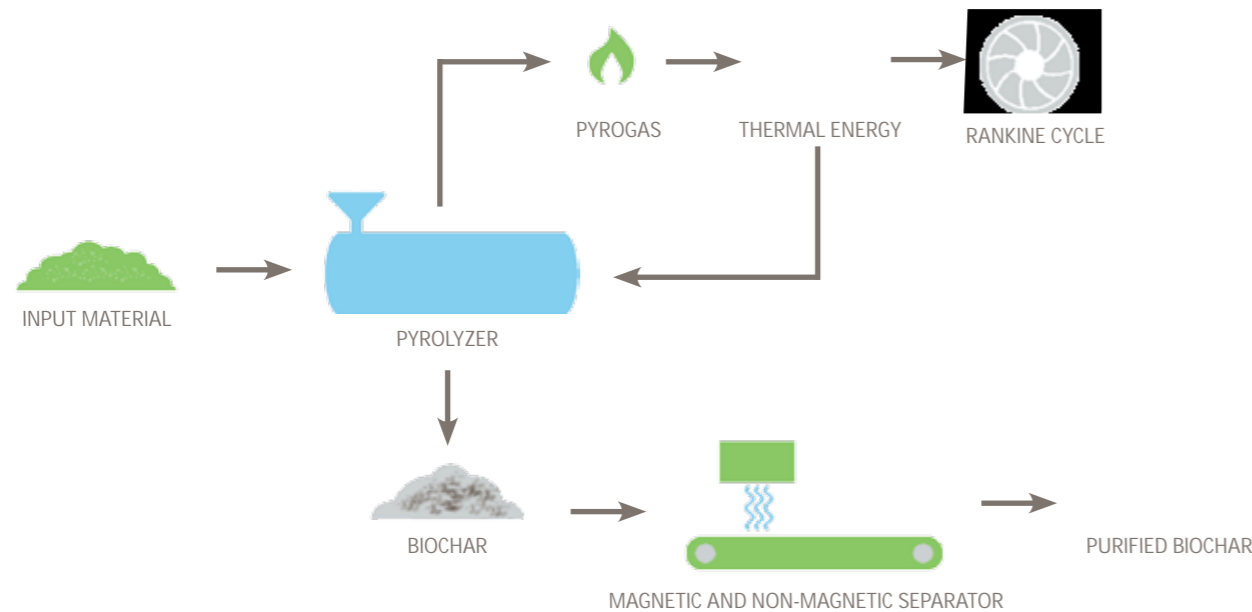


ENVIRONMENTAL
ENGINEERING
RENEWABLE
ENERGIES

bioener[®]



Pyrolysis



Bioener S.p.A. realizes pyrolysis plants of RDF, biomass, asphalt and tires. Pyrolysis is a thermochemical process of decomposition of materials, at elevated temperature and in the complete absence of oxygen.

PLANT DESCRIPTION:

The pyrolytic reactor, said Pyroboiler, is able to generate a gas with a high calorific value (pyrogas) and a vegetable charcoal (biochar).

The generated pyrogas is extracted from the pyrolysis reactor and sent to a special combustion chamber.

The pyrogas used in burners provides the thermal energy required to the pyrolytic process. The combustion exhausted gas of the pyrogas warms the rotating drum.

The biochar, containing inert compounds, is extracted from the reactor and treated before being disposed of

in landfill. The biochar is subjected to a removal process of magnetic and non-magnetic metals, that are recycled. In this way there is a "CO₂ sequestration" process, since carbon is fixed in a stable form, the biochar, for very long periods (hundreds of years).

The thermal energy is used by a Rankine cycle for the production of electrical energy.

Treatment of waste water and sludge

Bioener S.p.A. operates in the area of purification with specific solutions for the treatment of industrial waste and sewage sludge; it has many technologies for the treatment and purification of water that allow to produce energy from renewable sources.

WASTEWATER TREATMENT:



Chemical - Physical processes: pollutants removal by a coagulant. Odor treatment with activated carbon or ozone biofilter.

Chemical Oxidation processes : to purify highly toxic and inorganic wastes.

Aerobic Bio-processes: to remove pollutants through the use of aerobic bacteria.

Bio-Anaerobic processes: degradation of organic matter into biogas by bacteria that working in the absence of oxygen.

SLUDGE TREATMENT:

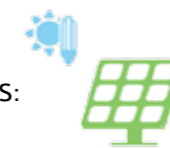
Systems to dispose of substances produced from industrial processes and from the purification of waste waters.

Treatments to inhibit, to remove any odors and to control emissions of volatile organic harmful substances.

Solar energy

Bioener S.p.A. designs, develops and manufactures equipment for the solar energy recovery from the photovoltaic and solar-thermal technology. The plants are made either as stand-alone structures and in integration with other bio-energy plants.

PHOTOVOLTAIC SYSTEMS:

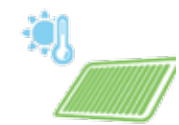


The photovoltaic panels can directly transform solar energy into electricity.

The system can be set up in stand-alone mode or in grid-connected mode, giving the produced energy to the electricity grid.

Bioener offers to the customer the management of the complete service, from design to the supply and laying of the panels, to the network attachment and assistance, to perform the request of the public contribution practices.

THERMAL SOLAR PANELS:









Solar panels allow to capture solar energy to get thermal energy.

In the industrial sector thermal solar can save most of the energy normally used for the washing processes with water at temperatures below 100 °C.

Energy efficiency improvement

Bioener S.p.A. is an Energy Service Company, offering integrated services, starting with the energy audit, aim to identify the best achievable actions. The actions in the energy field are aimed to reduce consumption to the rational use of energy, to the use of renewable energy resources and the conservation of the environment and natural heritage to achieve a sustainable development of the territory. The energy efficiency improvement is a process that improve the performance of plants and facilities, to substantially reduce costs and power consumption.

Bioener S.p.A., thanks to its experience and high specialization, offers its innovative services through:

-  Preliminary verification plant;
-  Energy system diagnosis;
-  Normative fulfillments;
-  Plant Restructuring and upgrading;
-  Automation and continuous monitoring of the plant;
-  Ordinary and extraordinary maintenance.

Thanks to the consolidated know-how, Bioener S.p.A. is able to study and develop customized solutions, calibrate to the different needs of the customer.

The only cost to the customer, starting from the signing of the energy service contract, is the energy consumed. Cogeneration plants are not a cost to the customer because all costs for repairs and maintenance will be paid by Bioener S.p.A.

The energy is accounted by special instruments placed in plants and the cost sharing with the customer happens by deducting the fuel costs and amortization from the revenues.

Bioener S.p.A. maximizes system efficiency and avoids occurring anomalies that affect the operation.

Bioener S.p.A. provides services with a flexibility to support customers at 360 degrees.

-  Technical-Economic-Financial Feasibility
-  Preliminary-Final-Executive Project
-  Project Financing
-  Construction Management
-  Construction Supervision
-  Coordination, Safety and Health
-  Supervision, Start-up phase and Operating assistance
-  Plant Management

Bioener S.p.A. has achieved the certifications:

-  ISO 9001: Quality Management System;
 -  ISO 14001: Environmental Management System.
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The duty of the engineering team is to adapt and optimize the best technology available on the market for each type of intervention to the customer's specific efficiency, size and saving requirements.

Bioener S.p.A takes care of customers:

- BEFORE** studying and choosing the best solutions, starting from the analysis to optimize the energy consumption of customers, the planning, through pilot tests, the assistance during the authorization process.
- AFTER** when required, dealing with the management and maintenance of plants, following, on behalf of customers, the authorization procedures and operation management of the incentives for renewable energy.



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