



EnviWaste – Value from Waste

Manufacturing partner for:



www.a3-usa.com

EnviTec Biogas



Waste materials and by-products are accrued in conjunction with every single manufacturing operation, such as enterprises associated with the food and restaurant sector, the fuel industry, the cosmetics sector and the animal husbandry sector. However, the quantity of organic waste produced by the citizenry is also significant for communes – about half a tonne per year per person. In addition to saving you the trouble of disposing of your residual products, our biogas technology also makes it possible for you to convert the waste into useful energy.

Waste materials must be managed in manufacturing operations.

Waste materials generated by manufacturing companies can emerge in the form of remainders from slaughterhouses, glycerine, mash from the ethanol industry, by-products from the biofuel industry, malt spent grains from breweries or residues from the animal husbandry sector etc. These residual materials must be disposed of properly, which involves certain costs. In this regard, you could use the waste to generate electricity, heat or bio-natural gas in a profitable manner.

Sustainable use of waste materials is advantageous for the industrial sector.



The potential of waste materials usually goes unnoticed in the value chain of a company. The biogas technology targets the sustainable utilisation of these potentials. In addition to producing economic advantages for your company, this also results in a reduction of environmental pollution.

SUBSTRATES WITH HIGH ENERGY CONTENTS:

Waste materials and by-products from

- Slaughterhouses
- The food-production industry and the food-processing industry
- Supermarkets, e. g. spoiled food products
- Breweries (malt spent grains)
- Restaurants
- Juice production
- The ethanol industry (mash)
- The biofuel industry, e. g. glycerine
- Animal husbandry
- Purification plants: Sewage sludge
- The animal feed industry

Cost pressure – Energy prices

The energy costs are rising steadily in the industrial sector. The requirements put forth on companies are also growing simultaneously: In addition to strengthening their competitiveness in domestic and international markets, the companies also have to strengthen and nurture their brand image. The smart integration into the supply strategy of electricity and heat generated from biogas results in low and consistently stable energy costs, a lower dependency and a significant boost to the company's image.

Boosting your image through a healthy CO₂ balance

Would you like to increase your competitiveness and simultaneously improve your environmental performances? If so, you should make use of these potentials. Thanks to the high energy yield in the EnviWaste plants, the required amount of fossil fuels undergoes a reduction, resulting in a considerable improvement in the CO₂ figures of production plants. This gives you an important competitive edge, as more and more consumers and companies are emphasising sustainable production when purchasing products.

Higher added value for communes



Communes must dispose of their waste materials in a proper and expensive manner, and thereby do justice to the most varied interests. Efficient utilisation of local resources reduces dependence on fossil fuels.

Furthermore, the income remains in the region in question and the citizens benefit from a promising and secure energy supply.

Waste materials can frequently become problematic for companies and communes, if the associated economic potential is not recognised.



← Even packaged waste can be used for biogas production following an automatic separation from its casing.

→ Energy-rich raw materials: Slaughterhouse waste, leftover foodstuffs, mucilages, distillation residues, glycerine etc.

→ → A biogas plant is particularly advantageous for energy-intensive companies that produce a large proportion of organic waste, such as food-production corporations.



→ From the point of view of breweries, draff is a residual product that is also a suitable and energy-rich material. Breweries can also benefit from the utilisation of the waste heat of the CHP unit.

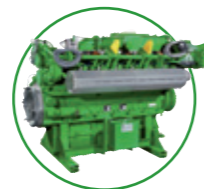
→→ Biogas that has been processed using membrane modules can be fed into the gas grid in the form of bio-natural gas. It can also be used as a fuel for in-house motors, for example.



In addition to solving your disposal problem, the conversion of waste materials into biogas also represents a lasting investment.

EnviWaste enables you to produce your own electricity and heat so that you will profit from enormous costs savings on the purchase of energy. If there is an adequate regulatory framework available, you can alternatively sell your energy to the grid as well as benefit from the options offered by the liberalized energy markets. Investing in the future market of renewable energy is doubly worthwhile: It lightens the burden on the environment and optimises your value chain. Make use of your untapped potential and invest in the future!

Separate energy from the CHP: Electricity, steam and heat



Biogas can be used as a source of electricity or to generate heat. After it has been processed into biomethane, it may also be fed into the gas grid.

The marketing of electricity is a business that offers long-term security –

no other renewable form of energy is as versatile and storable, while simultaneously being available throughout the year. In case of industrial utilisation, the heat that accrues in conjunction with the combustion process taking place in the CHP can be returned to the company in the form of process heat. This is particularly worthwhile for energy-intensive companies with high heat requirements. It makes it possible for such companies to save on heating expenses.

However, the waste heat can also be fed into the district heating grid. Since a CHP does not have to be operated at the site housing of the biogas plant, the heating of public facilities such as swimming pools or schools represents a useful and long-term utilisation of this waste heat, from the point of view of communes.

Processing biogas into bio-natural gas



Biomethane is as versatile as natural gas: It may be utilized in households or as a CO₂-neutral fuel. It can also be converted into electricity and heat.

Furthermore, biomethane can be used in a decentralised manner: The

utilization of the gas does not depend on the location of production, since biomethane is simply fed to the natural gas grid or bottled and transported to the location where it can be used best. The grid offers a simple and excellent storage solution, one whose scope far outstrips that of other energy storage models. This allows biomethane to be accessed at any time and also gives it a base load capacity which helps to stabilise the energy system.

Biomethane can also be provided as a fuel which may, for example, be used to facilitate motor vehicle transportation or the actuation of in-house motors.

Odour-free, natural fermentation residues for agriculture



If a biogas plant is operated properly, there are no odour nuisances since the produced gas cannot escape from the closed cycle. The fully fermented end product has a noticeably reduced odour after the fermentation process.

As high-nutrient fertilisers, these fermentation residues make it unnecessary for farmers to purchase expensive and pollutant mineral fertilisers.

Filtering and cleaning the digestate residues to form process water



Ultra-modern filtration technology makes it possible to further process the digestate. This procedure yields processed service water that can be used for the subsequent industrial process.



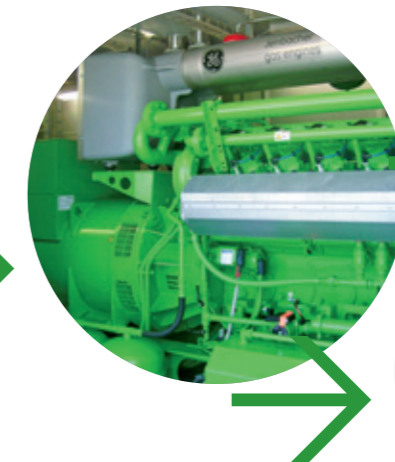
← ← Floating fat is stored in large silos after acceptance.

← In Herzberg/Brandenburg, a biogas plant is used to produce electricity and heat for an animal feed factory.

→ Thanks to the biomethane production, the processed biogas has the same characteristics as natural gas.



From waste to energy – An overview of the important process steps.



Waste materials from the industrial, business and agricultural sectors

Many different organic waste materials are well-suited for being used as raw materials for the production of biogas. When used in conjunction with the right technology as high-value substrates, food and restaurant waste, green waste, glycerine, slaughterhouse waste and botanical and animal fat can lead to an impressive income. In this regard, the advantage that residual materials have over other input materials which appear to be equally attractive from an energy-related point of view is the fact that these residues do not require any cultivation areas.

Unpacking and cleaning the waste materials

Even packaged waste can be used for biogas production following an automatic separation from its casing. It must also be cleaned, in order to ensure that it is harmless (from the point of view of hygiene) and is free of pathogens. Waste fermentation plants are subject to stringent technical requirements, since plastic packages and the like are non-recyclable and must be removed before the fermentation process is carried out.

Pre-processing and disintegration

In order to ensure that the raw materials are fermented in the best possible manner, they must be broken down to the highest possible degree. Our patented Kreis-Biogas-Dissolver optimally mixes and shreds the input materials to a fine dimension, thereby increasing the biogas output. Various other mixing devices ensure that substrates of varying consistencies can be fed in.

Production of biogas in the digester

In the heated and air-tight digester, the biomass ferments in conjunction with the production of methane, the so-called biogas. The resultant residual product, i.e. the fermented biomass, can be used instead of expensive mineral fertilisers as a low-odour, natural fertiliser in the agricultural or horticultural sector. The filtration of the fermentation residues can also yield process water.

Combustion of the biogas in the CHP

The biogas is incinerated in the combined heat and power plant (CHP), and electricity for which compensation can be obtained is generated. The accruing heat can either be returned to the respective company or fed into the district heating grid. The CHP can be regulated in terms of its utilisation. Consequently, it can correspond to various remuneration regulations and be complemented through other heating concepts.

Production of electricity, heat, bio-natural gas and fuel

Biogas can be used in a variety of ways: It can be used to produce electricity and heat for private residences, and it can also be used to supply public buildings or the selfsame manufacturing company. Apart from that, biogas can be channelled into the gas grid after it has been processed into biomethane. It can also be utilized as a fuel that may, for example, be used to facilitate motor vehicle transportation or the actuation of in-house motors.



← ← Increased efficiency by the use of optimized mixing technology: the Kreis-Biogas-Dissolver.

← Pasteurisation system, cleaning the organic waste so that it is hygienically harmless and free of pathogens.

→ The tanks receive liquid waste and the processed waste from the de-pack room.

→ → Separator system in Rogerstone, Wales.



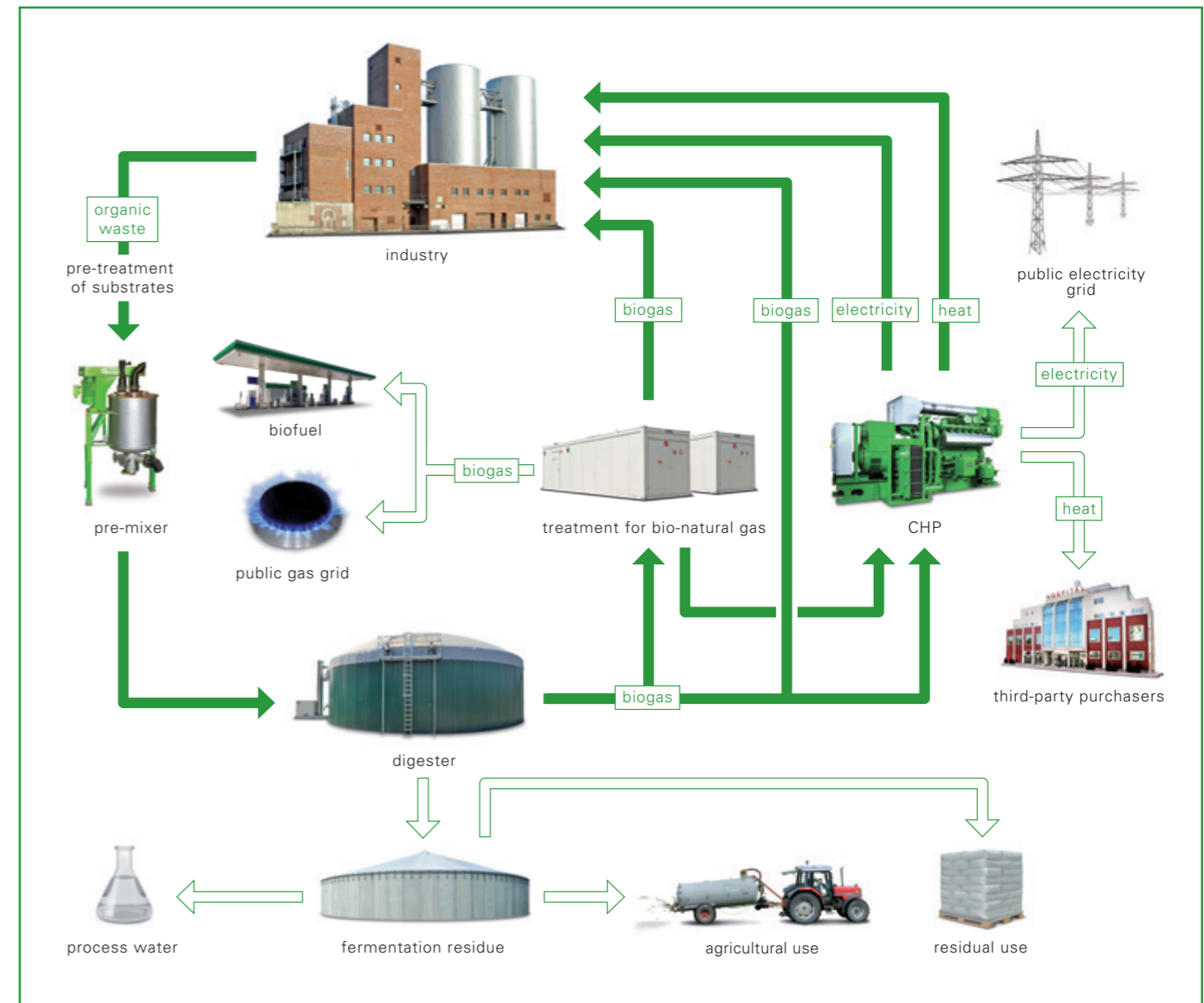
Our technology and experience – Facilitating successful investments.

In our capacity as an entity that serves as a supplier of all the respective individual process steps, we stand ready to assist you with our innovative and turnkey system technology, our thorough service portfolio and the several decades' worth of experience that we have gained in the industrial and agricultural sectors.

Each waste material requires special treatment, hardly any two industrial operations function in the same manner, all communes have their own characteristics and each country has its own raw materials and laws – the highest degree of flexibility has always been a pre-requisite in our domain. Our goal is to make sure you get as much as you can out of the collaboration, offer the most progressive technology on the market and deliver the smartest marketing concepts for your energy. Consequently, we have consistently managed to occupy a leading position in the global biogas sector.

We are one of the few providers in the market that can serve as a one-stop shop for all the respective stages, and can thus facilitate a successful and friction-free project:

| Project planning | Construction | Start-up | Service |
|--|--|--|--|
| <ul style="list-style-type: none"> – Planning of whole biogas plant – Survey – Permits – Contracts | <ul style="list-style-type: none"> – Turnkey construction – Contract management – Quality check – Function testing | <ul style="list-style-type: none"> Start-up support of biogas plants until expected target performance level is reached | <ul style="list-style-type: none"> – Biological service – Technical service – Assurance |



Several companies and communes make use of the financial assistance that the political system provides for the realisation of the energy-related potential of waste management or just benefit from producing their own energy. Since the year 2002, we have developed technologies for biogas plants that produce impressive income from food waste, glycerine, slaughterhouse waste and fats. Across Europe, we have already built over 30 EnviWaste facilities, with a total capacity of 31.8 MW.

Energy from food waste at Premier Foods in Wales

LOCATION Rogerstone/Wales
CAPACITY 499 kW_{el}
IN OPERATION SINCE 03/2011
INPUT MATERIALS Food waste
FEATURES The ready-meals factory derives its energy supply from food waste.

The plant is located next to the Rogerstone Park ready-meals factory of RF Brookes, a subsidiary of food company Premier Foods. Its purpose is to generate energy from the food waste produced by the company. The biogas plant supplies about 10 percent of the electricity required for food production in the factory. In the process, the biogas plant contributes to an annual CO₂ savings of approximately 8,500 tonnes. In addition, the former costs for disposal of the waste have been eliminated.

Unpacking and cleaning of waste materials in Ribeauvillé, France

LOCATION Ribeauvillé/France
CAPACITY 1,4 MW_{el}
IN OPERATION since 01/2012
INPUT MATERIALS Cattle slurry, renewable resources, waste materials from the food industry
SPECIAL FEATURES Separate hygienisation plant with a capacity of 25,000 t/a

A successful example of the flexibility associated with input materials is the 1415-kW plant owned by René Van der Meijden, Philippe Meinrad and Noël Adam of Agrivator Énergie in Alsatian Ribeauvillé. The plant uses cattle slurry, renewable resources and waste materials from the food industry. In order for the organic waste materials to be transformed into valuable substrates, food that is still packed must first be unpacked and cleaned in a separate system. With a total capacity of 25000 t/a, the EnviTec hygienisation plant offers enormous flexibility. Thanks to the biogas plant, heating contracts have already been concluded with a casino and hotel complex. A neighbouring housing development is also supplied with heat from the plant.

Heat and electricity for L’Oreal in Libramont, Belgium

LOCATION Libramont/Belgium
CAPACITY 3,2 MW_{el}
IN OPERATION since 07/2009
INPUT MATERIALS Maize, food waste, fats
SPECIAL FEATURES The plant in Libramont is unique in that it completely utilises the generated electricity and the heat that has been transformed into vapour within the factory itself.

The industrial biogas plant that was erected and is operated by EnviTec was built in the immediate vicinity of the L’Oréal production plant in Libramont. The input material is biomass supplied by the neighbouring farmers and the food industry. The biogas secured by L’Oréal is used to facilitate the operations of three combined heat and power plants, which produce green thermal energy as well as CO₂-neutral electricity. This biogas plant is unique in that the generated electricity and the heat (that has been transformed into vapour) are fully used within the factory itself. Apart from that, more electricity is generated than the production plant needs – the surplus energy, which fulfils the requirements of about 4000 households, is fed into the public electricity network.

Smart investments and innovative concepts – Successful industrial projects in the global marketplace.



←← In Wales, the food factory Rogerstone Park uses its biogas plant to supply itself with energy.

← In Ribeauvillé (France), a housing estate and a casino and hotel complex benefit from the waste heat of a biogas plant.

→→ The L’Oreal cosmetic unit in Libramont receives electricity and process heat from the biogas plant.



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