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# BTS Biogas Srl/GmbH



# Vision

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- Contribution to the **environmental protection**
- **Energy** generation in a complete and natural cycle (through the fermentation of biomass)
- **Satisfaction** of our clients
- Highest **quality**, continuous **innovation** and **high profitability** of our plants
- Our corporate activity is characterized by a sense of duty and **sustainability**

# General Information



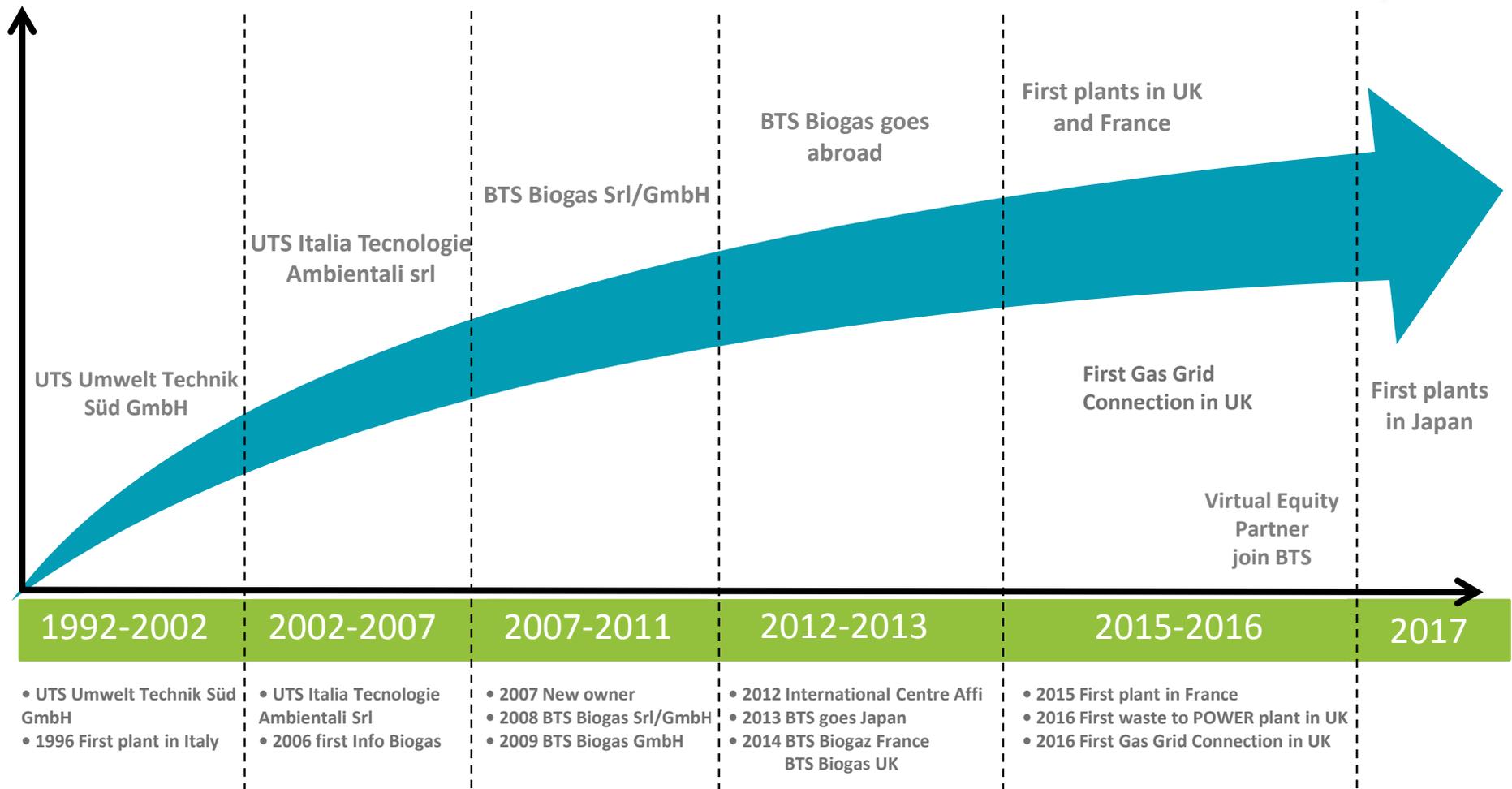
- **Headquarters:** Bruneck (South Tyrol) - Italy
- **Headcount:** 80 (biologists, technicians, chemists, agronomists, developers)
- **Products:** Modular biogas plants, capacity 25 kW to 1.5 MW+
- **Plants:** 190 (total capacity 160 MW)



Also in 2016 BTS Biogas Srl/GmbH has obtained the certification of its quality system.



# BTS Biogas: a Brief History



# Our Company



**Logistics & International Training Centre**  
Affi (VR) – Italy  
800 m<sup>2</sup> offices  
3500 m<sup>2</sup> warehouse  
18500 m<sup>2</sup> surface



**METANlab - Affi (VR) Italy**  
First biogas dedicated biogas laboratory in Italy

Here we're able to optimize the seed, the harvest, the silage and the biochemical operation of the biogas power plants of our customers



# Helping the Environment



- ✓ Through the power plants themselves
- ✓ Compensation for carbon emissions in the context of business air travel



- ✓ Driving innovation: company vehicles powered by methane



- ✓ Conversion from natural methane to a BIOmethane filling station
- ✓ And more to come...

# BTS Biogas Worldwide



# Plants & Products

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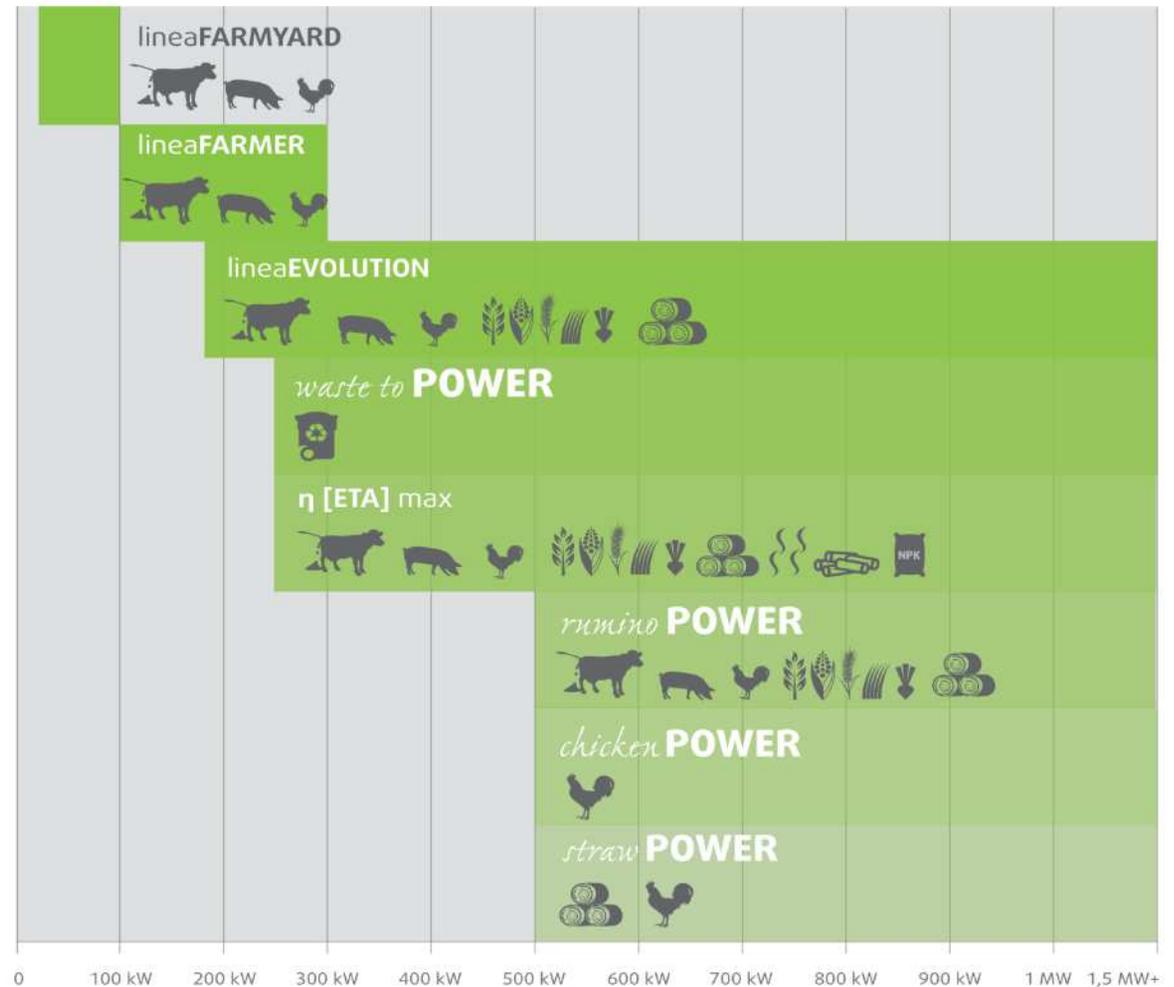
- ✓ Turnkey biogas power plants (modules from 50 kW up to 1.5 MW+) which can flexibly be combined and multiplied
- ✓ Possible use of various types of biomass
- ✓ Customized solutions (for the farmers, industrial agronomists, communities and investors in many countries)
- ✓ Software development for our customers

# Our Plants: from 25 kW to 1.5 MW+

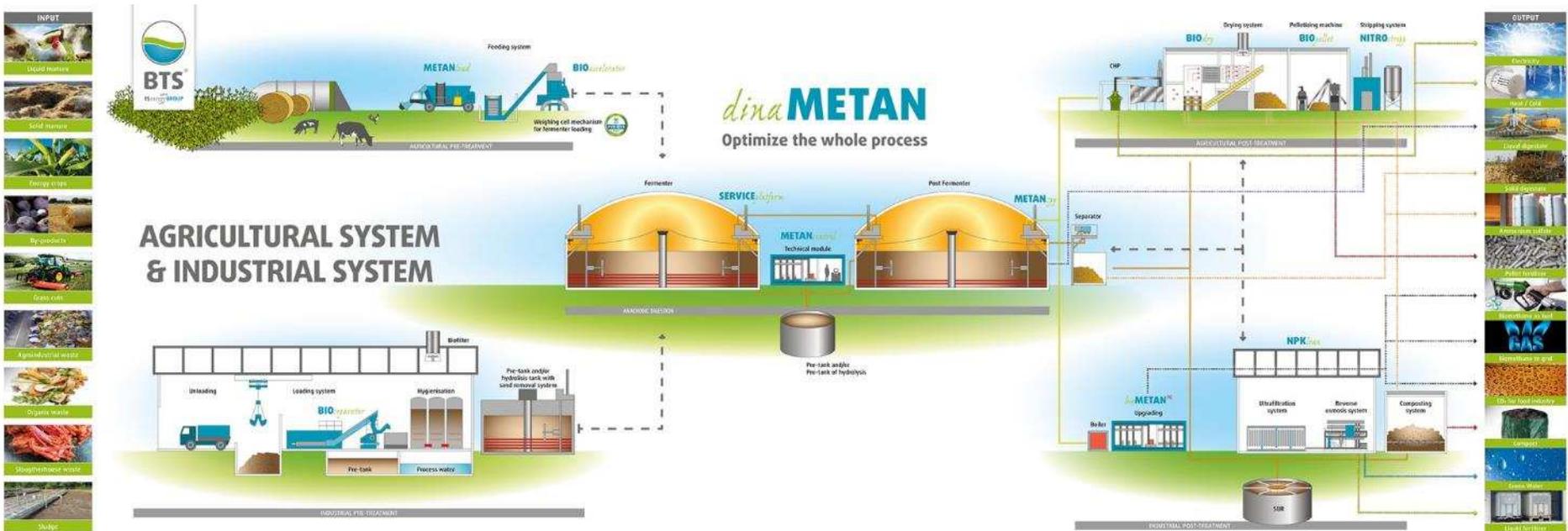


From small farms  
to big harvest  
and compost centres

From breeding farms  
to municipal companies



# Our Modular Systems



# Developed products - Pre treatment



Extrusion, compression, pressure, impact or temperature: the various types of BIOaccelerator break down the cell walls of the biomass using various principles to exploit the substrates which, otherwise, would not be used for the anaerobic digestion and to maximize the yield in the production of biogas. BIOaccelerator is the perfect technology to upgrade or to repower existing plants. The BIOaccelerator can process a variety of substrates. By breaking up the cell structure of the input material and the related enlargement of the contact surface for bacteria, also difficult, hardly fermentable materials can be used in biogas power plants. This means greater flexibility in the choice of input substrates and allowing operators to use inexpensive, seasonal produce.

The methane yield increases, thereby saving biomass and allowing the biogas power plant to be operated more profitably.



Accelerated fermentation through the biomass defibrator



Accelerated fermentation through the extruder



Accelerated fermentation through the impact reactor



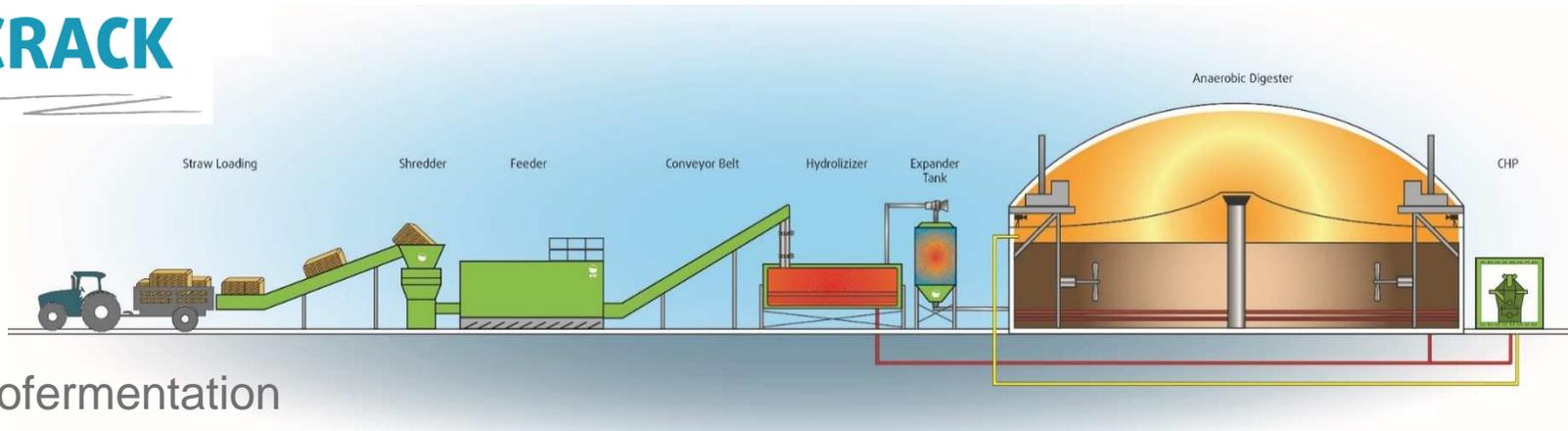
A powerful shredder for bio-waste



# Developed products - Pre treatment

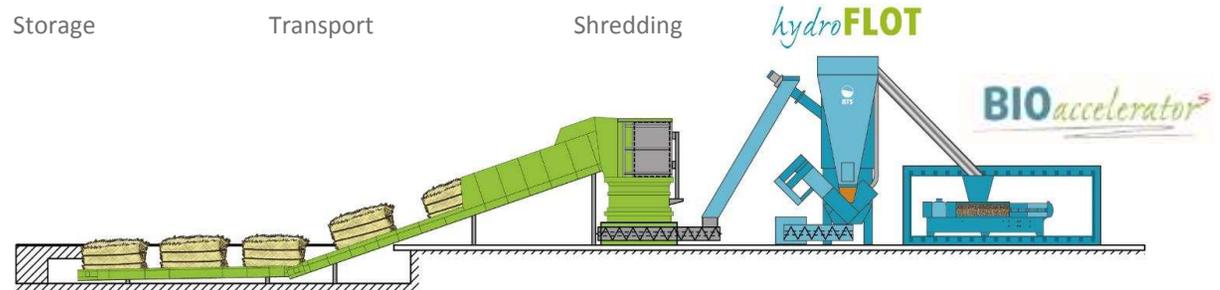


## *fibre*CRACK



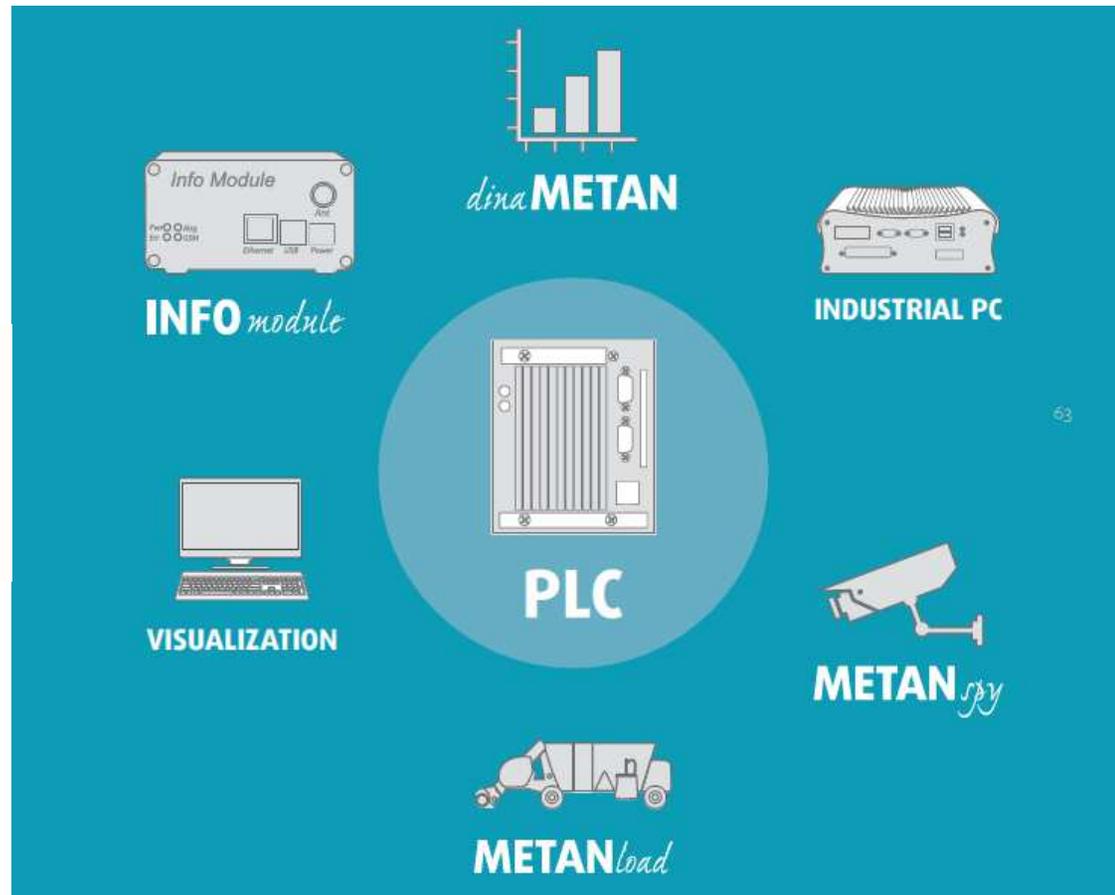
- ✓ Monofermentation
- ✓ No traditional high quality biomass (e.g. maize)
- ✓ Low and not valorized biomass (e.g. straw even with bad quality)

## *acq*EXTRUSION



# Developed products - Control

**METAN** *control*



# Developed products - Control



## **METAN***load*

The METANload system is a development by BTS Biogas. A clever calculation software with integrated hardware components, which helps the operator to implement optimal biogas plant feeding.

## *dina* **METAN**

Developed by BTS Biogas, the software is able to optimise the feeding recipe from a biological, technical and economic point of view; providing a clear picture of the biological dynamic of the system (hence the name dinaMETAN), the software is therefore able to predict any problems and take timely and appropriate countermeasures.

### **PLC and INDUSTRIAL PC**

BTS Biogas plants are managed by extremely flexible and reliable PLC (Programmable Logic Controller) technology. The PC installed on BTS Biogas plants is an industrial type PC, the only standard able to ensure the reliability required in difficult environmental conditions like those in which biogas power plants normally operate.

## **INFO***module*

Thanks to the INFOmodule developed by BTS Biogas, the management staff can verify and intervene on the plant at any time and remotely. In the event of anomalies, the system sends voice alerts by telephone, classified by priority.

## **VISUALIZATION** and **METAN***spy*

The system is equipped with a complete and intuitive display system for simple and fast plant management. With METANspy you can have visual control (remotely and in real time) of the most sensitive parts of the plants such as, for example, the inside of the fermenters or the pre-treatment load.



# Developed products - Control



## PLUG&produce TECHNICAL MODULE

The technical module developed by BTS Biogas acts as a technical centre for biogas power plants, it is compact and modular, with standard measurements and requires less investments compared to the common installation inside the building. This technology also leads to cost savings in terms of installation times and therefore assembly costs. The module is designed and tested in-house, thus ensuring greater reliability and it comes in several customisable sizes, both for new plants and for existing plants. The module is fitted with the gas measurement instruments, the desulphurisation blowers, the system for the distribution of heating and pumps, the air conditioning system, the running water distribution system and, possibly, even a heat exchanger fitted on the roof. The start-up and control instruments are located in another separate room.



## service BOX & service PLATFORM

- Simple and safe maintenance of the agitator
- Safe operation and maximum workplace safety during maintenance
- Prevents biogas release to atmosphere thanks to the stainless steel skirt inside the tank
- No requirement to empty the tank or halt biogas production during maintenance
- Inspection porthole with light located inside the tank
- Monitoring camera with cleaning nozzles for checking inside the fermenter
- The height and direction of the agitator can be regulated to allow precise agitation and prevent crust formations



# Biology



**METAN** *lab*

The first laboratory for biogas in Italy

With our laboratory, the first one in Italy dedicated exclusively to the biogas world, we want to develop a new generation of biogas power plants, to ensure long-lasting, safe and profitable operation. By following scientific methods, we collect empirical values that describe the production processes and biogas efficiency in various conditions. Thanks to this data we are able to constantly improve the design and management of the biogas power plants, by entering it in the dinaMETAN database.

## **METAN** *max*

The best thing to manage a biogas power plant is to get advice from experts with years of experience in biological and economic optimisation. BTS Biogas offers the package best suited to the specifications of the biogas power plants.

METANmaxn

Solutions for biogas power plants based upon metal salt and additives

METANmax+

The product METANmax plus is composed of microelements and aids the enzymes and bacteria contained in the liquid of the biogas power plant fermenter to balance out a possible lack of such elements.

## **NIRS** System for the analysis of biomass values

- Measurement of 22 biomass parameters, including: SS, SSO, starch, XP, ADF, NDF, iNDF and XL
- Creation of calibration curves by the METANlab staff
- Analysis of corn, gramineae, dry forage (e.g. hay) silage
- Analysis of liquid digestate
- Various positioning possibilities (on BIOaccelerator, on self-propelled machine, on shovel, in fermenter...)



# Developed products – Post Treatment



## BIOdry

Drying is the most efficient method for using the excess heat from the biogas plant and for transforming slurry into a precious fertiliser. This process produces a solid product and a liquid product: the dry matter (BIOdry) and ammonium sulphate. The drying process optimises the biogas power plant by giving the plant an additional source of income. Thanks to the high organic content of the fertiliser the soil quality is improved and there is a lasting effect on the components.

## NITROstripp

Stripping is a highly efficient system for solving the nitrogen issue. This method is used particularly in biogas power plants that are fed with a lot of slurry. The stripping process can also be carried out without adding chemical additives. The product achieved is ammonium sulphate.

## BIOpellet

The technology provided by BTS Biogas for digestate pelleting is an important step to make the most of all energy and agricultural resources of the biogas power plant system. The resulting material from the anaerobic digestion process can in fact be pelleted with considerable advantages in economic, management and agronomic terms. The process involves loading the hopper with the material previously dried with BIOdry; after a route that involves a mill, various stages of filtering, pressing, sieving and fortifying, the pellets can be packed in Big-Bags or 15/25 kg sacks.

## BIOfire

The technology offered by BTS Biogas gives the possibility to alternate the production of digestate pellets with that of wood pellets BIOfire, resulting in flexibility and return on investment.



# Biomethane



Biogas generated by BTS biogas power plants can be used not only to produce electricity, heat, cold and fertilizer but also biomethane. Through biogas upgrading (biogas processing), methane is separated from all other gases, chiefly CO<sub>2</sub>. This upgraded gas discloses two new possible applications, on the one hand the typical supply into the existing methane network, on the other the use of biomethane as fuel for vehicles. Moreover 100% pure CO<sub>2</sub> (bioMETANm) can be produced, a gas which can be used especially in the food industry. Biogas can be upgraded either with bioMETANw, a process involving pressure water washing, or with bioMETANm, i.e. by means of membranes. Pressure water washing proves profitable to large size plants (>2MW), whereas membrane processing is rather used in small and medium plants.



## **bioMETAN<sup>MC</sup>** Process employing membranes

In this process the biogas is first purified from hydrogen sulfide and then brought to higher pressure with a compressor. The methane is then separated from CO<sub>2</sub> by means of membranes. A clever sequence of separation stages combined with CO<sub>2</sub> recovery allows to separate 100% of the methane. The recovery of CO<sub>2</sub> facilitates the 100% methane separation from biogas and subsequently provides food-safe CO<sub>2</sub>. To achieve these goals, after going through the membrane separation the part containing CO<sub>2</sub> is further compressed. The CO<sub>2</sub> is subsequently liquified, while non-condensable gases are separated within a downstream separator and conveyed again to the membrane unit.



## **bioMETAN<sup>W</sup>** Pressure water washing process

This process consists in dissolving CO<sub>2</sub> and hydrogen sulfide in water and separating them from the biogas. The biogas is brought to higher pressure and cleansed with counterflow water in a packed column. At this stage the water absorbs the “unwanted” gases, whereas the purified gas from the column is drained, dried and made available for further use, i.e. conveyed into the gas network or directly employed. The water containing unwanted gases is then led into a flash-column where it undergoes a tension reduction. In the following step, CO<sub>2</sub> is extracted in another column by means of air, and the purified water returns to the washing column. Thanks to this simple process, it is possible to avoid using chemicals and achieve an effective biogas pureness. Thermal energy can be derived at different points in the system and used to heat the tanks of the biogas plant.



# Services



To ensure optimal and constant operation of the high-tech systems, BTS Biogas has always been investing in the ongoing development of its support service. A team of experts are indeed provided to our customers 24/7, 365 days a year. Full support – biological, technical, automation assistance – maximises profit by ensuring reliability and optimal technical and operating conditions. Customers can therefore count on a highly specialised team with guaranteed extremely quick intervention times on all the territories in which the service is active.

## Repowering

- BTS Biogas offers tailored solutions for maximum
- technical, biological and economic efficiency
- in existing plants with different standards to
- BTS Biogas plants. Through a standardised
- assessment and design programme (check-up)
- all the options for improvement are presented
- in order to carry out the most appropriate
- repowering process, to achieve the maximum
- efficiency of the biogas power plant.



## Biology

BTS Biogas provides professional tailor-made support for the biogas production system. Customers can choose between different solutions and adapt the support to their needs. Analyses of the biogas treatment system carried out on site by BTS Biogas' experts and exhaustive assessments of the biologists in the METANLab ensure a safe activation and optimal operation of the system.

## Technology & Automation

Thanks to its exhaustive warehouse, located in a strategic position, spare parts can be delivered and mounted in a very short space of time.

Also the automation system offers a 24/7 support service by constantly monitoring all the systems being serviced, identifying and solving issues with specific standards used to define priority and seriousness, as well as providing intervention orders to the various departments with a ticketing system.

# Plants Performance



Name of the Plant	Biological Efficiency	Name of the Plant	Cost of Ration	Name of the Plant	Use of By-products	Top 10 Average			Top 20 Average		
						BE %	CoR €/kWh	UoB %	BE %	CoR €/kWh	UoB %
1 Laser Industries	93,77	Chiesa	6,50	Chiesa	63,38	91,42	8,51	44,05	89,99	9,25	34,89
2 ERP	93,76	Grazioli	6,70	Mingoia	62,52						
3 Valandro	92,34	Martinoni	7,67	Wood Energy	55,68						
4 Maleo	91,37	Mingoia	7,70	Rapolano	47,86						
5 Zambelli	91,15	Bagnacavall o	8,84	Pro Energia	44,86						
6 San Daniele	91,03	Pasquali	9,06	Narni	35,49						
7 Pro Energia	90,54	Federici I	9,59	Scattolin	34,03						
8 Enersab	90,41	Chiesone	9,61	Canino	34,02						
9 Montone	90,02	Metagri	9,66	Mezzanato	31,56						
10 Ciocca	89,81	Rusta	9,74	Barbieri	31,06						
11 Foroni	89,45	Rinaldi Luca	9,76	Agricola 2000	31,05						
12 Cairo	89,43	Martinelle	9,77	Grazioli	30,84						
13 Ghione	89,18	MZ	9,83	Chiesone	29,58						
14 Agricola 2000	88,49	Valandro	9,90	Sant'Elena	26,73						
15 Genola	88,48	Manerbiese	9,95	Green Energy	25,12						
16 Poggio Energia	88,46	Cazzola II	10,09	Nicolasi	23,69						
17 Smedile	88,31	Cazzola I	10,09	San Vittore	22,63						
18 Italia Energia	88,24	ERP	10,10	San Daniele	22,62						
19 Martinelle	88,03	Mezzanato	10,17	Pasquali	22,60						
20 Tonoli	87,56	Smedile	10,18	MZ	22,47						

# More than 200 references



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