



# HOW TO GET THE MAX EFFICIENCY FROM STRAW

Broadley Energy and Sheppey Energy Case Study



# BioBANG - PRINCIPAL EFFECTS

▶ CAVITATION EFFECTS:

- ✓  MOLECULAR FRICTION
- ✓  PARTICLE'S REDUCTION
- ✓  HOMOGENIZATION



▶ IMPROVEMENTS:

- Digestibility of fibers pectins etc ...
- Product's viscosity
- Biomethane speed and production



**MORE THAN 100 INSTALLATION IN ALL EUROPE  
(ITALY, GERMANY, FRANCE, SWITZERLAND, DENMARK, POLAND)**

# WHY STRAW NEED PRETREATMENT



Increase the fiber's digestibility and reduce their retention time.

**OPTIMIZATION OF THE DAILY FEEDING**



Increase of TS concentration in the digesters and reduce the liquid for dilutions

**INCREASING IN GAS YIELD**



Improve the viscosity in the digesters and reducing the work of the mixers.

**IMPROVING OF PLANT ENERGY EFFICIENCY**



# SOME OF OUR CASE STUDIES

► **Broadley energy**



**Type:** Biogas Plant  
**Power:** 1800 kW/h  
**HRT:** 60 days  
**Feeding:** Corn Silage, Rye, Pig manure, Straw  
**BioBANG installed:** June 2018

► **Sheppey energy:**

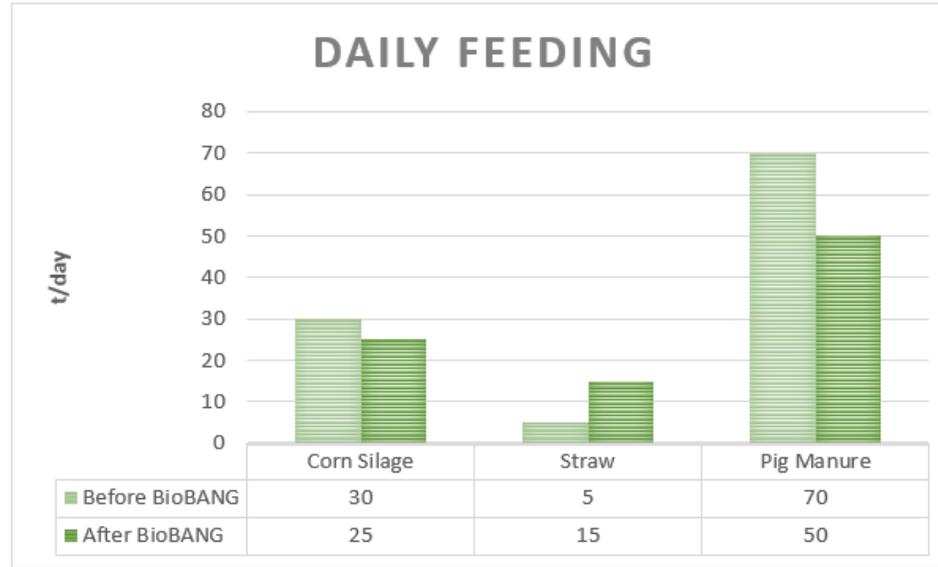


**Type:** Biomethane Plant  
**Production:** 500 mc/h of methane  
**HRT:** 60 days  
**Feeding:** Corn Silage, Waste fruits, Chicken manure, Straw  
**Plant started:** February 2020

# BROADLEY ENERGY FARM

6 months after BioBANG installation:

► Daily feeding:



► Production:

Production without BioBANG	
Daily Production (kWh/day)	13740
Annual Production (kWh/year)	5015100

Production with BioBANG	
Daily Production (kWh/day)	15800
Annual Production (kWh/year)	5767365

► Net Benefits:

Profit with BioBANG	
Daily Production (kWh/day)	2060
Annual Production (kWh/year)	EFFICIENCY INCREASE WITH BioBANG

Efficiency increase with BioBANG
<b>15%</b>

# How these plants treat the straw?

## FIRST PHASE PRETREATMENT IN FEEDING:

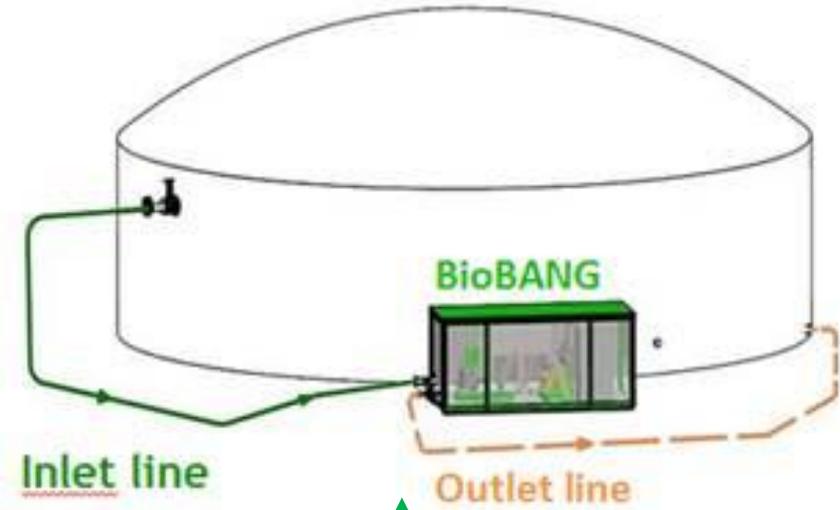
- ▶ It's necessary to load the straw efficiently, without a lot of liquid for dilution
- ▶ **In Broadley energy Farm:** composed by vertical screw-mixer hopper and Premix system.
- ▶ **In Sheppey energy Farm:** Composed By straw bale breaker, Cyclone filter, Hammer mill, Briquetting press

## SECOND PHASE PROCESS PRETREATMENT:

- ▶ Composed By **BioBANG** in recirculation on the main digesters
- ▶ It allow to Maximize the efficiency from the straw breaking up the fibers, reducing the straw's retention time and improving the viscosity.

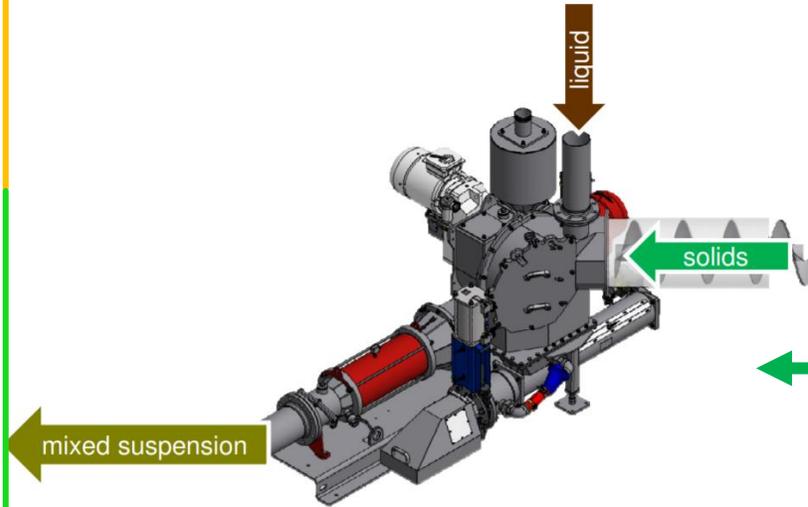
# Broadley Energy - Straw Pretreatment Scheme

BioBANG in recirculation on the digester



**PROCESS  
PRETREATMENT**

**PRETREATMENT  
IN FEEDING**



**Premix**  
Straw length: 25 - 75 mm

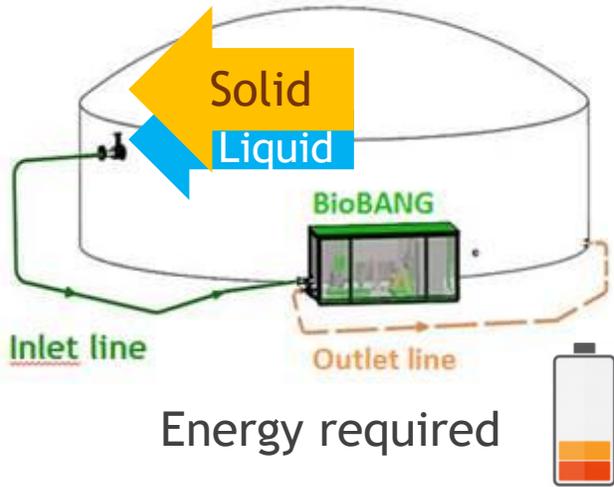
**Vertical Screw-Mixer Hopper**  
Straw length: 50 - 150 mm



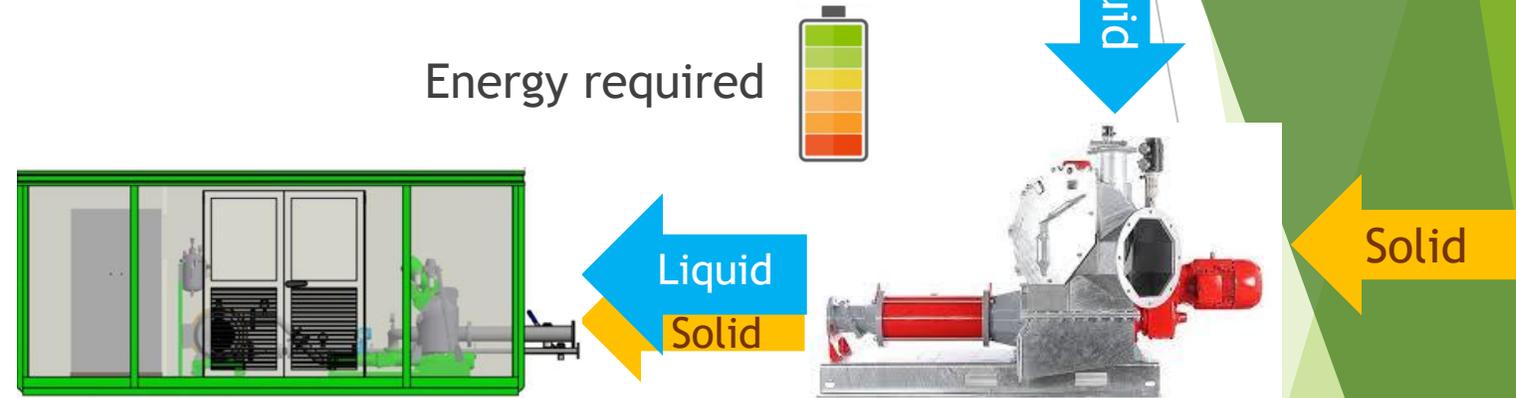
**Straw**

# Installation methods

## ► BioBANG in recirculation



## ► BioBANG pretreatment feeding (total or partial)



- BioBANG in recirculation take the product on the digester's surface, where the solid feedstock is concentrated for stratification effect.
- BioBANG in recirculation work with less liquid and can concentrate its treatment only on the solid feedstock.
- It means **Energy optimization and consumption's reduction**

# Why manufacturers have to install BioBANG in recirculation in their projects?



## INCREASED FLEXIBILITY CUSTOMER'S FEEDING CHANGES OR FOR FUTURE PLANT'S REPOWERING.

- Effective use of waste matrices for projects that provide diet change or biogas repowering projects to biomethane
- Savings in overall sizing and design costs from **5%** to **20%** on the total cost of the project.



## REDUCTION OF THE DIMENSIONING OF AGITATORS WITH THEIR COST OPTIMIZATION

- Drastic reduction of product viscosity and optimization of agitator's sizing
- Power savings of mixing and pumping systems from **30%** to **60%** with consequent reduction of the average installation cost.



## INCREASED SPECIFIC PRODUCTIVITY: MORE m<sup>3</sup> OF GAS WITH SAME PLANT'S VOLUME

- Increased digestibility and reduction of biomass retention time, ensuring greater safety in the design phase.
- Optimization of the size of the digesters up to **20%** of the volume with an economic saving on the costs of designing and building the tanks.



THANK YOU FOR  
YOUR ATTENTION

[www.biobang.com](http://www.biobang.com)

[matteo.brambilla@biobang.com](mailto:matteo.brambilla@biobang.com)

