广东省高新技术企业

# Foshan Greenvinci Biomass Machinery Co., Ltd

## Biomass Gasification Burner Proposal

**2018.10.28**

## 一、Status of working conditions and the purpose of reconstruction

1. **Status of working conditions and user needs(According to the actual situation of the user):**

（1）Factories and enterprises are using or going to build a new steam boiler / thermal oil boiler, which currently uses coal, diesel and natural gas as fuel.

（2）Boiler. size: 6 ton steam boiler, working time: 12-14 hours per day. Working pressure: 0.15-1.6mpa.

**2.The purpose of reconstruction：**

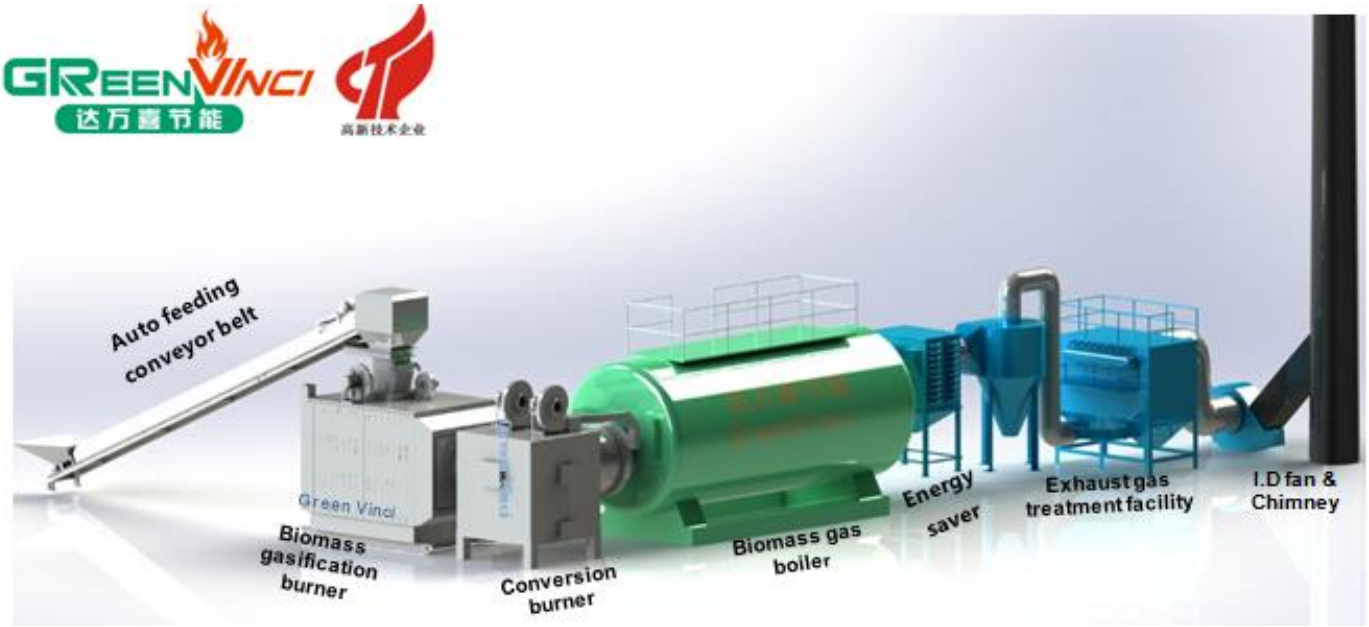
（1）Using biomass clean energy to minimize boiler operation cost.

（2）The use of biomass clean energy to replace high polluting fuels such as coal and heavy oil makes the emission of exhaust pollution meet the standards.

（3）The biomass gasification burner is used to achieve the effect of environmental protection, high efficiency, energy saving and safety.

3. **Recommended solution：** It is recommended to use a 3.6 million kcal biomass pyrolysis gasifier to dock the newly installed/reformed 6-ton steam boiler.

## 二. Biomass gasification burner system introduction




1. **Biomass gasification burner：** Biomass gasification burner is the main body that converts biomass fuel into thermal energy (flame) output. It is composed of high temperature pyrolysis chamber ,oxygen supply system, double-layer sealing feeding device, automatic slag discharge system (optional), burner nozzle and electric control system. Converter: If limited by the site, when the nozzle direction needs to be turned, the converter need to be configured.
2. **Feeding conveyor belt：** Run in linkage with the feeding device to form a time-sharing automatic feeding system.

3. **Biomass gas boiler：** Biomass gasification burner can be adapted to the boiler in use or configured a new boiler, suitable for gas, biomass steam and thermal oil boilers.
4. **Energy saver：** Reduce exhaust gas temperature and increase thermal efficiency。
5. **Exhaust gas treatment facility：** According to different environmental discharges, configure corresponding dust removal facilities.
6. **Electronic control system：** PLC, frequency conversion, touch screen electronic control system, automatic feeding, automatic constant pressure and constant temperature; At the same time, it is connected with the boiler electric control system, which can realize over-pressure, ultra-high and ultra-low water level shutdown, and the safety guarantee is fully in place.

**（*See the attachment for reference drawings of actual field layout）**

## 三、Equipment purchase list and quotation.

### 1. Automatic discharge 3.6 million kcal biomass gasification burner, Item:GV-360-AG

| No. | Item | Quantity | Unit | Market price | Remark |
|---|---|---|---|---|---|
| 一 | **Biomass gasification burner** | | | | **Total** |
| 1 | 3.60 million kcal biomass gasification burner | 1 | piece | | standard configuration |
| 2 | Burner nozzle :310S | 1 | piece | | |
| 3 | Electric or pneumatic | 1 | set | | |
| 4 | Water cooling auto cleaning | 1 | set | | |
| 5 | Cleaning maintenance tool | 1 | set | | |
| 6 | The electromagnetic valve:3sets;air tube:3m | 1 | | | |
| 7 | 1temperaturecontrol probe,temperature control line:5m; power cord: 25 m | | | | |
| 8 | Moving guide rail | 1 | set | | |
| 9 | Electric cabinet: double frequency conversion,PLC,touch screen | | | | |
| 二 | **Auxiliary machine accessories** | | | | **total** |
| 10 | Screw Air Compressor7.5kw | 1 | set | | Optional |
| 11 | 5.5kw water pump ( for auto slag cooling） | 1 | set | | Optional |
| 12 | Belt conveyer（within 8M）、hopper | 1 | set | | Optional |
| 三 | **Freight and installation** | | | | **total** |
| 13 | Freight | 1 | set | | Optional |
| 14 | Gasifier guide installation, manual commissioning（within 7 days） | 1 | set | | Optional |
| | **Total** | | | | |

***The above quote valid period：15 days**

| Parameter of the biomass gasification burner | | | |
|---|---|---|---|
| **Item No.** | GV-360-AG | **Size** | 3103*2888*3584 mm |
| **Output Power** | 360 x $10^4$ KCAL | **Nozzle from ground floor** | 1646mm |
| **Applicable Fuel** | wood chips,pellet,briquette | **Nozzles dia** | ∅596mm |
| **Voltage** | 380V | **Gross weight** | 11.6 ton |
| **Total equipment power** | 24.7KW (full load) | **Electroniccontrol system** | PLC,double frequency conversion,touch screen,Safety interlock cabinet |
| **Fuel consumption(h)** | 1030KG/H (full load) | **Feeding system** | Belt conveyor |
| | | **Slag discharge way** | Auto |
| *The above calculation is based on the calorific value of biomass fuel ≥3600 kcal. | | | |
| *Power consumption includes：Continuous operation and intermittent operation of blower, secondary fan, air compressor, circulating water pump, feeding motor, etc. | | | |
| *Due to continuous improvement of products, the parameters of this product are subject to change without prior notice, subject to the order contract or the factory materials. | | | |

**Remark:**

（1）The above prices do not include tax, invoices plus 14% tax. The whole equipment is guaranteed for 1 year, and the grate and nozzle are guaranteed for 6 months.

（2）The costs of foundation digging, unloading and hoisting as well as the accommodation and accommodation of the installation personnel shall be borne by the user. The cost of shipment loading shall be borne by the supplier.

（3）Payment terms: 50% deposit, balance before shipment loading .

（4）Our company can provide relevant qualification documents of equipment, excluding the cost of notification and acceptance procedures of installation and transformation of the quality supervision bureau。

（5）About 30 days for equipment design and production, and about 5-7 days for installation。

（6）If the new gas boiler is purchased, the size of boiler door before delivery shall be communicated with us。

（7）Biomass fuel calorific value ≥ 3600kcal / kg, equipment output power meets design requirements。

（8）The air compressor is recommended to be purchased locally to facilitate the warranty service; If it is configured by our factory, we do not assume the warranty.

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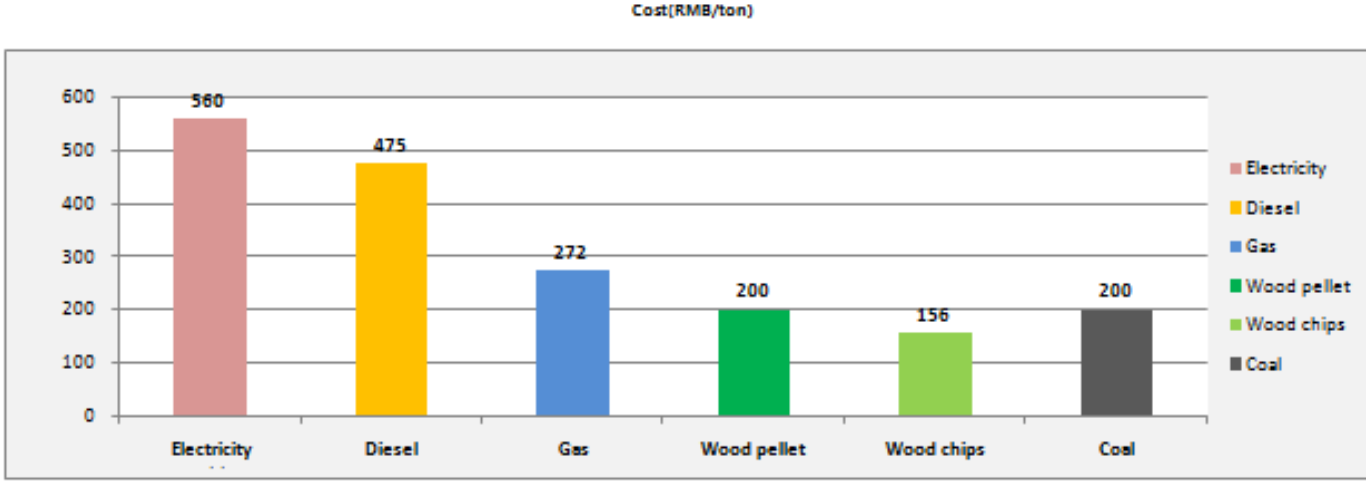
## 四、The feature of Greenvinci Biomass Gasification Burner

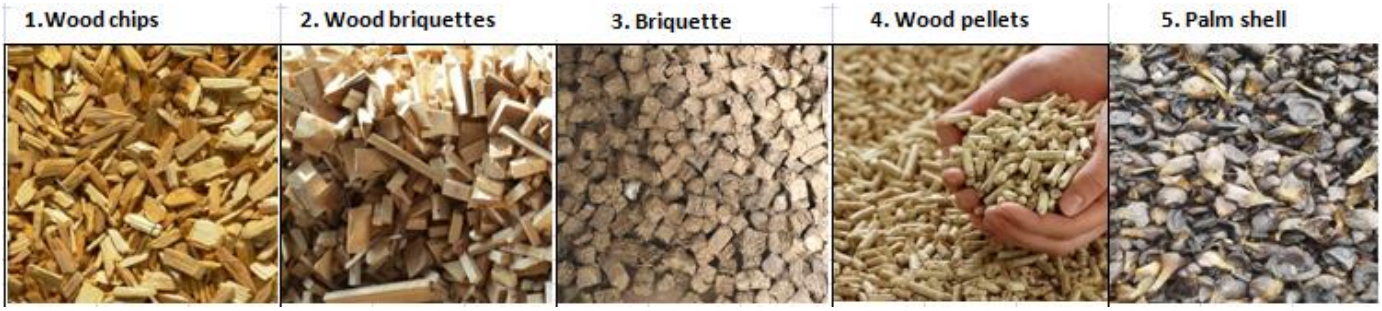
**1. Wide adaptability of fuel and low fuel cost**

All the forms of biomass or solid fuels , such as wood chips, wood blocks, wood-wastes , palm shell , fruit shell and briquettes can be used. Fuel supplies can also be secured in areas where there are no pellet plants. The fuel cost is also more tahn20% lower than that of molded.

| Energy types | Unit | Fuel value ( Kcal ) | Unit price ( RMB ) | Energy Consumption | Cost ( RMB/Ton ) | Cost comparison |
|---|---|---|---|---|---|---|
| Electricity | kw | 860 | 0.8 | 700 | 560 | 119% |
| Diesel | kg | 10200 | 7.30 | 65 | 475 | 86% |
| Gas | m3 | 8500 | 3.40 | 80 | 272 | Standard |
| Wood pellet | kg | 4000 | 1.10 | 200 | 200 | -22% |
| Wood chips | kg | 3800 | 0.70 | 263 | 156 | -39% |
| Coal | kg | 5200 | 1.00 | 200 | 200 | -22% |




***Take the fuel cost of producing 1 ton of steam as an example, the actual cost will be different due to the different fuel price and boiler thermal efficiency in each place.**

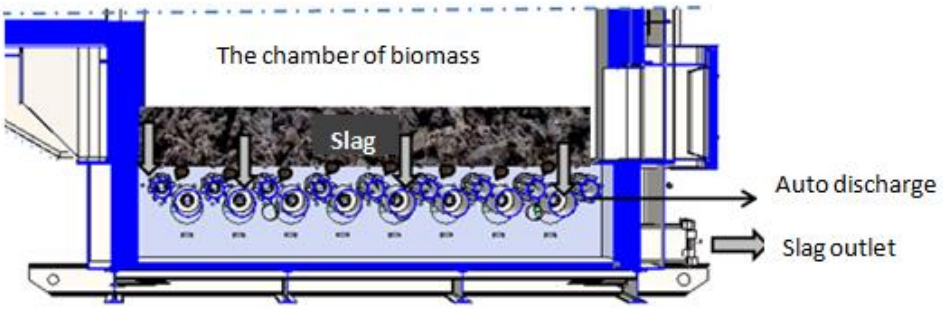



**Cost comparison: take a 4-ton gas steam boiler and produce 2000 tons of steam every month as an example: (in RMB)**

| Fuel type | Fuel value | Unit price | Daily consumption | Daily cost | Monthly cost ( 28days ) | Monthly cost savings | Annual cost savings ( 11 months ) |
|---|---|---|---|---|---|---|---|
| Gas ( m3 ) | 8500 | 3.5 | 5400 | 18900 | 529200 | | |
| Biomass ( kg ) | 3600 | 0.7 | 16428 | 11500 | 321989 | -207,211 | -2,279,323 |

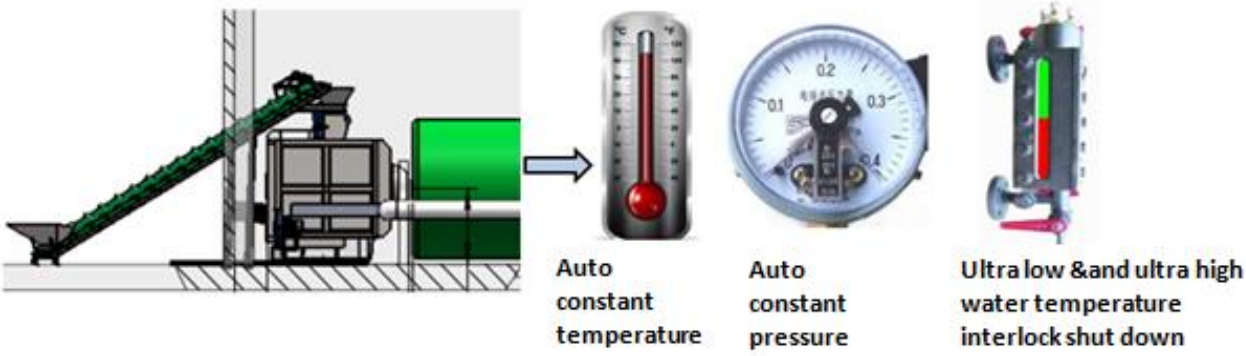
**2. High level of automation**

**（1）Automatic discharge（Optional）：** According to the energy demand and fuel quality, the user can select the automatic slagging system to achieve continuous operation for 24 hours. During operation, there is no need to shutdown burner toclean slag,can ensure the production capacity is stable.The general loose slag device can only scrape the ash on the grate, and can not completely discharge and reduce the ash of the furnace, which will still affect the combustion effect.The slag discharging system independently developed by Greenvinci can really discharge the slag from the furnace continuously and improve the combustion efficiency to the greatest extent.



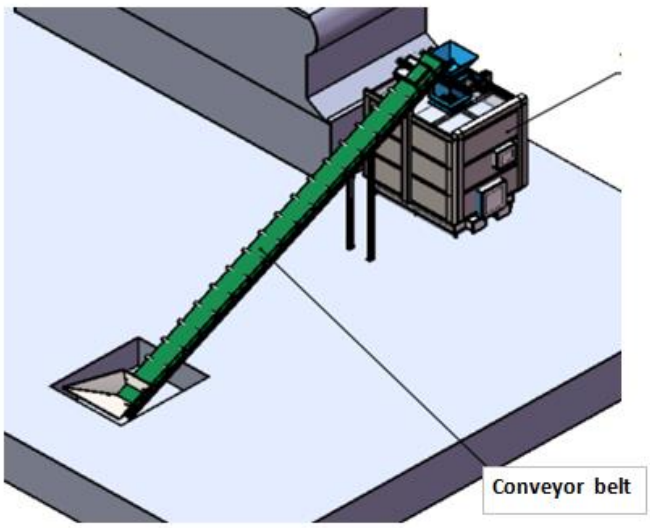

**（2）Automatic constant pressure and temperature control, Safety interlock guarantee：**

The electric control cabinet can be connected with the pressure gauge of the boiler and the kiln, and the temperature meter to automatically control the pressure and temperature through multiple stages of fire. At the same time, it can be connected with the boiler control cabinet to realize over-pressure, ultra-low and ultra-high water level shutdown, and the safety guarantee is in place. At the same time, it can be transformed and accepted by the technical supervision bureau.




**（3）Auto feeding**

The conveyor belt controlled with the electric control box to realize automatic feeding. Operators only need to ensure that there is biomass fuel in the silo, and the whole equipment will automatically control the feeding speed and fire power according to the temperature and pressure.The operation and labor intensity of operators is low, and every shift needs only 1~2 operators.

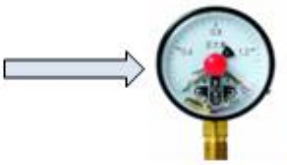



(4) **Intelligent control system： PLC variable frequency touch screen control, can be connected with boiler electric control cabinet, boiler induced draft fan, feeding conveyor belt, automatic slag connection parallel control. Through the liquid crystal display, the operation of each part can be visually displayed. At the same time, the operating parameters can be adjusted according to the actual conditions of the working conditions, which is intuitive and convenient, and the training of the operators is easy.**


**Pressure and temperature controls :**

**1. Boost and temperature rise: the frequency conversion of blast air for oxygen supply is automatically increased, the frequency of feed is automatically increased, and the frequency conversion of induced draft fan is automatically increased**

**2. Pressure maintaining and heat preservation: the frequency conversion of blast air for oxygen supply is automatically reduced, the feeding frequency is automatically reduced, and the frequency conversion of induced draft fan is automatically reduced.**



**Automatic shutdown for over pressure and over temperature**

**High and low water level automatic shutdown**

**3. Less emission of smoke**

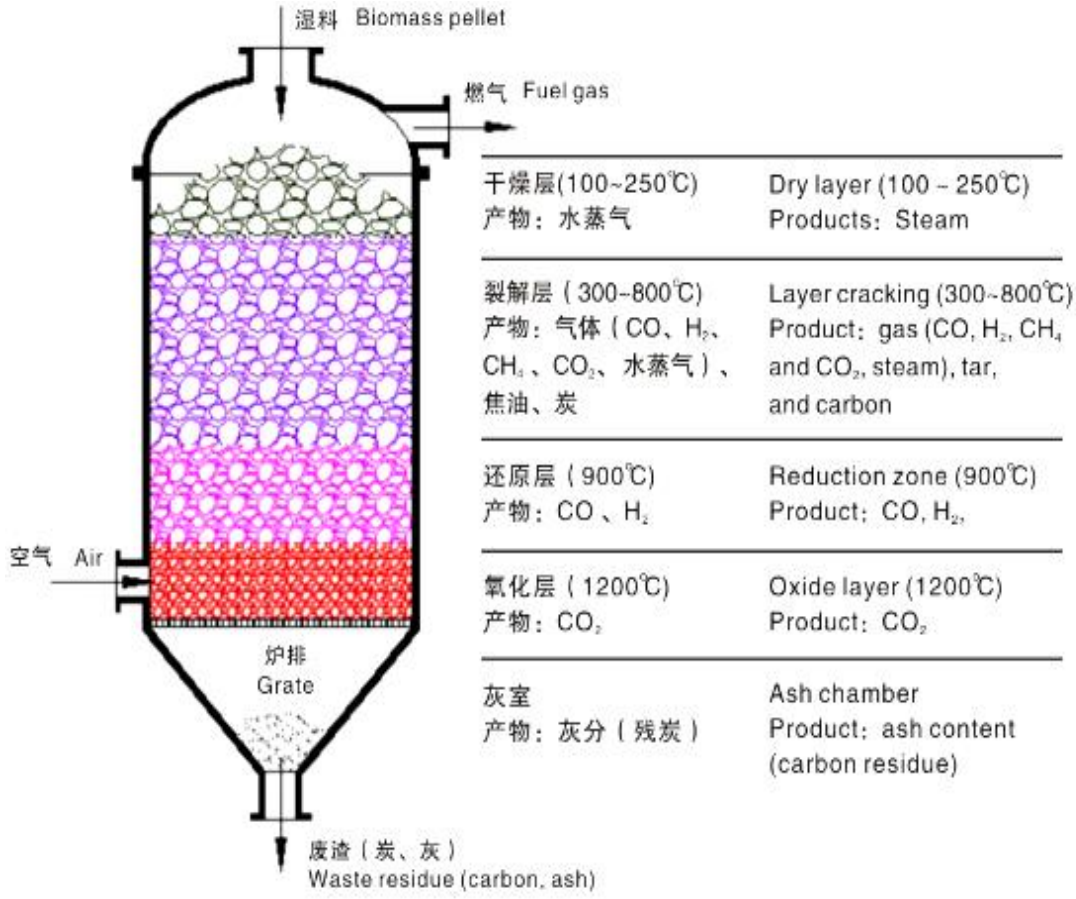
High temperature pyrolysis gasification combustion, lower emission of dust, CO, NOX and no black smoke, is a cost-effective alternative to highly polluting fuels.

| Item | Biomass | Gas | Coal | Standard |
|---|---|---|---|---|
| Fuel value kcal/kg | 4000 | 8500 | 5500 | / |
| Sulphur content (%) ≦ | ≦0.2 | ≦0.1 | 1 | / |
| SO2 (mg/m3) | < 15 | / | 300 | 30 |
| NOX (mg/m3) | < 200 | 30 | 300 | 200 |
| Smoke dust mg/m3 | < 30 | 0 | 40 | 30 |
| Smoke blackness | 0 | 0 | 1 | ≦1 |

## 五. Operating principle of Biomass gasification burner

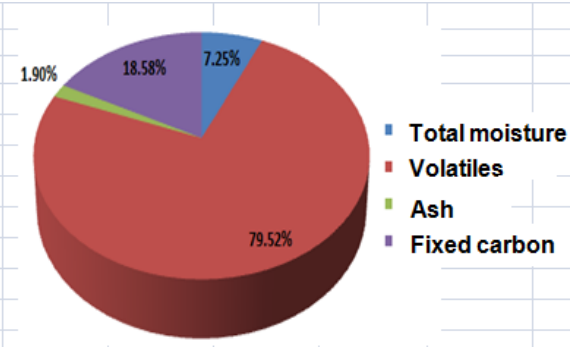
### 1. High temperature pyrolysis gasification principle

High temperature pyrolysis gasification is the burning of combustible smoke, such as CH4, CO, H, etc., by biomass fuel in a certain environment. The combustible material accounts for about 80% of the biomass fuel composition.A part of the combustible material is burned in the furnace, and the other part is fully combusted by the secondary oxygenation of the nozzle.

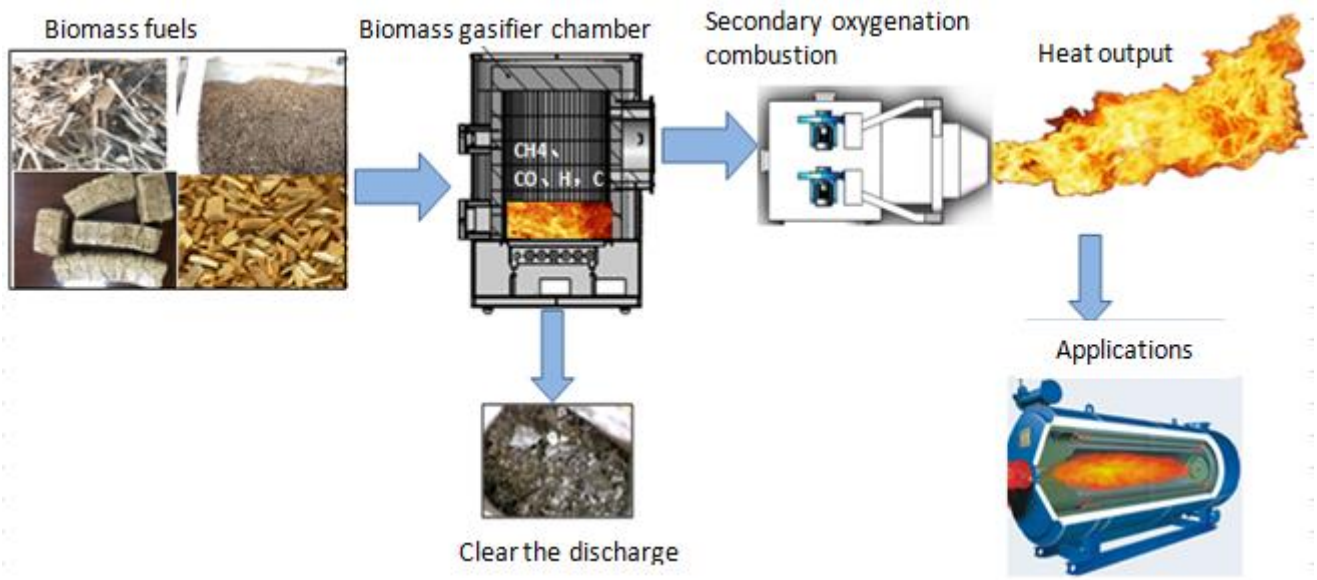



### 2.Biomass fuel composition

| No. | Items | Results |
|---|---|---|
| 1 | High calorific value of dry base Qgr,v,d | 18.86 (MJ/kg) |
| | | 4509(Kcal/g) |
| 2 | Net calorific value as received basis(Qn | 16.8 (MJ/kg) |
| | | 4018(Kcal/g) |
| 3 | Total moisture Mt | 7.25 (%) |
| 4 | Sulfur content of dry base(St,d) | <0.01 (%) |
| 5 | Dry base volatiles(Vd) | 79.52 (%) |
| 6 | Dry base ash(Ad) | 1.9 (%) |
| 7 | The dry base fixes the carbon(FCd) | 18.58 (%) |



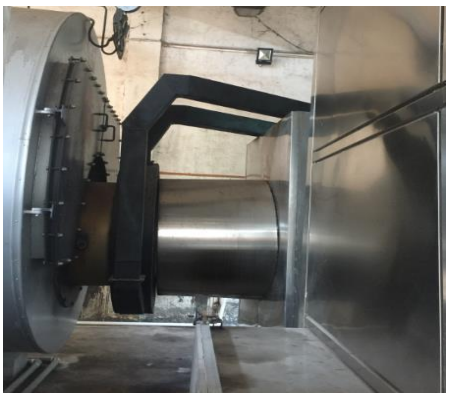
**3. Operating principle**




**六、Biomass combustion equipment comparison**

| | Items | Pellet burner | Biomass gasification burner | Biomass gasifier |
|---|---|---|---|---|
| 1 | Equipment cost | Lower, 1/3 full gasification | Lower, less than 1/2 of full gasification, about 60,000 yuan | High cost, the market price exceeds 150,000 yuan / ton |
| 2 | Avaible fuel | Forming pellets | Pellets,briquettes,wood chips | Pellets,briquettes,wood chips |
| 3 | Steam cost | Higher,close to natural gas | Much lower | 20% higher than biomass gasifier |
| 4 | Operator | 1~2 people/shift for one machin | 1~2 people/shift for one machin | More than 5 people/shift for one machine |
| 5 | Combustion system | Direct-fired | High temperature pyrolysis semi-gasification | Complete gasification |
| 6 | Tar | Tar can burn directly | Tar can burn directly | Tar needs to be recycled and needs to be disposed of in hazardous waste |
| 7 | Slag discharge wa | Manual slag cleaning, intermittent operation | Optional automatic slag discharge,24 hours continuous | Automatic slag discharge, 24 hours continuous operation |
| 8 | Integrated thermal efficiency | 91%, only the exhaust ash resic Fuel ash 4%, furnace heat loss of about 5% | 93%, only the exhaust ash resid Fuel ash 4%, furnace heat loss of about 3% | No more than 80%, about 18% charcoal The heat loss of furnace body is about 2%, and the cooling heat of gas through |
| 9 | exhaust emission | Higher,dust≧100mg NOX : High | Less , dust≦50mg NOX:less | Less,dust ≦30mg NOX:less |
| 10 | Installation space (No fuel storage) | About 15m3 Boiler room Installation | About 30m3 Boiler room Installation | 50m3~100m3 Outside the boiler room, there should be enough space for installation |
| 11 | Installation and renovation period | Shorter , 2~5days | Shorter , 3~7days | Longer , 20~40days |
| 12 | Maintenance cost | Low cost, simple and cheap ac | Lower, simpler, cheaper access | High, more complex, high accessory price |
| 13 | Installation pictures |  Pellet burner |  Biomass gasification burner |  Biomass gasifier |

## 七、Our Case(parts)

| 1) 3.6 million kcal biomass gasifier is applied to Qingyuan Environmental Protection Company's 6-ton gas boiler（replace gas） | 2)7.2 million kcal Biomass gasifier is applied to Dongguan Food Factory’s 12-ton gas boiler（replace gas） | 3)6 million kcal Biomass gasifier is applied to Hubei Pharmaceutical Factory’s 10-ton gas boiler |
|---|---|---|
|  |  |  |
|  |  |  |
| | | |
| 4)3.6 million kcal biomass gasifier connect to Hengyang glycerin production plant 3500kw thermal oil boiler | 5) 3.0million kcal biomass gasigier connect to 5-ton vertical boiler in Thailand (replace firewood） | 6) 3.6 million kcal biomass gasifier connect to Zhaoqing Xinqiao Food & Beverage Factory’s 6-ton hand-fired boiler(replace coal) |
|  |  |  |



公司简介
Company profile

GREENVINCI
达万喜节能

**Foshan Greenvinci Biomass Mavhinery Co., Ltd, founded in 2012,is a manufacturer specialized in the development of energy, environmental protection and energy-saving technologies, integrating product research and development, manufacturing and sales. In the field of biomass energy application technology and supporting equipment research and development, it has achieved breakthrough results, successfully developed biomass gasifier and new multi-functional biomass gasification hot air system and more than 10 national patents have been declared and many national certificates and honorary certificates have been obtained.Formed a complete independent intellectual property system.**

**Since establishment, Foshan Greenvinci Biomass Machinery Co., Ltd has taken the integration of R&D, production and sales of its main products as the main body, and has joined the new elements of project development, management and operation .At present, the main partners are located in more than 50 countries and regions around the world, including: Israel, Singapore, Austria, Thailand, Malaysia, Vietnam, Indonesia, Russia, Ukraine, Egypt, China Guangdong, Hunan, Guangxi, Jiangxi, Zhejiang, Liaoning and other countries and area， Through continuous efforts in innovation, research and development, transformation and improvement, at present, technology, management, operation and other aspects are very mature. In order to meet the product and fuel needs of more partners, the company has set up fuel production and processing bases for biomass pellets and wood chips in Foshan, Jiangmen and Qingyuan, Guangdong. In Guangzhou Huangpu Port, Zhejiang Ningbo Port and other places, raw material storage bases have been set up, and biomass solid briquette fuels and palm shells have been imported from Vietnam, Malaysia, Thailand and Indonesia, providing enterprises with more clean energy and energy-saving solutions. Greenvinci Biomass has adhered to the cooperate culture and management philosophy of being “steady, professional, honest and win-win” and won wide supports and praises from users and partners all over the world.**



## Business advantage


**1. Equipment and technical advantages**

**“GV-G”“GV-AG series biomass gasifier is a thermal energy equipment developed and matured by Foshan Greenvinci Biomass Machinery Co., Ltd. based on years of experience in thermal energy application and for various biomass fuel characteristics. It has various biomass fuels ( Wood chips, pellets, briquettes, etc., high level of automation, with low ash of flame, stable operation, high thermal efficiency, convenient operation and maintenance, etc., is the only biomass burning equipment on the market that can directly replace fuel, such as gas, diesel and coal. Users need to save energy, reduce costs, and reduce emissions.**

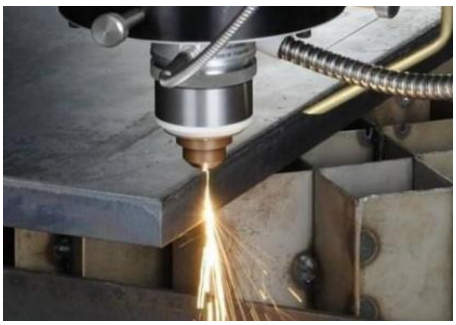
**Our company has set up the technology R&D department and the "Greenvinci energy research center", which is the department of new energy application R&D and energy efficiency audit of the company. More than 5 research and development personnel are engaged in new energy application R&D。Our products have a number of national invention patents and utility model patents, and won a number of certifications and honors such as "high-tech enterprises" and "high-tech products", forming a complete independent intellectual property system.**


## 2. Brand advantages

**Foshan Greenvinci Biomass Machinery Co., Ltd. and its brand "Greenvinci" have been established for more than 9 years, is the earliest enterprise in China to develop and apply biomass and new energy equipment. Our products and services are all over the country and the world and our company has continuously established good brand advantages and customer relationships.**


## 3. Production and project building capacity.

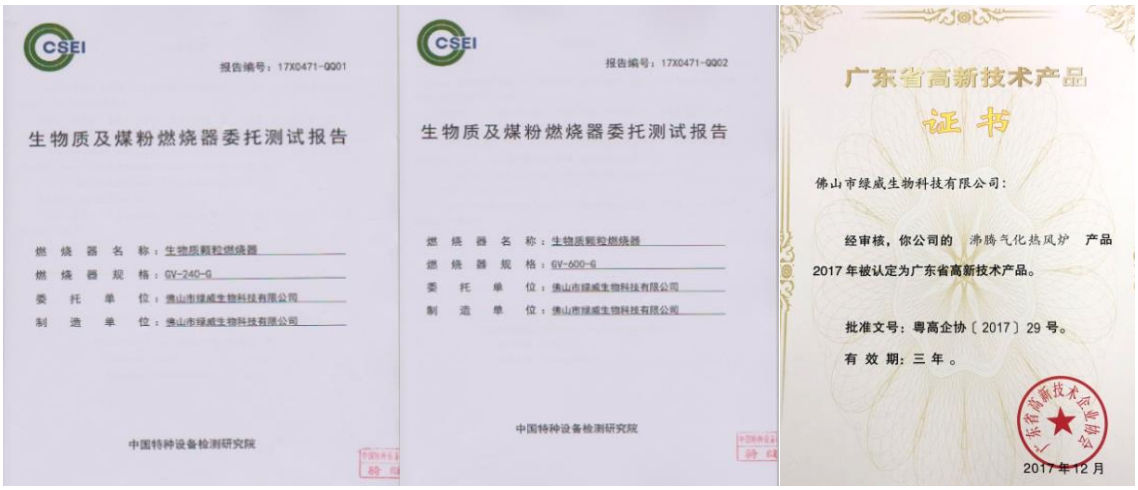
The company has thousands of square meters of standard production plants. The main production workshop is equipped with heavy lifting machinery and advanced processing equipment. The design is rigorous, advanced in technology and well-made. The company's production staff and externally installed after-sales personnel a total of 25 people, the company has always focused on the management of the quality of management personnel, the continuous improvement of the production process of production workers, the continuous development of technology research and development, installation and after-sales service support. The project covers the whole world and specializes in engineering construction, personnel training and turnkey projects.




**4. Advantages in project management and cooperation.**

The company set up a special EMC project management and operation center, and launched a user “0” investment multi-cooperation mode according to customer needs. According to the user's energy characteristics, design reasonable and feasible technical solutions, provide customers with one-stop service of project design, equipment production, installation, transformation and operation management. Our company set up the project department to configure professionals of boiler operation, safety management, energy efficiency measurement, maintenance and repair, quality inspection and safety . The company has a complete labor and training system, and the project ensures safe, efficient and smooth operation. The equipment has the qualification documents for inspection by domestic government authorities, and can be successfully installed according to customers’ demand, installed and accepted in all parts of the country.


**5. Raw material guarantee advantage**

Based on the customer, our company aims to establish a multi-channel supply and guarantee system for raw materials, self-operated and cooperative production bases, overseas procurement and other raw materials, and to form a cluster network of regional customers and raw materials supply.

Provide continuous and stable quality fuel to guarantee the operation of the project and customers equipment。

Nanhai Xiqiao distribution base



Jiangmen daze distribution base

Nanhai Jiujiang distribution base

Huangpu Port distribution base

Hainan Wanning distribution base

## Company display

The general manager gave a speech at the asia-pacific biomass summit BBS, the company leaders communicated with domestic and foreign counterparts and experts, and the exhibition style

Foreign customers to visit the company and technical communication

Provincial department of industry and information technology, environmental protection, technical departments to visit the company's clean energy transformation projects

# Greenvinci Biomass Machinery Co.,Ltd


Add：Building 2 West IndustrialArea,Danzao town,Nanhai district,Foshan city,Guangdong China

Hot line：400-009-3676　　Fax：0757-85432108

email：admin@vincienergy.com

Web：www.vincienergy.com　　WeChat public number：greenvinci

TEL：0757-63258876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