



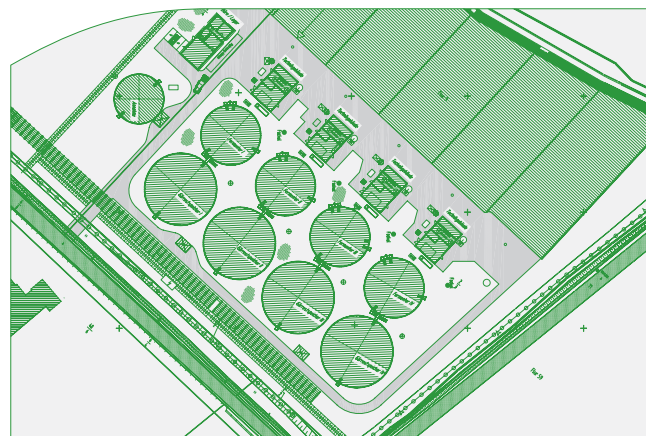
Partners and projects – Our own biogas plants

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Exemplary cooperation with an energy provider in Friedland.

About one third of the households as well as many public facilities in Friedland, a town in Mecklenburg-Vorpommern, are supplied with low-cost heat from the local biogas plant of EnviTec Biogas AG. The project was initiated by Heino Themann (l.), Managing Director of EnviTec Biogas Beteiligungsgesellschaft (EBB), who signed up energy company Cofely as cooperation partner to supply the local community with energy via the district heat grid. "We are very grateful that we have such a reliable supplier in EnviTec," says Klaus-Peter Berger (r.), Head of the Cofely Service Center in Friedland.



Layout plan of the biogas plant in Friedland

The biogas plant in Friedland

The plant consists of four modules with a rated output of 500 kW_e each and feeds just under 1.6 MW_{th} per hour into Cofely's public heat grid. A not inconsiderable part of the heating energy that is fed into the public grid at a flow temperature of up to 90 degrees Celsius comes from the exhaust gas from the engines of the co-generation units, which is more than twice as hot. Exhaust gas exchangers ensure that the heat is used as effectively as possible.

An ideal parship

More and more villages and towns in Germany source their heating energy from environmentally-friendly biogas plants. Given that biogas produces no additional emissions of the greenhouse gas CO₂, it helps reach the climate protection targets laid down by the industrialised countries in the Kyoto Protocol. Friedland in Mecklenburg-Vorpommern takes environmental protection seriously. Some 6,600 people live here in this small town. About one third of its households as well as many public facilities are supplied with low-cost heat from the local biogas plant of EnviTec Biogas AG.



The plant feeds just under 1.6 MWh per hour into Cofely's heat grid.

»The additional exhaust gas exchangers increase the efficiency of the entire plant.«

Cofely, a subsidiary of French energy corporation GDF Suez, is responsible for supplying the heat via the district heat grid. "It's an ideal partnership. We sell the exhaust heat that is generated during the electricity production process in our biogas plant to Cofely and they supply it to the end users," explains Heino Themann, Managing Director and Project Developer of EnviTec Biogas Beteiligungsgesellschaft. A bit less than

1.6 MW_{th} per hour are fed into Cofely's public heat grid by the EnviTec plant. "We are very grateful that we have such a reliable supplier in EnviTec and that we can help improve Friedland's carbon footprint significantly thanks to the heat supplied by the biogas plant," says Klaus-Peter Berger, Head of the Cofely Service Center in Friedland.

Research plant

Ever since it was taken into service in 2007, EnviTec has used the biogas plant in Friedland not only to generate electricity and heat but also as a research plant where new technologies are tested. Whether it's the "Kreis-Dissolver" for the perfect shredding of substrates or "EnviTec Feedcontrol" for the automated feeding of bacteria in the fermenter – many path-breaking developments of the biogas industry were used in Friedland at an early stage and delivered important data for the comparative studies conducted by the EnviTec engineers. Great progress was made in Friedberg also with regard to the efficient use of the exhaust heat; the use of exhaust gas exchangers has clearly proven its worth. A not inconsiderable part of the heating energy that is fed into the public grid at a flow temperature of up to 90 degrees Celsius comes from the exhaust gas from the engines of the co-generation units, which is more than twice as hot. The new technology complements the generation of heat from the engine coolant. "The additional exhaust gas exchangers allow us to use the heat even more effectively, thus increasing the efficiency of the entire plant," explains Project Developer Themann.

Technical service

Apart from its importance for Friedland's heat supply and for the ongoing development of the biogas plant technology, the plant also includes a spare parts warehouse for EnviTec's technical field service. This regional presence ensures that eastern German customers are quickly supplied with wear-and-tear parts to protect them against downtime if necessary.



EBB Managing Director Heino Themann and Klaus-Peter Berger from Cofely are happy about the successful cooperation.



← The biogas plant in Friedland consists of four modules with an output of 500 kW_{th} each.

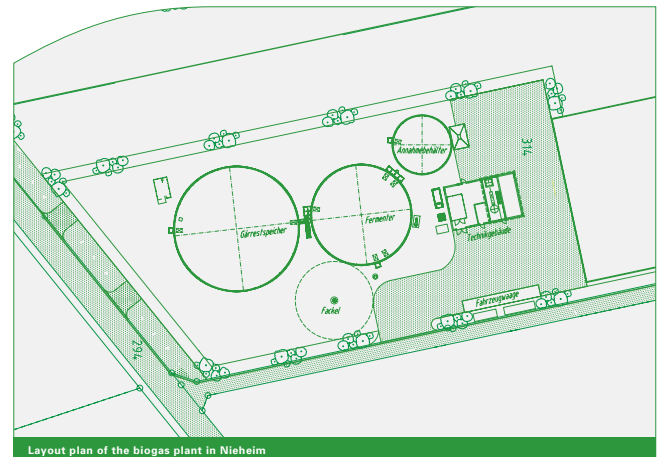
→ Liquid manure and renewable resources are the main input materials.





Nieheim: sufficient exhaust heat for an entire old people's home.

Supplying exhaust heat from the co-generation unit of a biogas plant to end users via a district heat network helps save resources, cuts the customer's heating costs and increases the efficiency of the biogas plant. This is what is happening in Nieheim, Germany, where Thomas Bitter (l.), Director of the St.-Nikolaus Hospital is happy about the cooperation with EnviTec Biogas and farmer Johannes Seneca. Andreas Junge-Bornholt (r.), partnership project manager at EnviTec Biogas, has initiated the alliance. The old people's home is supplied with heat from the nearby biogas plant throughout the year.



The biogas plant in Nieheim

Primarily running on maize and liquid manure, the 500 kW_e biogas plant produces some 6,500 cubic metres of methane gas per day. The gas engine and the electricity generator in the co-generation unit turn the gas into 12,500 kW_e of electricity and 10,000 kW_{th} of heat. A maximum of three degrees of heat is lost over the 1,500 metre water pipeline that leads to the hospital. All renewable resources fed into the plant are supplied by local farmers.



← The St.-Nikolaus Hospital in Nieheim is the main consumer of the exhaust heat from the biogas plant.

→ More than 100 residents live in the old people's home and hospital.

→→ The biogas plant is located at a distance of 1,500 metres from the home.



»Everybody in Nieheim was enthusiastic about this opportunity.«

Thomas Bitter seldom receives an invoice that makes him happy because it is low. The annual heating bills are one of the few exceptions for the Director of the St.-Nikolaus-Hospital in Nieheim. Since the combined old people's home and hospital was connected to the district heat network of Biogas Nieheim GmbH & Co. KG, the heating bills have been much lower than before. "Ever since we started receiving our heating energy from the biogas plant, we have made big savings," Thomas Bitter says. "I can now invest this money elsewhere to the benefit of our residents."

Heat as a by-product

The biogas plant that supplies the St.-Nikolaus-Hospital with heat via a 1,500 metre pipeline is operated by farmer Johannes Seneca in cooperation with EnviTec Beteiligungs GmbH, the EnviTec subsidiary in charge of partnership projects. Together with the employees of EnviTec, he ensures that hot water comes flowing out of the hospital's taps and that the more than 100 residents of the old people's home feel comfortably warm even on cold

winter days. But the heat, which also heats some of Seneca's farm buildings via pipelines, is actually only a by-product of the biogas plant. The 500 kW plant primarily generates electricity for some 1,300 households, which is fed into the public grid. "The exhaust heat is produced during the combustion of the biogas in the co-generation unit," explains Andreas Junge-Bornholt, partnership project manager at EnviTec. "It makes excellent economic sense to use this heat to increase the efficiency of the biogas plant.



The heat arrives in the cellar of the home and is distributed throughout the building.



The heat comes from the biogas plant's co-generation unit.

Ideal size for efficient supply

It was the idea of Markus von Lehmden, Managing Director of EnviTec Beteiligungs GmbH, to supply the heat to the St.-Nikolaus-Hospital, when he took a closer look at the picturesque health resort following a meeting with Johannes Seneca. He immediately noticed the old people's and nursing home near Seneca's farm. It was not only ideally located but also had the perfect size to be supplied with heat from the planned biogas plant. Together with the project partners from EnviTec, von Lehmden developed a concept that not only convinced farmer Johannes Seneca and the Director of the St.-Nikolaus-Hospital, Thomas Bitter, but also the responsible authorities and the representatives of the City of Nieheim. "Everybody was enthusiastic about the opportunity we offered them and nobody put obstacles in our way," farmer Johannes Seneca recalls.

A reliable source of income

Running mainly on maize and liquid manure, the biogas plant generated 6,500 cubic metres of methane gas per day. The gas engine and the electricity generator in the co-generation unit turn it into 12,500 kW_{el} of electricity and 10,000 kW_{th} of heat. The heat is supplied to the St.-Nikolaus-Hospital via a pipeline in the



The plant produces 6,500 cubic metres of methane gas per day.

form of 90°C hot water. "The heat loss amounts to only one to three degrees," says EnviTec Project Manager Junge-Bornholt. The proximity to the neighbouring farms also obviates the need for long transports. Some 20 farmers from the region supply the Nieheim biogas plant with renewable resources, which provides them with a reliable source of income. The fermentation residues are supplied back to the farmers, who use them as fertilizer. "It's a great project. Every day, I am happy that I built the biogas plant with EnviTec," says Johannes Seneca.

Farmer Johannes Seneca could have built a biogas plant on his own but the performance would have been too low to realise an efficient heat concept. This is why he is pleased about his partnership with EnviTec Biogas.

■ Mr Seneca, what made you consider building a biogas plant?

I am a farmer through and through and I want to secure the existence of the family business in the long term. But this is not exactly easy these days. Sole reliance on crop and pig

to hear the opinion of my colleagues. After several talks, it became clear that many of my colleagues are very satisfied with the plants and the services provided by EnviTec Biogas. I then contacted EnviTec and held initial talks with representatives of the local authorities, the district government and with neighbouring farmers. First of all, I wanted to find out what is feasible and



Farmer Johannes Seneca supplies the old people's home with heat all year round.

»The partnership helps me maintain our family farm and inspires confidence in the local community.«

farming would have jeopardised the long-term viability of our farm. As giving up the farm was never an option for me, I considered possible sideline businesses, and this is how I came across biogas.

■ How did biogas convince you?

I talked to other farmers who operate biogas plants to hear genuine opinions. Farmers speak plain language, which is why I wanted

which farmers qualified as potential suppliers.

■ What was EnviTec's advice?

The EnviTec project planners first took a very close look at the local situation and then proposed a concept under which the exhaust heat would have been supplied to the St.-Nikolaus-Hospital to improve the efficiency of the plant. But the plant size of 500 kW that would have been necessary was beyond my

means. Luckily, EnviTec came up with a solution.

■ What did that solution look like?

EnviTec proposed a cooperation by way of a partnership model. This was further proof to me that EnviTec themselves were much convinced of the overall concept of the plant. I could not have realised this project on my own. So I ultimately shared the construction of the biogas plant with EnviTec.

■ What has the cooperation been like since?

I am very satisfied. The plant operates to roughly 99 percent of its capacity. EnviTec ensured from the very beginning that I earn an income from the operation of the plant and never left me out in the cold. The cooperation has been very pleasant, the chemistry is right. It is our shared goal that the utilisation of the plant remains high at all times – each party within their respective sphere of responsibility.

■ Who is responsible for what?

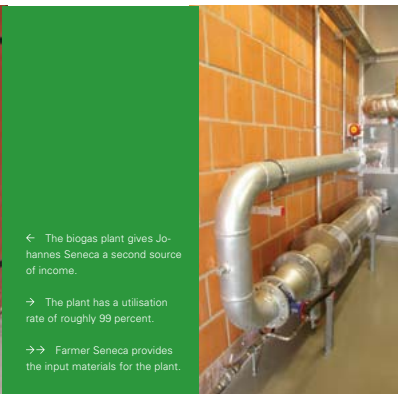
I take care of the production and procurement of the input materials and the day-to-day operation of the plant, while EnviTec is responsible for the technical and biological service of the plant as well as the commercial aspects.



The heat tank contains sufficient hot water for the district heat network.

■ What do the local residents say about the project?

The whole town backed the idea from the very beginning; there have never been any problems. During the planning phase, I was always open to questions of my fellow citizens. After the plant was completed, I organised an Open Day. Acceptance is very high. Many residents benefit from the project in one way or another. Just think of the farmers who supply the maize, for instance, or the families who have a relative residing in the old people's home.

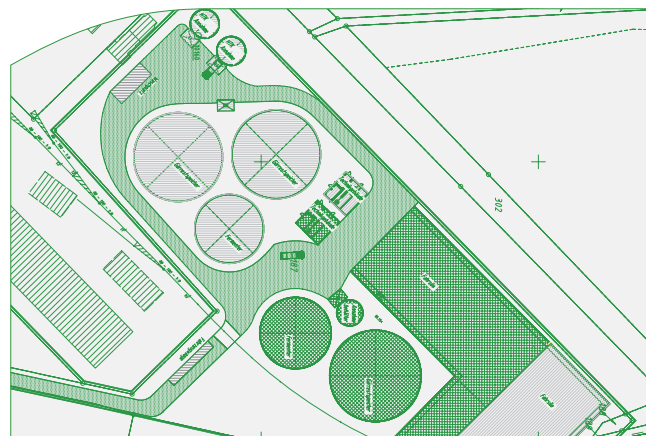


- ← The biogas plant gives Johannes Seneca a second source of income.
- The plant has a utilisation rate of roughly 99 percent.
- Farmer Seneca provides the input materials for the plant.



Heating oil replaced by steam in animal feed production in Herzberg.

For many years, Deutsche Tiernahrung Cremer in Herzberg used to cover 100 percent of its heat requirements from heating oil. Since the end of 2009, a major portion of the required energy has been supplied by the nearby biogas plant of EnviTec Biogas. The heat supply is the result of a cooperation between Cremer and the EnviTec Biogas subsidiary in charge of partnership projects, which was initiated by Markus von Lehmden (r.), Managing Director of EnviTec Biogas Beteiligungsgesellschaft. "We are pleased that our company is able to make a contribution to climate protection," says Plant Manager Thomas Schulze (l.)



Layout plan of the biogas plant in Herzberg

The biogas plant in Herzberg

The biogas plant consists of two modules with a capacity of 500 kW_e each. A heat pipe carries water heated to approx. 90 degrees Celsius from the EnviTec plant to the Cremer facility. The heat is used not only to heat the administrative building and the production halls but also in the production of the fodder. Another pipeline supplies saturated water vapour, which has a temperature of about 180 degrees Celsius. The company needs this vapour to press the fodder into pellets



← Herzberg is one of eleven locations of the animal feed producer.

→ The cooperation allows Plant Manager Thomas Schulze to cut the company's heating oil consumption significantly.

→→ The biogas plant is located right next to the company's Herzberg factory.



"We originally intended to build our own biogas plant. But then we thought that we know very well how to produce animal fodder and that EnviTec knows very well how to build biogas plants. So we very quickly reached an agreement with EnviTec," says Thomas Schulze, Plant Manager of Deutsche Tiernahrung Cremer GmbH & Co. KG in Herzberg. Here, on the border to Saxony-Anhalt and Saxony, some

90 kilometres south of Berlin, the company produces animal fodder as well as pet food. Herzberg is one of 11 production sites operated by Germany's leading animal feed producer. In the past, Deutsche Tiernahrung Cremer used to cover 100 percent of the heat requirements of the Herzberg plant from heating oil. Since the end of 2009, a major portion of the required energy has been supplied by the neighbouring

»The bottom line: fewer fossil fuels, less carbon dioxide.«



EnviTec's Markus von Lehmden initiated the cooperation with Cremer.

biogas plant of EnviTec Biogas. The heat supply is the result of a cooperation between Cremer and the EnviTec Biogas subsidiary in charge of partnership projects. Cremer provided the site and leased it to EnviTec, while EnviTec financed and built a biogas plants consisting of two modules with a capacity 500 kW_e each and sells the heat generated in the electricity production process to Cremer. "Thanks to the cooperation with EnviTec, we need fewer fossil fuels, which greatly improves our carbon footprint," says Plant Manager Schulze.



The plant supplies heat in the form of hot water and saturated vapour.

Saturated vapour for the production process

A heat pipe carries water heated to approx. 90 degrees Celsius from the EnviTec plant to the Cremer facility. The heat is used not only to heat the administrative building and the production halls but also in the production of the fodder; to ensure that the liquid state of ingredients such as oil, fat or molasses is maintained in the storage tanks, they need to be stored at constant temperatures between 40 and 60 degrees Celsius.

Another pipeline supplies saturated water vapour, which has a temperature of about 180 degrees Celsius. The company needs this vapour when it comes to pressing the fodder into pellets; the humid vapour conditions the material for the pressing process. "We need about one ton of saturated vapour per hour. About two thirds of this volume is supplied by the EnviTec

biogas plant," explains Thomas Schulze. The saturated vapour comes from a steam plant which allows EnviTec to take advantage of the high temperatures of the exhaust gases that are produced during the electricity production process in the co-generation units of the biogas plant. "We use the heat to fire a steam boiler. The saturated vapour is then delivered to Cremer at a pressure of 10 bars," explains Markus von Lehmden, Managing Director of EnviTec Biogas Beteiligungsgesellschaft and initiator of the forward-looking heat concept that greatly increases the efficiency of the Herzberg biogas plant, while at the same time reducing the heating oil consumption of Deutsche Tiernahrung Cremer significantly. "We are pleased that we are able to make a contribution to climate protection, although entering the partnership with EnviTec Biogas was a very sensible decision also in view of the rising prices of fossil fuels", says Plant Manager Thomas Schulze.



Cremer uses the heat to heat the buildings as well as in the feed production process.

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