

# Powermax Renewables

Wuxi Powermax Renewable Energy Technology Co.,Ltd. Wuxi Teneng Power Machinery Co., Ltd.







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# 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!

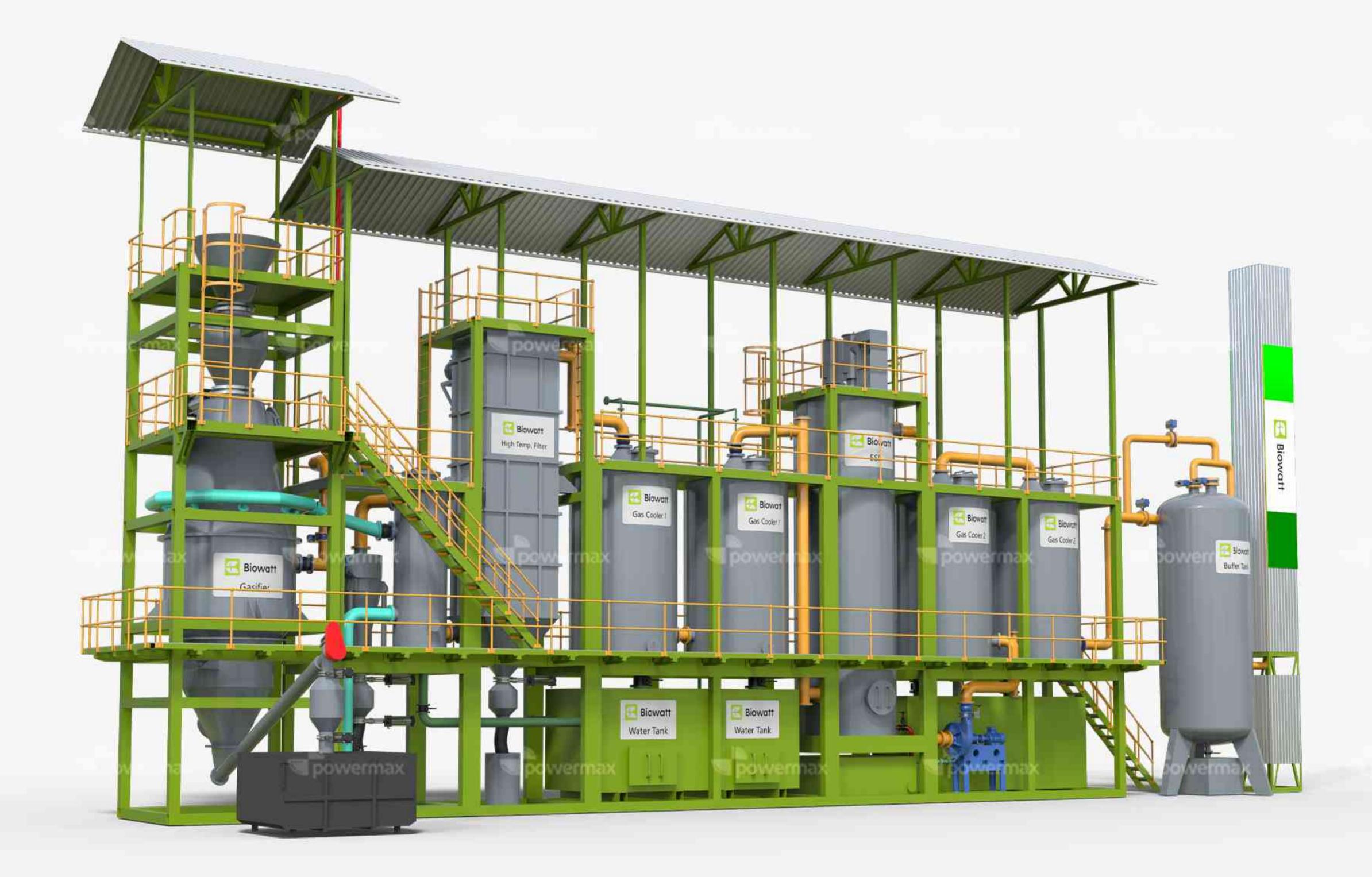
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Factory Address: No.26 Jingrui Rd, Xibei Town, Xishan District, Wuxi, Jiangsu, China.

# Powermax Biowatt<sup>®</sup> 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 DESIGN

Completely compact design and simple operation.



## SMART ECONOMY

Quick and simple Installation reduce investment cost.



Local clean energies that can be used without waste.



## SMART INSTALLATION

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

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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.

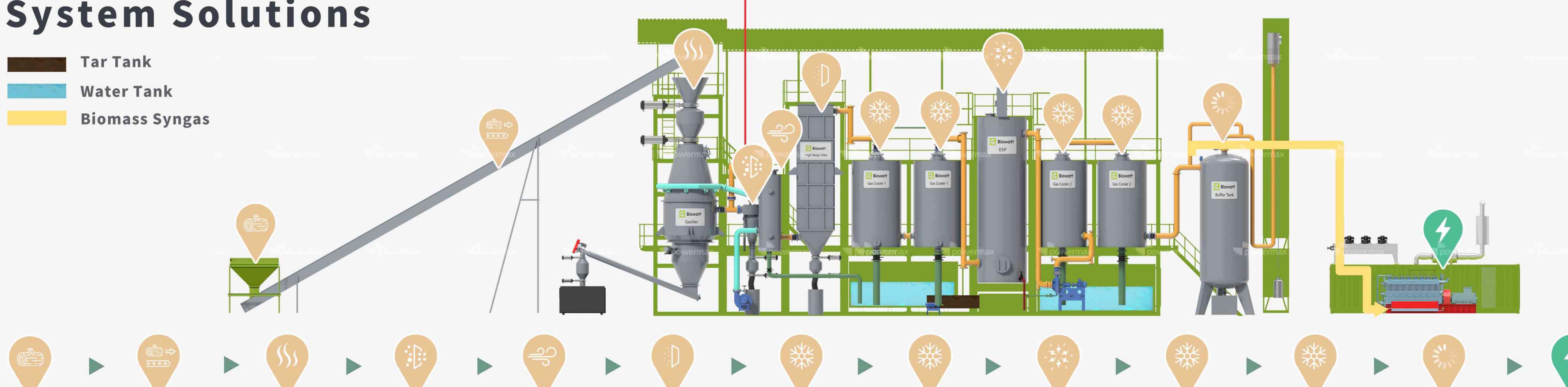
Be environmentally conscious and economically viable.

Clean Energy Solutions



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.



#### Temporary silo

Stores biomass feedstock, regulates material flow, and increases production

#### 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.

Heating air gasification agent to improve

The dust-laden syngas passes The first temperature through High temperature ceramic fiber filter tube, the performed on the comdust remains on the filter surface, and the purified gas generated. go to next step

reduction treatment is bustible biomass syngas

#### Air exchanger High-Temp. Filter Primary cooling Secondary cooling ESP

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

The high-voltage electric field action electrically charges the tar and dust in and condensation prothe gas and adsorbs them cesses are performed on on the electrode plates to the combustible biomass achieve the objective of gas purification.

#### Tertiary cooling

The third step of the temperature reduction synthesis gas generated.

#### Quaternary cooling

The fourth step of the temperature reduction and condensation processes are performed on the combustible biomass synthesis gas generated.

#### **Buffer tank**

It buffers combustible with relative stability.

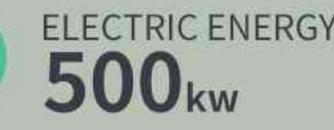
Power generation

Convert combustible syngas and ensures that gas into electrical electricity can be output 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.









#### 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.



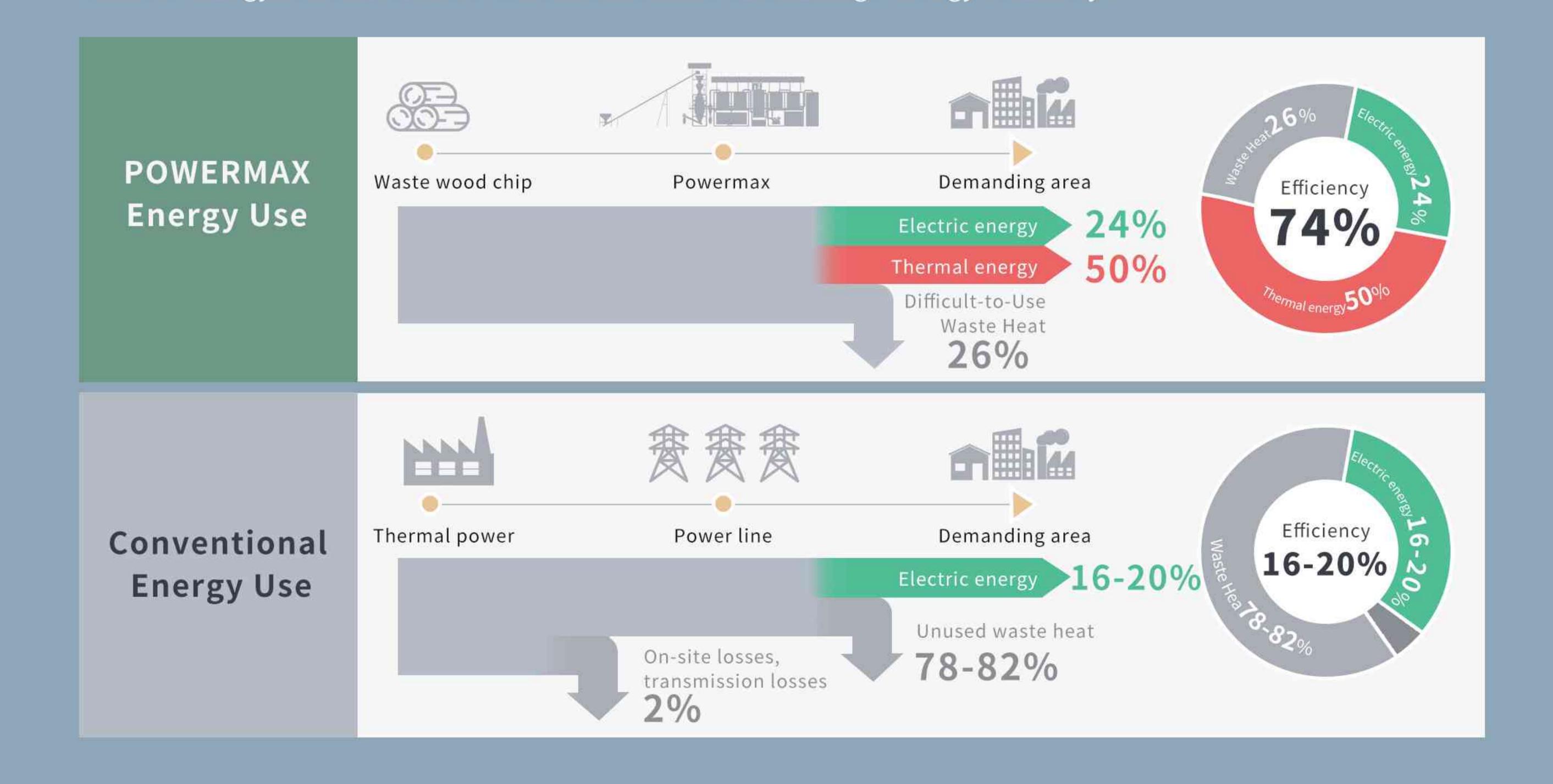




■ EQUIVALENT TO APPROXIMATELY

## 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.





#### 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.

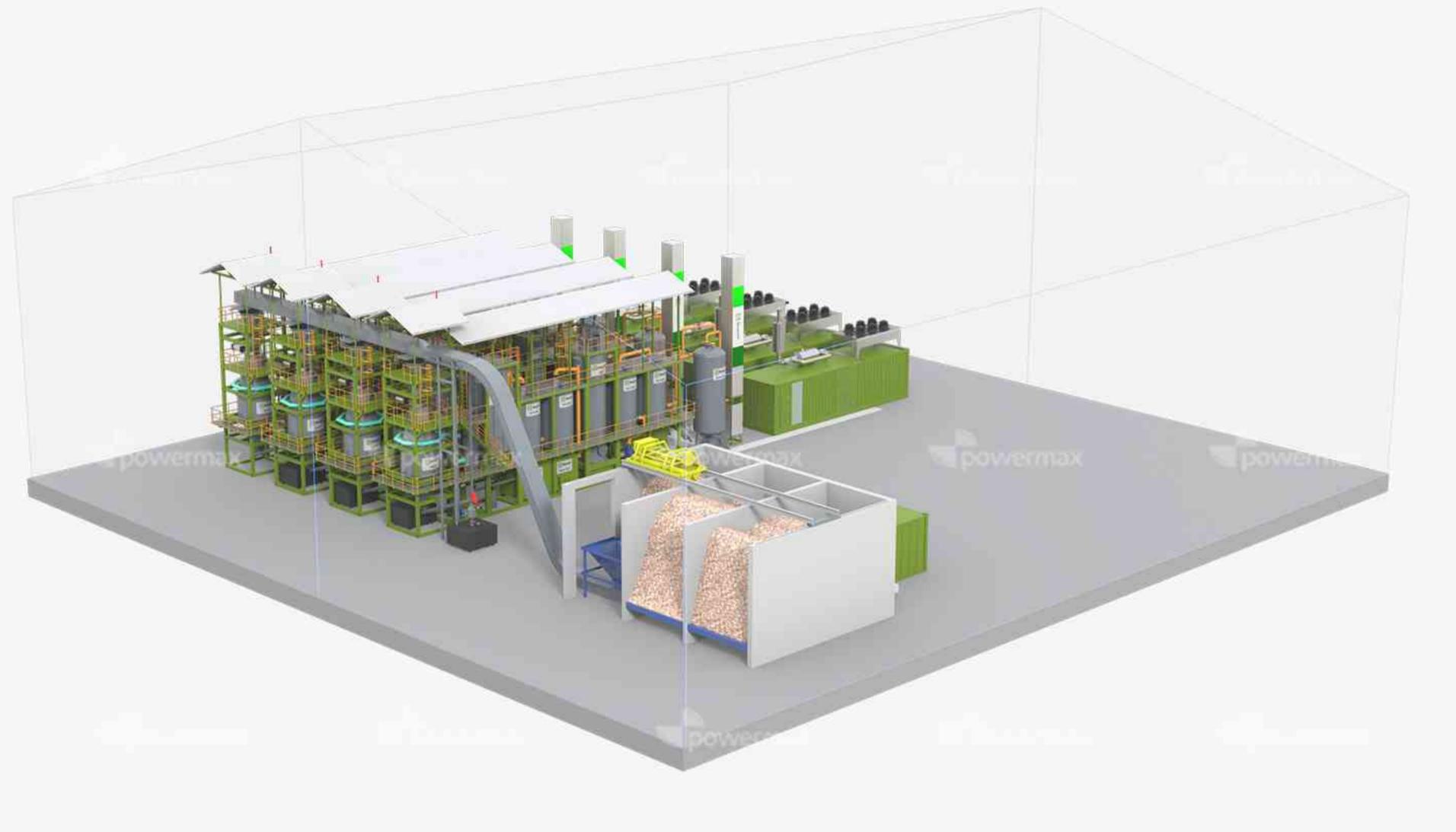


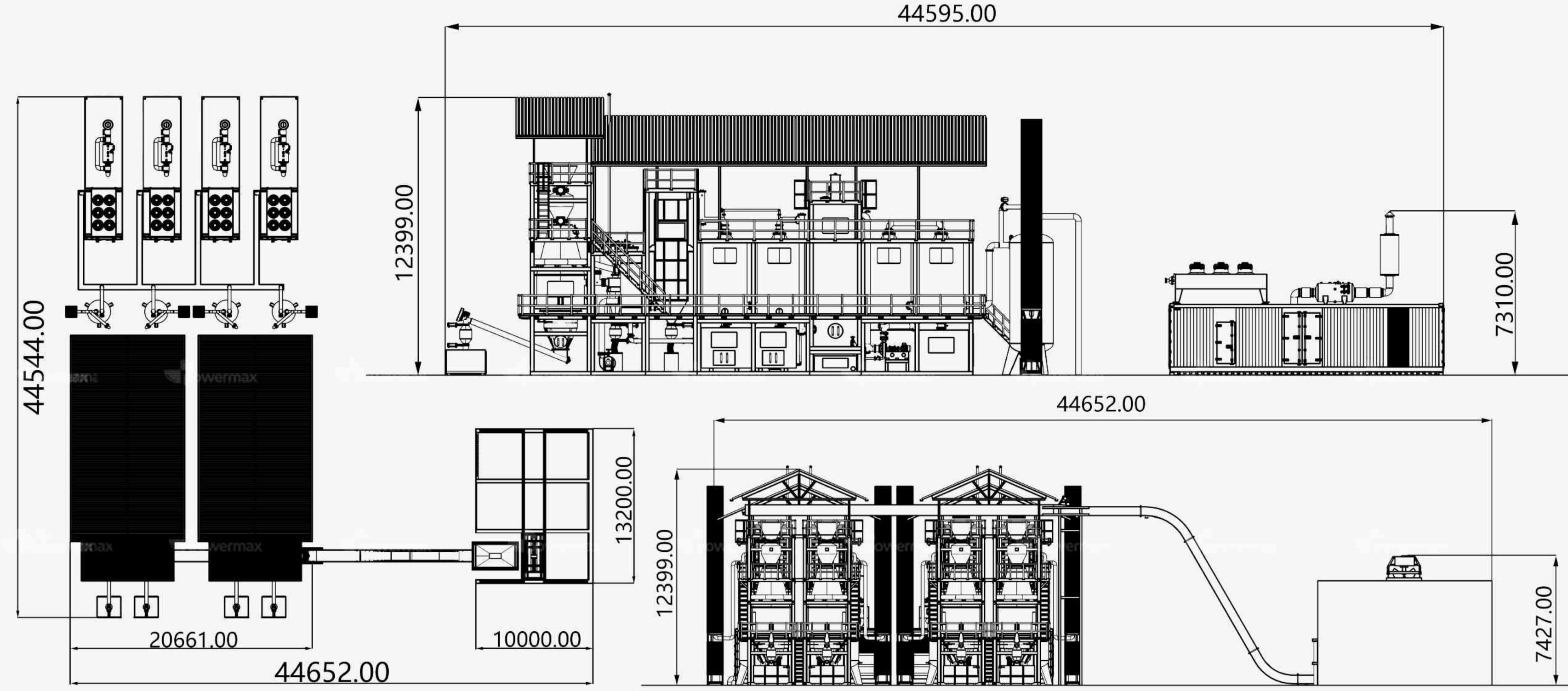
# Taking 2MW as An Example

# Different Power Generation Schemes

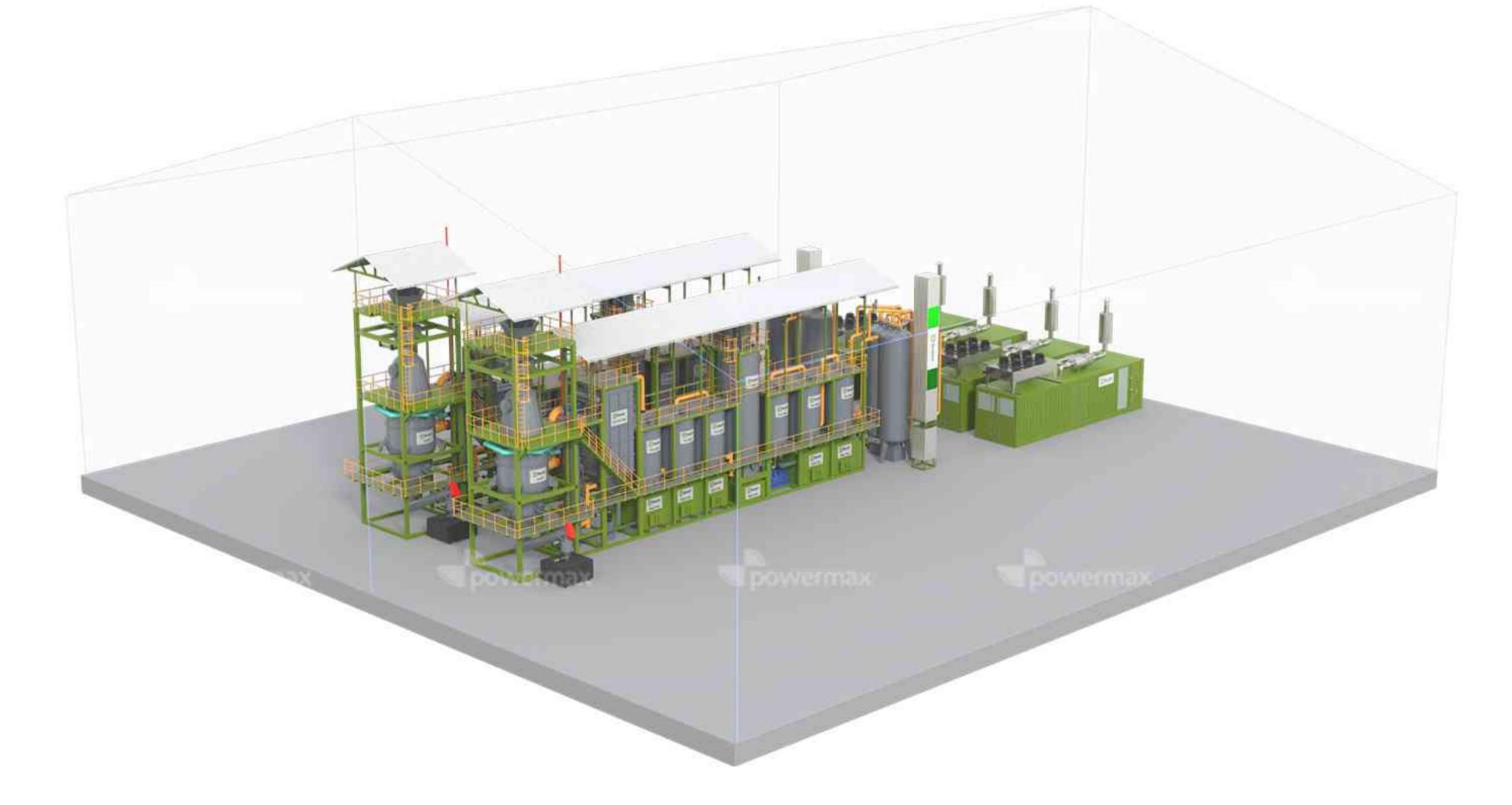
The Powermax Biowatt Compact Biomass Gasification power generation systems are an "fast-to-use" solution that quickly meets investors & users needs for biomass power generation and heat supply. The Compact skid-mounted design is suitable for underdeveloped areas because it can operate off - grid.

Option
500kW\*4



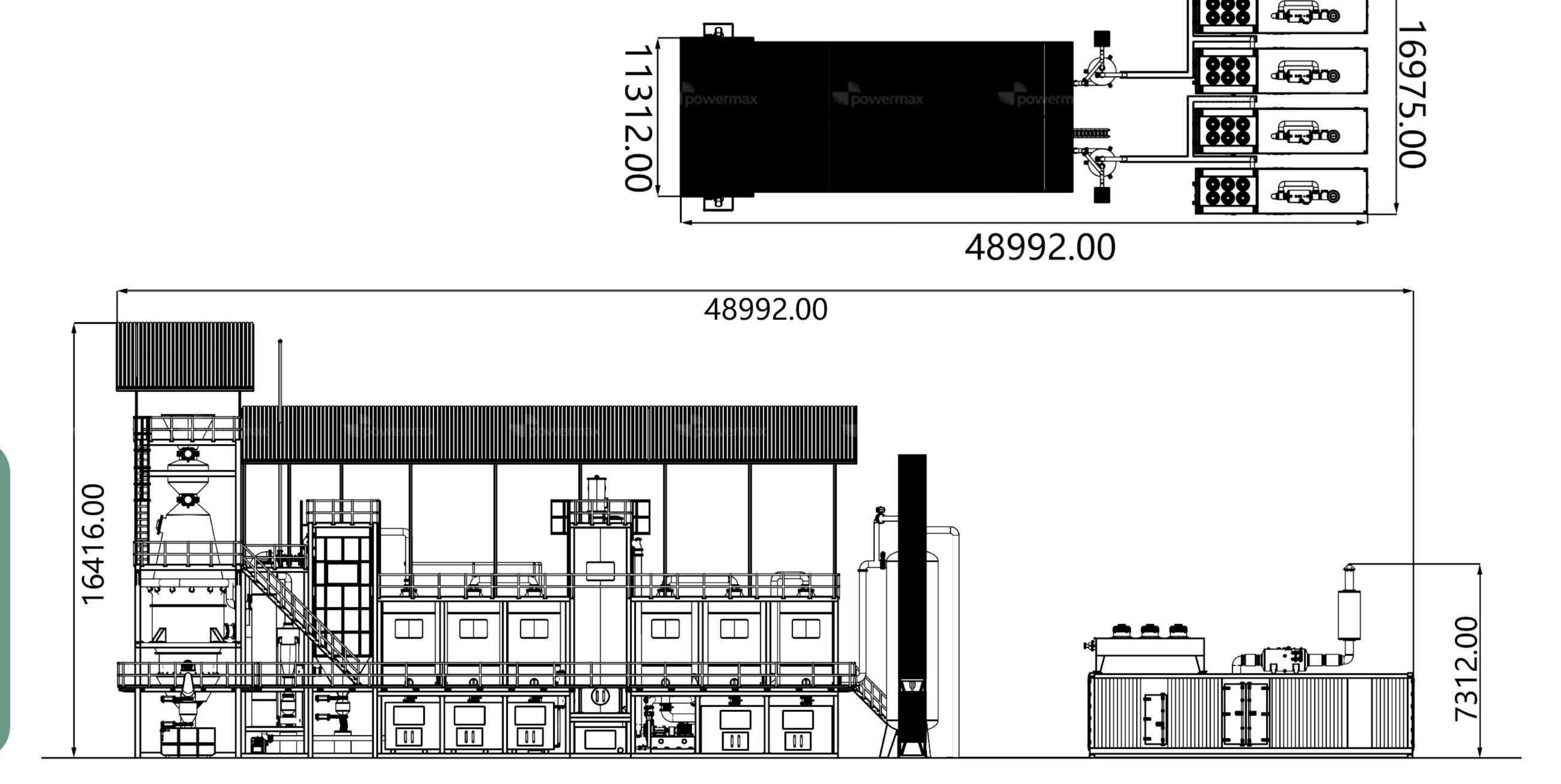


Option 1MW\*2



- 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.

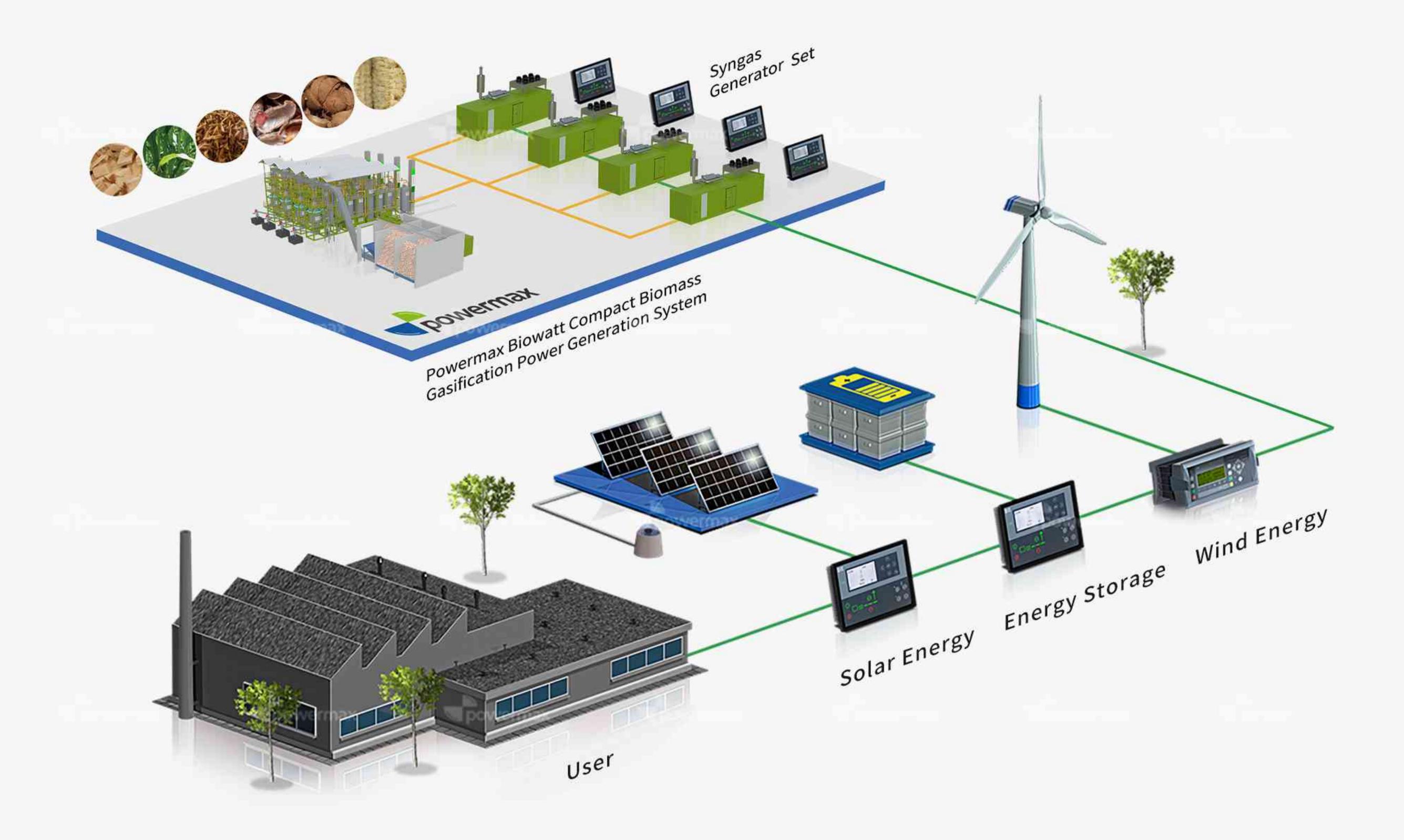
- No need for factory building, suitable for many countries.
- System components such as transport system, de-ashing system, or fuel dryer available in combination with all Powermax equipment.



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# 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.

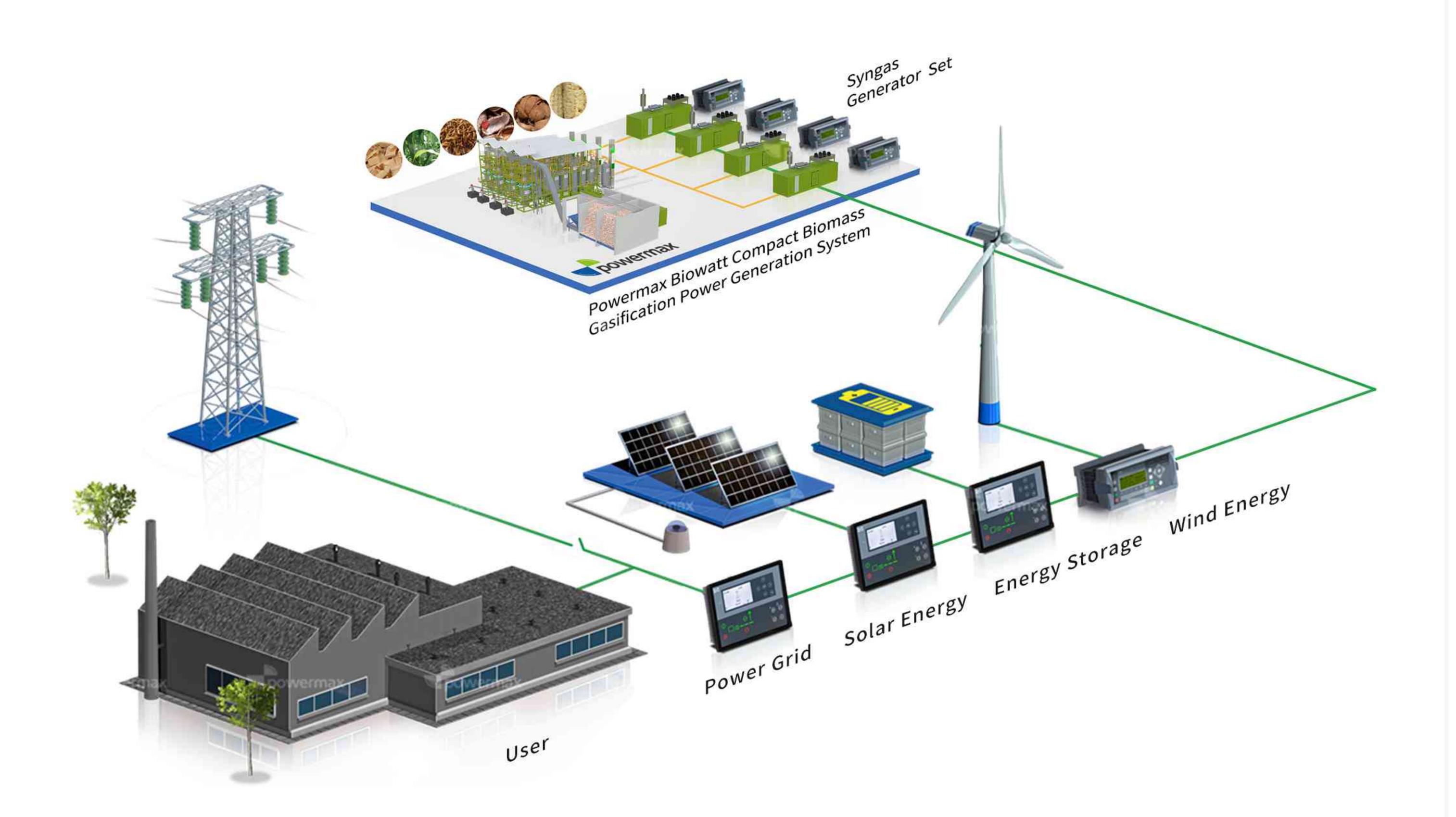
Powermax provides complete hybrid power plants for off-grid or on-grid applications where security of power supply is of the essence. These effective solutions use clean fuels which combine with highly gas-efficient gensets and renewable energy systems to generate power. Energy storage systems keep excess 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, 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

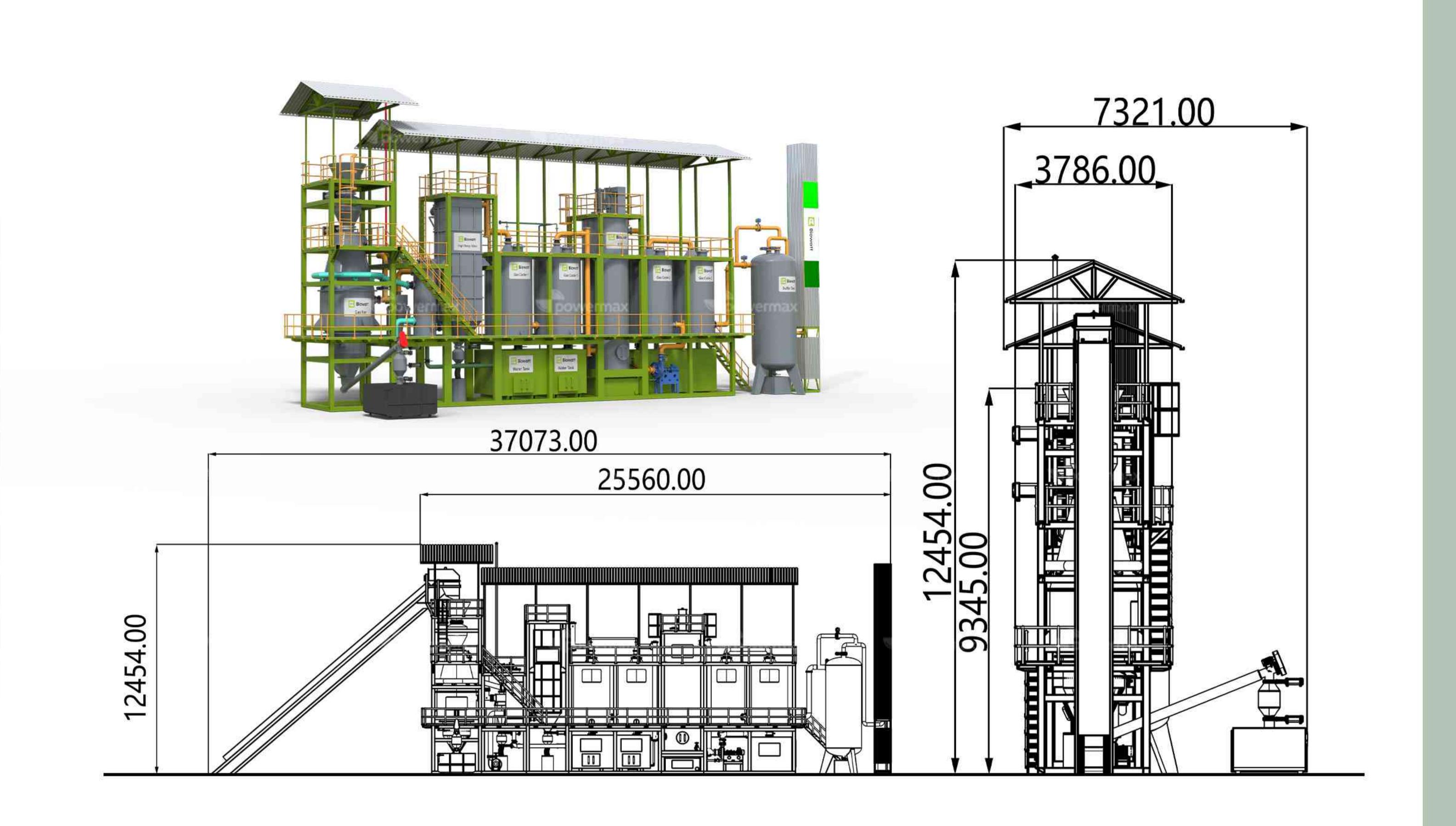
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# Parameter

## 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(Nm³/h)	1250-1500
Ash Discharge Type	Dry ash discharge/wet ash discharge
Length	27000mm
Height	9500-13000mm
Width	3786-8720mm
Floor Area	108-235m²

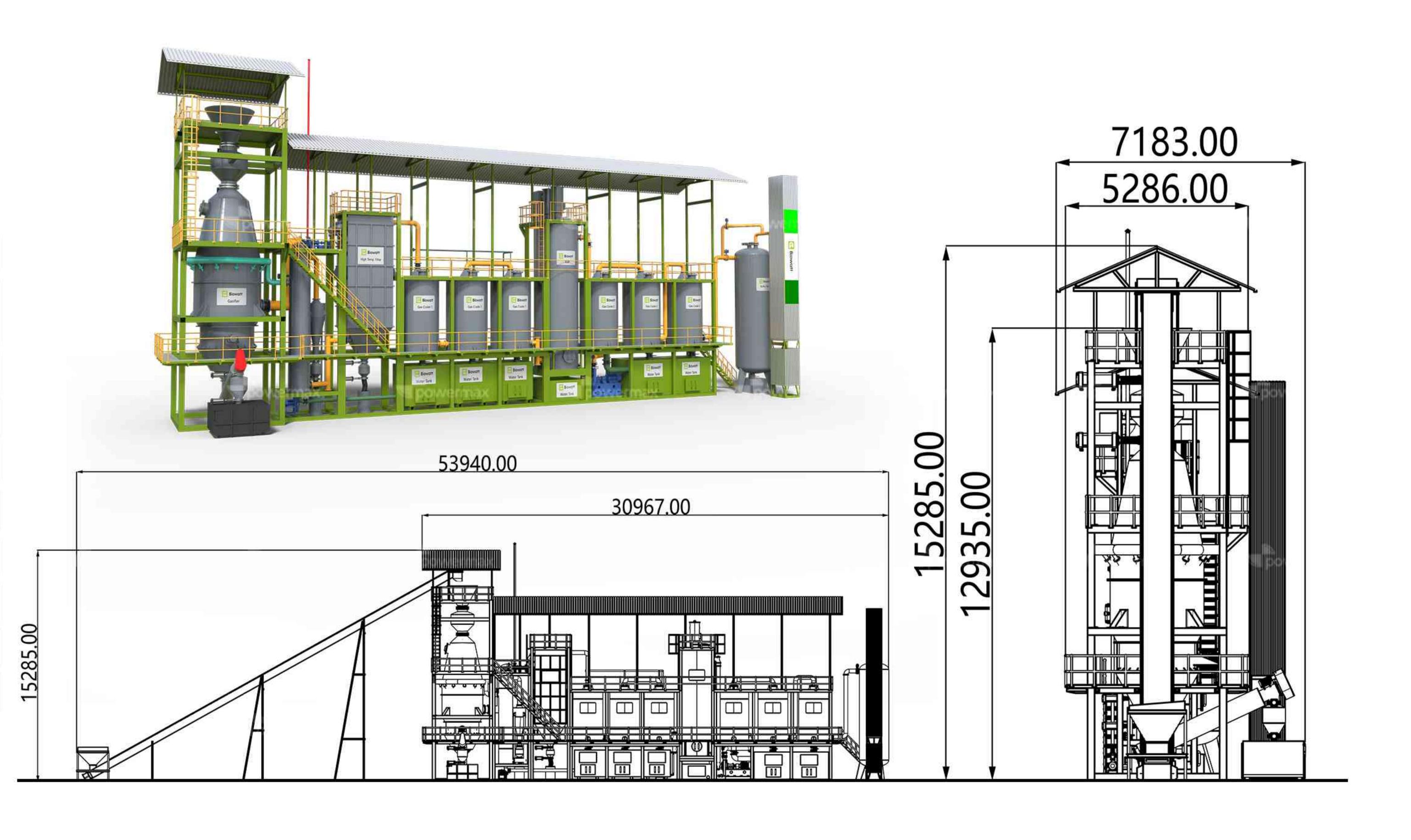
<sup>\*</sup> The actual size of the equipment may vary according to the site installation.



# 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(Nm³/h)	2500-3000
Ash Discharge Type	Dry ash discharge/wet ash discharge
Length	32000mm
Height	13000-16000mm
Width	5286-7190mm
Floor Area	170-232m²

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



#### Raw Material

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

#### **Gas Engine**

Engine Displacement	215L	8-cylinder	
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#### 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 (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**

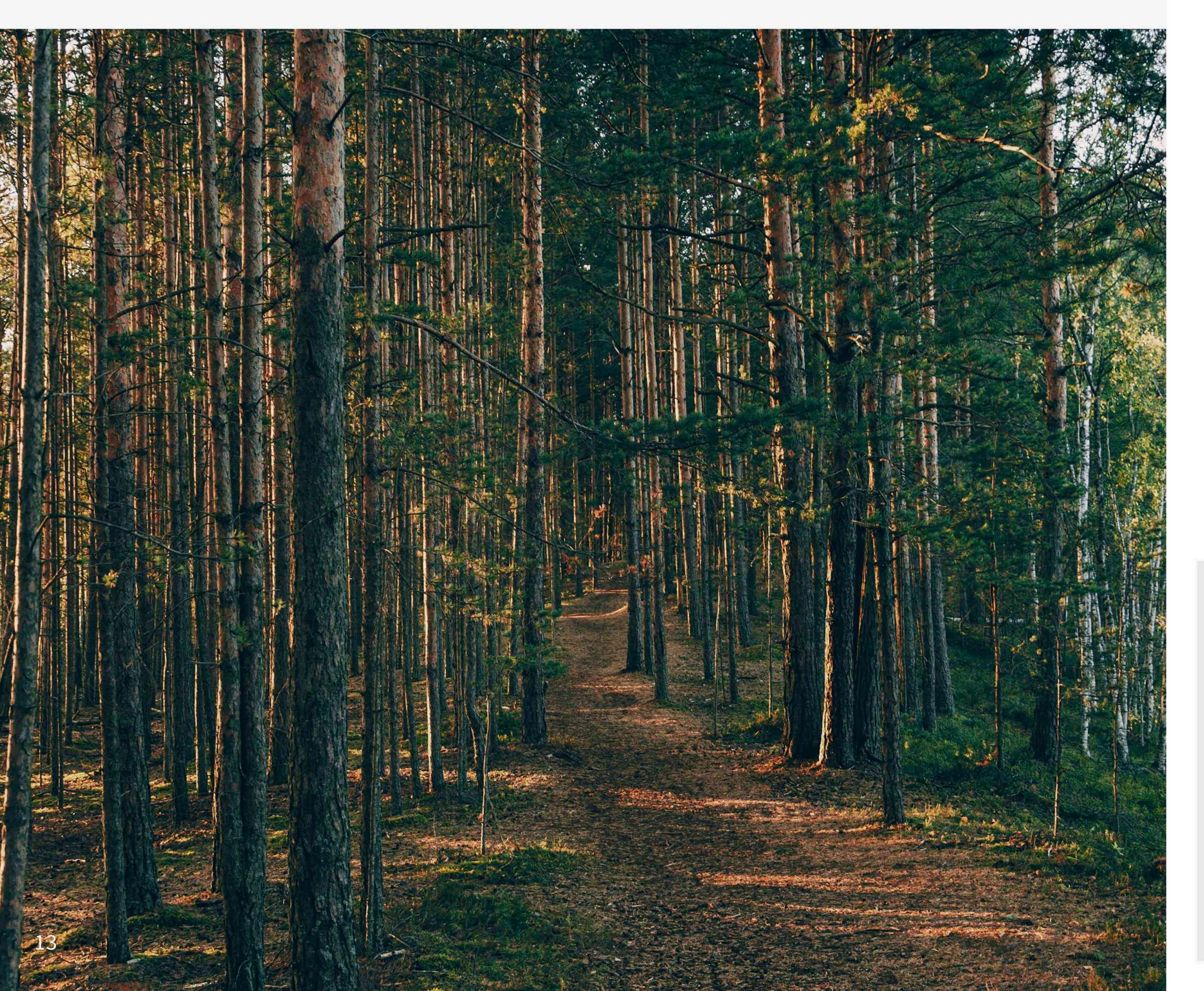
Recommendation	Deuter communication speed
	of ADSL or higher

# 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)