

ENVIRONMENTAL
ENGINEERING
RENEWABLE
ENERGIES

**bioener**[®]



“

The energy of change and innovation for
a sustainable development

”



Company Profile



Bioener S.p.A. was established in the 2010 to develop the idea of biomass digestion plants, idea which was concretized with the patent myHENergy and the relative plant.

In 2012 Bioener S.p.A. built two Anaerobic Digestion plants for the treatment of animal manure and agricultural by-products.

Since 2013 Bioener S.p.A. deals with separation of solid urban waste through Mechanical-Biological treatment (MBT).

From 2014 Bioener S.p.A. deals with treatment of special infected waste from different sources.

In 2015 Bioener S.p.A. presented two initiatives of Project Financing for the plants of treatment of OFMSW and organic waste for the town of Udine and the towns of ARO2 BAT Barletta-Andia-Trani.

In 2016 Bioener S.p.A. won the project for the construction of the plant of treatment of OFMSW and organic waste for the town of Udine.

Bioener S.p.A is an engineering company that operates in the environmental field, in advice services and high level engineering. It offers specialistic skills to private and public clients finding innovative solution.

Bioener S.p.A is a “Customer Oriented” company which satisfies clients through dedicated soluzions with continued support.

Our MISSION

Our work is based on values which provide a truly sustainable development, for the benefit of the population and the environment and economically profitable for those investing in our technology. We believe in the energy of change and innovation for a clean future that respects the environment.

Our VISION

Thanks to our economic-engineering skills and the know-how from the past experiences we can compete on the italian and international market.



“
Innovative solutions
to satisfy the market
demand”

Interventions Areas



RENEWABLE ENERGY

- MBT plant for MSW
- Anaerobic Digestion plant of OFMSW and agricultural by-products
- Photovoltaic solar plant

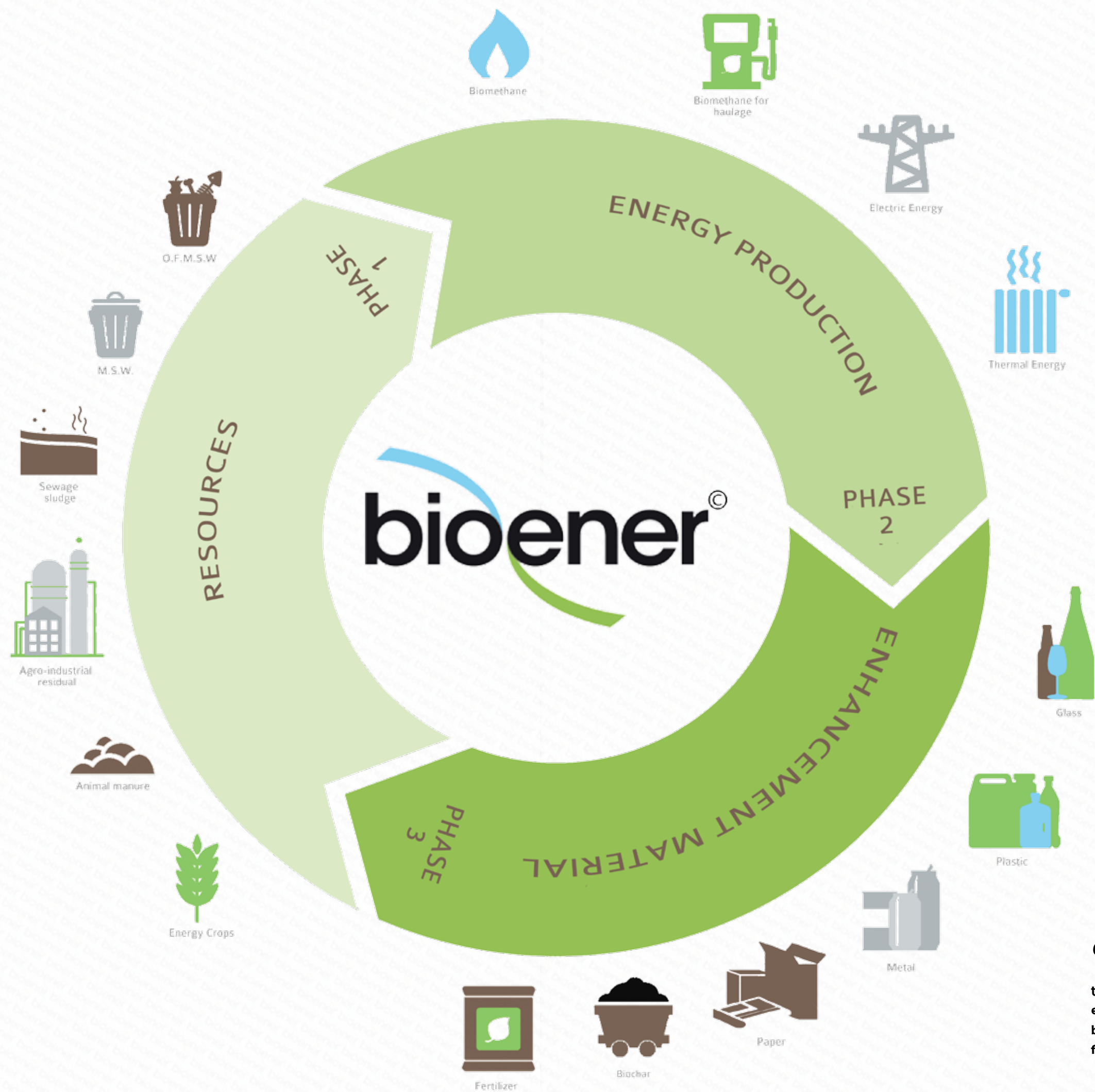
WATER TREATMENT

- Wastewater purification
- Treatments of sludge with anaerobic treatment

ENERGY EFFICIENCY

- Performance improvement of plant to reduce costs and consumption

“ The great flexibility of our technology allows the use of a wide variety of organic matrices and not ”



“ Efficient technology to transform resources into electrical energy, thermal energy, biogas, biomethane, Biochar and products for agriculture and industry ”

Bioener S.p.A. researches and develops innovative solutions in terms of technology and respect for the environment, according to an eco-sustainable approach both to prevent the formation of possible pollutants (solid waste treatment) and in the pollutants removal processes (water and sludge treatment).

Starting from “passive” prevention activities and pollutants removal, the company maintains an “active” approach, using virtuously wastes to produce biogas, biomethane, RDF and the generation of renewable energy.

Goals

Energy Recovery: waste becomes valuable resource for energy production;

Energy optimization: plants are made by choosing high-quality equipment and studying the process that optimizes the use of input materials;

Reduction of CO₂ emissions: for Anaerobic Digestion plants this reduction is attributable to the exploitation of the fermentation process under confinement, with a reduction of 95% compared to the aerobic one, and to the use of biomethane as a fuel for automotive purpose in place of conventional fuels, with a 20-25% reduction; for sorting plants it is due to the reduction of waste sent to the burners or landfills;

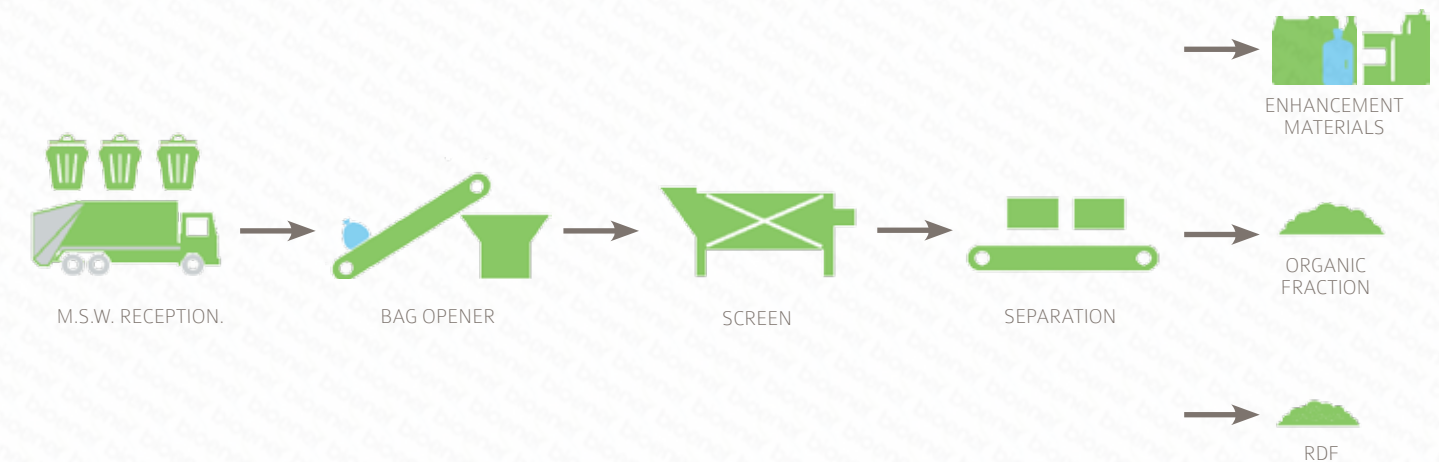
Abatement emissions from the engine cogeneration: systems for the reduction of NO_x, such as the regulation on lenox combustion, and CO, using an oxidizing catalyst, are provided;

Safe working environment with zero emissions: suitable collection systems of dust, resulting from all processing phases, allow a change of air into the work rooms, to guarantee the respect of the relative standards for the workplace and dust and odor abatement before the emission into the atmosphere. Acoustic reduction systems are used, such as the soundproof container for the cogeneration module, and it is also provided the respect of the differential noise level near residential areas;

Polluting waters abatement: the process water to the purification plant is about 30% water of the total process and it is treated with the SBR (Sequencing Batch Reactors) technology to remove pollutants;

Abatement of air emissions: the pyrolysis process takes place in a condition to avoid the formation of dioxins, solving the serious problem of the organic pollution. The pyrolysis gas is chlorinated organic compounds (PCDD-PCDF) free.

Selection of Municipal Solid Waste

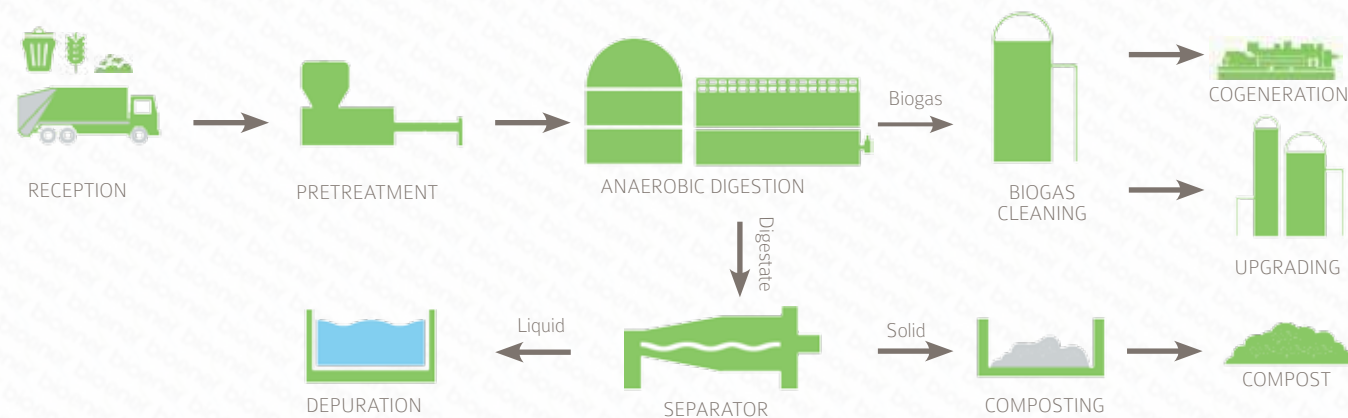


Bioener S.p.A. realizes plants for the selection of the waste coming from both the differentiated and undifferentiated collection, to maximize the recovery of secondary raw materials such as plastic, paper and cardboard, and non-ferrous materials, glass, for recycling, a dry fraction usually used for the production of RDF (Refuse Derived Fuel) and an organic fraction, for the biostabilization.

PLANT DESCRIPTION:

- Waste is sent to the shredder with the function of bag opener to obtain a waste with appropriate particle size.
- A sieve separates matter into three fractions, a fraction of oversize and two fractions of undersize. The undersize fraction is made of biodegradable material and polluting material, subsequently removed, the other is made of recyclable materials exploitable on the market.
- The next phase of separation is used to select the secondary materials. This phase can be characterized by separation through machineries or by manual separation.
- When all the recoverable fractions are separated, the fraction used for production of RDF, which is triturated and pressed.

Anaerobic Digestion

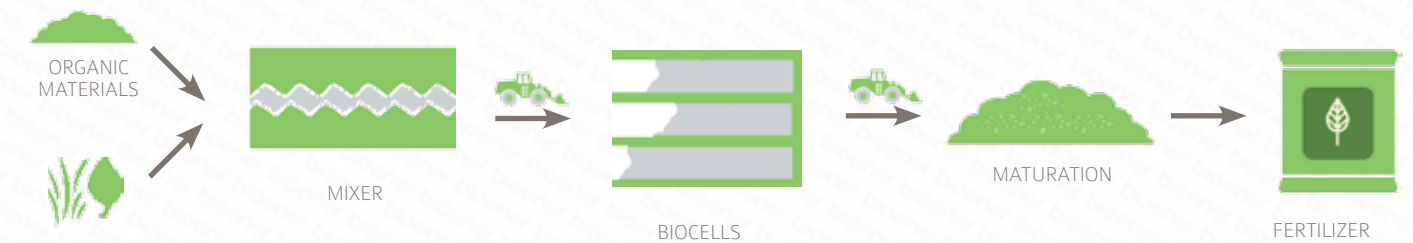


Bioener S.p.A. realizes plants for the treatment of organic waste and biomass through anaerobic digestion. These systems are addressed to public reality for disposal of the Organic Fraction of Municipal Solid Waste, to the industries, agricultural and zootechnical activities. Our systems have the advantage to enhance the Organic Fraction, with a production of electricity and heat by cogeneration or otherwise biogas and bio-methane and the production of a high quality stabilized compost.

PLANT DESCRIPTION:

- The organic fraction is pre-treated through a separation system and by biosqueezing before being loaded into the anaerobic digester.
- The anaerobic digestion process consists in the degradation of the organic substance by bacteria in the absence of oxygen. The process produces the biogas and digestate.
- The biogas is collected in the gasometer and partly sent to a cogeneration system for the production of electrical and thermal energy, partly sent to upgrading system to produce biomethane.
- The digestate is sent to a solid / liquid separator by centrifuge; the liquid fraction is partly purified while the solid part is for the composting treatment.
- The composting process happens in the dedicated sections to the preparation of the mixture to be composted, the biocells for accelerated maturation, the final maturation and the refining of the high quality compost.
- The upgrading of biogas consists of a desulfurization system, a compressor, a scrubber to remove the ammonia, a water and CO₂ removal system.

Composting

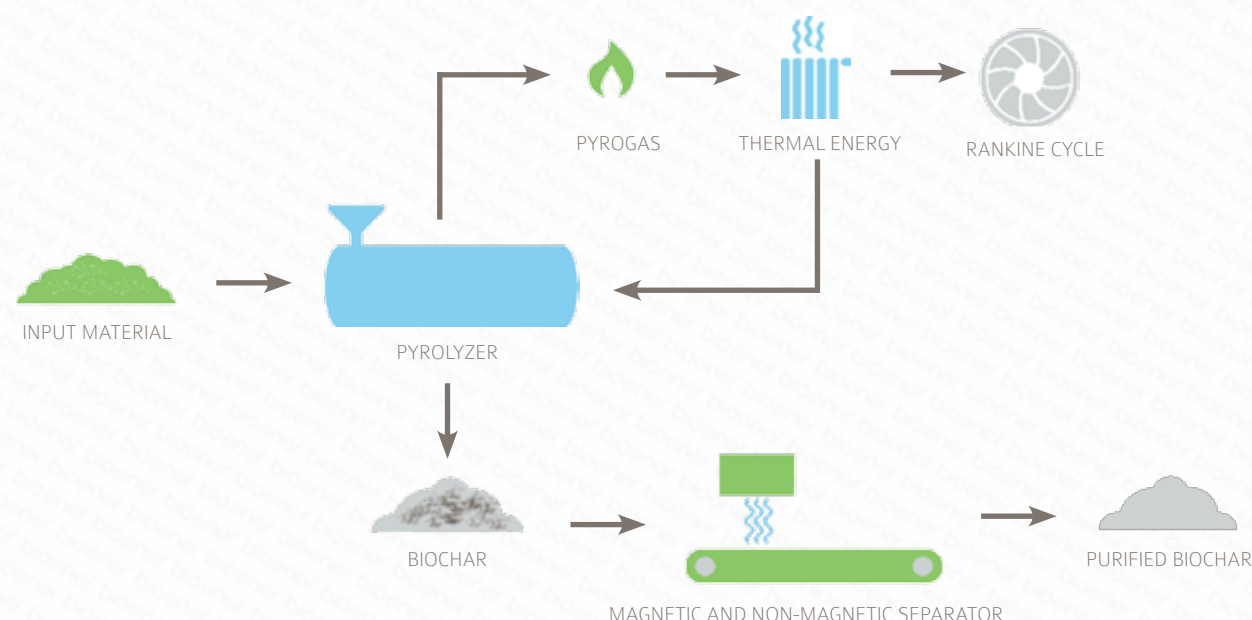


Bioener S.p.A. realizes composting plants to treat the Organic Fraction of Municipal Solid Waste, the Putrescible Organic Fraction and green.

PLANT DESCRIPTION:

- Biomass arrives to the mixing section.
- Mixer prepare the composting mixture to guarantee the quality of the mix, the effectiveness of the maturation processes, the convenience of the operations and the optimal management of the required green structuring.
- The mechanical shovel loads the biocells for accelerated maturation. The design of accelerated maturation section has high modularity and high theoretical residence time to guarantee the optimum completion of operations.
- At the end of the accelerated maturation period, the material is extracted from the bio-cells through mechanical shovel and conferred to the final operations.

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

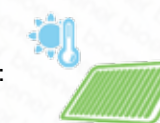
Bioener S.p.A. designs, develops and manufactures equipment for the solar energy recovery from the photovoltaic and solar-thermal technology. The plants are made either as stand-alone structures and in integration with other bio-energy plants.

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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