



**SYSTEMIC**  
Circular solutions for biowaste

Factsheet  
SYSTEMIC Outreach Location

## Biogastur (Navia-Asturias, Spain)

### A short introduction to Biogastur

BIOGASTUR originated in 2009 with the objective of promoting resource management projects (waste) of the primary sectors, based on biogas generation as well as the production of biological fertilizers from the final digestate. In 2017 the construction started of one of the biggest projects in renewable energy.

Table 1. Technical information of the biogas plant

Date of construction	2017
Size (MWeI)	4,5
Volume (m <sup>3</sup> )	28.000
Digester type	Thermophilic digestion

### Feedstocks

The biogas plant would treat cattle slurry (87,5% of total yearly input), crop residues and dairy waste from an agreement with a milk cooperative. Each count for 6,25% of the total input (Table 2).



### Biogas production

This plant will be producing 17 Mm<sup>3</sup> of biogas per year. This will be valorised into 30 GWh of energy per year by means of 3 CHP engines (Jenbacher 420) of each 1500kWe with an efficiency of 42%. The heat coming from the CHP, hot water, hot air and flu gasses will be recovered as 4692 kWth.

Table 2. Origin of feedstock

Type	Mass per year
<b>Cattle slurry</b>	350 kt
<b>Agro-industrial residues</b>	25 kt
<b>Dairy waste</b>	25 kt
<b>Total</b>	<b>400 kt</b>

The CHP can only work efficient if the concentration of hydrogen sulphide is below 200 ppm. To remove hydrogen sulphide from the biogas, the BIDOX® system is used, which is a patented system based on biological desulfurization. Here, anaerobic bacteria carry out the oxidation of sulphate and the sulphate is removed in the form of a very dilute sulfuric acid solution. The concentrations of H<sub>2</sub>S left in the biogas are lower than 1000 mg/L.



BIDOX® tower

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### Current process and disposal routes for end products

Feedstocks are digested in a residence time of 3-4 weeks. The digestate is separated by a centrifuge in a liquid fraction and a solid fraction.

The liquid fraction is treated by MBR-NAS® process. This is a membrane reactor where a classic biological activated sludge system removes the nitrogen and organic material by oxidation and nitrification-denitrification to N<sub>2</sub> gas.

By applying the ANPHOS® system to the liquid fraction, phosphorus is recovered as 1 tonne of struvite per day.

The solid fraction is dried to a dry matter content of 77-90%. Only if a water content of less than 20 % is preferred, part of the biogas would be used in order to dry the solid fraction.

Biogastur owns his own truck fleet with which they can collect manure and distribute their fertilizers to farmland.

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

D i g e s t a t e		Mass (kton/year)	Dry matter (%)	N- total (g/kg)	P-total (g/kg)	K <sub>2</sub> O- total (g/kg)
		Raw digestate	360	10		
	Solid fraction after centrifuge	25	70			
	After drying	24	90	2,7	1,5	2
	Liquid fraction after centrifuge	300	12			
	Struvite	3				
	Evaporated water	10				

### Current problems and obstacles

At the moment, struvite is not needed as a fertilizer in the region, but there is a need for custom made fertilizers. Blending of different recovered nutrients (N-P-K) could create a market.

Nitrogen is not recovered in the biogas plant but is converted to an environmentally harmless form N<sub>2</sub>. Ammonia stripping scrubbing would create a problem for use of the ammonium sulphate as a fertilizer, since this product is subject to REACH regulation in Spain.

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

Biogastur wants to integrate wastes as a resource, through optimal treatment and guaranteeing its traceability.

The biogas market in Spain needs still to be developed and more specifically agro-industrial biogas, where Biogastur will be leading in production capacity, the technologies implemented and the level of management of waste and GHG reduction.

They consider it essential to be at the forefront of technology and information which is developed within the European framework, covered by the Horizon 2020 program objective.