thermochemical conversion processes of biomass and waste

torrefaction
pyrolysis
gasification

www.BIOGREEN-ENERGY.com
Thermochemical conversion processes of biomass and waste

Biogreen® is an innovative and patented process for thermochemical conversion of biomass, plastic and waste. It includes an exclusive and patented pyrolysis system that extracts useful substances to be used as a source of energy or a renewable product for green chemical applications.

Wood, straw, cereal waste, plastic waste or tires, sewage sludge or methanation sludge... all can be converted into oil, char or coke and gas.

What makes Biogreen® unique:

- Continuous & fully automatic
  No labour and computerized
- On your own site
- Simple: Small footprint; lean & mean
- Money: Change waste into money; Low risk investment
A real industrial innovation

Protected by international patents, Biogreen® is an extremely versatile system that offers a wide range of possibilities for thermochemical conversion of biomass and waste into materials and energy.

Biogreen is one of the leading processes in Europe, which has demonstrated reliability and performance over 8 years of operation. Its extreme simplicity guarantees high reliability combined with low maintenance costs and operating costs.

Biogreen guarantees energy efficiency ratio up to 91%.

Biogreen is perfectly suited for the following applications:

- Production of solid fuel, heat and electricity from forestry and crop biomass
- Production of liquid fuels and electricity from plastic waste
- Production of carbon black and fuel from waste tires
- Energy optimization and biochar production from sewage and sludge
- Production of soil enhancers and fertilizers (Biochar) from biomass
Thermochemical conversion changes a product’s structure when applying heat in an oxygen free environment. Depending on the operating parameters, thermochemical processes applied to the biomass and waste produce recoverable materials as a solid, liquid and gas in varying proportions.

With Biogreen®, ETIA extends its wide range of equipment and processes for thermal treatment and for adding value to all kinds of bulk products.

*Biogreen® has a unique design. The operating parameters are perfectly controlled. This allows the operator to adjust the percentage of char, liquid and gas production.*
Biogreen can be used for biomass torrefaction. Torrefaction is one of the possibilities to create denser energy. Treatment is achieved within a few minutes in a temperature range between 200°C to 300°C in an anaerobic environment. Biomass will lose weight (around 30%), and become crumbly. This prepares it to be crushed or gasified. Torrefaction also produces a homogeneous product, which can be easily compacted to produce TOP (torrefied wood pellet).

Pyrolysis operates between 400°C and 900°C. The oil can be used as fuel, carbon black, or a soil enhancer. The oil can be used as fuel for renewable chemical industries. It can also be refined. Gas can be used as fuel for burner or gas engines or turbines. High temperature pyrolysis also produces high quantity of high calorific value with CH4 concentration up to 50% depending on feedstock quality.

Biogreen® allows gasification (with small amount of air injection) or high temperature pyrolysis (800°C to 900°C). Calorific value of the gas can be in the range between 10 to 30 MJ/m³. After a gas clean up process, gas can be used as fuel for electricity production or syngas production.
The Spirajoule® technology is an exclusive process for thermal treatment. It is designed with a low voltage electrically heated worm screw conveyor. The screw heats the product as a result of the joule effect. The product temperature is precisely controlled based on the heating screw temperature setting; the dwell time is regulated by screw rotation speed setting.

Biogreen® is an innovative process for optimizing energy consumption.

The pyrolyzer has an electronic temperature regulation and is quickly heated by electricity (Spirajoule®, patented technology) to the nominal operating temperature for torrefaction or pyrolysis. The product to be treated is then introduced into the pyrolyzer.

Depending on its Low Heating Value, the product will immediately reach operating conditions for an exothermal reaction. This reaction will then be maintained at the nominal temperature of the pyrolyzer during production and electrical energy consumption will stop. However if for any reason, the feeding condition changes (more moisture or flow rate), the internal temperature will decrease and the electrical energy supply will restart automatically to maintain the power needed to reach the nominal operating temperature.

This allows Biogreen® to guarantee a perfect and constant quality of the product obtained from the treatment.

*View of a 1000 °C electrical heated screw ➔*
Our expertise at your service

Founded in 1989, ETIA is a French engineering company specializing in innovation, equipment and processes for continuous thermal treatment of bulk products.

ETIA covers more than 30 countries in the five continents. Recognized for its policy in industrial innovation, ETIA received the label OSEO EXCELLENCE for the third consecutive year.

With a team of experts covering all functions required for the development of innovative industrial processes (R & D, engineering, design, marketing, sales and consumer support) ETIA offers:

- Expertise in waste management
- Pilot plants for feasibility studies
- Engineering and design for turn key production plant
- Sales department for optimal solutions for sustainable waste and biomass treatment