



Green energy for demanding customers



– excellence in biogas

Biogas has many applications



1



2



3



4



5



6



7

Biogas is produced whenever organic materials decompose in an anaerobic (oxygen-free) digestion process. This is the most efficient way of extracting energy from wet biomasses.

1 Manure

When spread onto fields untreated, manure represents a challenge to the environment. Once manure has been treated in an Xergi biogas plant, it is in fact an excellent fertilizer.

2 Agricultural crops

Almost any kind of crop can be used to produce biogas, regardless of whether they are energy crops grown for this specific purpose or are just residue and waste.

3 Waste from food processing

Waste from food processing often go to land-fill sites. Their energy content is often high and this can be exploited effectively using biogas technology.

4 Food waste

Food waste of many different kinds - from domestic, commercial and catering sources - can provide an excellent substrate. This waste can be collected with a minimum of contamination. Biogas technology makes it easy to convert these waste streams into sustainable income.

5 Biofuel by-products

The rapid growth of bio-ethanol and bio-diesel production means increasing volumes of by-products from these industries. Biogas technology provides an ideal way to deal with glycerol for instance.

6 Wastewater sludge

Anaerobic digestion is often used in treating wastewater sludge. If there is no such treatment available at the wastewater plant, the sludge can instead be treated in a nearby biogas plant.

7 Combined heat and power (CHP) plants

Xergi has more than twenty years of experience in designing and constructing combined heat and power (CHP) plants. CHP plants are fuelled by natural gas or biogas and they are delivered on a turn-key basis equipped with gas engines or gas turbines.

Industrial organic waste as a source of energy



Green energy from waste

The food processing industry produces a wide range of waste suitable for biogas. Disposing of this effectively can often develop into a costly problem. Biogas technology makes it possible to exploit the energy within this waste to produce green energy that can then be sold to generate income.

Better environmental profile

Consumers are focusing more and more on global warming issues.

Using biogas technology to deal with waste reduces your CO₂ foot print, and can boost the strength of your company's brand name by helping highlight your environmental profile.

Individual solutions

Regardless of the kind of organic waste products your company has to deal with, Xergi can provide a solution that will satisfy your particular needs and requirements, and help generate added value for your company.

Process heat – an extra bonus

The biogas produced from a biogas installation is often used as fuel in a gas engine to generate electricity and heat. This will help in reducing your energy costs significantly.



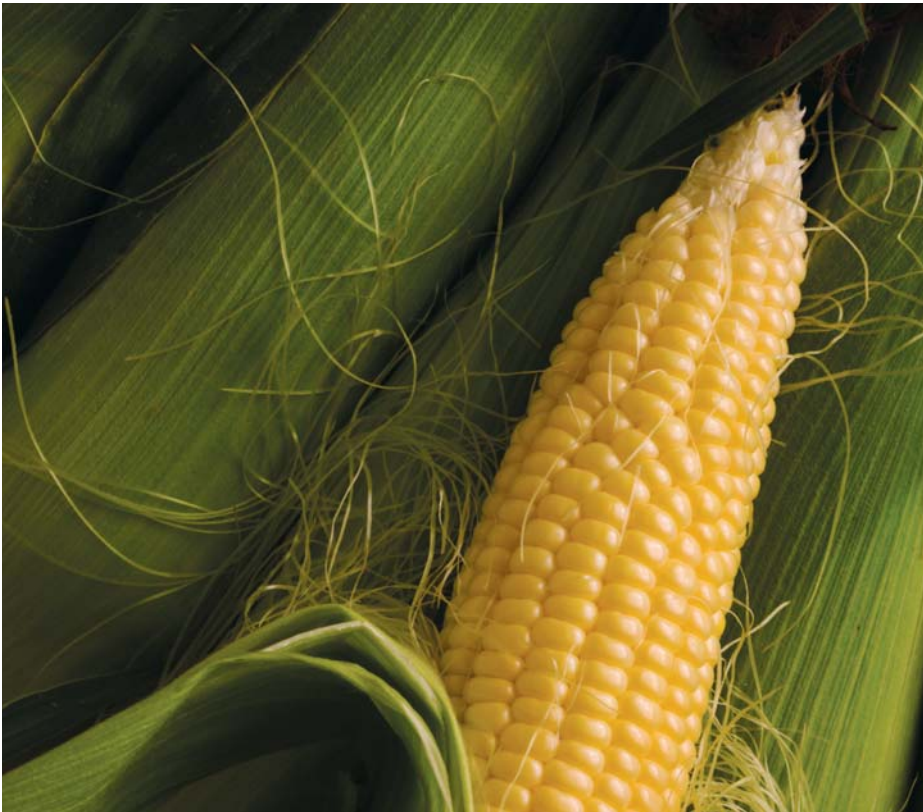
Producing biogas using residue from food processing operations not only benefits society as a whole, it also helps the industry reduce production costs.





Energy crops

– an opportunity for energy farming



Maize is just one of many crops that can be used to produce biogas. Xergi process technology paves the way for very efficient utilisation of whatever biomass you choose to use.

Using crops for biogas production

Agricultural products are an excellent source of raw material for producing biogas, and a broad selection of crops can be used.

A number of farmers choose to grow crops solely for use in their biogas plant, while others use surpluses from their existing production of crops, often combined with manure.

Green energy produced for profit

Once produced, biogas is often used as fuel in a gas engine to produce electricity and heat. The electricity can be sold on the open market while the heat can be used on the farm or sold directly to appropriate users, such as local industry, public swimming pools and district heating networks.

This means a biogas plant can easily serve as an additional source of income for farming operations.

Efficient utilisation

The more efficient the plant is, the less energy crops you need to achieve production targets and lower the operating cost of the plant.

Xergi's process technology ensures a high, consistent gas yield that provides the best return on the investment.

Easy operation

Advanced control systems make operation of the plant straightforward and reliable.

The intuitive control interface makes it easy to monitor the system and make adjustments, if needed.

Manure

– nature's source of energy



Energy that adds value

Digesting manure makes it possible to capture valuable energy in the form of biogas.

Biogas based only on slurry/manure

A world patent allows Xergi to design biogas plants running only on slurry/manure. The technology separates nitrogen and phosphor during the digestion process for effective fertilizer management. In addition, 20 % more biogas is produced compared to conventional biogas technology.

Less odour, fewer pathogens

Raw manure spread on the fields often results in obnoxious smells. However, if the manure is treated in a biogas plant prior to being spread on the fields, the odour is reduced significantly. In thermophilic bio-

gas plants the pathogens are reduced which also makes the manure safer to use on the fields.

Saving on fertilizer

In a world where oil and gas prices are rising, the costs of chemical fertilizer will continue to rise correspondingly. Digesting manure results in the conversion of the nitrogen content from organic to inorganic form. This makes it a more effective fertilizer than untreated manure as well as providing significant savings on the farm's chemical fertilizer budget.



Processing manure in a biogas plant provides a wide spectrum of benefits.

Biogas plants for demanding customers and investors

– a broad range of solutions



Custom-built plants

Biomasses vary widely in type and composition and therefore it is necessary to design each plant to maximum flexibility. Xergi's modular concept is designed to fit the specific needs of each individual customer.

Attractive ROI

At Xergi, we know that one of our customers' prime concerns is the return on investment which a biogas plant can provide.

We help our customers to maximize return on investment by focusing on what we do best – professional counselling,

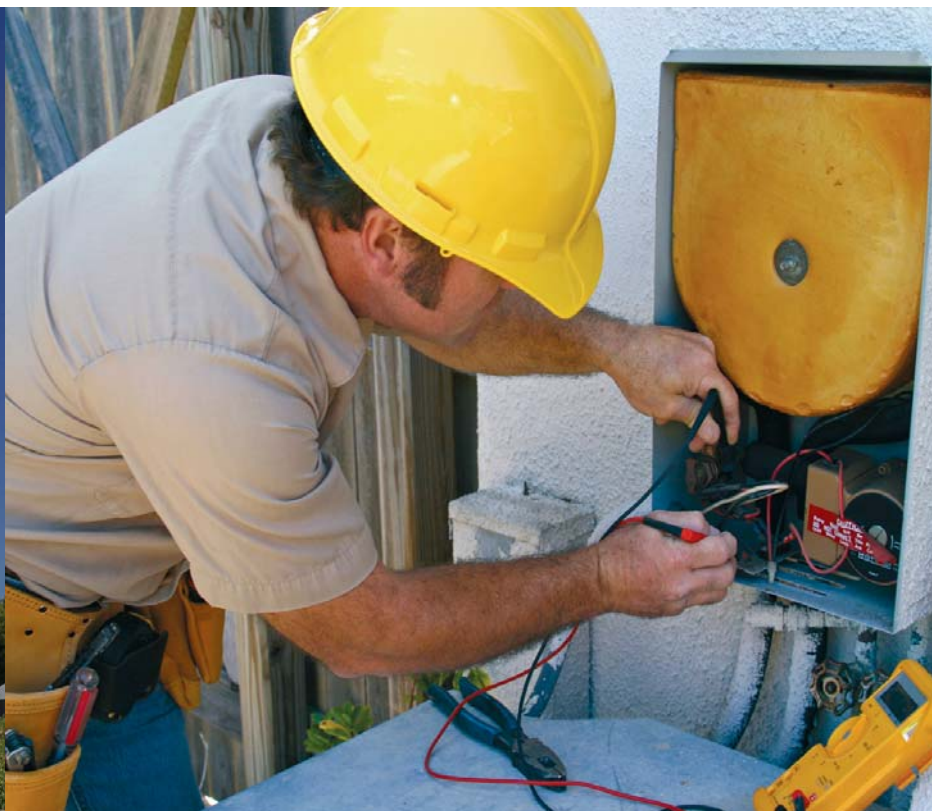
effective plant design and hassle-free systems operation.

Reliable partner

With more than twenty years of experience in building, operating and maintaining biogas plants, Xergi has proven expertise in supplying reliable installations that provide the benefits of biogas for many years.

Quality components

Xergi biogas plants are designed using quality components and industrial standard design principles. This ensures a robust, reliable plant with only a minimum of production downtime and maximum operating hours.



Upgrading opportunities

A plant from Xergi provides a straightforward path to upgrading and/or expanding the plant at any time in the future. This means that if the biomass supply alters in configuration or volume, the plant can quickly be adapted to deal with this by adjusting the receiving facilities or adding extra processing capacity.

Low operating and maintenance costs

We know from experience how to design a plant and how to keep maintenance costs to the minimum. Components are carefully scrutinised and chosen for maximum durability and the best possible performance.

In addition, the SCADA system is designed for easy control of the anaerobic digestion process, ensuring consistently high gas production rates.

Xergi's experts make a biogas installation a solid investment that you can depend on.



Energy from sustainable sources

– getting into the clean-tech business



From waste to energy

A range of different factors is constantly encouraging the demand for renewable energy solutions. The most important is the focus on CO₂ emissions.

This is an area in which biogas technology has a lot to offer. Not only is it based on sustainable resources, it also avoids CO₂ and methane emissions by ensuring these are not released into the atmosphere – as would be the case if the untreated manure is spread on fields.

Aquatic environment

Treating manure and organic waste in a biogas plant protects the aquatic environment. Organic nitrogen is converted into an inorganic form thus being available for plants as a fertilizer as opposed to being washed-out as a heavy pollutant.

Bonus on renewable energy

Politicians all over the world are aware that renewable energy is required in order to ensure sustainable development. Special incentive schemes, such as bonuses for producing “green” energy, are widespread and are encouraging the implementation of biogas production all over the world.

The cost of global warming

It is often said that renewable forms of energy cannot compete on price with energy based on fossil fuels. In superficial terms, this may seem true. However, a truly valid price comparison should include the environmental impact and the effect on global warming – which are rarely included in direct cost comparisons.

The right solution from day one

– and then onwards



Designed for flexibility

Designed for flexibility

Each Xergi biogas plant is individually designed and configured to meet the requirements of the particular customer. Even though the set-up is customised, the input system retains a versatility that ensures the plant can manage changes in the availability of different types of biomasses.



Accurate dosing

Accurate dosing

A special module ensures accurate dosing and pre-treatment of the biomasses being processed. This results in a high degree of control and efficiency, but it also provides flexibility in deciding which biomass to use.



Ideal process temperature

Ideal process temperature

The Xergi design philosophy is based on plants running at the highest feasible process temperature. This makes it possible to take full advantage of nature's own processes and to make sure that biogas production is as effective as possible.



High mixing efficiency

High mixing efficiency

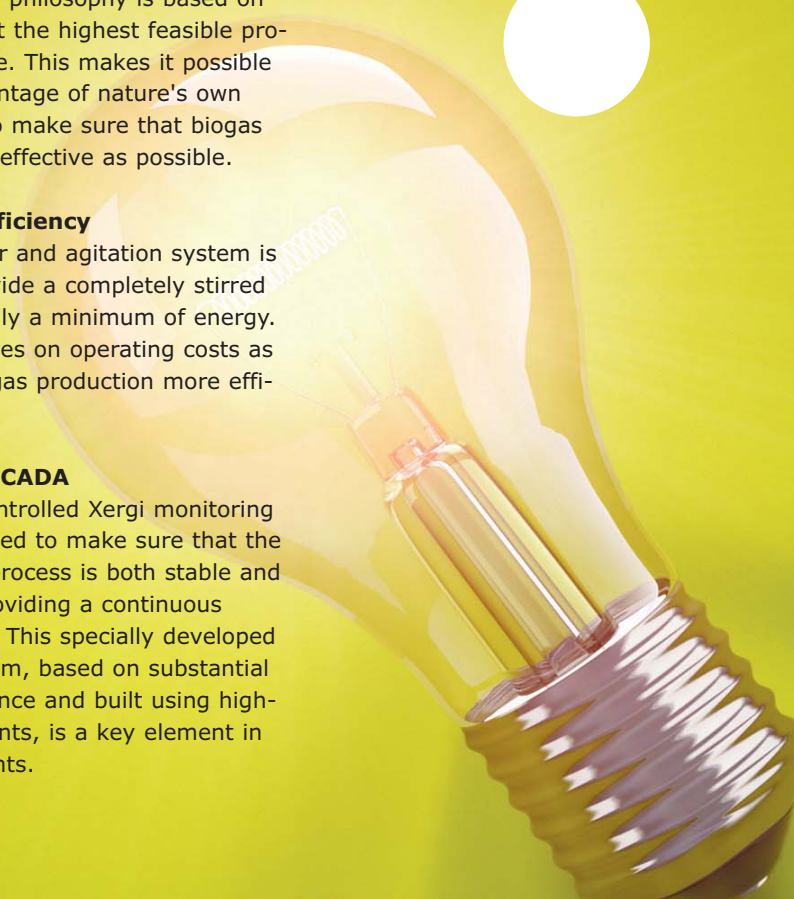
The Xergi reactor and agitation system is designed to provide a completely stirred reactor, using only a minimum of energy. This solution saves on operating costs as well as making gas production more efficient.



User-friendly SCADA

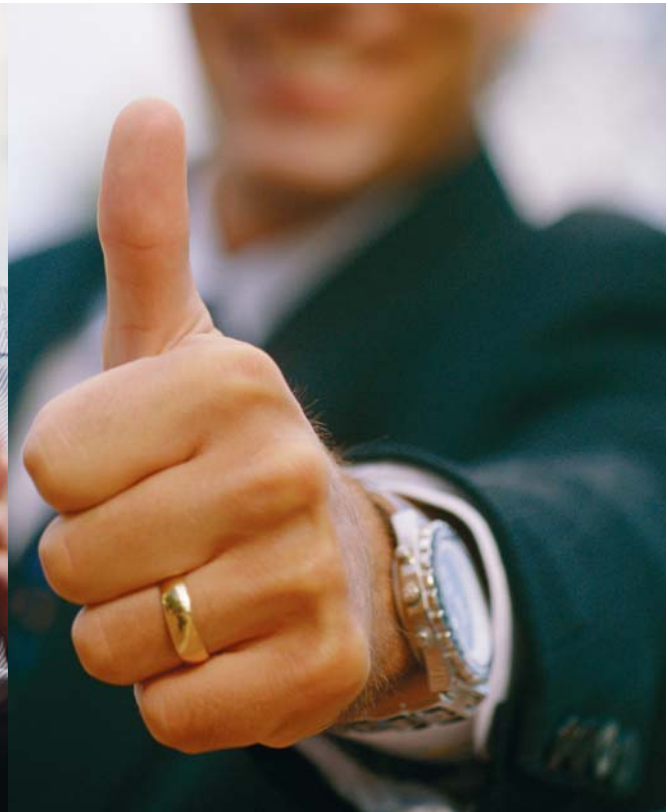
User-friendly SCADA

The remotely controlled Xergi monitoring system is designed to make sure that the gas production process is both stable and reliable, thus providing a continuous revenue stream. This specially developed monitoring system, based on substantial practical experience and built using high-quality components, is a key element in Xergi biogas plants.



Financial advisor's conclusion

– credible and approved



Proven technology

With more than twenty years of experience, Xergi is one of the pioneers of bio-gas technology. Our clients reap the benefits of this as the technology we deliver is well-proven.

Maximum ROI

Our focus is on increasing the ROI that our customers can achieve by influencing those variables where we can make a difference and create real value.

These include Xergi process technology that makes it possible to achieve the best possible utilisation of the biomass, and versatile

plant configurations that make it possible to use alternative substrates, to cope with the changing availability of biomasses.

We also strive towards low costs of maintenance by designing for quality and choosing long-lasting and robust technical solutions.

Consistent credibility

As a technology supplier, we know that project feasibility can be seriously affected by any changes in the basic assumptions. This is why we always focus on delivering project feasibility data that is valid and that you can depend on as a basis for effective decision-making.



Technical consultants

– as Xergi Partners



Knowledge sharing

Xergi believes in sharing knowledge – not only in-house but also with our external business partners. Open discussions and a constructive dialogue with a technical consultant can be fruitful for both parties.

The right solution

Open dialogue means that we deliver the right solution to meet the exact needs. Based on the available parameters, we design a first-fit solution that makes sure there are no unresolved issues.

Inspiration

As a pioneer in this industry, it is our goal to inspire and encourage the development of biogas technology. By focusing strongly on research and development, and on

implementing the results of this work in our solutions it is possible to reach the goal. Staying in touch with Xergi means keeping up to date with the latest development in biogas technology.

Technical back-up

Whatever needed in the form of specialist know-how, back-up and assistance, our experts are at your disposal.



Choose Xergi

– dedication is our approach



Experience a trademark

With more than twenty years of experience, Xergi has the know-how to bring any project to successful completion.

International mindset

Xergi's staff and organisation have solid international experience and are fully capable of managing the particular project – wherever it may be located.

Competent sparring partner

As a turnkey supplier, we are fully competent in all aspects of biogas project development, and can act as your sparring partner right from first contact to project completion.

Robust technology

Our biological and technical concepts mean that we offer well-proven, robust

technology that will make the most of the investment. The components we use comply with high industrial standards where reliability and quality are key issues.

Solid ownership

Xergi A/S is owned by the Danish companies Schouw & Co. and Dalgas Group, providing us with a solid financial foundation for all our activities.

As a key investor in the Danish wind power industry, Schouw & Co. has played a pioneering role in developing the renewable energy industry worldwide. Among the activities within the Dalgas Group are forest management and advisory services in wastewater treatment.

Inspiration and pioneering technology

– future compatible innovation



Constant system evolution

Xergi is strongly committed towards developing biogas process technology. Our Process Research Department is constantly working to optimise the biological processes via continuous testing and trials, in order to develop next-generation technology.

Our R&D department is located in the world's largest test facilities for biogas. Laboratories, pilot plants and a full-scale biogas plant provide the foundation for our extensive research program.

World-class test plant

Building the world's largest biogas test plant – for the Danish Agricultural Science Centre – means that Xergi has taken the

lead in the development of biogas process technology. The delivery of this plant underlines Xergi's position as the world's leading supplier of biogas technology.

R&D cooperation

Xergi works closely with leading research institutions and other partners, including the Danish world leading biotechnology company, Novozymes. Exchanging knowledge with other professionals enables Xergi to continue developing biogas technology, to the benefit of our customers and of society in general.



Service and support

– ready when needed



Commissioning

Xergi always takes full responsibility for the commissioning of each new biogas plant we deliver.

The start-up is a particularly critical phase in which the bacterial flora build up. By fine-tuning the biomass load, we make sure you have a fully functional plant ready to bring on line.

Technical service

Xergi is a professional partner that can provide you with all the necessary mecha-

nical service and maintenance for your biogas plant. Our substantial operating experience guarantees you expert assistance.

Biological support

Xergi specialists can help you make all the right decisions and optimise the biogas production by continuously monitoring plant operations and keeping track of biological conditions via samples and lab tests.

Facility management

For customers looking for a totally care-free solution, Xergi provides full facility management services.

CHP plants

– combined heat and power units



Unique competences

Xergi has more than twenty years of experience in designing and constructing combined heat and power (CHP) plants.

A CHP plant combines the advantages of using the thermal energy that is generated along with the electrical energy. This means environmentally friendly power generation, reduced energy costs and a more secure energy supply.

Flexible turnkey solutions

CHP plants are delivered on a turnkey basis equipped with gas engines or gas turbines. Often absorption chillers are added for a complete heat, power and cooling solution.

Container-based CHP plants give the customer a high degree of flexibility as regards both location of the container and the generating capacity.

Xergi CHP plants are fuelled by natural gas, biogas or a mixture of gases and diesel fuel. These gases are transformed into power and heat. The gas can also be upgraded to biomethane equal to natural gas quality for transportation or feeding to natural gas grid.

Effective energy use

Xergi also provides expert guidance focused on feasibility calculations, as well as advice on the most effective use of energy.



The biogas plant

Biogas is produced from organic materials decomposed in an anaerobic environment – a completely natural process. A biogas plant simply accelerates this process by creating conditions in which the micro-organisms and bacteria thrive and bring about this decomposition in the most efficient way.

Any organic material – with a few exceptions – can be used to produce biogas. However, manure, crops and organic by-products and waste from industry are the most common sources. Such biomasses are delivered to the receiving facilities, where they are stored until needed. The dosing module ensures a correct, efficient biomass feed flow and prepares the biomass for the digestion process.

Processing for biogas

The biomass is mixed in the primary digester. This is where the anaerobic digestion takes place and the biogas is produced. If possible, a high process temperature is chosen in order to achieve maximum efficiency.

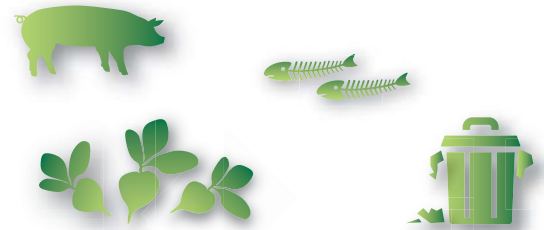
The secondary digester is used as gas storage and also features a gas cleaning system. Up to 20% of the biogas is also produced here.

The output

A storage tank is used as a final step before the digestate is used as fertilizer for spreading on fields – resulting in savings on chemical fertilizer budgets.



Biomasses used for a biogas plant - examples include liquid manure, organic waste from industry, farm crops, etc.



A feasibility study is carried out in collaboration with the customer to assess project viability.

The right energy solution

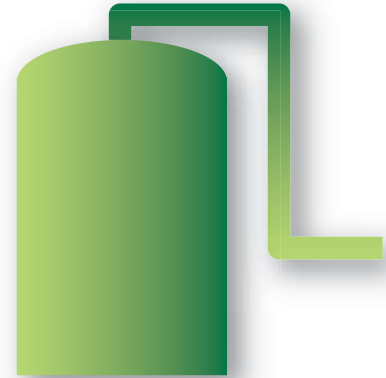
Getting the

The biomasses are delivered to the plant's receiving facilities, where they are stored until needed.



The dosing module ensures a correct, well-adjusted feed flow and prepares the biomass for the digestion.

A pressure cooking module using a patented technology can be installed for nitrogen removal.



The biomass is digested efficiently in the primary digester, which is where the main digestion takes place. Biogas is produced.

If feasible, the process temperature is chosen to be higher to achieve greater efficiency.

User-friendly SCADA



Xergi assists the customer in getting the relevant permission and approvals for the plant.

Xergi engineers undertake the basic design of the plant, based on the requirements and site specific information.

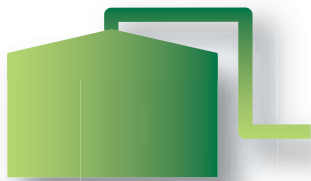
Xergi supplies the relevant documents needed for the financial part of the project.

Production from day one

full picture

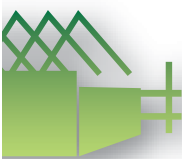
Mass is mixed in the digester. This is the anaerobic process and the actualy

... a high pro- perature is provide efficiency.



The secondary digester is used for gas storage and also houses a gas cleaning system. Some residual biogas is also produced here.

The gas engine in the CHP unit uses the biogas as fuel, transforming the biogas into power and heat. Alternatively the gas can be upgraded to biomethane equal to natural gas quality for transportation or feeding to natural gas grid.



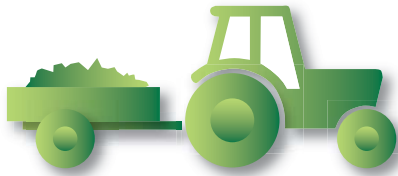
... all the mentation relevant ners.

Detailed design work is carried out so the construction phase can begin.

Xergi deals with the implementation of the whole project, right from the first step to final commissioning.

The plan invo as o

A storage tank is used as a final step before the digestate is spread onto nearby fields.



Constructing a biogas plant

Analysis and basic design

Xergi experts assist the customer by conducting the necessary profitability and feasibility analyses, and we recommend in the selection of key components.

Authorisation and financing

Financing has to be structured before construction of the biogas plant can begin. Xergi assists in preparing the documents necessary for gaining appropriate financial approval.

Detailed planning and design

Once the necessary planning permission and financing are in place, we begin the detailed planning and design of the plant. We also make sure all technical documentation is ready to enable the construction phase to begin.

Construction

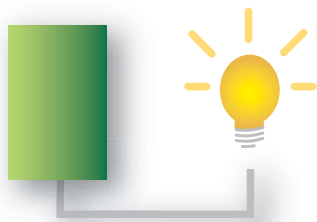
Xergi undertakes implementation of the whole project, from breaking ground to final commissioning.

A professional team is assigned to each project and keeps in close contact with the customer throughout the construction phase.

Commissioning and operation

The start-up of a biogas plant is a critical procedure. The bacteria have to build up and minor adjustments need to be made in order to make sure the plant operates efficiently and reliably.

Commissioning is undertaken by Xergi biologists and specialists to guarantee a reliable, successful operation.



start-up of a biogas plant is critical and involves biologists as well as other process experts.

A turnkey plant is delivered, ready to produce green energy for the benefit of the individual customer and society in general.



Head office:

Xergi A/S

Hermesvej 1
9530 Støvring
Denmark

Tel: +45 99 35 16 00

Mail: mail@xergi.com



www.xergi.com