

Dry fermentation plant (batch method), Biomassehof Langenau

ltd. partnership with a ltd. liability company as general partner

The biogas plant is operated as dry fermentation in batch method. To minimise fluctuations in the gas yield and the gas quality 7 digesters are operated parallel and time delayed. Every third or fourth day one digester is emptied and re-filled and hence the total retention time in one digester is up to 28 days.

When the digester is filled approx. 20% of digested material serving as inoculum or starter is mixed with fresh substrate. Additionally a percolation liquid is used to distribute bacteria through the substrate heap. The percolation liquid is sprayed over the substrate, trickles through the heap and is collected at the floor from where it is pumped into a storage tank. In the storage tank the temperature is kept at 40 C. The percolation liquid is recirculated between the different digesters.

The resulting gas from all digesters is collected in a gas holder before it fuels the cogeneration units which produce electricity and heat.

At the end of the digestion period a stackable digestate leaves the digester. This material is comparable to a compost with a decomposition grade of 2-3.

A part of the digestate is further composted until it reaches the decomposition grade of 5. The major part of the digestate is spread on agricultural land in order to return nutrients and organic matter to the soil. Land-spreading of stackable digestate from dry fermentation plants is also allowed in zone 2 of water protection areas.



Biomassehof Langenau

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Biogas Regions Shining Example



key data

Operator.....	Agrar Diensleistungs- gesellschaft des Maschinenring Ulm- Heidenheim mbH
Start of Operation	2006
Type of corporation.....	Ltd. Company
Investment costs	approx. 1,9 Mio. €
Design/ Planning.....	Kausch Consult, Stuttgart
Amount of gas produced	2 – 2,4 Mio m³ per year

Feedstock

Grass silage	4.000 tons per year
Maize silage.....	8.000 tons per year
Grass from landscape maintenance.....	2 - 3.000 tons per year

Agricultural area.....**150-200 ha for energy crops**

production data

Available area for the output of the biogas fertilizer	150 – 200 ha
Thermal power of the gas engine	675 kW
Electric power of the engine.....	540 kW
Generated thermal energy.....	4,536 kWh/a
Utilisation of heat	50% are used for drying woodchips as fuel wood, for swimming pools
Generated electric energy	4,05 Mio kWh/a
Power consumption (electricity) of the plant itself	122.000 kWh/a

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Biogas Regions Shining Example



Annual delivery of electricity to the (regional) electric grid company

3.9 Mio kWh per year

Electric grid company.....**EnBW**

technical plant description

- Digester: 7 garage digesters (l=25 m, w=5.5 m, h=4 m)..... **500 m³ each**
- Percolate tank for storing inoculation liquid (percolate).....**320m³**
- Gasholder, covers 2 hours of full CHP capacity.....**600m³**
- CHP, 3 gas engines by MAN..... **180 kWel. each**
- Operating temperature.....**40°C**
- Residence time in the digester **28-35 days**
- Average expenditure of human labour **3 hours per day**

Feed-in system: A wheel loader is used to empty and fill the garage digesters. To start the digestion process 20% of already digested material is used as inoculum and is mixed with fresh input substrates.



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This shining example information sheet was created in July 2008 ©, WFG

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