

Anaerobic digestion plants connected upstream of composting plants

- Technology, costs and efficiency –

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The IFEU Institute for Environment and Energy Research in Heidelberg and other partners were contracted by the German Ministry for the Environment, Nature Conservation and Nuclear Safety to report on the “Improvements for a sustainable development of biogas production and use in Germany”. In the context of this project the IGW Engineering Company Witzenhausen and the Witzenhausen Institute assessed the economic efficiency of integrating an anaerobic treatment unit into existing composting concepts.

The approach included

- Assessment of the existing asset of composting plants in Germany,
- Estimate of operational expenses of biowaste composting,
- Inquiry of manufacturers of anaerobic technology regarding the investment and operational expenses of their systems,
- Estimate of operational expenses of an upstream anaerobic treatment unit,
- Estimate of revenues depending on the granted bonuses as well as the different concepts of energy utilization,
- Overall assessment of the economic efficiency of an integration,
- Recommendations on measures to develop biogas production from biowaste.

As the study revealed, the integration of an anaerobic digestion plant as upstream unit in composting plants became more interesting in recent times. Based on the Renewable Energies Act EEG with its different bonuses and depending on the specific technology and utilization concept, revenues of 20 to 35 € per ton biowaste could be reached. However, these revenues are facing additional investment and operational expenses that cannot compete with the self-financing operation of an exclusive composting.

The integration of an anaerobic treatment unit into a composting plant requires an enclosure or at least partial enclosure of the composting facility. This is due to the fact that it can be assumed that the digestion residue has to be led to the post-maturation in an obligatory closed system. Also, a minimum quantity of 10,000 to 20,000 Mg/a biowaste should be processed. The number of plants that meet these requirements is estimated to be 200 to 250 composting plants which would require additional investments.

Under optimum conditions the integration of an anaerobic treatment unit into composting plants can already today be considered economically favourable. However, this assumes site specific and local authority related synergies such as:

- Increase of throughput for the biological treatment of the plant on the same base area of up to 40% of the previous input,
- Reduction of odour nuisance by anaerobic treatment at critical sites,
- Environmental and climate relevant advantages through the production and use of bioenergy (biogas).

Altogether it can be stated that for a further development of the anaerobic digestion of biowastes either additional financial incentives to improve the revenues (e.g. higher compensation rates) or to reduce the costs (e.g. low interest loans) are required. Alternatively, regulatory policy measures (rigid enforcement of Technical Regulation Air TA Luft, efficiency criteria for biological waste treatment etc.) may lead to a further development of anaerobic digestion.