



Methane to Markets

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Making Anaerobic Digestion Work in the UK

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Brief History of On-Farm AD Plants in UK

- Approximately 30 to 40 AD plants were installed on farms between 1975 and 1995, of which 10 are still operating.
- Many of these were “one-off” installations, but there were two companies who each installed more than ten plants.
- Capital grant aid was available for a short period.
- Farm AD plants were built to a low budget cost because of economics, and were not sufficiently robust.
- Seven digesters were installed in 2004 on dairy farms in Southwest Scotland.

Digester on Cattle & Pig Farm Built in 1970's



Below-Ground Digester on Beef Unit in 1980's



Dairy Farm Digester Installed in 1990's



Current UK Farming Background

- Reduced number of livestock farms.
- Farms have higher average livestock numbers.
- Nitrogen vulnerable zones (NVZs) increased in area.
- Higher energy and fertiliser prices.
- Introduction of single farm payment system.
- Strong dependence on supermarkets.
- Farmers recognise need for diversification.

Drivers for Farm Digesters in UK

- On-farm energy production.
- Reduced consumption of mineral fertilisers.
- Reduced odours and easier application of digestate.
- Reduced pollution.
- Sustainability in the food chain.
- Rural diversification.

Barriers to development of Digesters on UK Farms

- Uncertain value of renewable electricity (compared with Germany and Austria who have 3000 on-farm digesters).
- Uneconomic without financial support.
- Difficulties with connection to electricity grid.
- Waste management licensing required for imported feedstock.
- Definition of “waste”.
- No premium for renewable heat.
- Biogas as a vehicle fuel not appreciated.

Co-Digestion with Energy Crops

- Maize silage, grass silage, fodder beet and other crops can be grown for co-digestion with manure.
- A pan-European consortium (Cropgen) led by the University of Southampton is researching biogas from energy crops.
- The debate on bioenergy (biofuels, biomass & biogas) should give proper consideration to net energy balance, allowing for costs of cultivation, harvesting and processing.
- Energy crops for biogas may be the most energy efficient.
- The landscape will not change with these energy crops.

Pilot Digester for Ryegrass



Scottish Farm AD Plants

- Scottish Executive commissioned a research project to investigate how AD can control the levels of pathogens discharged from cattle farms into bathing waters.
- Seven full-scale AD plants were designed and built by Greenfinch in Southwest Scotland in 2004, ranging in capacity from 80m³ to 480m³.
- The AD plants were designed to be robust, simple and reliable.
- Research was carried out into the environmental, economic and sustainability aspects.

One of Seven On-Farm AD Plants in Scotland



Key Conclusions from this Project

- The AD plants work reliably with minimum farmer input.
- The reduction of pathogens has been up to 500 fold.
- The farmers find the digestate easier to spread and grass yields have improved or fertiliser application reduced.
- Manure management practices have changed on the farms.
- On-farm digesters are not economic without financial support.
- Greenhouse gas emissions are substantially reduced.
- AD can make a positive contribution to the rural economy.

South Shropshire Biowaste Digester

- Defra funded project as part of a programme to demonstrate technologies which divert biodegradable waste from landfill, providing a link to another M2M sub-committee.
- Partnership between South Shropshire District Council (19,000 households & an area of 1000km²) and Greenfinch.
- Digester recycles 5000 tonnes per year of food waste and garden waste.
- Biofertiliser used beneficially in agriculture.
- Biogas used to produce electricity and heat.

Plant Building



Process Tanks



CHP Unit



Biofertiliser



Conclusions

- Agricultural AD reduces greenhouse gas emissions in 4 ways:
 - Reduced emissions of methane.
 - Reduced dependency on mineral fertilisers.
 - Reduced transport.
 - Displacement of fossil fuels.
- AD controls diffuse pollution from agriculture.
- AD improves resource management and sustainability.
- The UK should follow the lead given by Germany & Austria.
- M2M is an important initiative towards agricultural AD.