

### Biogas plant with small district heating



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The RODING Distillery Cooperative, located in the county of Cham, Bavaria, started planning for a Biogas plant already in 1994. At the very beginning, the Biogas plant should only be incorporated into the distillery complex. However, the distillery is working only for about 6 till 7 months a year, during the potato season, when potatoes can be used as distillery input. However this 6 months operation period was not sufficient for an economic operation of the plant, as during the rest of the year, no use of the heat produced by the CHP (Combined Heat Power) plant was possible. In the year 1998 new synergy-effects for the heat use show up. The local county-hospital, a neighboring nursing school, a dialysis station and an old people's home were interested to buy the heat of the CHP plant for heating and air conditioning purpose. A small district heating system was designed and in 1999 the Biogas plant together with a 800 m insulated pipeline and a Biomass fueled boiler plant were built and started operation.

All the excess heat of the CHP plant is now used by the distillery and the district heating system, the produced electricity is fed into the local grid. The Biogas plant is now the main money earner of the energy plant (Biogas plant plus boiler plant), producing approx. 60% of the total income by selling electricity and heat.

Our scope of supply was the turn key erection of the Biogas plant including the detail engineering of the plant components. We supplied the complete substratum intake plant (for distiller's wash, potatoes, grain, liquid manure etc.), the buffer silo and a substratum mill, the fermentation tank, the gas piping and the control equipment for automatic operation and the Biogas buffer tank plant including the protective housing.

The Biogas plant is mainly working on distiller's wash with cattle manure for co-fermentation. During the potato "off season" when there is no distiller's wash available, Triticale grain is mashed and fermented as co-ferment. By this type of operational cycle, the Biogas plant can work all the year round at full capacity, in case more heat is required (in cold winter time) the Biomass fueled boiler plant produces the additional heat required.



### Technical data

Intended substratum input:	
Distiller's wash (potato)	ca. 2.100 m <sup>3</sup> /a
Triticale (grain)	ca. 700 t/a
Cattle manure	ca.14.000 m <sup>3</sup> /a
Fermentor volume:	1.520 m <sup>3</sup>
Biogas yield:	up to 2.000 m <sup>3</sup> /d ca. 600.000 m <sup>3</sup> /a (average > 30 m <sup>3</sup> Biogas from 1 m <sup>3</sup> substratum!)

Methane content in Biogas	> 68 % CH <sub>4</sub>
Hydrogen sulfide (H <sub>2</sub> S):	< 800 ppm
Primary energy content in Biogas:	ca. 3.600 MWh/a
Electric energy yield:	ca. 1.080 MWh/a (at $\eta_{\text{electr.}} = 30\%$ )
Thermal energy yield:	ca. 1.980 MWh/a (at $\eta_{\text{therm.}} = 55\%$ )

CHP plant installed (Perkins): 2 x 100 kW<sub>electric</sub>



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