



BIOGAS REGIONS

Regional Strategy and Action plan for the Walloon region (Belgium)

SUMMARY

*Report produced by Centre wallon de Recherches agronomiques as a partner to the
Intelligent Energy for Europe project “Biogas Regions”.*

1. Definition of the region

As a Federal state, Belgium consists of 3 main regions: the Flemish Region, the Walloon Region and the Brussels-Capital Region. The Walloon Region is located in the south of Belgium, bordered to Germany, Luxembourg Grand Duchy and France. In Belgium, the major part of biogas production results from landfills and anaerobic digestion of organic (industrial and domestic) waste. Anaerobic digestion of agricultural wastes is still not well developed. At present time, it exists only 6 biogas plants in the agricultural sector in Wallonia (South region) using pig and cattle manure, food industry wastes and energy crops as substrate. The total electrical power rating for the agricultural sector is about 1000 kW_h. There are also 1 municipal 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).

Table 1: Characteristics of agricultural biogas facilities in Wallonia (Source: Centre wallon de Recherches Agronomiques CRA-W, 2006)

Biogas plant	Co-substrate (tons/y)			Digester volume (m ³)	Biogas production (m ³ /y)	Electric capacity (kW _{el.})	Electricity production (kWh _{el.} /y)	Heat production (kWh _{th.} /y)
	Cattle manure	Energy crops (maize, grass)	Food industry wastes					
Wallonia								
1. Ferme Kessler (Attart) since 2003	3750	570	6260	2 x 750	1 330 000	390	2 260 000	3 100 000
2. Suzénergie (Surice) since 2006	2900	800		1 500	300 000	104	530 000	750 000
3. Ferme Lenges (Recht) since 1999	4800	350	1400	600+1600	950 000	360	1 700 000	8 500 000
4. Ferme Heck (Nidrum) since 2001	3400	750	700	1 800	360 000	100	605 000	1 200 000

Currently, there are several biogas projects in the agricultural sector. A number of farmers' cooperatives have initiated feasibility studies. Most of the projects are involving a few farms and planned to use manure as main substrate with a mix of energy crops (grass + corn). They also try to find local food-industries willing to treat their by-products by AD. However, partnerships between industrial and agricultural sectors need to develop in order to maximize biogas production efficiency and rise profitability of the sector.

In Belgium, a green certificates trade system operates for the production of green electricity from renewables. Biogas is one of the RES technologies favoured by this system, which is quite complex in their implementation due to the scattered Belgian market with three different regional management frames. Producers of renewable electricity are assured a minimum price of 65€/GC since Wallonia's energy authority will buy certificates at this price.

2. Estimation of potential for biogas production

The biogas production should be estimated by the diversity of the Walloon agricultural area. In the southeast of Wallonia, the main agricultural activity is the cattle breeding. Most of crops cultivated are forage crops. In this region, the energy potential is essentially coming from farm effluents. The methane potential of the total farm manure is estimated to 98 284 tpe

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(agra-ost, 2006). Bovine manure represents 85% of methane potential. 3% comes from pig slurry and 12% from poultry manure.

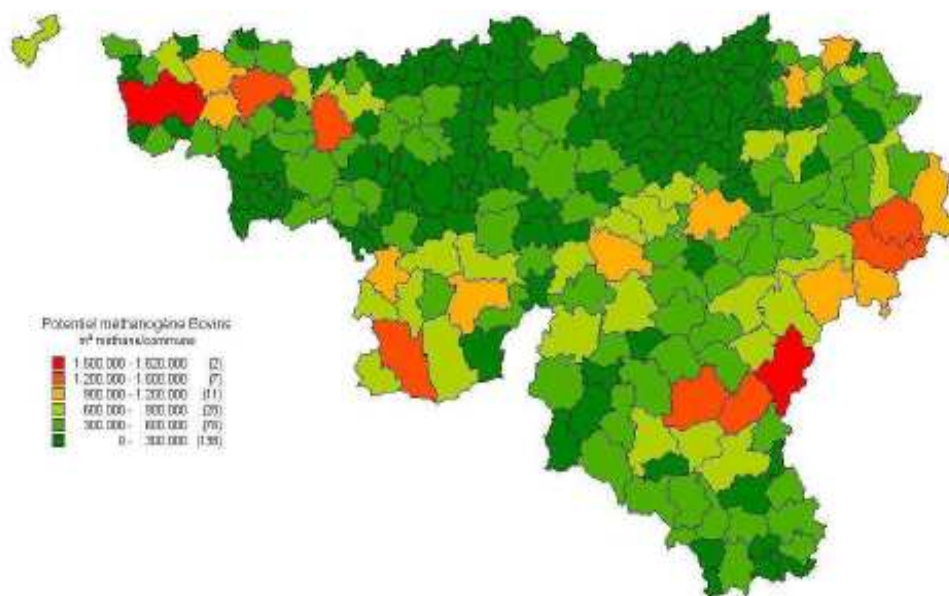


Figure 1 : Bovine methane potential (methane m³/ municipality) (Agra-ost, 2006)

In the northwest part of Wallonia, the arable crops dominate. This part of the region is most favourable for the development of energy crops in a way of diversification of traditional crops.

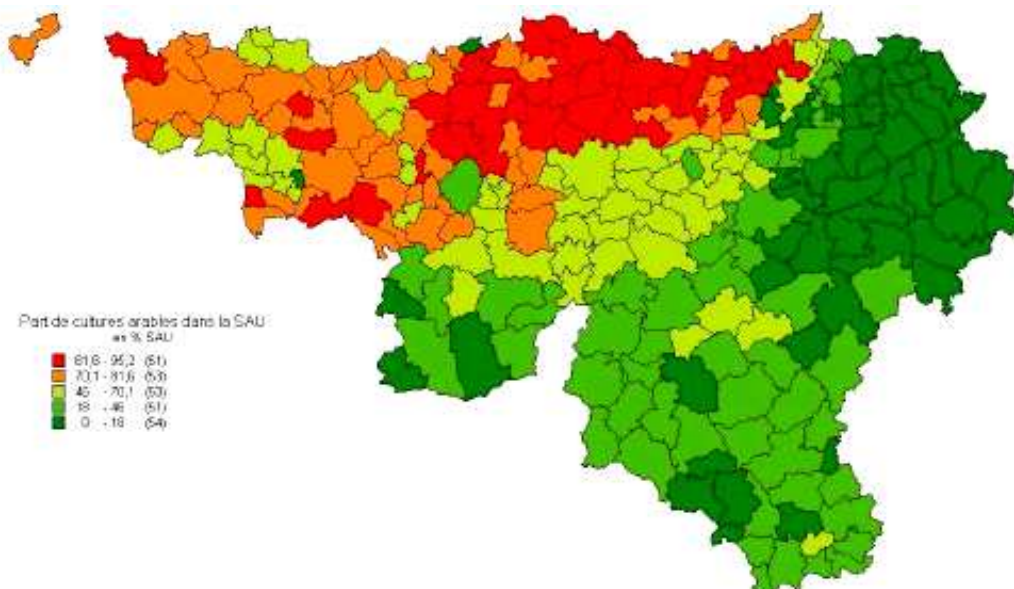


Figure 2 : Part of arable land in percent of the useful agrarian area (Agra-ost, 2006)

3. Possible uses of produced biogas



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Currently, the biogas is used for electricity and heat production. The feeding of biogas into the grid is not yet developed as well as the use of biogaz as fuel.

For the biogas injection into the grid, the most important brake is the biogas quality which must be higher to be compatible with the natural gas of the grid. The upgrading of the biogas required specialized and expensive technologies which are not enough profitable for small biogas plants. The minimal flow must be upper that 200m³ per hour according to studies).

The other brakes are:

- the lobbying by gas, nuclear and petrol companies
- gas transport and distribution companies bring up the principle of high precautions needs
- the transport and distribution network management even than energy market are divided into federal and regional authorities
- the cost of the biogas upgrading system
- a lot of areas are not connected to natural gas network and the cost of connections are very expensive

The European directive 2003/55/EC stipulates the non discrimination access to biogas but it is still a theory in Belgium. Security rules and technical specifications are needed to develop this application.

4. Identification of obstacles and barriers

The backwardness of the AD development in agricultural sector can be explained by several factors:

4.1 Economic aspects

- **Green Certificates system not well appropriate for small size unit or farm biogas production:** In order to finance additional cost of green electricity production and to ensure a definite quota of green electricity is generated, transferable green certificates (GC) are issued to producers for a number of kWh corresponding to a MWh divided by the CO₂ saving rate. GC are market basic instruments with a minimum guaranteed price of 65€/GC. But this mechanism is still has some obstacles:

- No long term guarantee for the price of the GC: Prices are guaranteed only for 15 years. It is a too short period to ensure the long period of return on investments. Moreover, lots of banks or financing organisms do not want to take risks if long terms profits made by the plant are no guaranteed.
- The calculation for GC attribution is very complicated.
- Using by-products or other feedstock than animal effluent reduces the number of GC: energy consumption to produce energy crops, to transport waste,... put at disadvantage small units that need other sources of feedstock
- Need to sell electricity and heat throughout the year. The heat demand must be continuous to make the GC profitable. This requires a constant and sufficient biogas production.
- Precise accounting of input and output (for CO₂ balance) is heavy, time and costs consuming

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- Costs to control the plant conformity to obtain and validate GC are high. It is the same price for small farm unit or big plants.
- **Investments:** The total costs investments (for feasibility studies, plant installations, connection the plant to electricity grid) are too high for small farm biogas unit. The return on investments and profits are dramatically reduced all the fees. The subsidies in Walloon region are not numerous nor sufficient for small farm unit. Public aids are more centred on public institutions or authorities projects. Only 15 to 25% of subsidies are for small cooperative of farmers or small firms.
- **Lack of know-how and experience:** few Belgian companies or consultancy agencies have experience in biogas. Expertise, materials and installations are often provided by foreign companies (from Germany or Luxembourg). As there is little competition on Belgian biogas market tariff and prices remain very high. Maintenance costs are also very high and reduce profitability.
- **Poor awareness of the benefits of AD:** Many positive externalities linked to biogas production should be studied in order to be integrated at an economic level.

4.2 Legal and technical aspect

- **Setting up:** it is possible to build a plant *in agricultural area* only for an individual plant on its own fields or farm lands, or if it is recognized as being beneficial to the general public. For all others cases the biogas plant has to be in industrials or habit areas with no inconvenient for residents.
- **Digestate utilisation as a fertiliser:** there exists vagueness in the legal status of the digestate. Anaerobic digestion sludge is considered as non-treated manure if it results from digestion of cattle effluents from one single farm and it can be spread on agricultural lands following agricultural good practices and Nitrate Directive. As soon as manure is mixed with a co-substrate external to the farm it is considered as a waste. In that case, authorisation for spreading, controls and analyses are required which are expensive and time consuming.
- **Availability of good quality substrates:** in order to increase methane yield from digester it is more profitable to mix manure with other co-substrate as energy crops or organic wastes from food industries as starch, oils, whey, etc. The use of animal waste from slaughtering should be another source of substrate. But currently it is not allowed by regulation because it is considered as a waste. Concerning the supply of co-substrate, collaboration and partnership between farms and (food)- industries are not frequent. Most of biogas projects are worked out without consultation between different sectors. Interesting sources of potential co-substrates could be ignored at local scale. The concept of centralised co-digestion is not developed yet in Belgium.

4.3 Social aspect

- **Lack of collaboration and information between the different parts involved in a project:** (cooperative of) farmers, local authorities, local industries, local population. Residents are often reluctant to biogas plant in their neighbourhood fearing odours, noise,

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traffic or impact on the landscape. There is poor awareness of the positive externalities linked to biogas production.

- **Complicated administrative and legislative aspects:** as some aspects depend on federal/regional competence or on different ministries the whole procedure to build a biogas unit takes very long time and requires investments.

5. Strategy development – some proposals:

5.1 To improve the financial support by the Green certificate system and aids

- To deliver green certificate during a longer period (during all the operation time of the plant?) to ensure return on investment and to guaranty the amount of these certificates. To adapt green certificate system to heat production
- To grant subsidy to farmers which send their effluents, energy crops and grass mowing to biogas units
- To subsidy (totally?) the feasibility studies by public authorities
- To allocate the cost of the connection of small size plant to the electric grid to the grid manager company

5.2 The substrate

- To elaborate a clear regulation about the authorized substrates with rationalization and simplification of application and controls.
- To distinguee the agricultural biogas plant from waste treatment plant to avoid heavy waste regulation? What about animal waste?
- To improve and regulate the use of agro-food industry co-substrate
- To secure the source of substrate supply

5.3 The use of digestate

- To clarify the legal status of digestate as a agricultural manure
- The digestate should be considered as a mineral fertiliser because Nitrogen is quite totally mineralised after the process. This consideration should give an additional interest of this product.

5.5 To develop the feeding of biogas into the grid

- To deliver origin certificate to Green gas
- To encourage the cogeneration system to improve the biogas production and the methane content by plant.

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6. Proposed action plan

6.1 Proposition of action plan to the Advisory Committee

We propose to develop actions in the following directions:

1. To identify an organism that could train employees in order to make opportunity studies with the collaboration of municipalities before sending the proposition to the Facilitator (person in the interface between Walloon Region and people, making free of charge feasibility studies). The organism could be in charge of the management of training courses for (future) workers in the biomethanation field.
2. To promote the development of three-party project (farmers-industries-municipalities) for the improvement of the quality of the inputs and the valorisation of the outputs (gas, heat).
3. To change the legislation concerning the use of organic waste, to promote a quality system based on Quality Insurance instead of Quality Control. It would diminish the costs for the farmers.
4. To regulate the use of digestate. A project exists in Wallonia but is in stand-by.
5. To improve the use of heat with the development of three-party projects or with a subsidy for heat grids.
6. Other alternatives than electricity for biogas?
7. The possibility to develop new subsidies (for biogas or heat).
8. To inform the public (TV program for example)
9. To promote financial agencies that invest in sustainable development

6.2 Request of the Advisory Committee for the action plan

Our Advisory Committee identified three important problems that the action plan has to resolve. The weaknesses concern the return on investments of the plants, the supplying of raw materials with a high methane potential and the utilisation of the digestate. And the 5 important guiding lines are:

1. **The choice of another economic model:** the current model is not appropriate for biomethanation investment; the supplying of raw materials with high methane potential is not sure to the medium/long term. So, a model less expensive, using more raw materials with a poor level for the biogas production would be discussed and promoted.
2. **The modification of the nitrogen status:** for the moment, in Europe, nitrogen in the digestate is considered as organic. If nitrogen could be considered as mineral, the utilisation of the digestate would be optimised.
3. **The use of biogas:** for the moment, biogas is converted into electricity and heat. The two others possibilities to develop and promote are injection into the grid (legislation is changing for the moment) and biofuel.
4. **The use of heat:** the loss of money due to the not optimal use of heat in the plants could be reduced by the development of heat grids, by subsidies (or other alternatives) or, during the elaboration of a plant project, by thinking about a way to use the heat (drying shed for instance, ...).



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- 5. The creation of a group with experts/professionals in biomethanation technology.**
It would follow project by project the communicational aspects of a new plant. These persons could also be in charge of the identification of new sites for opportunity studies and for the development of training activities for biomethanation workers.

Moreover, actions are especially identified for the Belgian Authorities. They concern the legislation:

- 6. Evolution of the legislation concerning the use of digestate on or into the soil.**
- 7. Evolution of the legislation for the use of organic wastes in plants.**