Radeberg in Saxony, Germany

Co-fermentation Plant

The co-fermentation plant in Radeberg demonstrates that the combined purification of sludge, domestic and industrial organic waste in an anaerobic sludge plant leads to synergy effects. As part of the extension of the sewage treatment plant, a complete sludge treatment was integrated additional to an aerobic biological purification. Since 1999 two anaerobic waste fermenters process in addition to 41 000 tons of sewage sludge another 15 000 tons of organic waste per year in the plant.

Co-fermentation plant Radeberg (source: Strabag 2013)

The plant has separate pathways to process the different waste fractions sewage sludges, liquid biological waste (e.g. industrial fat) and solid biological waste. Therefore the plant is highly flexible to the frequently changing availability of biological waste and allows adjustment to the current energy demand. Two fermenters with a capacity of 2 300 m^3 each, can be operated separately by different input flows. The pre-treatment facilities of the organic waste include wet processing with a mill, a magnetic separator, a pulper and a drum screen. The mechanical cleaned waste then goes into a hydrolysis container. Before moving to the fermenters, hygienic conditions are created at 70°C for one hour.

The plant produces around 40 m^3 Biogas per ton of input, which supplies two gas engines with an installed electrical power of 380 kW. The generated electricity covers more than the total demand of the plant, thus surplus electricity is fed into the public grid. The produced heat is used for the total heat demand of the waste treatment plant, the service building and a nearby school.

The combination of the joint digestion of sewage sludge and biological waste provides in addition to its high technological flexibility further advantages. The purified sewage waste water can be used as cooling (BHKW) and process water. When processing sewage sludge and biowaste together, the dewatered digestate is used as a secondary fuel in an extern co-generation plant. If biowaste is porcessed separately the digestate can also be used as fertilizer.

With higher fat input, the biogas production was doubled and the methane content of the produced biogas rose to 65 %.

Technology at a glance

- Installed electr. power of CHP: 2 x 380 kW
- Installed therm. power of CHP: 2 x 550 kW
- Installed therm. power of heating boiler: 335 kW
- Biogas production: 40 m3/t input (mixture)
- Gas storage: 780 m3, double membrane
- Gas fare: 800°C

BEST-PRACTICE

BIOGAS PLANT IN RADEBERG, GERMANY

Gas fare (source: Strabag 2013)

- Digester: 2 x 2 300 m^3, wet fermentation
- Retention time: 20 days
- Organic loading rate: 2,5 kg /(m^3 * day)
- Amount & type of waste used:
    - Domestic biowaste: 5.000 t/a
    - Industrial biowaste: 6.000 t/a
    - food waste: 4.000 t/a
    - sewage sludge: 41.000 t/a
- Dewatered digestate (28 % DM): 11.440 t/a

Pulper and drum screen (source: Strabag 2013)

Information on financing

The investment costs for the co-fermentation plant were drastically reduced compared to the building of two separate plants, a sewage and a biogas plant. Simultaneously the economic efficiency of the waste treatment site Radeberg was improved significantly. By using existing infrastructure of the sewage plant and supplying the plant with self-generated electricity and heat the running costs were reduced. Substantially higher gas yields improved the profitability additionally. Finally, the approval procedure could be simplified, due to the already existing license according to the Water Act.

Crucial Factors

The co-fermentation plant in Radeberg represents an innovative system for a sewage plant including organic waste fermentation. It demonstrates the important synergy effects of a combined purification of sludge and organic waste.

More Information

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