

Anaerobic Digestion of Biodegradable Municipal Wastes: A Review

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Introduction

The EC Landfill Directive defines various targets that non-inert wastes must be treated before landfill. Over 1 million tonnes of Biodegradable Municipal Wastes (BMW) are produced in Wales every year. Other organic wastes are produced in large quantities, particularly agricultural wastes (Figure 1). Anaerobic digestion (AD) in addition to being able to treat these wastes, can also produce renewable energy in the form of biogas. Many Life Cycle Analysis (LCA) studies have shown that AD is a superior environmental option than its main rival for the treatment of source separated biowastes, in-vessel composting. AD produces net energy, whereas in-vessel composting uses energy.

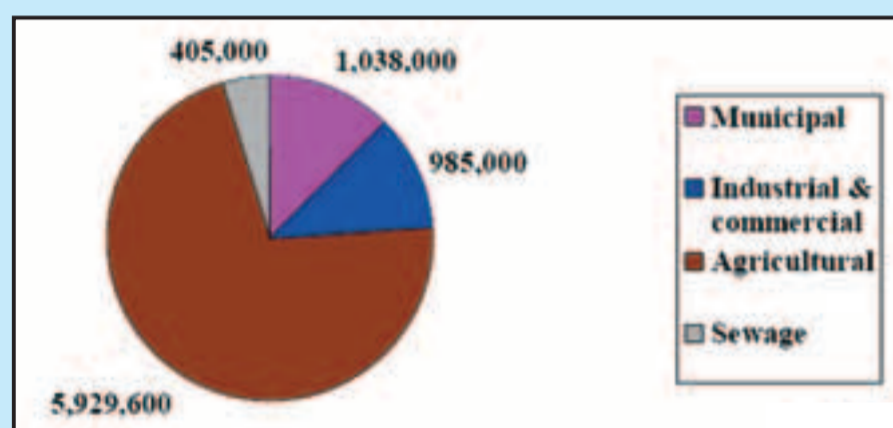


Figure 1. Biowastes in Wales (WAG Waste Strategy Unit, Owens, 2004).

Objectives

- To review the use of AD as a BMW management technique.
- To enhance knowledge of AD of BMW, by transferring knowledge and industrial experience from continental Europe to the UK.
- To identify best practices and learn lessons from the experiences of other European countries.
- To disseminate information to potential users, and policy and decision makers.



Methods

- All aspects of the AD of BMW have been reviewed, and barriers to implementation identified.
- Over 165 anaerobic digestion sites currently treating either centrally separated Organic Fraction of Municipal Solid waste (OFMSW) or source separated BMW have been identified.
- Main AD suppliers and operators have been contacted, and information gathered.
- A total of 20 industrial scale anaerobic digesters treating municipal biowastes have been visited, in 8 European countries.

Results and Discussion

- Best practices in other European countries have been identified.
- Main AD plant suppliers have been identified and main system configurations reviewed (Figure 2).
- The AD of BMW/OFMSW is proven and reliable in many different technical configurations.
- Successful Swedish experiences of using biogas as a transport fuel have been reviewed. The upgrading and use of biogas as a renewable transport fuel is proven technically and has been established to significantly improve inner city air quality.
- An interactive DVD has been produced that will take policy and decision makers on virtual tours of the AD facilities visited.

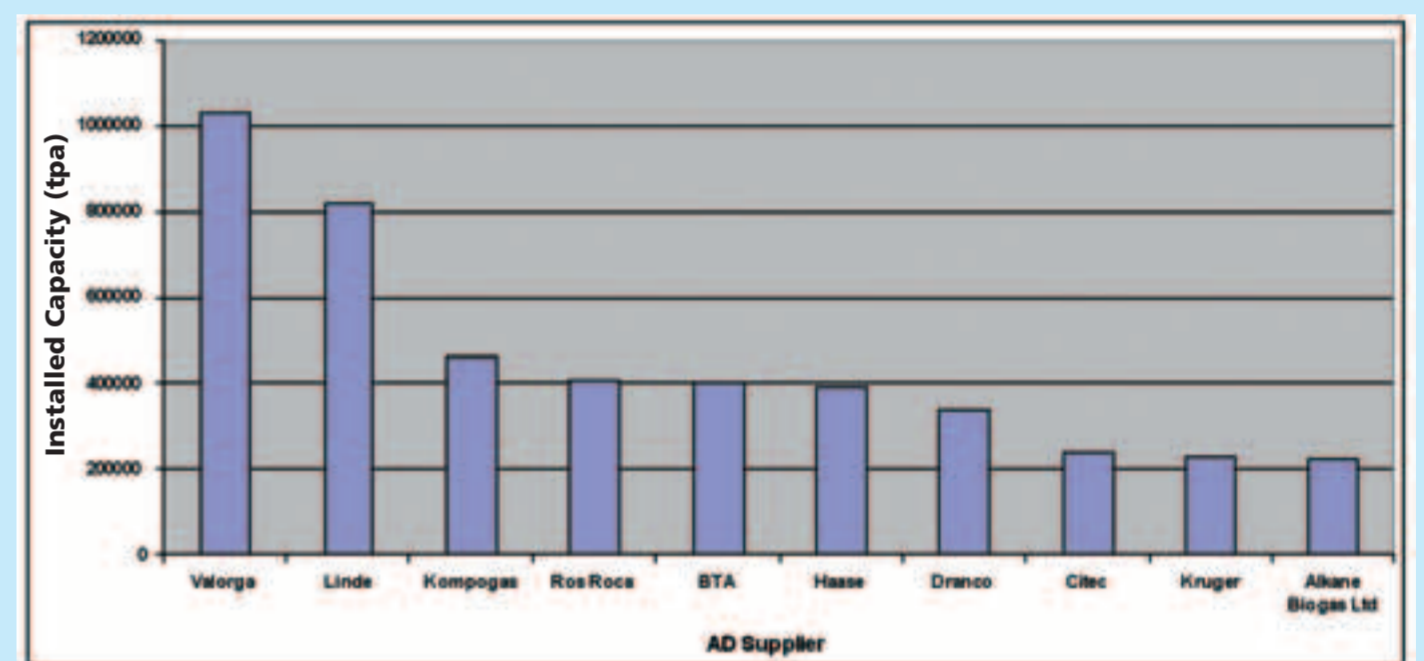


Figure 2. Installed AD capacity of main anaerobic system suppliers.

Conclusions

- AD of BMW/OFMSW is proven and reliable in many different plants throughout mainland Europe.
- Barriers to further implementation in the UK are policy related rather than technical.
- Biowastes represent an abundant, locally available and renewable energy source throughout the UK; their potential should be fully realised by installing AD plants for biogas generation.
- Biogas should be a major component of UK renewable transport policy.
- Economics vary with plant setup, however compliance with European landfill diversion targets, increasing energy prices and security of supply issues make AD ever more attractive.
- Anaerobic digestion is a proven, reliable technology that can economically treat organic wastes and produce renewable energy.



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