YOUR WASTE
OUR RESOURCE.
OUR TECHNOLOGY
YOUR ENERGY.

SEBIGAS

COMPANY PROFILE

2009, JANUARY 1ST SEBIGAS becomes part of S.E.C.I. Energia, the sub-holding company of the MACCAFERRI INDUSTRIAL GROUP, a business corporation active since 1879 around the world in a range of industrial sectors that provide products, services and technologies among the most advanced on the market.

2009 TO 2012 SEBIGAS strengthens its presence in Italy, constructing 37 plants in 2012 alone.

2013 SEBIGAS moves headquarters and builds an in-house biological research laboratory to further develop its expertise and create a more competitive and flexible response to customer requirements.

2013, OCTOBER 4TH SEBIGAS initiates a process of internationalisation with the sealing of the joint venture SEBIGAS UAC in Thailand.

2014 SEBIGAS expands into Brazil with the establishment of SEBIGAS do Brasil. Maintaining its own technological profile, SEBIGAS do Brasil develops innovative, high-efficiency solutions for the industry of sugar and bioethanol production.

2015, APRIL 1ST AGRIPOWER is founded as a spin-off of SEBIGAS. The company is focussed on the management and maintenance of biogas plants across the country.

2015, OCTOBER 1ST SEBIGAS becomes a division of EXERGY, society of the MACCAFERRI INDUSTRIAL GROUP operating in the renewable energy sector, giving rise to an even more competitive organisation on the market. The merger enhances the technical know-how, financial potential, competences and long-held experience of the two companies operating in all major markets around the globe.

2017 With the success achieved in the European market thanks to its products SEBIWASTE and AGRISEBI, SEBIGAS becomes part of the sub holding SECI Energia and no more a division of EXERGY, to reach higher goals in the international biogas sector.

2020, JUNE 24TH SEBIGAS is acquired by the Chinese TICA GROUP.

SEBIGAS was established as a company specialising in the **DESIGN OF BIOGAS PLANTS.** Recognised quickly as having great potential, the company has been acquired in 2020 by the Chinese TICA GROUP. The goal of SEBIGAS is to offer agricultural, industrial and municipally-owned enterprises innovative turnkey solutions for the production of sustainable energy.

Today SEBIGAS offers **INTEGRATED SOLUTIONS** to meet the widest-ranging demands of the market. Financial strength, technological expertise and flexibility in execution with a focus on research and development in the field of biology and engineering are the strengths that characterise SEBIGAS products.

SEBIGAS operates either as an **EPC CONTRACTOR** for the construction of turnkey plants and provides technology and engineering in the role of **TECHNOLOGY PROVIDER.** It also offers project financing, plant maintenance, biological consulting and all ancillary services for the full development of a project, from the embryonic stage to full execution.

WHAT IS BIOGAS

BIOGAS IS PRODUCED THROUGH A PROCESS OF ANAEROBIC DIGESTION OF A RANGE OF ORGANIC SUBSTRATES DERIVING FROM AGRICULTURAL, LIVESTOCK AND INDUSTRIAL SUPPLY CHAINS

Anaerobic digestion is a natural biological process by which, in a temperature-controlled environment deprived of oxygen and aided by the presence of microorganisms, the biomass decomposes and releases biogas.

The biogas produced is a mix of gas, mainly composed of methane and carbon dioxide.

Input resources

The high flexibility of SEBIGAS technology allows the use of a wide variety of organic matrices in the anaerobic digestion process:

AGRICULTURAL BY-PRODUCTS: fruit and vegetable scraps, straw, tubers, leaves and collar, etc.

ANIMAL MANURE: pig, cattle, sheep, chicken, etc.

AGRO-INDUSTRIAL WASTE: from the production of coffee, sugar, ethanol, fruit juices, alcoholic beverages, dairy products, oil, rice and other cereals, tomato sauce, etc.

OFMSW: Organic Fraction of Municipal Solid Waste

ENERGY CROPS: maize, sorghum, triticale, oat, wheat, beet, Napier grass, etc.

SLAUGHTERHOUSE WASTE: fat, animal powder, paunch and stomach content, offal, blood, etc.

SEWAGE SLUDGE from municipal wastewater or purification plants

Output products

ELECTRICAL ENERGY AND THERMAL ENERGY: by means of the combustion of biogas inside a cogeneration system, electricity and heat are produced for sale to the grid or for industrial purposes.

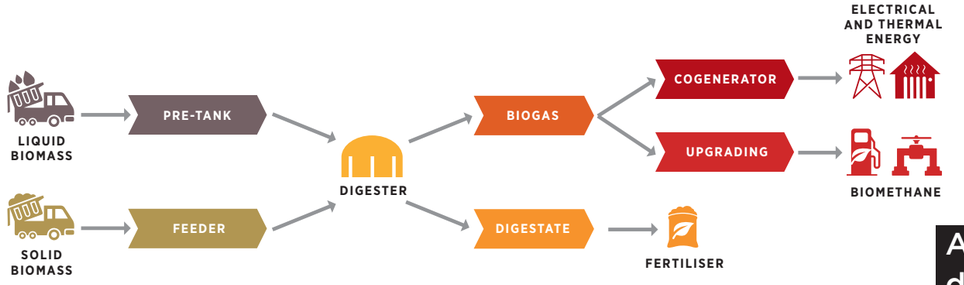
BIOMETHANE AND CARBON DIOXIDE: through biogas purification systems, the methane is separated from the carbon dioxide. The methane can be injected into the grid, sold for automotive fuel or for high-efficiency cogeneration; the carbon dioxide can be sold to chemical and/or food companies.

DIGESTATE: output of stabilised material from the plant featuring concentrated fertilising properties thanks to the inclusion of nitrogen, phosphorous and potassium. Digestate can be separated in solid and liquid fraction and used in a range of post-treatments to produce a high quality and economical fertiliser.

The efficiency of SEBIGAS technology transforms resources into electricity, heat and biomethane and products for agriculture and industry.

“INTEGRATED SOLUTIONS TO MEET THE WIDEST-RANGING DEMANDS OF THE MARKET”

TECHNOLOGY

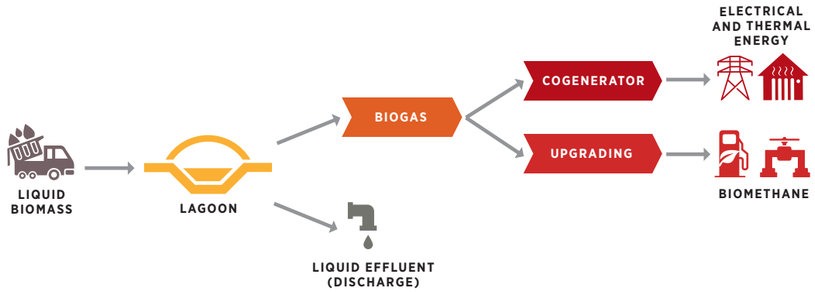


Anaerobic digesters

SEBIGAS provides CSTR (Continuous-flow Stirred Tank Reactor) biogas plants. This technology is based on a semi-continuous flow of fresh biomass that enters the reactors, mixed at controlled temperature, and exits as biogas and digestate.

PLANT DESCRIPTION:

- Organic substrates are fed to the digesters using a pre-tank or a feeder, depending on the type of biomass;
- The digester is the reactor where anaerobic digestion takes place. It is fed with organic substrates and is continuously mixed to ensure the optimum production of biogas. It also has a gasholder to guarantee a storage volume for the produced biogas;
- The biogas is used to produce electrical and thermal energy by means of a cogeneration system, or biomethane by means of a purification system;
- The output digestate can be used in agriculture as fertiliser.



Anaerobic lagoons

SEBIGAS provides a technology based on lagoons mixed with the capture of produced gas to treat:

- Liquid effluents from the processing of sugar, ethanol, palm oil
- Wastewater from tapioca or sago processing
- Pig liquid manure
- Other liquid organic waste.

PLANT DESCRIPTION:

- Liquid effluents are taken from the production facility and pumped into the lagoon;
- The lagoon is the reactor where anaerobic digestion takes place. Its content is mixed using a specific technology that guarantees an adequate production of biogas. The biogas is stored inside a gasholder;
- The biogas is utilised for the production of electrical and thermal energy by means of a cogeneration system or else biomethane by means of a purification system;

Result of the anaerobic digestion process is a reduction in pollutants of the incoming effluent and thereby a lower environmental impact while obtaining an energy benefit.

APPLICATIONS

SEBIFARM

TARGET	Livestock farms that have availability of agricultural waste and by-products.
ADVANTAGES	Transformation of wastes into energy source with increase in profitability for the enterprise.
PLANT SIZE	From small plants with installed power of 60, 100, 250 and 300 kW up to large-sized plants from 600 kW to over 2 MW, in replicable modules.

AGRISEBI

TARGET	Agricultural enterprises that have availability of by-products and energy crops.
ADVANTAGES	Transformation of products and by-products into an energy source with increase in profitability for the enterprise.
PLANT SIZE	From small plants up to large-sized plants from 600 kW to over 2 MW, in replicable modules.

SEBIMILL

TARGET	Mid- to large-sized enterprises in biofuel and food processing that have availability of solid or liquid organic wastes deriving from their own industrial production.
ADVANTAGES	Environmental: diminishes the quantity of wastes and their organic content. Energy: integrates the revenues of their core business with the sale of energy or biomethane.
PLANT SIZE	Large-sized plants from 1 MW up.

SEBIWASTE

TARGET	Municipally-owned enterprises, distribution chains, supermarkets and slaughterhouses.
ADVANTAGES	Disposal of the Organic Fraction of the Municipal Solid Waste (OFMSW) by converting it into a source of energy and investment.
PLANT SIZE	Large-sized plants from 500 kW up.

To date SEBIGAS has designed and built **OVER 80 BIOGAS PLANTS IN 3 CONTINENTS**. As a partner it is :

EFFICIENT

75.7

HOURS OF PLANT DOWNTIME

Implementing well researched solutions that improve performance and permit maintenance without plant stoppage, SEBIGAS installations function at their maximum power over 99% of the time, guaranteeing a stable and high energy production.

TAILORED

100%

CUSTOMIZED PLANT DESIGN

Boasting an extremely flexible technology adapted to each type of organic substrate, SEBIGAS can design ad hoc plants that respond to the specific requirements of the customer.

RELIABLE

830

MILLION EURO

The strength of a Chinese Group with tradition in industrial manufacturing, combined to the experience in the biological and technological R&D, makes SEBIGAS market leader in the design and construction of high quality biogas plants.

GLOBAL

73

BRANCH OFFICES

With offices around the world but its technological core in Italy, SEBIGAS is a reliable brand recognised internationally for its concrete solutions.

HEADQUARTER AND
REGISTERED OFFICE IN ITALY:
VIA SANTA RITA, 14 - 21057 OLGIATE OLONA (VA)

TEL. +39 0331 1817711 | SALES@SEBIGAS.COM | WWW.SEBIGAS.COM

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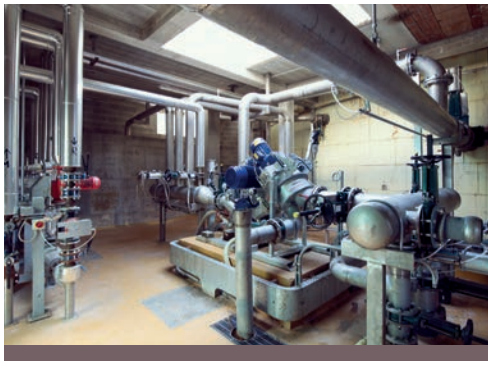
SEBIFARM

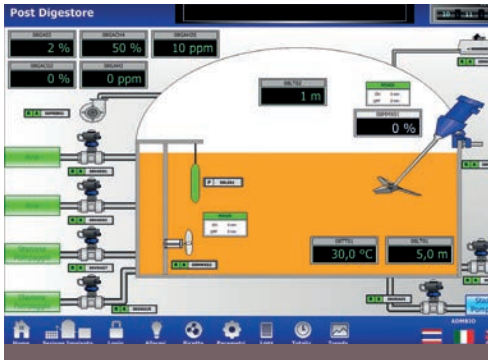
BIOGAS FROM 100 KW TO 2 MW FOR LIVESTOCK FARMS

The **SEBI FARM** line is the product of years of experience in the construction of large and small plants operating primarily with manure to exploit the waste from livestock breeding.

Each **SEBI FARM** plant provides the customer with:

- a **PRE-TANK**, which mixes the biomass uniformly and is equipped with specific technical features to avoid future maintenance to digesters due to the inlet of foreign materials.
- a **FEEDING SYSTEM** with high efficiency suited to all types of matrices; it shreds the straw and removes the inert materials contained in the stable manure.
- **DIGESTERS** sized and designed in-house by SEBIGAS to optimise gas production by maintaining a volume suited to the biomasses available or to the size of the selected plant.
- **SEBI BOX**: extraction system with no stoppage or loss of gas, which facilitates and speeds mixer maintenance.
- **SEBI SMART CONTROL** : customisable control system for easy management with respect to traditional plants; for example, it permits automatic flows from and for each tank of the plant without the need for an operator to be present.
- A **HIGH QUALITY** of materials and mixing solutions with a compact and customisable plant design.





SEBIGAS provided a biogas plant consisting of a feeding pre-tank and two digesters. The plant operates with only by-products of the farm, i.e., cow effluent and manure and 1% of waste from corn drying.
This is the first SEBIGAS plant developed using technology designed to separate matrices with a high content of inert materials before inlet into the digesters.

LOCATION

PIOSSASCO (TURIN)

INSTALLED POWER

635 kW

INPUT RESOURCE

COW EFFLUENT AND MANURE, WASTE FROM CORN DRYING

IN OPERATION SINCE

2012

LAYOUT

2 DIGESTERS

LOCATION

MORES (SASSARI)

INSTALLED POWER

100 kW

INPUT RESOURCE

COW EFFLUENT AND MANURE

IN OPERATION SINCE

2014

LAYOUT

1 DIGESTER

The solution designed by SEBIGAS is a biogas plant featuring only one digester designed to digest cow effluent and manure.
The resource fed into plant is 100% from livestock waste produced by the farm, signifying the virtual cycle of cow breeding.

SEBIGAS provided a biogas plant consisting of a feeding pre-tank and a mono-digester. The plant functions with only by-products of the farm, i.e., cow effluent and manure mixed with straw.
Design of the plant incorporated features intended to maximise hours of operation, limiting stoppage only for routine maintenance of the cogeneration system.

LOCATION

NIELLA TANARO (CUNEO)

INSTALLED POWER

300 kW

INPUT RESOURCE

COW EFFLUENT AND MANURE WITH STRAW

IN OPERATION SINCE

2015

LAYOUT

1 DIGESTER

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AGRISEBI

BIOGAS FROM 100 KW TO 2 MW FOR AGRICULTURAL ENTERPRISES

The **AGRI SEBI** line is the result of the SEBIGAS's consolidated experience in the biogas sector. The company strives to meet its goal of designing a plant suited to the requirements and potentialities of each and every customer.
This line is designed to valorise different types of organic matrices: **AGRICULTURAL BY-PRODUCTS** and **SILAGE** .

Usually, local regulations require the principal use of by-products, higher than 70% in weight with respect to the total of products fed into the plant.

"LINE DESIGNED TO VALORISE DIFFERENT TYPES OF ORGANIC MATRICES: AGRICULTURAL BY-PRODUCTS AND SILAGE"

The biogas plant, in operation in the Eridania sugar factory, allows the valorisation of by-products normally unused from sugar processing, such as sugar beet collar, leaves and pulp. The electrical energy produced is sold to the national grid, whereas the thermal energy recovered is designated for the sugar factory to perform its activity.

LOCATION

SAN QUIRICO (PARMA)

INSTALLED POWER

999 kW

INPUT RESOURCE

SUGAR BEET PULP, LEAVES AND COLLAR

IN OPERATION SINCE

2010

LAYOUT

2 DIGESTERS

LOCATION

BRESCELLO (REGGIO EMILIA)

INSTALLED POWER

999 kW

INPUT RESOURCE

MELONS, SUGAR BEETS, SILAGE

IN OPERATION SINCE

2012

LAYOUT

2 DIGESTERS

Plant facility that produces energy using silage in co-digestion with fruit and vegetable by-products that do not possess the characteristics for market sale, but from which excellent energy yields may be obtained. Downstream the cycle is concluded by reutilising the digestate on land intended for raising crops, thereby eliminating the use of synthetic fertilisers.

The SEBIGAS solution is a biogas plant featuring two primary digesters and a post-digester designed to digest pig manure and Napier grass, a tropical plant with low costs of cultivation and several harvests per year. The automatic feeding system minimises the need for the operator to be present in the plant.

LOCATION

CHIANG MAI (THAILAND)

INSTALLED POWER

1,487 kW

INPUT RESOURCE

NAPIER GRASS AND PIG MANURE

IN OPERATION SINCE

2014

LAYOUT

3 DIGESTERS

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SEBIMILL

BIOGAS FROM LIQUID EFFLUENTS IN ANAEROBIC LAGOONS

SEBIGAS developed **SEBI MILL**, a tailor made technology for the anaerobic digestion of by-products from:

- Sugar production (vinasse and filter cake)
- Bioethanol production (vinasse and filter cake)
- Palm oil production (POME)
- Manioca/Cassava/Tapioca/Sago palm processing
- Distilleries
- Pig farms

The process has been studied and optimised to ensure the highest transformation of the organic content of the liquid effluent into biogas, achieving a remarkable reliability rate, if compared with similar solutions.

SEBIGAS provides the design and construction of anaerobic lagoons with the best drainage, water-proofing and gas-tight solutions.

Anaerobic lagoons

TECHNOLOGY

- The anaerobic digestion of the organic content of the liquid effluents occurs through the biomass recirculation in an active sludge layer with controlled flow rates.
- Digestion volumes are adequate to the typical high effluent flow rate of industrial processes in order to ensure the biological stability of the anaerobic digestion.
- Effluent distribution system is fitted to perform the best contact between the active sludge and the fresh biomass in order to enhance the biogas production.

ADVANTAGES

- Simple technology with several references in operation.
- Low installation investments and reduced operation costs.
- Tailor-made solutions, based on the customer biomass availability.
- Safe operation of the plant, thanks to a specific design, developed to reduce risk in event of seasonal storms, typical of tropical areas.

SEBIGAS technology enables the effluents of the sugar and bioethanol industries (vinasse and filter cake from sugarcane processing) to be exploited by converting the organic matter into biogas and reducing their environmental impact.
The digestate output from the process has a pH suitable to its usage as fertiliser.

MILL CAPACITY

4,000,000 t/y OF CRUSHED SUGARCANE

DAILY FLOW RATE

10,000 m³/d OF VINASSE

EFFLUENT COD

25,000 mg/l

BIOMETHANE PRODUCTION

59,000 m³/d

INSTALLED POWER

10 MW

MILL CAPACITY

60 t/h OF FFB - FRESH FRUIT BUNCH

DAILY FLOW RATE

700 m³/d OF POME

EFFLUENT COD

60,000 mg/l

BIOMETHANE PRODUCTION

12,500 m³/d

INSTALLED POWER

2 MW

The palm oil industry can doubly benefit from the installation of SEBIGAS technology with a reduced pollution load of POME (Palm Oil Mill Effluent) and the production of renewable energy (electricity or biomethane).

The wastewater derived from cassava mills can be treated in the SEBIGAS anaerobic lagoons with biogas production. Besides being an energy source, the plant allows a reduction of the greenhouse gas emissions.

MILL CAPACITY

100 t/d OF CASSAVA STARCH

DAILY FLOW RATE

1,500 m³/d OF CASSAVA WW

EFFLUENT COD

15,000 mg/l

BIOMETHANE PRODUCTION

6,000 m³/d

INSTALLED POWER

1 MW

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SEBIWASTE

BIOGAS FROM 500 KW UP BY OFMSW

One of the current challenges for the biogas sector is to achieve more efficient transformation of the Organic Fraction of Municipal Solid Waste (OFMSW) for purposes of energy production. SEBIGAS can supply biogas plants fed by OFMSW by utilising a wet anaerobic digestion system specially researched by the in-house R&D Department capitalising on its technical and biological experience in the sector.

To better manage these substrates, heterogeneous and rich in impurities, SEBIGAS has implemented tailored modifications in the choice of the equipment and the design of the digesters.

Advantages of OFMSW anaerobic digestion

- Significant reduction of disposal costs, together with a decrease in environmental impact related to the waste management
- Sustainable production of electricity, heat and biomethane, together with the revenue related to its sale
- Production of a quality compost for agriculture purposes

"ANAEROBIC DIGESTION SYSTEM SPECIALLY RESEARCHED BY THE R&D DEPARTMENT"

Example of a biogas plant fed by OFMSW

OFMSW QUANTITY

25,000 – 30,000 t/y

BIOMETHANE PRODUCTION

250 Sm³/h

INSTALLED POWER

1 MW

Plant features

01 PRE-TREATMENT

The pre-treatment line removes unwanted elements from the mix and creates a slurry suitable for wet anaerobic digestion. In this area of the plant, specially designed equipment that is simple and easy to operate performs the following functions:

- Bag breaking (plastic and biodegradable)
- Sifting
- Inert material removal
- Sand removal
- Pasteurisation
- Homogenisation of the organic suspension

02 ANAEROBIC DIGESTION

Thanks to its highly specialised experience, SEBIGAS utilises the wet anaerobic digestion process as the technological core of its plants. Digestion occurs inside digesters that have the following advantages:

- Conical bottom to facilitate an easier removal of the sediments
- Effective mixing system
- Easy maintenance of all components

03 LIQUID FRACTION TREATMENT

The fermented substrate exiting from the digester is sent to the dehydration stage (separation solid/liquid).

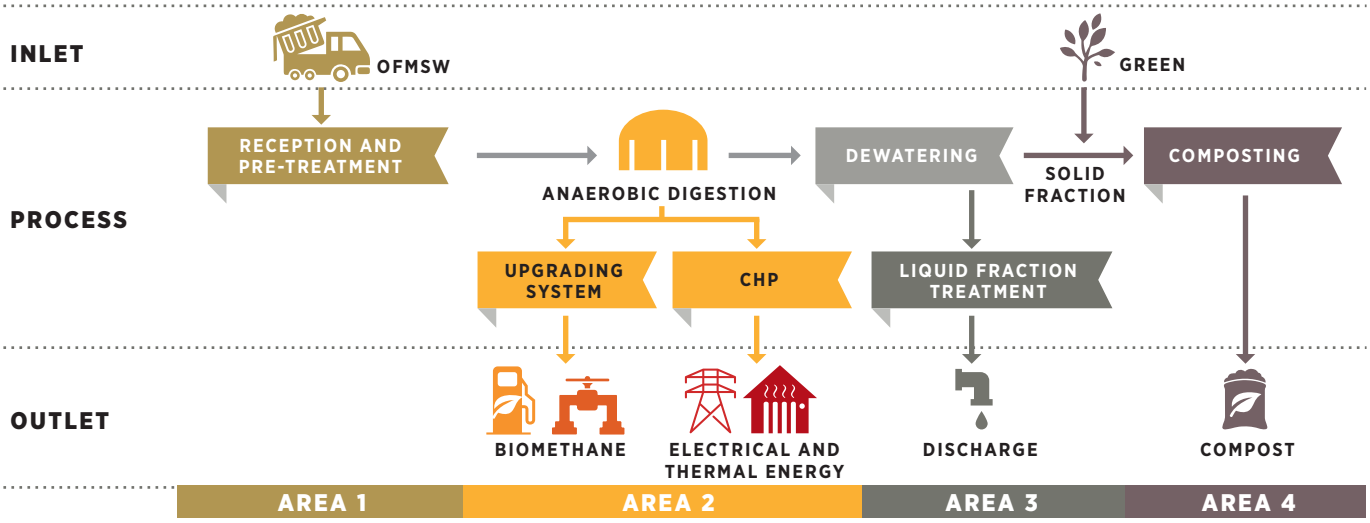
Through a series of stages including aerobic biological treatment, membrane separation treatment (ultra-filtration and osmosis) and evaporation, a clean waste adhering to stringent industry standards may be obtained.

The various technological steps, taken singularly or in a series, allow a reduction of volumes, the capture of excess heat, in addition to significant savings in disposal costs.

04 DIGESTATE COMPOSTING

The separated solid fraction is mixed with lignocellulosic material (green) followed by activation of the bio-oxidisation process. During this approximately 20-day process, the material is periodically turned and maintained in aerobic conditions to ensure that the biological stabilisation of the biomass is completed.

When the bio-oxidisation process has concluded, the material is taken and the maturation phase starts. The material is later stored in heaps in preparation for its end use in agriculture or to be packaged.



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