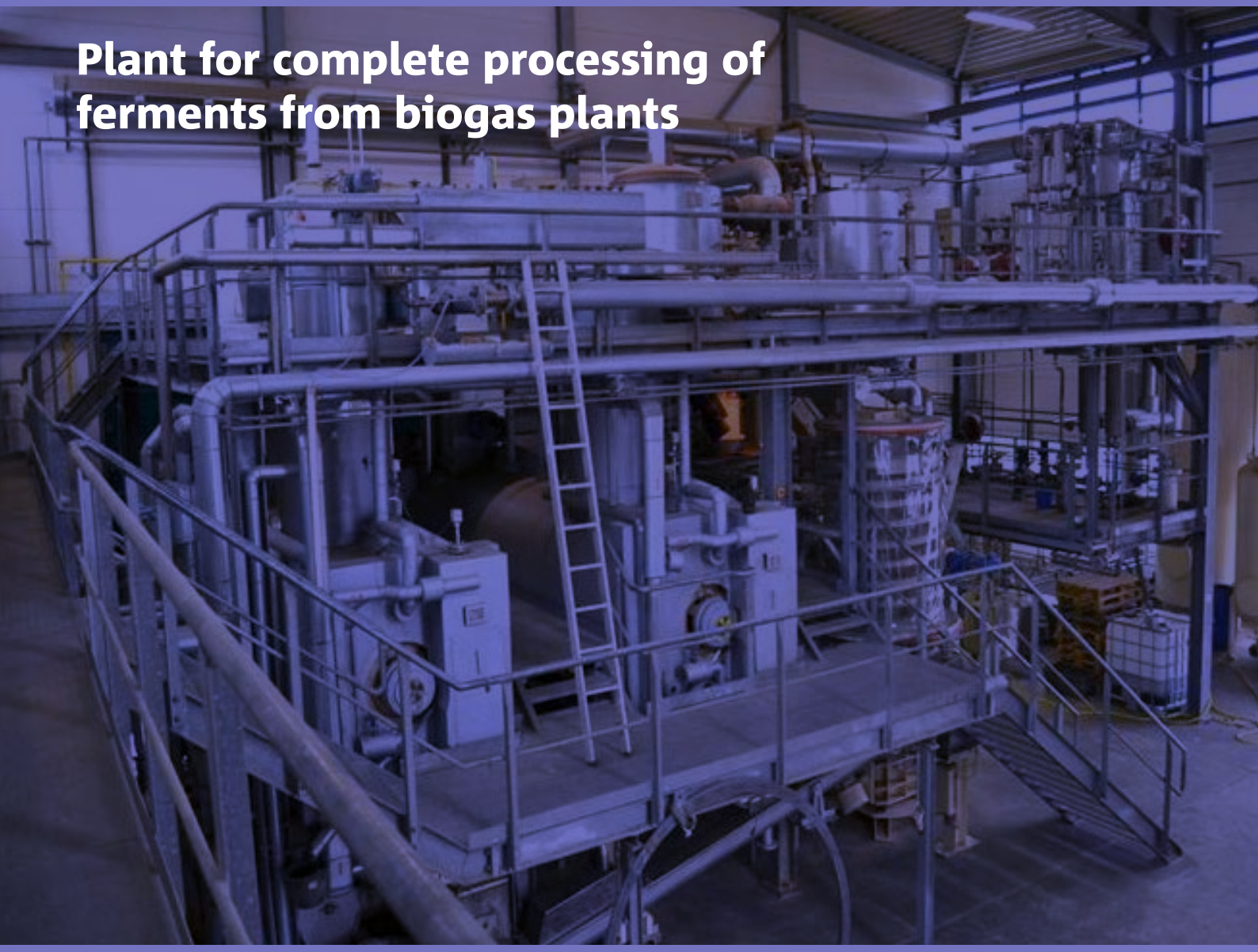
KRETO

Plant for complete processing of ferments from biogas plants



Project background

In June 2017 the new Fertiliser Ordinance (BGBl. I S. 1305, 1348) came into force in Germany

The ordinance introduces appropriate measures with the aim of reducing the levels of nitrates and phosphates in groundwater, which in some areas are very high, with one of the objectives being to reduce the use of fertilisers and additives in areas with high levels of contamination. In addition, waterproof silos must be constructed or retrofitted (in accordance with Paragraph 12 Section 3 of the Fertiliser Ordinance) to store natural fertilisers (such as fermentation residues) produced during biogas production for at least 9 months. Considerable (re)engineering work is therefore required, particularly in the commercial biogas industry. In this sector alone there are around 8000 plants across Germany which are affected by this new ordinance.

100% treatment of the fermentation residue with KRETO and DFT© technology

Operation & procedure

The mechanically pre-drained fermentation residue is transported via the reception hopper (1) to the DFT© vapour/fluid dehumidifier (2) using a bottom discharger and chain conveyor.

In the DFT© there is a pure steam atmosphere in which the fermentation residue is heated to 120 °C. The liquid products are removed from the solid residue through evaporation. As a result of this process, the evaporated liquids and the solids remaining in the DFT© are 100% sterilised and free of bacteria. The solid remains in the DFT© for at least 30 minutes before leaving the dehumidifier.
The evaporated liquid products are purified with a Teflon filter and subsequently condensed isothermally in the plant condenser. The condensation heat is used to heat the mechanically obtained liquid fermentation residue and returned to the biogas plant.
The 100% bacteria-free solid is compacted in the press (4) once it has left the DFT© humidifier, cooled to 40 °C and stored in the silo (6) or in small containers on pallets until being sold as natural organic fertiliser. The necessary dehumidifying heat is supplied to the dehumidifier through a thermal oil heat carrier, using waste heat from the CHP unit. Using this waste heat from the biogas plant in this process entitles operators to a government power tariff (a “KWK bonus”) of three eurocents for each kilowatt hour generated, in accordance with the German Renewable Energy Sources Act (EEG).

DFT© system for dehumidifying fermentation residue from biogas plants, production of natural organic fertiliser
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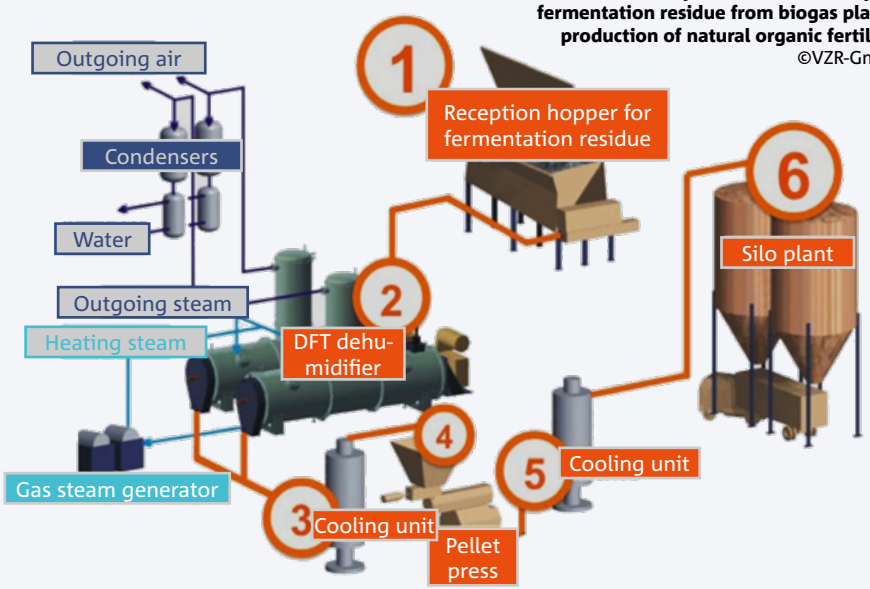

Procedure

The procedure in a biogas plant with a downstream DFT© system is divided into the following production stages:

Raw material procurement

- **Corn silage and biogenic residues**
- **Inspection of raw materials on delivery**
- **Procurement of additives**

Stage 1

- **Fuel treatment and biogas production through fermentation / gas treatment**
- **Electricity and heat generation with a CHP unit**

Stage 2

- **Pre-drainage of fermentation residue and thermal dehumidifying with DFT**
- **Production of NPK fertiliser pellets**
- **Treatment of fermentation residue water**

Final product sale

- **Electricity generation (EEG)**
- **Sale of heat produced by cogeneration**
- **Sale of NPK and ASL fertiliser**

Special features

Transforming biogas plant operators from generators of fermentation residue into producers of 100% bacteria-free and storable NPK fertiliser.

1 The combined biogas plant and vapour/fluid dehumidifying process is unique, as it is the first time when using biogas in regenerative electricity generation that closed energy and residue cycles have been produced in such a way that 100% “green electricity” and bacteria-free **(a world-first!)**, storable natural organic fertiliser with long-term stability is the result.

2 Plus, in addition to production of “green electricity” and natural organic fertiliser, all the waste heat produced by the CHP unit is used for heating as “high-temperature heat up to 200 °C” and as “low temperature heat up to 100 °C” **(using cascade heat)**, and the heat can also be sold on.

3 The combined process produces neither waste nor residual water.

Raw product
Water content w: 73.4 max.%
Bulk density (raw): 294 kg/m³

Water condensate

Dry product
Water content: 3.5 max.%
Bulk density (dry): 124 kg/m³

NPK fertiliser pellets
Water content (w: 3.5 max.%)
Bulk density (dry): 600 kg/m³

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