# Powermax Renewables

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powermax

# ABOUT POWERMAX

## Powermax Proflie

Powermax is a green & clean energy company. Powermax has a long experience in producing and supplying environmentally friendly and high performing gasification systems and gas generator sets. We specialize in biomass, coal and waste gasification to energy systems and have a company history of 30 years.

Powermax have since the start in 1986 been specialized in biomass gasification power plants. Our gasification energy systems convert various types of biomass or waste or coal into: electricity, process steam, drying, industrial heating, district heating and etc.

Powermax has its own Development, Design, Construction and Project Management Departments. We have our own in-house gasifiers, gas purification systems and gas generator sets production facilities in China.

All our gasification designs benefit from more than 100 reference installations worldwide.

## Powermax Competences

- We are the technology and market leader in Asia in offering biomass, coal and waste gasification power generation systems. We offer a proven technology, high performance and profitable systems.
- We design, produce and deliver complete biomass and waste gasification power generation systems including gasifiers, gas purification systems and gas generator sets.
- We offer installation and supervision of our plants.
- We offer our own electrical installation crew.
- We have developed our own standardised process control solutions.
- We offer an extensive aftersales service with 24/7 support.
- Project Management – We convert projects into reality!

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Factory Address：No.26 Jingrui Rd, Xibei Town, Xishan District, Wuxi, Jiangsu, China.



# Powermax Biowatt®

# Compact Biomass Gasification Power Generation System Solutions

**( Biowatt 500 & Biowatt 1000)**

- Biowatt 500 & Biowatt 1000 biomass gasification system is built into multiple skid-mounted container-type frames, easy to ship and fast to install.
- Biowatt 500 & Biowatt 1000 complete system is built into multiple skid-mounted container-type frames that make transportation installation simple. This means that equipment is fully tested in the factory before arriving at site, minimizing commissioning time.
- Easy to operate and transport, the system can be unloaded from the truck and installed rapidly for quick operation.
- **No need of factory building, on-site installation only takes within 7-10 working days.**

# SMART

Change the way you generate and use energy.
Create exactly what you need, rather than creating extra amount.
Maximize the use of the neglected source of energy that we throw away.
Use local, renewable resources.
Be environmentally conscious and economically viable.

Clean Energy Solutions

## SMART DESIGN

Completely compact design and simple operation.

## SMART ENERGY

Local clean energies that can be used without waste.

## SMART ECONOMY

Quick and simple Installation reduce investment cost.

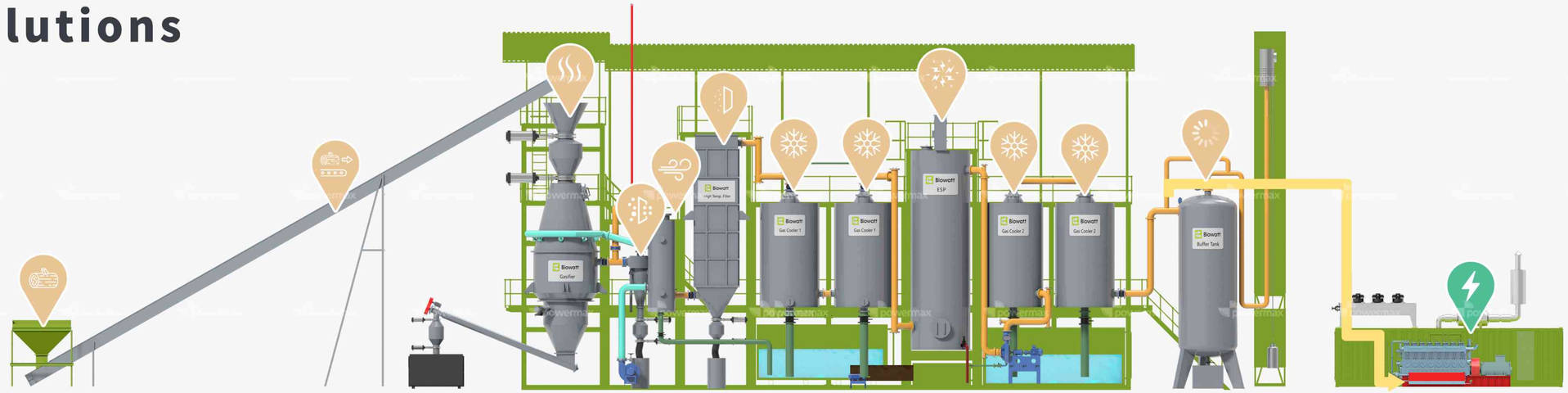
## SMART INSTALLATION

Its frame design facilitates simple loading and transportation, necessitating minimal or no on-site civil construction.

# Powermax Biowatt® Compact Biomass Gasification Power Generation System Solutions

All components are pre-installed, investors can achieve fast returns. This not only simplifies installation, but also allows for very quick start-up, so you can benefit immediately. The system offers great flexibility because it provides a modular design and the ability to trigger biomass power plants for maximum performance. Containerized power generation systems can be optimally tailored to unique situations and environments. The broad power capacity allows for further customization.

- Tar Tank
- Water Tank
- Biomass Syngas




**Temporary silo**
Stores biomass feedstock, regulates material flow, and increases production efficiency.

**Transportation**
Transportation of biomass raw material.

**Gasification**
Pyrolysis and gasification of biomass raw materials to generate combustible gases such as carbon monoxide and hydrogen.

**Cyclone**
Remove particles dust from gas flow.

**Air exchanger**
Heating air gasification agent to improve gasification efficiency.

**High-Temp. Filter**
The dust-laden syngas passes through High temperature ceramic fiber filter tube, the dust remains on the filter surface, and the purified gas go to next step

**Primary cooling**
The first temperature reduction treatment is performed on the combustible biomass syngas generated.

**Secondary cooling**
The second temperature reduction treatment is performed on the combustible biomass syngas generated.

**ESP**
The high-voltage electric field action electrically charges the tar and dust in the gas and adsorbs them on the electrode plates to achieve the objective of gas purification.

**Tertiary cooling**
The third step of the temperature reduction and condensation processes are performed on the combustible biomass synthesis gas generated.

**Quaternary cooling**
The fourth step of the temperature reduction processes are performed on the combustible biomass synthesis gas generated.

**Buffer tank**
It buffers combustible syngas and ensures that electricity can be output with relative stability.

**Power generation**
Convert combustible gas into electrical energy output.

## Combined Heat and Power (CHP)

CHP, also known as combined heat and power, is an efficient, clean, and reliable way to generate electricity and thermal energy from a single fuel source. Cogeneration can significantly improve a facility's operating efficiency and reduce energy costs.

| | THERMAL ENERGY | ELECTRIC ENERGY |
|---|---|---|
| Biowatt500 | 1,040kw | 500kw |
| Biowatt1000 | 2,080kw | 1,000kw |

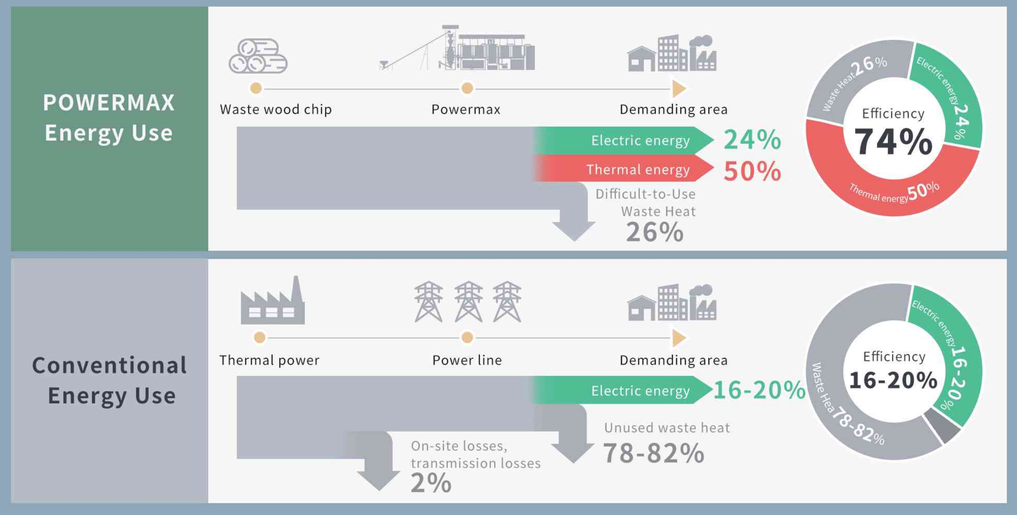
## Carbon Offset

Compared to coal and petroleum resources, biomass gas is a clean energy source. Zero carbon dioxide emissions during the process that produces small amounts of NOx and SOx. Tar, dust, and condensate are comprehensively treated after collection through the facility.

| | REDUCE $CO_2$ ANNUALLY | EQUIVALENT TO APPROXIMATELY |
|---|---|---|
| Biowatt500 | 3,700t | 85,000trees |
| Biowatt1000 | 7,400t | 170,000trees |

## High Energy Efficiency

Powermax achieves an energy efficiency of 74%. A conventional centralized energy use, such as thermal power generation, usually causes energy loss during transmission while Powermax can achieve distributed energy utilization, so power generation can be used without wasting power generation and heating. In addition, thermal energy can also be used within facilities to achieve high energy efficiency.




## Cost Performance High

The Powermax Biowatt Compact Biomass Gasification power generation system is an affordable choice among biomass power generation systems. It combines biomass processing with thermal electricity generation capability, making it an ideal candidate for valuable applications in terms of heat supply and electricity.

FOOTPRINT **Small**

COST-EFFECTIVE **High**

## Automatic Control & Production Security

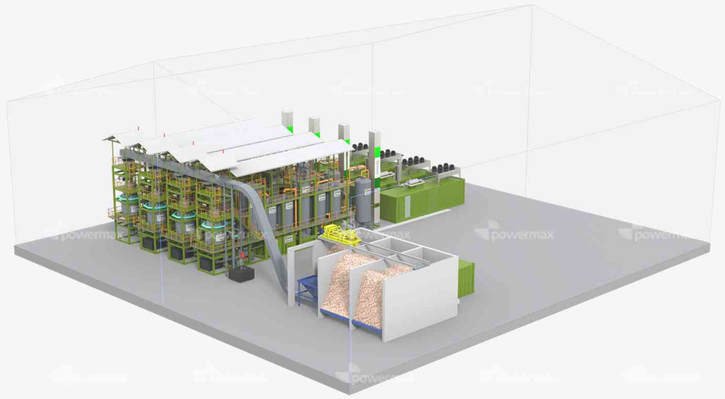
Feed-React-Power generation-Heating and Application, fully automated control, easy to operate. Installed with fault alarm system, interconnection interlock, and remote control system.

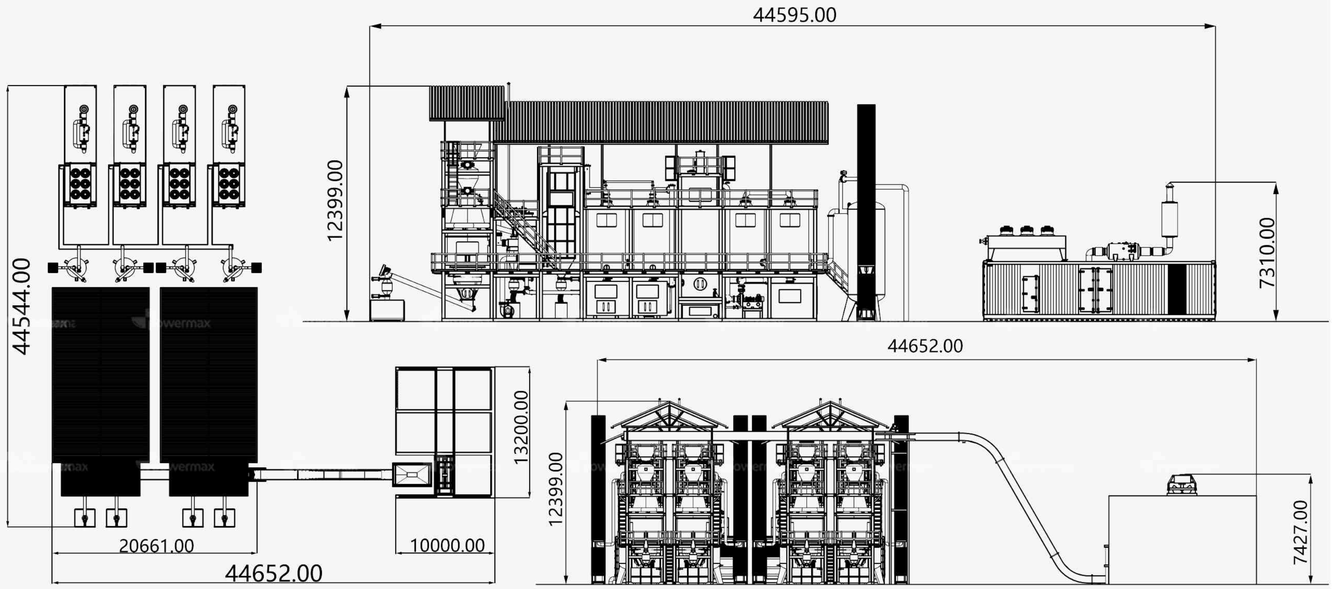
# Taking 2MW as An Example

## Different Power Generation Schemes

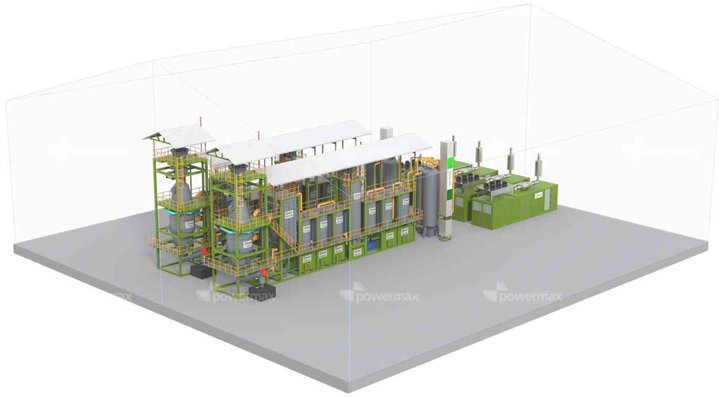
The Powermax Biowatt Compact Biomass Gasification power generation systems are an "fast-to-use" solution that quickly meets investors & users needs for biomass power generation and heat supply. The Compact skid-mounted design is suitable for underdeveloped areas because it can operate off - grid.

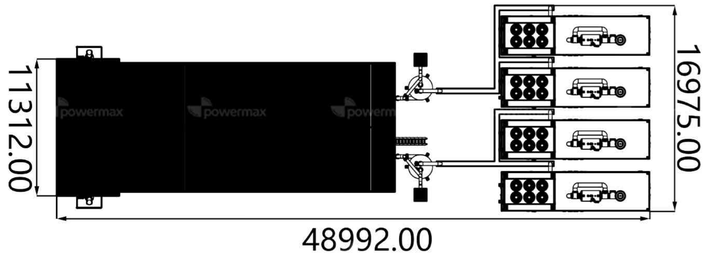
**1** Option
500kW*4

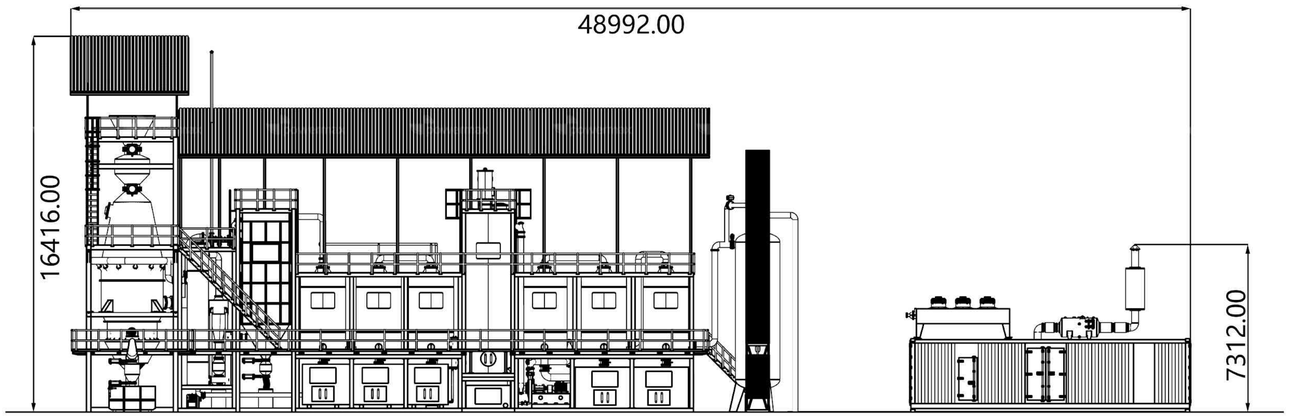





**2** Option
1MW*2



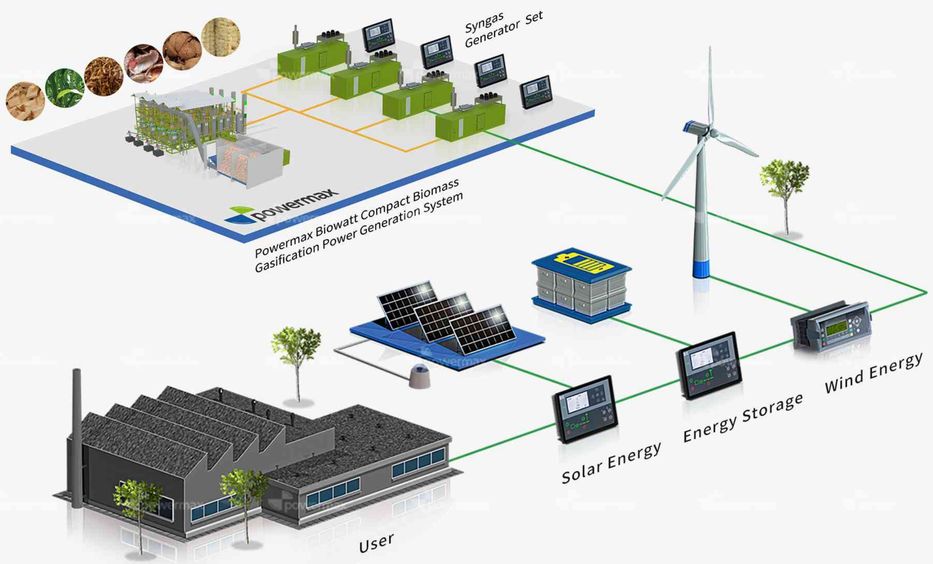



- Complete solution for biomass power generation and heat supply.
- Easy installation with factory pre-assembly.
- Start / stop at any time.
- Compact and space-saving design.
- No need for factory building, suitable for many countries.
- System components such as transport system, de-ashing system, or fuel dryer available in combination with all Powermax equipment.

# Taking 2MW as An Example (4xBiowatt 500)

## Off-grid Power Management



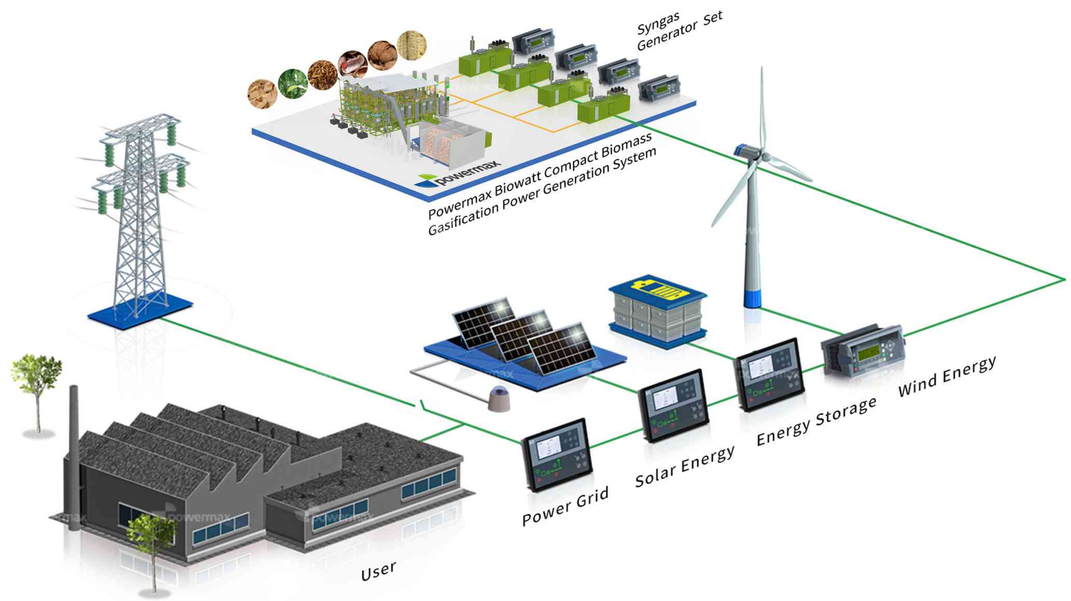

Our hybrid power solutions combine renewable energy sources(such as solar, wind, biomass energy) and energy storage systems together, storing surplus energy and utilizing biomass-powered gasifiers and gas generators to provide instant power replenishment. The hybrid system can make wind and solar power more reliable. Our energy management systems(EMS) can optimize hybrid systems and ensure their reliable operation anytime, anywhere.

Powermax provides complete hybrid power plants for off-grid or on-grid applications where security of power supply is of the essence. These effective solutions use clean fuels which combine with highly gas-efficient gensets and renewable energy systems to generate power. Energy storage systems keep excess power from waste while ensuring a reliable power supply. An energy management system could efficiently coordinate production to meet customers' demands.

### Benefits at A Glance:

- Increased reliability
- Increased gas efficiency
- Fewer emissions and better $CO_2$ footprint
- Enhanced flexibility and fuel independence
- Wide range of operating modes
- Reduced cost of energy

## Grid-tied Power Management




During cloudy days in monsoon season, when solar energy storage plant is forced to idle for lack of sunlight, the biomass power station can continue to generate electricity and feed it into the grid as needed, thereby maximizing the utilization of grid capacity. More importantly, biomass power plants help prevent power bottlenecks and transfer power generation in a timely manner.

This hybrid power system is more effective and more reliable as compared to any other single mode of power generation system. The power delivered by hybrid model of PV/WIND/Bl0MASS is more stable and economical than the current system. The system is more environmental friendly as the waste products do not contain any harmful gases or products. The system uses all the renewable energy sources for electric generations, which are the need of the time. The use of energy from wind, solar and biomass will help to reduce our dependency on fossil fuels.

### Benefits at A Glance:

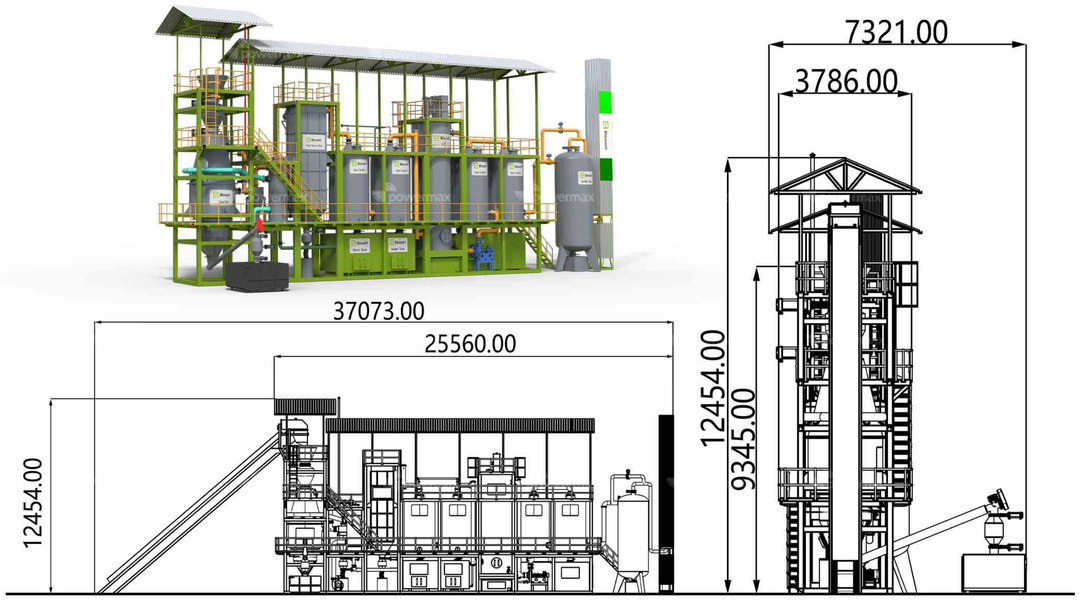
- Low to no carbon emissions
- Saves fuel
- Efficient and reliable power supply
- Enhanced flexibility and fuel independence
- Wide range of operating modes
- Reduced cost of energy

# Parameter

## Biowatt 500

| | |
|---|---|
| Rated Power(kW) | 500kW |
| Rated Voltage(V) | 220/380/400/440/6300/6600/11000/13800V |
| Rated Frequency(Hz) | 50/60Hz |
| Biomass Consumption(Kg/hr) | 500-750 |
| Gas Production($Nm^3/h$) | 1250-1500 |
| Ash Discharge Type | Dry ash discharge/wet ash discharge |
| Length | 27000mm |
| Height | 9500-13000mm |
| Width | 3786-8720mm |
| Floor Area | 108-235$m^2$ |

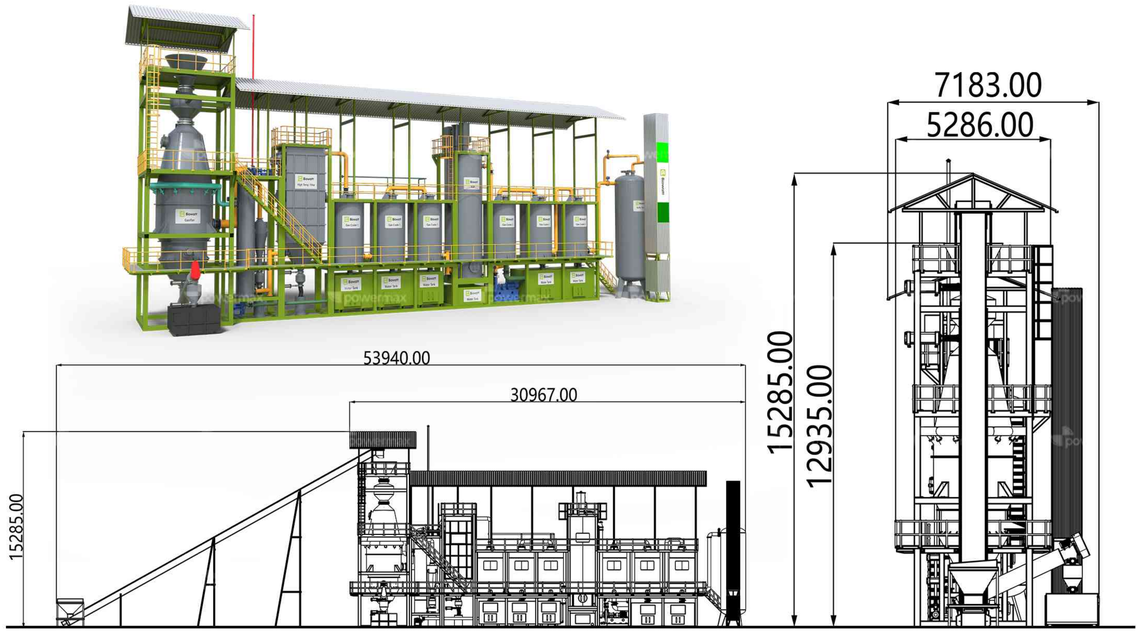
❊ The actual size of the equipment may vary according to the site installation.




## Biowatt 1000

| | |
|---|---|
| Rated Power(kW) | 1000kW |
| Rated Voltage(V) | 220/380/400/440/6300/6600/11000/13800V |
| Rated Frequency(Hz) | 50/60Hz |
| Biomass Consumption(Kg/hr) | 1000-1500 |
| Gas Production($Nm^3/h$) | 2500-3000 |
| Ash Discharge Type | Dry ash discharge/wet ash discharge |
| Length | 32000mm |
| Height | 13000-16000mm |
| Width | 5286-7190mm |
| Floor Area | 170-232$m^2$ |

❊ The actual size of the equipment may vary according to the site installation.




## Raw Material

| | |
|---|---|
| Fuel | Biomass |
| Fuel Supply Caliber | Biowatt500: 1524mm<br>Biowatt1000: 1550mm |
| Moisture Content | ≤15% (WB) |
| Fuel Size | 20~80mm |
| Biochar Output | ≤8%(wood chip for example) |

## Gas Engine

| | |
|---|---|
| Engine Displacement | 215L 8-cylinder |

## Generator

| | |
|---|---|
| Model | Alternator |
| Voltage | 400VAC |
| Frequency | 50Hz / 60Hz |
| Current | 902A / 820A |
| Engine Speed | 600rpm |
| Power Factor | 0.8 |
| Cooling Method | Air cooling / Water cooling |

## Heat Transfer Medium Connection Specifications

| | |
|---|---|
| Pipe Flange Size | (Inlet size)76mm<br>(Outlet dimension)89mm |
| Inlet Temperature | 35~55°C, Maximum 65°C |
| Outlet Temperature | 70~80°C, Maximum 85°C |

## SMS-alarm

| | |
|---|---|
| SIM Card | Standard SIM Card |

## Internet Connection

| | |
|---|---|
| Recommendation | Deuter communication speed of ADSL or higher |

# Biomass Energy

Biomass is a renewable, carbon neutral energy source.

Biomass energy currently just meet 10% of the world's energy consumption demand.

**By 2050, biomass energy will become an important energy source, with its share of demand rising to 30%.**

# Type of Biomass & Waste can be used in POWERMAX system:

## Biomass

Rice husk (briquetting)

Wood chip

Sugarcane residue (briquetting)

Bamboo processing waste

Bamboo chip

Forest wood

Coconut shell

Corn straw (briquetting)

Corn cob

Cotton stalk (briquetting)

Grain stalk (briquetting)

Hazelnut shell

Olive nut shell

Peach kernel

Coconut husk (briquetting)

Peanut shell (briquetting)

Sorghum stalk (briquetting)

Twig

Urban furniture waste

Walnut shell

## Palm Tree Waste

Empty fruit bunch (briquetting)

Palm fiber (briquetting)

Palm shell

## Refuse Derived Fuel

Municipal solid waste (briquetting)