BIOGAS REGIONS [biogas development in your region]

SUMMARY

Biogas production and market development through local and regional partnerships

Based on the review that biogas production is still lagging behind in Europe in relation to the objectives fixed for 2010 and its important role within the European Biomass action plan this project will foster the biogas development in seven highly motivated European regions. The barriers for developing this technology are manifold. Profiting from countries like GE and AU with a rapidly growing market of biogas plants the organised know-how transfer and sharing of experience will enable a rapid uptake in the less developed regions. The mobilisation of positive synergies between the different sectors (local authorities, farmers and food processing industries) and their concrete project implication will increase biogas plants realisation. The territorial approach facilitating partnerships between the different sectors and the elaboration of a strategic strategy and action plan in each region will overcome the obstacles and create a biogas friendly environment.

The BIOGAS website : **http://www.biogasregions.org/**

Biogas situation in France and in Rhône-Alpes

In France you can find around 70 biogas plants in urban wastewater treatment plants, 120 biogas plants in industrial wastewater treatment plants, nearly twenty in equipped landfill sites but only four animal manure treatment units. Water treatment facilities exist and are well developed, but biogas plants in agriculture suffer from a lack of profitability, due to low feed-in tariff for electricity.
However, a new tariff is in place since July 2006 that allows for developing biogas plant with co-digestion (external organic matter treated in the farm) but not for biogas plant based on energy crops.

Rhône-Alpes is an very appropriate territory for the biogas regions project, 25,000 farms are spread over the 1,7 mio ha dedicated to agriculture.; the Livestock account 1 Mio cattle and 400,000pigs; and the agro-food industry is well developed. The feasibility of 20 new biogas plants, with a specific focus on the valorisation of CHP-produced thermal energy during summer time, is currently studied. The know-how and hands-on experience that the region will gain from the project will contribute to solve the issues related to the implementation of quality biogas plants.

Agricultural Joint Energy Group(GAEC in French) du Bois Joly

The GAEC du Bois Joly is a farm of 73 hectares in La Verrie (close to Nantes in the west of France) with cattle and rabbit breeding.
First of all, the GAEC has set-up a management system for the farm's manure, in order to comply with the applicable regulation. In 2006, the GAEC initiated studies on an anaerobic digester with solid substrates, which they start building a year later. The first digester has been closed in spring 2008, and the CHP plant started in the middle of April 2008.
The biogas unit is composed of 4 digesters resembling maize silage silo, with a capacity of 185 m3 each; a tank for liquid slurry of 150 m3; a tank for recirculation "percolate" of 33 m3 and a CHP of 30 kWel. The expected bio

gas production is 67 500 m3/year. The electricity produced is sold to EDF, and the heat is used for the 4 digesters, the farmer's house, the recirculation tank, and one of the rabbit breeding hutch.
This biogas unit will be closely monitored in order to evaluate its technical and economical performances and environmental impact. This study is financed by the ADEME (National French Energy Agency).

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Photo: © Association EDEN, legend: front view of digesters of GAEC du Bois Joly

State of Art of Biogas in Italy and in Abruzzo

Italy developed experiences in the field of the biogas generated from depuration processes of liquid wastes (both urban and industrial wastes) and from urban solid waste dumping sites (in line with Italian Legislative decree 36/2003 dumps have to install a biogas captation plant).
Data analysis of the CRPA (Research Centre for Animal Production) revealed that there are 115 anaerobic digestion plants working in the technical area of the zoo and in the agro-food industry sector, 22 are under construction and 17 are in the authorization process. The majority of the plants are located in the North of Italy and about 70 of them were built with a plastic gasometric dome on the zoo wastes stocking tank. The majority of the plants has been developed according to energy saving criteria, using the energy produced during the process, for breeding farms or for the houses. 56% of the plants run with pig or cattle manure, the remaining plants use co digestion through (from?) energy crops or organic wastes.
In Abruzzo Region, there is not working biogas plant for anaerobic digestion of manure and/or energy crops/food industrial waste, but there are four companies that have just submitted the request to be authorized by Abruzzo Region. Two of them plan to use mainly energy crops (corn silage, maize silage, barley, rye, etc.), the two other one will use pig manure (28%) and energy crops (72%).

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Biogas frame in Wallonia, Belgium

In Belgium, the major part of biogas production results from landfills and anaerobic digestion of organic (industrial and domestic) waste. Anaerobic digestion of agricultural waste is still not well developed. To date, there are only 6 biogas plants in the agricultural sector in Wallonia (South of Belgium) using pig and cattle manure, food industry wastes and energy crops as substrate. TThe total electrical power of the biogas sector in the agricultural sector in Wallonia is about 1000 kW. However, there are also 1 municipal household waste treatment plants, 7 urban sewage purification plants, 10 landfills and 8 industries treating by-products by anaerobic digestion. Most of them are sugar beet industries (sugar beet grating or sugar refinery).
Currently, there are several biogas projects in the agricultural sector. A number of farmers' cooperatives have initiated feasibility studies. Most of the projects involve a few farms and plan to use manure as main substrate together with a mix of energy crops (grass + corn). They also try to find local food industries willing to treat their by-products by Anaerobic Digestion. However, partnerships between industrial and agricultural sectors need to be further developed in order to maximize biogas production efficiency and raise profitability of the sector. Nevertheless, the news regulations related to management of organic waste and the Renewable Energy Sources Directive should give a push to new biogas projects in the agricultural sector. Furthermore, the Green Certificates (GC) system encourages green electricity production by financing additional cost of the production. This way, transferable certificates are provided to producers for a number of kWh corresponding to a MWh divided by the CO2 saving rate. Green certificates are market-based instruments with a minimum guaranteed price of 65 /GC.
However, to improve the development of biogas production in Wallonia, some barriers need to be overcome such as the regulation on the building of biogas unit in the agricultural areas, the complicated administrative procedures and legislative aspects, the legal status of the digestate for using as fertiliser, the lack of know-how and experience from Belgian companies or consultancy agencies, the lack of collaboration and information between the different sectors involved in a project.

Ferme du Faascht (Attert)

Located in Luxembourg, a province in the south of Wallonia, the Faascht farm is managed by the Kessler brothers. With a livestock of 300 cows, the main activity of the farm is the meat and cheese production for the local market. Since January 2003, a biogas plant composed of 2 digesters of 750m³ each, treats cattle manure mixed with grass and little amount of waste from the food-industry (in total 12.000 tons/y). The total fermentation lasts 40 days at 38°C. The biogas production reaches 2.020.000 m³ per year. The digestate is stored in a tank of 4000 m³ before being used as fertilizer.
The cogeneration system is composed of two dual-fuel engines and a biogas engine. The total electric capacity is 390 kWel and the heat capacity is 545 kWth. The electricity and heat production are respectively 4,900,000 kWhel and 3,700,000 kWhth per year. Around 85% of the electricity production is injected into the grid. The heat production is used by the process (5%), for heating the farm (5%) and to dry the digestate (67.5%). With this biogas installation, the farm avoids the production of 2784 tons of CO2 per year.

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Photo: © CRAW; legend: "Faascht farm at Attert (B), the digester and the post-digester of the biomethanation plant"

State of art in Castilla y León, Spain

From the White Book of the European Commission and the Spanish transposition with the Law 54/1997 of the Electrical sector, the first "Plan for the Promotion of Renewable Energies, PFER: 2000-2010" (Plan de Fomento de las Energías Renovables de España) has been elaborated. In this document the objectives of development for every renewable energy such as Biogas were defined, in order to cover 12 % of the national consumption of primary energy in the 2010. This document was update in 2005 by the "Renewable Energy Plan, PER 2005-2010).

Biogas consumption in Spain reached 266.7 ktoe at the end of 2004; three times more than in 1998, and in line with the targets set by the 2010 renewable energy plan. This significant increase was achieved thanks to the first "Plan for the Promotion of Renewable Energies, PFER: 2000-2010".

Most biogas plants developed in Spain produce biogas by the degasification of dumps, which accounts for 80 % of the primary energy associated to projects under exploitation during the period 1999-2004. There are also projects from sludge, while the other treatment for an energy use has proven less advance, especially in the case of farmer residues by anaerobic digestion, which has been displaced in Spain by a thermal drying with natural gas. The initiatives from industrial organic residues are even in a minor scale.

The more remarkable milestone in the legislative framework has been the Spanish Royal Order 661/2007, which has established the methodology for the update and the systematisation of the legal and economical regime of the electricity production in a "special regulation" such as the biogas.

In the biogas area the last revision of the "Plan de Fomento de las Energías Renovables" set as a target to reach 111.20 MW and 239,103 toe at the end of 2010. This will involve an increase to 78 MW and 150,000 toe during the period 1999-2010. This target was fortunately already exceeded at the end of 2003.

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Photo: © EREN; legend: Motor Vertedero RSU Salamanca

Current Situation in the UK

There are still very few operational biogas plants in the UK outside of sewage treatment works. Some of those built to date have animal wastes as the main feedstock with the primary motivation being the treatment of waste products rather than the generation of energy. There are, however a few relatively recent plants that are treating food wastes and other similar feedstock but there is little, if any, use of energy crops and this seems to be unlikely to change at least in the short-term.

The fledgling UK biogas industry is experiencing unprecedented interest in their products and services and the number of AD plants does seem set to increase dramatically - particularly with the promised introduction of "double ROCs" (Renewable Obligation Certificates). There is huge interest from local authorities struggling to find ways to hit landfill diversion targets. Their interest is directed at the more traditional wet systems that can handle source-segregated food waste and the newer, dry systems that might be able to handle more general organic wastes.

The big issue for UK developers does appear to be the difficulty in getting proposals through the land use planning system which is partly as a result of the limited knowledge and undue fears of local government officials and councillors, and the public at large.

A recent seminar on AD held at the Royal Agricultural College at Cirencester, under the auspices of the Biogas Regions project, was very well attended with an almost immediate request for it to be repeated in the near future - now set for December in Wiltshire.

South Shropshire Biodigester, Ludlow, England

The South Shropshire Biodigester was funded by the Department of Food and Rural Affairs (Defra) and Advantage West Midlands to demonstrate the diversion of source separated household kitchen waste from landfill. The plant was designed and built by Greenfinch Ltd, who also now has the contract to operate the plant. Greenfinch Ltd and South Shropshire District Council are partners on this project and have set up a not for profit company called "Biocycle South Shropshire" to oversee the plant.

The plant has been designed to process 5,000 tonnes per annum of household kitchen waste into biogas to produce renewable heat and electricity, and a biofertiliser that is returned to local agricultural land.
The initial feedstock was garden and kitchen waste but the garden waste contained a lot of contamination ranging from plastic bags right through to building materials and even car engines! The plant was operated on this feedstock for the first nine months. Subsequent to this collections were put in place in some regions to collect segregated food waste and the plant commenced operating using this feedstock only. Operating costs were much higher with the inclusion of garden waste but with lower biogas production.

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Photo: © Greenfinch Ltd; legend: South Shropshire Biodigester

Biogas Situation in Austria and Steiermark

In Austria there are 335 biogas plants approved (2007) for producing green electricity for the public grid. The average dimension of the Austrian biogas plants range from 30-40 kWel. (2000) to 315 kWel. (2007).
The produced gas is used in combined heat and power units (CHP). The electricity is delivered to the national grid with special feed-in tariffs. A small amount of produced heat is used to increase the temperature of the digesters to optimal conditions. The surplus of heat is often used to feed in a district heating system.
Currently in Austria there is a lot of activities to integrate biogas into the public gas grid. The production of "surge currents" is a big challenge for the future, biogas can be stored for some hours without any troubles. Biogas is a very efficient technology for producing bio-fuel from the agricultural land. Biogas fuel for transport is seen as an important opportunity.

The first Biogas plant for anaerobic digestion in Styria was built in 1978, then a real boom started at the end of the 1990s. Today there are about 45 biogas plants approved (total electric capacity of about 17 MW) and 42 plants are already operating. With this installed capacity, electricity can be delivered to some 20.000 to 25.000 households. A recent study of LEV/LEA shows that the potential exists to supply electricity from biogas to 50.000 more households. About 35% are co-fermentation plants, the rest uses only renewable raw material like maize, grass and liquid manure. About 80% of the plants are operated by farmers. (Urban wastewater treatment plants are not included).

Biogas plant "Saaz"

Saaz is a typical 500 kWel energy crop biogas plant. The "RWP bioenergy limited" plant is funded and operated by 3 local framers specialized in pig and poultry farming and the cultivation of maize. The two digesters are made of reinforced concrete and have a capacity of 1800 m³ each. They are equipped with hydraulic and paddle agitator (start of operation: 2004; investment: 1 585 000).

The different types of feedstock (grass, maize, milled corn cobs, green pruning rye) are ensilaged (silo with a capacity of 8400 m³). In a proportioning tank the ensilaged feedstock is mixed with liquid pig manure. The daily load of 20 tons of energy crop feedstock requires an additional 15 tons of liquid manure. The daily yield of biogas is 5000 m³ (mesophilic way - 38°C).

Rosentaler bio power plant

The "Rosentaler" biogas plant in St. Stefan (Eastern Styria) was built in the year 2003. This plant was the first to realise a combination of organic waste, animal by-products, liquid manure and energy crops in Styria by installing an innovative hygienisation unit. The corporate partnership includes 10 farmers (owning 80 %), who have pig breeding and fattening farms, the municipality St. Stefan (10 %) and a waste management company (10 %). The investment costs for the plant amount to 2,600,000 Euro.
About 5500 tons liquid manure (pig), 1800 tons silage maize, 950 tons silage grain maize, 200 tons green pruning, about 240 tons apples/pomace (residuals from juice squeezing), 130 tons vegetable matter and 1900 tons organic leftovers make the annual feedstock of this biogas plant.
The plant produces about 750 kW of electricity per hour, which is supplied to the public grid.
The produced thermal energy is fed into a district heating system and used for heating the neighbouring stables, two blocks of flats and for drying fruit in a neighbouring plant. www.biokw.at

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photo 1: © Energieregion Oststeiermark, RMO; legend: Biogas plant "Hainersdorf"
photo 2: © LEA Eastern Styria; legend: Biogas plant "Saaz"
photo 3: © LEA Eastern Styria; legend: Rosentaler

Biogas Situation in Slovenia

Interest for production and energy use of biogas in Slovenia has greatly increased these last few years. The country is now experiencing its first phase of big investment in biogas plants. In Slovenia we are expecting building in the next years few biogas plants with 7 to 10 MWe power. Most of these biogas plants will be very sophisticated. The main resource for gas production will be waste from food industry and household organic material. Great potential is also on farms which can use manure, corn silage, grass and other organic materials for biogas production.
Biogas production is now available in five medium and big size farms. It will be also great opportunity to motivate small and medium size Slovenian family farms to produce biogas in common village plants. Small family farms however still face great risks when investing in small biogas plants (financial risks, problems with permissions from local authorities and with local inhabitants,...). Limited knowledge and experience about low cost biogas plants also hinders such initiatives at small family farms level.

Biogas plant "Bioplinarna Nemš?ak (Panvita EKOTEH d.o.o..)"

This biogas plant is the new one of the two existing biogas plants of the farm of Nemš?ak. The plant consists of reinforced concrete stocking silo (for silage maize), sanitising unit for wastes form slaughter industry, mix-sump, two flow trough reinforced concrete digesters which are equipped with dive in mixers and a second digester (also made of reinforced concrete) to serve also as storage for fermented substratum. The second digester is covered with a double membrane and serves as biogas storage. Biogas is piped from the storage to the CHP gas engine.

The total generated electric power is transmitted to the public grid respectively sold under feed in tariffs to the regional public electric power distribution company whereas heat is used for heating of digesters and farm stables.

The project is based on the concept of integral solution for waste treatment of the slaughter industry division of the agricultural group GROUP PANVITA and generates income from sales of "green electric power" to the public grid under feed-in regime.

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Photo:© Kmetijski inštitut Slovenije; legend: Part of the biogas plant Nemscak with power 1,6MWe, biggest biogas plant (SL)

Biogas situation in Poland

In Poland, the site must be chosen in accordance to the land use planning requirements. In the cases when communities that do not have such a plan, a special "decision about the facility location and terrain development" is needed. To start the development, investors have to obtain the permission for construction from the authorities.
Biogas plants are treated as recycling facilities. Permission from the Powiat (administration unit) is required. Production of electricity and heat requires licence. This licence is given by the "Energetic regulation office" for a duration ranging from 10 to 50 years. In most case, a "Report on the environment impact" is required to assess the consequence of the biogas plant on the environment.
Thanks to the RES directive, the electricity grid operator is constrained to buy the energy that is produced from renewable sources. Poland choose the green certificates market-based instruments.

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Regional Newsletters

The regions parters of the BiogasRegion project are publishing a newsletter in their own languages presenting national & regional frame and successful biogas plants. Have a nice reading !

Abruzzo	Newsletter 1	- in Italian
Castilla Y León	Newsletter 1	- in Spanish
Malopolska	Newsletter 1	- in Polish
Rhône-Alpes	Newsletter 1	- in French
Severn Wye	Newsletter 1	- in English
Slovenia	Newsletter 1	- in Slovenian
Steiermark	Newsletter 1	- in German
Wallonia	Newsletter 1	- in French

EP Resolution on sustainable agriculture and biogas

The European Parliament adopted a resolution on sustainable agriculture and biogas and the need to review EU legislation in this area. The own-initiative report had been tabled for consideration in plenary on behalf of the Committee on Agriculture and Rural Development.

The resolution recognises that biogas is a vital energy resource that contributes to sustainable economic, agricultural and rural development and environmental protection. It also stresses the contribution that biogas can make to reducing the EU's energy dependence on imports. Members encourage both the EU and Member States to exploit the huge potential in biogas by creating a favourable environment, as well as developing support schemes to inspire investment in, and sustenance of, biogas plants.

Parliament discusses the environmental, energy-efficiency and sustainability implications of biogas. It emphasises that biogas from livestock manure has numerous environmental advantages. For biogas installations just as for livestock farms, sustainability and a size that is adapted to the particular region are essential if the environmental benefits are to also lead to greater acceptance of livestock farms, which encounter many problems due to an increased number of complaints from neighbours and the general public.

With regard to economic viability, Parliament reminds Member States and the Commission that further advancement of biogas is not possible without additional funding. It recalls that funding needs to be provided for research and development, for the promotion of results from specific projects, for installations and for the increased support of 'green electricity' and 'green gas'. Parliament urges the Commission and Member States to ensure that funds from EU and national programmes go to the most efficient and sustainable installations.

The Commission is asked to present a specific report on biogas and its promotion in the EU, outlining the necessary changes in Community and national law to facilitate further expansion of the biogas sector and pointing out the most efficient ways of using EU funds and programmes, while providing examples of best practices. Parliament also asks, in this regard, for an impact assessment of the various forms of biogas production on climate, the ecology of the landscape, rural incomes and worldwide security of food supply.

Parliament proposes that the promotion of biogas be fully included in the framework of the proposed Directive on the promotion of the use of energy from renewable sources (COD/2008/0016), with special emphasis on the following:

- annual statistics and reports on agricultural biogas production in order to be able to follow up on the targets;

- measures for the construction and promotion of biogas installations based on a regional and national;
- measures for the dissemination and promotion of results gained from prior experiences or demonstration projects need to be included in all plans; if regional and rural development regulations do not allow funding of such measures, they must be amended;
- provisions encouraging or requiring Member States to engage in national and regional planning in order to limit legal and administrative impediments, for instance natural gas or other fossil fuels should not be preferred in areas in which it is feasible to sell heat generated from biogas to local heating providers.

The European Commission is called upon to:

- present a strategy to include biogas installations in the Kyoto-mechanism, for example through 'green certificates', special premiums or tax-credits for electricity and heat from biogas- installations;
- present a proposal for a biowaste directive, including quality standards;
- explore the possibility for a joint biogas and biowaste directive;
- present proposals for legislation on the use of residues from biogas installations;
- ensure that only organic material that allows residues to be used without endangering the environment may be used in biogas installations;
- ensure that the IPPC Directive, Nitrates Directives, Sewage Sludge Directive, Water Framework Directive, Birds Directive, Habitats Directive and the Heavy Metals legislation are enforced effectively in all Member States and regions, thereby making biogas installations based on manure and sludge more attractive;
- foster the feeding of biogas into natural gas networks by way of recommendations or a directive;
- present its proposals for further enhancing the use of animal and agricultural crop by-products for biogas;
- ensure cooperation and coordination between the Member States so they may learn about each other's best practices with biogas plants;
- present a coherent report on European biogas production and future prospects in this area, including an impact assessment, to the European Parliament by 15 December 2008.

Read the resolution from the European Parliament

With the support of Intelligent Energy Europe

"Intelligent Energy - Europe" - IEE II programme as part of the Competitiveness and Innovation Framework Programme. 730 million will be available to fund projects for the promotion of energy efficiency and renewable energy. The new programme will build on the strengths of IEE I whilst giving greater emphasis to addressing the needs of small and medium-size enterprises, as well as improved competitiveness and innovation. The programme will cover three main areas - energy efficiency, renewable energy sources and transport - and within these areas many of the themes from previous years have been repeated, including buildings, industry, consumer products, renewable electricity, heating and cooling and biofuels.

http://ec.europa.eu/energy/intelligent/index_en.html

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