ELIQUO | STULZ

Case Study

Energy surplus wastewater treatment plant with phosphorus recovery

MUNICIPAL SEWAGE TREATMENT WORKS, LINGEN

Lingen's municipal sewage treatment works, with 30 employees, ensures wastewater from the town of Lingen and neighbouring districts in Germany's Emsland region, is collected and treated. The upgrade of the treatment plant is designed for 195,000 PE, treating around 12,000 m³ per day of wastewater.

PROJECT

As part of a project funded by the Federal Ministry for the Environment, Nature Conservation and Reactor Safety (BMU) and the KfW banking group, the Lingen wastewater treatment plant was converted into an "energy surplus wastewater treatment plant with phosphorus recovery". The intention was not only to achieve self-sufficiency in electricity and heat, but also to generate a 25% surplus of electrical energy by using the co-fermentation of highly polluted wastewater from the production of biodiesel.

Digestion was enhanced by utilising the LysoTherm® system for the thermal disintegration of secondary sludge. The separate digestion of primary and secondary sludge (LysoGest®) allows increased phosphorus recovery from the sludge flow using Magnesium Ammonium Phosphate (MAP, struvite) precipitation and improved digestion performance with the EloPhos® system.

These measures were supplemented by the installation of new more efficient combined heat and power plants (CHPs) and the use of high-temperature thermal oil exhaust gas heat exchangers for operation of the LysoTherm® system.

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit

Umwelt Bundesamt

UMWELT INNOVATIONS PROGRAMM

KFW

STADTENTWÄSSERUNG LINGEN

IMPLEMENTATION

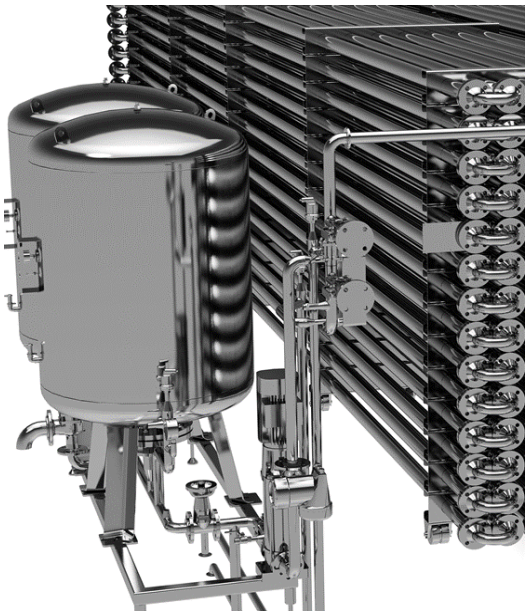
The project comprised all contract services from design and planning, through delivery, construction and commissioning, to full performance warranty coverage. It was based on the use of the LysoTherm® technology for thermal disintegration of sludge, the LysoGest® process for separate digestion of primary and secondary sludge, and the patented and proprietary technology EloPhos® for phosphorus recovery from the sludge flow.

SOLUTIONS

- Additional mechanical thickening of the primary sludge
- LysoTherm® system with a processing capacity of approx. 3,500 kg DS/d
- LysoGest® process for separate, highly efficient digestion of primary and secondary sludge
- EloPhos® system with upstream EloVac® vacuum degassing for the struvite precipitation out of digested sludge with a maximum throughput of 10 m³/h
- Installation of a centrifuge for dewatering of digested sludge
- Biological digester gas desulphurisation
- 2 CHPs with an electrical output of 300 kW each, plus thermal oil exhaust gas heat exchangers

AT A GLANCE

By implementing a variety of technologies, the capacity and performance of the digestion plant was greatly enhanced and the amount of sewage sludge for disposal significantly reduced.



LysoTherm® – quality in stainless steel

Result

The sludge treatment at the wastewater treatment plant at Lingen was upgraded with new and innovative technologies. The increase in gas production, the reduction in the amount of sewage sludge and the recovery of phosphorus results in a considerably higher cost-effectiveness.

Scope of services provided

Turnkey execution of the entire project by ELIQUO STULZ

Construction period

2012 - 2017

Total contract sum

Approx. EUR 5.5 million

Wastewater treatment plant Lingen (Ems) – an integrated sludge-energy-nutrient solution as a step to an „energy surplus wastewater treatment plant“

LysoTherm®
Efficient and low-cost sludge disintegration

EloPhos®
Struvite precipitation for phosphorus recovery from the sludge flow

EloVac®
Vacuum degassing and reduction of climate-damaging methane emissions

LysoGest®
Optimal sludge flow management with phosphorus recovery

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