



POWERMAX Biomass Gasification Heating System Provides Clean and Green Energy to Your Boiler and Heating Equipment

New Choice for Reducing Energy Cost

Enjoy the Easy Service of Natural Gas by Paying the Price of Biomass



Wuxi Teneng Power Machinery Co.,Ltd.
www.chinateneng.com



Grain Straw



Corn Stalk



Cotton



Rape

As a large agricultural country, our country has rich agricultural biomass resources including crop straw and agricultural products processing waste. The crop straws mainly refer to rice straw, wheat straw, corn straw, cotton straw and other oil crop straw. The total amount gathered every year is about 0.69 billion tons and among which 0.34 billion tons can be used as energy.

Biomass energy is a kind of renewable and carbon neutral energy. So far, biomass energy has solved over 10% of the energy consumption around the world. By 2050, biomass energy will be greatly demanded as an important energy and the demand rate will rise to 30%.



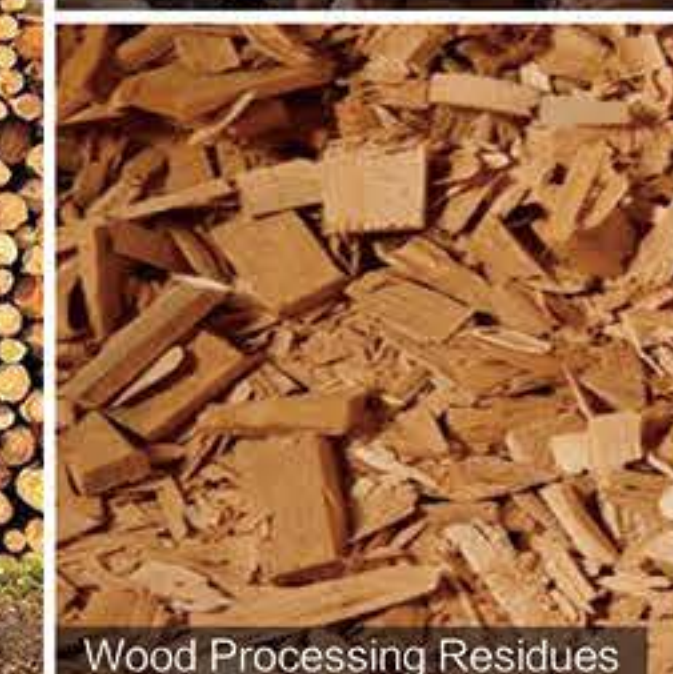
Wood Forest



Tree Root



Tree Branch



Wood Processing Residues

In the field of forest leftovers and energy plants, our country has a woodland area of about 0.304 billion hectare. Materials available for energy utilization are mainly fuel wood forest, agricultural leftovers, wood processing leftovers etc. The total amount every year is about 0.35 billion tons.

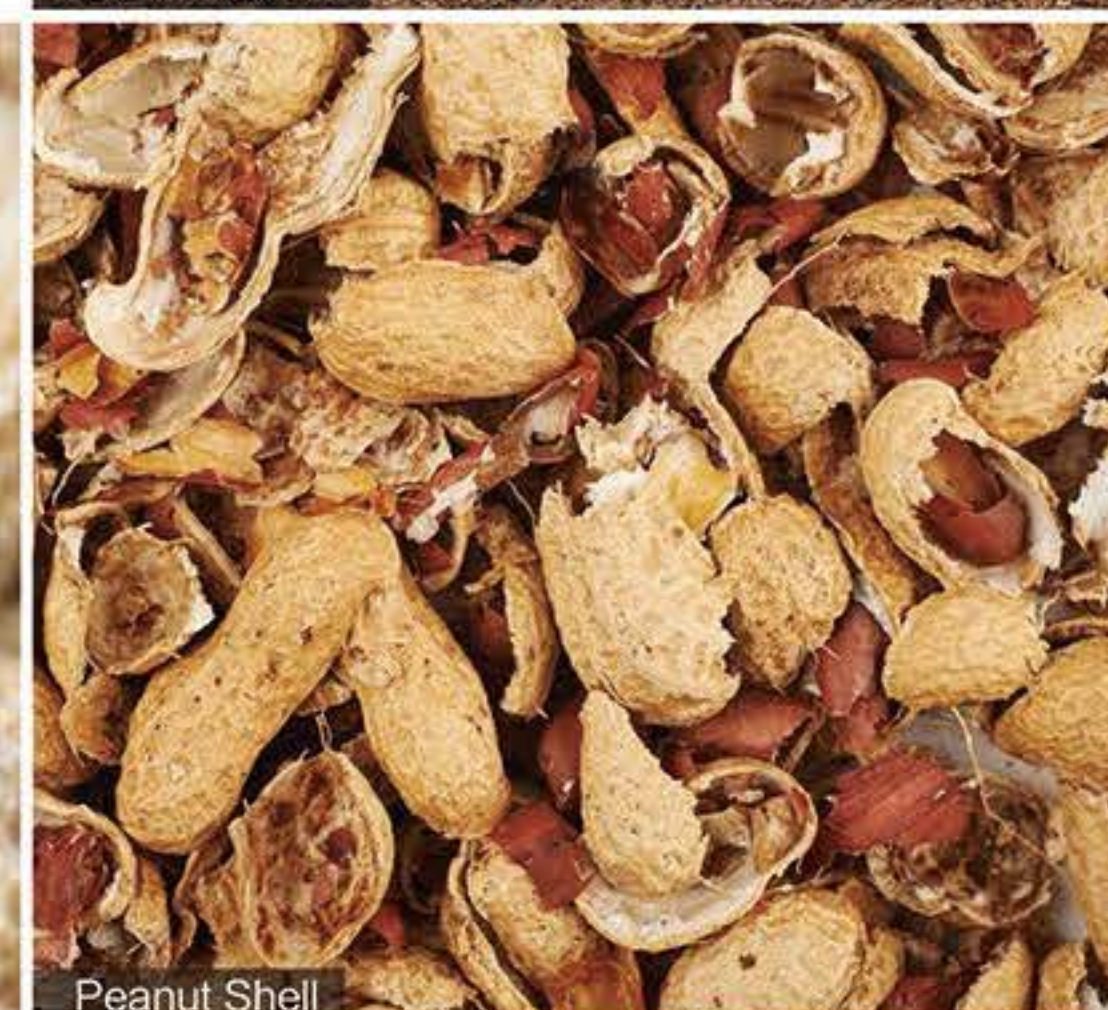
There are a lot of agricultural processing waste among the agricultural biomass resources, mainly including rice husk, corn cob, peanut shell and bagasse. The processing remains amount to 0.12 billion tons every year, among which 60 million tons can be used as energy.



Rice Husk



Corn Cob



Peanut Shell



Bagasse



About us

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!

Hongze Teneng Biomass Power Generation Co.,Ltd is a rice husk comprehensive utilization gasification power generation project in Hongze, Jiangsu which is invested by Wuxi Teneng Power Machinery Co.,Ltd. It includes 10 gasification systems and 13 gas gensets and other auxiliary systems such as material storage and delivery system, biochar packaging system, water feeding system, electrical system and thermal control system. This project is biomass energy power generation project and belongs to an emerging industry which is greatly supported by the government. The project uses local rice husk as fuel to produce gas in the gasifier and then the gas goes into the genset to generate electricity. The project not only solves the problem of dealing with the rice husk, but also reduces environmental pollution and energy waste. It can generate 3708.6 million KWh electricity to go to grid annually which can alleviate the pressure of the local power supply and has positive effect on the local energy saving work. The project can deal with 74,800 tons of rice husk, generate 4104 million KWh electricity, supply 3708.6 million KWh electricity to grid and produce 20592 tons of rice husk biochar every year.

POWERMAX biomass gasification boiler

2017 invention patent

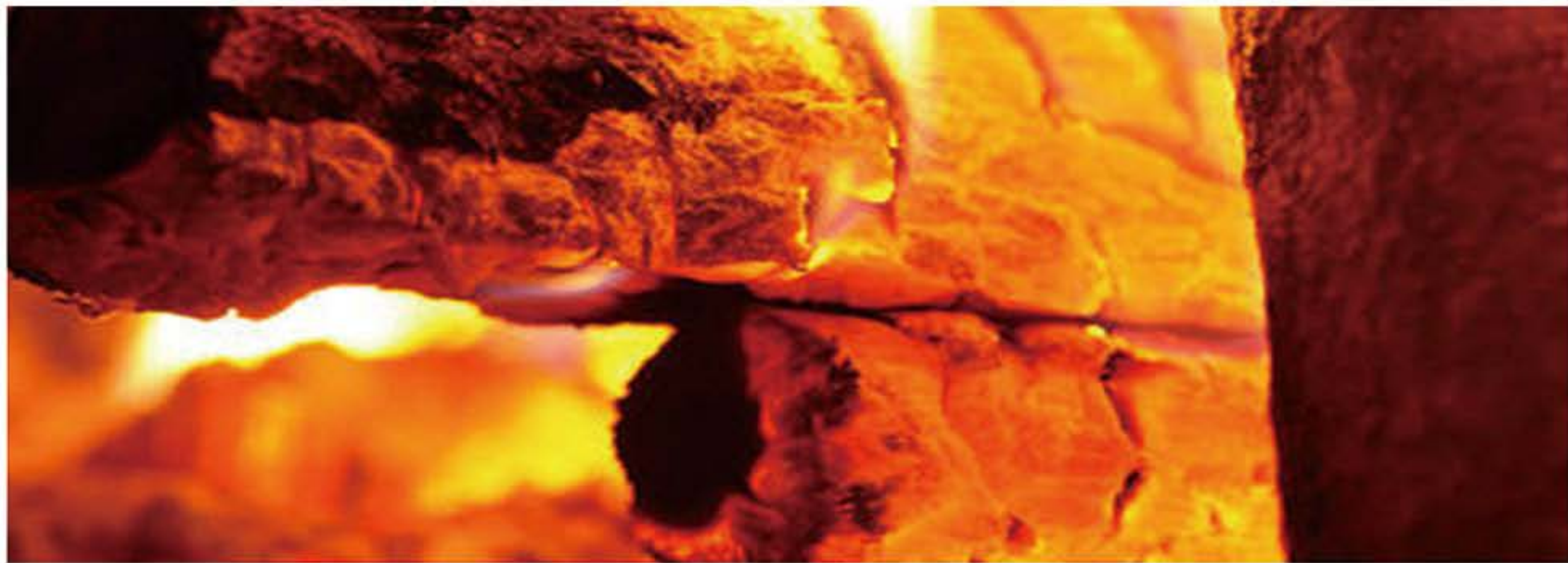


letters patent



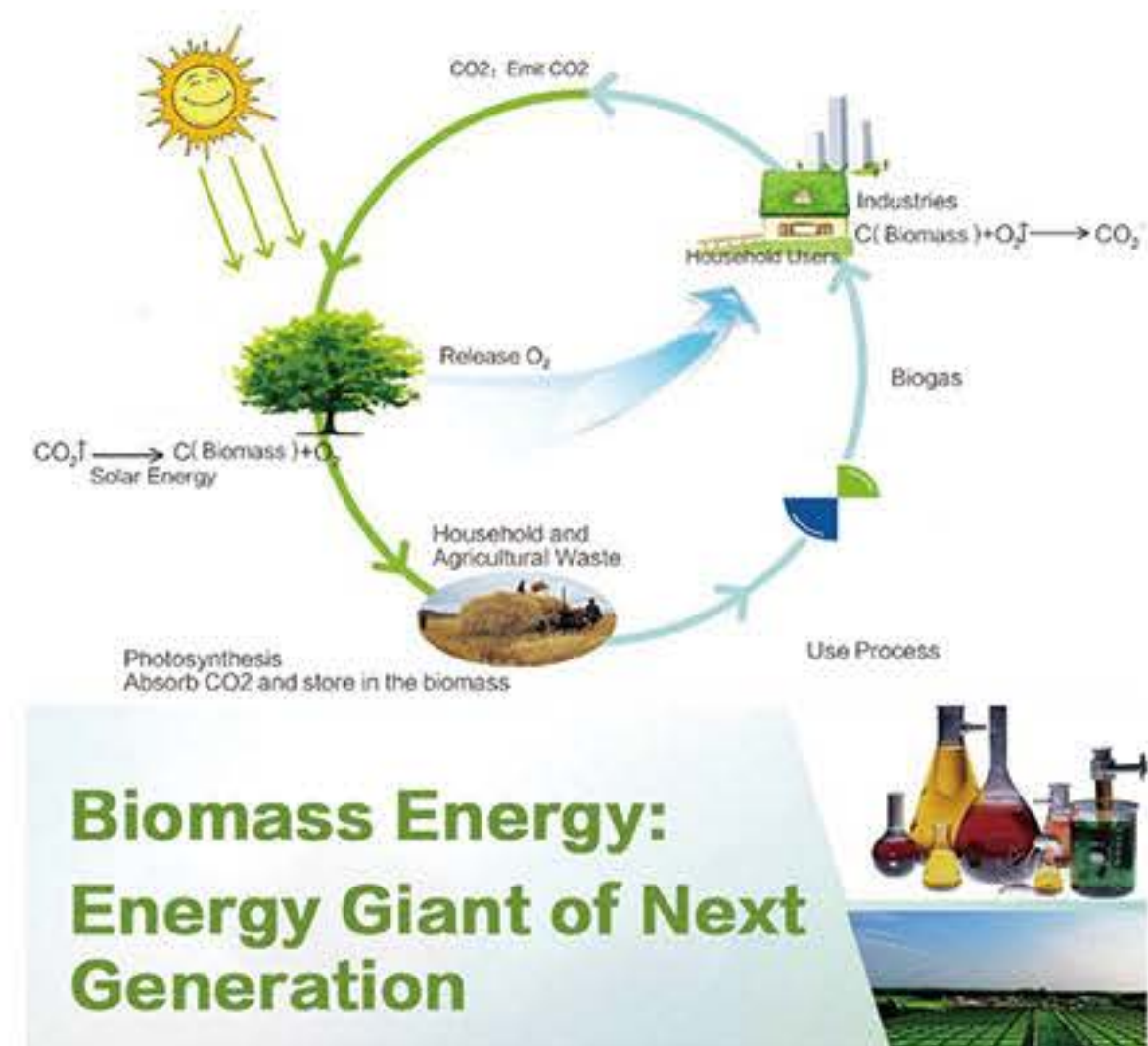
Enterprise certification





Biomass Energy

Biomass energy is a kind of energy which uses biomass as carrier to store the solar energy in the form of chemical energy. It comes directly or indirectly from the photosynthesis of the green plants and can be converted into regular solid, liquid or gas fuels. It's unlimited and renewable and also the only kind of renewable carbon source. Materials generated by photosynthesis every year on earth amount to 1730 tons. The energy contained is equivalent to 10–20 times the total consumption around the world, but the current utilization rate is lower than 3%. Based on the current situation, it is urgent to develop new technology and equipments, both for renewable development and environmental protection.



Characteristics of Biomass Energy

1

Renewability

The biomass energy is converted from solar energy. The solar energy is converted into chemical energy through photosynthesis of plants and then be stored in the biomass. It is same as wind energy and solar energy which are renewable and can be utilized sustainably.

2

Alternative Advantage

Biomass energy is clean energy. CO₂ and water are combined into biomass through photosynthesis and later are generated again during use process. It forms cyclic emission of CO₂ which can reduce the net emission of human CO₂ and alleviate greenhouse effect.

3

Clean and Low-carbon

The biomass energy can be converted into biomass briquette fuels, combustible biomass gas and biomass liquid fuels through modern technology and it can also be transformed into solid, gas and liquid fuels which are easy for storage and transportation.

4

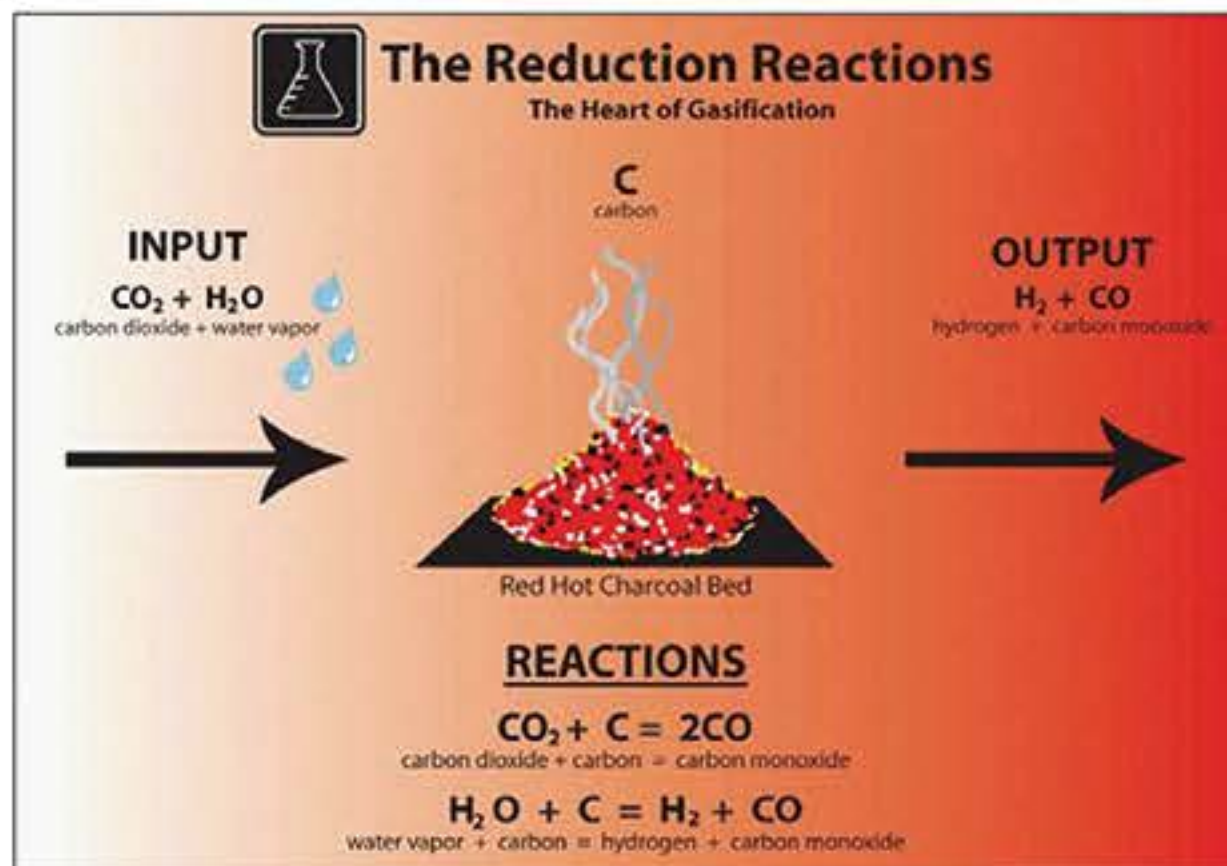
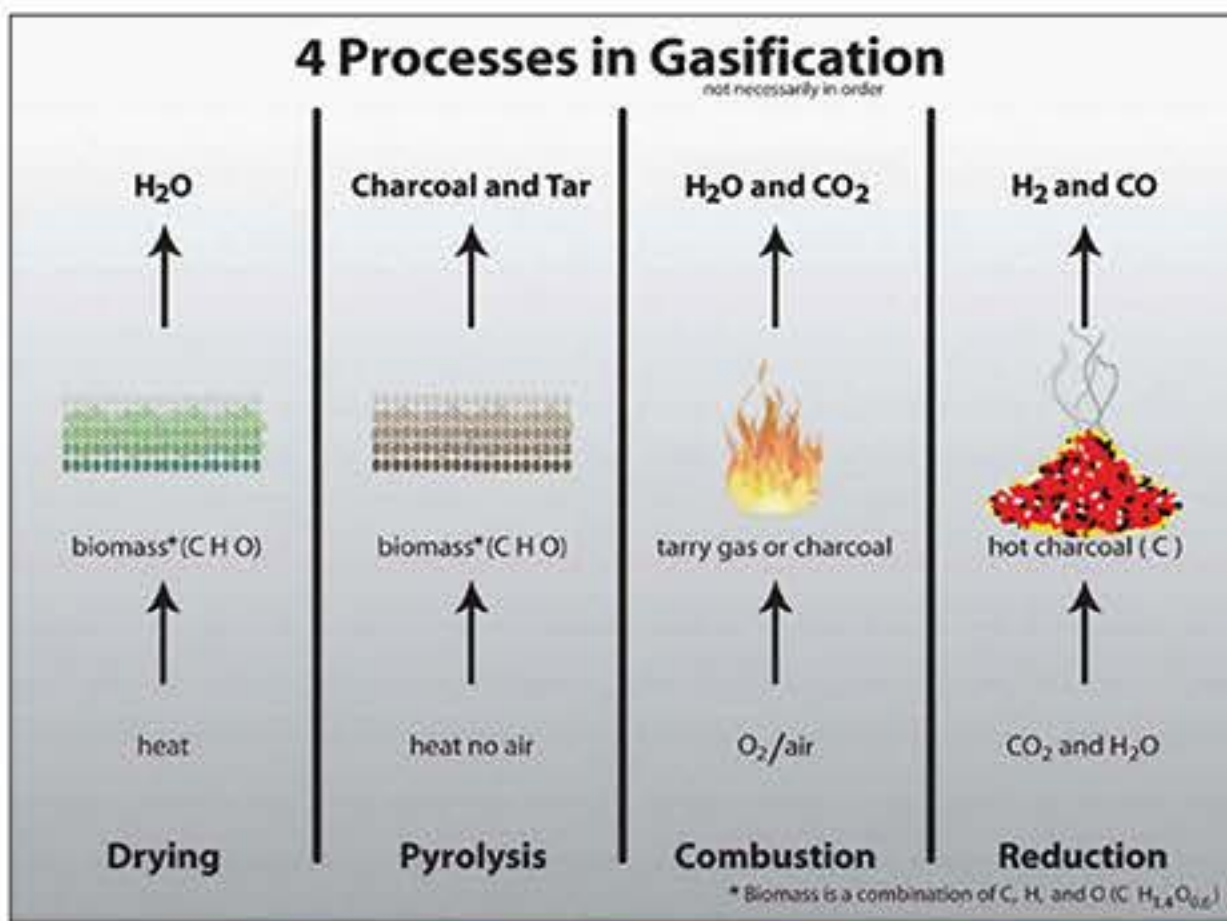
Abundant Raw Material

The biomass energies are rich and widely-distributed. It is the most desirable alternative energy since the traditional energies are depleting day by day. It is hailed as 'the fourth energy' just after coal, petroleum and natural gas.

Biomass Gasification

Biomass gasification is a process during which the raw materials (such as stalk, sawdust, bagasse) are made into briquettes or simply crushed and dried and then be fed into the gasifier under oxygen-deficit conditions and splitted. In another words, the high polymers in the biomass undergo pyrolysis, oxidation, reduction and reforming reactions with the help of air(oxygen) or steam under specific thermodynamic conditions. The tar generated during the pyrolysis process is pyrolyzed again into small molecule hydrocarbons and the combustible gases (such as CO, H₂ and CH₄) are produced. The produced gas is then be purified and becomes product gas.

Essentially, the gasifier is a chemical reactor in which a lot of complex physical and chemical reactions are happened. The biomass goes through drying, heating, pyrolysis, partially oxidation and reduction reactions in the gasifier.



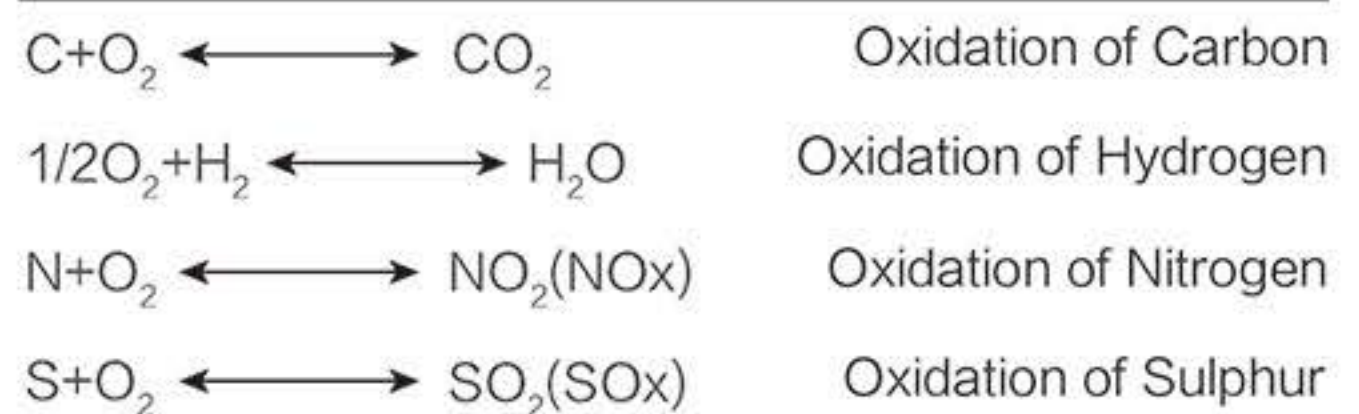
Comparison between Gasification and Combustion

Through comparison of chemical reactions involved in different processes, we can better understand the differences between gasification and combustion.

Combustion

Combustion is a process during which carbon, hydrogen and other components are completely oxidized and release heat energy. Generally the thermal efficiency of combustion is lower than that of gasification. Typical combustion reactions is showed as following picture, it will produce polluting gases such as SO_x and NO_x which contain higher concentration of toxicants compared with gasification.

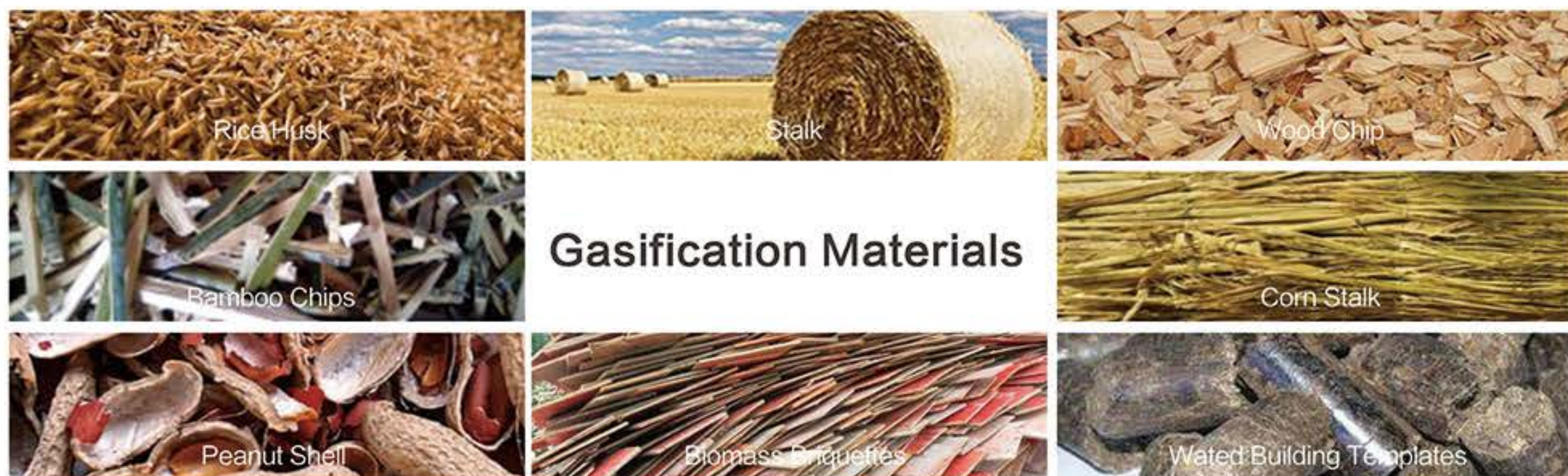
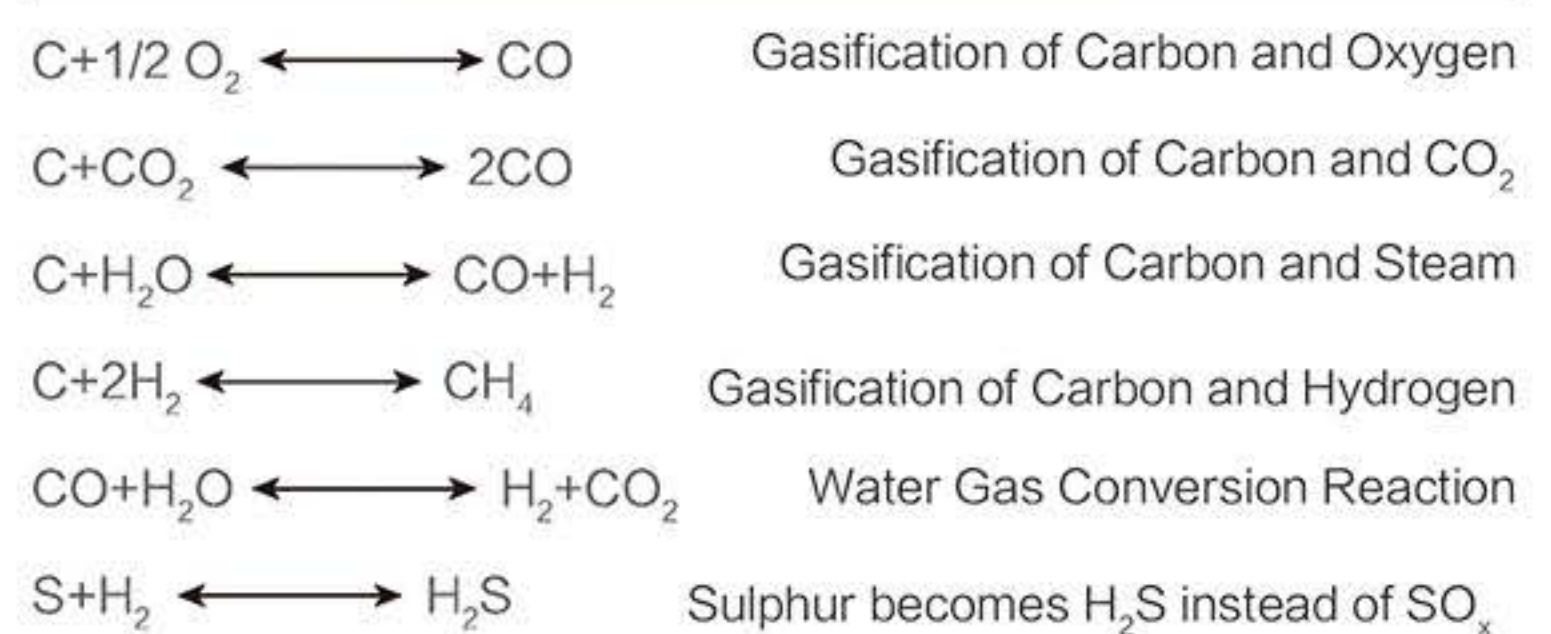
Combustion (Oxidation) Reactions



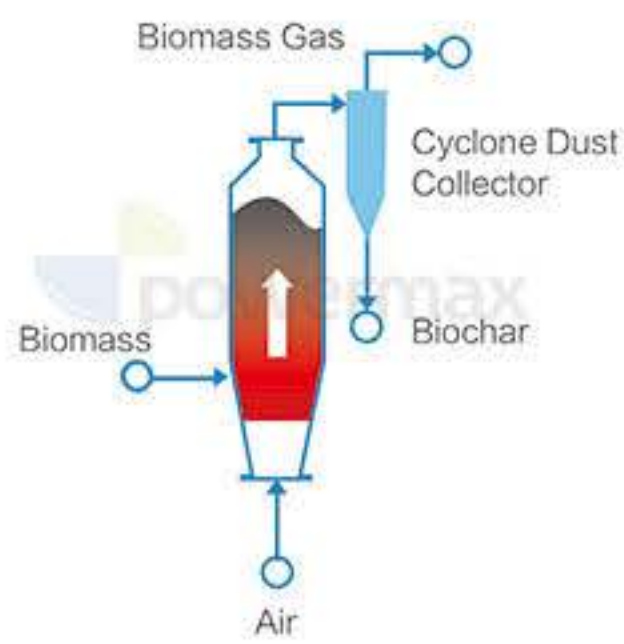
Gasification

Gasification can convert carbon materials into energy. It is more clean than combustion. The fuels are firstly converted into combustible gas under high temperature. The gas can be used as clean fuel gas or be converted into chemical substances such as ammonia for industrial and agricultural use. Through the comparison of typical combustion and gasification, the SO_x and NO_x content of the syngas have been greatly reduced during the gasification process before burning the syngas product.

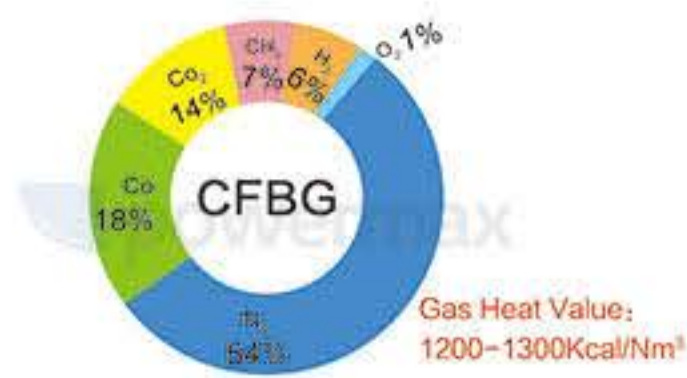
Gasification Reactions



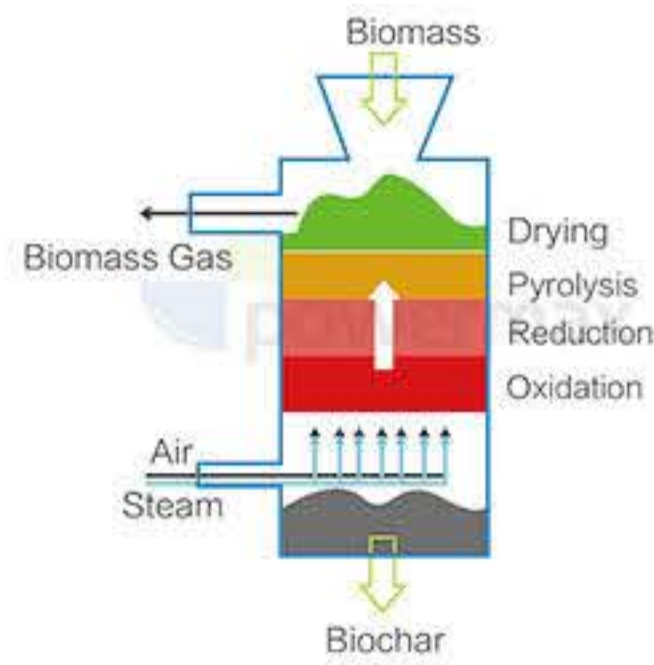
High temperature gas(>600°C) goes into boiler.



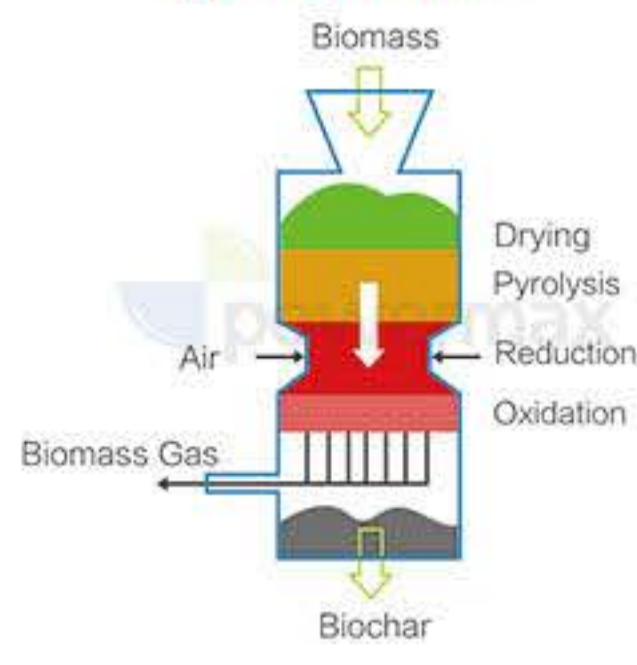
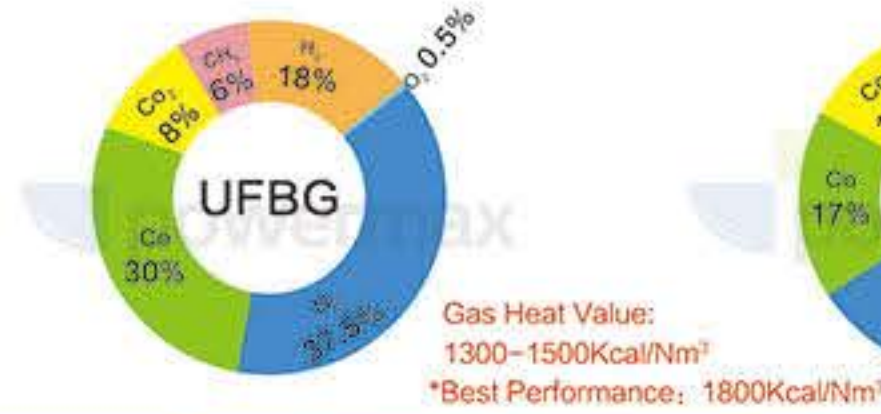
CFBG Fluidized Bed Gasifier



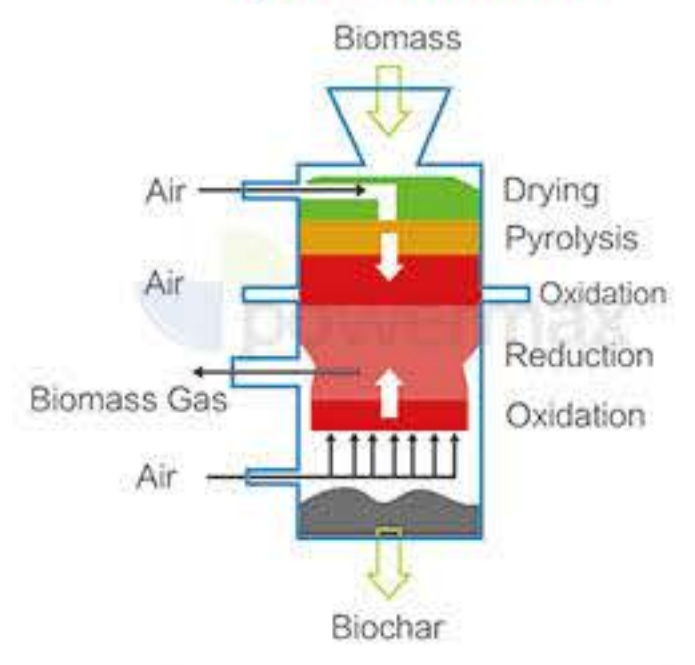
High temperature gas(>300°C) goes into boiler.



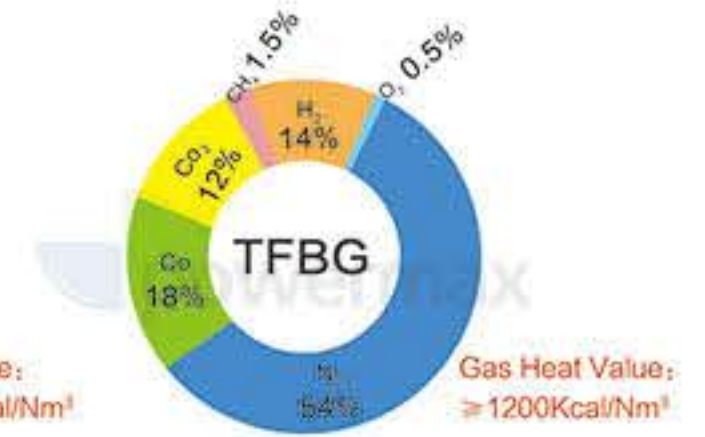
UFBG Updraft Fixed Bed Gasifier



DFBG Downdraft Fixed Bed Gasifier



TFBG Twin Fire Fixed Bed Gasifier



Item	Fluidized Bed Gasifier	Updraft Fixed Bed Gasifier	Downdraft Fixed Bed Gasifier	Twin Fire Fixed Bed Gasifier
Material Size Requirement	< 10mm	20-80mm	20-80mm	20-80mm
Material Moisture Requirement	≤ 16%	≤ 55%	≤ 20%	≤ 25%
Advantages	High level of automation, the finer the material is, the higher the efficiency is	The material has high adaptability and highest thermal efficiency.	The gas contains small content of tar and can produce high quality biochar.	The gas contains small content of tar and the gas production efficiency is high.
Disadvantages	The gas contains lots of dust and some tar	The gas contains lots of tar.	The gas production efficiency is low.	-

Advantages of Biomass Gas

Besides the general features of biomass fuels, the biomass gas also has following characteristics:

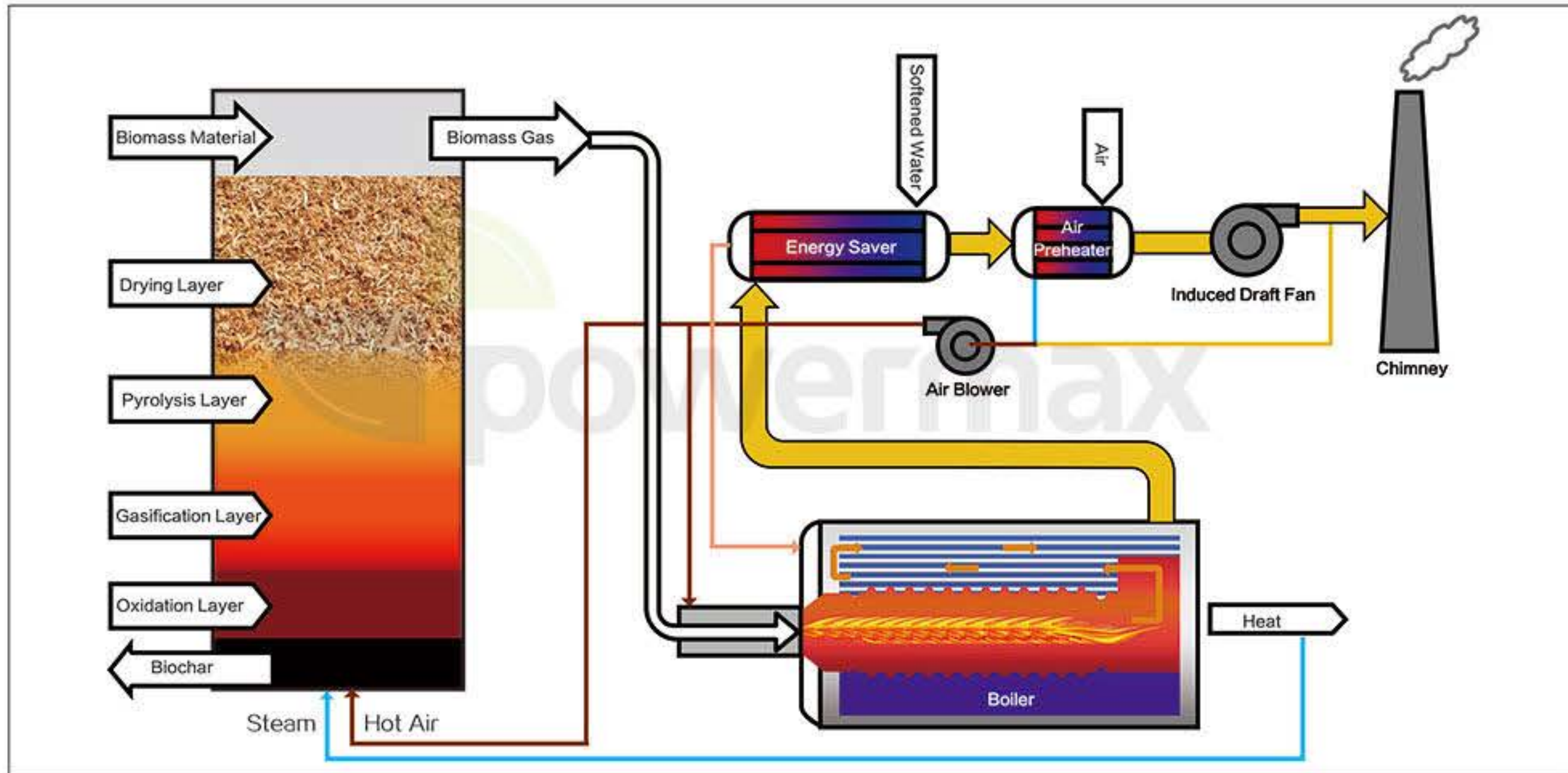
- Clean and environmental-friendly gas fuel;
- Good combustion performance and high burn-off rate;
- Extremely low sulphur content, only 1/20 of the oil fuel and no need to take extra desulphurization measures
- Extremely low nitrogen content and no need to take any denitration measures to meet general environmental requirements
- Low ash content in the gas
- Economic, has more market prospect compared to expensive fossil fuels
- Strongly supported by state policies
- Zero-emission: The CO₂ released when burning the biomass is same as that absorbed during the regrowth process. It substitutes the fossil fuels and reduces net emissions. According to the Tokyo Protocol mechanism, the CO₂ emission of biomass fuel is zero.

POWERMAX' s Gasification Equipments and Applications

The biomass gasification heating system designed by POWERMAX has all the advantages of biomass gasification and also has the following benefits:

1. Feeding-Reaction-Purification-Application, the whole process is automatically controlled, easy to operate.
2. The structure is compact and good-looking, the on site environment is clean and tidy.
3. The biomass gas produced has no negative impact on the gasifier chamber and exhaust system when burning and the exhaust gas meets the environmental standards.
4. It has fault warning system, interconnected and interlocked, safe and efficient.
5. It has been tested and used by several companies and the gasification system is proved to be stable, long-lasting and energy-saving.

Biomass Updraft Gasification Boiler Flow Chart



Environmental Protection Benefits

During the gasification process, the pipelines of the equipments are sealed all the time to make sure that there's no gas leakage. The carbon residue at the bottom of the equipment can be recycled and the exhaust gas produced after burning the biogas meets the latest emission standards for the gas boiler both of the country and the region.

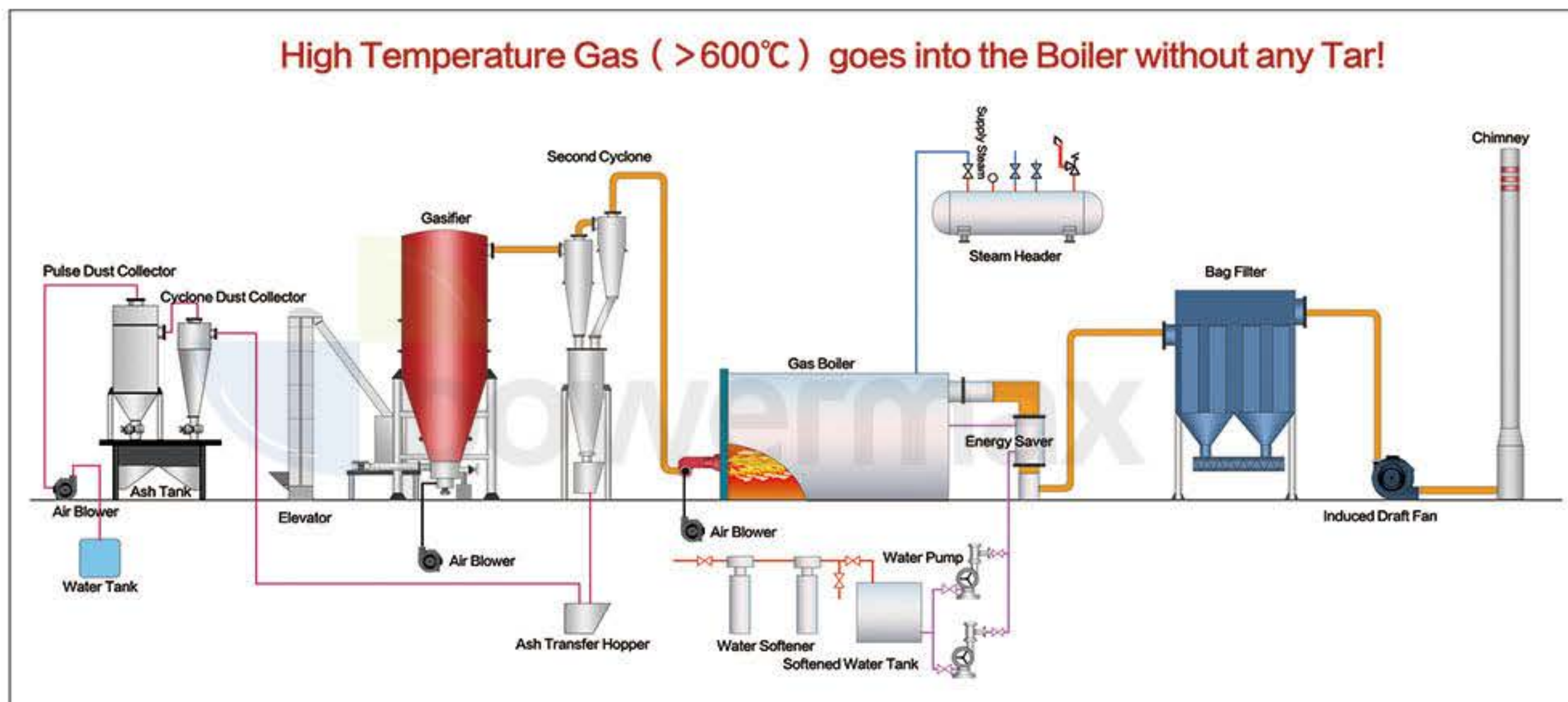
Item	Smoke	SO ₂	NO ₂	Note
Coal-fired Boiler	50	300	300	National Standards
Oil-fired Boiler	30	200	250	National Standards
Gas-fired Boiler	20	50	200	National Standards
Gas-fired Boiler	20	50	150 / 50*	Jiangsu Standards
Test Report of Biogas-fired Boiler	<15	<50	<100	Meet the Standards

Note: * represents ultra-low emission limit and needs to install denitration device.

Economic Benefits Economic Cost Performance of Different Fuels(1t/h Steam Boiler)

Item	Biomass Pellets	Natural Gas	0# Diesel Oil	Heavy Oil	Coal	Biomass Gasification
Heat Value of the Fuel (kcal/kg;kcal/Nm ³)	4100	8600	10200	9640	5500	4100
Gasification Efficiency(%)	-	-	-	-	-	85
Sulphur Content(%) _≦	≦0.11	≦0.15	≦0.2-0.3	≦1.11-1.8	-	≦0.2
NO _x (mg/m ³)	220	248	330	300	400	140
SO ₂ (mg/m ³)	300	48	280	300	300	48
Smoke (mg/m ³)	46	16	50	47	80	20
Price(Yuan/t, Yuan/m ³)	900	4	4500	3500	470	400
Saved Fuel Cost (%)	37%	61%	55%	52%	-27%	-

POWERMAX Biomass Fluidized Bed Gasification Boiler System



Product Introduction

POWERMAX Biomass Fluidized Bed Gasification Boiler includes: material feeding system, fluidized bed gasification system, cyclone dust collector, burner, gas boiler system, flue gas treatment system, etc. The working principle is that the biomass (such as rice husk, sawdust, branches, stalks, fruit shells, bagasse and corncob etc) have pyrolysis and gasification reactions with limited oxygen in the gasifier and generate combustible gas. The gas goes into the gas boiler after simple dedusting treatment and generates steam or hot water for civil and industrial use.



Biomass Material

Technical Parameters

Model of Gasification Boiler	CFBG-SZS4-1.25-Q	CFBG-SZS6-1.25-Q	CFBG-SZS8-1.25-Q	CFBG-SZS10-1.25-Q	CFBG-SZS12-1.25-Q	CFBG-SZS15-1.25-Q	CFBG-SZS20-1.25-Q
Rated Evaporation Capacity (t/h)	4	6	8	10	12	15	20
Rated Working Pressure (MPa)	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Rated Outlet Temperature (°C)	193	193	193	193	193	193	193
Rated Water Inlet Temperature (°C)	20	104	104	104	104	104	104
Water Capacity (M ³)	8	10	11	12	13	14	15
Gasifier Type	Fluidized Bed Gasifier						
Gasify Agent	Air						
Applicable Material	Rice Husk, Straw, Sawdust, Bagasse, Corn Cob, Wood Trimmings						
Moisture Content	≤16%						
Size Requirement	≤10mm						
Biomass Consumption (kg/h*)	900-1280	1350-1920	1800-2560	2250-3200	2700-3840	3375-4800	4500-6400
Gas Output (Nm ³ /h)	2200-2400	3300-3600	4400-4800	5500-6000	6600-7200	8250-9000	11000-12000
Gas Component	CO: 12-18%; H ₂ : 3-7%; CO ₂ : 10-16%; CH ₄ : 4-8%; N ₂ :54-60%; O ₂ :0.5-1.2%; C _n H _m :1-1.4%;						
Gas Heat Value	1200-1300Kcal/Nm ³						
Ash Discharge Type	Dry Type						

* The consumption rate depends on the different heat value of the materials.
To produce 1 ton steam needs 600000 Kcal.

Product Features

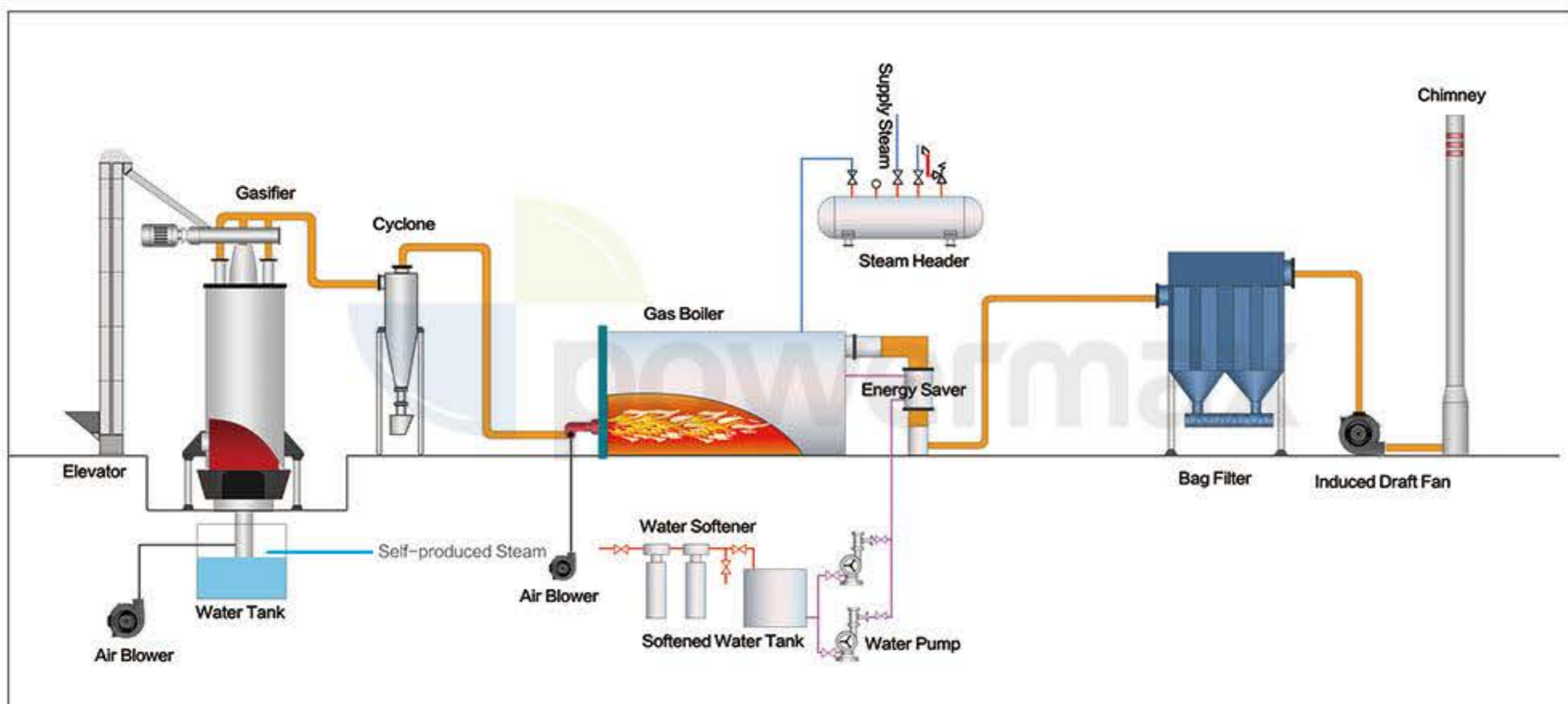
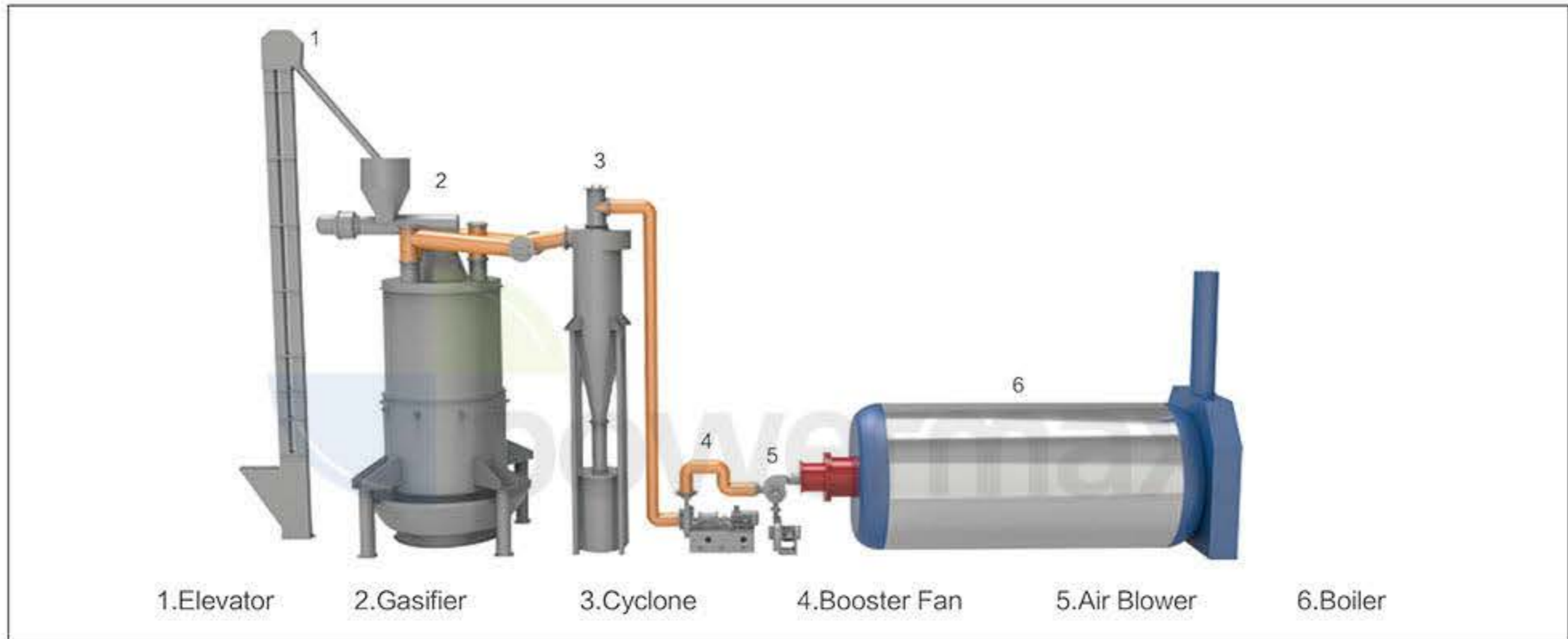
Reasonable Structure: The gasification system adopts fluidized bed gasifier, the smaller the material is, the higher the efficiency is and the gas production is stable. The boiler uses typical double-drum longitudinal 'D' type structure which has small land coverage and good flame fullness. The furnace water wall and convection pass use membrane wall structure which has good sealing performance and can reduce smoke loss and increase boiler heat efficiency. The low heat value gas generated by gasification process goes directly into the gas boiler, sensible heat of the biomass gas and heat of the tar can be made good use of and increase overall efficiency.

High Level of Automation: The control system uses PLC controller, it is interconnected and interlocked and can automatically eliminate the potential safety risks. The control system is safe and simple and can work stably and continuously for 24 hours.

Environmental-friendly: Biomass gas is clean energy, it generates little NO_x and almost no SO_x and 'zero' emission of CO₂.

Low Operation Cost: The raw material is abundant and easy to get. The byproduct called biochar can be further processed into carbon commodities of high value, which can also increase the profit.

POWERMAX Biomass Updraft Fixed Bed Gasification Boiler System



Product Introduction

POWERMAX Biomass Updraft Fixed Bed Gasification Boiler includes: material feeding system, Updraft fixed bed gasification system, burner, waste heat boiler system, flue gas treatment system, etc. The working principle is that the biomass (such as building templates, wood chips, bamboo chips, corn cobs and biomass briquettes etc) have pyrolysis and gasification reactions with limited oxygen in the gasifier and generate combustible gas. The gas goes into the thermal-insulated furnace directly and then produce hot flue gas and the hot flue gas turns into steam or hot water after the waste heat boiler for civil and industrial use.



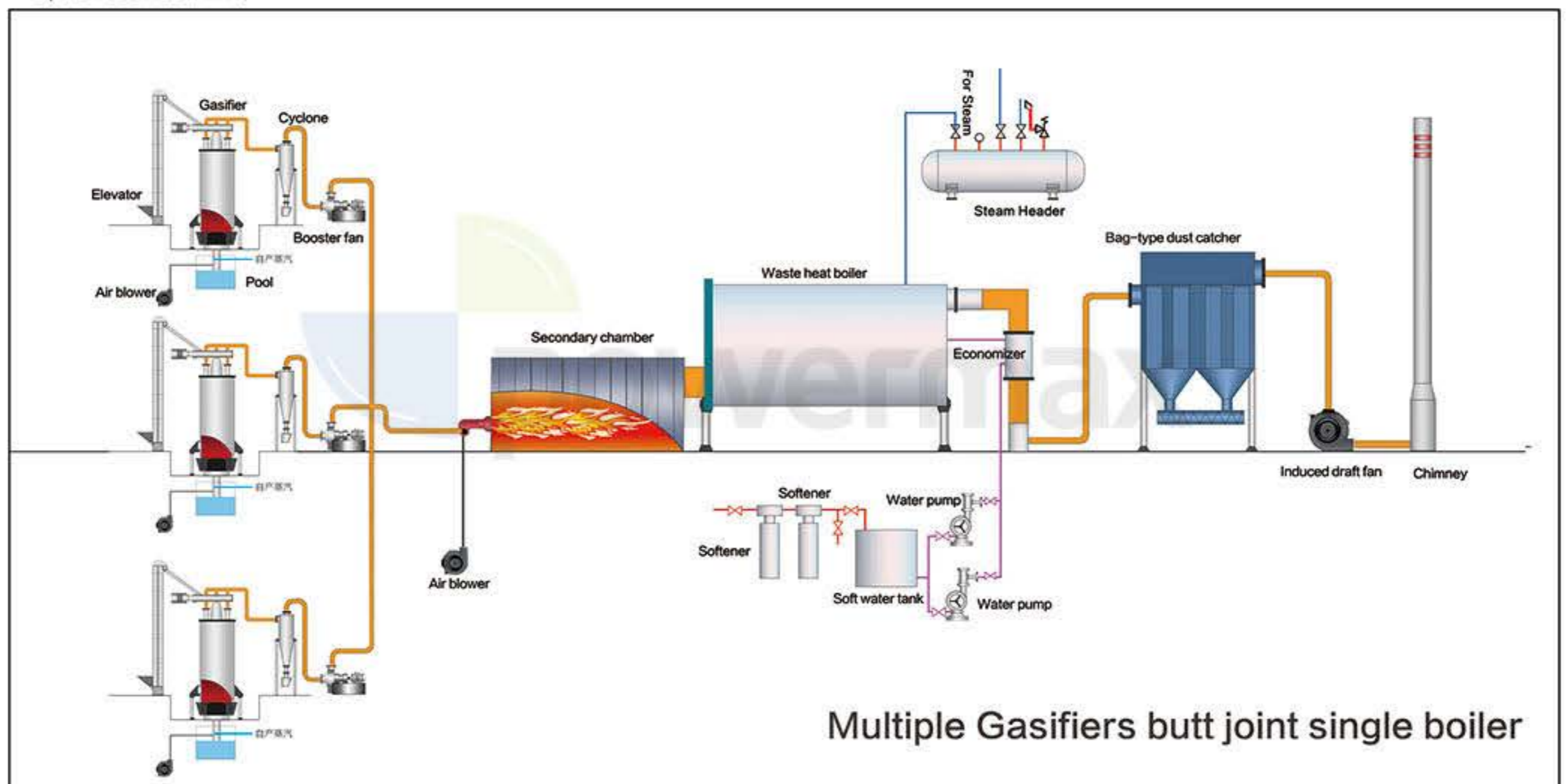
Biomass Material

Technical Parameters

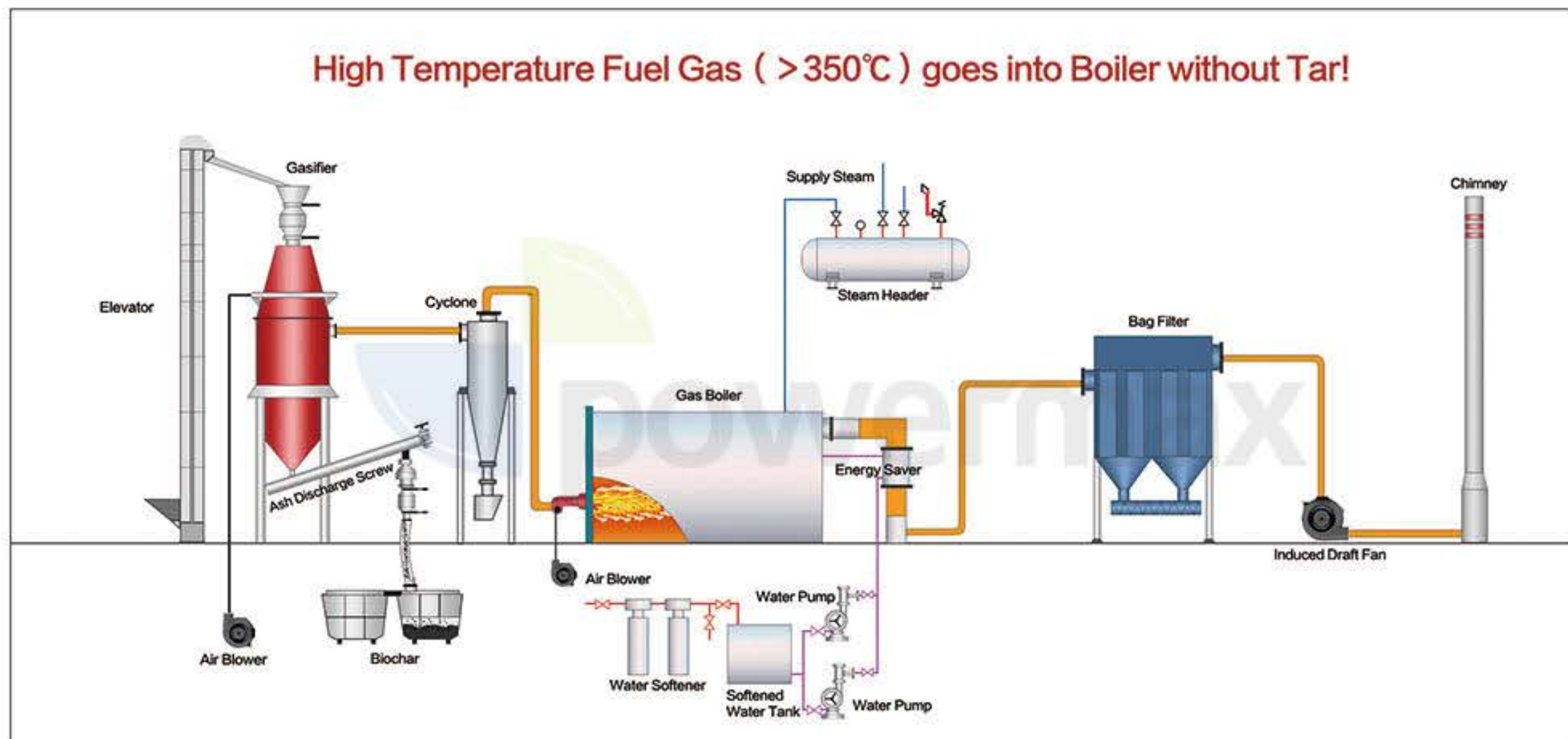
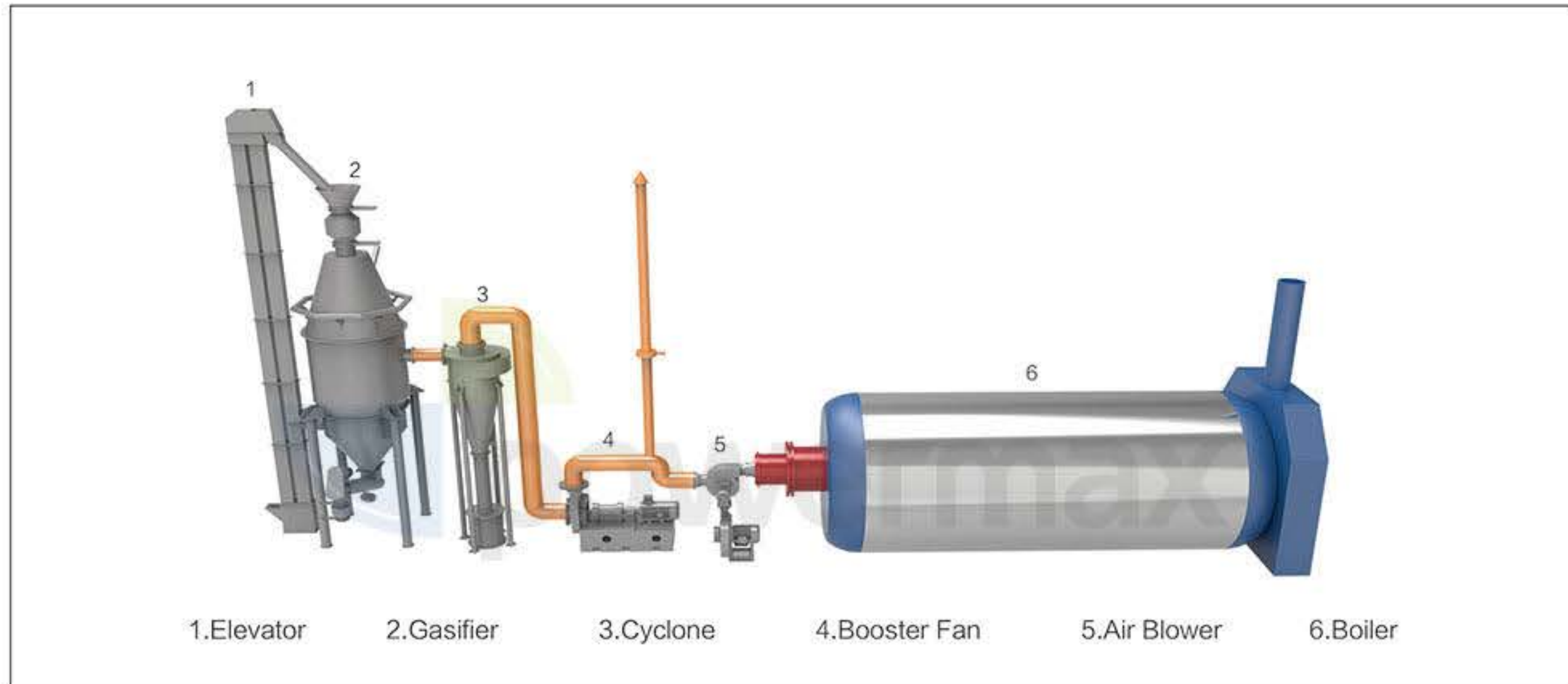
Model of Gasification Boiler	UFBG-Q C4-1.25	UFBG-Q C6-1.25	UFBG-Q C8-1.25	UFBG-Q C10-1.25	UFBG-Q C12-1.25	UFBG-Q C15-1.25	UFBG-Q C20-1.25	UFBG-Q C25-1.25	UFBG-Q C30-1.25
Rated Evaporation Capacity(t/h)	4	6	8	10	12	15	20	25	30
Rated Working Pressure (MPa)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Rated Outlet Temperature(°C)	193	193	193	193	193	193	193	193	193
Rated Water Inlet Temperature(°C)	20	104	104	104	104	104	104	104	104
Water Capacity(M ³)	11	12	13	14	15	16	17	18	19
Gasifier Type	Fixed Bed Gasifier								
Gasify Agent	Air+Steam								
Applicable Material	building templates, wood chips, bamboo chips, corn cons and biomass briquettes etc								
Moisture Content	≤25% (Maximum acceptable ≤55%)								
Size Requirement	Diameter: 20-80mm; Length: 20-80mm								
Biomass Consumption(kg/h)*	900-1200	1350-1800	1800-2400	2250-3000	2700-3600	3375-4500	4500-6000	5625-7500	6750-9000
Gas Output(Nm ³ /h)	1800-2000	2700-3000	3600-4000	4500-5000	5400-6000	6750-7500	9000-10000	11250-12500	13500-15000
Gas Component	CO: 27-33%; H ₂ : 16-19%; CO ₂ : 6-10%; CH ₄ : 4-7%; O ₂ : ≤0.5%; N ₂ :remains;								
Gas Heat Value *	1300-1500Kcal/Nm ³								
Ash Discharge Type	Wet/Dry Type								

* The consumption rate depends on the different heat value of the materials. To produce 1 ton steam needs 600000 Kcal.

★ Up to 1800Kcal/Nm³.



POWERMAX Biomass Twin Fire Fixed Bed Gasification Boiler System



Product Introduction

POWERMAX Biomass Twin Fire Gasification Boiler includes: raw material feeding system, twin fire fixed bed gasification system, cyclone dust collector, burner, gas boiler system and flue gas treatment system, etc. The working principle is that the biomass (such as rice husk, sawdust, branches, stalks, fruit shells, bagasse and corncob etc) have pyrolysis and gasification reactions with limited oxygen in the gasifier and generate combustible gas. The gas converted from biomass goes into the gas boiler after simple dedusting treatment and generates steam or hot water for civil and industrial use.



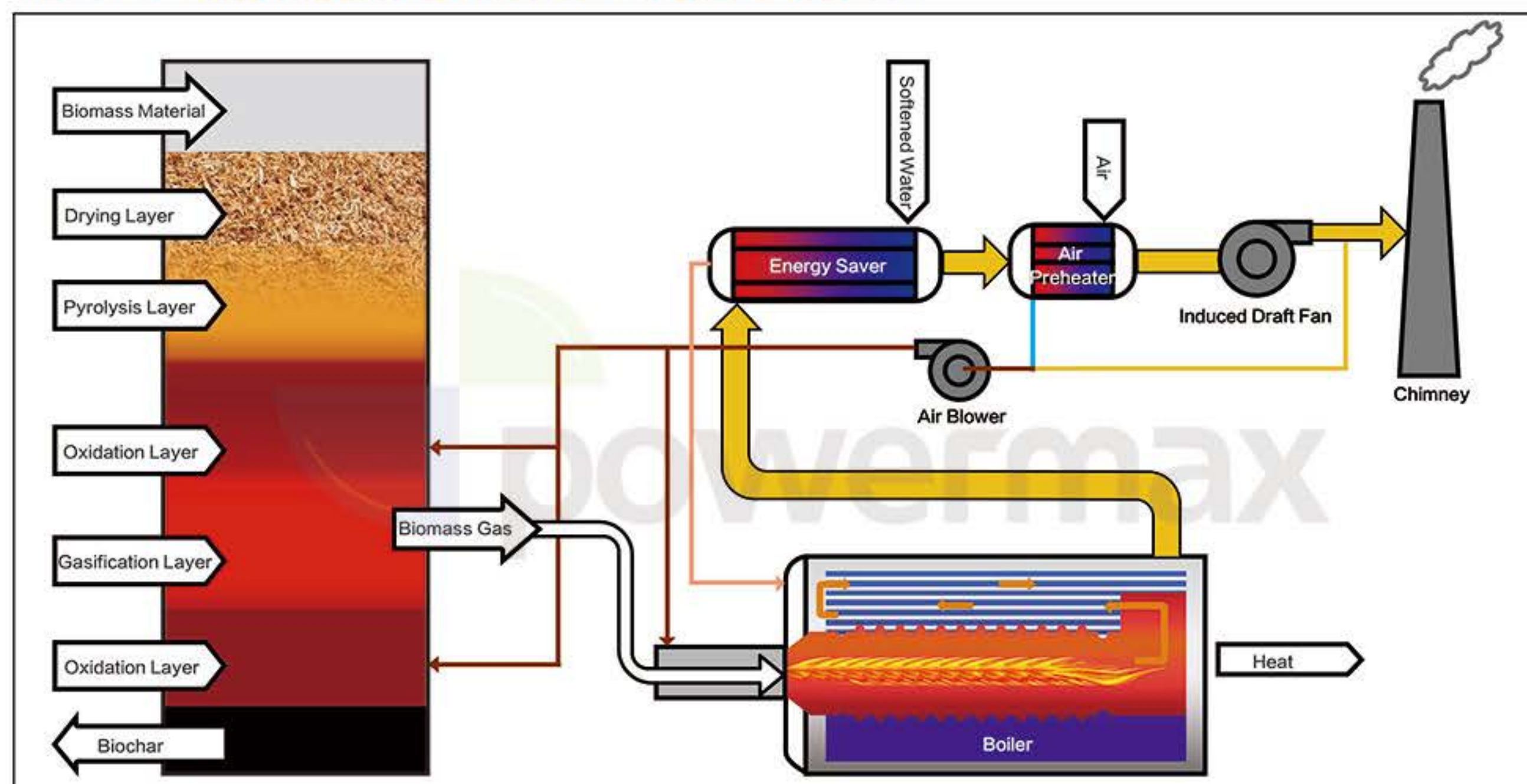
Biomass Material

Technical Parameters

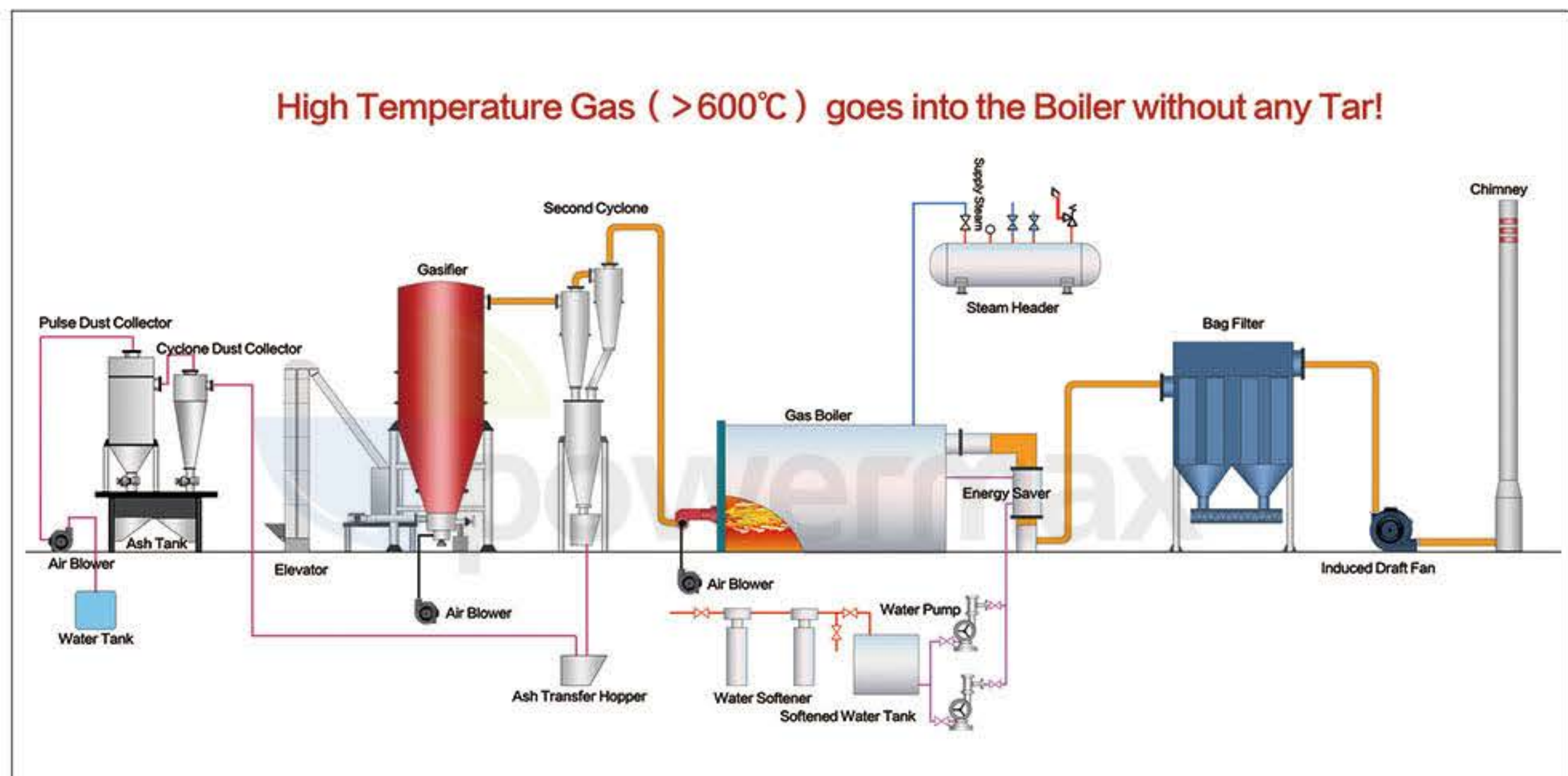
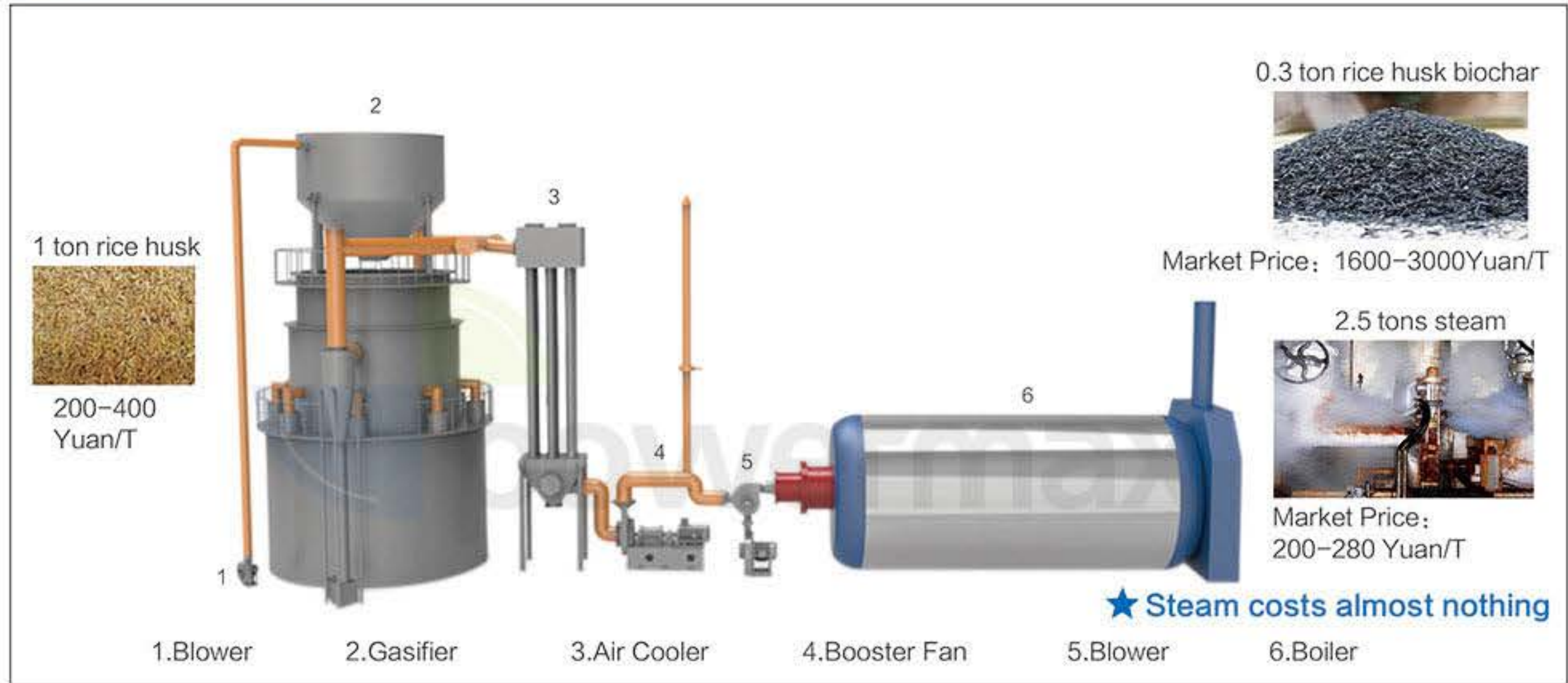
Model of Gasification Boiler	TFBG-WNS1 -1.25-Q	TFBG-WNS2 -1.25-Q	TFBG-WNS4 -1.25-Q	TFBG-WNS6 -1.25-Q	TFBG-WNS8 -1.25-Q	TFBG-WNS10 -1.25-Q	TFBG-WNS12 -1.25-Q	TFBG-WNS15 -1.25-Q
Rated Evaporation Capacity (t/h)	1	2	4	6	8	10	12	15
Rated Working Pressure (MPa)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Rated Outlet Temperature (°C)	193	193	193	193	193	193	193	193
Rated Water Inlet Temperature (°C)	20	20	20	104	104	104	104	104
Water Capacity (M³)	3	4.5	6.5	8.5	12	14	18	22
Gasifier Type	Twin Fire Fixed Bed Gasifier							
Gasify Agent	Air							
Applicable Material	Building Templates, Wood Chips, Bamboo Chips, Corn Cob, Biomass Briquettes							
Moisture Content	≤25%							
Size Requirement	Diameter: 20-80mm; Length: 20-80mm							
Biomass Consumption (kg/h) *	225-320	450-640	900-1280	1350-1920	1800-2560	2250-3200	2700-3840	3375-4800
Gas Output (Nm³/h)	525-600	1050-1200	2100-2400	3150-3600	4200-4800	5250-6000	6300-7200	7875-9000
Gas Component	CO: 17-20%; H ₂ : 12-16%; CH ₄ :0.5-1.5%; CO ₂ : 8-14%; C _n H _m : 0.1-0.2%; O ₂ : 0.2-0.5%; N ₂ : remains;							
Gas Heat Value	≥1200Kcal//Nm ³							
Ash Discharge Type	Dry /Wet Type							

* The consumption rate depends on the different heat value of the materials. To produce 1 ton steam needs 600000 Kcal.

Twin Fire Gasification Boiler Schematic Diagram



POWERMAX Biomass Downdraft Fixed Bed Gasification Boiler System (Coal Gasification Boiler)



Product Introduction


POWERMAX Biomass Carbonization Boiler system includes: material feeding system, carbonization system (fine material), burner, waste heat boiler system, flue gas treatment system, etc. The working principle is that the biomass (such as rice husk, straws, bagasse, peanut shells and sunflower seed shells etc) have pyrolysis and gasification reactions with limited oxygen in the gasifier and generate combustible gas. The gas goes into the thermal-insulated furnace directly and then produce hot flue gas and the hot flue gas turns into steam or hot water after the waste heat boiler for civil and industrial use.



Technical Parameters

Model of Gasification Boiler	DFBG/S-QC1-1.25	DFBG/S-QC2-1.25	DFBG/S-QC4-1.25	DFBG/S-QC6-1.25
Rated Evaporation Capacity (t/h)	1	2	4	6
Rated Working Pressure (MPa)	1.25	1.25	1.25	1.25
Rated Outlet Temperature (°C)	193	193	193	193
Rated Water Inlet Temperature (°C)	20	20	20	104
Water Capacity(M ³)	8	10	11	12
Gasifier Type	Downdraft Fixed Bed Gasifier			
Gasify Agent	Air			
Applicable Material	rice husk, straws, bagasse, peanut shells and sunflower seed shells etc			
Moisture Content	≤20%			
Size Requirement	≤10mm			
Biomass Consumption(kg/h)*	≤400	≤800	≤1600	≤2400
Gas Output (Nm ³ /h)	≥600	≥1200	≥2400	≥3600
Gas Component	CO:15-20%; H ₂ : 10-15%; CO ₂ : 8-12%; CH ₄ : ≥4%; N ₂ : 45-55%;			
Gas Heat Value	1000-1100Kcal/Nm ³			
Ash Discharge Type	Dry Type			
Carbon Production Rate (%)	< 30%			

* The consumption rate depends on the different heat value of the materials. To produce 1 ton steam needs 600000 Kcal.



Lab Reference No.: MNE1916540Z
 SGS Report No.: MERG21900599-01
 Testing Report Page: 1 / 2

TESTING REPORT


Declared Principal Name: WUXI TENENG POWER MACHINERY CO., LTD.
 Declared Principal Address: NO. 123 JIAOSHAN RD, YANGJIAN TOWN, XISHAN, WUXI, JIANGSU, CHINA
 Declared Sample Name: RICE HUSK CHARCOAL
 Sample Received Date: 2019-04-10
 Sample Testing Period: 2019-04-11 ~ 2019-04-11
 Declared Sample Number: RHC20190401
 Sample Condition on Receipt: CHIP(1.7kg)

In accordance with instructions received from applicant, we prepared and carried out required test on the sample. The analysis results reported as follows:

Test Items	Symbol	Unit	AR	AD	D	DAF	Method/Standard No.
Total Moisture	M	%	7.6	/	/	/	GB/T 211-2017
Air Dried Moisture	M _a	%	7	6.66	/	/	GB/T 212-2008
Ash	A	%	33.83	34.16	36.59	/	GB/T 212-2008
Volatile Matter	V	%	3.99	4.03	4.31	6.80	GB/T 212-2008
Char Residue Characteristic	CRC	/	/	/	2	/	GB/T 212-2008
Fixed Carbon	FC	%	/	55.15	/	/	GB/T 212-2008
Total Sulfur	S	%	0.10	0.10	0.11	/	GB/T 214-2007
Hydrogen	H	%	/	0.97	1.04	/	GB/T 30733-2014
Gross Caloric Value	Q _g	MJ/kg	/	19.87	21.29	33.58	GB/T 213-2008
Net Caloric Value	Q _{net,v}	MJ/kg	/	19.31	19.52	/	GB/T 213-2008

Q_{net,v,ar} correspond to 4.618kcal/kg, Q_{net,v,ad} correspond to 4.668kcal/kg.

***** To be continued *****



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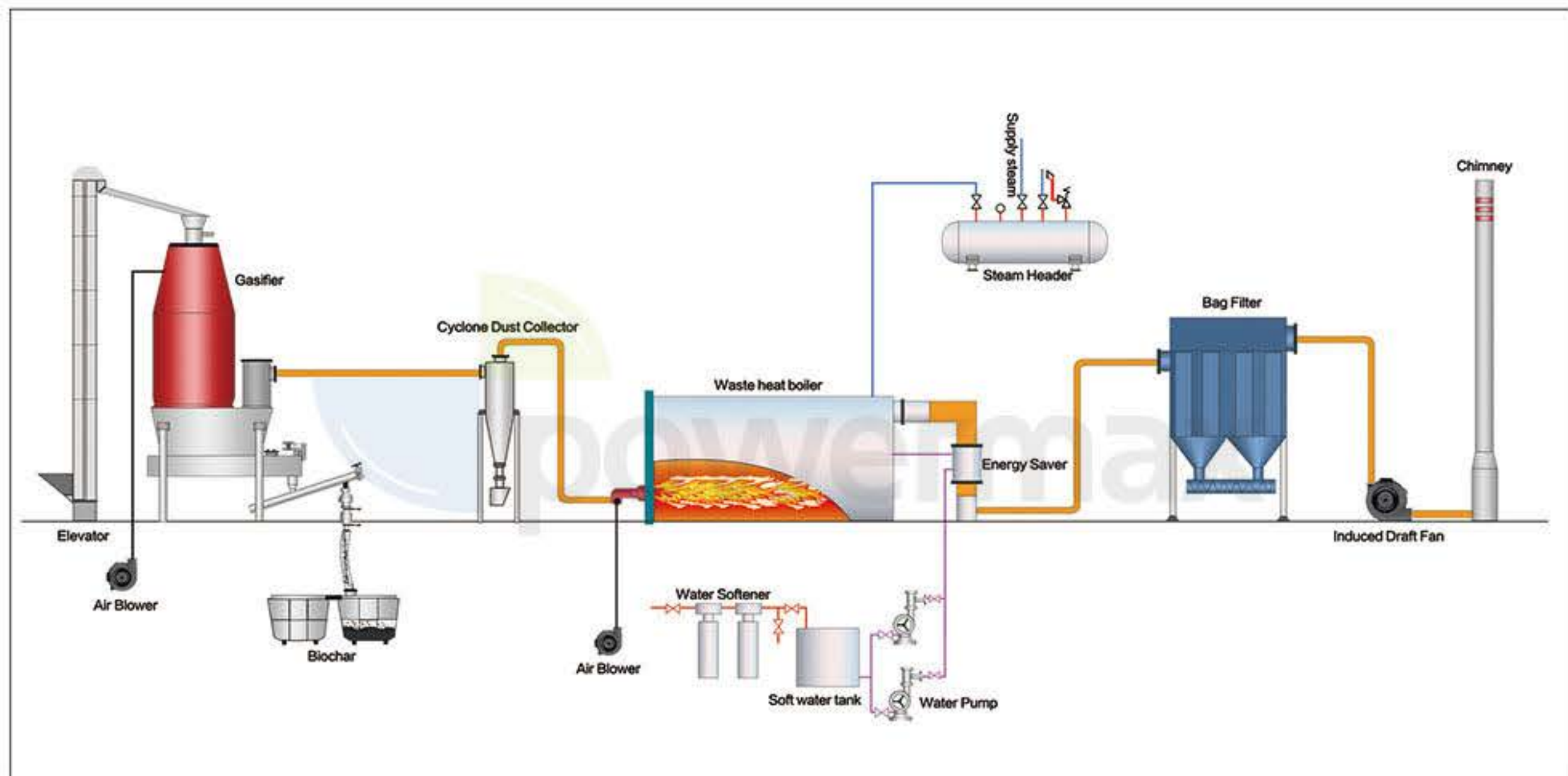
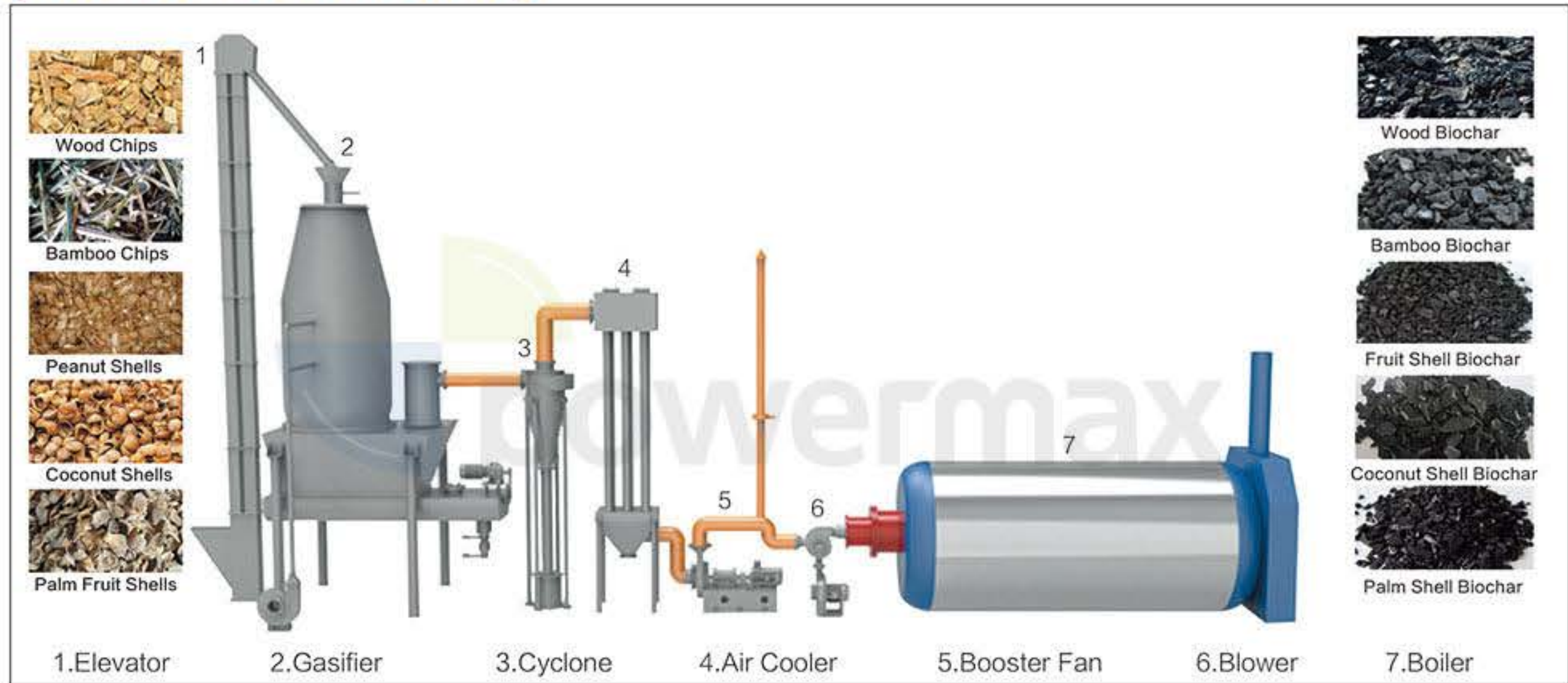
Application of Rice Husk Biochar

The rice husk biochar is mainly used as thermal insulation material. It is with light weight, low thermal conductivity and has good performance of thermal insulation. In the field of metallurgy and casting, the rice husk biochar can be used to cover on the surface of the liquid steel and iron to reduce the radiation, convection and thermal loss. It can reduce the tapping temperature, energy consumption and steel shrinkage cavity under the premise of ensuring the casting temperature of the metal and can increase the yield of the steel.



Rice Husk → Rice Husk Biochar

POWERMAX Biomass Downdraft Fixed Bed Gasification Boiler System (Coal Gasification Boiler)



Product Introduction

POWERMAX Biomass Carbonization Boiler system includes: material feeding system, carbonization system (large-size material), burner, waste heat boiler system, flue gas treatment system, etc. The working principle is that the biomass (such as wood chips, straw briquettes, bamboo chips, palm shells, corn cobs, coconut shells and biomass briquettes etc) undergoes pyrolysis and gasification reactions with limited oxygen in the gasifier and generate combustible gas. The gas goes into the thermal-insulated furnace directly and then produce hot flue gas and the hot flue gas turns into steam or hot water after the waste heat boiler for civil and industrial use.

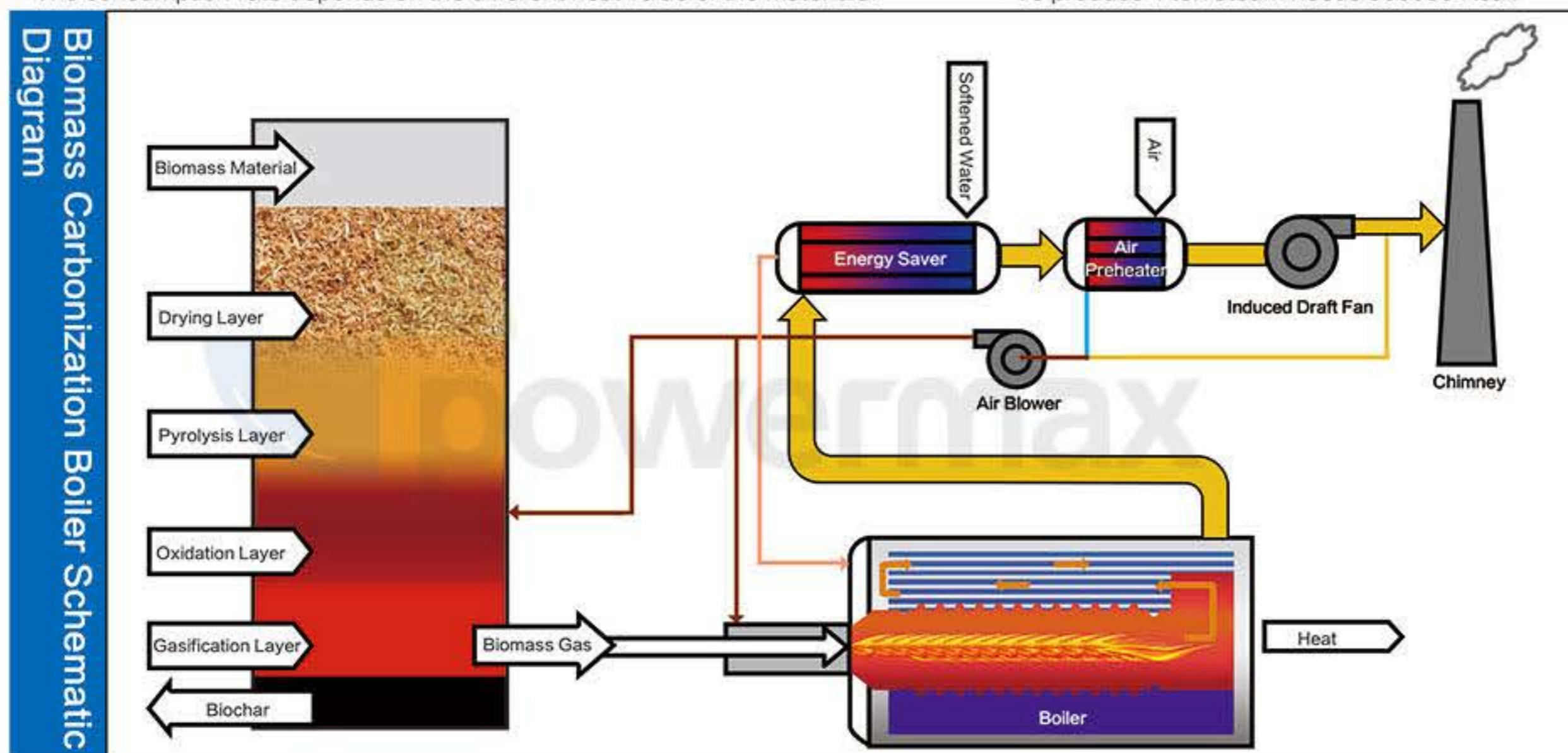


Technical Parameters

Model of Gasification Boiler	DFBG/B-Q C1-1.25	DFBG/B-Q C2-1.25	DFBG/B-Q C4-1.25	DFBG/B-Q C6-1.25	DFBG/B-Q C8-1.25	DFBG/B-Q C10-1.25	DFBG/B-Q C12-1.25
Rated Evaporation Capacity(t/h)	1	2	4	6	8	10	12
Rated Working Pressure (MPa)	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Rated Outlet Temperature (°C)	193	193	193	193	193	193	193
Rated Water Inlet Temperature (°C)	20	20	20	104	104	104	104
Water Capacity (M ³)	8	10	11	12	13	14	15
Gasifier Type	Downdraft Fixed Bed Gasifier						
Gasify Agent	Air						
Applicable Material	wood chips, straw briquettes, bamboo chips, palm shells, corn cobs, coconut shells and biomass briquettes etc						
Moisture Content	≤20%						
Size Requirement	Diameter: 20-80mm; Length: 20-80mm						
Biomass Consumption (kg/h)	≤400	≤800	≤1600	≤2400	≤3200	≤4000	≤4800
Gas Output (Nm ³ /h)	≥550	≥1100	≥2200	≥3300	≥4400	≥5500	≥6600
Gas Component	CO:16-22%; H ₂ : 16-20%; CO ₂ : 5-11%; CH ₄ : 4-8%; N ₂ : 50%;						
Gas Heat Value	≥1100-1200Kcal/Nm ³						
Ash Discharge Type	Dry Type						
Carbon Production Rate	<25%						

* The consumption rate depends on the different heat value of the materials.

To produce 1 ton steam needs 600000 Kcal.



Application of Gasification

The main application of gasification is to use the gas generated by gasification to produce electricity (and heat) directly. It can not only be used in the independent CHP system, but also in the large-scale power plant for gas co-firing. In 2004, the total installed capacity in 25 countries around Europe reached about 700GWe and the figure may increase to 1040GWe in 2020 if the annual power consumption growth rate is 2%. Between 2000 and 2020, the target of the gasification power plant can be set as 10% of the power output growth.

Power Generation



Power to Grid



Rural Electricity



Factory Backup Generation



Agricultural Irrigation and Water Pump Station

Since the fossil fuel is reducing everyday and every country is devoted to reduce the reliance on fossil fuels. People become more and more interested in obtaining syngas from renewable biomass resources, such as 'biosyngas'.

Biomass will play an important role in the basic construction of world-wide power generation and heat supply in the future. Since the gas produced from biomass gasification is the material of high-efficiency power generation system and for composing chemical compounds, gasification will play a leading role in the biomass conversion technology.

Biomass gas is a clean living and industrial fuel. The unpurified biomass gas can be applied to industrial furnaces which have low requirements for the fuel such as steel rolling heating furnace, copper smelting furnace, crucible furnace, industrial furnace, cement rotary furnace and fire-proof tunnels through delivery pipes. The gas after purification can be applied to industrial furnaces which have higher requirements for the fuel such as ceramic kiln, glass kiln, hot-blast stove and power plant.

Heat Application



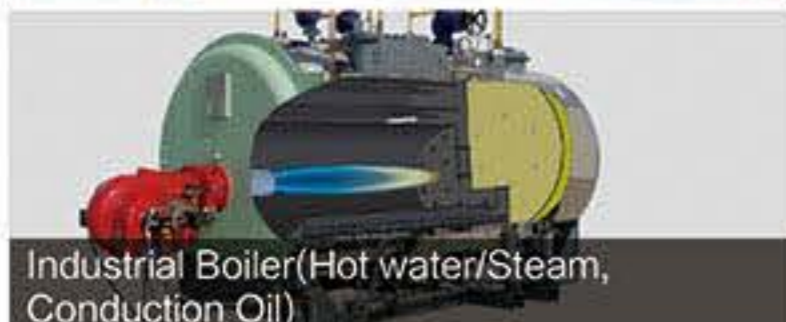
All kinds of industrial furnaces and kilns



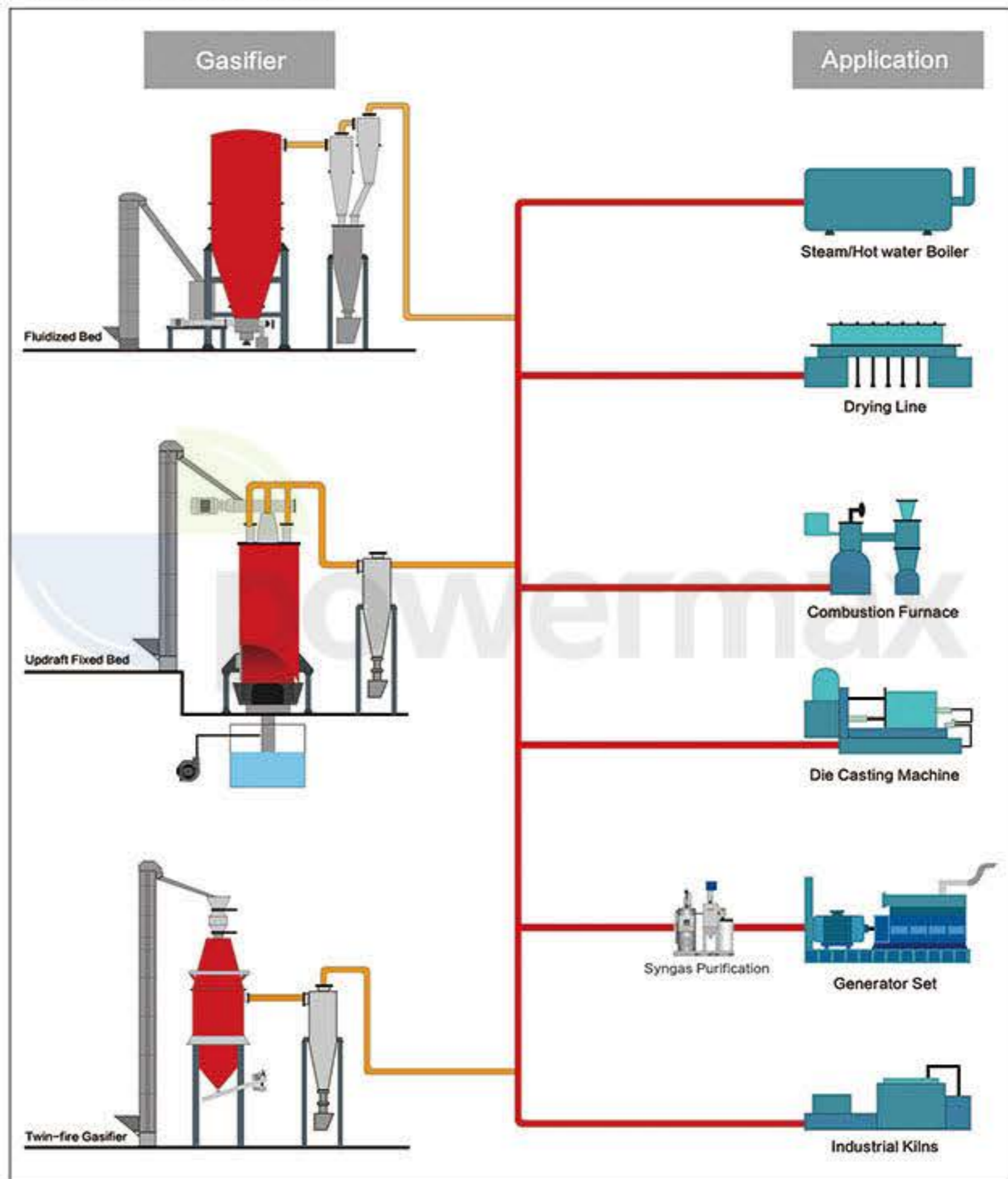
Industrial Dryer/Hot-blast Stove



Industrial Oven



Industrial Boiler(Hot water/Steam, Conduction Oil)



Fluidized Bed Gasifier Technical Parameters

Gasifier Model	CFBG800	CFBG1000	CFBG1400	CFBG1800	CFBG2000	CFBG2500	CFBG3500
Gasifier Type	Fluidized Bed Gasifier						
Gasify Agent	Air						
Suitable Material	Rice Husk, Sawdust, Straw, Bagasse, Corn Cob, Wood Scrap etc.						
Moisture Requirement	≤16%						
Size Requirement	≤10mm						
Biomass Consumption(kg/h)	900-1280	1350-1920	1800-2560	2250-3200	2700-3840	3375-4800	4500-6400
Gas Output(Nm ³ /hr)	2200-2400	3300-3600	4400-4800	5500-6000	6600-7200	8250-9000	11000-12000
Gas Components	CO: 12-18%; H ₂ : 3-7%; CO ₂ : 10-16%; CH ₄ : 4-8%; N ₂ : 54-60%; O ₂ : 0.5-1.2%; CnHm:1-1.4% ;						
Gas Heat Value	1200-1300Kcal/Nm ³						
Gas Temperature (°C)	> 600						
Ash Discharge Type	Dry Type						
Total Gas Heat Value (Wan/Cal)	280	420	560	700	840	1050	1400

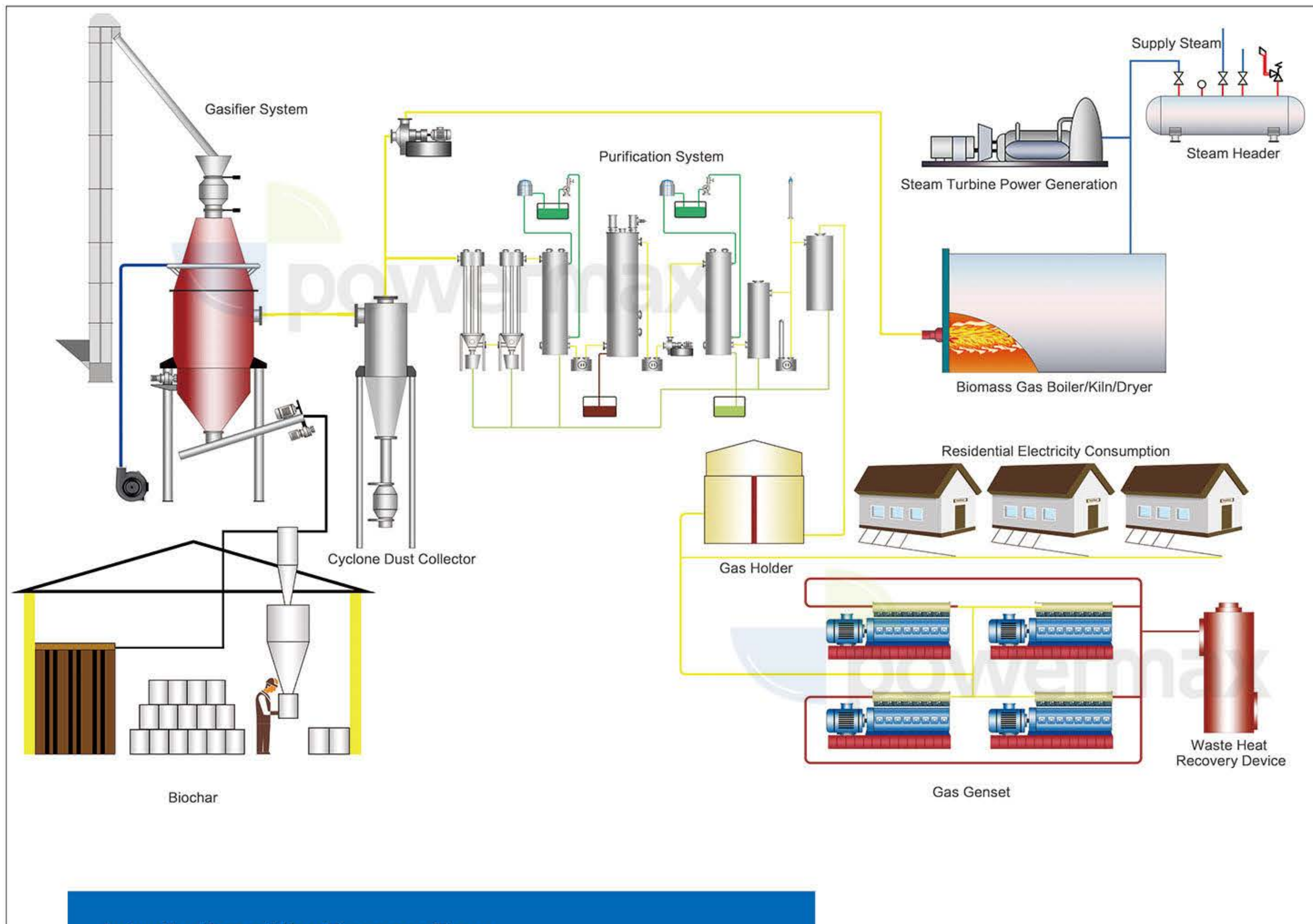
Fixed Bed Gasifier Technical Parameters

Gasifier Model	UFBG800	UFBG1000	UFBG1400	UFBG1800	UFBG2000	UFBG2500	UFBG3500	UFBG4500	UFBG5500
Gasifier Type	Updraft Fixed Bed Gasifier								
Gasify Agent	Air+Steam								
Suitable Material	Building Templates, Wood Chips, Bamboo Chips, Corn Cob, Biomass Briquettes etc.								
Moisture Requirement	≤25% (Maximum Acceptable ≤55%)								
Size Requirement	Diameter: 20-80mm, Length: 20-80mm								
Biomass Consumption(kg/h)	900-1200	1350-1800	1800-2400	2250-3000	2700-3600	3375-4500	4500-6000	5625-7500	6750-9000
Gas Output(Nm ³ /hr)	1800-2000	2700-3000	3600-4000	4500-5000	5400-6000	6750-7500	9000-10000	11250-12500	13500-15000
Gas Components	CO: 27-33%; H ₂ : 16--19%; CO ₂ : 6-10%; CH ₄ : 4-7%; O ₂ : ≤0.5%; N ₂ : remains;								
Gas Heat Value	1300-1500Kcal/Nm ³								
Gas Temperature (°C)	100-200								
Ash Discharge Type	Wet/Dry Type								
Total Gas Heat Value (Wan/Cal)	280	420	560	700	840	1050	1400	1750	2100

Twin Fire Fixed Bed Gasifier Technical Parameters

Gasifier Mode	TFBG200	TFBG400	TFBG800	TFBG1000	TFBG1400	TFBG1800	TFBG2000	TFBG2500
Gasifier Type	Twin Fire Fixed Bed Gasifier							
Gasify Agent	Air							
Suitable Material	Building Templates, Wood Chips, Bamboo Chips, Corn Cob, Biomass Briquettes etc.							
Moisture Requirement	≤25%							
Size Requirement	Diameter: 20-80mm, Length: 20-80mm							
Biomass Consumption (kg/h)	225-320	450-640	900-1280	1350-1920	1800-2560	2250-3200	2700-3840	3375-4800
Gas Output (Nm ³ /hr)	525-600	1050-1200	2100-2400	3150-3600	4200-4800	5250-6000	6300-7200	7875-9000
Gas Components	CO: 17-20%; H ₂ : 12-16%; CO ₂ : 8-14%; CH ₄ : 0.5-1.5%; O ₂ :0.2- 0.5%; CnHm:0.1-0.2%; N ₂ : remains;							
Gas Heat Value	≥1200Kcal/Nm ³							
Gas Temperature (°C)	> 350							
Ash Discharge Type	Wet/Dry Type							
Total Gas Heat Value (Wan/Cal)	70	140	280	420	560	700	840	1050

POWERMAX Biomass Twin Fire Fixed Bed Gasifier Central Gas Supply and CHP System Process Flowchart



Introduction of the Process Flow

Biomass gas genset produces gas continuously. The air from blower goes into the gasifier as gasify agent. The material feeding device put the biomass into the gasifier and the biomass undergoes pyrolytic reaction with limited oxygen in the gasifier and produce biomass gas. The gas first goes through the cyclone dust collector and 98% of the dust is removed, then to the air cooler and indirect cooler to cool down, then to the ESP to remove the tar and rest dust, then the gas goes into the second indirect cooler through pipe for final cooling, then pressurized by the booster fan and dehydrated by the drop catcher and then the final qualified biomass gas is delivered to the user through pipes from the gas holder.

Product Description

Biomass central gas supply is to produce the gas concentrately and massively through biomass gasification station and supply the gas to users through piping manifold. User can use the gas for heating, shower, cooking and power generation based on different needs. The gas is produced through pyrolysis reaction of the biomass and has high energy conversion rate. It is environmental-friendly, efficient, energy-saving and also has low running cost.

The biomass central gas supply system is the new energy project encouraged by government and country especially in the rural area which has rich biomass resources. It is the best solution to substitute the native energy with development and utilization of the renewable biomass energy. It is an effective measure to save energy, protect the environment and integratedly utilize the biomass resources. The promotion and application of the project can have great influence on many different aspects such as improving rural environment, protecting the ecological balance and environment, enhancing the living quality of the farmers, changing the ways of using energy, improving the grade of using energy, saving energy and reducing emissions. Biomass central gas supply is to use the forestry and agricultural residues (such as rice husk, sawdust, branches, tree leftovers, stalks, rice straws, wheat straws, fruit shells, corn stalks, cotton straws, bagasse, coconut shells, corn cobs etc) to produce gas and biochar. The gas is stored in the gas holder and delivered to the gas station through pipes. It can be used in daily life for heating and also be applied to industrial thermal equipment (unpurified gas) and gas genset for power generation.

Product Features

1. Wide Sources of Materials

The materials of biomass central gas supply are mainly forestry and agricultural residues such as rice husk, sawdust, branches, tree leftovers, stalks, rice straws, wheat straws, fruit shells, corn stalks, cotton straws, bagasse, coconut shells, corn cobs etc. They are plenty with low purchase cost.

2. High Efficiency and Energy Saving

Compared with distributed gas supply, biomass central gas supply can save more energy and reduce the consumption rate and meanwhile increase the maximum gas output rate.



3. Clean and Environmental-friendly

Compared with coal and oil resources, biomass gas is a clean energy. Little amount of NOx and SOx is generated during the process and there's zero emission of CO2. The tar, dust and condensate water are treated comprehensively after being collected by equipments.

4. Solve the problem of pollution caused by burning agricultural waste

Biomass central gas supply can solve the environmental pollution like haze and people's upper respiratory infection during harvest season which are caused by burning agricultural waste such as stalks.

5. The technology is safe and reliable

Biomass central gas supply technology is mature. The safety problem has been solved completely. Compared with traditional gas supply mode, it has higher safety factor.

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