

# Heat use for biogas plants

## RST fermentation substrate drying for biogas plants



 **Quantity reduction of the fermentation substrate by evaporating of liquid (0,7-1 kg/kWh)**

- Savings of storage capacity and transport logistics up to 50 %
- Recognition in the Fermenter volume capacity

 **Automatic plant operation with low maintenance and energy expenditure**

- Plant is integrated into the process; with automatic filling and emptying

- Continuous plant operation with year-round-utilization possible

 **Economic fertilizer production by increasing the dry matter content up to 50 %**

- Due to the evaporation of liquid the dry matter content of the slurry increases up to 12 %. The nutrients per m<sup>3</sup> increase accordingly.
- The exhaust air scrubber binds the ammonia with sulfuric acid. This results in a solid ammonium sulfate bond (ASL) (= liquid fertilizer). In the mixture with ASL the manure becomes a high-quality fertilizer.

 **Dust-free plant operation**

- The fermentation substrate is reduced to a maximum of 12 % dry matter. Plant operation only with exhaust air purification according to Air Quality Control (TA-air), as a result no odorous emission.

 **Use of the complete available waste heat, CHP bonus capable**

- The power varies with the available heat. Only time is influenced by this.
- Example: At 600 kWh x 1 l /kW = approx. 600 liters/h evaporated liquid
- At an 8000 h annual operation this corresponds to approx. 4800 m<sup>3</sup> of liquid that doesn't need not be stored and transported.

## Function:

It is a plant for increasing the solid content in the fermentation substrate by evaporation of liquid. Rotating drums immerse continuously heated contact plates in the substrate. The moistened metal sheets are guided into the air flow. The heated air flows through the sheets and takes away the evaporated liquid.

This results in high-quality manure as the nutrient content is doubled by the reduction of the amount.

In addition, the volume reduction saves logistics efforts and costs when bringing out the manure.

Operating costs electricity consumption fermentation substrate dryer Romberger RST 2.5x2.8 when using waste heat of 600 kW/h							
technology	power consumption/h in kW/h	running time h	operating hours /year	electricity price/kW/h €/kW	costs / year €		
fan 2 x 1,68 kW/h	3,36	24,00	8.000	0,23 €	6.182,40 €		
replacement for table coolers 2x2 kW	-4	24,00	8.000	0,23 €	-7.360,00 €		
motor drum	0,37	24,00	8.000	0,23 €	680,80 €		
acid pumps 2 x 0,75 kW	1,5	24,00	8.000	0,23 €	2.760,00 €		
pump	5	2,00	730	0,23 €	839,50 €		
					3.102,70 €		
Cost calculation saving liquid manure transport							
waste heat available	power	annual operating time	quantity/h	barrel volume	transport price	annual quantity reduced	savings per year
600 kW/h	1,00 L/kW	8000 h/year	600 l/h	10000 L	5,00 €/m³	4800 m³/year	24000,00 €/year
				480 barrels/year			
CHP bonus							
waste heat available	CHP bonus (EEG)	annual operating time	kW/year	bonus/year			
600 kW/h	0,0263 €/kW	8000 h/year	4.800.000 kW/year	€/kW/kW/year			

## In order to grant the CHP bonus, the following points have to be proven:

-  Preparation of fermentation products for the purpose of fertilizer production: The aim of the treatment is a weight reduction to improve transport and storage capacity as well as a manure appreciation
-  Connection to a heating network of at min. 400 m length
-  Energy-efficient plant that requires no more than 1.500 kWh (therm) to evaporate 1.000 l of water
-  Nitrogen loss should be less than 30 %. Nitrogen contents of the products of exhaust gas and exhaust air cleaning are deducted from the difference and are therefore not counted as nitrogen loss
-  Installations are notifiable to the competent authority
-  Quantity detection fermentation substrate via flow meter, energy requirement via heat quantity meter
-  Compliance with Air Quality (TA-air) by means of exhaust air purification with odour indication ppm/m<sup>3</sup>, possibly report on odours
-  Coordination of the plant with the responsible environmental expert



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