

ULTRAWAVES ULTRASOUND SYSTEM FOR IMPROVEMENT OF BIOGAS PRODUCTION ON FARMLAND BIOGAS PLANTS

Löhndorf FBP, Germany



Figure 1: Container with system from the outside and inside (US module and pump are shown)

I. Specification of the plant

Specification of the plant	<ul style="list-style-type: none"> • 1 MW nominal capacity (CHP utilization 90–95 %) • 1 main digester (MD) à 2.205 m³ • 1 secondary digester (SD) à 3.000 m³ • 1 storage tank (S) à 6.200 m³
Substrate (before US application)	<ul style="list-style-type: none"> • Maize silage <ul style="list-style-type: none"> ○ Supply: 44.4 t/d ○ Dry matter: 31–36 % • Grass silage <ul style="list-style-type: none"> ○ Supply: 3.4 t/d ○ Dry matter: 25–28 %
Power production (before US application)	<ul style="list-style-type: none"> • 897 kW generated power (829 kW net) • 1.313 kWh/t DM electricity yield (1.214 kWh/t DM net)

II. Objective of the ultrasound test

- Intensification of anaerobic digestion process
- Reduction of substrate input
- Increase of specific biogas yield

III. Installation of the Ultrawaves ultrasound system

- One ultrasound system (5 kW) was installed in July 2012
- Sonication of biomass (1.8 m³/h) which is recirculated from secondary to main digester (Figure 2)

IV. Results of the ultrasound treatment

- Increase of power generation by 9.5 % (Figure 3)
- Reduction of dry feeding by 5.7 %
- Decreased viscosity
- Reduction of power necessary for plant operation by 8.7 % through decreased power consumption of agitators and pumps (Figure 4)

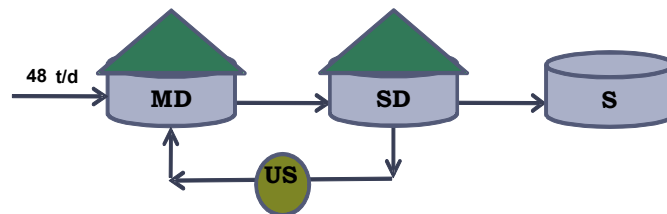


Figure 2: Flow scheme of FBP Löhndorf and integration of the ultrasound system (US)

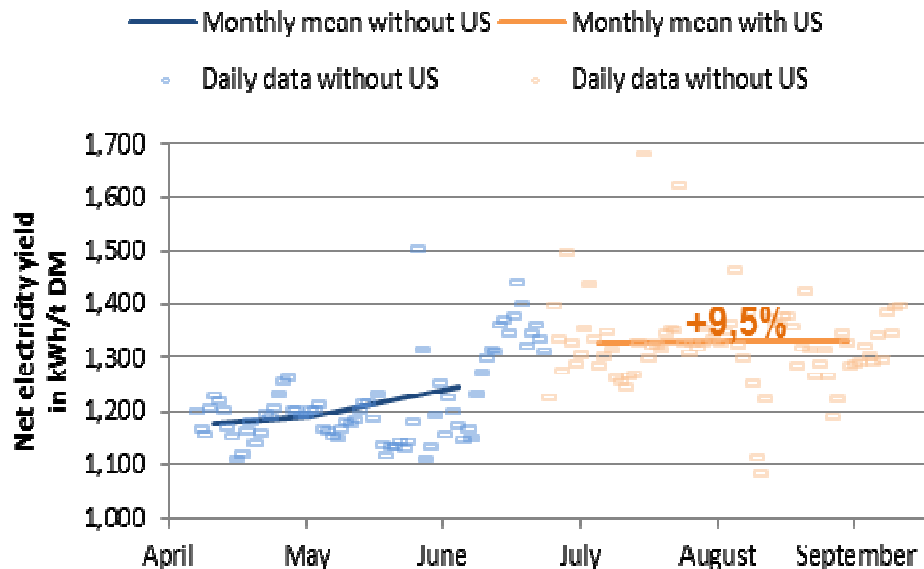


Figure 3: Net electricity yield based on dry feeding (data from 2012)

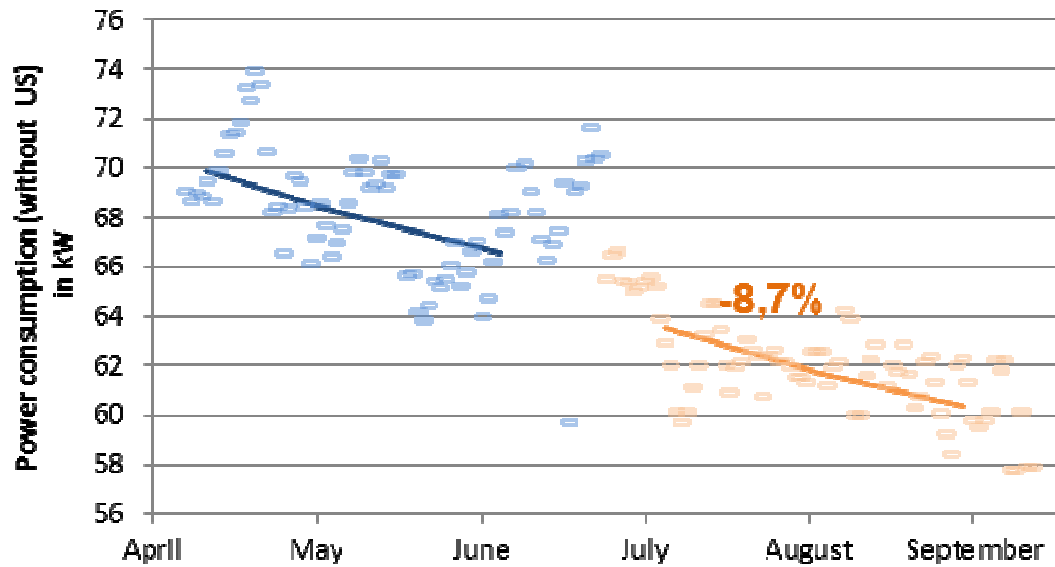


Figure 4: Power necessary for plant operation (data from 2012)

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