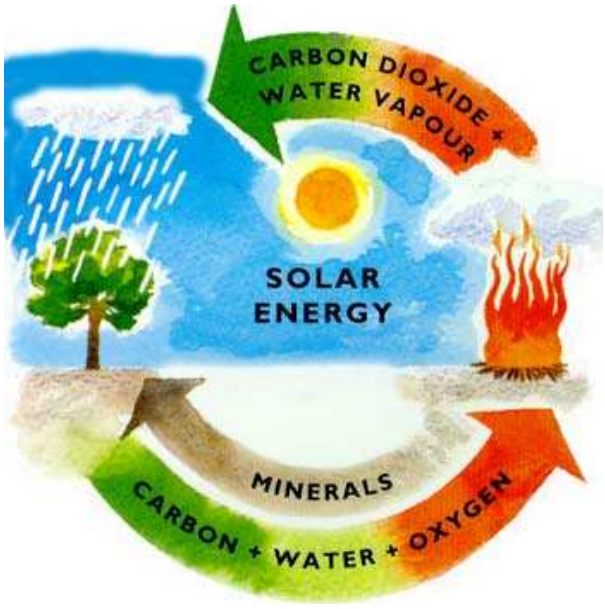


Bioenergy Technology specialise in wood fired systems . The photograph below shows a 2.3mW CHP system being installed at the site of a wood producer early in 2002.

Bioenergy Technology Ltd.

Fuel

Carbon dioxide from the atmosphere and water from the earth are combined in the photosynthetic process to produce carbohydrates (sugars) that form the building blocks of biomass. The solar energy that drives photosynthesis is stored in the chemical bonds of the structural components of Biomass. If we burn biomass efficiently (extract the energy stored in the chemical bonds) oxygen from the atmosphere combines with the carbon in plants to produce carbon dioxide and water. The process is cyclic because the carbon dioxide is then available to produce new biomass. Biomass is a renewable resource, but above all, it is carbon neutral, therefore not contributing to global warming!



- With the increase in Landfill Tax and the introduction of the latest Climate Control Levy, biomass will become even more competitive with fossil fuels.
- Biomass is a chosen growth sector in the U.K.
- Opportunities for district heating and CHP projects.
- Increased awareness of opportunities at grass roots levels and beyond.

Bark/Wood chip

Wood pellets

Reeds

Miscanthus

Forestry residue

Although much of the focus on CHP in the U.K. has been focussed on electricity generation in recent years, we believe it is important to ensure for any planned project that there is a strong thermal requirement to ensure an efficient system.
Typical successful CHP users in the U.K. have been:

- Leisure centres
- Hospitals
- Schools
- Colleges
- Universities
- Community centres
- Industrial
- District heating schemes

Energy usage often ranges from 800kW to 4mW and above, with typically, a 2:1 ratio between thermal and electrical output.

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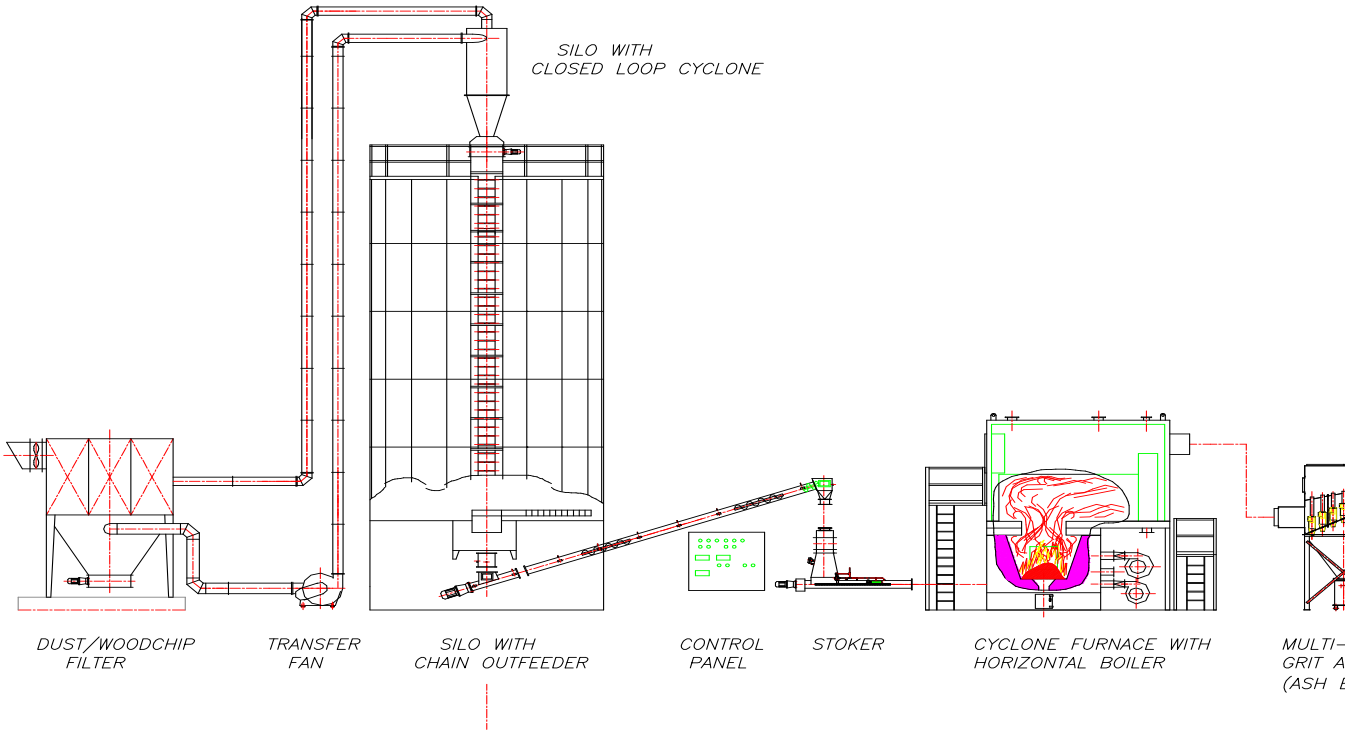
Equipment

With many years of experience in manufacturing, supplying and installing wood combustion systems, Bioenergy Technology are able to offer wood fired boilers ranging from domestic to Combined Heat and Power plants including all ancillary equipment.

Bioenergy prides itself on its ability to provide a full installation specification from storage systems through to the chimney, and together with a detailed knowledge of mechanical services we can offer a full Turnkey solution.



Bioenergy typical site layout

Storage

Bunker

These are often constructed below ground as a classic solution for large volumes or on sites where fuel delivery requires the facility to tip the material from a vehicle easily.

Silo

This is intended for storing dry wood chip/ pellets.
Available in 3m, 4m or 5m diameter.

Ro-Ro Bins

This is a purpose designed heavy duty mobile steel bins with two flap end doors. Each bin fitted with a single moving floor scraper system and hydraulic cylinder with quick release flexible hoses and fixed pipe work. A Ro-Ro bin can ‘plug in’ directly to the wood combustion system.

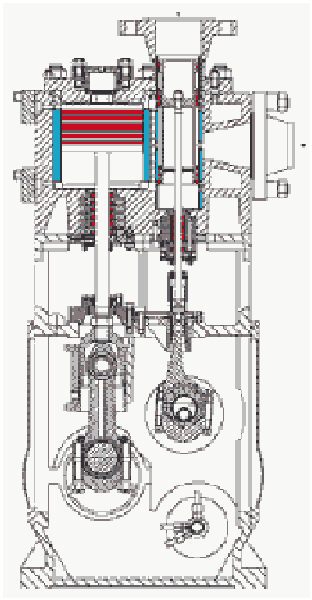
Boiler

Bioenergy Technology Limited supplies different combustion plants, meant for all kinds of biomass streams. Each boiler and plant is supplied to the specific demands of the customer, the starting point is always the basic plant as to the kilowatt output requirement.

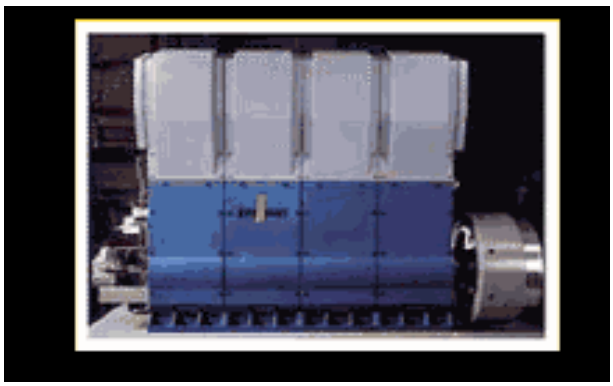
Constant monitoring of improvements incorporating modern designs and can include the following equipment:
-Moving Grate technology
-Static retorts
-Pre-combustors

A 2.3mWatt wood fired steam boiler system , which utilises a Spilling one cylinder system steam engine generator unit, to produce approximately 170kWatts of electricity from steam at 14bar was installed in Northern Ireland by Bioenergy. For smaller installations of less than 1mW, steam engines (reciprocating engines powered by steam) are more cost effective and flexible solution to producing power efficiently.

Electrical generation



There are broadly two methods of generating electricity from combustion – via steam turbines or by use of very clean (non particulate) fuels (e.g. natural gas or diesel) via reciprocating engines.
Bioenergy Technology favour the use of steam turbines cycle (the Rankine Cycle) for use of wood combustion to develop Combined Heat and Power. This is well established technology with a high level of reliability. It is possible to develop gas from wood to run reciprocating engines or gas turbines, but this technology (gasification) is currently at an earlier stage of development and therefore lower reliability.



Bioenergy Technology steam engine

Free Standing Chimney

Bioenergy chimney is a twin insulated chimney constructed generally as detailed below:

The inner liner is manufactured from stainless steel grade 316 0.46mm, whilst the outer casing is stainless steel 304 0.46mm.

The insulating material on internal diameters 125mm—200mm is a high quality silica based powder which ensures optimum performance.

The sockets and spigots are manufactured from stainless steel grade 316 0.46mm, their construction having bayonet type engagement which lock rigidly together.

The inner liner is lock formed and fixed to the upper male spigot only, and the outer casing is lock formed and is joined to both the male spigot and female socket end caps. This form of construction allows the inner liner to expand and contract with the varying temperatures without affecting the outer casing.

Bioenergy Chimney internal diameter is from 250mm—600mm and is constructed in the same manner as the smaller diameters.

Additional equipment

Dissipator

Flatbed air blast cooler, incorporating heat exchanger and axial fans to cool the water.

Bioenergy Wood Granulator

Bioenergy has the right solution for every type of application, all the machines are manufactured in line with the standards of the wood processing industry. The basic model can be modified according to specific requirements (e.g. desired output, hopper shape and rotor types).

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For further information or advice on any new boiler or ancillary equipment please visit our website at:
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