

# Energy from Biogas



Clare T. Lukehurst  
UK Team Leader

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Task 37**

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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)

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

# 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

(m<sup>3</sup>/ CH<sub>4</sub> tonne of organic total solids)

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

# 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 CO<sub>2</sub> tonnes/yr

<b>Product</b>	<b>Output</b>	<b>CO<sub>2</sub> avoided</b>
<b>CHP</b>	<b>10-20 Twh</b>	<b>6-10mt</b>
<b>Vehicle fuel (diesel/petrol)</b>	<b>For every 1000 t</b>	<b>13.3t</b>
<b>Nitrogen</b>	<b>450 kt</b>	<b>1.044 m t</b>
<b>Phosphate</b>	<b>200 kt</b>	<b>0.5 m t</b>
<b>Potash</b>	<b>430 kt</b>	<b>?</b>
<b>Haulage</b>	<b>?</b>	<b>?</b>

# 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**

