

Large-scale biogas plant

A large-scale anaerobic digestion plant is nearing completion at Devon, the United Kingdom. The nation's first large-scale biogas facility is based on technology familiar in Germany and Denmark, and is being built by Farmatic Biotech Energy Ag, based in Germany. The new plant is expected to start production by March 2002 and will process 146,000 t/y of cattle, pig and poultry manure as well as organic food waste. While manure will be collected from local farms within a 8-16 km radius, food waste would be collected from processors in the Southwest.

Manure and food waste will be discharged into a reception pit located in the receiving hall of the plant. During unloading, a ventilation system would be running and the ventilated air will pass through a bio-filter to reduce the risk of odour problems. The manure and waste are mixed before being discharged into a larger mixing tank where a three-stage heat exchanger system heats the mixture to 70°C within an hour. This pasteurization step will eliminate pathogens, viruses and weed seeds.

Following pasteurization, the mixture is sent through the heat exchanger into one of the two digesters, each of 4,000 m³ capacity, where anaerobic digestion takes place at 37°C for an average duration of 20 days. Methane gas released during this period is cleaned using a desulphurization unit and then stored in a gas holder above the digestate (the digested waste mixture) storage tank. The digestate is eventually returned to the supplying farmers as a valuable biofertilizer.

The plant's total methane gas production is expected to be approximately 3.9 million m³/y. This gas will be used to generate electricity and heat in two gas engines with a total power capacity of about 2.1 MW. The anticipated power production is about 14.4 million kWh/y. Excess heat generated during power production will be sold through a new district heating system, nearly 15 million kWh/y. Some of the key benefits offered by anaerobic digestion of manure and food wastes are listed below:

- Reduction in the risk of spreading diseases;
- Reduction in emissions and odour problems;
- Reduction in the consumption of mineral fertilizers;
- Reduction in the need for landfill sites; and
- Reduction in surface/groundwater pollution.

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