

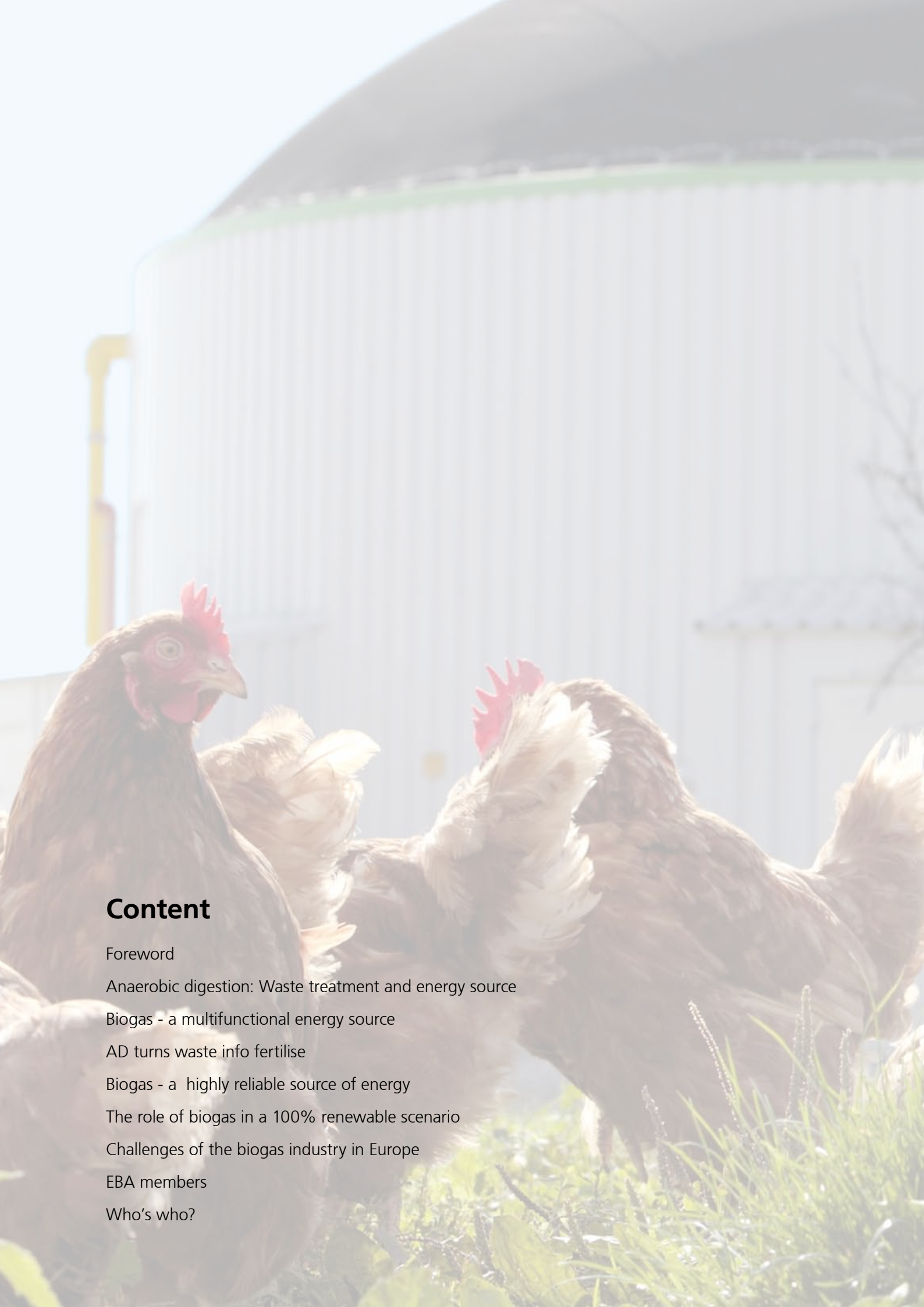


# BIOGAS

*Simply the best*



EBA - European Biogas Association  
Renewable Energy House  
Rue d'Arlon 63-65, B  
1040 Brussels, Belgium



## **Content**

Foreword

Anaerobic digestion: Waste treatment and energy source

Biogas - a multifunctional energy source

AD turns waste into fertiliser

Biogas - a highly reliable source of energy

The role of biogas in a 100% renewable scenario

Challenges of the biogas industry in Europe

EBA members

Who's who?



# Biogas: a Versatile Energy Source

---

## Foreword by Arthur Wellinger, President of the European Biogas Association

To date, biogas is the only technologically fully established renewable energy source that is capable of producing heat, steam, electricity and vehicle fuel. It is, in the true sense of the word, a versatile energy source.

Biogas has become a real success story over the last 20 years. Roughly 10,000 biogas plants in agriculture, industry and waste water treatment are in operation in Europe. The majority is located in Germany. This success is due to the high feed-in tariffs which have been in force over a decade now. More than 20 countries worldwide have copied this model though their approaches have not been as consistent as that of the German government. There is a great number of organic substrates from which biogas can be produced.

The most widespread substrate is agricultural waste followed by energy crop (maize). In other countries the major source of biogas is source separated waste either from households, restaurants and canteens or from para-agricultural industries such as food factories, distilleries, etc. Until a few years ago the decentralised production of electricity and heat was the only application of biogas. Today there is a much greater variety of utilisation options. Thanks to the fact that upgraded biogas can be fed into the natural gas grid, it can be used for all applications designed for natural gas. The most interesting option is its utilisation as vehicle fuel in public buses and taxis, trucks and passenger cars. It serves as a useful complement to natural gas, reducing CO<sub>2</sub> and NO<sub>x</sub> emissions as well as particles.

Treating biogas as an energy source alone does not do justice to its overall value. If the substrate is properly select-

ed, the digestate serves as an excellent fertiliser and soil improver of high quality replacing mineral fertiliser.

The fact that an increasing number of companies are becoming members with EBA is a clear sign, that biogas is becoming an important business opportunity. Over the recent years about 20,000 jobs have been created in Europe.

With this brochure our company members – since early this year organised in a company advisory council – make themselves visible to a larger public and demonstrate their common interest to collaborate and to re-enforce the leadership of the European biogas industry.

The potential of biogas is still enormous. Based on figures of the German Biomass Research Centre (DBFZ), also member of EBA, we calculated that under condition of a supportive national legislation, the available biomass would not only cover the targets set in the National Renewable Energy Action Plans (NREAP) but beyond that would allow to multiply the production of biogas by a factor of four to five.

With this brochure we hope to give you an insight into the European biogas development and convince you about this valuable source of energy either as future producer or consumer of biogas.

Sincerely yours,  
Arthur Wellinger



## Anaerobic digestion: Waste treatment and energy source

---

Climate change does not stop at the borders of countries. We therefore need to promote the leading European biogas industry throughout the entire world  
Agraferm Technologies

Currently around 80% of the world's overall energy supply of 12 bln toe per year is derived from fossil fuels. Nevertheless roughly 10%–15% of this demand is covered by biomass resources, making biomass by far the most important renewable energy source used to date. Biogas is a renewable energy source that is technically fully established, producing heat, steam, electricity and vehicle fuel. There is no doubt that the role of biogas in the European energy mix is steadily growing. Biogas facilities, unlike wind power, can be ramped up and down at the touch of the button. As renewables increasingly make up a greater share in energy supply this function becomes more important allowing to cover peak demands and balance off down periods of other renewables.

Biogas is produced during anaerobic digestion (AD) of organic substrates, such as manure, sewage sludge, the organic fractions of household and industry waste as well as of energy crops.

It is produced in large scale digesters found preliminary in industrial countries for sewage sludge treatment and stabilisation purposes, as well as in small scale digesters on individual farms. Biogas is also produced during anaerobic degradation in landfills and is then referred to as landfill gas.

The interest in biogas has further increased today due to global efforts of displacing the fossil fuels used for energy production and the necessity of finding environmentally sustainable solutions for the treatment and recycling of animal manure and organic wastes. Biogas installations processing agricultural substrates are some of the most important applications of AD today. Thousands of agricultural biogas plants are in

operation in Europe and North America. Even millions of small-scale digesters in China and the Indian sub-continent.

Many of the larger scale digesters are using the newest technologies. Biogas is a real success in Germany where the number of agricultural biogas plants reached 6000 in 2010. Other best practise countries like Austria, Denmark, Sweden, Switzerland, and the Netherlands experience very positive biogas market developments which encourages other countries to follow the example.

In line with other biofuels, biogas from AD is an important part of the European transport and energy policy. As affordable and CO<sub>2</sub>-neutral source of renewable energy it offers the possibility of treating and recycling a wide range of agricultural residues and by-products in a sustainable and environmentally friendly way. At the same time, biogas brings along a number of socio-economic benefits for the economy, environment, society and security of energy supply.





# Biogas - a multifunctional energy source

---

## Biogas feedstock

Biogas is produced during anaerobic digestion of organic substrates. It can be produced from most types of organic raw material, except for lignin, which is not anaerobically degraded. The most common substrates for biogas production are agricultural products (energy crops) and by-products such as manure, followed by various kinds of biowaste, including sewage sludge, source-separated municipal waste, and organic fractions of household and industrial waste.

## AD process and biogas composition

During anaerobic digestion organic material is broken down in several steps by different types of microorganisms. The end-products are biogas, a mixture of methane and carbon dioxide and a slurry or solid fraction consisting of what is left of the treated substrate, referred to as digestate. Digestate also contains all the remaining inorganic compounds, like nutrients, which makes it an excellent natural fertilizer. The substrate composition affects the yield of biogas and its content of methane. There are different technologies for biogas production, featuring various number of reaction stages, average dry matter content, and many more process parameters. They also differ in efficiency of organic matter degradation.

To increase the quality of the raw biogas, the gas is usually cleaned of unwanted substances such as sulphure (hydrogen sulphide), ammonia, and water vapour. The main reason for doing this is to prevent corrosion and mechanical wear of the equipment in which the biogas is used.

## Gas Utilisation

Biogas can be used in more or less all the applications that are developed for natural gas. For some of the applications it may have to be upgraded. Injection of biogas into the natural gas grid will result in an improved security of supply. This is important since dependence on imported natural gas is increasing and only about 2/3 of the European gas consumption is covered by gas from the EU. The benefits of gas as a fuel have resulted in increased use. Natural gas accounts for 23% of Europe's energy consumption in 2010 ([www.bp.com](http://www.bp.com)).

There are three basic ways biogas can be utilised:

- Production of heat and steam
- Electricity production/ co-generation
- Vehicle fuel

The main utilisation of biogas is governed by national frameworks like the tax systems or feed-in tariffs. Worldwide, biogas is mainly used for electricity production. A growing portion of biogas is used for vehicle fuel.

## Heat Production

The most common use of biogas from small-scale plants in developing countries is cooking and lighting. In Asia millions of family owned, small scale digesters are in operation. Countries like China, India, Nepal and Vietnam produce biogas for cooking and lighting. There are some 2 million rural biogas plants mainly in China and the Indian sub-continent where biogas serves the daily energy need of a family. In a number of industrial applications biogas is used for steam production. Burning biogas in a boiler is an established and reliable technology.

We believe that a successful biogas sector will depend on both private and public communication networks. The European Biogas Association represents an ideal platform in this context.

Enbycon Holding AG



## Electricity Production

More than 90% of Europe's biogas plants operate a combined heat and power plant to produce heat and electricity. The most common technology for power generation is internal combustion. Engines are available in sizes from a few kilowatts up to several megawatts. Gas engines can either be SI-engines (spark ignition) or dual fuel engines with injection of (bio-) diesel (10% and up). Modern engines have good electric efficiencies up to 48% at sizes of 250 kW or more. SI-engines are equipped with regular ignition systems and a gas/air mixing system that provides a combustible mixture to the engine. SI-engines can either be stoichiometric or lean-burn engines. The stoichiometric engines operate without air excess and can thereby also use a three-way catalyst that is common in light duty vehicles.

Fuel cells (FC) are power generating systems that convert hydrogen formed from Biogas and oxygen directly into energy without producing mechanical energy. Therefore, fuel cells have extremely low emissions and high electric efficiencies of more than 50%. Nevertheless, widespread commercial use is yet to be achieved once investment cost is reduced. Special interest for stationary biogas application is focussed on hot fuel cells operating at temperatures above 800°C particularly because the CO<sub>2</sub> does not inhibit the electrochemical process. Two types of hot fuel cells are in an advanced stage of development: the solid oxide fuel cell (SOFC) for small applications of a few kW and the molten carbonate fuel cells (MCFC) operating in the range of 250kW and up.

We have to find answers to the question of how an increasing number of people can live well, even within the limited resources available on our planet.

The use of renewable energies such as biogas is part of that response.

Evonik Fibres GmbH

Lean burn engines with excess air are more common in larger sizes and generally have a higher efficiency.

Micro-turbines in the range of 25kW to 150kW have been successfully introduced in biogas applications. They have lower electric efficiencies (26% to 34%) however, they are marked by low maintenance cost and low emissions.



## Biomethane production

Biogas can be upgraded to Biomethane and injected into the natural gas grid to substitute natural gas or can be compressed and fuelled via a pumping station at the place of production. The advantage of injection and gas utilisation e.g. by a CHP in a village has the advantage, that both electricity and heat can be fully used whereas on a farm, usually heat has to be vented, i.e. lost. Overall efficiency and economy drop down considerably. In addition, the medium or high pressure gas grid can serve as storage because pressure can vary.

Injected biomethane can be used at any ratio with natural gas as vehicle fuel. At the end of 2010 there were more than 1.4 million natural gas vehicles (NGV) operated in Europe thereof 145,000 buses and 108,000 trucks. In total, there were 2,600 public and 1,100 private fuelling stations available. Most of the private stations are city owned to refuel public transport buses and waste trucks. Market leader is Italy with 730,000 NGVs however, without biomethane so far because it was not allowed to be injected. Sweden is the biomethane leader with a 55% share of all gas used in vehicles followed by Switzerland with 22%. So far nine countries in Europe allow injection of biomethane.

Most of the gas driven light duty vehicles are retro-fitted by specialized workshops. Some others are factory built like from Fiat, Opel or Volkswagen. Dedicated gas vehicles can be optimized for better efficiency and also allow for more convenient placement of the gas cylinders without losing luggage space. Gas is stored at 200 to 250 bars in pressure vessels made from steel or aluminium composite materials. Emissions of particles and soot are also drastically reduced, even compared with Euro 5 engines equipped with particle filters. The emissions of NO<sub>x</sub> and Non Methane Hydrocarbons (NMHC) are also strongly reduced.

Together with other major players of the biogas sector, we want to help to develop the European biogas market. Therefore, we support the EBA and joined the Company Advisory Council.  
[agri.capital GmbH](http://agri.capital GmbH)



## AD turns waste into fertiliser

EBA – A reliable partner  
in creating CSE's biogas  
future.

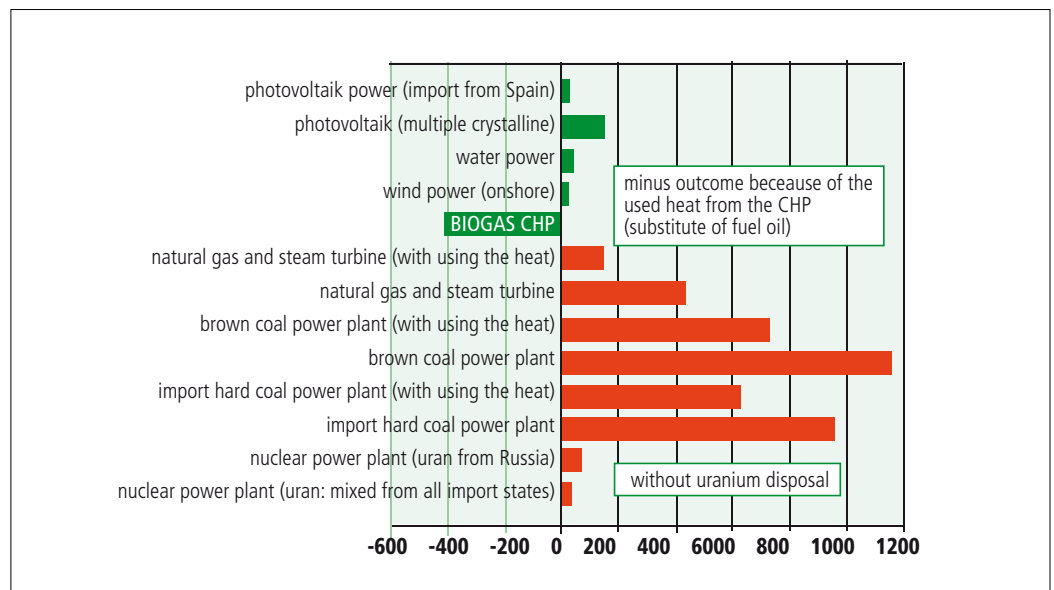
### Biogest

Biogas can be produced from different kinds of substrates e.g. manure, renewable raw materials like energy crops, grass and many others. Non-agricultural substrates are also a good material for biogas production (e.g. residues from food industry, household waste). The digestate i.e. the remaining fraction after AD, contains nearly 100 % of the nutrients from the substrates and is a perfect natural fertiliser. Biogas technology is the only technology converting organic waste to energy without losing the nutrients.

The produced gas is a methane rich gas with a content of 50 up to 75 % methane depending on the substrates. It can

be directly used for producing heat or combined heat and power (CHP) or be upgraded to natural gas quality and injected into the gas grid. After that it can be again used for heat production or in a CHP technique. Additionally it can be used as an alternative renewable fuel for transport (cars, trucks). This application brings us a very environmentally friendly traffic with no particle, 80 % less NO<sub>x</sub> emissions and a CO<sub>2</sub> neutral engine which runs with about 50 % lower noise.

In comparison to other power production methods biogas technique is a very good option for saving greenhouse gas emissions.

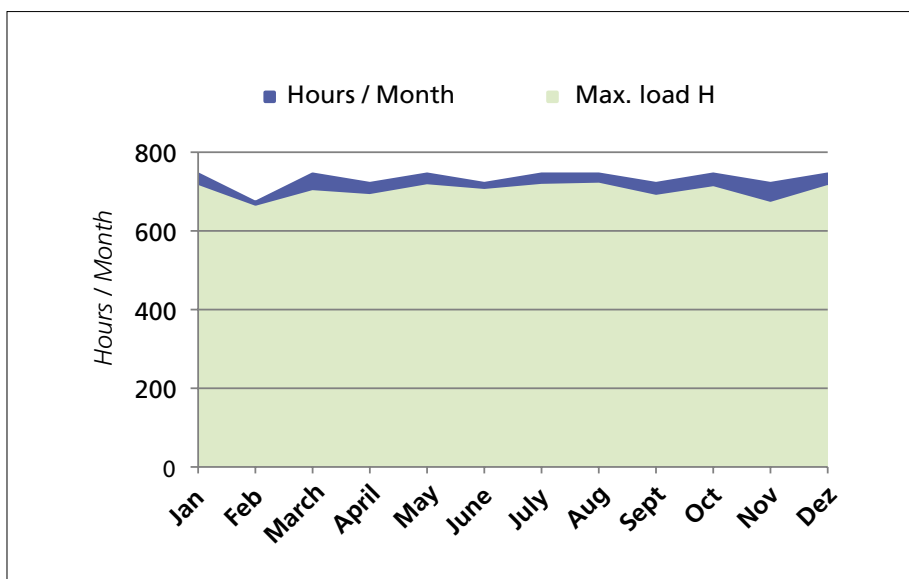
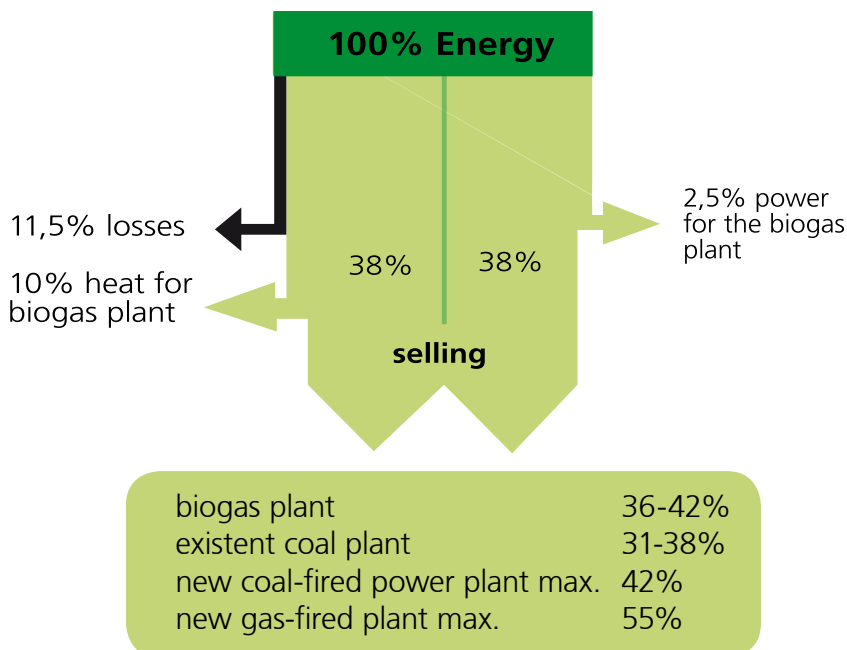


Net balance of greenhouse gas emissions from different power plants (complete-process chain): CO<sub>2</sub> equivalents [g/kWh]



## Biogas - A highly reliable source of energy

Energy efficiency is another advantage of the biogas technology. From 100 % energy content only 12 % are needed to run the plant and only about 10 % energy is lost during CHP process. About 78 % of the energy content can be sold in form of power and heat. If the biogas is upgraded to biomethane and injected to the gas grid the efficiency will raise up to more than 80 %.



Typical electricity production of a biogas plant (h/month), The graph demonstrates that biogas plants are producing under full-load electricity almost continuously.



Teplosoyuz Ukraine is very glad to support the initiatives of the EBA that make a significant contribution to the development of biogas market in Europe.

Teplosoyuz Ukraine

Like all other renewable energy technologies AD creates regional workplaces and a new economic activity within the region. Per 1 MW power installed capacity around 7 permanent jobs are created.

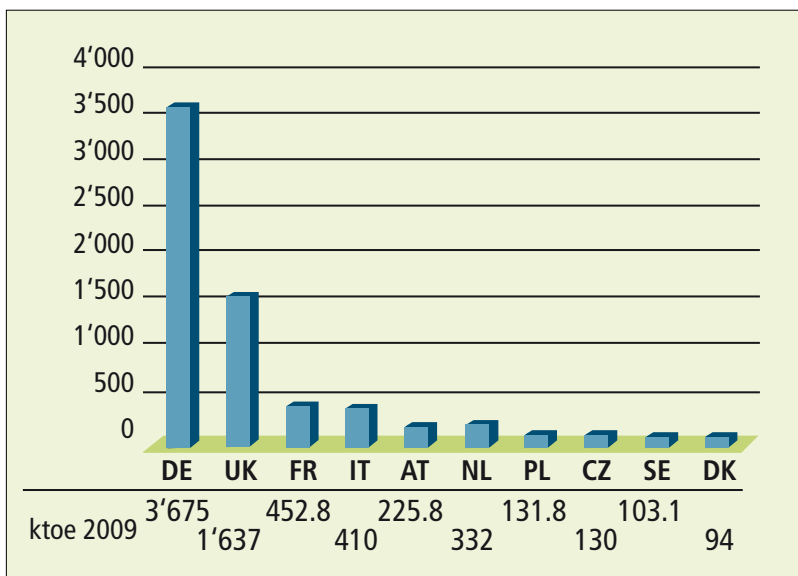
The European biogas production has been on the rise all through the first decade of the 21st century and reached 8,34 million tons of oil equivalent in 2009 (according to EuroObserver's Biogas Barometer 2009). Different sources have contributed to the total biogas production of 2009:

- landfills (35.9% of production),
- urban wastewater and industrial effluent treatment plants (12.1%)
- biogas plants for processing mainly slurry, manure, agricultural residues, energy crops, wastes from food processing industry etc. (52%).

Biogas energy is mainly recovered in the form of electricity: in 2009 25.2 TWh was produced from biogas, which is an increase of 17.5% compared to 2008. Heat supplied to heating networks reached the volume of 171.7 ktoe in 2009. Another form of biogas, biomethane (purified biogas), also started to develop in several countries such as Sweden, Germany, Switzerland and the Netherlands. By mid 2011 about 150 biogas upgrading plants have been constructed in Europe, biomethane was injected into the natural gas grid in nine countries and used as vehicle fuel in five countries.

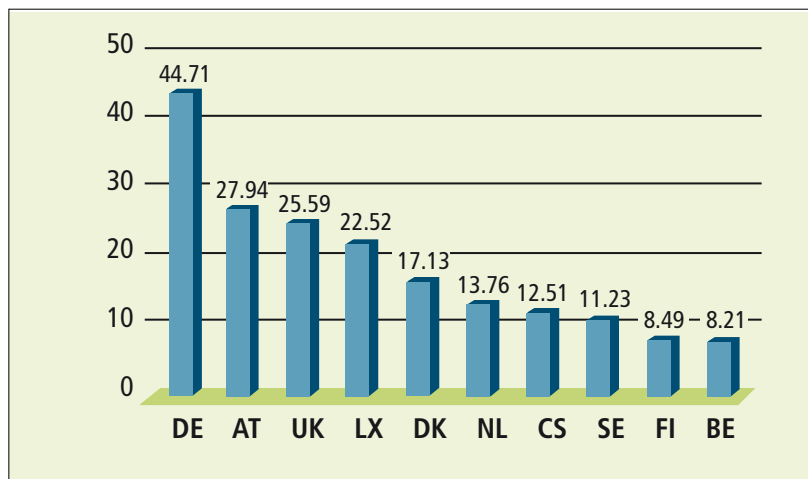
The development of the biogas industry has been very variable different countries, mostly dependent on the government policies for supporting renewable energy. Countries with ambitious goals and efficient feed-in tariff systems have reached substantial increases, while the green certificate schemes have provided less satisfactory results. Germany is the leading European alone accounting for 44 % of European primary biogas output and 50% of biogas-sourced electricity output. According to the German biogas association (Fachverband Biogas e.V.), the country had over 6000 biogas plants by the end of 2010.

The level of biogas production does not always correlate with the size of the country. The 10 biggest European biogas producers (in absolute figures) are:



These 10 countries provided 85% of the total biogas production in Europe.

The list of the 10 European countries with the highest per capita biogas production (toe/1000 inhabitants) in 2009 is different, as shown in the graph.



In 2009 the average per capita biogas production in Europe was at 16,8 toe/1000 inhabitants. Only five countries (DE, AT, UK, LX and DK) were producing biogas at above average rate, this indicates how uneven the development of the biogas industry has been.

Most of the member countries of the European Union have drawn up a biogas roadmap as part of their national renewable energy action plan. These plans have been developed under the framework of the European Renew-

able Energy Directive (2009/20/EC). The review of the National Renewable Energy Action Plans submitted by the governments shows that the European Union is set for a sharp increase in electricity production from biogas which should rise from 12.5 TWh in 2005 and 25,2 TWh in 2009 to 63.3 TWh in 2020 (with Germany contributing 23.4 TWh). The production of recovered heat, both sold outside and used inside, will rise from 0.6 to 5 Mtoe (including 1.7 Mtoe in Germany).

Given that DSM believes an integrated approach is needed to advance the biogas market and come to truly innovative solutions, we are very glad to support the initiatives of the European Biogas Association.

DSM

		2009	2020	Increase
Biogas production	Mtoe	8,35	20,83	249%
Biogas production	toe/1000 inh	16,77	41,83	249%
Electricity from biogas	TWh	25,2	63,9	254%

Nevertheless, the overall 2,5 fold growth is lower than the rate of increase of other sources of renewable energy and is also much below the potential.



## The role of biogas in a 100% renewable scenario

---

The EBA is the only European platform that unites industry and policymakers in the biomethane industry. An opportunity KEMA has to take part in.

KEMA

The present role of biogas in Europe is dominated by installations in countries with fixed feed-in tariffs for electricity. That is the reason why more than 90% of all European biogas is used in CHP units producing electricity as well as heat. The size of these units differs widely, mainly determined by the availability of the necessary feedstock, be it waste water, solid organic waste, animal-by-products or especially grown energy crops.

Only in 9 countries, part of the biogas is being upgraded and fed into the natural gas grid, thus opening the way to the whole variety of possible uses:

- electricity and heat by CHP,
- peak electricity by highly efficient gas-and-steam turbines,
- district heating,
- vehicle fuel for methane powered cars,
- use as chemical feedstock for industrial or pharmaceutical products.

This makes clear that biogas is one of the most versatile sources of renewable energy.

On the other hand biogas installations need permanent organic input. Ergo, biogas represents both: the most precious as well as the most expensive renewable energy source.

What are EBA's consequences for the future use of biogas?

Our first aim is to produce biogas as sustainably as possible, by firstly using all available organic waste and animal-by-products, and secondly by sustainable production of energy crops – preferably on former waste land, then degraded arable land and only lastly on first grade farmland.

How to put biogas to a best practice use in a 100 % renewable society? Considering the fact that the far cheaper renewable energies wind, solar, hydro, geothermal do not need regular

input of raw material, these will have to be preferred for electricity production. On the other hand, especially production of wind and solar are very variable, depending on the amount of sunshine and wind that are available. That is why biogas will be needed in times of low generation from these cheaper sources, and in times of peak demand which exceeds the other sources.

At all other times, biogas will have to be stored in the largest energy storage application available today, which is the natural gas grid. Of course, upgrading to gas grid quality is a must for this. From the gas grid, our precious gas should only be extracted for those uses where the other renewable sources are scarce or not applicable, these being peak electricity, road transport, shipping, and use within the chemical industry.

What we need for this is a complete transformation of the present energy system, which still is based on few large scale fossil and nuclear power plants. The renewable-based energy system will have to take into account the strengths and weaknesses of the renewable sources: They are many and they are distributed all over the country, and some of them are dependent on varying weather conditions. But their great number makes the failure of single plants negligible for the safety and reliability of the system as a whole.



# Challenges of the biogas industry in Europe

---

Biogas technology is widely used in Europe since several decades. At the beginning the technology was driven by the upgraded value of digested agricultural waste as a fertilizer. In the later stage after 1991 with the feed-in tariffs, the interest shifted towards energy production.

Over the last 15 years Germany became the leading country in biogas production. Today, other countries are following. The development today is pretty impressive: Over 1,000 companies throughout Europe do their business in turnkey construction or production of technical components for biogas plants. Among them are highly specialized companies like microbiological services, automatic system control or upgrading technologies. It also includes service companies or engineering offices that are involved in design, consulting and integration of the biogas plants into the local infrastructure.

Biogas is a highly developed technology. Today exist over 8,500 biogas plants in Europe with a cumulated sales volume of ca. 18 billion Euro. During the last years about 20,000 jobs were created by the biogas industry, and it is still growing at double-digit rates.

Modern biogas plants are characterized by fully-developed concepts, high industrial production standards and reliable performances, e.g. over the last 15 years the operation time of a CHP in a typical agricultural biogas plant was boosted from 5,000 hours p.a. to more than 8,300 hours p.a. at full load. This was achieved by the joint development and optimization of the plant construction and the service in operation. Today technology optimisation and control of the microbiological process go hand in hand.

The members of EBA active in the whole manufacturing chain (suppliers, technology providers, plant constructors, service companies etc.) have created the Company Advisory Council (CAC) to give the European biogas industry a platform and shape. All member companies are members of their national biogas associations. Along with their individual commitment to environment and climate protection they unite the expertise of biogas industry in Europe and push the development of the biogas technology in Europe and the rest of the world to an even more successful future by having a common approach throughout Europe.

The CAC as part of EBA sees itself as a contact point for decision makers in all aspects of biogas industry in the European market and beyond. Based on EBA's policy goals

CAC focuses on:

- quality standards as professional basis for the biogas practice,
- the exchange of local and national market experiences, and the diffusion of technological developments as an advantage for the whole European biogas market,
- the economic-technological approach in policy instruments,
- further increases in efficient use of biomass and land,
- the reduction of the ecological footprint associated with the biogas production,
- ensuring and the extension of the European biogas companies' worldwide leadership in technology

The company members of EBA are convinced that Europe has a worldwide responsibility for the extension and integration of biogas technology based on its' technological leadership. They want to contribute that this special position is recognized and expanded.





# Full members



# Associated members





# Who is who

[www.agraferm.com](http://www.agraferm.com)  
Germany



[www.agri-capital.de](http://www.agri-capital.de)  
Germany



[www.biogest.at](http://www.biogest.at)  
Austria



[www.bts-biogas.com](http://www.bts-biogas.com)  
Italy



[www.dsm.com](http://www.dsm.com)  
The Netherlands



[www.enbasys.com](http://www.enbasys.com)  
Austria



[www.greenfield-group.com](http://www.greenfield-group.com)  
Switzerland



[www.kema.com](http://www.kema.com)  
The Netherlands



[www.zander.de](http://www.zander.de)  
Germany



[www.sattler-ag.com](http://www.sattler-ag.com)  
Germany



[www.schmack-biogas.com](http://www.schmack-biogas.com)  
Germany



[www.schaumann-biotic.com](http://www.schaumann-biotic.com)  
Germany



[www.teplosoyuz.com](http://www.teplosoyuz.com)  
Ukraine



[www.evonik.com](http://www.evonik.com)  
Austria



# agri.Capital

agri.capital



Hafenweg 15  
D-48155 Münster

Phone  
+49 (0)251 - 27 601 - 100

Fax  
+49 (0)251 - 27 601 - 900

E-mail  
info@agri-capital.de

Website  
www.agri-capital.de

Year founded  
2004

Employees  
160

The agri.capital Group is one of Germany's largest decentralized producers of energy from biogas. At present, the company operates biogas plants in 58 locations. Its current electricity generation capacity is approximately 52 MW, with further plants under construction. The agri.capital Group is a vertically integrated company that covers large portions of the entire biogas supply chain. In addition to heat and electricity generation, agri.capital operates six plants for feeding biomethane (bio natural gas) into the natural gas network. The capacity of these plants adds up to 300 mill. kWh per year. agri.capital intends to continue growing in this sector and will be scaling up its investment in biomethane projects in the future.





Our innovative biotech solutions make anaerobic digestion a more efficient process and provide you with better economic results.



DSM  
P.O. Box 1  
2600 MA Delft  
The Netherlands

Phone  
+31 (0)46 476 35 80  
+49 (0)211 975 49 94 Fax

Fax  
+31 (0)46 476 37 40  
+49 (0)211 975 49 97

Year founded: 1902

Employees: 22.000

Royal DSM N.V. is a global science-based company active in health, nutrition and materials. By connecting its unique competences in Life Sciences and Materials Sciences DSM is driving economic prosperity, environmental progress and social advances to create sustainable value for all stakeholders. DSM's 22,000 employees deliver annual net sales of around € 9 billion. With an extensive know-how in developing materials and over 100 years of experience in biotech and fermentation technology we have developed a strong position in the field of bio-energy and bio-based chemicals.

DSM develops and markets innovative products to improve the biogas production process. We develop new robust enzymes mixes to break down biomass and organic waste streams more effectively and with our patented Methaplust<sup>®</sup> enzyme product we have established ourselves as one of the first movers into biogas biotechnology. By applying our biotech know-how we increase conversion rates, reduce viscosity in the biogas fermenter, and accomplish a more cost-effective and more stable production process.

DSM provides enzyme products and technical support to a broad group of biogas plant owners and operators. We also actively build partnerships across the value chain to advance the valorisation of organic side streams and make biogas production more sustainable, efficient and economically viable.



Inside the Huelsenberg Holding GmbH & Co. KG the activities concerning the field of Renewable energies and CleanTech are concentrated in the Enbycon Holding with the following international operating companies:

Schaumann Biotic Consult GmbH  
An der Mühlenau 4  
25421 Pinneberg  
Germany  
Phone:  
+49 41 01/2 18 59 00  
Fax:  
+49 41 01/2 18 59 99  
E-Mail:  
info@schaumann-biotic.com  
Year founded: 2009

Schaumann Biotic Consult GmbH is specialized in the development of renewable energy projects. This includes several major steps of the project development like feasibility studies, conceptual design, start-up and optimization of the running installation. With the high degree of experience Schaumann Biotic Consult also supports investors during the realization of their projects through independent project evaluation, opinion letters, market studies and training courses.

**Schaumann BioEnergy GmbH** is a leading company concerning conservation of organic substrates and the optimization of anaerobic digestion facilities. Schaumann BioEnergy offers tailor-made additives to increase efficiency of AD processes. The portfolio of Schaumann BioEnergy comprises trace elements mixtures, several specific additives to reduce inhibition effects, enzymes and bacterial products for conservation purposes.



**gewitra GmbH** is an engineering company with the main focus on the biological treatment of municipal solid waste. In municipal waste management projects gewitra covers all engineering steps including detail engineering and process optimization. The reduction and effective treatment of exhausted air from the waste treatment is another focus of gewitra's activities.

**bonalytic GmbH** is a laboratory service provider with proven expertise in the biogas sector. Thousands of solid, liquid or gaseous samples from biogas plants all around Europe are analysed there every year. Bonalytic GmbH is accredited according to DIN EN ISO / IEC17025.

Agraferm Technologies AG is a turnkey supplier of biogas plants who has constructed more than 60 biogas plants.

The Agraferm Group is comprised of the companies Agraferm Technologies AG, BTA International GmbH, Luxembourg sàrl, Agraferm Italia Srl, and Agracontrol sàrl. It thus is one of the few plant manufacturers covering the entire range from agricultural biogas plants through industrial/commercial plants to waste handling plants. Moreover biological and technical services are provided by the subsidiary Agraserv.



Färberstraße 7,  
85276 Pfaffenhofen,  
Germany

Phone:  
+49 (8441) 8086-130

Fax:  
+49 (8441) 8086-190

E-Mail:  
[m.seipp@agraferm.com](mailto:m.seipp@agraferm.com)

Website:  
[www.agraferm.com](http://www.agraferm.com)

Year founded:  
2004

Employees  
80





**KEMA** Established in 1927, KEMA is an independent knowledge leader and a global provider of high-quality services to the energy value chain, including business & technical consultancy, operational support, measurements & inspection, and testing & certification.

## KEMA

Utrechtseweg 310  
6812 AR Arnhem  
The Netherlands

Phone  
+31 26 356 9111

Fax  
+31 26 442 9781

E-mail  
emea@kema.com

Website  
www.kema.com

Year founded  
1927

Employees  
1,900

KEMA provides impartial advice and support to producers, suppliers and end users of energy, as well as to governmental bodies. In addition, KEMA certifies products, systems and individuals for a wide range of clients.

We are actively engaged in advancing the evolving energy system. For over 40 years, our gas consultancy & services group has served as a true knowledge center for gas infrastructure and utilization. KEMA's gas services provide you with a single gateway to a broad field of expertise in the fields of gas markets & policy, sustainability & clean energy, gas infrastructure & transport and gas quality & flow.

New gases, such as green gas, has come forward as one of the fuels of the future. It can be applied in the existing gas infrastructure, offering the possibility for a gradual transition to a



sustainable energy system. This requires the reconsideration of e.g. gas quality standards, transportation activities, and congestion management, affecting technical, economical, legal and social standards. KEMA is closely involved in the developments with regard to green gas. Our knowledge and expertise can be deployed for challenges related to multi-client projects, strategy roadmapping, economic modeling, chain analysis, technical assistance and certification.



EBA was founded in February 2009 as a non-profit organisation aiming to promote the deployment of sustainable biogas production and use in Europe through information and market evaluation. The seat of the association is in the Renewable Energy House, Brussels, Belgium.

Starting with 11 founding members - all national biogas associations – EBA is growing steadily. By now national biogas associations, institutes and companies from over 20 countries all across Europe have become member of EBA. The growing membership provides a well-established network and communication platform for exchanging information and expertise. The network enables us to provide information on market opportunities and the future market development in the different countries. EBA unites Europe's most experienced biogas experts and has highly educated and skilled staff providing policy advice, know-how and information to promote beneficial legislation and framework conditions in the field of biogas.

In 2010 EBA opened an office in the Renewable Energy House (REH) which is the central point for renewable energy issues in Brussels. Being close to the main European institutions - European Commission, the European Parliament and the Council - creates cooperative actions and information exchange on renewable energy.

EBA is a member of the European Biomass Association (AEBIOM), the European Renewable Energy Federation (EREF) and the European Biowaste Alliance.

## **EBA's objectives**

EBA is committed to the following objectives:

- To promote the deployment of sustainable biogas production, upgrading and utilisation to become a substantial part of the European energy mix.
- To be present in Brussels and acknowledged as a topic leader for biogas by EU institutions.
- To serve as a platform for information exchange, knowledge transfer and contacts between national associations, operators and industry.
- To provide easy access to and information on European regulation, market overviews, events, technology, contacts to national associations and updates about biogas developments in different EU countries, especially on country specific regulatory issues

## **European Biogas Association – Biogas industry voice in Europe**

EBA - European Biogas Association,  
Renewable Energy House  
Rue d'Arlon 63-65, B  
- 1040 Brussels,  
Belgium

Phone: +32 2400 1087

Fax: +32 2546 1934

E-mail  
[info@european-biogas.eu](mailto:info@european-biogas.eu)

Website  
[www.european-biogas.eu](http://www.european-biogas.eu)



# Biogest Biogas

Biogas pioneer in Central, Eastern and Southeastern Europe



Inkustraße 1-7/5/2  
3400 Klosterneuburg

Phone:  
+43 2243 20840

Fax:  
+43 2243 20840 40

E-Mail:  
office@biogest-biogas.com

Website:  
www.biogest-biogas.com

Year founded:  
2007

Employees:  
30

Biogest is an international biogas plant manufacturer with headquarters in Austria and additional sites in the Czech Republic, Hungary and Romania. The core competencies of Biogest range from project development, planning and financing to turnkey construction and operation of facilities. The geographical focus is on Central, Eastern and South Eastern Europe and CIS, where more than 60 biogas projects have been realized. The biogas plants are installed in the well-established Biogest PowerRing technology, which has advantages especially in Central and Eastern Europe with regard to energy efficiency, reliability and availability.





EBA - European Biogas Association  
Renewable Energy House  
Rue d'Arlon 63-65, B  
1040 Brussels, Belgium  
[www.european-biogas.eu](http://www.european-biogas.eu)





