### WHAT IS BIOMASS GASIFICATION?





## Drying Process:

After the biomass enters the gasifier, its free water and bound water evaporate by the action of heat.

### Pyrolysis Reaction:

The thermal decomposition reaction begins when the temperature reaches 200 °C or above. About 70% of volatile substances are released at 300-400 °C (While 30% of volatile substances are released at 800 °C from coal). The pyrolysis reaction mainly releases volatile components such as steam, hydrogen, carbon monoxide, methane, tar, and other hydrocarbon.

### Biomass Gasification Principles:

It is a thermochemical reaction that converts the combustible part of the biomass into fuel gas (mainly  $H_2$ , CO,  $CH_4$ ) under high temperature conditions using oxygen or oxygen containing substances as gasifying agent.

When heating the biomass, a large amount of volatile substances may be deposited at relatively low temperatures. (The volatile content in biomass is approximately about 76 - 86%).

In order to provide thermal conditions for reactions, the gasification process must limit the supply of air or oxygen to cause partial combustion of the raw material. Which converts energy into combustible gas obtained from the reaction as much as prossible, and the gasification products are mainly combustible gas containing  $H_2$ , CO,  $CH_4$  and low molecular CmHn.

### Combustible Gas:

After combustible gas is obtained by biomass gasification, it is necessary to purify the combustible gas to various degrees to meet the requirements of the following equipments.

The gas produced by biomass gasification is now applicable in Three ways: (1) "gas supply" in which the gas is used for cooking, boiling water, and for bathing instead of liquefied gas. (2) "hert supply" in which the gas is piper to industrial boilers to generate steam or hot water and uesd as fuel for industrial kilns and drying equipments.(3) "electricity supply" in which the gas is uesd as fuel for gas internal combustion engines, generating electricity from genset that are connected to the grid or used by users themselvers.

#### Oxidation Reaction:

The remaining charcoal from pyrolysis reacts with the introduced air, mainly generating carbon dioxide and a small amount of carbon monoxide and releasing a large amount of heat meanwhile to support the drying, pyrolysis, and subsequent reduction reactions of biomass, with a maximum temperature of 1000-1100 °C.

#### Reduction Reaction:

Oxygen does not exist in the reduction process, and carbon dioxide and carbon monoxide generated by oxidation react with water vapor and charcoal to produce hydrogen and carbon monoxide. These gases, along with the gases generated from the pyrolysis of volatile matter, constitute biomass combustible gas, ultimately completing the process of biomass conversion from solid to gas fuel.





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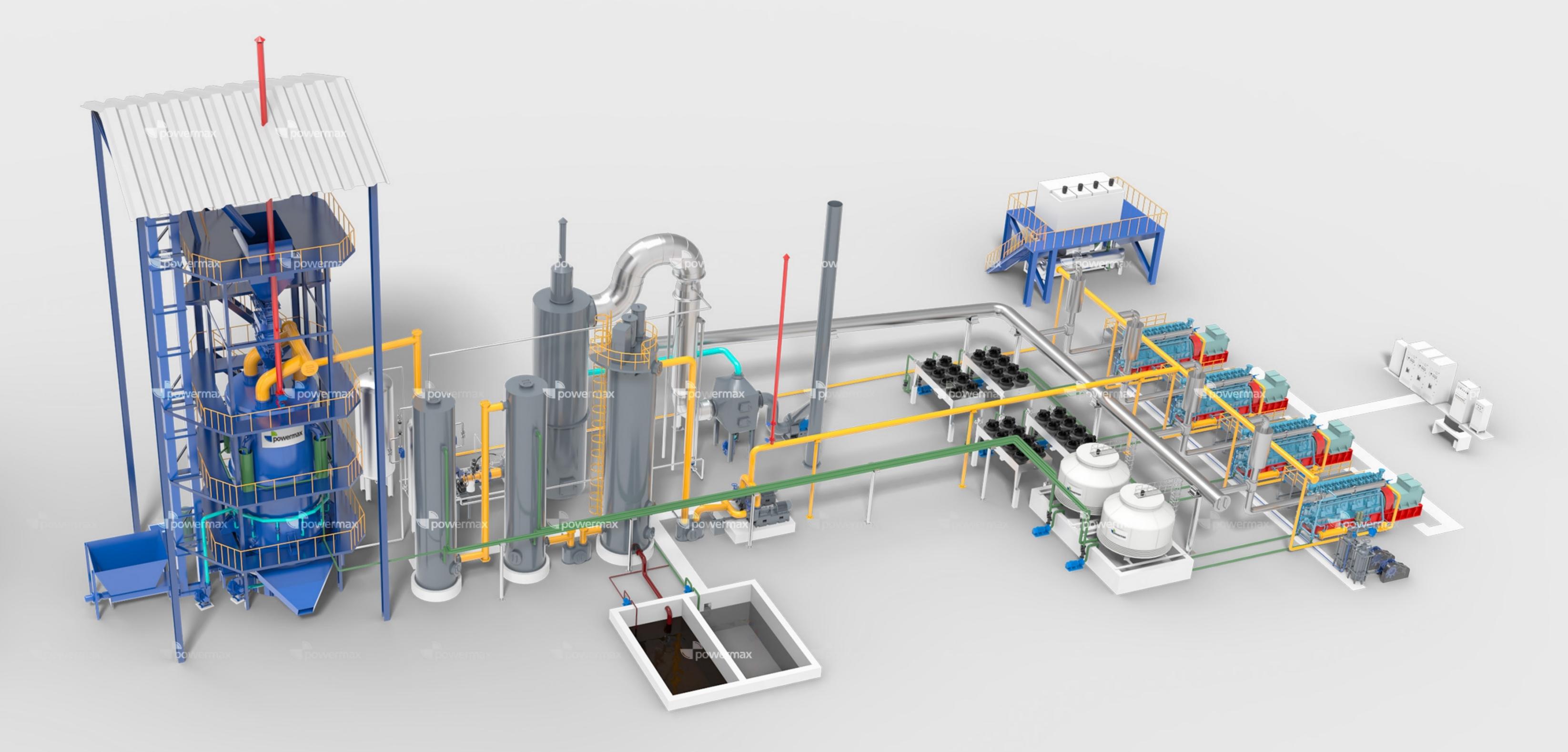
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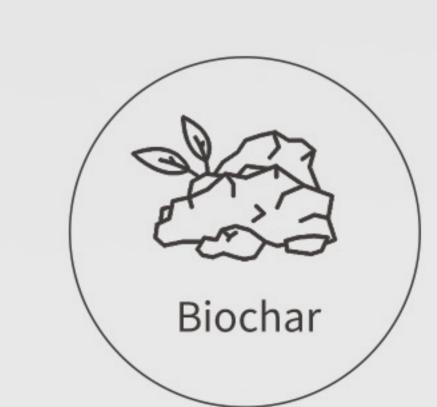
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# Biomass Gasification Power Generation System















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### WASTE IS ENERGY TREASURE.

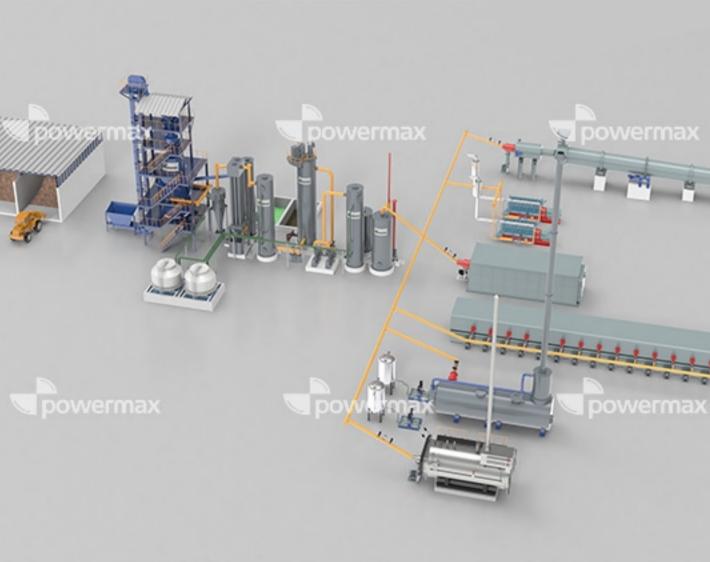
# LET US PLAY OUR ROLE IN REDUCING THE EARTH'S CARBON DIOXIDE EMISSIONS.

As fossil fuel age is coming to an end, bio energy attracts more attention from future oriented companies. This is the time to know about powermax's technology.

Biomass is a renewable source that plays a central role in energy recovery in the future. Our company produces more electric and thermal energy with its own patented technology, and achieves flexible energy supply without using conventional methods. We will consistently help you to transit to efficient and sustainable energy production.

### Our Advantage:









### Wide Range of Raw Material

All kinds of agricultural waste such as waste wood, husk, sawdust, treebranch, forest waste, rice straw, rice husk, peel, bagasse, corn cob, and other biomass can be used to produce clean energy.

### Cogeneration of Heat and Power

Cogeneration is also called an energy cogeneration, an efficient, clean and reliable method for generating power and thermal energy from a single fuel source.

Cogeneration can greatly improve the operating efficiency

of the facility and reduce energy

costs.

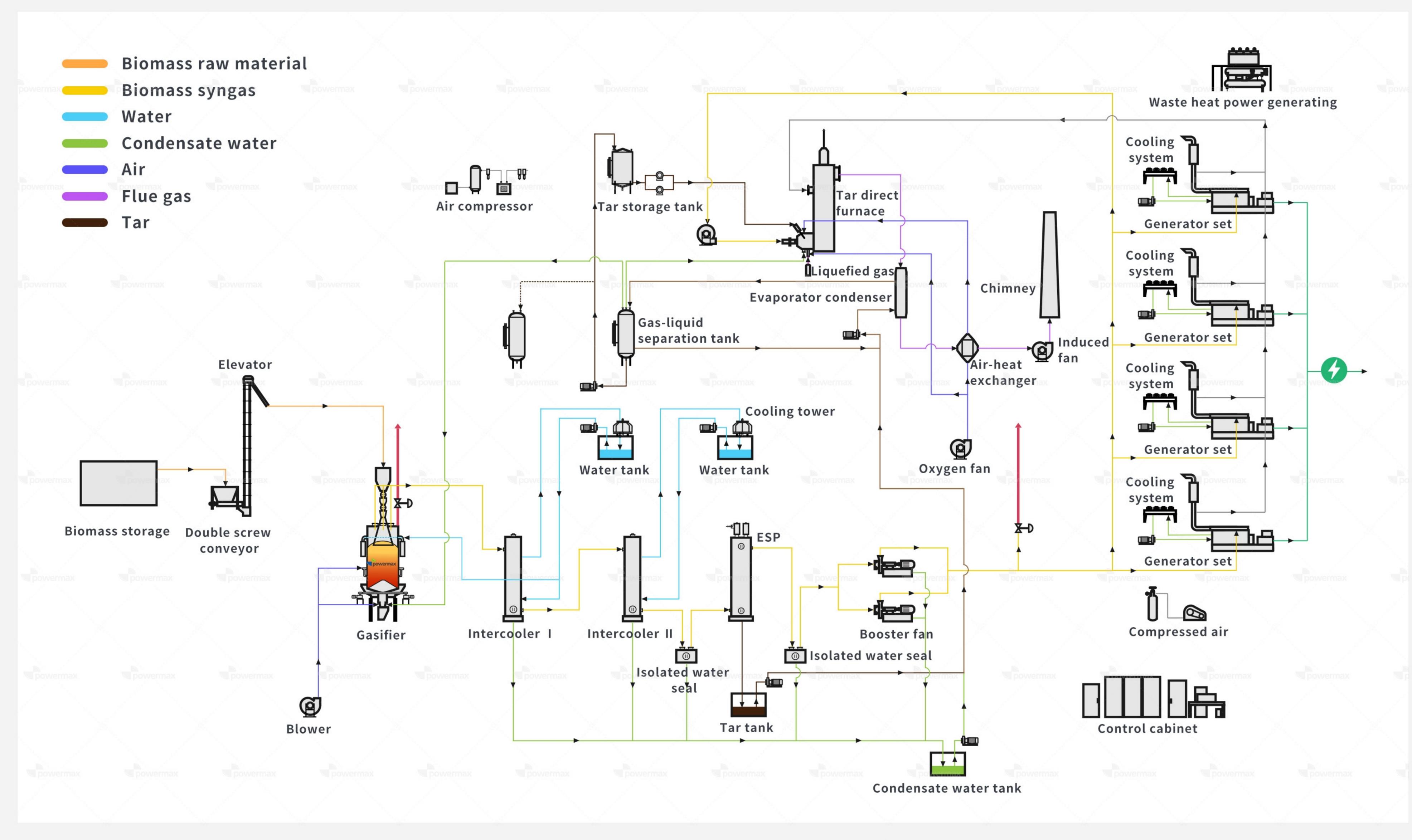
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Powermax provides a power plant where you can't make dust when generating electricity and ergonomics. Also, in the gasification process, charcoal is recovered as a by-product, and the profit is born. Charcoal can be used as an activated carbon, so it is taken into the material cycle of the material.

# Byproducts (Charcoal) Power Generation Equipment

The 300 series gas power generation unit is widely applied in the clean field. Comprehensive use of energy generation and waste heat, such as especially energy generation from and comprehensive utilization of waste heat, and blue carbon gas. The engine speed is 500 R / min and 600 R / min, and the output power is between 400 kW and 3000 kW.

### Flow Chart:



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### Technical Parameters:

Equipment Model	UFBG 2MW
Rated Power (kW)	2000kW
Rated Frequency (Hz)	50/60Hz
Rated Voltage (V)	220/400/440/6300/6600/11000/13800V
Gasifier Type	UFBG Gasifier
Biomass Moisture Requirements	≥35%(WB) MAX50%
Biomass Size Requirements	Diameter: 20 mm to 80 mm, Length: 10mm-80mm
Biomass Consumption (kg/Hr)	3000-4000
Natural Gas Production (Nm³/h)	5000-6000
Discharge Type	Wet Ash Type / Dry Ash Type
Gas Purification Type	Dry Gas Purification System
Gas Heating Value	≥1300Kcal/Nm³
Gas Type	CO: 16~25%, CO <sub>2</sub> : 5~11%, H <sub>2</sub> : 10~18%, CH <sub>4</sub> : 4~6%, N <sub>2</sub> : 38~50%,
Generator Set Model	500GFLS
Generator Set Unit	4 Sets

