

An overview of biogas production from small-scale anaerobic digestion plants on European farms

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Abstract

Small-scale anaerobic digestion (SSAD) holds promise as an attractive technology for the treatment of livestock manure and the organic fraction of municipal wastes especially in low population communities or standalone waste treatment facilities. SSAD systems can transform organic matter into biogas (a mixture mainly composed of methane and carbon dioxide), making the technology suitable for a variety of applications in energy, agriculture and potentially the emerging bio-products and processes sector. These systems are beneficial for improving on-site energy generation, upgrading wastes and providing a nutrient-rich fertiliser from the digester effluents, while reducing pathogenic loads, odours and greenhouse gas emissions emanating from the agricultural processes. Small-scale farming processes can further exploit the portable and flexible options made available by implementing SSAD systems, to effect on demand conversion of organic waste streams to useful heat (and potentially electricity), with significant economic benefits accruable (especially when such energy carriers are exported). SSAD is particularly applicable to the European agriculture sector where the average individual farm sizes and land productivities are currently insufficient to meet the feedstock requirements of medium-and large-scale plants. Despite the apparent benefits of SSAD, the technology is still not well implemented with much of the research previously conducted focused on large-scale systems.

This study seeks to explore the current-status of SSAD technology in Europe by identifying the various EU policies in place, the process design and operational characteristics, the recent progress related to SSAD, and the issues encountered. This comprehensive study sheds light on an area with limited research by providing an overview of the technology's present status in Europe and identifying areas of future study.

Summary

This study presents a technological and economic overview of small-scale anaerobic digestion systems in Europe. The study will further consider the issues and barriers currently limiting the implementation of SSAD systems. Existing policy frameworks and support schemes in select EU countries to encourage uptake is also assessed.