powermax

BIOMASS GASIFICATION POWER GENERATION SYSTEM

Powermax is supplying you small to medium scale modular biomass gasification power generation systems(50KW to 2000KW each module) to intake the waste biomass all around us. Instead of hauling the biomass to a central utility for conversion, Powermax is bringing our system to where the fuel already is, right where the users and needs already are."

• www.powermaxgasifiers.com

• 50–2000KW Modular Design

• Local Solution for a Global Future

WHO WE ARE?

Biomass gasification industry leader

"Our company mission is to exceed the expectations of our customers with the most reliable,efficient and economical green and clean energy solutions available."

Wuxi Teneng Power Machinery Co., Ltd. is located in Wuxi City Jiangsu Province, which is a city on the Yangtze River between Suzhou and Nanjing, and is located in the south of Jiangsu Province, half way between the cities of Shanghai and Nanjing, with Shanghai 128km to its east and Nanjing 183km to its west.

Our company was founded in 1986, which has a strong technical design , developing capabilities and professional processing capacity. It is a group company which manufactures biomass gasification equipment, coal gasification equipment, gas generator sets and other biomass treatment equipments.

The business covers : product design, R & D, manufacture, sales, project contracting, installation and debugging, project delivery, staff training, maintenance and technical advice.

The company's main products include: coal gasification power generation systems, Biomass gasification power generation systems , coal gasifier(single stage coal gasifier, two stage coal gasifier, twin-fire coal gasifier and fluidized bed gasifier), biomass gasifier(fluidized bed gasifier, updraft fixed bed gasifier, downdraft fixed bed gasifier and twin-fire fixed bed gasifier), Biomass Boiler(biomass gasification boiler, biomass fired boiler),biomass briquetting equipment, biomass pelleting equipment, gas purification equipment and all kinds of gas generator sets.

Our company's products are widely used in Shandong, Henan, Zhejiang, Jiangsu, Anhui, Jiangxi province and are also exported to Philippines, Cambodia, Myanmar, Thailand, Vietnam, Indonesia, India, Africa, Europe, South America and other countries and regions.

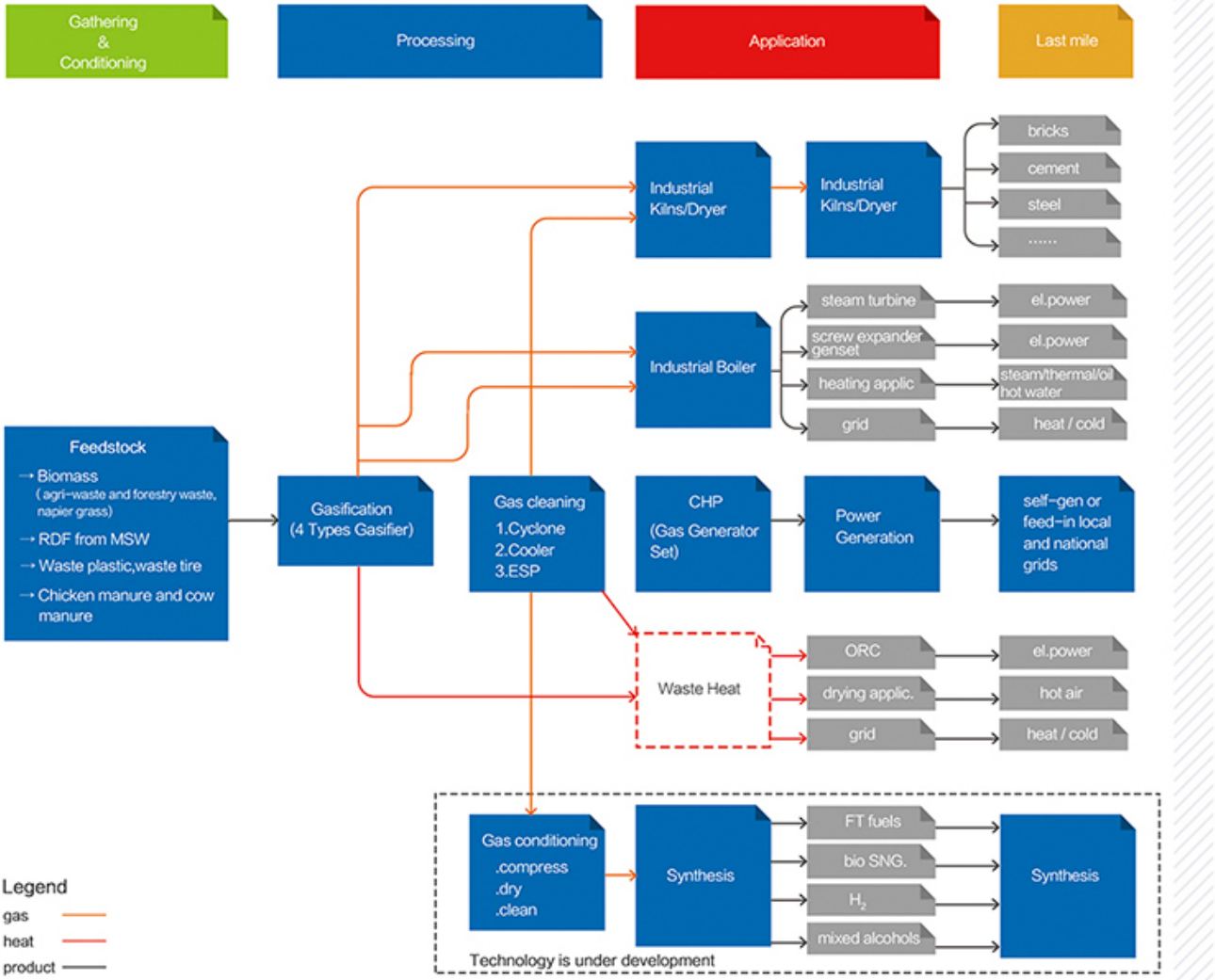
Our company has passed ISO9001 quality management system certificate which is awarded by Royal U.K. UKAS Certification Authority, and our product has passed the EU export licensing CE certificate and etc.

In the building of 'high quality products' , Wuxi Teneng Power machinery Co., ltd. would also put 'high-quality service' as an important factor in the development of the enterprise. It persists in the 'customer first, common development' spirit of enterprise, and 'steady and sure, reputation to be first' corporate style of work.

We put 'The pursuit of perfect quality, Meeting customers' demand 'as the quality policy, and provide more products of high quality and superior services to the masses of users at home and abroad.

We will sincerely welcome domestic and foreign customers to visit and win-win cooperation to create a happy tomorrow!

POWERMAX
CARBON RECYCLING OVERVIEW



CE certificate for biomass gasifier

CE certificate for gas generator set

ISO9001

ISO14001

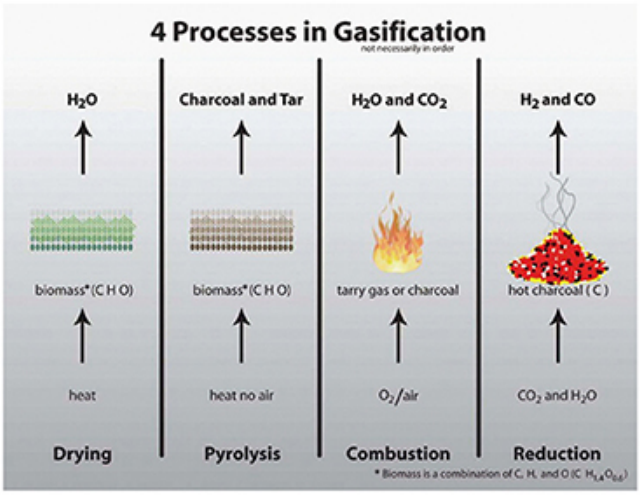
WHAT IS GASIFICATION?

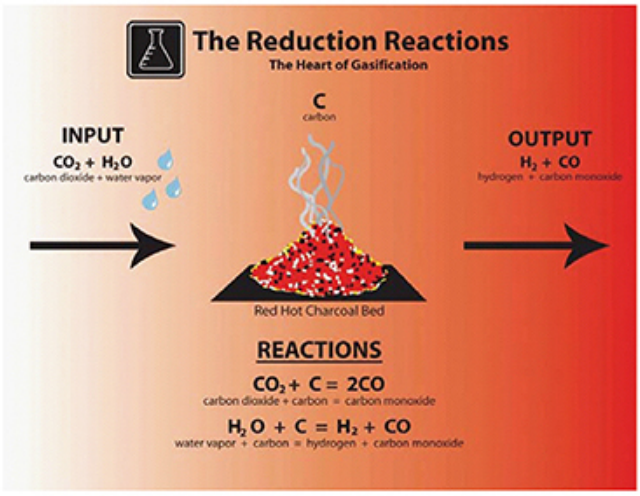
Gasification is the use of heat to transform solid biomass or other carbonaceous solids into a synthetic 'natural gas like' flammable fuel. Through gasification, we can convert nearly any dry organic matter into a clean burning fuel that can replace fossil fuel in most use situations.

Whether starting with wood chips or walnut shells, construction debris or agricultural waste, gasification will transform common 'waste' into a flexible gaseous fuel you can use to run your internal combustion engine, cooking stove, furnace or flamethrower.

The gasifier is essentially a chemical reactor where various complex physical and chemical processes take place. Biomass gets dried, heated, pyrolysed, partially oxidized and reduced in this reactor as it flows through it.

Four distinct processes take place in a gasifier: 1) Drying of the fuel 2)Pyrolysis 3)Combustion 4)Reduction.





APPLICATION OF GASIFICATION

The major application of gasification is that the produced gas will be directly used for the generation of power(and heat). This can be either in stand-alone combined heat and power (CHP) plants or by co-firing of the produced gas in large-scale power plants. The installed power production capacity in the EU_25 countries is Approx. 700GWe in 2020 (based on an assumed growth rate of the power consumption of 2% per year). A target can be set to implement 10% of the growth of power production in the period between 2000 and 2020 with biomass-gasification plants.

In the view of decreasing reserves of fossil fuel and also because of aim of the world to reduce the dependency on imported fossil fuels, there is a growing interest in producing syngas from the renewable source biomass, i.e. 'biosyngas'. Biomass will play an important role in the future global energy infrastructure for the generation of power and heat. The dominant biomass conversion technology will be gasification, as the gases from biomass gasification are intermediates in the high-efficient power production or the synthesis from chemicals and fuel.

POWER GENERATION

Generation of Power and Selling it to Grid
Generation of Power for Factory
Generation of Power for Village Electrification
Generation of Power for Irrigation and Pumping activities

THERMAL APPICATION

Industrial Furnaces / Kilns
Industrial Ovens
Industrial Dryer / Hot Air Generators
Industrial Boiler(Hot Water, Steam, Thermal Oil)

WHY USE BIOMASS GASIFICATION TECHNOLOGY

Gasification technology represents a significant advancement over combustion or incineration technology due to its innate ability to control pollutants (i.e tar, particulates,etc) and its ability to produce multipe products including: biomass gas, heat, power,liquide fules: tar oil and biochar vs. just steam from combustion.

Gasification compared to combustion

The differences between gasification and combustion are best understood by comparing the chemical reactions involved in each process.

Combustion

Combustion is the total oxidation of carbon,hydrogen and other elements, which releases thermal energy. Combustion is generally less thermally efficient than gasification. As shown by considering the typical combustion reaction below,combustion (as carried out in incinerators) produces higher concentration of pollutant gasses such as SO_x and NO_x than does gasification.

Gasification

Gasification is a much cleaner process than combustion(incineration) for converting carbonaceous materials to energy. In gasification,the fuel or converted to chemicals such as ammonia for industrial or agricultural use. The differences between gasification and combustion are best understood by comparing the chemical reactions involved in each process.As can be seen by comparing the typical combustion and incineration reactions,the levels of SO_x and NO_x are much reduced by first gasifying the fuels prior to combustion of the syngas product.

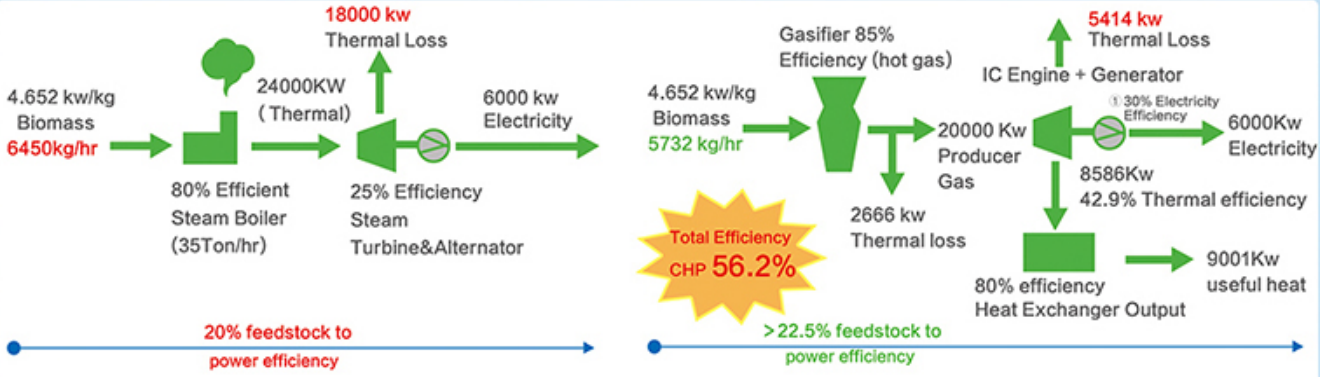
Combustion (Oxidation) Reactions

$C+O_2 \longleftrightarrow CO_2$	Oxidation of Carbon
$1/2O_2+H_2 \longleftrightarrow H_2O$	Oxidation of Hydrogen
$N+O_2 \longleftrightarrow NO_2(NO_x)$	Oxidation of Nitrogen
$S+O_2 \longleftrightarrow SO_2(SO_x)$	Oxidation of Sulfur

Gasification Reactions

$C+1/2O_2 \longleftrightarrow CO$	Gasification with Oxygen
$C+CO_2 \longleftrightarrow 2CO$	Gasification with Carbon Dioxide
$C+H_2O \longleftrightarrow CO+H_2$	Gasification with Steam
$C+2H_2 \longleftrightarrow CH_4$	Gasification with Hydrogen
$CO+H_2O \longleftrightarrow H_2+CO_2$	Water-Gas Shift Reaction

Comparison of 1*6MW Combustion Steam Boiler &Turbine VS 6*1MWGasifier & Gas engine

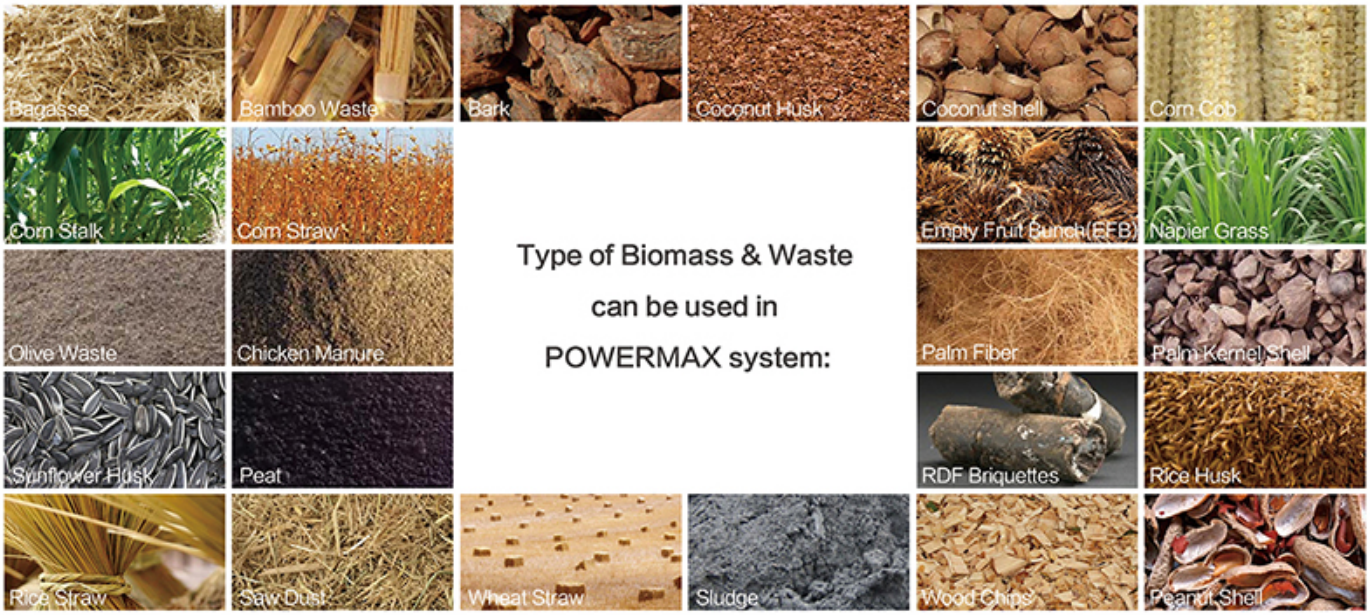


- 12.5% higher feedstock consumption
- 36.2% lower over all efficiecny
- If steam is used for thermal application, electricity generation reduces further
- Large make-up water requirement
- Bigger over all system foot print
- 18-24 months to implement
- Higher EPC/turnkey cost(transporation,civil work , installation)
- Higher Operation & Maintenance Cost, require more workers and high-level workers for O&M
- Not suitable for self-gen and island mode, only good for grid mode
- Typically not feedstock flexible
- Must continuously running without stop, fuel storage and reliable fuel supply
- No Biochar produced

- 12% lower feedstock consumption
- 36.2% higher over all efficiecny
- 33.7% of feedstock energy can be recovered as useful heat
- Extracting thermal energy doesn't cause a decrease in the electricity generation
- Less than 1 liter/kwh make-up water requirement
- Smaller over all system foot print
- 4-6 months to implementation, can build one module by one module
- Lower EPC/turnkey cost(transporation,civil work and installation)
- Lower Operation & Maintenance Cost, require less people and Low-medium level workers for O&M
- Suitable for self-gen,island model and grid model
- Very feedstock flexible
- Start and stop modules of systems according to power demand and fuel supply, more flexible
- Ash is Biochar,another revenue, 6MW can produce 2292tons biochar per year, 458400USD per year (Price of biochar:$200/ton)

① Powermax is developing biomass gas genset's electricity efficiency to 36% with German Heinzmann, then the total electricity efficiency can reach 27%.

POWERMAX BIOMASS GASIFICATION POWER PLANT

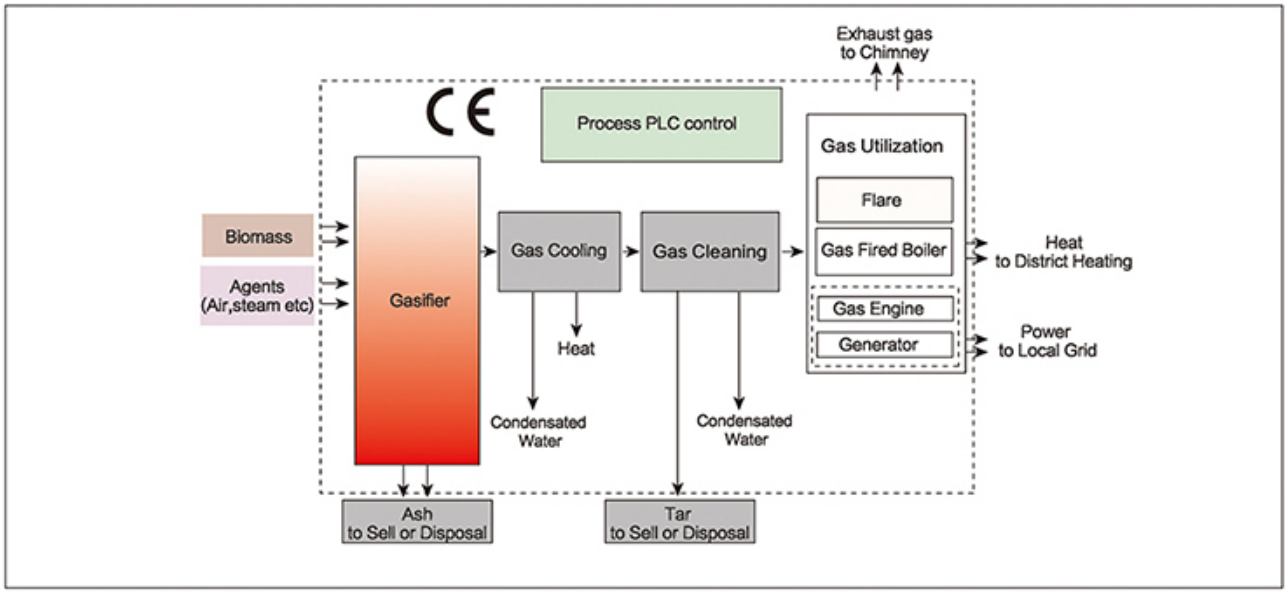


The basic principle of POWERMAX's biomass gasification system(abbreviated as BGPS) is to convert agriculture and forestry products and wood processing remains(including rice husk, wood powder,branches, offcuts, cron straws,rice straws,wheat straws,cotton straws, fruit shells,coconut shells,palm shells,bagasse,corn cobs and etc.) into combustible gas.

It is then used as fuel in gas engine to generate electricity.Biomass gasification successfully conquers the disadvantages of biomass,such as low flammability and wide diversity.Biomass gasification system is characteristic of small land requirement and environment friendly.It's one of the most effective way of biomass utilization.

Our biomass gasification process includes three steps. The First step is biomass gasification, which convert biomass into syngas.The Second step is syngas purification.The producer gas coming from gasifier usually contains contaminants including dust,coke,tar and etc. The contaminants will be removed by the purification system to ensure normal operation of gas engine.

The Third step is power generating in gas engine. The high temperature exhaust gas may be reused by waste heat boiler to generate steam or hot water for civil or industrial use.Steam turbine may also be considered to make a gas-steam combined cycle power plant, which will increase the total efficiency.



The POWERMAX biomass gasification power generation systems are based on a modular concept and are able to be applied to 50-20000KW biomass power station.

There are four series of biomass gasification systems offered by POWERMAX which range from 50-2000KW of power generation:

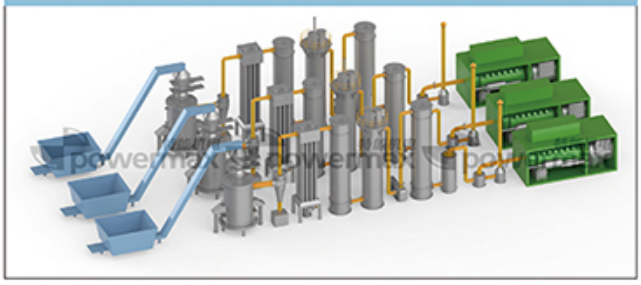
CFBG(Circulating Fluidized Bed Gasifier) Series,

UFBG(Updraft Fixed Bed Gasifier) Series,

DFBG(Downdraft Fixed Bed Gasifier) Series,

TFBG(Twin-fire Fixed Bed Gasifier) Series.

Modular Concept Biomass Gasification Power Plant



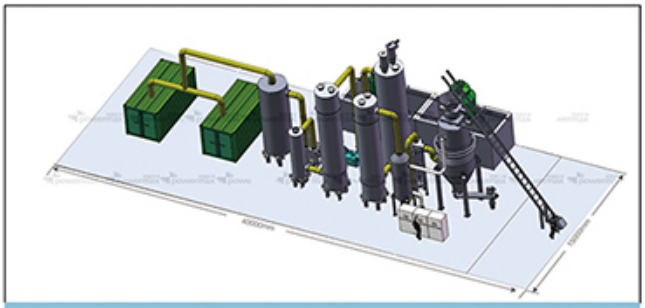
A series biomass generator sets from 50KW to 1200KW are developed by POWERMAX to combine with POWERMAX advanced gasification technology.

These gas generator sets are using the high efficiency Siemens technology alternators,Chinese top brand medium speed gas engine (500-1500rmp) with advanced European engine control systems. The high performance of the POWERMAX biomass gasification plants and the later production of electricity with the gensets represents a competitive solution when compared with conventional boiler-fired system.

Comparing with other renewable power generating system, POWERMAX-BGPS is characteristic of:

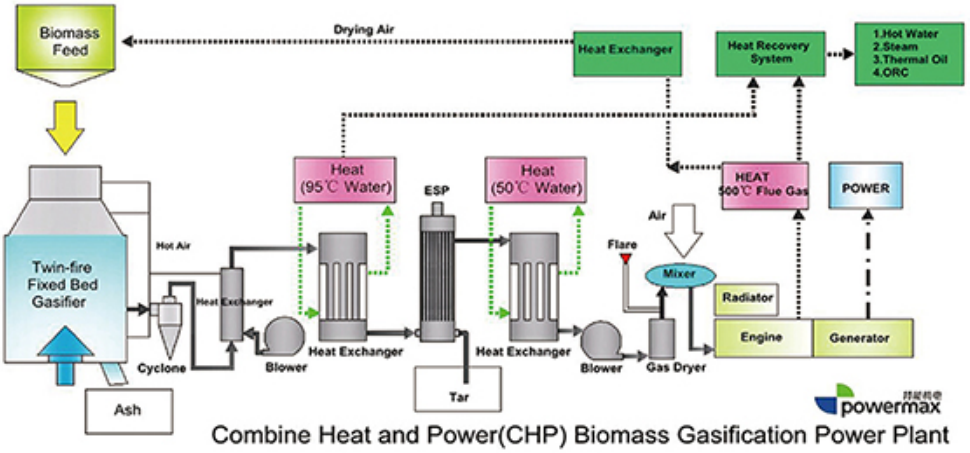
1).Flexibility. Gas engine,gas turbine and even waste heat recovery boiler may be used considering various power plant capacity requirements. It ensures high power generating efficiency. Different capacities of biomass power generation plant can be designed with various types of POWERMAX-BGPS system.

2).Clean technology. Biomass,as one kind of renewable energy,may reduce the emission of carbon dioxide causing from fossil fuel. Nitrogen oxides emission is very limited in our biomass gasification power generating system because of low temperature (700℃-1200℃) 。



1MW Biomass Gasification Power Plant Covers 600㎡.

3).Economical. POWERMAX-BGPS is capacity flexible.Even small size biomass power plant is also profitable process and less land requirements make biomass gasification power plant more economical comparing with other renewable energy.Generally speaking, biomass gasification power generating is the most economical tecnology in renewable power generating plant,the cost of which is nearly the same as small-size conventional power plant.



Combine Heat and Power(CHP) Biomass Gasification Power Plant

ABOUT CHP

Combined heat and power(CHP) also known as cogeneration,is an efficient, clean,and reliable approach to generate power and thermal energy from a single fuel source.By installing a CHP system designed to meet the thermal and electrical base loads of facility,CHP can greatly increase the facility' s operational efficiency and decrease energy costs.At the same time,CHP reduces the emission of greenhouse gases,which contribute to global climate change.

BIOMASS GASIFICATION POWER GENERATION SYSTEM GENERAL FLOW CHART

What is Biomass Gasification?

Gasification is : Thermo－chemical conversion of Biomass to combustible fuel gas called Biomass Gas.

Biomass is : Carbon bearing plant matter such as wood chips, rice husk, corn cob…

Four Stage Conversion Process : Biomass is converted to Biomass Gas in a 'Gasifier' in four stages : drying ,pyrolysis ,oxidation and reduction.

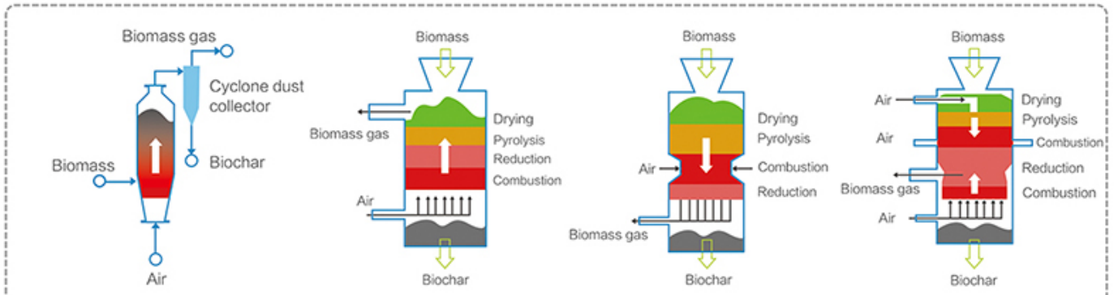
Biomass Gas conversion of : Carbon Monoxide (CO), Hydrogen (H_2), Methane (CH_4) Carbon Dioxide (CO_2) and Nitrogen (N_2).

Biomass Gas is used as : Fuel Gas to substitute or replace any fossil fuel in thermal application.Fuel Gas in Gas Genset to produce electricity.

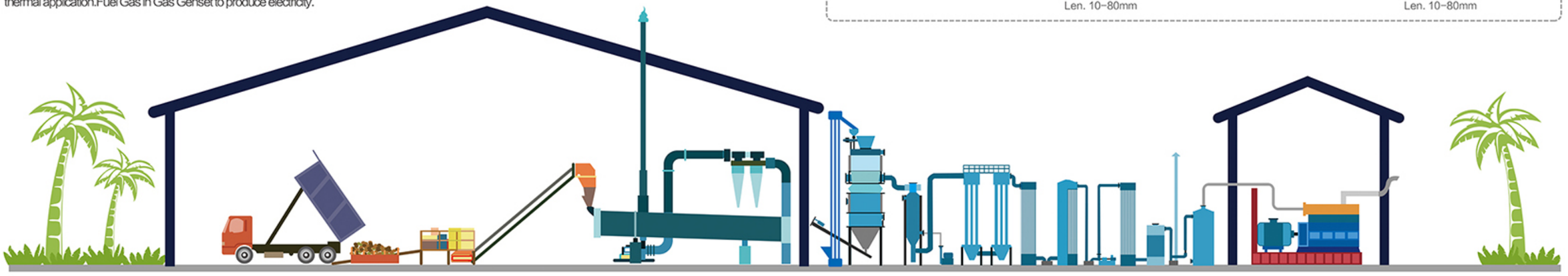
Biochar : When added to soil, biochar has great capacity to retain nutrients reducing fertilizer requirements while increasing crop growth, health and yields. Research is confirming benefits of adding biochar to soil such as: Moderating soil acidity ; Increased water retention ability of soil;Increased in number of beneficial soil microbes;Increase number of nitrogen fixing microbes in soil.Biochar can improve almost any soil. Areas with low rainfall or nutrient-poor soils will benefit the most.

Biochar can reverse soil degradation and create sustainable food and fuel production in areas with nutrient depleted soils, scant organic resources, and insufficient water and chemical fertilizer supplier. Biochar acts to accommodate beneficial microbial activity in soils. Mixed to soil at a ratio of 0.4kg/m² biochar has been shown by various studies to signficantly improve soil conditions and enhance crop growth.

POWERMAX provides four types biomass gasifiers for different fuels and applications



	CFBG Circulating Fluidized Bed Gasifier	UFBG Updraft Fixed Bed Gasifier	DFBG Downdraft Fixed Bed Gasifier	TFBG Twin-Fire Fixed Bed Gasifier
Fuel requirement:				
Moisture content:	≤16%(Wet Basis)	≤20%~35%(Wet Basis)	≤20%(Wet Basis)	≤20%(Wet Basis)
Size:	≤10-15mm	Dia. 20-80mm Len. 10-80mm	≤10mm	Dia. 20-80mm Len. 10-80mm



BIOMASS → BIOMASS DELIVERY → BIOMASS PREPARATION → BIOMASS DRYING → GASIFIER → GAS CLEANING → POWER GENERATION

BIOMASS

- Wood
- Corn Cob
- Rice Husk
- Palm Shell / EFB
- Coconut Shell and Husk
- Peanut Shell
- Sawdust
- Napier Grass
- Cotton Stalk
- And many more

BIOMASS PREPARATION SYSTEM

- Weighbridge
- Storage
- Chipper for Wood ~ if needed
- Briquettes for fine material ~ if needed
- Transport Conveyor
- Dryer ~ if needed
- Dust collector
- Biochar Recycle System
- Crusher ~ if needed

GASIFICATION SYSTEM

- Bucket Elevator / Skip Charger / Belt conveyor
- Gasifier－4 Types (CFBG, TFBG, DFBG, UFBG)
- Biochar Discharge Screw
- Dust collector
- ESP (Electrostatic Precipitator)
- Air Blower / Roots Blower / Suction Blower
- Air cooler
- Heat Exchanger
- Buffer Tank
- Gas Dryer
- Flare
- Process water treatment system /evaporator
- Cooling tower

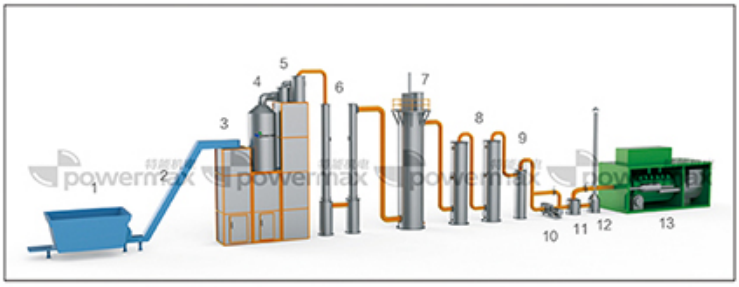
POWER SYSTEM

- Biomass Gas Generators

OTHER APPLICATION

- Dryers
- Boilers
- Thermic Fluid Heaters
- Ovens
- Furnaces
- Kilns
- Micro Turbines
- Gas Turbines

POWERMAX CFBG Series Biomass Gasification Power Generation System Flow Chart (CFBG–Circulating Fluidized Bed Gasifier)



1. Biomass Storage
2. Biomass Conveyor
3. Biomass Buffer Bin
4. Biomass Gasifier
5. Cyclone Dust Collector
6. Gas Filter
7. ESP
8. Gas Scrubber
9. Gas Dryer
10. Blower
11. Buffer Tank
12. Gas Flare
13. Gas Generator Sets

Technical Specification of CFBG series Biomass Gasification Power Generation System

Model	200CFBG	400CFBG	500CFBG	600CFBG	800CFBG	1000CFBG	1200CFBG	1500CFBG	2000CFBG
Rated Power (KW)	200	400	500	600	800	1000	1200	1500	2000
Rated Frequency	50 / 60 HZ								
Rated Voltage(V)	220 / 400 / 440 / 6300 / 6600 / 11000 / 13800								
Model of Gasifier	CFBG200	CFBG400	CFBG500	CFBG600	CFBG800	CFBG1000	CFBG1200	CFBG1500	CFBG2000
Gasifier Type	Circulating Fluidized Bed Gasifer (CFBG)								
Biomass Moisture Requirement	≤20%(Wet Basis)								
Biomass Size Requirement	≤8–15mm								
Biomass Consumption(Kg/Hr)	200–360	400–720	500–900	600–1080	800–1440	1000–1800	1200–2160	1500–2700	2000–3600
Gas Production(Nm^3/h)	500–600	1000–1200	1250–1500	1500–1800	2000–2400	2500–3000	3000–3600	3750–4500	5000–6000
Ash Discharge Type	Dry Type								
Type Of Gas Purification	POWERMAX Semi Dry Type Gas Purifcation System								
Heat Value Of Gas	1200–1300Kcal / Nm^3								
Gas Composition	CO–12 ~ 18%, CO_2 –10 ~ 16%, CH_4 –4 ~ 8%, H_2 –3 ~ 7%, CnHm–1 ~ 1.4%, O_2 – 0.5 ~ 1.2%, N_2 –54 ~ 60%.								
Model of Genset	100GFLS	400GFLS	500GFLS	300GFLS	400GFLS	1000GFLS	400GFLS	500GFLS	1000GFLS
Qty Of Genset	2 Sets	1 Set	1 Set	2 Sets	2 Sets	1 Set	3 Sets	3 Sets	2 Sets

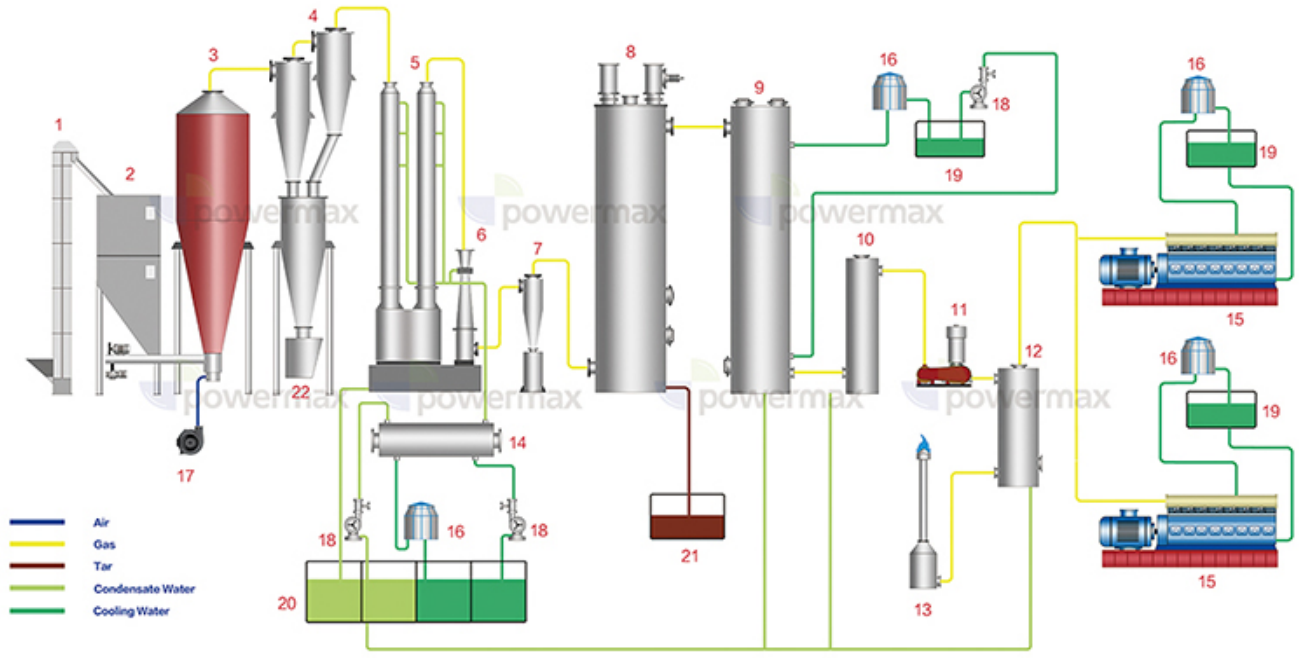
2MW CFBG POWER PLANT

0.5MW CFBG POWER PLANT

3MW CFBG POWER PLANT

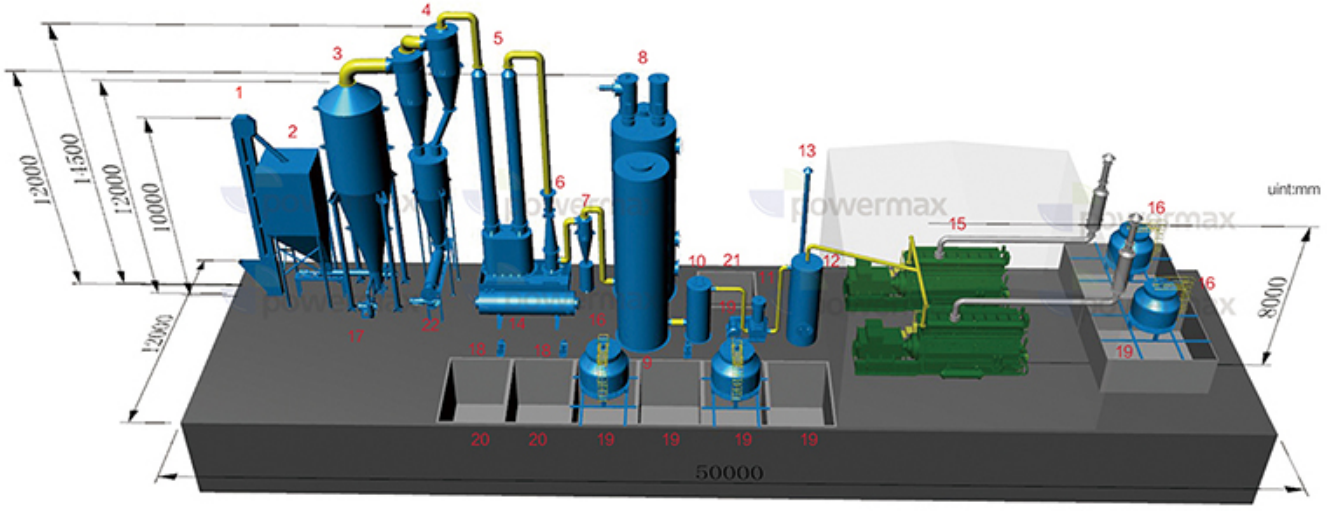
0.5MW CFBG POWER PLANT

Technical Specification of CFBG series Biomass Gasification Power Generation System Flow Chart

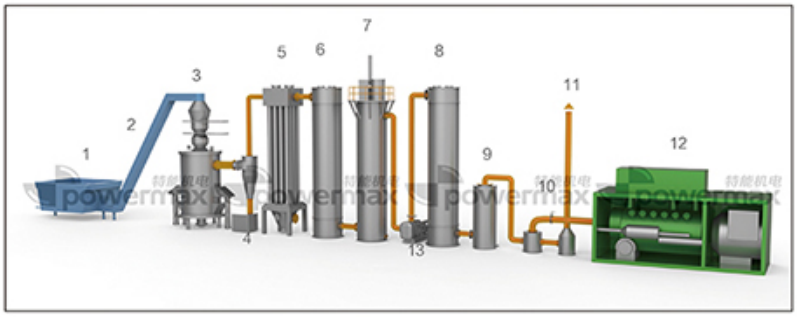


1. Elevator
2. Feed Bin
3. Gasifier
4. Cyclone
5. Tube Type Dust Remover
6. Venturi
7. Cyclone Hydraulic Separators
8. ESP
9. Indirect Cooler
10. Water Drop Catcher
11. Roots Blower
12. Buffer Tank
13. Vent Cans & Gas Flare
14. Tubular Heat Exchanger
15. Gas Generator Set
16. Cooling Tower
17. Air Blower
18. Water Pump
19. Cooling Water Pool
20. Condensate Water Pool
21. Tar Tank
22. Biochar Outlet

Technical Specification of CFBG series Biomass Gasification Power Generation System 3D Model (1MW as sample)



POWERMAX UFBG Series Biomass Gasification Power Generation System Flow Chart (UFBG–Updraft Fixed Bed Gasifier)



1. Biomass Storage
2. Biomass Conveyor
3. Biomass Gasifier
4. Cyclone Dust Collector
5. Air Cooler
6. Gas Cooler
7. ESP
8. Gas Cooler
9. Gas Dryer
10. Buffer Tank
11. Gas Flare
12. Gas Generator Sets
13. Blower

Technical Specification of UFBG series Biomass Gasification Power Generation System

Model	50UFBG	100UFBG	200UFBG	300UFBG	400UFBG	500UFBG	600UFBG	800UFBG	1000UFBG	1200UFBG	1500UFBG	2000UFBG
Rated Power (KW)	50	100	200	300	400	500	600	800	1000	1200	1500	2000
Rated Frequency	50 / 60HZ											
Rated Voltage(V)	220 / 400 / 440 / 6300 / 6600 / 11000 / 13800											
Model of Gasifier	UFBG50	UFBG100	UFBG200	UFBG300	UFBG400	UFBG500	UFBG600	UFBG800	UFBG1000	UFBG1200	UFBG1500	UFBG2000
Gasifier Type	Updraft Fixed Bed Gasifier											
Biomass Moisture Requirement	≤20%~35%(Wet Basis)											
Biomass Size Requirement	Diameter 20mm~80mm; Length 10mm~80mm											
Biomass Consumption (Kg/Hr)	50~100	100~200	200~400	300~600	400~800	500~1000	600~1200	800~1600	1000~2000	1200~2400	1500~3000	2000~4000
Gas Production (Nm^3/h)	125~150	250~300	500~600	750~900	1000~1200	1250~1500	1500~1800	2000~2400	2500~3000	3000~3600	3750~4500	5000~6000
Ash Discharge Type	Wet Ash Type / Dry Ash Type											
Type Of Gas Purification	Dry Type Gas Purification System											
Heat Value Of Gas	≥1100~1200Kcal/Nm^3											
Gas Composition	CO~16 ~ 21%, CO_2 ~5 ~ 11%, CH_4 ~4 ~ 6%, H_2 ~10 ~ 12%, N_2 ~54 ~ 60%,											
Model of Genset	50GFLS	100GFLS	100GFLS	300GFLS	400GFLS	500GFLS	300GFLS	400GFLS	1000GFLS	400GFLS	500GFLS	1000GFLS
Qty Of Genset	1 Set	1 Set	2 Sets	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set	3 Sets	3 Sets	2 Sets

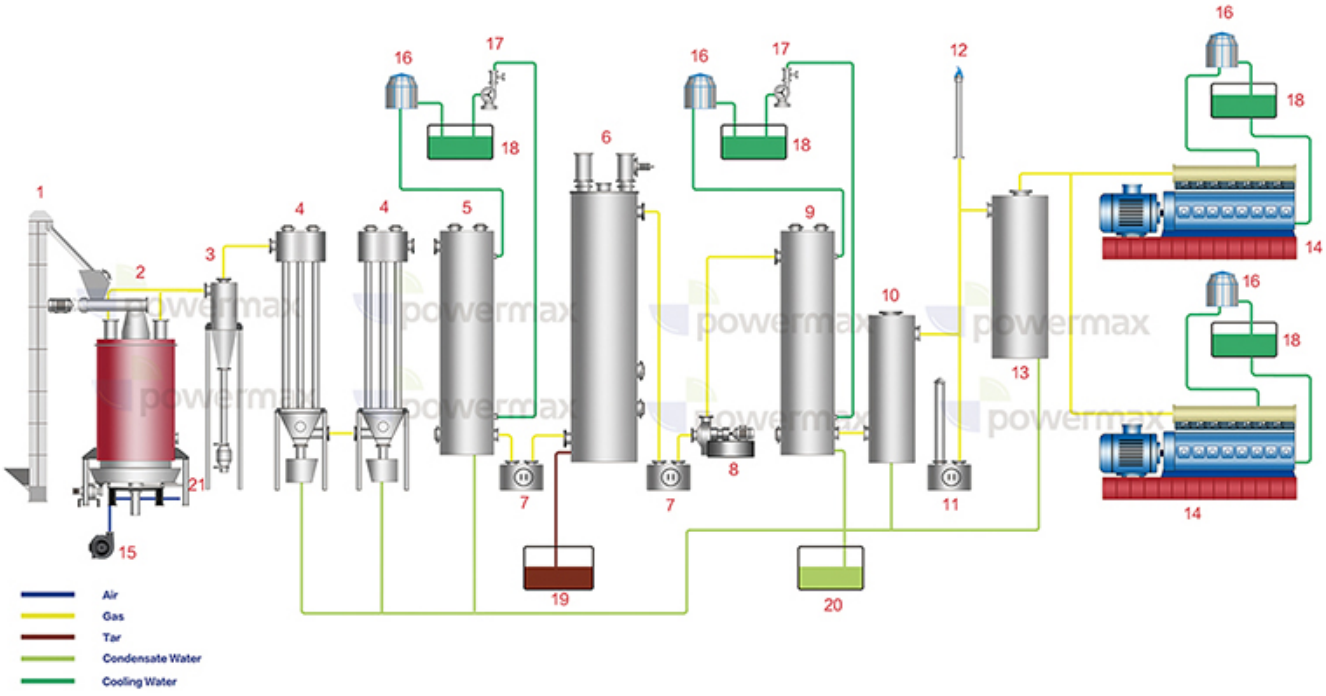
0.8MW UFBG POWER PLANT

2MW UFBG POWER PLANT

1MW UFBG POWER PLANT

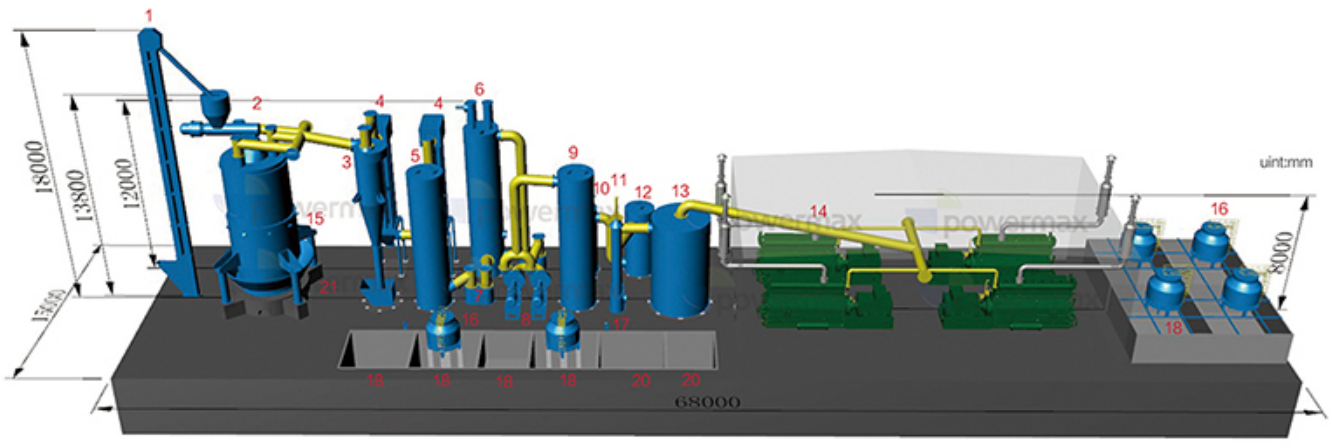
1MW UFBG POWER PLANT

Technical Specification of UFBG series Biomass Gasification Power Generation System Flow Chart

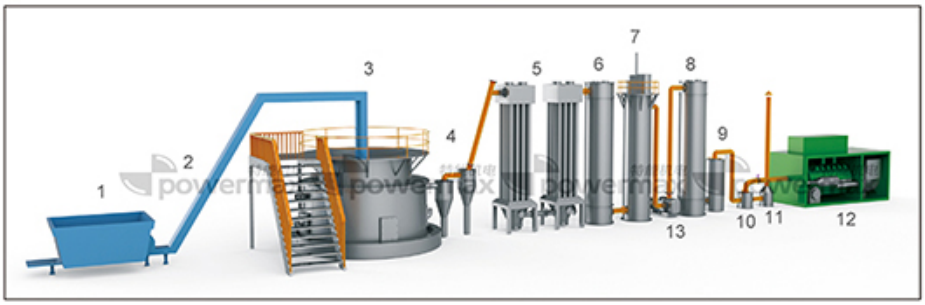


1. Elevator
2. Gasifier
3. Cyclone
4. Air Cooler
5. Indirect Cooler
6. ESP
7. Isolation Seal
8. Booster Fan
9. Indirect Cooler
10. Water Drop Catcher
11. Water Bleeding
12. Gas Flare
13. Buffer Tank
14. Gas Generator Set
15. Air Blower
16. Cooling Tower
17. Water Pump
18. Cooling Water Pool
19. Tar Tank
20. Condensate Water Pool
21. Biochar Outlet

Technical Specification of UFBG series Biomass Gasification Power Generation System 3D Model (2MW as sample)



POWERMAX DFBG Series Biomass Gasification Power Generation System Flow Chart (DFBG-Downdraft Fixed Bed Gasifier)



1. Biomass Storage
2. Biomass Conveyor
3. Biomass Gasifier
4. Cyclone Dust Collector
5. Air Cooler
6. Gas Cooler
7. ESP
8. Gas Cooler
9. Gas Dryer
10. Buffer Tank
11. Gas Flare
12. Gas Generator Sets
13. Blower

Technical Specification of DFBG series Biomass Gasification Power Generation System

Model	50DFBG	100DFBG	200DFBG	300DFBG	400DFBG	500DFBG	600DFBG	800DFBG	1000DFBG
Rated Power (KW)	50	100	200	300	400	500	600	800	1000
Rated Frequency	50 / 60HZ								
Rated Voltage(V)	220 / 400 / 440 / 6300 / 6600 / 11000 / 13800								
Model of Gasifier	DFBG50	DFBG100	DFBG200	DFBG300	DFBG400	DFBG500	DFBG600	DFBG800	DFBG1000
Gasifier Type	Downdraft Fixed Bed Gasifier								
Biomass Moisture Requirement	≤16%(Wet Basis)								
Biomass Size Requirement	Less than 1cm								
Biomass Consumption(Kg/Hr)	50-100	100-200	200-400	300-600	400-800	500-1000	600-1200	800-1600	1000-2000
Gas Production(Nm^3/h)	125-150	250-300	500-600	750-900	1000-1200	1250-1500	1500-1800	2000-2400	2500-3000
Ash Discharge Type	Dry Ash Type								
Type Of Gas Purification	Dry Type Gas Purification System								
Heat Value Of Gas	≥1100Kcal / Nm^3								
Gas Composition	CO-15~20%		CO_2 - 8~12%		CH_4 - Up to 4%		H_2 - 10-15%		N_2 - 45~55%
Model of Genset	50GFLS	100GFLS	100GFLS	300GFLS	400GFLS	500GFLS	300GFLS	400GFLS	1000GFLS
Qty Of Genset	1 Set	1 Set	2 Sets	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set

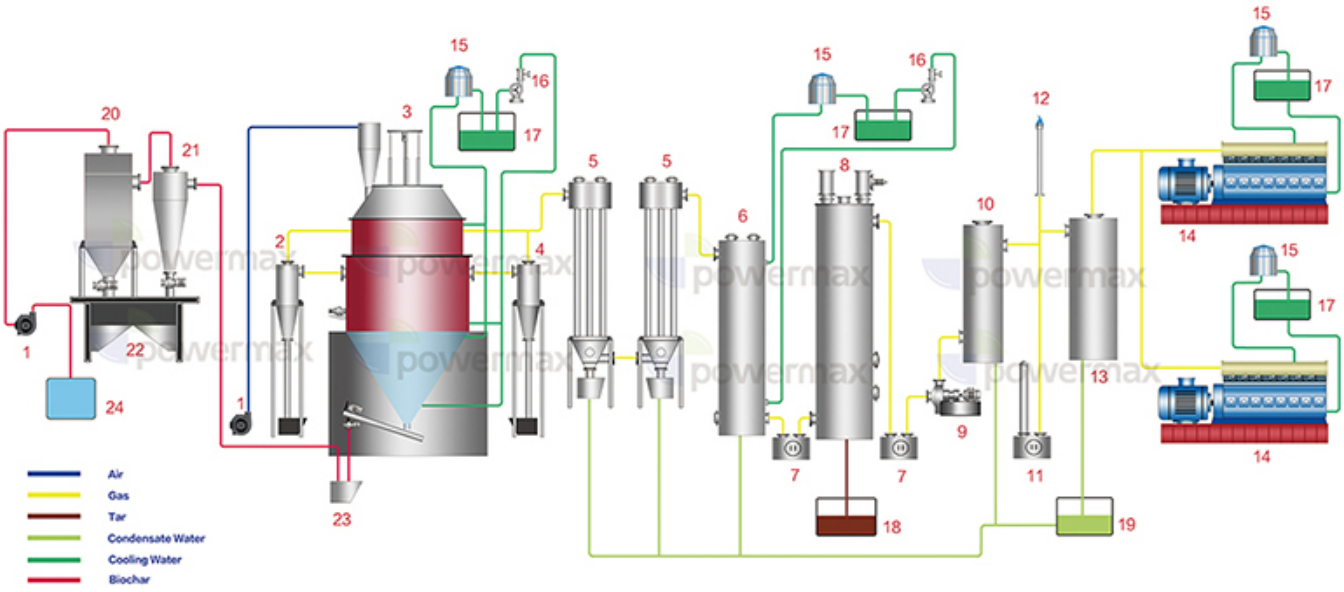
1MW DFBG POWER PLANT

1MW DFBG POWER PLANT-2

1MW DFBG POWER PLANT

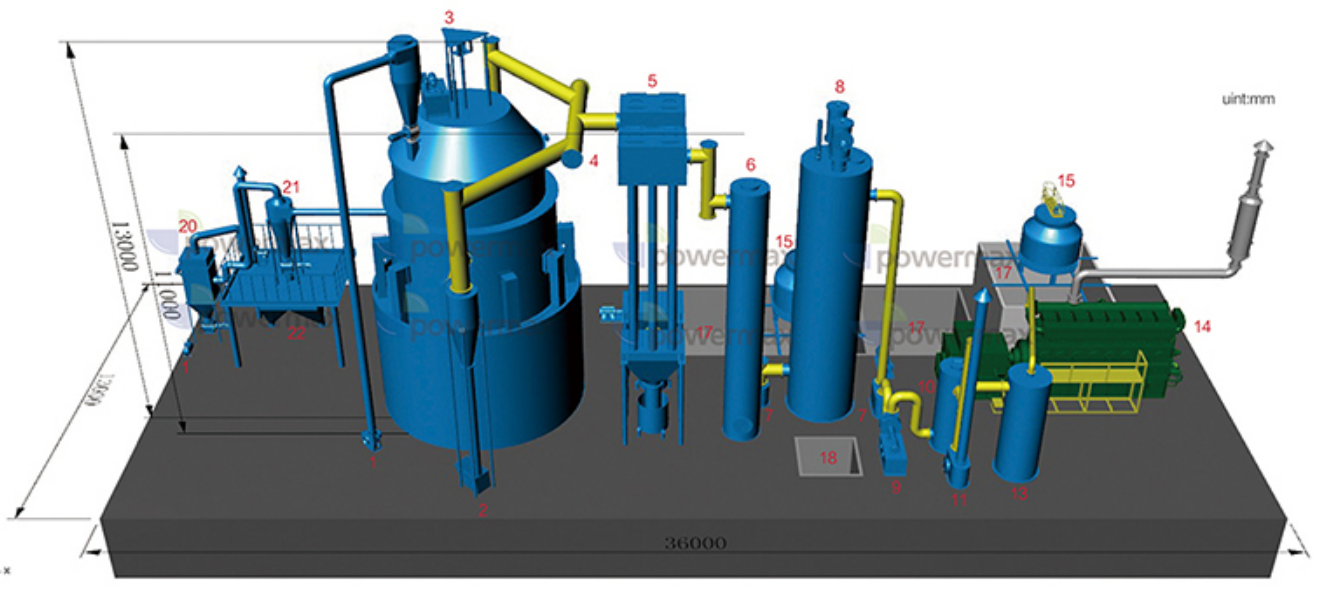
0.8MW DFBG POWER PLANT

Technical Specification of DFBG series Biomass Gasification Power Generation System Flow Chart

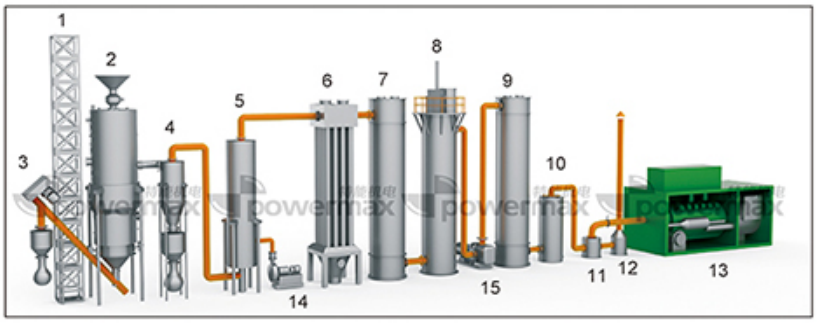


1. Biomass Fuel Blower
2. Cyclone
3. Gasifier
4. Cyclone
5. Air Cooler
6. Indirect Cooler
7. Isolation Seal
8. ESP
9. Booster Fan
10. Water Drop Catcher
11. Water Bleeding
12. Gas Flare
13. Buffer Tank
14. Gas Generator Set
15. Cooling Tower
16. Water Pump
17. Cooling Water Pool
18. Tar Tank
19. Condensate Water Pool
20. Pulse Dust Collector
21. Cyclone Dust Collector
22. Ash Tank
23. Ash Discharge Transition Hopper
24. Water Tank

Technical Specification of DFBG series Biomass Gasification Power Generation System 3D Model (500KW as sample)



POWERMAX TFBG Series Biomass Gasification Power Generation System Flow Chart (TFBG-Twin-Fire Fixed Bed Gasifier)



1. Skip Charger
2. Biomass Gasifier
3. Dry Ash Discharger
4. Cyclone Dust Collector
5. Hot Air Heat Exchanger
6. Air Cooler
7. Gas Cooler
8. ESP
9. Gas Cooler
10. Gas Dryer
11. Buffer Tank
12. Gas Flare
13. Gas Generator Sets
14. Blower
15. Gas Compressor

Technical Specification of TFBG series Biomass Gasification Power Generation System

Model	50TFBG	100TFBG	200TFBG	300TFBG	400TFBG	500TFBG	600TFBG	800TFBG	1000TFBG	1200TFBG	1500TFBG	2000TFBG
Rated Power (kw)	50	100	200	300	400	500	600	800	1000	1200	1500	2000
Rated Frequency	50 / 60HZ											
Rated Voltage(V)	220 / 400 / 440 / 6300 / 6600 / 11000 / 13800											
Model of Gasifier	TFBG50	TFBG100	TFBG200	TFBG300	TFBG400	TFBG500	TFBG600	TFBG800	TFBG1000	TFBG1200	TFBG1500	TFBG2000
Gasifier Type	Twin-Fire Fixed Bed Gasifier											
Biomass Moisture Requirement	≤20%(Wet Basis)											
Biomass Size Requirement	Diameter 20mm-80mm; Length 10mm-80mm											
Biomass Consumption (Kg/Hr)	50-100	100-200	200-400	300-600	400-800	500-1000	600-1200	800-1600	1000-2000	1200-2400	1500-3000	2000-4000
Gas Production (Nm^3/h)	125-150	250-300	500-600	750-900	1000-1200	1250-1500	1500-1800	2000-2400	2500-3000	3000-3600	3750-4500	5000-6000
Ash Discharge Type	Dry Ash Type / Wet Ash Type											
Type Of Gas Purification	Dry Type Gas Purification System											
Heat Value Of Gas	≥1200Kcal / Nm^3											
Gas Composition	CO-15~20%		CO_2-8~12%		CH_4-Up to 3%		H_2-15~20%		N_2-45~50%			
Model of Genset	50GFLS	100GFLS	100GFLS	300GFLS	400GFLS	500GFLS	300GFLS	400GFLS	1000GFLS	400GFLS	500GFLS	1000GFLS
Qty Of Genset	1 Set	1 Set	2 Sets	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set	3 Sets	3 Sets	2 Sets

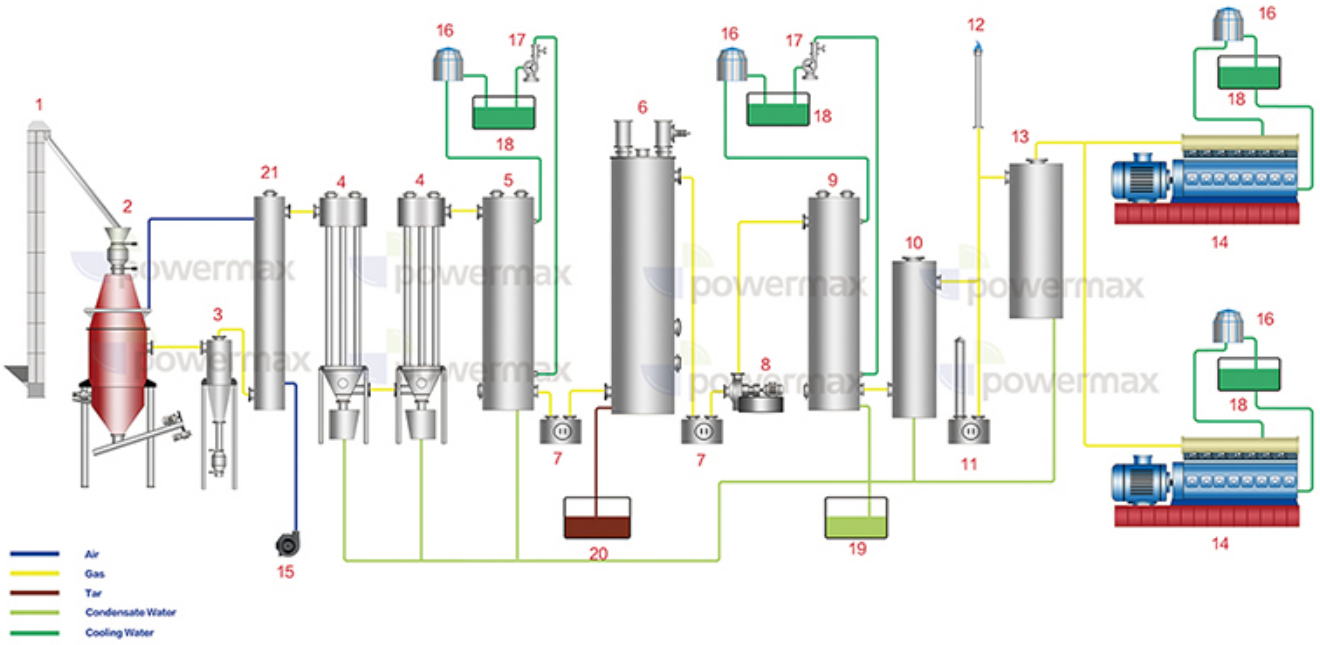
2 x 200KW TFBG POWER PLANT

1MW TFBG POWER PLANT

1000KW TFBG POWER PLANT

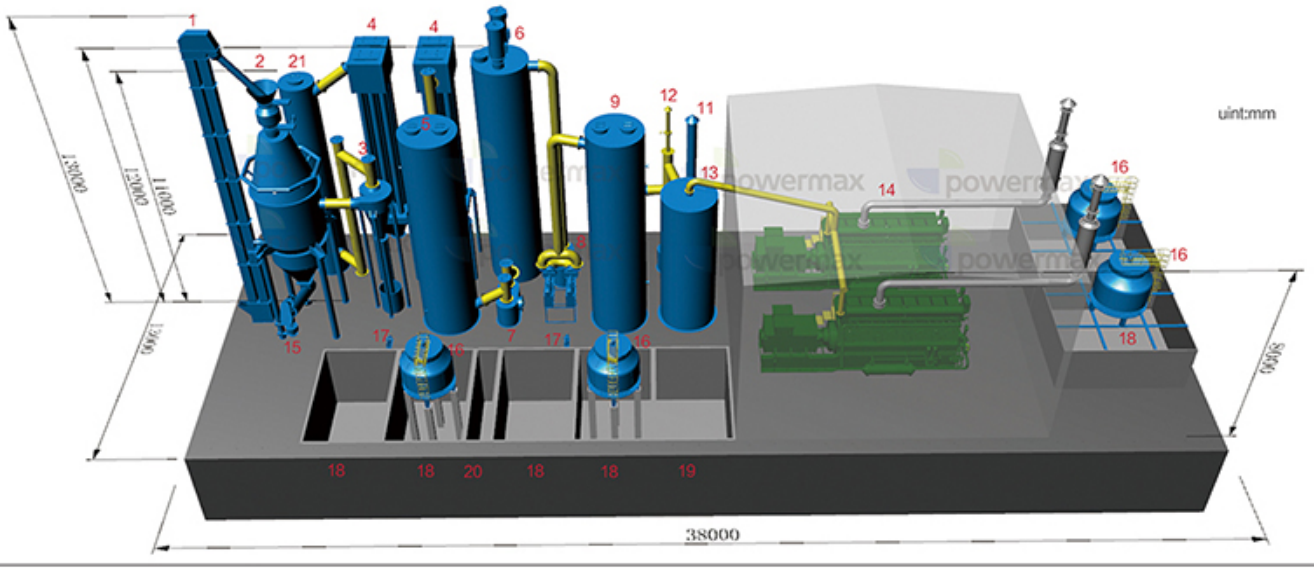
2MW TFBG POWER PLANT

Technical Specification of TFBG series Biomass Gasification Power Generation System Flow Chart



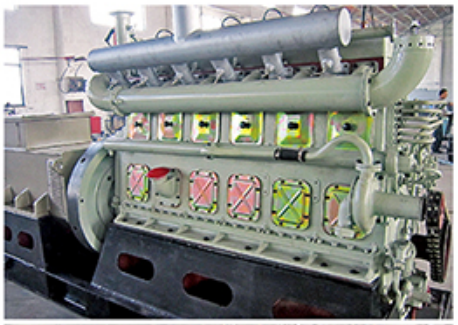
1. Elevator
2. Gasifier
3. Cyclone
4. Air Cooler
5. Indirect Cooler
6. ESP
7. Isolation Seal
8. Booster Fan
9. Indirect Cooler
10. Water Drop Catcher
11. Water Bleeding
12. Gas Flare
13. Buffer Tank
14. Gas Generator Set
15. Air Blower
16. Cooling Tower
17. Water Pump
18. Cooling Water Pool
19. Condensate Water Pool
20. Tar Tank
21. Hot Air Heat Exchanger

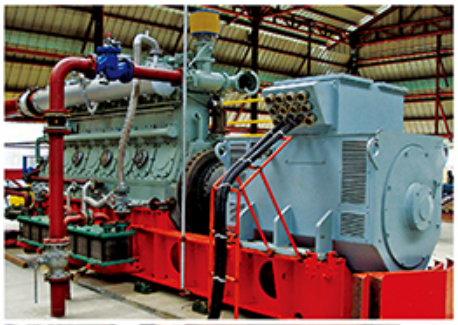
Technical Specification of TFBG series Biomass Gasification Power Generation System 3D Model (1MW as sample)

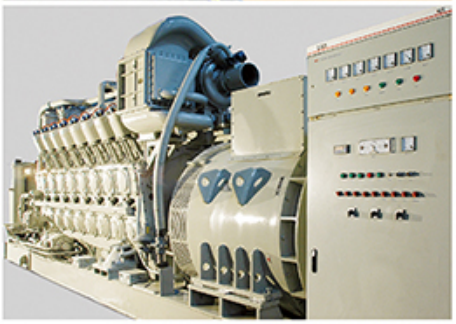


POWERMAX BIOMASS GAS GENERATOR SETS

Powermax biomass gas generator sets are characteristic of high efficiency, low exhaust temperature, simple operation, easy maintenance and stable running.With the function of automatic/manual control, electronic speed control, automatic fault monitoring, automatic shut-down and etc,POWERMAX gas generator may even be operated efficiently in long time under poor working conditions. Power range from 50-1200KW. High power output,lower emissions,lower life cycle cost(LCC),flexible gas application.



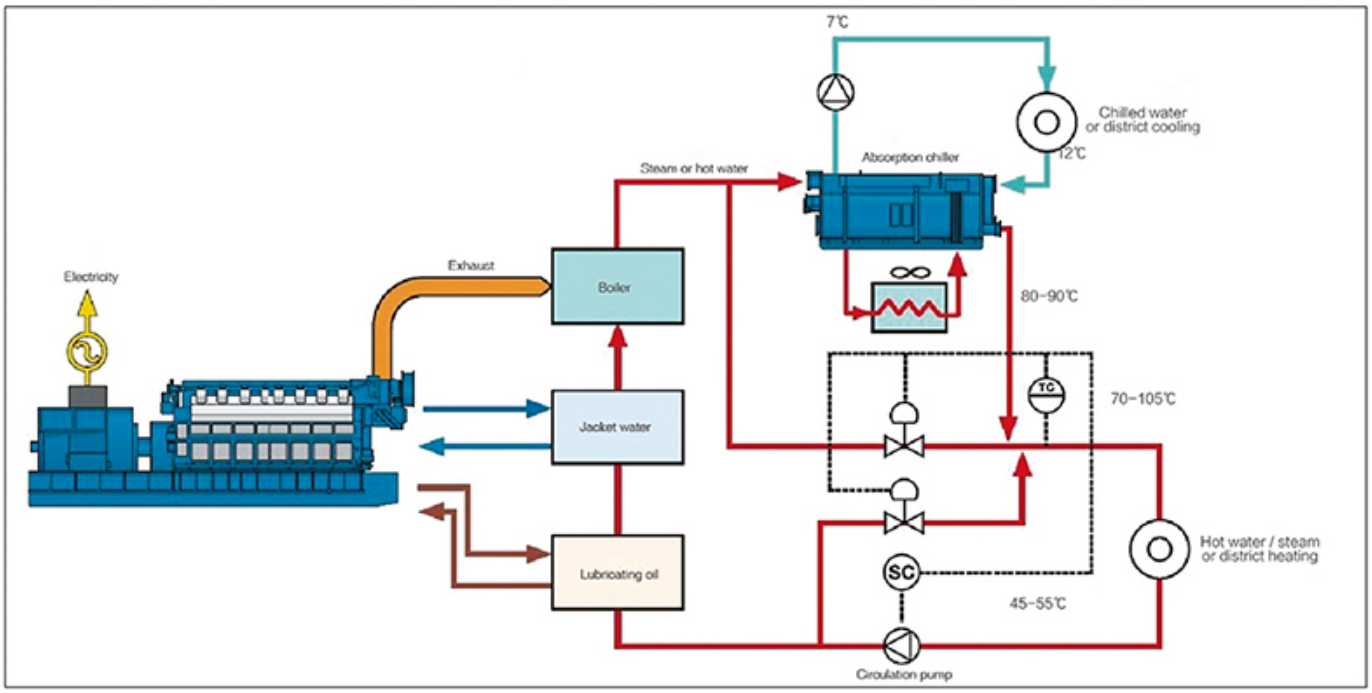





Deutz Series(50KW-250KW)
160 Series(80KW-150KW)
300 Series(300-1000KW)

OUR PARTNER: SIEMENS BOSCH HEINZMANN WOODWARD meccalte ComAp DEUTZ STAMFORD power generation

Gas Power Generation Power Plant Chart (CHP/Trigeneration)



"Main Technical Specifications of The Biomass Gas / Producer Gas Generating Set(50HZ/60HZ)"

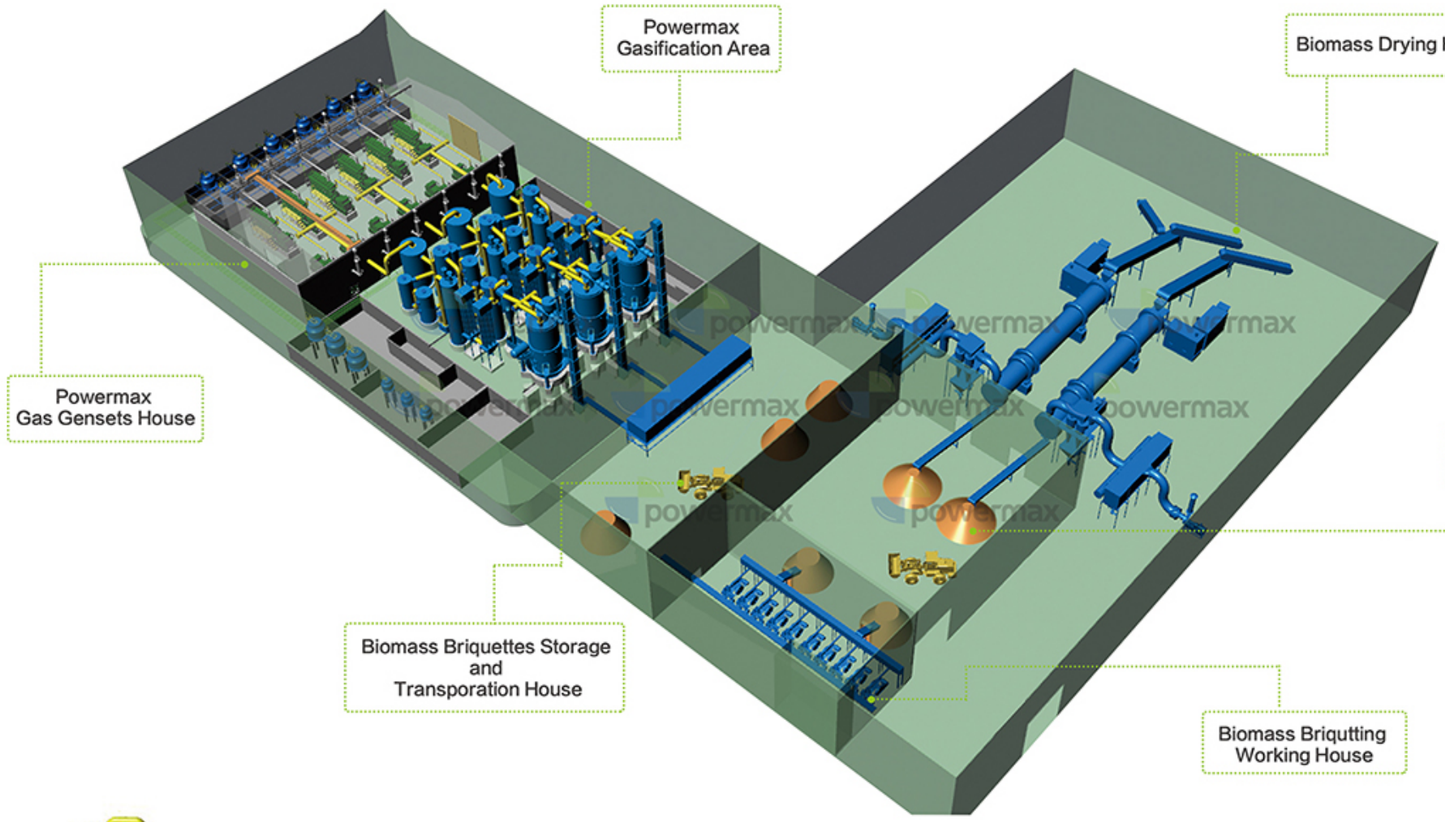
Items		Technical specification											
Generator Set	Model	100GFLS		300GFLS		400GFLS		500GFLS		800GFLS		1000GFLS	
	Rated Power (Kw)	100		300		400		500		800		1000	
	Rated Voltage (Kv)	0.4	0.44	0.4	0.44	0.4	0.44	0.4	0.44	0.4	0.44	0.4	0.44
	Rated Current (A)	180	164	541	492	721	656	902	820	1443	1312	1804	1640
	Rated Frequency (Hz)	50	60	50	60	50	60	50	60	50	60	50	60
	COS ¢ Power Factor	0.8Lagging											
	Model of Excitation	Brushless											
	Phase&Connection	3 Phased 4 Wires											
	Generator Model	1FC6 SIEMENS											
	Set Overall Dimensions (mm)	3482*1000*1985		5120*2040*2780		6892*2005*2603				8082 * 2685 * 3056			
	Set Net Weight (kg)	4100		11800		22000				44000			
Engine	Model of Engine	TNJD-6160Q1		TNJD-12V190Q1		TNJD-8300Q1		TNJD-8300Q3		TNJD-R16V300-L8		TNJD-R16V300-L10	
	Ignition Mode	Spark-Ignited											
	Arrangement of Cylinder	L-6 4-Stroke-Cycle		V-12 4-Stroke-Cycle		L-8 4-Stroke-Cycle				V-16 4-Stroke-Cycle			
	Cylinder Diameter	160		190		300				300		300	
	Stroke (mm)	225		210		380				380		380	
	Displacement (L)	27		71.5		215				430		430	
	Rated Power (Kw)	110		330		440		550		880		1100	
	Speed (r/min)	1000	900	1000	900	500	514	600		500	514	600	
	Exhaust Temperature of Cylinder (℃)	≤ 580											
	Gas Pressure (Kpa)	2.5											
	Specific lube oil consumption (g/kwh)	≤ 1.0											

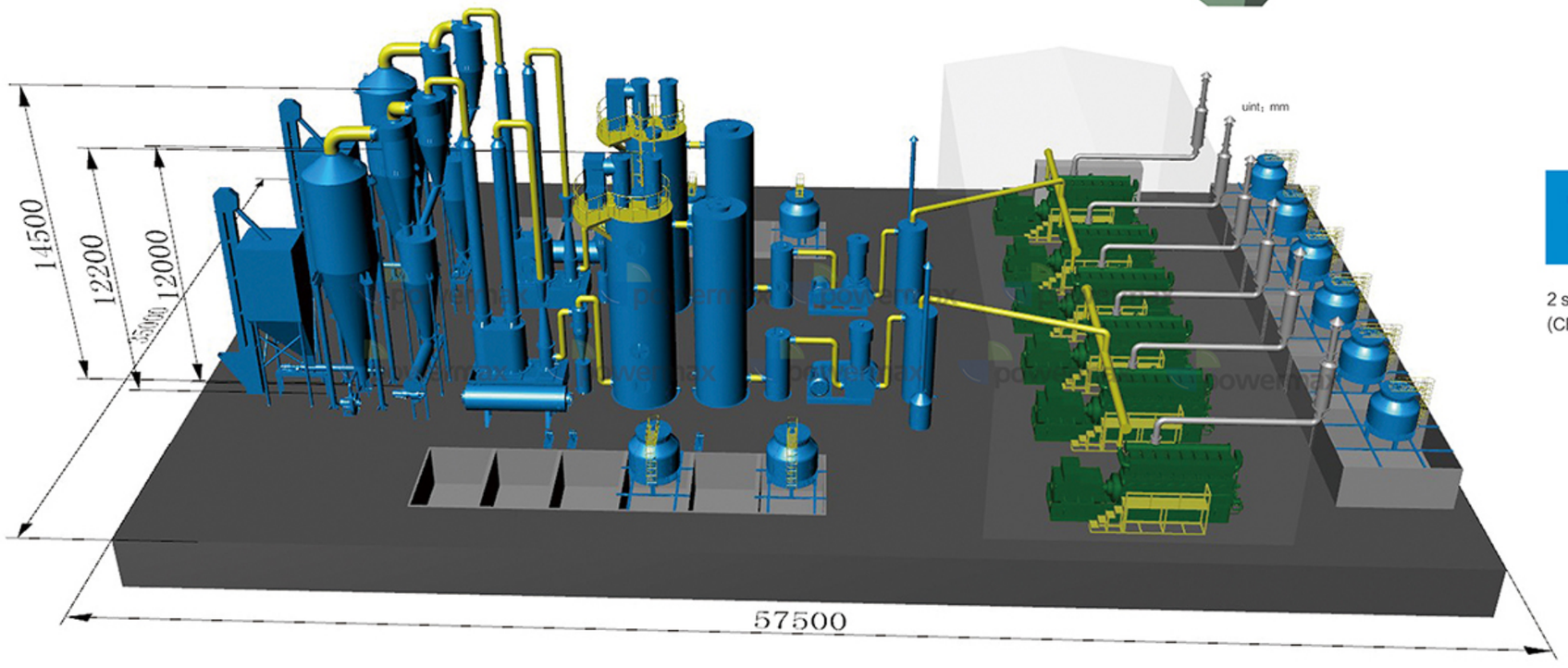
NOTE

1.POWERMAX also can supply 220v、240v、6300v、6600v、10500v、11000v、13800v high voltage output Siemens Generator.
2.The fuel gas also can be biomass gas,syngas,producer gas,coke gas and other low BTU gas.

Complete 6MW Biomass Gasification Power Plant 3D General Drawing

(Includes 2 sets Rotary Dryers, 10 sets Biomass Briquetting Machines, 3 sets 2.0MW Biomass Gasification Power Generation Systems (UFBG) and 12 sets 500KW Biomass Gas Gensets.)



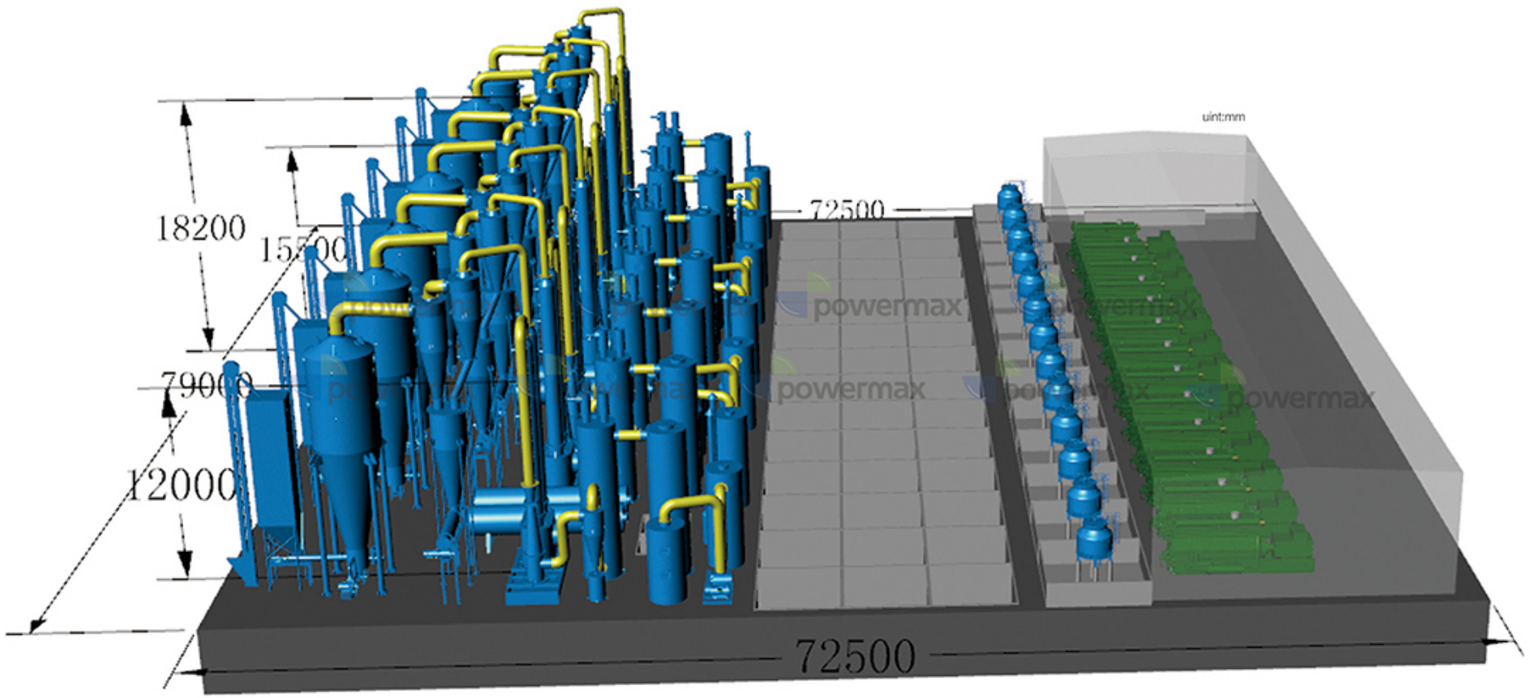


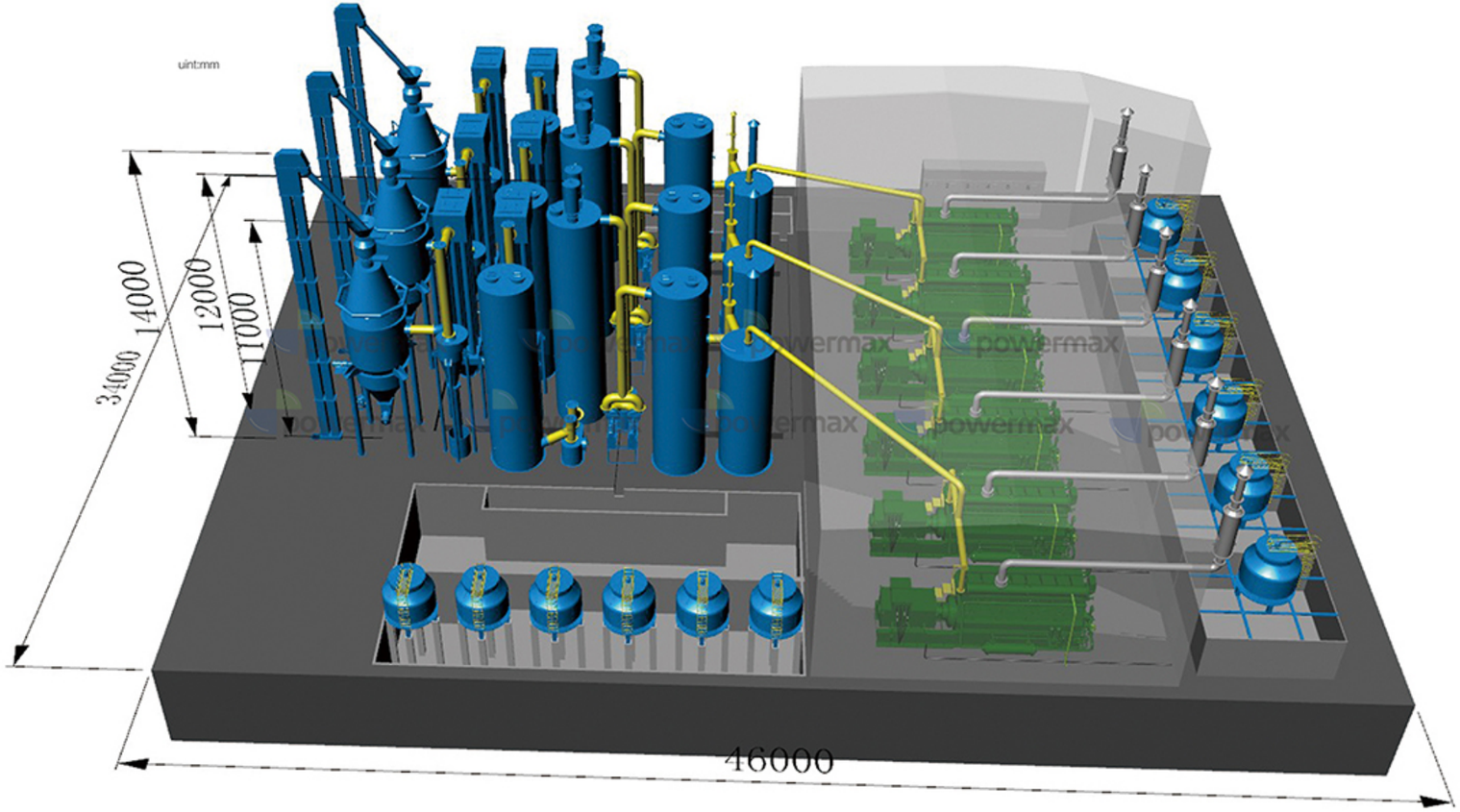
Complete 3MW Biomass Gasification Power Plant 3D General Drawing

2 sets Parallel Modules 1.5MW Biomass Gasification Systems (CFBG) and 6 sets 500KW Biomass Gas Gensets)

Complete 14MW Biomass Gasification Power Plant 3D General Drawing

(7 sets Parallel Modules 2.0MW Biomass Gasification Systems (CFBG) and 14 sets 1000KW Biomass Gas Gensets)



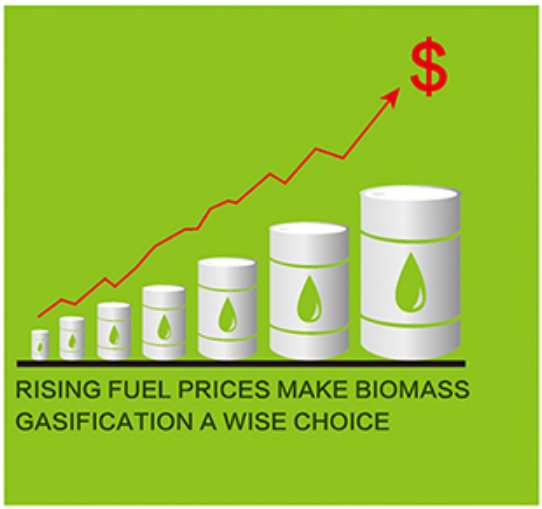


Complete 3MW Biomass Gasification Power Plant 3D General Drawing

(3 sets Parallel Modules 1.0MW Biomass Gasification Systems (TFBG) and 6 sets 500KW Biomass Gas Gensets)

Want to Cut Diesel cost by 85% Now you can !

The Biomass Gasification Systems we provide, efficiently convert biomass into a clean combustible fuel called producer gas. Producer gas effectively substitutes up to 85% of the diesel, LPG,CNG or fuel oil you currently use.



System Benefits

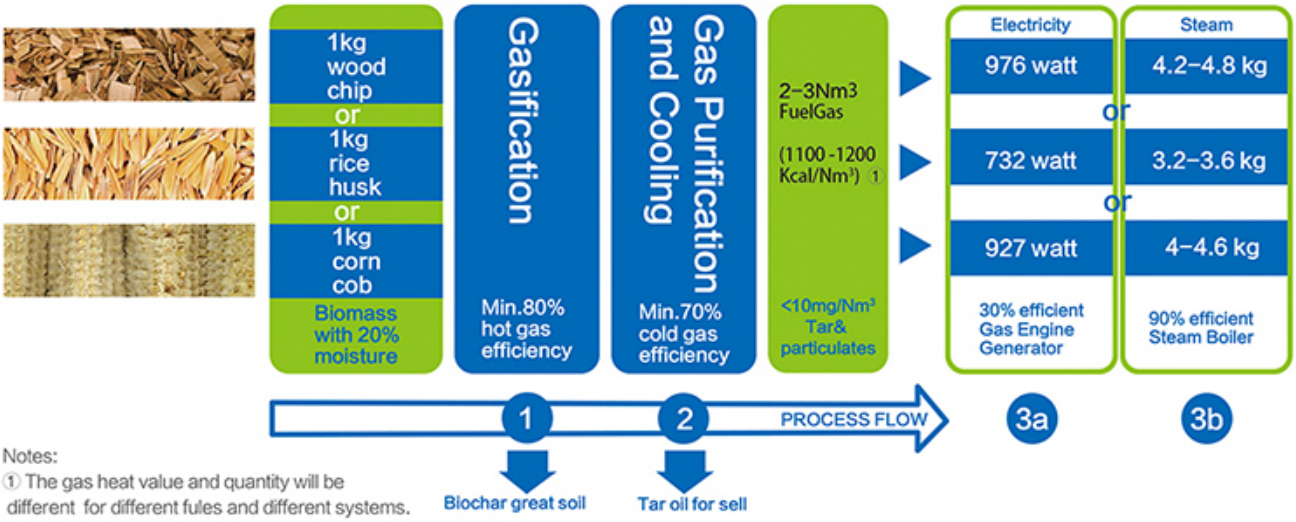
Cost Effective | Environmental friendly

CDM eligible technology | Biomass flexible

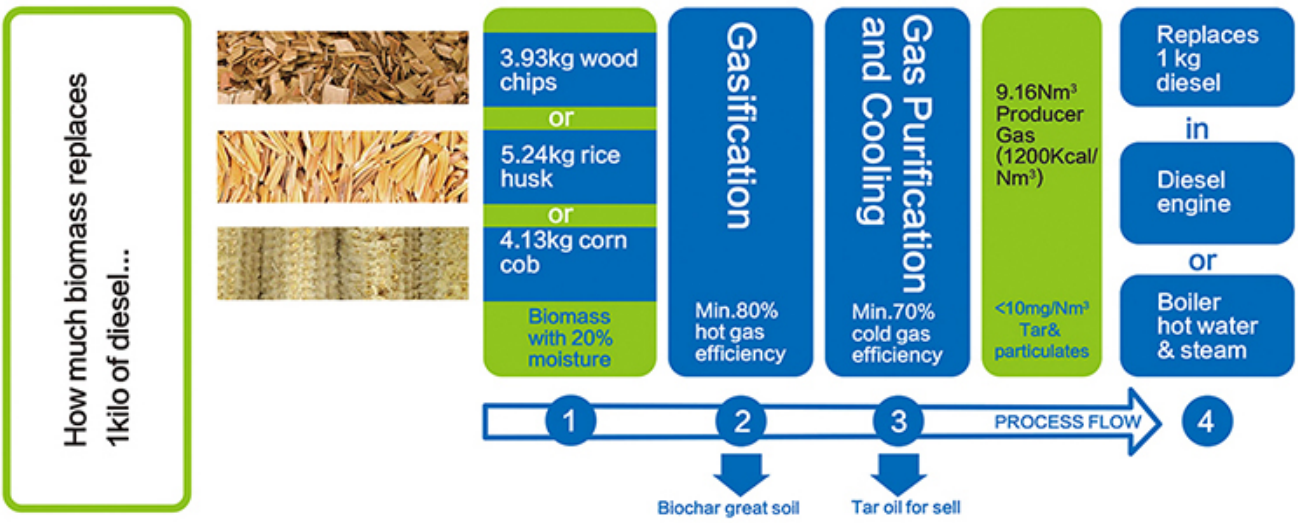
Simple & efficient design | Easy to Operate & Maintain

Systems Capacity 50-2000KW Modular

How much energy from 1Kilo of gasified biomass?



Notes:
① The gas heat value and quantity will be different for different fules and different systems.



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