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Biogas plant GAEC Oudet Codigestion and CHP

INTRODUCTION

GAEC Oudet manages bovine cattle in Clavy-Warby (Ardennes, North East of France)

Each year, 1100m³ of liquid manure and 1245 tons of manure are produced.

The biogas unit deals with manure, herb and cereals wastes

Biogas is then valorised in electricity and heat.

Investment was 200 000 €. The return of investment time is estimated around 6 years.

KEYWORDS

- CHP : Combined Heat Power
- Digester
- Herb and cereals wastes co-treatment
- 6 years depreciation



CONTEXT

GAEC Oudet (3 associates) manages a cattle of 65 dairy cows which means 107 livestock's units (plus juveniles). The livestock is on open housing (loose boxes) with an area for feeding yoke cow traps. The rest of the herd is on deep litter. All the livestock spends 7 months indoors and only 3 hours per day during the last 5 months. Thus 1100m³ of liquid manure and 1245 tons of manure are produced. The setting of standards was carried out before the methanisation unit building.

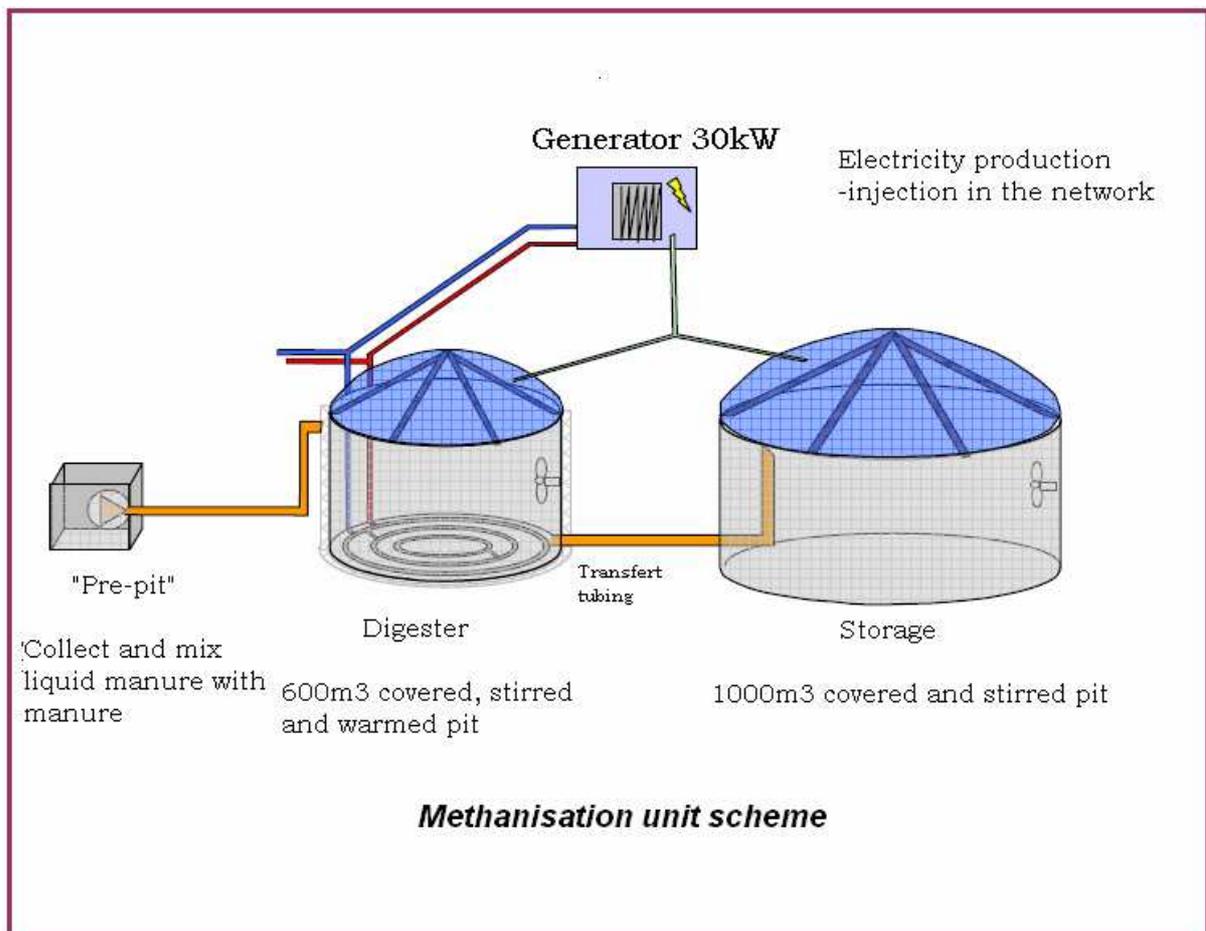
In 2001, the GAEC get in touch with Jean Mineur's project, an Ardennes farmer too, of building a biogas unit.

The associates contacted ARIA Energies (engineering office, specialist of biogas) which realised the feasibility study of Mineur's project. After a trip in Germany to visit german installations, they decided to start their project.

In association with Fachverband Biogas (german farm biogas association), they designed and built their unit. Inauguration took place in May 2005.

The unit treats daily 6 to 7 tons of co-substrates (90% of liquid manure, 9 % of cereals wastes and 1 % of herb). Effluents are then spread on the 188 ha of the exploitation.

Biogas is converted in electricity. All electricity is sold to EDF (French national electricity company) and the heat produced is used to warm the digester and 2 households.



TECHNICAL OVERVIEW

The digester is under continuous stirring. The farmers set themselves the wooden framework for the cover, PVC tubing and the plumbing system.

A « pre-pit » of 30m³ collects substrates. Here they are stirred and pumped until the digester (80 m far) via a grinding pump.

The digester is 600m³ concrete-pit. It is totally isolated (styrodur plates) and equipped with a heating system (40°C)

The pit is covered by an EPDM membrane. To ensure substrates homogenisation, an agitator is disposed inside the digester.

Organic residues are transferred in the second pit by overflowing.

The storage pit is based on the same building as the digester. Only the capacity differs (1000m³)

PERFORMANCE

550 m³ of biogas are produced per day. 80% of this amount is formed in the digester. 20% are formed in the storage pit at ambient temperature.

Biogas converted in the gas turbine generator set provides 720 kWh (el) and 1440 kWh (th) per day. This corresponds to an annual production of 500 000 kWh.



Technical data		
Construction year		2004
Wastes	Bovine liquid manure	1100 m ³ /an
	Cereals wastes	300 t/an
	Herb	25 t/an
Volumes	Digester	600 m ³
	Gas storage	300 m ³
	Residues storage	1000 m ³
Methanisation	Residence time	60 days
	Temperature	40 °C
Co-generation	Gas production	550m ³ /jour
	Electric power	30 kW
	Thermal power	60 kW
	Electricity production	250 000 kWh/an
	Heat production	500 000 kWh/an

FINANCIAL ASPECTS



Investment for this biogas unit was **201 400 €**

GAEC OUDET received grants from ADEME (French National energy agency), from Ardennes department (Conseil Général) and from the bank Crédit Agricole. The total of the granting covered 59% of the investment.

3000 hours of work were performed to build the biogas unit.

Each year, the associates earn an income of **20 100 €** (95 % electricity and 5 % fertilisants savings). Besides, heating of the farm and households is free.

Major costs for maintenance are linked to the cogeneration unit (around 2200 € per year).

The return of investment time is estimated around 6 years

Investment detail (2005)	Costs (€)	%
Earth work	4830	2
Digester (construction)	80640	40
Technical room	8100	4
Pumps, stirrers	27700	14
Tubing, water loop	9130	5
Desulfuration	300	0,1
Cogeneration unit	35000	17
Electricity	13700	7
Command board	4770	2
Network connection	2030	1
Project design	6400	3
Households heating	8840	4
TOTAL	201440	100%



EDEN
 Domaine Le Tinturier
 31770 Colomiers
 Tél : 05 61 75 19 53
 Fax : 05 34 56 93 07
 www.eden-enr.org
 eden@eden-enr.org

GAEC OUDET
 Mme Digracia, Mr Oudet, Mr Delaporte
 18 rue de la Brasserie
 08460 Clavy Warby
 Tél : 03 24 54 70 62
 Fax : 03 24 54 36 03
 gaec-oudet@wanadoo.fr



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