BLAABJERG BIOGAS PLANT

Built 1996

for

Blaabjerg BIOGAS

with

Bioscan A/S as planner

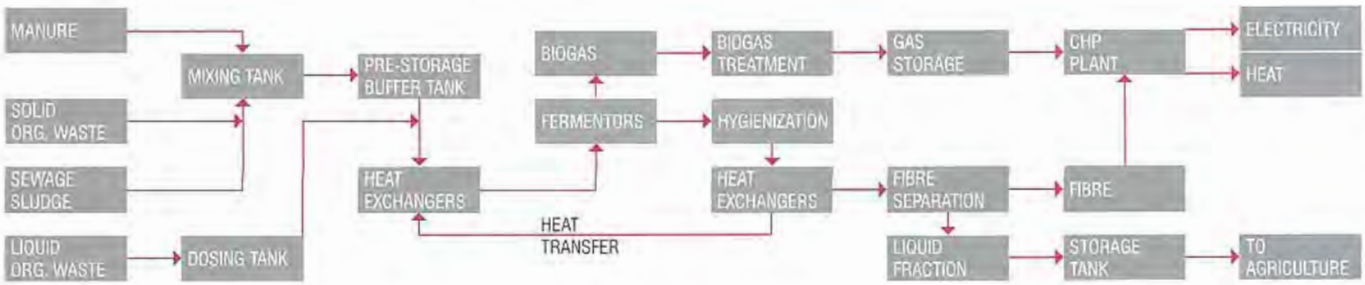
by

Burmeister & Wain Scandinavian Contractor A/S

BWSC

BLAABJERG BIOGAS PLANT PROCESS

The plant developed and constructed by BWSC is a thermophilic fermentation plant (53.5° Celsius) with a retention time of the biomass in the fermentors of approx. 15 days.



After mixing animal manure, organic waste and sewage sludge, the biomass is heated to the process temperature in a heat exchanger. The heat exchanger uses the heat from the degassed biomass supplemented with heat from the CHP plant. After heating, the biomass is pumped into the fermentors. After fermentation, the biomass is separated into a fibre fraction and a nutritious liquid fraction. The fibre fraction is used in combination with wood chips for heat production, and the liquid fraction is returned to the farmers and used as fertilizer. The biogas produced is led to the CHP plant where it is used in gas engines for combined heat and power production. The electricity produced is sold to the public grid, and the heat is used for district heating in the nearby town of Nørre Nebel.

PLANT CHARACTERISTICS

Fermentors	2 x 2,500 m³
Thermophilic fermentation	53.5° Celsius
Hygienization	8 hours at 53.5° Celsius
Gas storage	2 x 2,000 m³
Livestock manure	85,000 tons per year
Organic industrial waste	12,000 tons per year
Sewage sludge	3,000 tons per year
Fibre production	500 tons per year
Biogas production	3.0 mio. m³ per year
Gas engines	2 x JMS 316, each 736 kW_e and 945 kW_h
Biogas and fibre are converted into	8,300 MWh electricity (gross) from biogas
	10,850 MWh heat (gross) from biogas
up to	3,000 MWh heat from fibre
Plant consumption (per year)	900 MWh electricity
	1,600 MWh heat

BLAABJERG BIOGAS PLANT CONCEPT

The BLAABJERG plant concept includes a number of new developments which make the biogas plant more adaptable to various input materials and the requirements from the surrounding environment.

PRODUCTION OF FIBRE

To increase the energy efficiency of the plant, undigested fibre is separated from the biomass and utilized as a fuel additive in a wood-chip boiler. The fibre contributes to the heat production with up to 3,000 MWh per year thus increacing the total energy efficiency of the plant by 15%. Part of the liquid fraction is utilized in the H_2S removal process.

REMOVAL OF H_2S

H_2S in the biogas is removed in a biological process tank, where H_2S after injection of a small amount of air is oxidized to free sulphur and sulphuric acid. The necessary biological and chemical conditions are maintained by circulating some of the liquid fraction from the separation module through the process tank. In this way products, which might inhibit the oxidation process, are washed out.

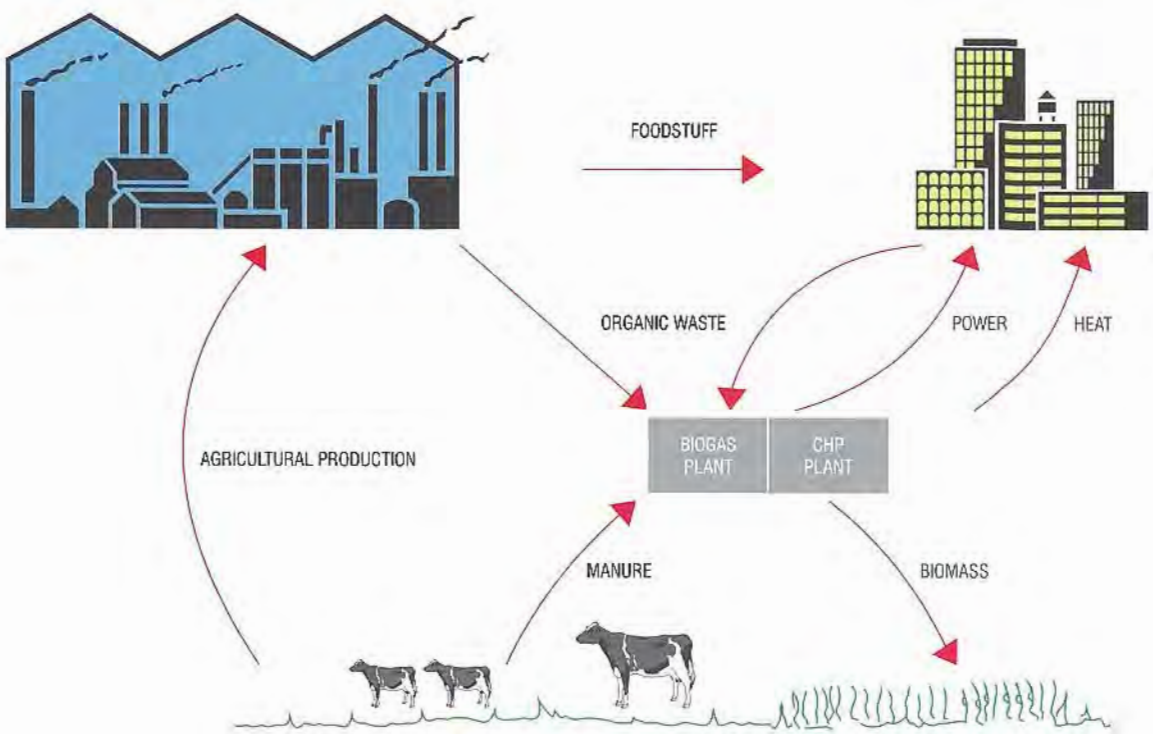
CATALYTIC COMBUSTION OF ODOUR

Process ventilation air is led through a regenerative combustion unit, where odour contaminants in the air are combusted at a temperature of approx. 1,000° C. By this process the odour is eliminated. This feature has been 100% financially supported by the Danish Energy Agency.

HYGIENIZATION

Through a combination of buffer tanks and pumping sequence the plant ensures a guaranteed retention time of 8 hours at a minimum temperature of 53.5° C. This combination of temperature and time ensures an efficient reduction of pathogens and allows treatment of sewage sludge and abbattoir waste. The process is in accordance with the recommandations from the governmental Danish Veterinary Service.

THE BIOGAS PLANT IN THE SOCIETY



A biogas plant will contribute to a better environment, thus adding to the efforts to form a sustainable society.

There are a wide range of advantages, both for the society in general and for the farmers in particular. The advantages are amongst others:

FOR THE SOCIETY

- Reduction of CO_2 emmissions.
- Reduction of methane emmissions.
- Prevents nitrate leaching to the ground water.
- Organic matter is returned to the land.
- Save on landfill capacity.
- Conservation of the limited resources of fossil fuels.
- Save on limited resources for production of commercial fertilizers.

FOR THE AGRICULTURE

- Better utilization of the nutrients in the manure.
- Added nutrient value from the food stuff waste.
- Possibility of better storage of manure and biomass.
- No smelling from spreading of manure.
- Saves purchase of commercial fertilizers.

WE ALL BENEFIT FROM THE SUSTAINABILITY !

BWSC

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