

Hitachi Zosen
INOVA

Winterthur / Switzerland

Kompogas[®] Plant with BioMethan Biogas Upgrading



1 x 23,000 t/a, 2,100,000 Nm³/a

Winterthur – Kompogas® Technology and BioMethan Process for a Sustainable Energy Policy

The plant, owned by Kompogas Winterthur AG, processes around 23,000 metric tonnes of kitchen and green waste every year from more than 78,000 households in the Winterthur and Frauenfeld areas.

It uses two in-house HZI technologies – Kompogas® and BioMethan – to produce 1,050,000 Nm³ of biomethane per year, plus high-quality liquid fertilizer and compost.

Biogas in the City of Winterthur

In 2011, the City of Winterthur launched a 2050 energy policy including a long-term reduction in greenhouse gas emissions to 2 tonnes of CO₂ equivalent per person per year, and corresponding measures to promote sustainable energy technologies. To this end the city has taken a 34 % interest in the construction and operation of the new biogas plant. 52 % of the project is held by Axpo, the largest energy provider in Switzerland. Managing the gas grid is the responsibility of the City of Winterthur's municipal utility. Part of the natural gas/biogas mixture is made available via three local natural gas fueling stations selling a mix containing 10 % biogas. The lion's share of the biogas produced is incorporated into various gas products consumed by private households and large customers.

Producing Biogas with Amine Scrubbing

The plant handles source-separated biowaste from municipalities, garden markets, and private individuals. After shredding and sieving, the substrate is fed into the fullsteel Kompogas® PF1500 digester which is part of the fully automated facility. The raw biogas produced in the digester is precleaned, i. e. desulphurized and dewatered before being fed into the BioMethan gas treatment plant for pressureless, heat-led amine scrubbing, a technology developed by HZI, to separate out the CO₂ and upgrade the CH₄ fraction to natural gas quality. This biomethane is compressed and then fed into the municipal gas grid.

Top-Quality Digestate

Two sieve screw presses are used to separate the digestate from the digester into a liquid and a solid fraction. The press cake is stored and further stabilized in subsequent composting. This process allows

the material to mature into top-grade compost that is collected by nurseries, market gardens and farmers for use as fertilizer. Part of the press juice is fed back into the digester to directly initiate the fermentation process. The remainder is used in agriculture as certified organic liquid fertilizer.

Clean Exhaust Air Thanks to Organic Filter

Exhaust air from the entire process is collected and fed into a biofilter filled with several layers of torn root wood to remove ammonia, and subsequently released into the atmosphere. This avoids the emission of unpleasant odors and means that the plant enjoys broad acceptance in the community.

General Project Data

Owner and operator	Kompogas Winterthur AG
Commissioned	2014
Scope of delivery	– Turnkey delivery – Planning, construction, and commissioning – Fully automated Kompogas® AD system – BioMethan® gas upgrading plant

Technical Data

Annual capacity	23,000 t/a
No. of digesters	1
Digester type	PF1500
Biogas use	Upgraded to biomethane
Type of waste	Source-separated biowaste (food and green waste)

Production

Production of biogas	2,100,000 Nm ³ /a
Biomethane exported	1,050,000 Nm ³ /a
Production of solid digestate	10,000 t/a
Production of liquid digestate	10,000 t/a