

Pre-treatment of dry feedstock in biogas plant in Tongeren, Belgium

SUCCESS STORY



Picture: Schmack Biogas GmbH

Operator

Swancote Energy Ltd.

Location of the project



Bridgnorth, Shropshire, England

Contact details

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Project results

Physical:

- Optimised feedstock use
- Digestate use

Thermodynamics:

- Higher efficiency

Economical:

- Lower operational costs
- Additional revenues through: heat certificates and sales of digestate as fertiliser

Environmental:

- Renewable electricity or heat supply

Project outline

The biogas plant in Tongeren is the biggest project of its kind in the province of Limburg, and one of the largest in Belgium. Located in the industrial area of Tongeren, it has been designed to digest maize silage (80% of feedstock) and industrial residues, such as glycerine from biodiesel production and other organic waste (20%). In order to ensure high sustainability and to produce 35 000 tons of energy crop per year local farmers have been contracted to deliver maize within maximum 20 km from the plant. Due to the high dry matter content of the feedstock, the plant constructor has decided to install a pre-treatment hydrolysis digester EUCO.

Technical data

Year of plant construction:

2011 - 2012

Plant size: 2.8 MW_{el}

Digester volume: 13,000 m³

HRT : ~ 110 days

Process temperature:

Mesophilic, ~ 40°C

Type of raw material:

Maize silage and glycerine, residues from industry and agriculture, ~ 40,000 t/year

Utilisation of biogas:

Electricity production, feeding into grid

Heat utilisation:

Heat is used for digestate drying and digesters heating

Utilisation of digestate:

After drying the digestate is used as a high quality, low odour and environmentally friendly fertiliser for agriculture

Total investment costs:

€11,000,000

Subsidy:

The plant gets Green Certificates for produced electricity in frames of the Flemish support scheme

Performed actions

The biogas plant in Tongeren consists of a pre-treatment digester EUCO, a tank digester and a gas-tight storage. Inside the first digester, which is constructed in a horizontal form, a paddle agitator mixes solid feedstock with pre-fermented material. The main function of the EUCO is to liquefy the solid feedstock (hydrolysis) to provide the second-stage digester with well broken - down material. As a result of such hydrolysis and the homogenisation of the feedstock, less mixing is required at the second stage. After the entire retention time, fermented mass is pumped from tank digester into the covered, gas-tight storage.

Results of performed service

The biogas plant in Tongeren is operational since August 2012. With the current installed capacity of 2.8 MW_{el}, the plant supplies 6,500 households with renewable electricity and saves up to 10,000 tonnes of CO₂ annually. In the future, the project can be extended to even double size. The inauguration of "Biopower Tongeren" was celebrated in the presence of the Minister of Economy and Innovation and the Mayor of the City of Tongeren.

Thanks to the EUCO pre-treatment tank, energy needed for mixing significantly decreased and material with high dry matter content can be simply digested without addition of liquids. Furthermore, even up to 50% of the biogas yield can be produced on the first stage of fermentation process. Nowadays, scientists and operators are seeking for new substrates and optimisation of anaerobic digestion. Therefore, different pre-treatment methods of the feedstock and increased availability of easily digestible organic matter will gain more importance in the future.



EUCO digester - Picture: Schmack Biogas GmbH