Optimising the feeding of input materials at Biogas Plants

Research project EU Agro Biogas

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Lamping Biogas Plant – Germany

Plant startup in 2001

1. extension:	2003
2. extension:	2009
Feedstock:	energy crops
Electric output	1,280 kW_{el}

Biogas Tanks

Digester:	2 x 1,400 m^3
Post fermenter:	2 x 900 m^3
Final storage:	1 x 4,000 m^3
Retention period:	80 days

Lamping Biogas Plant – Germany

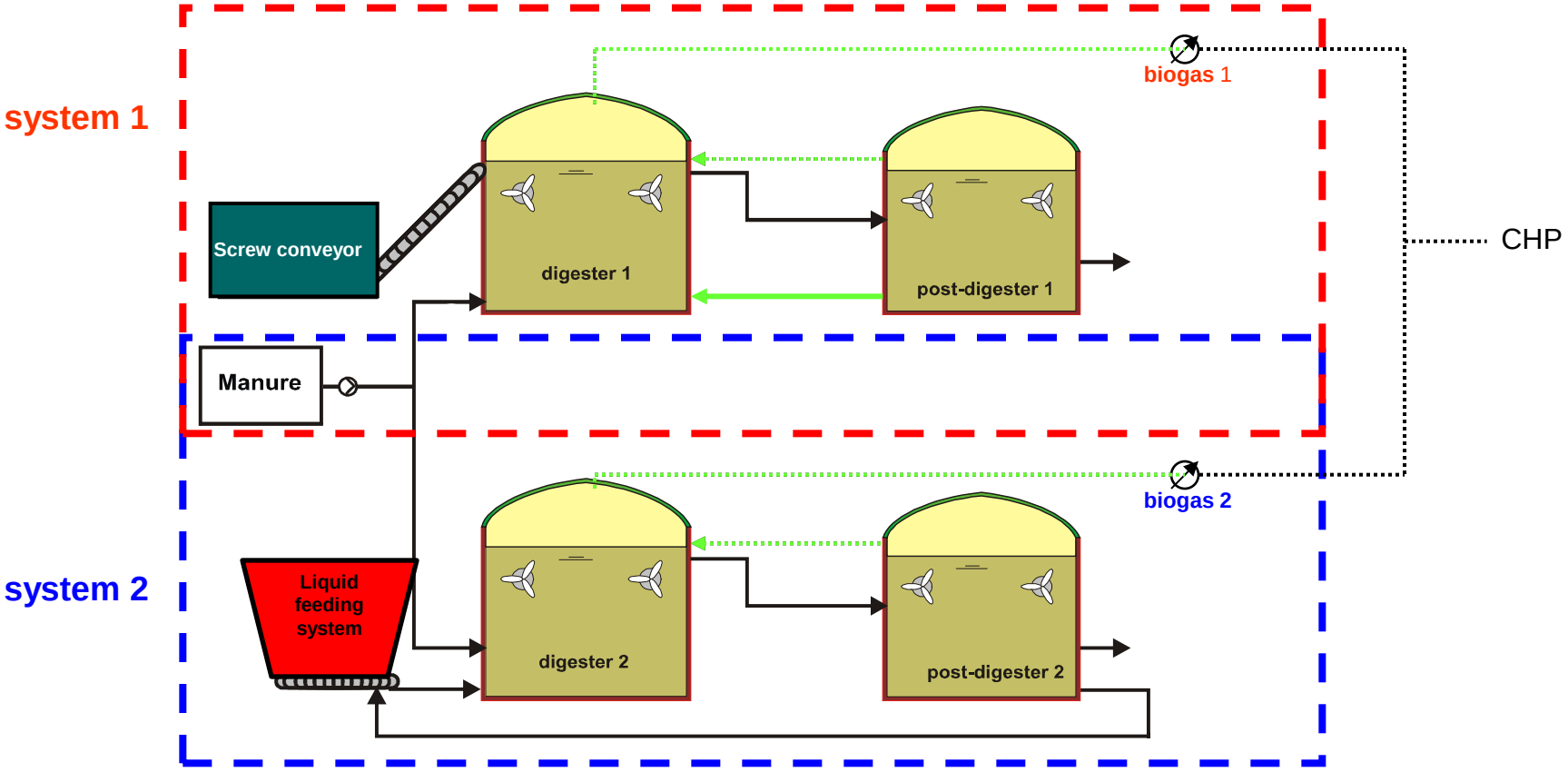
Input

liquid:	30% pig manure
Co-substrates (dry):	90% corn silage
	small amounts of grass silage
	waste from grain, fruits and vegetables

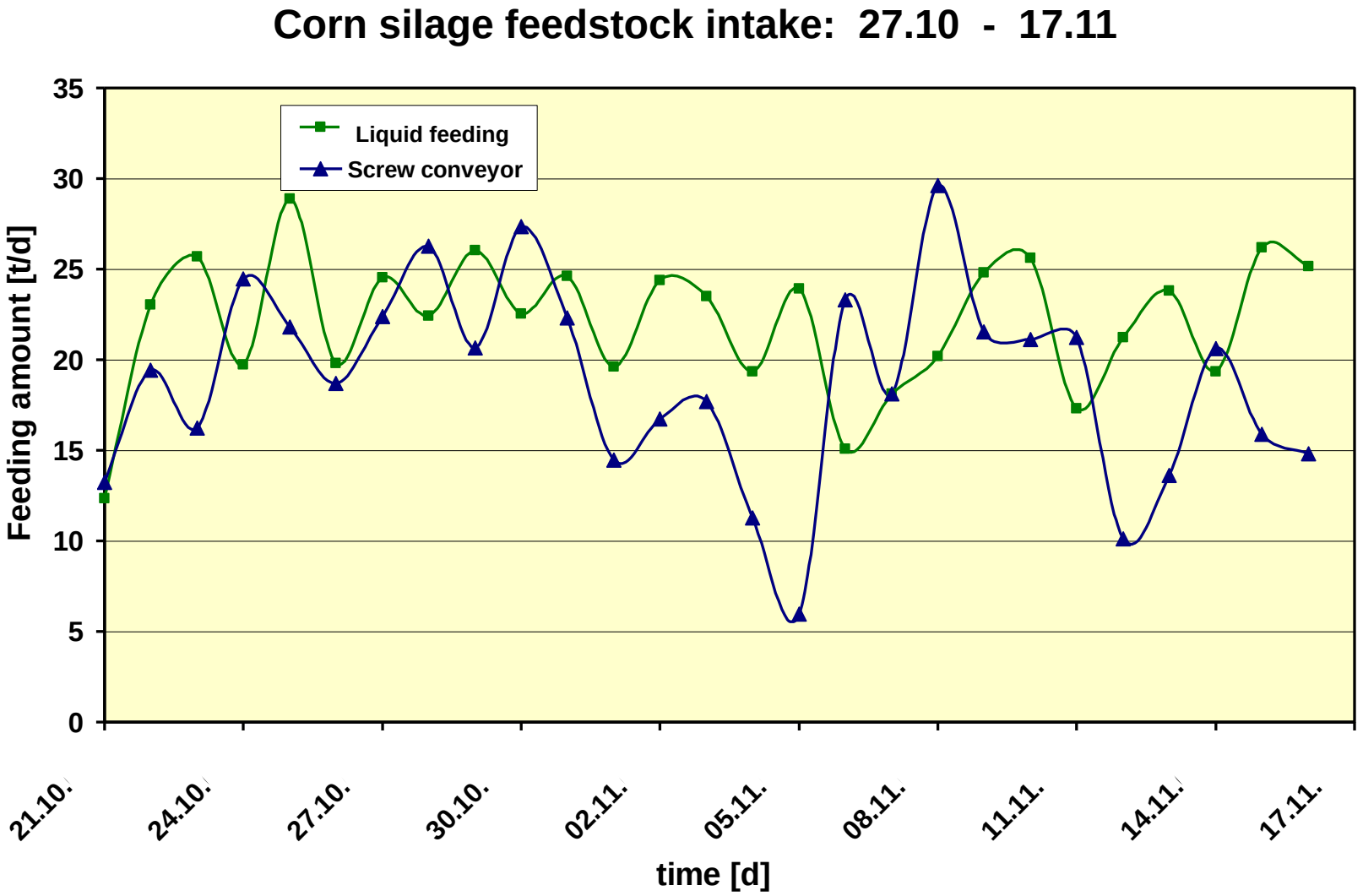
Output

electric power:	1,280 kW_{el}
head power output:	1,500 kW_{th}
used head:	1,200 kW_{th}

Comparing the mixing feeding system with dry feeding by screw conveyor



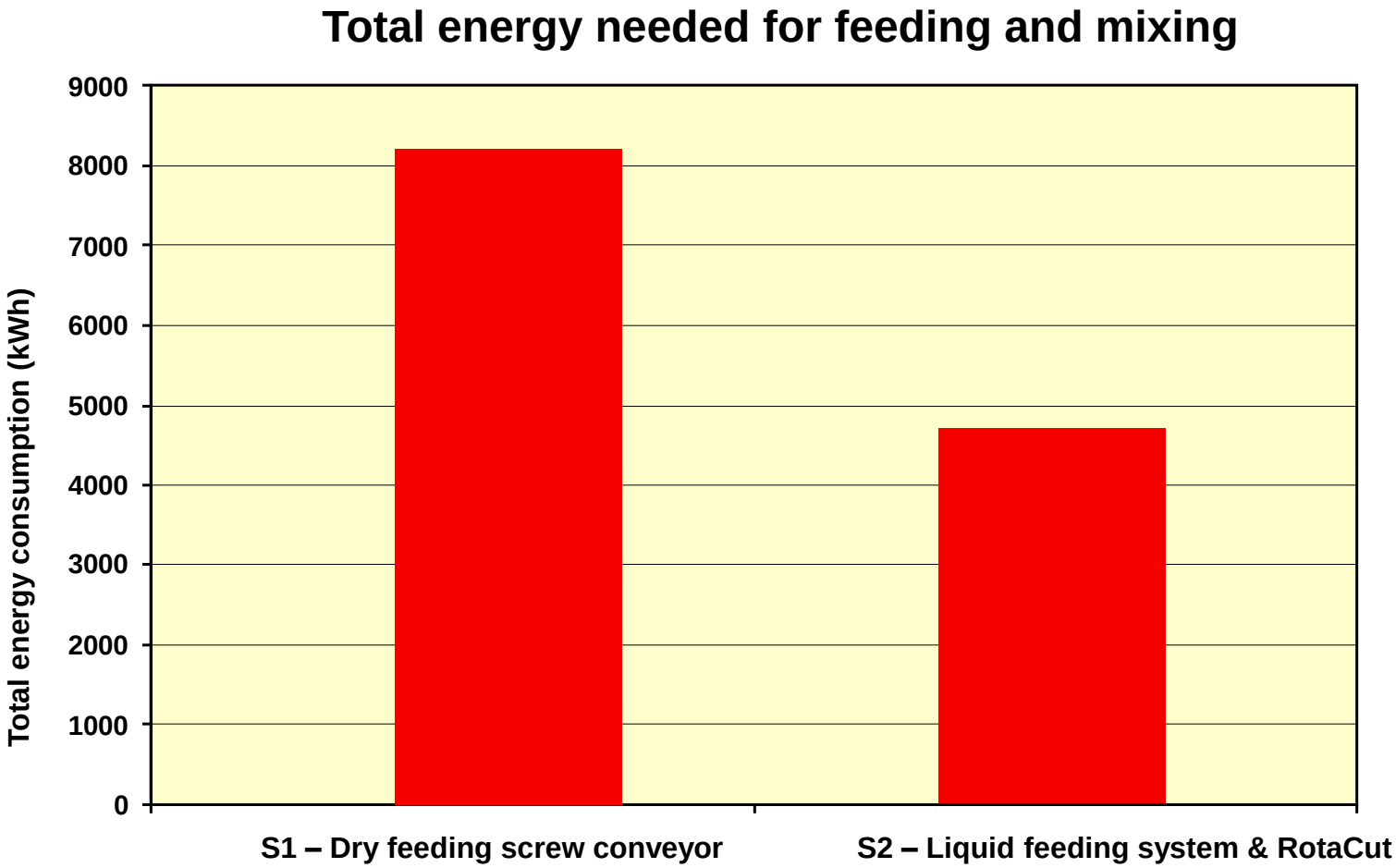
Comparison of Feedstock Intake



Results of Feedstock Intake Comparison

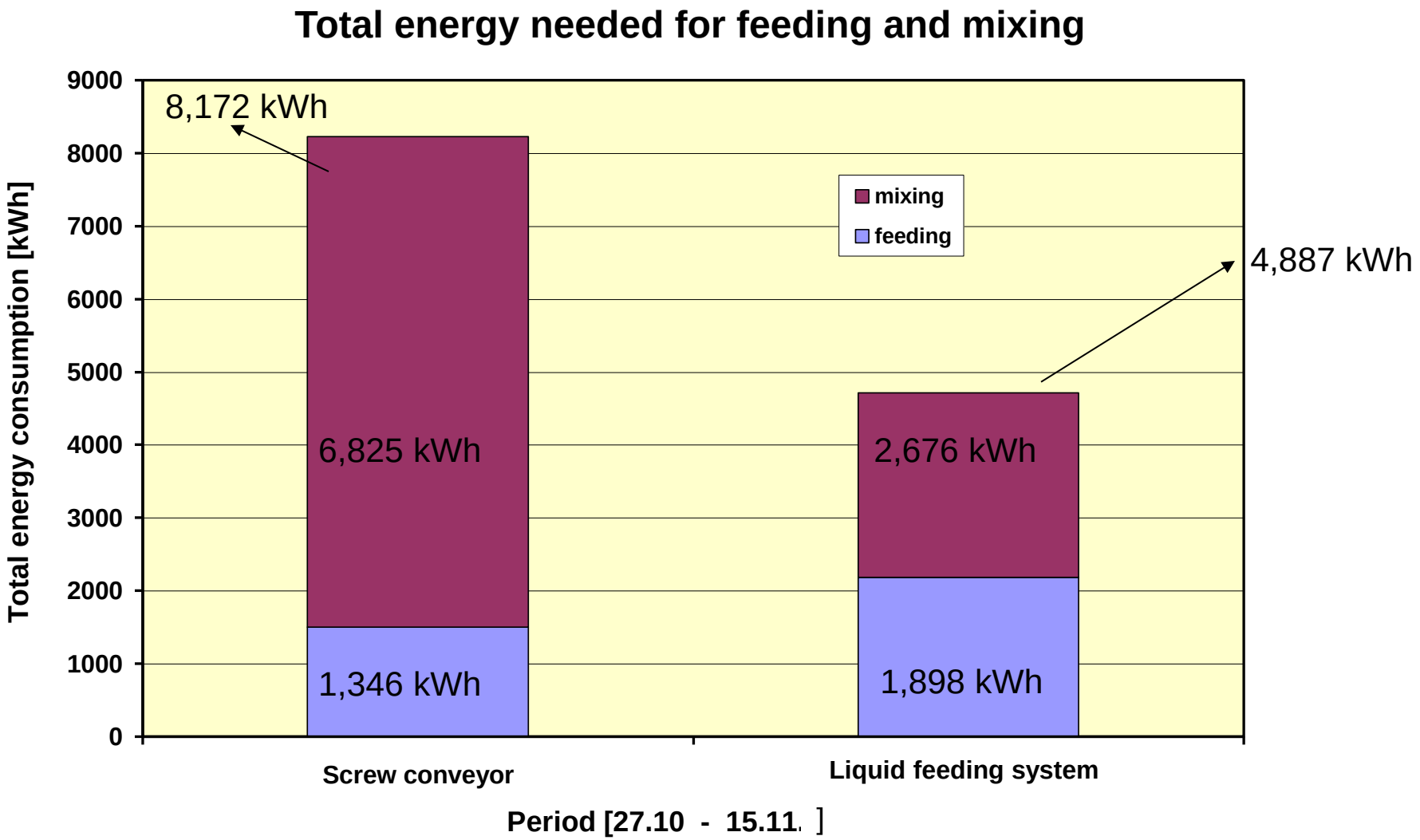
- Biology in System 2 (Liquid feeding system with RotaCut) was overall more stable. The measured data was more consistent compared to the dry feeding screw conveyor.
- Digester load was not at its maximum output, as shown by the more even feeding curve (red).
- Amount of feedstock input could be increased, thereby allowing the digester load to also be increased.

Energy Consumption Comparison

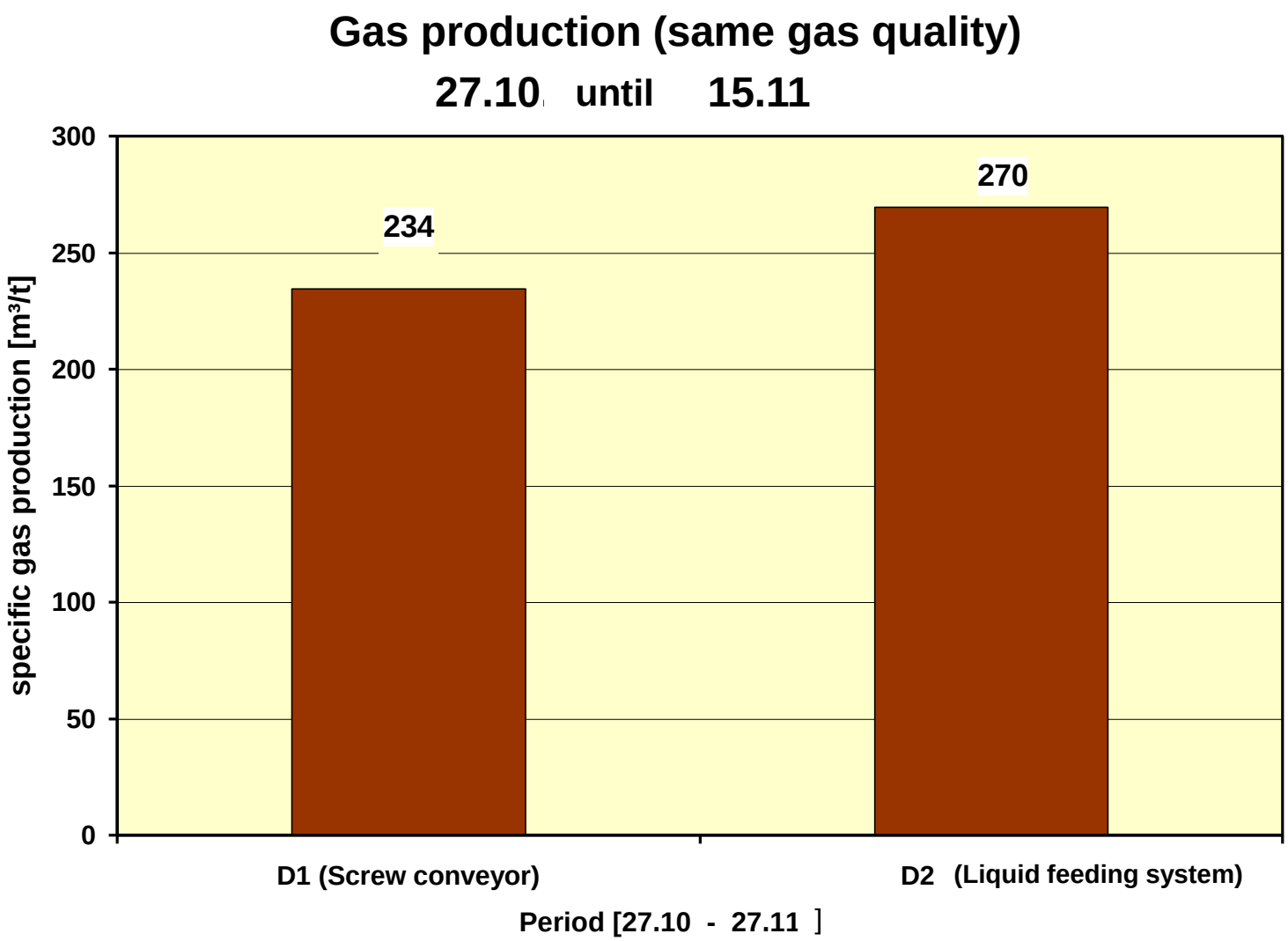


System 1: feeding and mixing 380 t cornsilage
System 2: feeding and mixing 430 t cornsilage
Period 27.10 - 15.11

Energy Needed Comparison



Gas Production Comparison



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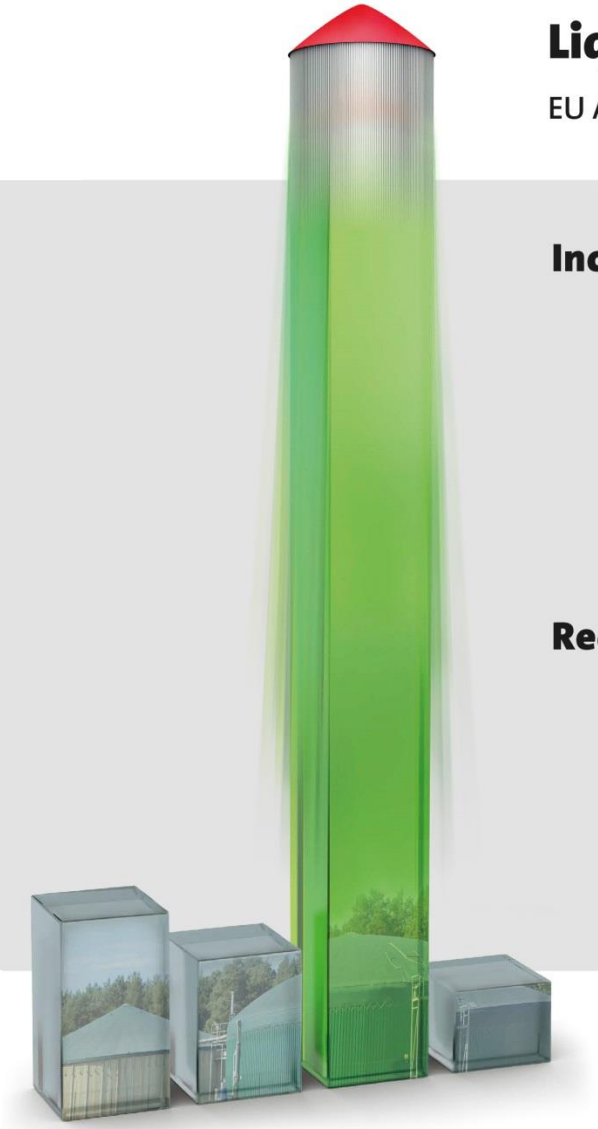
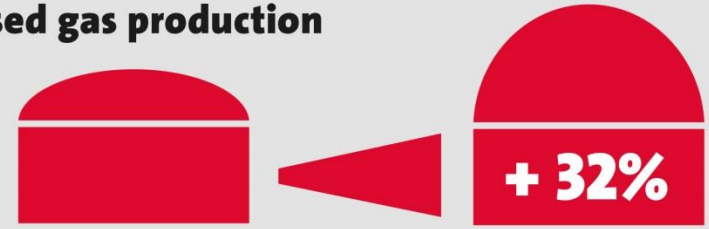


Liquid feeding system gives you more biogas!

EU Agro Biogas study results: Liquid feeding system vs. dry feeding system

Increased gas production



Reduced energy consumption

Information on graphics and data can be found at: vogelsang.ie/premix

eu-agrobiogas

vTI Johann Heinrich von Thünen-Institut

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Benefits of Liquid Feeding System

- Higher gas yield
- Breaks up and dissolves coarse and fibrous matter
- Feeding with a homogenous, well-mixed suspension
- Reduced energy requirements for mixing and pumping
- Overall system runs smoother
- Less downtime
- Reduced emissions and odour