On farm manure to energy – sustainable growth

December 2014
Introduction

- bhsl Background
- bhsl Process
- bhsl Benefits
- Environmental Study
- Maryland Project 2015
Company Background

- Irish Green Energy Company
- Founded in 2004
- Family-run Business with History in Poultry Industry since 1960
- On-site and Energy Solution for the Poultry Industry
- Contracts and Installations:
  - UK
  - US
  - Ireland
  - South Africa
Leading the way for Innovative Poultry Production

- Energy / Power
- Carbon Credits
- Less Odours
- Biosecure Energy Centre
- Heating Infrastructure
- Fuel (Biofeedstock)
- Ground Water Protection
The poultry manure undergoes clean combustion in a fluidised bed system at a temperature of 1600°F.

Hot water can be used to provide clean, efficient, indirect heat, or cooling through absorption chiller to the chicken houses.

The process produces energy and a valuable fertiliser.
Remote Management

24/7 Operations Centre

Energy Centre

Operations Centre

24/7 Support

Reporting
Optimal Ventilation

A clean source of **abundant** heat or cooling to optimize environmental conditions.
Broiler Welfare

The ability to control moisture levels in the house directly affects litter conditions and the production of ammonia.

Ammonia is a leading contributor to disease, poor welfare, and poor bird performance in the poultry industry.
Current biomass installations are designed to reduce fuel costs. But substantial performance improvement is found from Optimum Ventilation and Extra Heat.

<table>
<thead>
<tr>
<th>Site</th>
<th>Heat Use</th>
<th>Performance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>bhsl Clients</td>
<td>Between 2 and 3 times more heat used</td>
<td>Reporting very significant performance benefits</td>
<td></td>
</tr>
<tr>
<td>Other biomass</td>
<td>Using low cost fuel</td>
<td>Low 300 EPEF to 410</td>
<td>30p/m2/week (from 106p to 136p or 28%)</td>
</tr>
<tr>
<td>Straw System Anecdote</td>
<td>Double the heat</td>
<td>325 to 399 EPEF</td>
<td>23% better performance</td>
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</tbody>
</table>
Farmer of the Year!

Chicken litter can be a problem to dispose of, but two farmers are investing in using it as a source of renewable energy. (Phil Clarke and Olivia Cooper report)

Biomass boilers ready to turn litter into a profit

Two of the country’s largest biomass producers are looking to the drive towards using poultry litter as a way of producing sustainable, green energy. What is currently a waste product?

Nick Jones produces 400,000 birds at his Upham Farm in Wiltshire, while Ingham Hal, of Hay Farm, produces around 12,000 in Northumberland. Both have recently invested in biomass boilers that are capable of burning chicken litter as an energy source, which is then channelled to the furnace for burning.

The main reason for the move is to ensure that the boilers continue to work, and if not, can be sold and replaced. The boilers are also designed to use the energy generated from the chicken litter, which can then be used to power the farm’s own energy needs.

The boilers are designed to be flexible, and can be adjusted to suit the individual needs of each farm. They are also designed to be easy to maintain, with minimal downtime and low running costs.

**Manure Technologies Panel**

**Bhsl Dec. 2014**

Manure Technologies Panel
Environmental impacts of poultry production when using poultry manure as a fuel on broiler farms

Project report for bhsl, April 2013

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Environmental Study

- bhsl funded study
- Aim- evaluate environmental impact
- Method- Life Cycle Assessment (LCA)
- “From Cradle to farm gate”
Environmental Study

- Reduction of fossil fuel use
- Electric required to run system
- Trace gas emissions
- Changing transport burdens

- Changes in fertilizer use
- Changes in emissions from manure storage and from field
- Long term changes in soil carbon storage
Eutrophication Potential (EP) is used to assess the over-supply (or unnatural fertilization) of nutrients as a result of nutrients reaching water systems by leaching, run-off or atmospheric deposition.

Acidification Potential (AP) is mainly an indicator of potential reduction of soil pH.

Calculated using the method of the Institute of Environmental Sciences (CML) at Leiden University.
Main reductions as a result of considerable reductions of ammonia emissions

To a lesser extent, nitrate leaching from soils
Since April 2011, bhsl has collaborated in extensive tomato crop trials by Dr Mark Reiter of Virginia Tech.

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Phosphate from bhsl ash is plant available and a suitable alternative to commercial Triple Super Phosphate (TSP).

A form of pelletizing (agglomeration) ensures the ash can be applied using existing farm machinery.

Precision Agriculture
State of Maryland Award

- Bhsl awarded State of Maryland Grant of $970k
  Oct 2014 -to build demonstration unit in Rhodesdale, Maryland

- Animal Waste Technology Fund (AWTF)

[Image of Rhodesdale, Md. sign]
State of Maryland Award

- Installation commences Q2 2015
- Heating and Cooling solution
State of Maryland Award

- Commissioning Q3 2015
- 12 Month Monitoring & Demonstration
Thank you for your time

Any Questions?