

Energy from Biogas



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**International Energy Agency Bioenergy
Task 37**

**University of Reading Rural Research & Strategy Partnership
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Sponsors for UK membership of IEA

Agri-food Biosciences Research Institute (NI), AnDigestion Biogen (UK), Bioplex Technologies, Biffa Waste Services, Biogas Nord UK, Country Land and Business Association, Esmee Fairbairn Foundation, Greenfinch, Hardstaff Group, Organic Power, Permastore, Renewables East, Royal Institution of Chartered Surveyors, Sustraco, University of Southampton, Veolia Environmental Services, Xergi, WEDA-GB, **and supported by** DEFRA, BERR & DfT

Member countries

- Austria ,Canada, Denmark, Switzerland, Finland, France, Germany, The Netherlands, Sweden , United Kingdom and the European Commission
- 15-20 years building and operating experience available for technical transfer

The European context

- **UK the largest producer in Europe (based on sewage gas and landfill gas)**
- **15 years behind in exploitation of AD in agriculture**
- **Commercial scale co-digestion on Danish model introduced to UK in 1994 & came into production 2002**
- **Approx 25 + new plants in UK since 2002**

Biogas plants

(UK Approx 71 + 200 WWT)

Austria	350	Italy	72
Denmark	20 + 55	Germany	3,750
France	30 +130	Netherlands	8
Finland	6+4	Sweden	8+14
Ireland	5	Switzerland	81

Sources of biogas

- **DEFRA Calculations:**

**100 million tonnes organic material
of which**

**12-20m t food waste (inc. 50% source
separated MSW)**

90m t from agriculture (inc. manure)

1.73 m t sewage sludge

Biogas potential

(m³/ CH₄ tonne of organic total solids)

Cattle manure	200	Stomach Content -cattle	269
Maize	400	Blood	350
Grass silage	370	Vegetable	350
Household (food left over)	340	Pea haulm	310

Governments estimated potential

10-20 Twh of heat and power/year

Contributing between 3.8 – 7.5% of renewable energy target by 2020

also

**National Grid estimates potential
60% of domestic supply by 2020**

**Bio-methane for Transport estimate potential
16% of transport fuel supply**

Avoided CO₂ tonnes/yr

Product	Output	CO₂ avoided
CHP	10-20 Twh	6-10mt
Vehicle fuel (diesel/petrol)	For every 1000 t	13.3t
Nitrogen	450 kt	1.044 m t
Phosphate	200 kt	0.5 m t
Potash	430 kt	?
Haulage	?	?

Small scale CHP On site use in Canada



**Calais CHP from
source separated
MSW**



Farmers' co-operative Gas on contract to E- ON piped in local grid



- Sweden
- 85% of Government cars to run on biogas by 2008
- Exempt from congestion charges

35 bio-methane upgrading plants (40% for vehicle fuel)

France : Lille Metropole

- 100,000 t source separated MSW
- Weekly household collections from food bins
- Waste collection vehicles in - built water tanker for internal cleaning
- Garden biowaste by canal from Flanders
- Return cargo of non biodegradable waste to incinerator

Lille: biogas use

- 1994 4 buses run on sewage gas
- 1999 Decision to replace diesel buses with biogas
- 2001 60 biomethane powered buses
- 2005 331 buses with planned annual increase up to 500
- 2007 Installation of AD for MSW and new bus filling station opposite side of road
- Co-fuelling with compressed natural gas.

UK Future – we have



**Policy to support
AD
PAS 110 for
bio-fertiliser**

**Proven AD technology to produce
biogas and CHP available NOW**

**Proven technology to upgrade biogas to
bio-methane for grid injection and vehicle
fuel available NOW**

