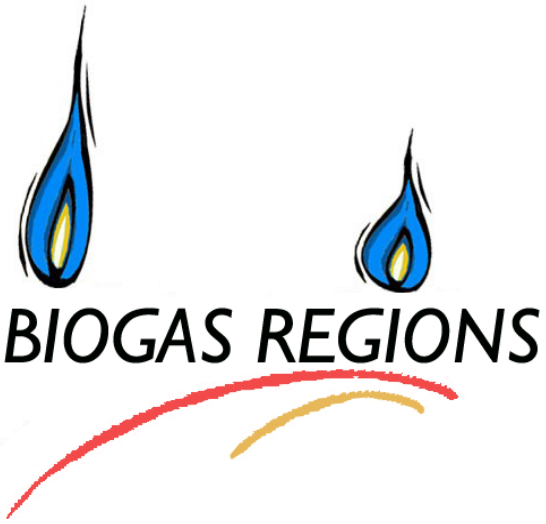
Intelligent Energy Europe



Promotion of biogas and its market development through local and regional partnerships

(Contract N°: **EIE/07/225/SI2.467622)**

Deliverable D 2.1

Compilation of administrative and regulatory framework conditions for each promoting country/region

24.09.2008

WP Leader (name, organisation, e-mail, telephone number):
Christian SAKULIN
LandesEnergieVerein Steiermark
c.sakulin@lev.at
T: +43 316 877 3389

Coordinator (name, organisation, e-mail, telephone number):
Reinhard SIX
Rhônalpénergie-Environnement
reinhard.six@raee.org
T: + 33 4 78 37 29 14

TABLE OF CONTENT

INTRODUCTION

Biogas – an all-rounder

Biogas can be used to generate electricity and heat as well as a fuel or for the injection into the natural gas grid.
Biogas can be produced from biogenous residues as well as from energy crops specifically planted for the production of biogas.
Biogas technology offers an energy supply with positive aspects for the environment, the region and the agricultural sector. In strong regions, biogas is however also seen as a very interesting stimulant for the economy.

The biogas plants in Europe are very diverse. Many different systems have emerged depending on the regional framework conditions.
In some regions, predominantly agricultural biogas plants that use liquid manure and energy crops from the own production to produce the biogas can be found. Other regions have concentrated on the use of biogenous residues and commercially/industrially operated biogas plants. A different kind of regions prefers to produce biogas fuels or the construction of CHP plants to generate electricity and heat. The size of the biogas plants in Europe ranges from very small plants (15 kW_{el}) up to several MW.
Also regionally different are the economic frameworks for biogas plants. The promotion of electricity from biogas plants takes place either through feed-in-tariffs for the produced or supplied amount of electricity or through green certificates (GC).

A quickly changing global economic situation in the past years lead to grain prices rising in a very fast and for many unexpected way. It has again become attractive for farmers to plant grains to be used for food and animal feed. The energy production stands in competition with the food production.
The fermentation of biogenous residues and waste materials that had almost been forgotten due to the excitement surrounding the use of energy crops has again become an interesting alternative. The legal frameworks have also evolved.

The predetermined framework conditions influence the development of biogas plants and are therefore of special importance to every biogas plant. Biogas systems will also in the future have to continue to adapt to changing framework conditions.

However, not only different framework conditions but also different topic areas make biogas interesting and complex.
A person that deals with biogas has many different areas in which he will be working in:

- energy generation (electricity, heat, fuels, gas)
- microbiology / chemistry / process engineering
- agriculture
- waste management
- plant engineering / mechanical engineering / electrical engineering / structural and civil engineering
- water protection
- hygiene
- administrative law (permit procedure)
- security aspects for people and the environment
- social components (communication, local population, etc.)

The biogas system remains extremely interesting and will become more varied and diverse in the future!

The presented summary of the different framework conditions of the individual target regions offers a short overview of the diversity in Europe.

Framework Conditions for Biogas Plant in Walloon Region (Belgium)

Corporate structure

The corporate structure must be a commercial structure because of the sell of energy (ltd, …). But the choice of a particularly commercial structure depends on the different subsidies requested.

Training of the operating personnel

No training session is required for the management of the biogas plant in Wallonia.

Choice of Site

In the Walloon region, a first pre-feasibility study is realized freely by the facilitator (the facilitator has been designated for advising industrials or farmers about biomethanisation project). This study includes the land use planning and sector conformity; the biogas, electricity and heat production estimation based on local and regional potential substrate (quantity, quality, conformity); the investment costs, the potential subsidies and the biogas plant profitability evaluation. The agreement of the local population must also be taken in account.

Authorization procedure

Permit to obtain

In Walloon Region, there is a single permit, which includes the environmental permit and the urban permit (Decree of 11 March 1999, order of 4 July 2002 improved by order of 1st March 2007). If the quantity of non-dangerous waste treated is above 50 tons/day in settlement zone or above 100 tons/day in the others zones of the Soil Occupation Plan, an environmental impact study is required.

Commercial conditions

As a commercial structure, an identification taxes number is required.

Green certificate obtaining (see § 9.1)

All green power generation units must submit a prior application to Walloon Commission for Energy (CWaPE) for the issuance of green certificates. A certificate of origin issued by an approved inspection body must be attached to this application. Once this preliminary application for certification has been accepted by CWaPE, the producer receives a given number of green certificates based on his quarterly energy metering statements.

Components of the plant and security

The components of the plant are defined by the architect in accordance with the urban recommendation (permit). No specific regulations about construction and security exist for biogaz plant. Anyway, the construction, operation and maintenance of the plant are subject to the local authorities recommendations about the security (DPA: authorization and prevention division, and/or fire department). The general work protection regulation and general electric facilities regulation must be considered. Before operating the plant, all the facilities must be controlled by a security representative of local authorities.

The substrate

The substrate types approved for biogas process are mentioned in the environmental permit. All toxic organic matters are prohibited. Maize and grass grown on set-aside land are allowed.

Treatment and analysis of substrate

No analysis is required for the owner's farm substrate. Substrate coming from others farm or industry must be mentioned in the environmental permit. Analysis of the content must be realized according to the permit and the Walloon waste office. The sludge from water treatment plant must be pre-treated by hygienization before the digestion as mentioned by the waste treatment regulation.All over the digestion, the fermentation parameters (pH, T°, CH_4, CO_2, fatty acid, H_2S, H_2,) must be reported.

Rules related to the storage conditions of ranch effluent

All the agricultural exploitations settled in Walloon Region have to respect minimal norms concerning the storage of ranch effluent. So, storages of 6 months are required for the liquid effluents. The solid manure storages have to be dimensioned according to the type of manure produced. The Ministry of Walloon region (DPA) imposes conditions of storage.

Gas utilisation

Heat

The heat supply from biogaz plant to buildings around the farm is not submitted to specific regulations except of the urban permit concerning the distribution facilities. The tariff is decided by the seller.

Electricity

A supply licence is required to sell electricity according the decree of 12 April 2001 related to the electricity regional market organisation (translation of 96/92/CE). For connecting to the grid, the authorization depends on the agreement of the local/regional electricity supply company based on a feasibility study concerning the local grid capacity, the voltage, the situation, the facilities. The connection must follow the technical recommendations of Synergrid (the electric/gas supply company federation). The cost of the connection is very high and totally in charge of the owner of the plant (around 25 000 to 50 000 €, in medium voltage for a farm unit). The feed-in tariffs is fixed by the local electricity supply company

Feeding the biogas into the grid / or fuel applications

Not existing in Belgium

Use of digestate as bio-fertiliser

The use of digestate is allowed only if there is respect of the norms. If not, the digestate must be destroyed by incineration, co-compost or used as landfill or industrial wasteland cover. If the digestate characteristics are conform to the norm, the farmer receives a use certificate guarantying the quality of the output product and its utilisation in agriculture. The analysis must be carried out twice a year and cost 1,000 €/analysis. The legislation about this certificate is in the AGW of 14 June 2001.

The spreading on the agricultural land can be done only in respect with the Nitrogen Directive. Before the spreading of digestate, a comprehensive soil analysis must be carried out. The necessary data are the percentage of organic matter, of minerals and of heavy metals. This soil analysis costs 2,000 €.

The Nitrogen Directive: spreading regulation

The AGW related to the sustainable management of nitrogen in agriculture does not allow the spreading of fertilisers if it is only to cover the physiological needs of nitrogen of plants, attending to limit the waste nutritive elements. Maximum amounts of spreading nitrogen are defined. The limits are fixed in step with the type of affection of lands (meadows or arable lands) profited by fertiliser contributions, with the geographical situation of lands and with the integration or not of farmers in a Quality Approach. In the same way, the maximum amounts of fertilisers vary in function of the situation in a vulnerable area, in a zone which is submitted to particular environmental constraints or elsewhere in Walloon. According to the type of manure and soil cover, there are periods when fertilization is prohibited.

Subsidies

- **Green certificate:** In Walloon Region, a green certificate system is in operation since the 1st October 2002. This system is applied in order to support the production of green electricity. A green certificate is a transferable certificate issued to producers of green power for a number of kWh generated which is equal to MWhe divided by the carbon dioxide saving rate. This saving rate is calculated by dividing the carbon dioxide gain achieved by the system under consideration by the carbon dioxide emissions of the traditional reference electric system (steam and gas turbine) defined and published annually by the Walloon Commission for Energy. The carbon dioxide emissions are those generated by the green power generation as a whole and include fuel production, emissions during combustion if applicable, and waste processing if applicable but also the transportation of external wastes or fuel consumption for energy crops. The price of Green Certificates is guaranteed at a minimum price of 65 €/GC for a period of 15 years. But the average value is around 90€/GC and depends on the GC virtual market. The green producer may sell the green certificates to different actors of the market (power supply companies, the transmission system operator ELIA, the Federal Government).

- **Subsidies for the energy efficiency and promoting of a more rational use of energy in the private sector (AMURE):** For private companies. This aid covers 50% (with a maximum of 25 000 €) of the cost of an energy audit.
- **UREBA :** For municipalities, non profit organisations. Various supports are possible:

  * 50% of the cost of an energy accounting installation

  * 50% of the cost of an energy audit

  * 50% of the cost of a pre-feasibility study

  * 30% of the investment cost of a cogeneration plant or a renewable energy plant
- **Energy premium 2008-2009 for cogeneration plants:** For private companies and individuals. This premium covers 20% of the investment cost of the cogeneration plant with a maximum of 15 000 €. The target is small scale cogeneration plants**.**
- **Investment subsidies for the development of agriculture (AIDA):** Subsidy for young farmers proposing a 3-year investment plan. The maximum amount is 250 000 € for buildings and 100 000 € for machines. The subsidy ranges from 10 to 30% of the investment plan.
- **Specific subsidy for farm biomethanation plants:** A premium additional price of 84.4 €/MWhe is provided to 100% agricultural biomethanation plants. This premium price is offered for one or two years.
- **Incentives to promote the environment protection and the durable use of energy:** For SMEs investing in projects protecting the environment and/or developing the rational use of energy. The incentive brings on the overcost of a RES plant compared with a traditional fossil fuel installation. The minimum part of the investment cost supported by the company is 25 000 €. The incentive varies from 15 to 40% of the total investment cost.

Fiscal incentives

- **Exemption of real estate immovables withholding:** For private companies investing in real estate. The exemption duration varies from 3 to 7 years.
- **Tax deduction for investment:** For industrial, commercial, agricultural companies as well as for liberal professionals. The deductible quota is 13.5% from energy savings investments, patents, research and development investments for environment.

Avoidance of hazards

General regulation for the work protection

The general regulation for the work protection established a system of authorization to operate.

Security regulation for the agricultural biogas plant

The rules concern the construction, the exploitation and the maintenance of the plant. Plant that is in an agricultural area and managed by the workers of the plant.

- **Construction**: leakproof and biogas-resistant materials, gates, mechanisms against fire, firebreak, airing of the rooms and ventilations, an appropriate distance between the plant and the others constructions… These are part of the elements to be considered for the construction of a plant.
- **Electricity:** the wiring and the electrical equipment have to be in accordance with the rules of the general electric facilities regulation and with all the standards in application. A protection against lightning is required for the aerial constructions.
- **Safety measures:** safety boards have to be put near the dangerous areas (risk of explosion / burning, no smoking), monitoring of the plant (temperature, alarms,…)
- **Plant inspection:** by the responsible authorities, before the beginning of the activities.

For further Information, please visit contact:

Sandrine Dufourny
Centre wallon de Recherches agronomiques - Departement Genie rural
Agricultural Research Centre - Agricultural Engineering Department
ValBiom asbl
Chaussee de Namur, 146
B-5030 Gembloux (Belgique / Belgium)
s.dufourny@cra.wallonie.be

Framework Conditions for Biogas Plant in England and Wales

Overall Conclusion

There would appear little doubt that land-use planning consent is one of the greatest barriers to the implementation of biogas projects in England and Wales. There are clearly issues relating to the financial viability and availability of finance but the situation is quickly changing in this respect and potential developers are becoming apparent, particularly where there are feedstocks available that will attract a gate fee. The regulations surrounding health and safety, environmental protection and bio-security are restrictive – but they are predictable and objective. It is the subjectivity of the planning process with its political input that frustrates developers and represents a significant barrier.

Framework Conditions

Limited Expertise

There is an apparent limited pool of expertise at all levels of the industry right through from plant designers and planners, through manufacturers and installers to plant operatives.

Land-Use Planning

Land use planning is a very significant barrier. Most Planning Authorities have little policy context for making decisions on biogas and there is very limited guidance from central government. The lack of knowledge and experience of the technology tends to lead to a situation whereby neighbours fear the unknown and planning officers and councillors play safe and refuse permission. At best, the decision often takes a very long time introducing significant and often costly delays.

Environmental Permitting Regulations

This issue is regulated by the Environment Agency and seeks to ensure that the operation poses no threat to the environment. It requires there to be demonstrated, technical competence, an absence of relevant offences and adequate financial provision/security.

Animal By-Products Regulations

These regulations come into play when food waste is involved and the State Veterinary Service ensures, through a tight set of requirements that bio-security is not compromised.

Plant Components and Safety

Biogas is potentially explosive and thus there are very strict regulations covering the need for precautions to be in place. Explosion is not the only risk to health and safety and all of the relevant issues need to be carefully addressed.

Availability of Appropriate Feedstock Material

The most likely feedstocks are source-segregated food waste, residual municipal waste, waste from food processing (including abattoirs), animal slurries and especially grown crops and crop residues. Long term contracts should be in place before commitments to build a plant are made.

Opportunities for Gas Utilisation

The most common method for extracting energy from the biogas is via a gas engine to generate electricity. For this to be economically viable there must be a connection to the supply network at reasonable cost.
The economic and environmental value of an electricity generating scheme is very greatly enhanced if the “waste” heat can be productively used.
Alternatives to electricity production include burning the gas for heat only, feeding the methane (approx 60% of the biogas mix) into the gas grid and using it as a vehicle fuel.

Using the Digestate

The liquid digestate can be very usefully used as a direct replacement for mineral fertiliser and this is most easily achieved if the land concerned is linked to the AD plant.

The solid fraction of the digestate can be utilised as a soil improver.

For further Information, please contact:

Andy Bull
Severn Wye Energy Agency
Entrance A, Royal Welsh Showground
Builth Wells, Wales. LD2 3NJ
andy@swea.co.uk

SevernWye ENERGY AGENCY

Framework Conditions for Biogas Plant in Rhône-Alpes (France)

This document is a summary in English of a more comprehensive document written in French which identifies current threats and opportunities in the area of farm or/and territorial projects and describes the context affecting this sector.

Hidden from view

Agricultural methanisation remains unfamiliar to elected people and the general public; it is still very much limited to the agricultural sector. Communication on projects will be very important and delicate. The communication tools aimed at elected people are hardly developed and those aimed at the general public do not yet exist. Those elected people who know the agricultural world are carrying out lobbying activities and developing interest at a local level.

Know-how to be developed

Training for planners and consultants is starting to take off in France. The main knowledge comes from German builders who offer training to project owners. With the backing of the builders, a cogeneration maintenance network should take shape at a regional level. Nevertheless, several constructors are represented in Rhône-Alpes. While expertise in the area of biogas and methanisation is good, expertise in the area of district heating for heat valorisation remains fragile.
Setting up a project from the feasibility study is sometimes difficult due both to the quality of the work performed and the lack of profitability, which fails to encourage the owner.

Forthcoming building standards

There are no specific standards for biogas plants (digesters). For the design of a plant, existing standards and practices will have to be used.

Difficulties to set up projects

Concerning projects in farms, a scenario based on an average cattle raising farm in Rhône-Alpes is not profitable. Find the right site for a project, easy given the situation in France, requires the total thermal valorisation of the heat produced. A territorial approach (with farms, agro food industries, and public bodies) is also necessary to reach a critical size and a worthwhile level of energy valorisation. This means involving local authorities and their associated bodies which significantly complicates the organisation of an operation due to there being more participants, different stakes and different decision-making procedures.

A farmer with a project remains alone figure. Farmers may resort to the chambers of agriculture and energy information offices for support during the process. However, the technical capacity of these technicians in the area of methanisation is not excellent. Rhônalpénergie-Environnement provides support.
Currently in the Rhône-Alpes region, for liquid manure systems, an analytical tool funded by the Agency for the Environment and Energy Management (ADEME) allows an initial technical and financial analysis to be carried out. But a lot of demand comes from cattle farmers regarding solid manure systems (system batch on solid manure), the know-how for which is not greatly developed in Europe.
Regarding the feasibility study, it is still very expensive (€10,000 to €15,000) and its results do not always match expectations particularly in the area of cosubstrate research and the regional approach.
The government's new budget law, allows farmers to consider the sale of electricity and heat as a part of agricultural revenue and thereby does away with the need to set up a company.
However, a project requires funding to attain an acceptable level of profitability.
As for loans, banks like to see sponsors put forward 20% of their own funds, something which is not easy to achieve given the size of the investments. Builders' research offices provide funding solutions by allowing investors (pension funds, etc.) to take a stake in the project.

Protracted administrative procedures

For biogas plants, there is currently no section specific to classified facilities in the area of environmental protection. This is being considered at a national level. Nevertheless, the plant can be subject to authorisation or declaration under various existing sections and mainly those sections:

- linked to cosubstrates if they come from classified facilities or if they are animal by-products,
- linked to the valorisation of biogas in cogeneration as from 30 kWe...

The administrative referent which will regulate the authorisation process is not yet clearly defined. Nevertheless, if the farm has already received approval, the methanisation activity could be considered as an extension. Everything will depend on the project.

The environmental authorisation process takes 12 months and cost 15 000 €. The dossier that has to be presented comprises:
An environmental impact study which describes the initial situation (with regard to the environment) prior to installation. Its purpose is to identify the disturbance caused by the new plant and to identify solutions put forward to limit the consequences of this disturbance. A risks study to identify hazards (explosion, fire, pollution, etc.) of any kind which could affect the environment and the populations concerned, during normal operation and in the event of an accident.
A health and safety study assesses the possible impact on employees in the plant and the prevention of risks.

The procedures to connect the plant to the electricity network are also very long and prolong the administrative process (10 months).

The need to find cosubstrates outside of the farm

The electricity repurchase price in France forces the project sponsor to seek payment for the treatment of waste outside (co-substrats)of the farm: however, such waste is increasingly hard to come by as people compete to collect organic waste, thereby allowing some industrial firms to release such waste at no charge or even to sell it. This situation does not help the plants' economic stability.

Limited uses for biogas

It is currently not possible in France to inject biogas into the natural gas network. This is due to regulatory and health reasons. Work is under way at a national level.
Transportation procedures specific to biogas do not yet exist. In the Rhône-Alpes region, Rhônalpénergie-Environnement has accompanied work from a technical angle as from landfill.
Biogas fuel is not contained in French legislation while at a European level it is recognised and implemented. The only use of biogas as a fuel occurs in Lille from biogas which, in the past, was produced by wastewater treatment plants and is now produced through household organic waste methanisation.
The biogas cogeneration rate has risen since July 2006. It is made up of three components: a cogeneration rate of €0.09/kWhe, a methanisation bonus of €0.02/kWhe and a thermal valorisation bonus of up to €0.03/kWhe, if there is a total valorisation of more than 70%. If there is thermal valorisation, the rate can rise to €0.14/kWhe for a farmer.
Such valorisation is very important for the profitability of a project, especially as it is sometimes difficult to use all of the heat in the farm's buildings. Cogeneration will produce heat throughout the year, therefore use of this heat must also be found during the summer months.

No status for digestates:

There is currently no standardisation or homologation for digestates. Standardisation is being studied at a national level. Digestate spreading will be laid down in law.

For further Information, please contact:

Valérie Borroni
Regional Energy Agency of Rhône-Alpes
Rhônalpénergie-Environnement
10 rue des archers
69002 Lyon, France
valerie.borroni@raee.org

Framework Conditions for Biogas Plant in Abruzzo (Italy)

Corporate structure (legal form) of the owners

There are several possible legal forms as shown in the next table:

Corporate Structure	Number of partners	Liability of partners	Constitutive Act	Minimum capital	Administrators
One man business	Only the owner	Unlimited (personal property)	It is not necessary	It does not exist	The owner
Family Company	The owner and the collaborators, members of the family	Unlimited(personal property)	Certified private document with the list of the family collaborators	It does not exist	The owner and for specific decisions th ecollaborators from the family
Copartnership	2 or more	Unlimited (personal property)	Certified private document Or Public Act	It does not exist	The partners
Limited partnership	2 or more, at least one is unlimited partner	Unlimited (personal property) for the unlimited partners, limited to the capital deposited for the limited partners	Certified private document or Public Act	It does not exist	The unlimited partners
Limited company	2 or more	Limited to the capital deposited	Public Act	€ 10.000,00	The partners or others
Limited company (with one partner only)	One partner only	Limited to the capital deposited	Public Act	€ 10.000,00	The partner
Cooperative company	A certain amount of partners according to the kind of cooperative	Usually limited to the capital deposited	Public Act	It does not exist	The partners or others

Operators / Training of the operating personnel

According to the Legislative Decree 626, 1994, training and information regarding occupational safety and health in the workplaces are compulsory in Italy for all the employees. The employer is responsible for training and information courses on the following topics: general and specific risks in relation to the job, safety and prevention measures, First Aid procedures, fire prevention, evacuation and fire fighting activities, the names of the workers in charge of First Aid procedures, fire prevention, evacuation and fire fighting activities, management of emergencies.
Chemical and biological risk needs specific training in order to reduce as much as possible the risk.
As to waste management there is no compulsory specific training and information. There are voluntary certifications such as (ISO/EMAS).
There are no other specific directives for the training operation of biogas plants.

Choice of Site

The site where to built the plant may have certain constraints such as environmental, archaeological, hydro geological, architectonic constraint. Depending on the kind of constraint the competent body (Region, Province and Municipality) should evaluate the project and give either positive or negative answer.
According to the Legislative Decree 387/03 art.12, plants for the production of renewable energy sources are useful for the community, it is therefore possible to expropriate the land where the plant will be built.
According to Legislative Decree 241/90, art.9 anyone who could be damaged by the expropriation procedure can take part in the procedure.
As to the smell in Italy there are no limit values or specific laws. The legislation only mentions the necessity to assure fair odour levels for the population.

Authorization procedure

More detailedi information are available on the web site:
http://www.regione.abruzzo.it/xAmbiente/ in section " energia" – "autorizzazione unica".

In Italy, the Regional Bodies are in charge of granting the so called "Autorizzazione Unica", that is the authorization for the construction and functioning of plants for the production of electric energy from renewable energy sources. This authorization also involves modifications, improvements, restructuring, maintenance and infrastructures and all those works which are fondamental for the construction and functioning of the plants. In the case of Regione Abruzzo the body that we represent is in charge of it. All the procedure takes 180 days at the most.
The only exception is the areas that should undergo the environmental impact assessment that needs to be done before the granting of the authorization.

There are also other bodies involved in this procedure, for example the provincial administrations are in charge of emissions in the atmosphere and industrial water wastes. In Regione Abruzzo there are 4 provinces CHIETI, l'AQUILA, PESCARA, TERAMO. Depending on the location of the plant the provincial administration is involved.

The technical Report to be sent to the regional body must include the following parts:

1. town and territorial planning
2. description and analysys of the type of activity involved: productive cycle, production of the plant, and energy consumption
3. raw materials
4. water cycle
5. emissions in the atmosphere
6. wastes management
7. re establishment of the site(comma 4 dell'art. 12 del D.Lgs 387/03)
8. monitoring and control plan
9. conditions that differ from normal functioning

Components of the plant

The following points were analysed, mentioning all the aspects involved and the laws that rule each specific topic:

- Civil Engineering
- Fire prevention (accumulation tank, co generator engine)
- Potentially explosive atmospheres ATEX Directive
- Electric plant
- Protection from atmospheric discharges – ground lead systems – Procedures
- Emissions in the atmosphere
- Hygiene
- Waste waters discharge
- Noise
- Maintenance
- CE marking

i.e. Civil Engineering

- **UNI 10458:1995** is a specific norm for biogas plants. It includes classification of plants, requisites, rules for the construction, offer, and start up. Because it has become inadequate for today's market ithas been revised by a Group of researchers GC 904"
- **Progetto CTI : E0209A420** It defines classification of plants, requisites, rules for the construction, offer, and start up of the plants for the production and use of BIOGAS from anaerobic fermentation. This norm applies to any anaerobic digestion plant that use organic wastes such as biomass, organic wastes etc. It does not rule biogas captation plants from dumps.
- **Italian building regulations**: DPR n. 380/2001 "Testo unico per l'edilizia", "Norme tecniche per le costruzioni" DM 14/01/08, DM 16/01/96, Costruzioni in zona sismica DPCM n. 3274 del 20/03/03, DM 14/09/05.

i.e. Emission in atmosphere and waste waters

- **Legislative decree 152/06 part V**: Establishes limit values and monitoring frequencies

Choice of Substrate – input

Regulation (EC) No. 1774/2002 :European Regulation on the treatment and further use of animal by-products could prevent a further spread of diseases. This very extensive regulation governs the collection, transport,methods and procedures of treatment, as well as the further disposal, use or trade in the products respectively.
In the case of wastes, the Legislative Decree 152/06 must be respected.
The substrate will respect technical prescriptions in order to obtain maximum efficiency.
The material will be evaluated by the regional administration during the authorization procedure. Those plants that produce energy and put in the net will obtain the Green Certificates (special incentives).

Gas utilisation – outcome

The biogas produced can used for the production of energy, with the acquisition of Green Certificates.
There are also other kinds of incentives, the TEE are granted to certify energy consumption reduction and energy efficiency.
The biogas produced can also be used for heat production both for self production inside the companies and in district heating system.
To be connected to the grid the owner has to present a request, according to the Electric Energy Autority normative n.281/05 to :
Terna if the connection power is ≥ 10 MVA 10 MVA
Other local distributors such as ENEL if the power is **< 10 MVA.**
The procedure is ruled by normative DK5310 which estabilishes also timing and contract conditions.

Utilization of digestate

If the digestate comes from anaerobic digestionof manure, energy crops and agro-industrail waste it has to be followed the DM 07/04/2006 regarding the agronomic utilization of this product. It fixes the conditions of the spearding and the maximum amount of N per unity of surface. If a percentage of other waste is in the input substrate also the digestate is considered as waste and the agronomical spreading has to be authorized in line with art. 208 of legislative Decree n.152/06.

Other regional measures:

- Delib.G.R. 7 settembre 2007, n. 899)“Art. 92 - D.Lgs. 3 aprile 2006, n. 152 - Approvazione definitiva del programma di azione per le zone vulnerabili da nitrati di origine agricola rielaborato a seguito delle osservazioni ministeriali”

- L.R. 17 luglio 2007, n. 22 (Pubblicata nel B.U. Abruzzo 25 luglio 2007, n. 42.) “Promozione dell'utilizzo dei rifiuti comportabili e degli ammendanti per la tutela della qualità dei suoli”

Avoidance of hazards

The main issues of the biogas plant to take nto consideration are: smell, Fire risks, explosion risck, asphyxia risks, emission of pollutant in air, examples of previous accidents occurred, phytotoxicity. The relative measure to avoid the relative hazars have already been included in the previuos chapter. Moreover a proper formation and information of operator is necessary in order to prevent any king of accident and properly react in case it occurs.

For further Information, please contact:

Iris Flacco
Abruzzo Regional Energy Agency
Via Passolanciano, 75
65100 Pescara, Italia
iris.flacco@regione.abruzzo.it

Framework Conditions for Biogas Plant in Poland

Corporate structure (legal form) of the owners

In Poland legal status depends from the number of the investors, law status of the investors, and the competences of the potential investors. The legal status, have no influence on the taxes but it influences the responsibility of the owners or investors.
The payers of the agricultural tax have a possibility to use the investment allowance when buying and installing the equipment for production of the renewable energy.

Choice of Site

The site must be chosen in accordance to the land use planning. When the community doesn't have a spatial plan the "decision about the facility location and terrain development" is needed. To receive such a decision the investor, have to prepare an application with:

- function and method of development of the area,
- the characteristic of the proposed development,
- demand for water, energy, the way of the water treatment, the procedures of dealing with waste,

Attachments:
Maps, agreements or technical conditions for technical infrastructure (water, sludge, electricity etc.) decision of the inclusion to the road system.
The authority informs all owners of the neighbour parcels. When receive no recall from the neighbours gives the decision. When there will be recalls can demand further documentation e.g. "Report on influence on the environment"

Permission for construction

To start the development investor, have to obtain the permission for construction from the legal authority. The authority checks the following aspects:

- is the project compatible with the spatial plan or with the "decision about the facility location and terrain development"
- is the project complete,
- the competences of the builders,

Authority has one month to give the permission that is 2 years valid.

Technical supervision

Before starting the plant the investor has to obtain the permission from the "Technical supervision". The permission is given after evaluation of the documentation and the examination of the installation.

Substrates

Biogas plants are treated as a recycling facilities. A permission from the powiat is required.
Substrates from the animal origin are divided into 3 categories. Only 2 (133 ºC 3 Br 20 m) and 3 (70 ºC, 1 hour)can be used in the biogas plants. The facility has to have own laboratory or use an external one.
To use the waste form the plant as a fertilizer a special permission is needed (Ministry of agriculture). When it is treated as a waste the permission for producing is needed (powiat).

Gas utilisation – outcome

Electricity - production of the electricity and heat requires licence. The licence is given by the "Energetic regulation office" for 10 to 50 years. To receive the license the "decision about the facility location and terrain development" is obligatory.
In Poland the operator of the electricity grid is obligated to buy the energy that is produced from the renewable materials (green certyficate). It is also obligated to build the grid to the plant but it is not specified how long it should take.

In Poland the producer of the renewable electricity can obtain income from the two sources:

1. The price of the electric energy, which is guaranteed, and represents average price of the electric energy on the market in the previous year,
2. The price of the certificate of origin, which depends from the present rate on the Energy Stock Exchange

The average price of the electric energy on the market in the year 2007 was **128, 44** zł/MWh which gives in current rate **38** €/MWh

The price of the certificate of origin on the Energy Stock Exchange on 27th June 2008 was **241.44** zł//MWh which gives in current rate **71**€

The total income which th eproducer can obtain is **109 €/MWh**.

Report on influence on the environment

The development of the biogas plant can be connected with the negative influence on environment. That's why in most cases the "Report on influence on the environment" is required. It's a document that indicates all the bad influence the investment can have on the environment. The proceedings have to be done with the participation of the society.

Availability of trained operators or specialised training programs.

Specialised training programs haven't been prepared yet in Poland. The trainings for the operators are usually provided by the contractors responsible for the process of building and starting up the plant.

Components of the plant and avoidance of hazards

The Technical Support regarding to different components of the plant is controlled by Ministry of agriculture standards (Statutory Instrument from 7th October 1997) and "Technical supervision" – special bureau responsible for acceptance of the new installations.

The fire safety regulations are included in Ministry of Infrastructure or Interior Ministry dispositions (12th April 2002 and 6th June 2003).Any explosion actions controls PN-EN 1127-1 Norm (April 2001).

For further Information, please contact:

Tomasz Lis
Małopolska Agencja Energii i Środowiska sp. z o.o.
Ul. Kordylewskiego 11
31 – 542 Kraków
tomek.lis@maes.pl

Framework Conditions for Biogas Plant in Slovenia

Structure of the owners of biogas plant

The owner of a biogas plant may be a natural person or a corporate body. Legal provisions refer to owner's commitment regarding the construction and operation of biogas plant regardless of the owner. Natural person engaged in agricultural activities will be able to register the activities as other activity. The decision to build a biogas plant may be made by a farm owner or a group of farmers who have large enough quantity of livestock wastes (slurry) or agricultural wastes (plant wastes) at their disposal. Among the corporate bodies, large livestock farms, enterprises collecting bio-degradable wastes, especially those produced in kitchens and restaurants, food producing companies and investment companies which see an interesting business opportunity in biogas plants, are the most appropriate to build biogas plants. The owners of biogas plants must be registered according to the Order on Standard Classification of Activities.

Operators of energetic plants

Biogas plant producing electric energy and/or heat will also be treated as energetic object. The operators of biogas plant have to fulfil legal conditions regarding the size of plants. Education and duties of operators of energetic plants are laid down in the Rules on Technical Education, Working Experience and Obligatory Training and Testing of Knowledge of Workers Performing Work and Duties Concerning the Operation of Energetic Plants. In the Rules mentioned above the professional training and test of knowledge for the operators of energetic plants are prescribed. Here are some of them:

1. Operator of steam turbine of which the nominal power exceeds 1 MW,
2. Operator of gas turbine of which the nominal power exceeds 1 MW,
3. Operator of co-generation plant, of which the nominal power exceeds 500 kW,
4. Operator of internal combustion engines, of which the total nominal power exceeds 300 kW,
5. Operator of gas plants performing the following work and duties: operation of plants and devices in the production or when technical and other gases are used, of which the total nominal power exceeds 300 kW.

The Rules on Technical Education, Working Experience and Obligatory Training and Testing of Knowledge of Workers Performing Work and Duties Concerning the Operation of Energetic Plants prescribe the program of technical training and test of knowledge for the workers performing work and duties of operating the energetic plants

Choice of site

The construction site of biogas plant should be located near the spot of waste generation such as farms, livestock farms or location of collection of the substrate used. The location for the construction of biogas plant is the piece of land intended for construction use in the communal land use planning. The land use purpose is determined in the official document on land use planning. The Law on Land Use Planning regulates the land use planning as part of land use regulation by determining the types of land use planning documents, their content and the procedures required for their preparation and adoption.
The Regulation on Biologically Degradable Wastes determines general conditions to be considered at the choice of biogas plant site:

- Quantity and type of available biologically degradable wastes and technology chosen for their processing,
- Distance of the site from housing areas, recreation areas, water bodies including their influential areas and other agricultural and settlement areas,
- Proximity of surface waters, water protected areas, coastal area, territorial waters and
- Proximity of areas protected by regulations on the preservation of nature or regulations on the protection of cultural heritage.

Beside these general conditions it is necessary to put in order the problems of leak water from the area of the plant conforming to the municipal regulations.

Site plan

The construction of a plant (biogas plant in our case) requires a definition in the official document on land use planning which determines its type and the conditions that need to be fulfilled to build in certain area. It is therefore necessary for the investor in biogas plants to verify right at the beginning of the project preparation, what are the conditions laid down in documents on land use planning in the area in which the biogas plant is to be built. Prior to start building the plant the investor has to find out whether the biogas plant construction site is adjusted and integrated in the valid documents on land use planning.

Municipal site plan

The content, form and types of preparation of municipal site plans are determined in a special regulation (Regulation on the Content, Form and Type of Preparation of Municipal Detailed Land Use Plan).
The Municipal Site Plan is prepared in accordance with the measures and conditions required for the management of space in the Municipal Law on Area Planning.
The investor submits an initiative to the municipality for the preparation of site plan. The initiative for the preparation of site plan has to contain an explanation and documentation in the form of a review and description of the proposed spatial plan, possibly in the form of several variants, so precise as to present the volume of the proposed spatial plan and its main characteristics. The initiative has to be based on the documents on spatial planning and other sector rules, which are the basis for the preparation of site plan with regard to area planning.

The Municipal Council accepts the Program of Preparation of Municipal Site Plan in which the required professional bases for site plan and their acquisition are stipulated. The Site Plan is spread out in the municipal building, or it may be carried out in some different locally usual way. Until the enforcement of municipal spatial order the area planning in municipal site plans is planned in accordance with spatial components of the municipal long-term and medium-term social plan.

Neighbours/ owners of the abutting land

The Law on Construction of Buildings in its 62nd paragraph, in the process of issuing of building permit for a plant in the area regulated by spatial order, gives the right to participate in the procedure, beside to the investor, also to other interested persons determined by the Administrative Body for Building Affairs.

Site Information

Site information is required for the establishment of adequacy of certain site for the building of certain plant (i.e. biogas plant in our case). Site information is issued for the purposes among which is the building of plants or performance of works on building sites or plants.

Smell

The Order on Processing of Biologically Degradable Wastes requires the solution of problems concerning the emission of annoying smell from biogas plant as a condition for integration in the environment.

Biogas plant with yearly capacity of processing more than 500 t of biologically degradable wastes of plant origin or 350 t of other biologically degradable wastes has to assure the functioning of a technical system that would be able to reduce the emission of annoying smell from such a plant.

Legal frame - licence, permits

Licence to perform the energetic activity

Energetic Law provides that the performance of individual energetic activity requires the acquirement of a licence to perform the energetic activity (further on: Licence) for plants producing electrical energy above 1 MW. From the provisions of Energetic Law it is evident that the Licence is required for biogas plants with installed electrical power exceeding 1MW.

Environmental authorization

Biogas plants using agricultural wastes do not require environmental authorisation if the entering heat power in the plants for the production of heat and/or electrical energy is lower than 1 MW.

Building permit

Building of a new plant, reconstruction of a plant, replacement building and removal of a plant may begin on the basis of legally binding building permit.

The application for the issuing of building permit is submitted at the competent administrative body for building affairs by the investor. It must contain data on plot number and cadastral

municipality of the building site with the intended building and sites on which the connections to infrastructure will be placed in case the plant is to be connected to it.

Fire prevention

The Law on Fire Prevention referring to the building of plants demands the fulfilment of requirements concerning fire prevention determined by Rule on Plant Building. Plants, installations, products, elements and complexes of constructions of plants have to be built and made in the way and from such materials as to assure the fire prevention conforming to the rules from the previous section.

The licence to use

The licence to use as defined in the Paragraph 89 of the Law on Building of Projects is a provision by which the administrative body that had issued the building permit on the basis of preliminarily performed technical surveillance allows the start of the plant use. The investor has to submit the application for issuing of the licence to use at the administrative body for building affairs who had issued the building permit in the interval of eight days after the information of performer that the building is completed. Prior to that the investor has to determine together with the authorised inspector and project leader for the acquirement of building permit that the construction was carried out in accordance with building permit so that the plant may be exploited, and that the project of performed work was completed.

Approval of Veterinary Administration

Biogas plant utilising animal by-products as substrate (slurry; slaughterhouse wastes...) needs an approval of Veterinary Administration of Slovenia conforming to the order No. 1774/2002 of the European Parliament and Council on the determination of sanitary rules for animal by-products not intended for human food.. In this order the animal by-products are divided into 3 categories:

Status of qualified producer of electrical energy

Qualified producers of electrical energy are producers of electrical energy in qualified electric power plants which acquire their status following the Order on Conditions Required for Acquisition of Status of Qualified Producer of Electrical Energy.

Choice of substrate

The substrate has to be chosen with regard to its available quantities in the surrounding of biogas plant. In agriculture the suitable substrates are slurry, manure and liquid manure, green wastes from agriculture and slaughter-house wastes. For the use of animal by-products as substrate for the biogas production conditions determined in the EC Order No. 177/2002 have to be fulfilled.

Biogas utilisation

Biogas generated from anaerobic fermentation or digestation of bio-degradable materials (substrate) is mostly used in the systems of co-generation of heat and electrical energy. In Slovenia the biogas is produced in relatively small plants driven by gas engine suitable for

low power biogas plants. There are no large biogas plants for the large scale production of biogas and its transfer in biogas grid in Slovenia.

Heat

Heat produced in steam boilers or in systems for co-generation of heat and electricity driven by biogas is applicable in the first place for heating of digestor to desired temperature while the remaining heat may be used for other useful purposes such as heating of premises, drying of agricultural products, heating of greenhouses and other purposes on the site.

Electricity

Biogas produced in biogas plants is used mostly for the production of electricity in the systems for co-generation of heat and electricity. The engines used prevailingly are gas engines adapted to biogas properties. In Slovenia gas engines are used for the production of electricity from biogas in all plants used for biogas production from agricultural and other wastes.

Fuel

The use of biogas for fuels is possible in all plants/engines which can use natural gas. It has to be mentioned, though, that prior to its use biogas has to be purified and the concentration of H2S lowered. In Slovenia the use of natural gas and biogas in traffic has not been established yet.

The use of processed substrate

The use of processed substrates depends on their components. Substrates composed from animal manure, slurry, liquid manure, maize silage, agricultural and vegetal wastes and other uncontaminated green wastes may be applied in agriculture as fertilisers. In case the substrates contain too high quantities of heavy metals such exploitation as fertiliser for agricultural products is not possible, however they can be applied for ornamental plants.

Hazards of biogas

It is necessary to prepare a detailed expert report on explosion threat which would consider all legislations passed and declarations of owners/employers saying that measures to reach the goals of Rules on Anti-explosion Protection will be taken.

For further Information, please contact:

Dr. Viktor Jejčič
Kmetijski inštitut Slovenije
Hacquetova 17
SI – 1000 Ljubljana, Slovenia
bioplin@kis.si

Framework Conditions for Biogas Plant in Castilla y León Region (Spain)

Corporate structure (legal form) of the owners.

In Spain basically can be established two kinds of corporative structures:
Private companies, which arrange agreement of buying and selling of residues with producers.
Participate societies by residues generators, technological company, sleeping partners and in some cases a minority percentage of participation directly from public administrations.
The most usual corporative structure for the promotion of a biogas plant in Spain is composed by a Limited Company which involves an energy promoter, which is usually an energy service company, being the bigger shareholder.

Operators / Training of the operating personnel

There is no specific training for operators of this kind of plants in Spain. But usually operators are informed about how the system is working by the providers of the equipment.
Anyway some indirect training could be related with some parts of Biogas plant construction and operation such as in official studies (professional training, university, postgrade studies). Also non regulated courses of specialisation or updating are available (electricity issues, gas issues, building issues…but in general for energy plants) organised by energy agencies, Professional Associations etc.… Trades and Conferences focused in bioenergy but with monographic sessions in Biogas topics (Valladolid, Valencia, Vigo, Jaen).

Only there is national normative of construction and specific regulations of security and installations: the Technical Code of Buildings, Instructions for Steel and Concrete, Regulations for Electrical Installations of high/low voltage, devices under pressure, protection against fire in industrial installation, etc..
It is usually contracted an expert company for the operation of the plant and it is quite common that the same company will assume the corrective maintenance and managing with equipment provider the preventive maintenance.
For the protection of employees, as in any company, it should be complied with the Law of Prevention and Labour Risks and the Decrees of Prevention Services.

Choice of Site

As the same than for any industrial work or building the Constructive Project which involves geotechnical studies for knowing the characteristics of the land, water level. etc…, topographer studies, climatology and hydraulic , for knowing the flooding capacity of the area, studies of effected services etc…

Biogas plants can be built in:

- **Rural areas:** in this case the land should have a rustic land labelled. Because of that the procedure should be as "Exceptional Use of Rustic Land" in the face of the Urban Territorial Commission of the province.
- **Industrial areas:** in this case there is any problem because the land has the proper label.

For getting the "Building License", is needed to have previously the "Environmental Authorization". In the same way, depending on factors such as size/ volume of the installations, the kind of residues to manage, etc.; Even it could be eligible from the Administration an Environmental Impact Assessment.

Regulations involved:

- Law of integrated prevention and control of pollution (air, smell, noise, ground water,)

Other regulation involved:

- Law 11/2003, of 8 april, for the Environmental Prevention in Castilla y León (this is regional regulation).
- Law 16/2002, of 1 july, of integrated prevention and controlling of the pollution (this is national regulation).

According urbanism-land uses, security and prevention of risks, health –hygiene regulations, the potential affection to neighbours should be included in the Environmental Impact Assessment. When the Project manages residues from farms, in rural areas, the project should be considered the sources of pollution, including the own transport of the residues, for getting the Environmental Authorization. The annoyance by smell and noise should be taken into account in the previous regulations. In some cases it there can be only municipal regulations regarding noises and smell.

Authorization procedure

The authorization procedure is strongly depending on national and regional legislation (because some competences are transferred to the Autonomous Communities). A proper authorization procedure ensures a long term operation of the plant. Summary steps:

For building the plant:

- Deposit the guarantee for requesting the point for grid connection: for digestion plants is 20 €/kW.
- Apply for the point for grid connection to the Distribution Company.
- Request the Administrative Authorisation of the Project (in the Territorial Service of Industry).
- Processing the Environmental Authorisation and the Environmental Impact Assessment when it should be done.
- When the Environmental Authorisation positive, it can be ask for the Building

For carry on the plant:

- Processing in the Service of Industry the approval of the Project and the Certificate of Starting the service provisional for testing.
- With the Certificate of Starting the service provisional it should be request the Previous inscription in the REPE (Electricity Producer in Special Regime) in the General Directorate of Energy and Mines.
- Signing of the electrical selling energy with the Distribution Company.
- Request the Certificate of Starting up in the Service of Industry and simultaneously, to process the definitive Inscription in the REPE.
- In the Council it should be processed the Opening License.

Main documents for submission

For the procedure in the Service Industry and in the Council it should be carry out the applications required by every administration, showing the Building Project, which basically will include the next documents:

- Report and Annex
- Diagrams: location, topography, structures, installations, construction details, etc.
- Sheet of Conditions y Technical Specifications of the equipments and materials to use.
- Budget: price frame, measures and budget.

For the procedure of inscription in the REPE (Electricity Producer in Special Regime):

- Certificate of Starting up (Service of Industry).
- Document for the option of selling (feed in tariff or pool).
- Certificate from the person in charge of the lecture.
- Inform from the system operator or from the grid manager.
- Accreditation of the compliance of market requirements for the production of electrical energy.

Remarks

The following summary- list shows documents needed for the authorization in Spain:

- REPE Request. (Technical Project included Security and Prevention Plan)
- Integrate Environmental Authorisation Request (Environmental Impact Assessment)
- Administrative Authorisation Request (+Financial guarantee)
- Project Approval Request for getting the Certified of starting
- Building License Request
- Opening License Request

Components of the plant

The biogas plant consists of several parts and components. Civil (concrete fermenter, machinery buildings, pits, etc.) and mechanical engineering (CHP module, pipes, pumps,

mixers, etc.) make the largest portion. Additionally electrical engineering components are used. For every topic there are special needs (regulations and standards) which come into place depending on the specific plant. The conditions need to be obeyed when planning, building and operating the plant.

Regulations which should be taken in account are:

- Building regulation and normative (CTE, LOE)
- Regulation for electricity producer in special regime: Spanish Royal Order 661/2007
- Gas Regulations
- Law of prevention and security (security of machines, periodic controls of machinery, explosion protection)
- Water protection and regulation
- Fire protection, Security and hygiene regulation: Directive 94/9/CE ATEX.
- Devices and systems of protection for the use in potential explosive atmospheres.
- Protection of the health and the security of workers exposed to risks derivate from explosive atmospheres in places of work: RD 681/2003.
- Document of Protection against explosions (responsible: the businessman):
  1. Evaluation of risks from explosion.
  2. Adequate measures for reducing it .
  3. Classification of different zones: Zone 0, Zone 1, Zone 2

Choice of Substrate - input

Substrate (feedstock) is the input raw material into the biogas plant. The choice of the substrate (energy crops, manure, liquid manure (slurry), organic wastes, slaughterhouse wastes, …) is linked to the authorization procedure, the remuneration (feed-in tariff) for electricity, heat or biogas process technology in use, the soil protection law, the waste management law and the economy of the plant, etc. In Spain the substrate used is mostly from organic wastes, slaughterhouse wastes and manure.
In Spain it is possible to use the grass that grows on set-aside land in the biogas plant. It has to be used according the subsidiary (municipal or provincial) regulations of land uses and it is possible to use set-aside land for energy production. Certain substrates or the origin of the substrate require certain (hygienic) process steps (e.g. hygienisation/ pasteurization (70°C for 1 hour) or reporting and recording procedures. Other regulation is the Regulation 1774/2002 of animal subproducts non destined for human consumption (It has been created a National Commission with the function of coordination all related to subproducts from meat and agrofood industry).In Spain the long term availability is recommended to include in the financial study of the plant in order to get some subsidies form the Economic Development Agency.

Gas utilisation – outcome

The utilisation of the produced biogas (or the transformed electricity and heat) and the digestate are to be considered. In Spain the mainly uses is for the digester. There is a kind of special bonus for the electricity when the heat is sold in Spain, but only for (cogeneration) CHP High Efficiency.
The calculation for this bonus1, which came from a EU directive, is now in reviewing.
1Spanish Royal Order 661/2007(Sets up the legal and economic system related to the electric energy generation activity in special regulation-Renewable sources).

The feed in tariff systems regulation for selling the remaining electricity:

	Tariff c€/kWh	bonus c€/kWh
Biogas from landfill:	8.2302	4.0788
Biogas generated in digesters:		
P<500kW:	13.3474	10.0842
500kW<P:	9.9598	6.6109

There is one initiative of Solid Oxid Fuel Cells (SOFC) in Almazán (Soria) using slurry as substrate. Regarding the gas grid connection there is only 1 initiative in Calatuña. And there is a lack of regulation.

Utilisation of the digestate – outcome

Normally the digestate is spread on arable land. Depending on the substrates and their origin continues testing of the digestate and the soil, where it is spread, including reporting is necessary. Further more some regional soil protection might inhibit the spreading of the digestate. E.g in the winter months spreading is not allowed -> a place to store the digestate for several months is needed.

Hazards of biogas

Prevention and Security Law and Law of integrated prevention and control of the pollution (explosion, fire, mechanical hazards e.g. due to freezing, forming of condensate, corrosion, blockage of pipes, risk of falling from heights, electrical hazards, lightning, thermal hazards, hazards through noise, hazards through suffocation and poisoning, hazard of infection and infection and health hazards by co-fermentation substances, emissions into air, ground water and surface water, release of pollutants when disposing waste, floods).

For further Information, please visit contact:

Mª Puy Domínguez Pérez
ENTE REGIONAL DE LA ENERGÍA DE CASTILLA Y LEÓN (EREN)
Avda. Reyes Leoneses, 11.
24008 León
dompermi@jcyl.es

Junta de Castilla y León EREN ENTE REGIONAL DE LA ENERGÍA DE CASTILLA Y LEÓN