V6 POLYGENERATION FROM BIOLOGICAL WASTE

Synopsis

The biogas produced by the digestion of sludge and biological waste in the sewage water purification plant in Växjö is used as source of electricity, heat and vehicle fuel.

Background

The heat and electricity produced thanks to the biogas is then locally consumed in the plant. The general demand to also make biogas available as a vehicle fuel for public use and Växjö's ambition to become a fossil fuel free community have brought the need to increase the share of biogas in the energy supply of the plant. This can be done by increasing the amount of biological components treated in the plant and at the same time to have an efficient energy use in the plant.

Objectives

- Demonstrate a cost-effective system for optimised energy use of all available biological waste materials: food waste and sludge from sewage water purification processes will be co-digested and the gas will be used for polygeneration of electricity, heat and vehicle fuel.
- Optimise the flexibility of the system to produce fuel for its technical service vehicles so that the plant can become self-sufficient in heat and produce more than 60% of its own electricity needs.

Project description

In order to increase the production of biogas, the Sundet plant introduced a system for collection, pre-treatment and storage of food waste in large scale kitchens and constructed new reception lines for different types of external sludge. A new gas engine with an electric capacity of 330 kW and a heat capacity of 400 kW heat was installed in 2008, reducing energy losses in surplus situations. Finally, a fuel filling station was constructed and provided with gas upgraded from 60% to 95% of methane. In 2007, the first trial with vehicles using biogas from Sundet was performed.

Credit: Technical department of Växjö

Results

All new installations are in commercial use. The new gas-engine will soon reach 60% self-sufficiency in electric supply on a yearly average. The sewage purification plant has also managed to become self-sufficient in heat, except in peak situations. The market for up-graded biogas for vehicle fuel has grown rapidly and the production is close to its maximum capacity, supplying for now around 50 cars with biogas.

Next Steps

The plan is to collect biological household waste and digest it at Sundet (instead of incinerating it), hence producing biogas from it. Växjö will then be able to produce 2,100,000 Nm^3 of biogas per year. This will be enough to serve the public transport and about 500 cars with vehicle fuel – an important step in the progress toward a fossil fuel free Växjö.

Food waste delivered to the sewage treatment plant is a source for biogas.

Credit: Technical department of Växjö

Further Information

- **Name:** Steve Karlsson
- **Position:** Project leader
- **Organisation:** City of Växjö, Technical department
- **Tel. :** +46 470 413 15
- **e-mail:** steve.karlsson@vaxjo.se