



[biogas development in your region]

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Biogas – an important pillar of Europe’s renewable energy supply by EBA

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<http://www.biogasregions.org/>

Biogas – an important pillar of Europe’s renewable energy supply

Biogas is an attractive source of renewable energy with a big potential in Europe. Its strength is the variety of applications for heating, cooling and electricity. Upgraded biogas (biomethane) is used as vehicle fuel or injected into the gas grid. One of biomethane’s strong points is that it can be mixed at any rate with natural gas. A wide range of biomass feedstock is available like the organic fraction of municipal solid waste (MSW), industrial wastes, agricultural wastes and sewage sludge as well as dedicated energy crops. All over Europe close to 7’000 biogas installations are in operation on top of sewage treatment plants, most of them in agriculture where usually a mixture of animal manures and energy crop (maize) is digested (co-digestion). The total potential of biogas is in the order of 200 Mtoe. About half of it could be produced by energy crop, the other half by waste materials. An equal share of biomethane could be produced by gasification of wood. The gran total of 400 Mtoe corresponds roughly to the actual consumption of natural gas.



Biogas industry is growing rapidly and will contribute to the EU's objective of producing 20% of its energy from renewable sources by 2020 including 10% of transport energy.

The plants sizes are increasing allowing lower production cost. The average power increased from 350 to 500kWel., where as the largest units built in Germany and Poland have more than 10MWel.

However, there is much to be done. Until today, no particular EU policy exists on biogas - it is covered by number of policies related to renewable energies, agriculture and waste management. What exactly needs to be done to unlock the potential in biogas industry? Europe needs a Biowaste Directive setting binding recycling targets for organic waste, clear standards for grid injection and reasonable sustainability criteria.

 Dr. Arthur Wellinger, President of the European Biogas Association, www.european-biogas.eu, info@european-biogas.eu

Regions focussed on concrete Biogas Plants

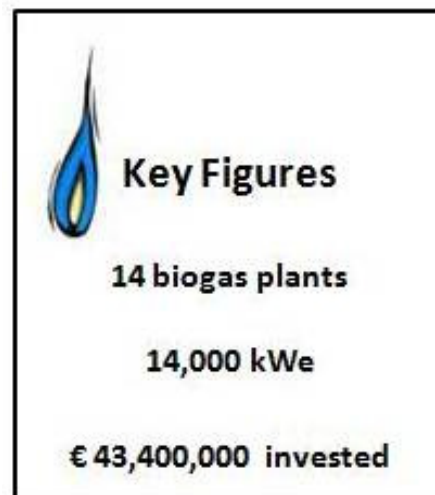
The regions Rhône-Alpes, Wallonia, Wales, Castilla y León, Abruzzo, Malopolska, Slovenia with the support of Styria, Feldbach and Wolperstshausen cooperate for developing a territorial approach of the biogas production.

Over the course of the 3 years, the regions developed successful information and promotion campaigns for deeply changing the acceptance of the biogas plants in their respective territories.

A high number of various activities has been carrying out such as:

- the setting up of an advisory groups,
- the publication of several booklets introducing the available technologies and underlining the added value of biogas for the agricultural and agro-food sectors,
- the edition of reports on the administrative, regulatory and financial frameworks, but also regional and European newsletters and best practices,
- the organisation of training sessions, site visits and workshops for local stakeholders and decision makers,
- the identification of developers and suppliers,
- the adoption of regional biogas plans,
- the conception of a biogas quick check tools and of a biogas calculator adapted to the local contexts, etc...

Finally, these territorial and interdisciplinary approaches that bring together energy experts, relevant public and private stakeholders had allowed the building of several biogas plants and the planning of several others.



Birth on a territorial biogas plant project in Rhône-Alpes Region (FR)

The first contact with the owner of the project occurred at the end of 2007. This project is now called "SIPER" as the owner, originally a farmer, has created a society dedicated to his future biogas plant: SIPER, for Sizeranne Production d'Énergie Renouvelable. The opportunity study was quite easy to do; the farmer was able to collect sewage sludge rather easily, produce energy crops, he was in contact with local agro-food industries to collect their organic wastes, had a company to transport sewage sludge,...and had a market for digestate. The main barrier was the plant location (impossible on the farmer's site because the heat optimisation was not possible).



After a meeting, the politicians gave their support to this project and decided to link it to a new aquatic centre owned by the local authority and the industrial park where will be located the biogas plant. From 2008, the aquatic center organised – with Rhônealpennergie-Environnement (RAEE) as expert - several workshops, for the technicians of the local authority, to connect the different parts of the project (biogas plant, district heating of the industrial park and aquatic center. The next step was to define the project and its technical, juridical, economical feasibility. The 8 month-study- worth €15 000 € - was done by a planner and verified by RAEE. At the same time there were local meetings with technicians and politicians to explain what an Anaerobic digestion plant was, the project, the local benefit and the impacts. It was necessary to visit existing plants too, in Germany (2008) and Austria (2009).

Following the partnership established with local authorities, 3 scenarii has been studied: 30-50 000 t of substrates and digestates, 4,3 M m³ to 7 M m³ of biogas, 1 to 3 MWe for the CHP plant , 10 000 – 20 000 MWh of heat to be utilised, 8 000-14 000 MWhe injected to the grid and an area needed for a plant 1-2 ha, 5-7 trucks/day

Today the project is 1,6MWe, 6 M € investment looking for 10-20% subsidies to be profitable. It's located in Bourg de Péage, a town of 10 000 inhabitants. The public district heating, that shall transport heat from the biogas plant, is owned by the group of local authorities pooling public service of energy, after competence transfer from the local authority. The heat will be used by the aquatic centre, and companies located in the industrial park. They are still looking for more heat optimisation solutions.

There is finally no sewage sludge (no support from politicians), but only substrates from agriculture, and most from agro-food industries. The plant got its building permit (1,5 years to change the document laying out local land development plans) but has just begun taking the step of authorization as regards environmental aspects. A new company has been created, with farmers and the constructor has been chosen: EnviTec biogas a German company. The local authorities paid attention to impacts such as the integration in the landscape, the transport trucks, and the smell (the substrate reception area is closed).

This project is the most interesting because of the mix between local authorities and a private initiative from farmers. Biogas Regions allowed RAEE to spend time convincing politicians and technicians in local authorities and in administration, to develop technical expertise (feasibility, development project), to advise the farmers, to organize visits and travels, and to create tools to be used by future owners.

 Rhônealpe-Énergie-Environnement, Valérie Borroni, valerie.borroni@raee.org

Feasibility of a Biogas plant in Di Giandomenico farm in Abruzzo (IT)



Thanks to Biogas Regions Project, Regione Abruzzo assigned two feasibility studies to the most promising farms in the regional territory. The following summary of the feasibility study is the best example of a small size plant to replicate in our region and in regions where there are many small size farms. The Agricultural Farm Di Giandomenico breeds cattle (160 cows) and the raw material available permits the construction of a power plant of 260 kW. The agricultural land to be allocated to production is 20 ha of corn silage and 20 ha Triticale silage. The manure and vegetable waste from the company comes from neighbouring companies already identified. The farm land is located in the municipalities of Teramo, Canzano and Penna Sant'Andrea, at an altitude of 250 meters above sea level.

On the basis of availability of organic matter several manufacturers of anaerobic digestion plants have been contacted. The plant solution that was chosen is the one that, using the same amount of substrates, has a greater energy yield thanks to a better technology and adopting a system with multi-stage cascade structure, which reduces the retention times and increases the availability of biogas.

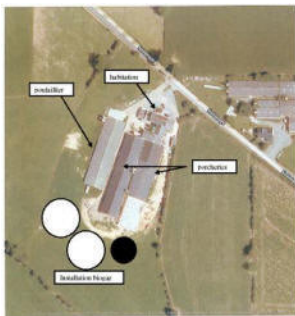
In summary, the biogas plant, which includes a cogeneration plant would:

- produce electricity: 2,080,000 kWh / a
- produce heat: 3,680,000 kWh / a

On the basis of the calculations, almost all of the digestate can be disposed of, in accordance with local regulations on farmland, the rest will be sold to farmers in the surrounding areas. The use of organic matter in an anaerobic digestion plant is a valuable way of reducing greenhouse gas emissions. From the conclusion of the feasibility study, the plant could save 1,258 tonnes of CO₂ per year. Considering a minimum of 20 years, the savings of carbon dioxide in the atmosphere could be at least 25,160 tons.

Regione Abruzzo, Energy and Environment Department, Iris Flacco, Iris.flacco@regione.abruzzo.it

Focus on Bosard's farm in Wallonia (BE)



In the project Biogas Regions, two decision-preparing studies have been realized. One of them is a typical situation of a farmer who would achieve energy independence (electricity and heat). This farmer, Mr Bosard, lives on the outskirts of Bolland, a small village next to Herve (West Belgium). This family farm, where a father works with his son, owns a henhouse with 25.000 seats for the fattening of broilers and two pig houses (2.200 pigs for fattening and 450 breeding sows).

Thinking through biomethanation for several years, and after his visit of the biogas plant of Surice and discussions with the responsible for the research consultancy LEE in Luxembourg, the farmer chose to go on and to study the possibility of building a biogas plant.

The first step of the decision-preparing study was to identify the substrate which could be injected in the digester, then to choose the size of CHP for having a more profitable plant (100 kW engine).

The first conclusion shown that:

- other matter from outside of the farm must be found,
- the heat produced will be used only on the production site,
- the electricity produced will be used to heat the family house, the farm and the digester. The surplus will be injected in the grid in exchange of green certificates.

In summary, the Anaerobic digestion plant would :

- digest - 7.600 tons/year of pig slurry:
 - 350 tons/year of chicken droppings,
 - 160 tons/year of maize cane,
 - 600 tons /year of grass,
 - 1.120 tons /year of waste from the food industry;
- produce 219.322 m³ of methane;
- produce 615.552 KWhe/y with a 100kW CHP;



- involve an investment of 1.120.000 € (The land is not included in the price since he already owns the land);
- reducing greenhouse gas emissions -1.000 tons CO2 equivalent.

The plant is conceived with a 100 kW CHP and with a digester dimensioned for a 200 KW in order to allow the farmer to upgrade to a 200 KW CHP in the future. However, this option is conceivable only if the farmer will be paid the biomethanation of organic matter coming from external sources.

At the present time, Mr Bosard is taking time to consider before investing as it is an important decision (financially speaking). But globally, it is a small project which is important to improve the revenue of the farmers.

i ValBiom asbl, Centre wallon de Recherches Agronomiques, Département valorisation des productions, Unité Biomasse et Bioénergie, Christelle Mignon, c.mignon@cra.wallonie.be

Figure 1: Localisation of the farm and of the potential biogas plant

Figure 2: general schema of the process

Next biogas expectative for Castilla y León (ES)



From 2005, Castilla y León has been working hard in the promotion of bio-energy in the region. One of its guidelines is boosting biogas installations. In this way analysis and measures have been realized. One of the vectors to develop this part of the regional biogas strategy has been the project Biogas Regions. It gave the opportunity to learn from the experienced partners, to visit biogas installations (study tour) and gave the opportunity to select 2 potential projects for studying more in deep, as the most promising project to develop biogas plant in the Region.

The first one is a plant with an estimated size of 4MWe, which will produce around 8,000,000 m³/ year of biogas and 20.954,9 equivalent toe CO₂ avoided. Where 51,000 t/year of pig manure; 6,100 t/year of rest from

slaughter and 43,000 of organic waste will be used as feedstock. An investment of 13,5 M€ would be required to make it possible.

Currently the initial society of the plant has been established by the manager of the abattoir, a financial institution and a renewable energy consultancy, as senior partners. Knowing that the consortium is not yet fixed, other energy organisations are interesting to take part in it.

In the second project, a medium sized plant of 500 KWe, with a estimated production of 2,000,000 m³/ year of biogas and residues from slaughter as feedstock has been studied. In this case there is only one promoter for the moment which is a renewable energy consultancy, but the involvement of new members for the partnership such as local producers of the residues (suppliers of the raw material of the feedstock of the plant) and some public organisations is still under discussion. An investment of around 2 M€ would be required.



In this way, it is foreseen that the investment for carrying out the two plants will come from private capital which will cover around 30 % of the total investment and the 70% will be financed through a loan to a local financial entity.

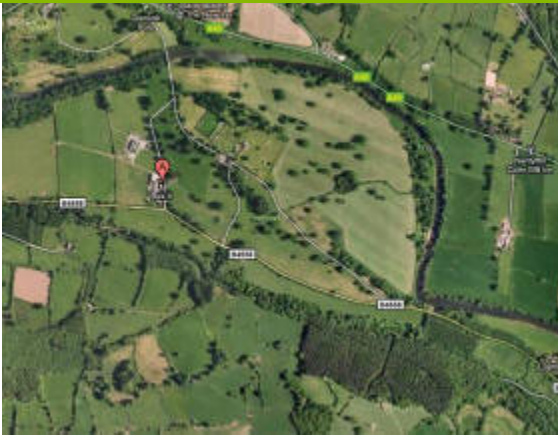
On the other hand this kind of project could be eligible for a regional or national subvention, depending on the options and opportunities on that specific moment.

Currently 11,2 MW of biogas plants are installed in Castilla y León. The biogas in Castilla y León has been estimated, and could increase by 6.7% by 2020.

i EREN, Ente Regional de la Energia de Castilla y León, Puy Domínguez, dompermi@jcy.es

Biogas at Glanusk Estate, Llangattock, Wales

One of the decision-preparing studies undertaken as part of the Biogas Regions project in the UK took its inspiration from an Austrian case study that was included within the brochure for England and Wales. The Zeltweg plant lies on a military airfield and its primary feedstock is the grass that clearly cannot be managed through the use of grazing livestock. The situation at the Glanusk Estate is that it is the use of the land for an annual music festival and other events that prevents grazing - but the



principle is exactly the same. The estate currently dumps the waste grass in a forest but the connection has now been made with the opportunities offered by Anaerobic Digestion (AD).

Glanusk Estate has partnered with community enterprise company, Llangattock Green Valleys and will be taking forward the biogas project together. The site has been chosen, consultations undertaken with the community, regulators and the local authority, and a land-use planning application is being prepared. The initial Biogas Regions opportunity study identified the potential of the grass silage base load and looked at the opportunities to add in cattle slurry. The decision-preparing study took the matter further and firstly examined the potential by

adding in other feedstocks and then looked at the opportunities for district heating in the nearby community of Llangattock. The possibilities offered by gas-to-grid are now under serious consideration. Support for the project has moved seamlessly from Biogas Regions to the Welsh Assembly Government's Ynni'r Fro (Community Energy) project that utilises EU structural funds. It now looks to be developed as an exemplar biogas project, community energy initiative and a first class example of joint venture working.



In summary, the AD plant would:

- digest 15,800 tonnes of waste grass, glycerine and manure, and energy crops,
- produce 2.24 million cubic metres of methane,
- if the CHP option is pursued would produce 8.45 GWh of electricity per year,
- involve an investment of around 4 million euro,
- save around 4,000 tonnes of greenhouse gas emissions per annum (from electricity or gas-to-grid).

The district heating option would look to use the AD plant's heat output as base load with a woodchip boiler/s (using wood from the estate's own forest) providing the peak demands.

A major UK utility company is prepared to back the project, thus providing even more confidence that it will proceed to implementation.

 SWEA, Severn Wye Energy Agency, Andy Bull, andy@swea.co.uk

Photo: Copyright SWEA, caption "The project was presented by Michael Butterfield of Llangattock Green Valleys during a "Biogas Regions" Anaerobic Digestion and Biogas Association exhibition at the National Exhibition Centre, Birmingham on the 7th July 2010.

Decision preparing study of biogas plant at farm Pristava (SL)



The expected location of biogas plant is at a pig growing Farm Ihan Pristava which is located at the edge of the Krakov forest near the village Pristava and has been ordered by: KOSTAK (Komunalno stavbno podjetje d.d., Leskovška cesta 2 a, 8270 Krško). The farm owns around 50 ha of arable land, 320 ha of arable land is rented.

Kostak Firm planned to use for biogas production yearly 30.000 m³ of pig manure from Farm Ihan in Pristava na Krškem polju. The farm also produces 11.900 tones of corn silage per year and part of the corn silage will be used for biogas production. The Kostak Firm collects from different municipal activities 1.900 tons of organic waste and green cuttings and 300 tons of kitchen waste per year. All material from municipal activities and kitchen waste will also be used for biogas production.

The amount of biogas that is produced yearly is 3.608.488 m³/year (54,13 % is methane) giving a total electricity production of 230.643,00 kWh/year and a surplus heat of 153.762,00 kWh/year. The calculated profit of 281.943,88 € annually is based on a 1.000 kW CHP unit working somewhat below its optimum at around 80.2 % load with no calculated income from heat sales.

Finally, taking into account that the Farm Pristava is surrounding by five villages and some big farms with greenhouses. To complete this project, the Institute has studied 2 options, the first one is to build a district heating for the nearest village and for the nearest greenhouses and the second one is to inject the biogas in the nearest gas network.

 Agricultural Institute of Slovenia, Tomaž Poje, Tomaz.Poje@kis.si

Recent publications

The Biogas Quick Check

The Biogas Quick check is a tool for potential biogas plant sites based on questions and a benchmarking system for farmers and consultants. Without specific technical knowledge it is possible (i.e. for municipal or chamber technicians or elected people) to fill in this quick check which will show the potential for building a successful biogas plant. With the result of this Quick Check the decision to continue with an opportunity study will be made easier and will be based on a structured evaluation. The Quick check tool was prepared by WFG Schwäbisch Hall mbH with the support of all partners and exists now in all languages – Test it !

- Abruzzo [in Italian](#)
- Castilla Y León [in Spanish](#)
- Malopolska [in Polish](#)
- Rhône-Alpes [in French](#)
- Severn Wye [in English](#)
- Slovenia [in Slovenian](#)
- Wallonia [in French](#)

The Biogas Calculator

The Biogas Calculator (Opportunity Study Tool) is available as a download from the website of the German partner to Biogas Regions. The tool should be used with !! caution !! and not before checking that the adjustable settings are appropriate to your circumstances and the current financial incentive arrangements. Let's use it!



Regional Newsletters

The partners regions of the Biogas Regions project are publishing a regular e-newsletter in their own languages presenting the last biogas development in their region. These newsletters are targeted to stakeholders from agriculture, municipalities and agro-food industry. Have a nice reading!

- Abruzzo - in Italian [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N°7](#), [N° 8](#)
- Castilla Y León - in Spanish [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N° 7](#)
- Malopolska - in Polish [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N°7](#)
- Rhône-Alpes - in French [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N° 7](#), [N° 8](#)
- Severn Wye - in English [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N° 7](#), [N°8](#), [N° 9](#)
- Slovenia - in Slovenian [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N°7](#), [N° 8](#)
- Steiermark Feldbach - in German [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N°7](#)
- Wallonia - in French [N°1](#), [N°2](#), [N°3](#), [N°4](#), [N°5](#), [N°6](#), [N° 7](#), [N° 8](#)

Communication Guides

Keep in mind
"Humans will only accept what they understand.
And they only understand something they know about.
They can only know about something if they are informed or have access to information!"

These sentences are the starting point of the Communication guides of the Biogas regions. The development of the biogas regions would have not been so successful without a large communication campaign on biogas.

During the course of the construction / project planning of a biogas plant every one will be confronted with a wide variety of questions from different people (local people, town or community/parish councils, consultees to the planning process and the Planning Authority itself).

Due to their different life circumstances, every person has a different subjective perception. This leads to the same topic often being viewed very differently. Operators of biogas plants should make an effort to try and understand the points of view of the locals / dialogue partners without any prejudice.

By trying to put oneself into the position of the person one is dealing with, the operator of a biogas plant can formulate his arguments in a better way and ensure a positive basis for a conversation.

Read it !

- in Abruzzo [it](#)
- in Malopolska [pl](#)
- in Rhône-Alpes [fr](#)
- in Severn Wye [en](#)
- in Slovenia [sl](#)
- in Wallonia [fr](#)

Others

Biogas Regions in Malopolska (PL)

In Poland the market of biogas plants using the agricultural substrates is at the beginning of the process. This is why the realization of the Biogas Regions project in Malopolska is so important. Through the Project Work Packages we have realized the main aims of the project which are listed below.

Strategic documents: At the beginning of the project country specific conditions and the regional strategy with the action plan were prepared. Country specific framework describes the concrete framework for biogas plants in Poland and the strategy gives medium and long term orientations.

Information, training and awareness raising: The major stakeholders from the agriculture, municipalities and agro-food industry were reached through leaflets, 8 electronic newsletters and brochure. To show the technology and the possibilities of building the plant 2 information seminars for 210 people were organized and a study tour to the existing biogas plant. All necessary information are presented on the project website.

The know-how transfer and investment preparation: In order to help the potential investors in the decision preparing process experienced partners from Germany and Austria with some help from other partners developed two very useful tools: quick check tool and the biogas calculator. People in Malopolska enjoyed working with this programs, because the quick check tool gave the knowledge about the basics before planning the plant and biogas calculator is giving the opportunity to calculate the amount of the substrates and costs of the potential biogas plant. With usage of this tools.

From the 5 opportunity studies done, the 2 following feasibility studies have been deeply enquired.



Subjects	Results	Results
Name of plant	Study nr 1 Private investor farmer	Study nr 2 Private investor farmer
Country, region	Poland, Malopolska	Poland, Malopolska
Motivation of investor	Waste management, energy selling	Waste management (pigs manure, grass)
Feedstock Quantity (tons per year)	Pigs Manure Potatoes Rye grains Corn stalks	Pigs Manure Straw Corn stalks Lawn cuttings
Cumulated size of digester's (in m ³)	1 289,92	597,53
Digestat : t/y	7 980,00	3 635,00
Spreading : area ha	30	30
Capacity of cogeneration (kWel)	1 791 155,00	663 335,56
Power kW	250	100

 MAES - Malopolska Agencja Energii i Srodowiska, Tomasz Lis, tomek.lis@maes.pl

Recent Events

Styria –Small Scale Biogas Plants

The development and fostering of small scale biogas plants (below 100 kWel) is currently one of the hot topics of the biogas sector in Styria. Especially in mountainous regions, where dairy farming on small farms is predominant, the potential for small scale biogas plants is estimated as very high. With animal manure and grass as feedstock, the plants deliver heat for the farm and electricity for the grid. The simplification of the administration procedure and the legal framework conditions are the main challenges at the moment.



The Biogas-Regions “Biogas Expert Round Table”, held in June in Styria, was one major step forward in linking the right people, sharing experiences and creating higher acceptance for this facet of the biogas technology. An investment aid especially designed for the small plants was announced recently.

 LEV - LandesEnergieVerein Steiermark, Christian Sakulin, c.sakulin@lev.at

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[Rhônâlpénergie-Environnement](#), Coordinator (F) - [WFG Schwäbisch Hall](#) (D) - [Landesenergieverein Steiermark](#) (AT) - [Ente regional de la energia de Castilla y Leon](#) (E) - [Malopolska regional energy agency](#) (PL) - [Centre wallon de recherche agronomique](#) (B) - [Regione Abruzzo](#) (IT) - [Agricultural Institute of Slovenia](#) (SL) - [Severn Wye Energy Agency Limited](#) (UK) - [Local Energy Agency of Eastern Styria](#) (AT) - [Internationales Biogas & Bioenergie Kompetenzzentrum](#) (D) - FEDARENE

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