

## France - Six batch digesters on manure of 288 m3 each

Gaec of Val de Maury is a farm of 2 partners located in Burgundy. It possesses initially a stable of **80 dairy cows (objective 150 dairy cows in 2017)** and a **SAU of 170 ha** (colza, wheat, barley, corn silage). The farmers looked for the technology allowing **to value at best an important quantity of solid manure**. Their choice quickly concerned a solid anaerobic digestion process with boat shape digesters which are operated in batch mode, because it did not require to change the way of production and especially because this technology was the only one approved in solid process by funders, at the end of 2011. Besides, this technology presented fewer equipments (no brewer, few pumps) and thus less maintenance. Finally, they also chose **a level of investment adapted to the farm size**, allowing to maintain the financial balance of the farm and thus a micro-scale AD plant.



### What lessons has been learned?

The daily working time on the AD plant is low, approximately 15 minutes for the supervising and the CHP servicing. **All 10 or 15 days, a day is necessary to empty one of the digesters.** The unloading and the load are realized by a telescopic loader :

- 3 hours to bring out the digestate and put it in the truck (require 2 people)
- 3 hours to load the manure (approx. 170 t. of introduced manure),

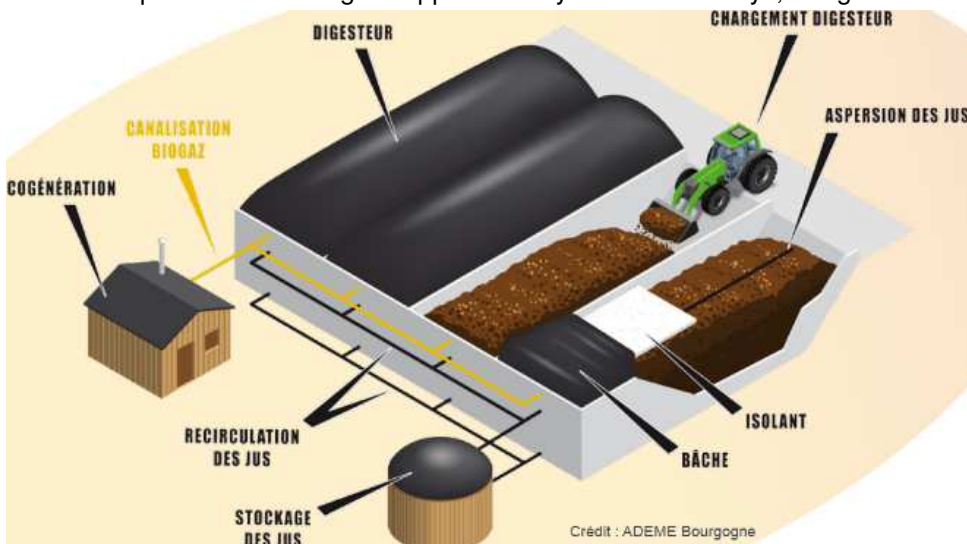
The opening and the lock requires **1 "in full form" person:**

- 30 min to undo the cover, the insulating material and the pipe of recirculation,
- 1,5 hours to put back the pipe, the insulating material and the cover.

Deeper  
digesters  
for less  
handling

### A short description of the process

The plant works essentially with the manure of the farm. Having cleaned out the stable, the manure is stored in a manure pit. Four boat shape digesters of 288 m3, then six in 2015, are operated in batch mode to have a constant production of biogas. Approximately all 10 in 15 days, a digester is emptied then filled with fresh



substrat. The substrat remains approximately 60 in 80 days in digesters.

**Juices** pumped out of the bottom digester space are reinjected to bring a hot and rich of methanogenic bacteria liquid on the manure. The **digestat** is then stored in the manure pit or at the end of fields before being spread.

## Key data :

**Start of operation:**..... August, 2013  
**Manufacturer :** .....ARIA Energies  
**Type of plant :** .....Batch technology on manure (six lane digester, type Silogaz®)  
**Location :** .....Les Rabiers - 89 110 LA FERTÉ-LOUPIÈRE  
**Amount of gas produced (56 % of méthane) (m<sup>3</sup> per year) :** .....255 000  
**Investment costs (EUR) :** ..... 820 000  
 (12 812 € /kWe In 2016 with additional investments; not much auto-construction)

- 520 000 € for the AD process (earthwork, civil engineering, silo, pipe, pump)
- 180 000 € for the CHP (ENERGOLUX), the technical place, the electric cupboard and the connecting ErDF
- 20 000 € for the heating network
- 70 000 € in studies and project ownership cost

**Payback period (years):** .....7,3  
 33 % of subsidies: 168 000 € (ADEME) and 100 000 € (Regional council of Burgundy)

**Environmental balance :** More than 623 tons of equivalent CO<sub>2</sub> avoided (mainly owed to the abolition of the emissions of methane and protoxide of nitrogen which would have naturally been rejected by the effluents without AD and by the substitution of fossil fertilizer).

## Feedstock – 5500 to 6000 t/ an

**cattle manure (t /year) :** .....approx. 4 000  
**Waste food-processing industry (cereal wastes; step of brewery; onions) (t /year) :** .... approx. 1 000  
**Green waters (t /year) :** ..... approx. 550

## Production data

**Electric power of the gas engine (kWe):** .....64  
**Run time (hours/ year) :** .....> 7500  
 Objective 8000 hours on average in 2017  
**Maximum capacity of biogas storage (hours) :** .....18  
**Generated thermal energy (kWh) :** .....approx. 660 000  
**Utilization of heat:** .....> 90%  
 (process 75 % + milking parlour & houses 15%)  
**Generated electric energy (kWh) :** .....500 000  
**Power consumption (electricity) of the plant itself (pumps ) (%) :** .....2  
**Digestat brut (t /year) :** .....approx. 4 950  
 15% de DM, With 7 % of nitrogen mineral / total nitrogen  
**Available area for the output of the biogas fertilizer (hectares):** .....160  
 Spreading without preliminary treatment, with classic spreader

## Technical plant description

**Operating temperature (°C):** Mésophilyc ..... 38- 40  
**Average retention time in digester (days):** ..... 60 to 80  
**Average daily working time (min / day):** ..... 15  
**Size of digester (m<sup>3</sup>):** ..... 288  
**Size of juice storage tanks (m<sup>3</sup>):** ..... 120