



SYSTEMIC

Circular solutions for biowaste

Factsheet
SYSTEMIC Outreach Location

Waterleau New Energy (Ieper, Belgium)

A short introduction to Waterleau New Energy

Waterleau is an environmental services company in the fields of water, air and waste treatment as well as in new energy recovery. Waterleau New Energy is their biogas plant in Ieper. It's location in West-

Flanders is characterized by intensive pig husbandry and therefore has to cope with a manure surplus and stringent local fertilizing legislation.

Feedstocks

The biogas plant is co-digestion of 45% manure and 55% biological waste streams.(Table 2).

Biogas production

The plant produces 1400Nm³ of biogas per hour (i.e. 800 Nm³ of methane per hour) which is valorized in a CHP to energy (7,5 MWth, 3,2 Mwe, 1,5 MW steam and 2,5 MW hot water).



Table 1. Technical information of the biogas plant

Date of construction	2012
Size (MWe)	3,2
Volume (m ³)	12.000
Digester type	Mesophilic digestion

Table 2. Origin of feedstock

Type	Mass per year
Manure and solid fraction of manure	54 kt
Grain waste	8,4 kt
Potato waste	9,6 kt
Glycerine	9,6 kt
Sludge industrial waste water treatment	16,8 kt
Other	21,6 kt
Total	120 kt

Table 3. Yearly biogas production and average composition

Component	Estimation
CH ₄ (%)	57
CO ₂ (%)	
H ₂ S (ppm)	<200
O ₂ (%)	
Total biogas production (Mm ³)	11,2
Biogas per tonne of feedstock (m ³ /t)	120

Current process and disposal routes for end products

The feedstock is heated/mixed up to 40°C and is digested for 30 days (+10 days in the post digester). The digestate is hygienized (1hour 70°C) and separated by a centrifuge. The solid fraction is dried in a Hydrogone® dryer. This is an indirect dryer which can evaporate 1-1,8 tonnes of water per hour. This water goes, together with the liquid fraction of the digestate (15m³/h) to an biological aerobic water treatment for small removal of COD. In the next step (evaporator) ammonium is transferred to the gas phase and a (K rich) solution is concentrated. The ammonia rich gas condenses with the water vapour and an ammonium solution is recovered.

The dried digestate is exported to France, the concentrated liquid fraction is exported also outside Belgium as fertilizer and ammonium water is used as exhaust gas treatment.

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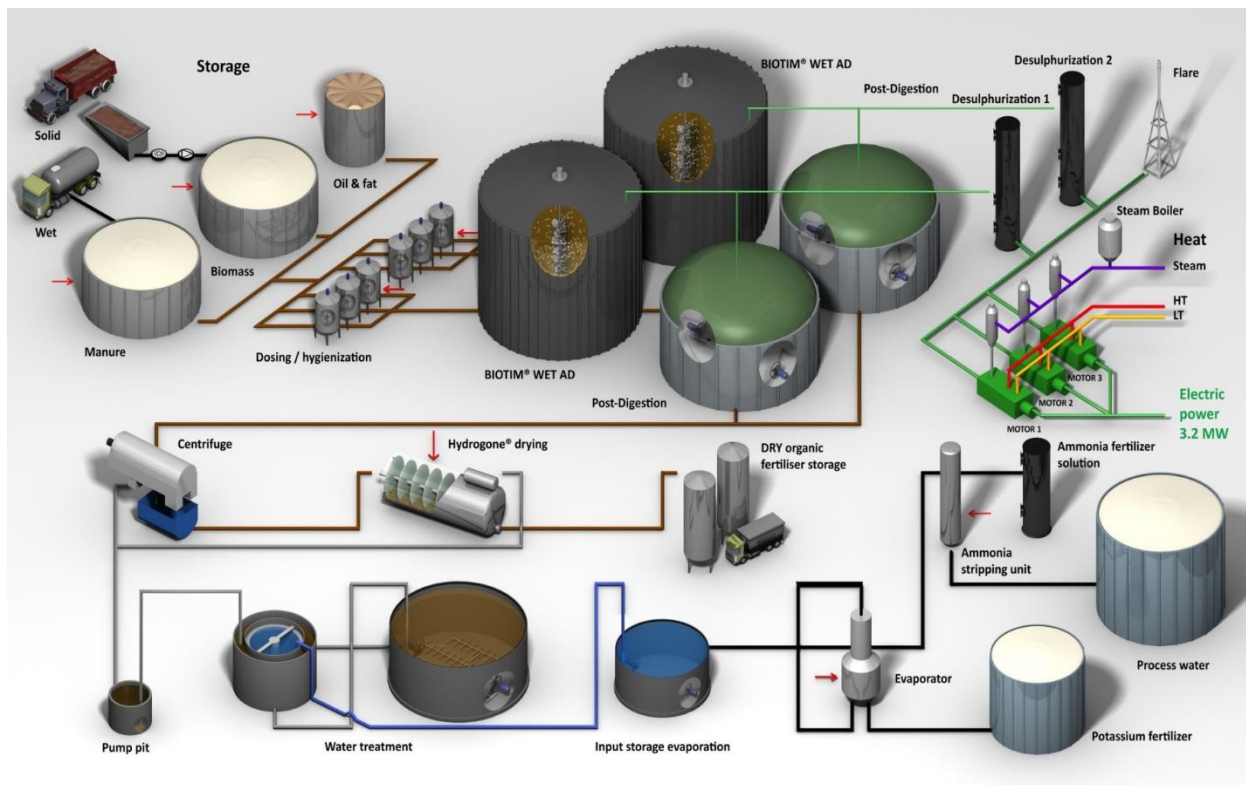


Table 4. Average composition of the recovered products and estimated separation efficiency

	Mass (kton/year)	Dry matter (%)	N- total (g/kg)	P-total (g/kg)	K ₂ O-total (g/kg)	
Digestate	Raw digestate		10,0			
	Solid fraction after centrifuge		25			
	After drying	5	95	3	5	13
	Liquid fraction after centrifuge		2,5			
	After aerobic treatment		2,0			
	Ammonium olution	1,5		15% ammonium		
	K-concentrate	12	20	7	3,5	20

Current drivers for interest in Nutrient Recovery and Reuse (NRR) Technologies

Getting rid of digestate (dried or concentrated) is getting harder or more expensive because of limited application and dosing. Production of separated nutrients gives more opportunities for the future and is more sustainable for the installation and the supplier who gets his biological waste streams or manure processed.

Waterleau New Energy hopes to learn in SYSTEMIC how to improve the efficiency of the evaporation and ammonium stripping unit. This could also create an end product of better quality and which could be easier to market.

Waterleau is also interested in learning more about membrane separation (reverse osmosis) which could be a possible polishing step of the liquid fraction towards dischargeable water.