United Kingdom
Interim Report

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Task 37 (UK)
2003 Energy White Paper

- To reduce CO$_2$ by 60% by about 2050
- To maintain reliable energy supplies
- To Promote competitive energy markets,
- 15.4% renewable electricity by 2015-2020

*NB Biomass at that time < 1.5% of UK electricity production*
## Composition of the 1.5% (in GWh<sub>e</sub>)

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount (GWh&lt;sub&gt;e&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind, solar &amp; hydro (all)</td>
<td>2,014</td>
</tr>
<tr>
<td>Bio-fuels:</td>
<td></td>
</tr>
<tr>
<td>Landfill gas</td>
<td>3,276</td>
</tr>
<tr>
<td>Sewage sludge/gas</td>
<td>345</td>
</tr>
<tr>
<td>Co-firing wood, palm kernels, etc</td>
<td>602</td>
</tr>
<tr>
<td>Other – Slurry, straw, poultry litter, SRC, meat &amp; bones (combustion)</td>
<td>937</td>
</tr>
<tr>
<td>Total bio-fuel renewable electricity of which biogas amounts to 70%</td>
<td>5,160</td>
</tr>
</tbody>
</table>
October 2004

Biomass Task Force set up to:
‘assist Government and the biomass industry in optimising the contribution of biomass energy to renewable energy targets and to sustainable farming, forestry and economy objectives’

NB Energy NOT only electricity
Brief of the Biomass Task Force

- Primary focus - heat and power from energy crops, agricultural plant and animal wastes
- Bio-fuels for transport and other non-food uses of crops
- Examine the barriers – frailty of supply chain, technical factors, planning restrictions and environmental factors relating to land use.
Evidence presented of energy potential (Gwh/yr)

<table>
<thead>
<tr>
<th>Source</th>
<th>Gwh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal manure and crop residues</td>
<td>4,250</td>
</tr>
<tr>
<td>Food production, retailing &amp; consumption</td>
<td>5,244</td>
</tr>
<tr>
<td>Farmyard manure (dung on straw)</td>
<td>3</td>
</tr>
<tr>
<td>Theoretical potential</td>
<td>9,497</td>
</tr>
</tbody>
</table>
Theoretical potential energy for crop growth from nutrients (kt/yr)

<table>
<thead>
<tr>
<th>Source</th>
<th>T/ N</th>
<th>P$_2$O$_5$</th>
<th>K$_2$O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manure &amp; crop residues</td>
<td>48</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>Agri – food, retailing and</td>
<td>37</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>consumption residues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>85</strong></td>
<td><strong>54</strong></td>
<td><strong>50</strong></td>
</tr>
<tr>
<td>FYM (cattle, pigs &amp; horses)</td>
<td>190</td>
<td>122</td>
<td>206</td>
</tr>
</tbody>
</table>
### Evidence of potential CO₂ equivalent avoidance

<table>
<thead>
<tr>
<th>Removal</th>
<th>m/ t /year</th>
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</thead>
<tbody>
<tr>
<td>Equiv. from wet wastes manure, agri-food processing, retailing &amp; consumption</td>
<td>17.20</td>
</tr>
<tr>
<td>Digestion of FYM (dry AD process)</td>
<td>15.80</td>
</tr>
<tr>
<td>Mineral fertiliser use (NPK)</td>
<td>0.61</td>
</tr>
<tr>
<td>Fossil fuel displacement (electricity &amp; heat)</td>
<td>2.30</td>
</tr>
<tr>
<td>Deduct CHP engine emissions, 35% CO₂ in biogas &amp; from new manure transport</td>
<td>3.33</td>
</tr>
<tr>
<td><strong>NET POTENTIAL AVOIDED CO₂ EMISSIONS</strong></td>
<td><strong>35.91</strong></td>
</tr>
</tbody>
</table>
Government response to Biomass Task Force recommendations

- Recognises AD as means of waste management, to generate energy and income
- Review approach to AD alongside Methane to Market Partnership Waste Strategy and Climate Change Programme
- Build up economic, environmental & practical knowledge to underpin & support policy
- Economic & environmental review of AD to establish viability of on farm biogas as diesel substitute and mechanisms to integrate it into RTFO with fuel duty rebate of 41p/l
2005 Biomass Task Force recommends Government

- To review current strategy & consider practical & financial mechanisms for expansion of AD but ensure balance between biogas production and uncontrolled methane escape
- To give urgent support for a digestate standard
- To carry out economic & environmental assessment of AD potential as an alternative renewable fuel to displace diesel
Methane to Market
Agricultural Task Force
formed 2004

Core members: Argentina, Australia, Brazil, Italy, Japan, Korea, Mexico, UK, Canada (IEA Task 37 members), USA, and joined by China, Colombia, Ecuador, India, Nigeria, Poland, Russia, Ukraine and Vietnam

2006 UK Co-chair with Argentina & hosted conference in UK November 2006

Conference Report available May 2007
November 2005 (in Buenos Aires) Agricultural Task Force (ATF) concluded:

- Agriculture is a significant source of CH$_4$ emissions
- There is opportunity to capture and utilise CH$_4$ from manure management
- ATF Recommendation accepted – Agricultural Sub Committee formed under co chairmanship of UK & Argentina
- Meeting in UK Nov. 2006
Methane to market aims and activities

- Bring together AD specialists to *exchange information*; share information about research
- **Technology** – bring technology developers and users together, identify & implement demonstration & technology transfer events
- **Policy** – quality controls (*digestate standards*), legislative & fiscal measures
- **Identify** project development in partnership states to feature in Expo Beijing 2007
Policy needs identified

- International workshop on fugitive emissions and development of interim guidelines
- Internationally agreed LCA methodology
- Joined up thinking between energy and environment on policy measures
- Acknowledge the value of AD for soil management, public health (*& animal health*)
- More work needed for co-digestion of agricultural waste & MSW
UK Supporting measures

- DEFRA’s Energy Crops & Rural Enterprise Schemes, Regional Development Agency project funding
- Range of small grants for local communities
- Renewables Obligation on electricity producers below target and buy out auction price at currently £50/MWh
- Climate Change Levy rebate for purchase of renewable electricity rising to £0.0456 in 2008
- Renewable Transport Fuels Obligation (Due shortly)
- Renewable Heat Obligation?
- Enhanced Capital Allowances
Whither the UK?

David Miliband MP & Secretary of State for the Environment replied thus to a Parliamentary question:

‘The Government is committed to making the most of anaerobic digestion to contribute to a number of key objectives, notably reducing greenhouse gas emissions from waste management and agriculture and improving air and water quality as well as a source of renewable energy’

May/June Publication of the Government’s Biomass Strategy
The Biomass Strategy
Government detailed proposals (June 2007)

- How to work with stakeholders to drive faster growth in the use of AD
- To work with the National Waste Strategy (due shortly) to set out the important contribution of AD to achieving UK waste management goals
- Environment Agency is working on standards for AD digestate (bio-fertiliser)
- Publication of the Climate Change Bill - enshrines UK target of 60% reduction in CO₂ 2050 in legislation
On farm digester on the shore of Solway Firth
THE PORTAGESTER for handling dry material - FYM
Northern Ireland activity

Agri-food Biosciences Institute: planned 600m$^3$

demonstration plant for dairy slurry to determine:

- Baseline performance of farm mesophilic digester
- Mass balance of on-farm slurry digestion
- Contribution of system to nutrient planning
- Life cycle benefits
- Methods for enhancing digester performance
- Research into pre & post digestion treatments
Other activities since 2005

- Plants under planning - 70+
- Resource studies eg. Leicestershire, Eastern Counties
- Road Shows include AD inter al. renewable technologies
- **Renewable Energy Association Biogas Sub Group**
- National Forum : Bio-methane as a transport fuel
  (25% NGOs, 25% academics, 25% industry and 25% other)
- **Task 37 (UK)**
- **REA/DEFRA AD Working Group**
Where we are now

- Plants in operation:
  - 1000+ in waste water treatment including some with co-digestion
  - 15+ Built ’75-’90 on farm - some enlarged to take ABPs
  - 24 Built since 2002/3 (9 slurry +ABPs, 8 MSW, 7 slurry only
  - 13+ Waste water treatment CHPs @ 0.5 – 2MW<sub>el</sub>

- Planning in progress:
  - 1 ABP only + 35 including cow slurry, silage maize, ABPs, etc sizes range 20-130kt/year over 18 counties
  - 25 on farm 300kW<sub>el</sub>
Drivers

- Rising energy prices
- Renewables Obligation
- Landfill Directive and diversion targets
- Landfill Allowance trading Scheme
- Organic material diverted from landfill
- Diversification enterprise on farms
- Nutrient management planning
- Carbon trading
Barriers

- UK application of EU waste regulations
- NIMBYs and some planning authorities
- Long term waste management contracts between local authorities and waste management companies - diverts material from existing facilities - incinerators, composting
- Ignorance of technology and benefits at all levels
- Bureaucratic delays, costs of licensing and local politicians fear of the ballot box
- Existing waste hierarchy and preference for composting
- Lack of profit in farming - lack of investment finance
Acknowledgements

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