



BIOGASHEAT



DEVELOPMENT OF SUSTAINABLE HEAT MARKETS FOR BIOGAS PLANTS IN EUROPE

www.biogasheat.org



The BioGasHeat project is supported by:



Co-funded by the Intelligent Energy Europe
Programme of the European Union

Disclaimer: The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained herein.

BIOGASHEAT

DEVELOPMENT OF SUSTAINABLE HEAT MARKETS
FOR BIOGAS PLANTS IN EUROPE

INTRODUCTION

The European Union has established itself as the world leader when it comes to fighting climate change. However, threats posted by changing conditions are not the only driver for the EU's energy policies. Reoccurring reminders pointing towards the continents limited fossil energy resources do not fail to impact strategic decisions while at the same time national budgets under pressure, the widening gap between rich and poor and rising energy prices demand concerted action. Against this background it is not surprising that the EU's concept targets three central objectives: sustainability, independence, competitiveness.

These three objectives were and are to be realized by a triumvirate of targets explained in the so-called EU2020 strategy. This strategy aims at a 20% increase of renewables, a 20% increase of efficiency and a 20% decrease of emissions in Europe compared to 1990. The 20-20-20 targets are currently under review as the European Commission prepares the EU2030 strategy. In a first Communication on a policy framework for climate and energy in the period from 2020 to 2030 the Commission only proposed two targets: one for CO₂ emissions and one for renewables. Officially this was due to the fact that the Energy Efficiency Directive has been under review and the Communication should not prevail the results of the revision. However, as certain Member States are opposed to a renewed efficiency target and others support it, it is open how this will develop. From a systemic point of view, it is absolutely necessary to have all three targets included as only the combination, the efficient use of domestic low-carbon resources will help the EU to achieve its fundamental objectives.

The BiogasHeat project supports the realization of those targets and objectives. Biogas is a domestic energy source and its utilisation decreases Europe's dependency on fuel imports. Its utilisation keeps finances inside the Union and generates additional incomes for farmers, i.e. promotes the competitiveness of Europe's economy. At the same time, it is a renewable energy source decreasing CO₂ emissions and the share of fossil fuels. Utilising the produced heat adds to these effects on a major basis. Increasing the efficiency of a biogas plant effectively means that less biogas needs to be incinerated for the same outcome, i.e. the same amount of biogas can replace an even bigger amount of fossil fuels. Heat is surplus energy, i.e. it does not generate additional CO₂ emissions or imports, and at the same time it is fully renewable. By replacing fossil fuels with surplus heat, CO₂ emissions can be decreased on a remarkable level while lowering the EU's dependency on energy imports. At the same time it helps to provide customers with cheaper energy and therefore increases the competitiveness even further.

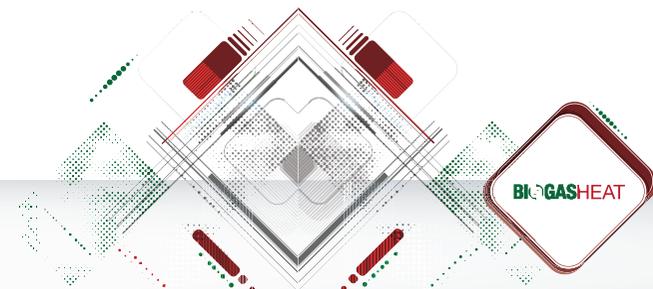
In short: BiogasHeat fits perfectly into the European energy objectives. It is a sustainable, indigenous, competitive source of energy.

The BiogasHeat Project

In Europe, as well as worldwide, the production and use of biogas is considerably increasing due to the growing demand for renewable energy as a substitute for fossil energy. Most industrial and agricultural biogas plants use biogas for electricity production in combined heat and power plants. However, in many cases the heat from these plants is not used. This is a result of a main focus of most support schemes on electricity production neglecting the efficient use of heat.

The inefficiency in energy use is a bottleneck in current biogas production, causing macroeconomic and microeconomic losses and challenges in the context of increasing land use competition. The BiogasHeat project addresses the problem of how to use the heat from biogas plants efficiently at the European, national and project level. Thereby, a set of different policy, good practice, field test and project implementation measures are developed and used. The project actions follow a comprehensive approach for a development of common practice heat use from biogas plants, which experts estimate would trigger €160 m total investments by 2020, leading to use of 52,600 toe/year of renewable heat corresponding to 118,000 tCO₂eq./year.

In the project, the partners analyse the market conditions and barriers leading to recommendations to policy and support scheme decision makers. Biogas experts and heat market actors together develop promising business models and entrepreneurial strategies for the use and recovery of biogas heat. Capacity is built up by training and support structures while targeted dissemination activities will motivate and support new market actors in European countries to start activities in this field.



Biogas markets in the BiogasHeat countries

Within the BiogasHeat countries there is a large discrepancy between the number of biogas plants and installed capacities. Germany is the leading biogas producer in Europe with about 7,500 installed biogas plants, while Czech Republic and Italy had a considerable market growth in the biogas sector in the last few years. Markets in Austria and Denmark, characterised with many biogas plants, have remained quite stable in the last years without any substantial establishment of new biogas installations. A considerable growth was achieved in Latvia in 2011-2013, however, this development was hindered when new tenders for obtaining the right to receive feed-in tariff were stopped until the end of 2015. Despite a high potential, biogas activities in Croatia and Romania are still very limited with a very few installed biogas plants.

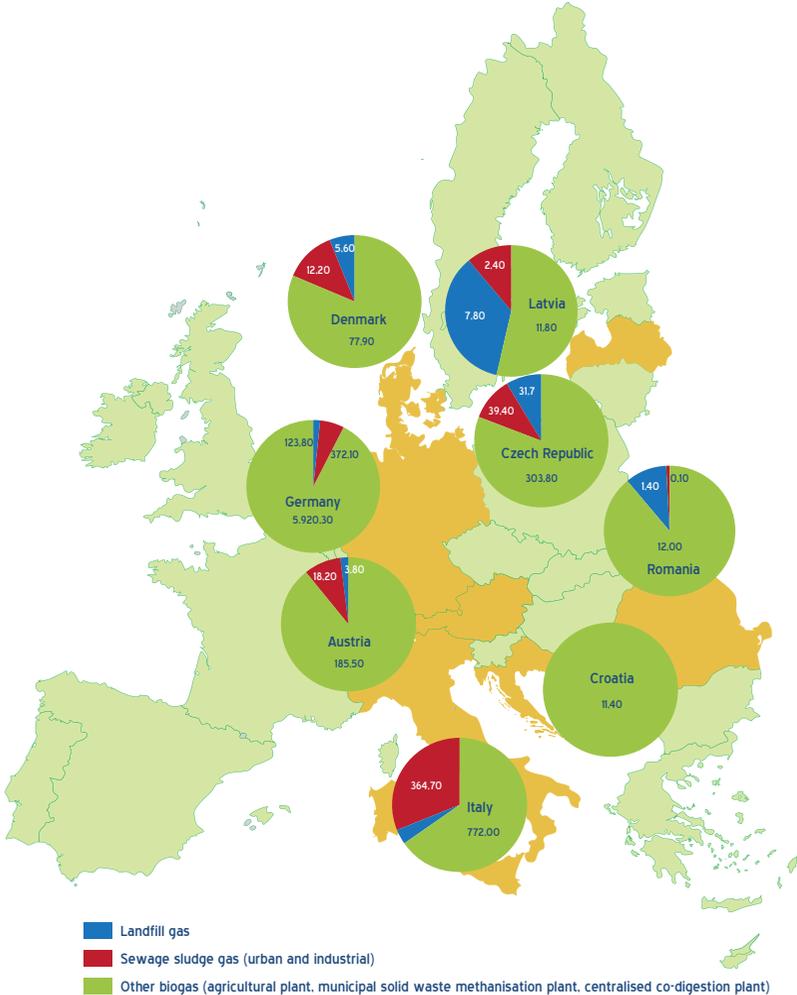


Figure 1. BiogasHeat partner countries with estimated primary production in European Union in 2012 (ktoe); Source: Eurobserv'er – The state of renewable energies in Europe – 2013 edition

Heat utilization in Europe and concepts

The market developments in different countries are heavily influenced by legal and political framework conditions. Most of the heat produced is used directly on site for drying sludge, heating buildings and keeping the digester at an optimal temperature. Sale of heat to the heating network is desirable, but it requires network to be close to the production plant which is most often not the case¹. In Denmark, district heating systems as well as CHP production have been highly supported by the government. Biogas is utilized mainly for decentralized co-generation plants in which biogas replaces natural gas, being the heat used in district heating systems. In Germany focus was mainly on the maximization of the electricity production supported by good feed-in tariffs, but with the introduction of several legislative amendments, this situation slowly changes, especially for new plants, as a 60% heat use obligation was recently introduced. In addition, Austria and Czech Republic have introduced measures to increase the heat use of biogas markets. Furthermore, in some countries the heat use of biogas plants has not yet been considered in legislation. The current focus in these countries is on the development of legal framework conditions for the emerging biogas markets to establish a critical number of biogas plants. The legislation on efficient heat use may be introduced at a later stage. In general, the actual status of heat utilization from biogas plants is not satisfactory. Although some heat is used for own purposes and internal processes, the commercial heat use of biogas is rare even though an enormous potential exists.

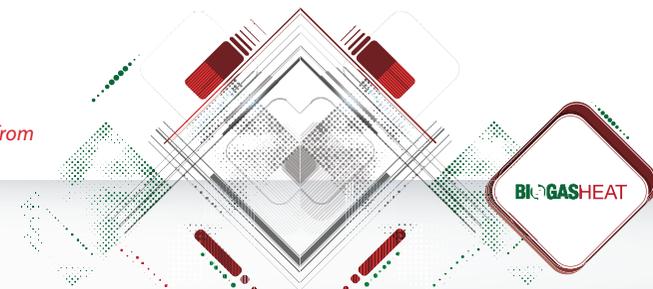
There is a variety of heat utilization concepts for biogas plants. Implementation of optimal heat utilization concept for a biogas plant depends on many factors, such as location of the biogas plant, location of the potential consumers and heat demand. Heat from biogas plants can be used for heating, drying or cooling purposes as well as for additional electricity production. Each of the applications needs a local evaluation at project level.

¹ Eurobserv'er – The state of renewable energies in Europe-2013 edition

More information about heat use concepts can be found in *BiogasHeat Handbook on Sustainable Heat use from Biogas Plants*: <http://www.biogasheat.org/documents/>

Table 1. Overview of main heat utilization options

Heating	District heating
	Stables (chickens, pigs...)
	Greenhouses
	Aquaculture
	Heat transport in containers
	Other heating options
Drying	Wood, woodchip, pellets
	Agricultural products (grains...)
	Digestate and sewage sludge
Cooling	District cooling
	Buildings
	Stables
	Acclimatization of food storage buildings
Electricity production	Process cooling
	Additional electricity production with Claius-Rankine- Cycles (CLC), Organic-Rankine- Cycles (ORC) or Kalina technologies



Good practice examples



Heating of greenhouses in Rumbula, Latvia

Landfill gas from municipal and industrial waste is used for production of electricity and heat. In total, 80% of heat is used for heating offices, infiltrate reactor, sanitary hot water preparation and heating the greenhouse complex. Greenhouse complex has an area of 3625 m².



District heating for residential houses in Margarethen am Moos, Austria

The total heat power of the plant is 1.2 MW. Around 10% of the produced heat is used to heat the digesters. The remaining heat is supplied to clients (120 households) through a 3.5 km long district heating network. In addition, upgraded biogas is injected into the natural gas grid and is sold at a local fuel station.



Heating supply to a SPA center in Trebon, Czech Republic

The majority of produced biogas is transported by a dedicated 4.3 km long biogas pipeline to a spa facility in the town, where a new biogas CHP plant (844 kW_{el}) supplies heat to the spa (for space heating, sanitary hot water and a large swimming pool) and an adjacent multi-apartment residential building. Two heat accumulators with total volume of 200 m³ are installed to equalize the daily fluctuations of heat demand.



Heating for a cannery in Niederdorla, Germany

Two biogas plants of 500 kW_{el} capacity provide thermal energy to the canning company located in the neighbourhood. The heat is used to produce process steam for the production of vegetable and fruit cans as well as jams. In addition, the heat is used to heat the production space. In total, nearly half of the heating oil needs (ca. 1 million litres/year) are replaced by the heat from two biogas plants. Currently, due to discontinuous use of process steam, around 70% of heat is used.

Lemvig biogas plant, Denmark - treats organic residual products and slurry from approximately 75 farms. The main goal for its construction was to treat the produced manure at the farms to protect the local environment. At the same time the Lemvig heat consumers appreciated that the cost of the locally produced heat from biogas was around 45% lower than the heat produced from natural gas.

ORC plant in Valovice, Czech Republic - ORC technology is used to generate electricity out of the waste heat which is produced by the CHP. With the help of ORC equipment with a capacity of 100 kW, the additional generation of around 740,000 kWh/year is reached.

FOR MORE EXAMPLES VISIT - www.biogasheat.org

Countries in brief

Austria

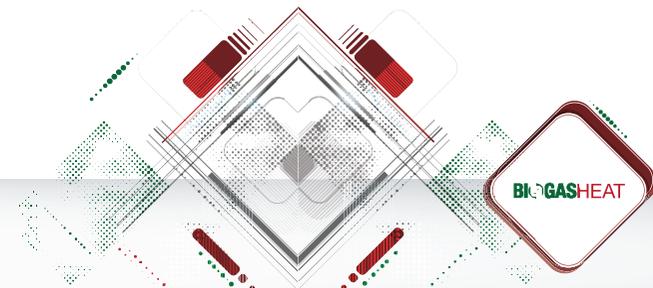
The Austrian biogas market has a strong agricultural background and follows a comparatively small-scale and decentralised biogas production. By average CHP plants have an installed capacity of approximately 250 kW_{el} per biogas plant. After deduction of 20% fermenter heating an estimated heat use potential of 530 GWh_{th} is available. According to expert interviews the biggest driver for biogas production in Austria is the obtainment of green electricity tariffs. However, in many cases this might have led to a maximization of green electricity production instead of focusing on both efficient heat use and power production. Also the location of the biogas plants turned out to be a crucial variable. In some cases the choice of location was not optimal and only minor fractions of the heat can be used. Hence, excessive heat supply is given in some local heat markets.

The connection of existing agricultural biogas plants to a district heating network in order to inject excessive heat is almost depleted. Currently, Austrian biogas plant operators push towards an efficient heat utilization on site as many plants are located in rural areas. Heating of family houses nearby, heating of stables and drying of various agricultural commodities (e.g. grain, hay or wood chips) with little investment costs are favoured options. If the heat is used efficiently biogas plant operators will obtain a CHP-bonus. Heat prices are about a tenth compared with subsidized green electricity tariffs. Promising future options are seen with the combustion of raw biogas in a satellite CHP and upgrading to biomethane.

The project partner e7 currently realizes a field test in the west of Austria. Thereby the biogas plant obtains comprehensive assistance with the real implementation of the heat use business model. The existing plant is located close to bigger heat consumers. However, the quality and quantity of the heat is not high enough – the size capacity of the plant 60 kW_{el} – for an efficient heat supply over a distance of about 1.5 km. Therefore, various on-site solutions are subject to a cost-benefit comparison. The field test will be completed in autumn 2014.



Figure 2. Self-made construction for hay drying



Czech Republic

Most of the biogas plants installed in the last five years were designed and built for power generation only and the utilization of heat is either none or low and typically limited only to the agricultural farm. A new law regulating the public support for RES has been adopted in 2012 and sets reasonable requirements on heat utilization for new biogas plants since 2014. In the meantime, however, all operational support for electricity from RES (except small hydro) has been stopped. The only operational support scheme still in place is green bonus for electricity from CHP (applicable only to new plants with installed capacity of up to 550 kW_{el}), but it is not sufficient for making the new plans economically feasible, thus almost no biogas plants are currently being planned.

New projects for increasing heat utilization from existing biogas plants have to be based on revenues from heat sales only. There are tens of locations with biogas plants close enough to build a hot water connection to the potential consumers (such as large health facilities or district heating systems) and could supply heat for a competitive price compared to natural gas boilers. However, such plans often have to compete with new natural gas fired CHP units which still receive a high operational support.

Heat supply from biogas plant in Žamberk

The biogas plant was installed in 2011 on a farm close to the town of Žamberk in East Bohemia and is owned and operated by a firm “KAVEMA” created for this purpose. Its current capacity is 1.75 MW_{el} and 1.8 MW_{th}. The potential clients for using the heat are 1) the health facility “Albertinum” situated about 2 km from the plant, and 2) the municipal district heating system with possible connection point about 4 km from the plant. Both supply lines are technically feasible and the capacity of the biogas plant is sufficient to deliver heat to both of them. The Albertinum facility currently (September 2014) organizes a public tender for the heat supply. If KAVEMA is the winner, it would install the connection line in 2015 and heat supply could start in 2016.

District heating system in the town is owned by the municipality and operated by a town's facility management company (SBŽ). The system includes two separate supply areas with central boiler plants and several larger buildings with local boilers. A modernization study has been prepared which recommends to interconnect the two island systems and some of the buildings which will create a DH system with annual consumption of about 5.5 GWh/a. Besides measures in the distribution system also several options how to reduce heat generation costs have been analysed. New condensing boilers will be installed plus one of alternative sources: natural gas fired CHP, biomass boiler plant or heat supply from the biogas plant. If the last option is adopted, KAVEMA would install the connecting hot water line and heat transfer station to the DH system and SBŽ will have to cover only the costs of integrating this source (piping at the boiler plant and heat accumulators). The construction would be scheduled in the second modernization stage of the DH system that is in 2016.

Table 2. Basic technical data for Žamberk

Total heat capacity of plant	1.8 MW _{th}
Possible heat supply to Albertinum	1.25 GWh/a
Possible heat supply to DH system	4.7 GWh/a

Croatia

At the present, the main motivator for running a biogas plant is the production of electricity. The majority of existing heat use deals with drying and greenhouses applications. Only recently, the first implementations of ORC systems particularly in biomass application have been prominent. This could perhaps turn out to be the most promising business model in the future bearing in mind the fragmented landscape and chunky concentration of main industries and inhabitants in a few large cities.

Landia Tordinci d.o.o - existing 1MW_{el} biogas plant explores heat use concepts

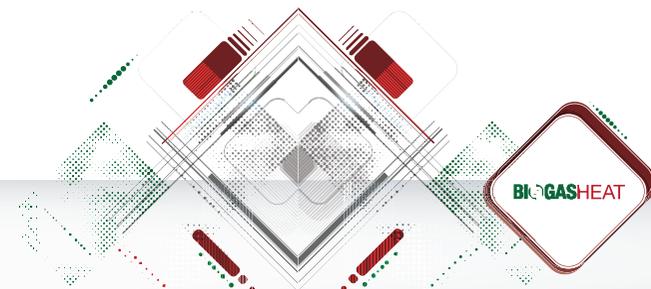
The biogas plant was built within one of the most modern milking cow farms in Croatia. As the optimal heat use concept, the installation of Organic Rankine Cycle – ORC system for the transformation of waste heat into electrical energy was identified. Two possible variants of ORC systems were considered:

- I.) the analysis of increased installed power of the plant was carried out to use the maximal available waste heat throughout the year.
- II.) the work of the cogeneration unit in the operating point lower than the nominal was considered with the difference in power to be replaced with ORC unit, thus lowering the input substrate (primarily corn silage) and hence decreasing the cost of raw materials and its preparation.

Results of the analysis showed profitability of the investment only for the second option, due to the fact that every increase in installed power results in decrease of the electricity purchasing price and consequently lowers the revenue.

Table 3. Technical data of the cogeneration unit and potential ORC unit:

Existing biogas cogeneration unit	
Total heat capacity of plant	1,071 kW
Planned production of heat	8,780,000 kWh/y
Annual own heat consumption	1,777,950 kWh/y
Maximal electrical power of unit	110 kW
ORC unit working power in option II	85 kW
Maximal additional production of electrical energy	902,000 kWh
Additional production of electrical energy in option II	697,000 kWh



Denmark

At present, almost all Danish biogas plants are based on co-production (and utilization) of electricity and heat. However, there is increasing focus and interest among Danish biogas stakeholders to upgrade biogas with subsequent injection into the natural gas grid in order to increase and optimize biogas production.

Limfjordens Bioenergi – optimization of heat utilization

This project aims to improve utilization of the heat production from Limfjordens Bioenergi biogasplant. The plant is a centralized biogas plant which was established in 2009.

Today, the biogas is used in a cogeneration unit with a capacity of 1.4 MW_{el} and 1.65 MW_{th}. The total electricity production is sold directly to the public grid.

The heat production from the cogeneration is used for process heating and for district heating through Sdr. Herreds CHP plant, where also natural gas is used.

The project will involve the construction and operation of a biogas upgrading plant and a 1.8 km long gas pipeline from the plant to the natural gas grid as well as a wood-fired plant to cover the current amount of heat produced from the biogas plant. With the applied assumptions, upgraded biogas (biomethane) could be delivered to natural gas grid at 0.93 €/m³ upgraded biomethane, as the current value of the biogas (0.45 €/m³ biogas calculated as 100% methane) are added together with the cost of upgrading and alternative heating (0.48 €/m³). This is balanced against a natural gas price of approximately 0.99 €/m³.

The project will result in the reduction of emissions as follows:

Emissions: 198 kg/MWh x 12,500 MWh = 2 475,000 kg

Nitrogen oxides: 2.9 kg/MWh x 12,500 MWh = 36,250 kg

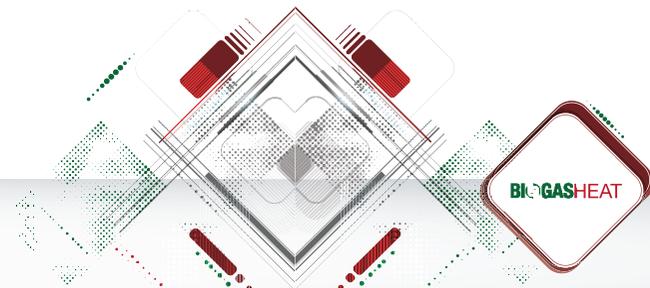
Italy

Italy is a very important producer of energy from biogas: at the end of 2013 Italy was 3rd in the world for production (with 4.5 billion of invested Euros, more than 1000 agricultural feedstock plants with 900 MW of installed capacity and 12,000 people working in the sector. A very intensive and uncontrolled growth of the sector, especially regarding large plants (999 kW) happened during the years 2009-2012 due to very favourable feed in tariffs: no bonus was considered for heat use and therefore nearly all plants needed to improve overall efficiency. Since 2013, the sector operators have to face lower incentives and a framework which favours smaller plants fed with agricultural by-products. Currently, the Italian Biogas Consortium is conducting an advocacy campaign for facilitating the access of those “first generation” plants to the white certificates in case the operators would make investments for improving their overall efficiency.

The resulting situation is many large plants in the countryside that only produce electrical power: one of the possible solutions for improving their efficiency is to increase the power production by installing an Organic Rankine Cycle machine. The efficiency is not very high (around 7%) but other heat uses are quite difficult to implement due to the remoteness of the plants and very strong seasonality in northern Italy: probably the only alternative to be used all over the year is digestate drying.

The possibility being studied in the field test in Italy is to install an ORC and decrease the CHP peak power installed in order not to exceed the 1000 kW, which is the maximum admitted for the feed in tariff, and therefore lower the costs for the entering feedstock and disposal of digestate.

The economic profitability of the intervention is very clear but the challenge is to get permission and continue to enjoy the feed in tariff and hopefully also the white certificates.



Germany

In Germany biogas is produced by more than 7,850 agricultural biogas plants. For a long time the main focus of biogas plants was electricity production. Therefore, the Renewable Energy Sources Act 2009 (EEG 2009) introduced a CHP bonus for heat utilization. Economic and ecological optimization of biogas plants became the main driver for heat utilization from biogas plants. Biogas plant operators started to consider different heat utilization concepts, such as district heating and cooling or drying of woodchips. The Renewable Energy Sources Act 2012 (EEG 2012) introduced a 60% heat utilization obligation for new biogas plants and the CHP bonus was removed. This means that new biogas plant operators have to consider heat utilization concepts already in the planning stage of a biogas plant. The heat could be used for industrial processes as the heat demand is constant (the whole year) and the amount of heat utilised is very high (it might be even the entire heat utilization). Interesting options are mini-heating grids to heat residential houses or drying of woodchips or other materials.

Biogas plant Fischer & Jehle GmbH – implementation of the mini-heating grid

The biogas plant Fischer & Jehle GmbH with a capacity of 380 kW_{el} and 424 kW_{th} is operated mainly with energy crops and manure. The plant produces about 3,223,878 kWh electricity and 3,682,056 kWh heat per year. The heat use included the heating of the farmer's house and adjacent buildings, as well as occasionally drying of logwood.

The main reason for the plant operator to invest in a micro heating grid was that the heat of the biogas plant was just wasted. In order to meet the peak load heat demand, the electrical capacity of the plant was increased from 380 to 550 kW_{el}. Therefore, 31 heat consumers were connected to a mini-heating grid. The final length of the whole grid is 1,280 m. The mini-heating grid started the operation in summer 2014. The total investment costs are about € 235,000 and the expected amortisation time is about 10 years.



Figure 3. Silo and digesters of the biogas plant Fischer & Jehle GmbH (Photo by D. Rutz, WIP)



Figure 4 . Piping (Photo by D. Rutz, WIP)

Latvia

When the electricity feed-in tariff system in Latvia was introduced, it was one of the highest feed-in tariffs in Europe and in combination with investment grants allowed biogas investors running biogas plants profitably even without providing income from sales of heat. Revision of the existing support system, application of new income tax on the payments received from the feed-in of electricity, and increasing feedstock costs are seriously affecting the economic feasibility of biogas plants in Latvia. Finding new ways to get additional income, e.g. sales of heat, is essential for biogas business in Latvia. Currently heat from biogas plants mostly is used for heating greenhouses or for drying of wood products. Some biogas plants sell heat to district heating or to small industries located near the biogas plant, but still in many cases significant amounts of heat are not used. Most promising heat use business models in Latvia are seen with installation of drying facilities in remote areas or supplying raw biogas to a satellite CHPs located closer to the heat consumer.

Piejūra Energy, Ltd – biogas plant looking at several heat use options

Piejūra Energy biogas plant is located in Livi, Nīca parish, Latvia. The closest heat consumers are a fish processing factory located 50 m away from the biogas plant, and residential areas in Nīca town located at the distance below 1 km from the biogas plant. In 2012 heat from the biogas plant was used only for heating of fermenters. The intention to provide heat to the fish factory and/or to the nearby town for district heating purposes has been evaluated within the BiogasHeat project.

Technical information:

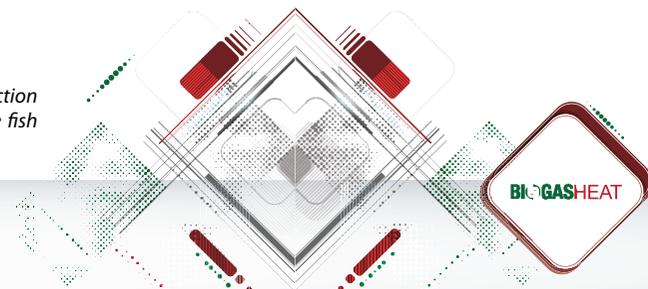
Start of the operation, year	2012
Installed electrical capacity, MW _{el}	2.2
Installed heat capacity, MW _{th}	2.186
Total heat production, MWh/year	17 500
Heat demand for fermenters, MWh/year	3 000
Heat delivery to the fish factory, MWh/year	5 280
Surplus heat available for other use, MWh/year	9 220



After the first screening of proposed alternatives, a combination of heat delivery to the fish factory and to district heating system of nearby located residential areas was selected as the most promising alternative. The district heating system is using wood logs as fuel and is not operated during summer months. It provides only space heating and does not supply hot water to the residents. Electrical water heaters are used instead in each household. To create sufficient heat demand in summer months a restoration of the hot water supply from the central heating plant should be considered. It was recommended by the BiogasHeat project to perform a detailed feasibility study on district heating development alternatives.

The connection from biogas plant to the fish factory was constructed in 2013 (see Figure below). Fish factory is getting heat from the exhaust gas cooling cycle of the biogas CHP engines and using it for generating the steam. Steam is further needed for fish processing operations. However, BiogasHeat project recommended detailed energy auditing of the fish factory. Professional energy audit would give better understanding about heat demand and would allow optimising the overall heat concept of Piejūra Energy biogas plant.

Figure 5. Construction of the heat connection from Piejūra Energy biogas plant to the fish factory (photo by I.Dzene, Ekodoma)



Romania

At the moment, the renewable energy market in general, and the one for biogas in particular are still confronting a lack of dynamics and new developments. After a two years lag in RES law elaboration, since March 2013 the Government decided to postpone payments for a number of green certificates (especially in photovoltaics and eolian) for the period 2017-2020. There was a reduction of green certificates support scheme, including for existing facilities. The biogas and biomass energy support schemes were not modified. Nevertheless, the implemented measures affected negatively the biogas market too, due to the legislation framework volatility. Many projects in the advance state were cancelled during 2013 and 2014. A good trend that could be seen in the market is the increased awareness of the farmers about the opportunities offered by biogas. Both energy crops and agricultural leftovers are now clearly identified as business opportunities, even if the concrete market conditions are not totally favourable to new investments.

One promising trend is the interest of the waste water treatment plant (WWTP) owners (including public bodies) to develop biogas facilities into the existing WWTP.

Existing biogas facility build in a waste water treatment plant is intended to be extended with a new sludge drier. Technical data of the biogas WWTP unit:

- 3,000 cubic meters per day
- Two biogas reactors
- 300 KW_{el} installed capacity
- Tank insulation to be improved and heat energy recuperation from the CHP machine could be further used into sludge drying process

Field tests focuses on the heat losses measurements on the production process, the optimum balance between heat used in the biogas reactors and the efficient use of the excess energy into the sludge drying compartment.



Overall conclusions

Markets

- Biogas markets in the project countries differ widely
- Heat markets in the project countries differ widely

Bottlenecks - the main reasons for underdeveloped heat utilisation are:

- A lack of awareness that heat can be utilised
- A lack of knowledge how heat could be utilised
- Unfavourable legal/political conditions

Legal framework

- The most successful support scheme for biogas builds on feed-in tariffs
- To foster heat utilisation additional legal requirements for heat use or efficiency are necessary paired with a positive list on heat utilisation options
- Support schemes must be long-term, reliable and sustainable

Heat utilisation options

- Biogas plants differ largely in size and capacity
- Other factors such as location and feedstock supply play a major role
- There is a vast number of heat utilisation options
- The 'right' option for every plants needs to be picked on a case-by-case basis – there is no one-size-fits-all

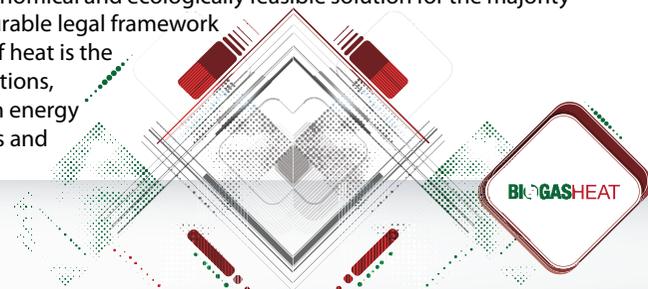
Feasibility checks / Business cases

- The location plays the most crucial role for the development of biogas and heat utilisation
- Instable legal conditions are the biggest obstacle for operators
- Long-term planning and contracts are necessary for a successful business case

The main three heat utilisation options for the future are:

- Upgrading of biogas for grid injection or transport
- Supply of biogas to a satellite CHP unit with subsequent heat supply
- Additional power production

In conclusion, it can be said that there are sufficient heat utilisation possibilities to find an economical and ecologically feasible solution for the majority of biogas plants. The main problem is a lack of appreciation for heat which results in unfavourable legal framework conditions. To change this and to make stakeholders and policy-makers aware of the value of heat is the first step towards sustainable heat markets in Europe. Subsequently, better framework conditions, financial support and the use of existing knowledge on the issue can have a major impact on energy efficiency and energy security in Europe as well as on the income situation of plant operators and farmers.



Impressum

Edited & layout: Energy Institute Hrvoje Požar, Savska 163, 10000 Zagreb, Croatia
Ekodoma, 3-3 Noliktavas street, Riga, LV1010, Latvia

Photo source on page 6:

Picture 1 www.a4d.lv/lv/plaukts/kpfiatbalsts-tematiskiem-rakstiem-la/

Picture 2 www.agrarplus.at

Picture 3 Bioplyn Trebon s.r.o. brochure

Picture 4 www.thueringen.de

Cover photos by D. Rutz, WIP



BIOGASHEAT

The BiogasHeat project is supported by:



Co-funded by the Intelligent Energy Europe
Programme of the European Union

Disclaimer: The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained herein.

THE BIOGASHEAT PROJECT PARTNERS

WIP Renewable Energies, Germany
Energy Institute Hrvoje Požar, Croatia
Energy Efficiency Center SEVEN, Czech R.
Sogesca Srl, Italy
e7 Energie Markt Analyse GmbH, Austria
Danish Technological Institute, Denmark
SC Mangus Sol Srl, Romania
Euroheat & Power, Belgium

BIOGASHEAT COORDINATION

Ekodoma, Latvia
Dr. Ilze Dzene [ilze@ekodoma.lv]

