

Open market for digestate from anaerobic digestion

Uppsala, Sweden

Population: 207,000

Area: 2,234 km²

Density: 92/km²

Total waste: 180,600 t

Household waste: 127,600 t

Commercial waste: 53,000 t

Recyclable: 15,000 t

Non-recyclable: 48,900 t

Organic waste: 54,000 t

About 60% of the Swedish municipalities are separately collecting food waste to be used in AD today. The overall goal is not primarily to produce biogas, but rather to re-circulate the nutrients back to arable land. Hence, the quality of the collected food waste is very important.

Uppsala Vatten (Uppsala Water) is in charge of several municipal services, such as water, sanitation and waste management. The company has 8 recycling centres that receive all types of waste, from general household to WEEE, bulky waste, hazardous waste and more. When it comes to treatment, the company owns a sanitary landfill for waste disposal and a modern biogas plant for the treatment of biowaste. The biowaste that is treated is collected directly from households through a separate collection. Although located in Uppsala, Uppsala Vatten also receives waste from neighbouring municipalities, as well as slaughterhouses and other producers of biowaste. Uppsala Vatten also has a biomethane station installed downtown that has biomethane available for fuelling cars.

Kungsängens farm biogas plant

The biogas plant was built in 1996 to produce biogas from manure and slaughter waste. Produced biogas was upgraded to biomethane and used in buses. New equipment was installed in 2006 in order to handle organic household waste. Up until 2010 the biogas plant produced about 500,000 m³ – 1,500,000 m³ of raw biogas each year.

A new reactor was built in 2010 and the biogas plant started receiving organic household waste from other municipalities. Since then, the annual production of raw biogas have increased every year. In 2014 the biogas plant produced 4,700,000 m³ of biogas. In 2015 - 2016 a new reactor and new pre-treatment plant for household waste will be built.

Digesters: 2 x 2,400 m³

Capacity: 40,000 t/y of biowaste (85%) and slaughter waste (15%)

Raw biogas: 4,700 000 Nm³/y

Biomethane: 3,000 000 Nm³/y

Digestate: 43,000 t/y

Employees: 9

Anaerobic digestion

The liquid waste is pumped in the receiving pocket or the settling tank and solid waste without plastic packaging is shipped into the plant's pre-treatment hall where material is emptied as it arrives packaged in plastic wrapping. The household waste later undergoes separate pre-treatment and is later mixed and diluted in a mixing tank to a substrate with 15% solid content. It is then pumped into a temporary storage tank before pumped through heat exchangers to one of the three hygienisation tanks. Then it finally reaches the digester. Digestion takes place through a continuous anaerobic thermophilic process at 52°C with continuous stirring. The produced biogas and the residue are stored and then collected in a gas dome. As the gas from the digester and digested residues can exceed a temperature of 50°C, they are cooled down in a water-cooled gas cooler.

Biogas upgrading

The gas is fed from the gas holder to a gas upgrading facility which extracts CO₂ from the gas so that the methane content of the upgraded gas exceeds 97%. Gas upgrading is equipped with a thermal incinerator that burns the methane abrasive particles that occur in the plant. Using the thermal incineration the methane emissions are within the range of 0.3% of the incoming methane amount. Biomethane is transported to the filling station or used for heat production in a gas boiler at the biogas plant. Biogas can be also flared in case of any malfunction on the site.

Swedish digestate market

Sweden has been assessing the quality of digestate as organic fertiliser since 1999 when the country launched the quality assurance scheme "Certifierad återvinning" ("Certified recycling") and has been building trust among users of organic fertiliser. Today, 99% of organic fertiliser produced in co-digestion plants (most of them using food waste from households as substrate) is used on agricultural lands. Approx. 80% of all organic fertilisers are certified according to the certification scheme.

