A Decade of Carrots: The impact of the renewable Heat Incentive on agricultural biomass use

20 October 2021
Company established in 2011, but with a pedigree going back to ~2000;

Specialism is in biomass, but also work in other forms of low carbon heat, heat recovery, district heating and forestry;

Business is a hybrid of consultancy, developer and installer;

Large part of consultancy is investigation and remediation of failed, problematic and inefficient systems;

Procurement support services to public and private sector for over £30m of investment since 2012;

Main office in Northumberland, staff in Cumbria, Speyside and Glasgow. Working across the UK, Ireland and internationally.
Working in forestry & bioenergy since 2003 in UK, NZ, EU & former Soviet states;

Wrote UK standard training course for woodfuel production (2004/5);

Have produced in excess of 200 feasibility studies, from breweries to sewage plants, castles to South Pole Station;

Sold and/or installed 500+ biomass-fired boilers;

Founding board member of Wood Heat Association, Vice Chairman from 2013, Chairman 2018-2020;

Have worked with Forestry Commission, DECC/BEIS, Carbon Trust, EU Research Directorate and UNDP in advisory positions on biomass energy.
• Setting the Scene
• UK Policy Environment & The Renewable Heat Incentive
• Typical Farm Schemes
• Market Impact
• Q&A
SETTING THE SCENE
Canada
~158m acres total farmland
~193,000 farms
~87m acres in combinable crops
Average farm size ~778 acres

UK
~42m acres total farmland
~192,000 farms
~26m acres in combinable crops
Average farm size ~213 acres
Proportion of electricity from renewables in the UK is currently 37.7% (Q2 2021);

Down significantly from Q2 2020 - highlighting the impact of reliance on intermittent renewable sources, such as wind and solar.

Source: BEIS Energy Trends April - June 2021
Added capacity since 2019 has shown marked decline across all technology types;

Brexit, Covid & government policy vacuum all playing a part in supressing investment.

Source: BEIS Energy Trends April - June 2021
SETTING THE SCENE

Percentage Renewable Energy in the Heating and Cooling Sector

Source: Eurostat SHARES, 2018
2008 - World’s first legally binding climate change target - reduction of UK GHG emissions by ≥80% by 2050 (1990 baseline);

- National policy & strategy measures;
- Demand reduction & efficiency improvements;
- Investment in low carbon technologies;
- Reporting on carbon emissions;
- International action.
Almost impossible to gauge exact spend on supporting biomass heat between 2000 and 2011, but figure was at least £60m.

Number of identified biomass heating installations in England by 2011 : 2,372*

Number of identified biomass heating installations in Scotland 2010 : c. 230**

Number of identified biomass heating installations in Wales by 2012 : <150 (estimate)
Between November 2011 and March 2021, heat from renewable sources has been supported by the **Renewable Heat Incentive**;

Works in the same way as feed in tariffs for electricity - per kWh payment for heat used in an eligible application;

Originally designed to deliver a 12% rate of return, with the intention of overcoming barriers to uptake;

Payments are made quarterly and for 20 years, and are intended to pay back the investment.

“Degression” mechanism was put in place to enable government to control costs - UK government had their fingers burnt with PV support scheme and weren’t keen to repeat the experience.
<table>
<thead>
<tr>
<th>Tariff Name</th>
<th>Eligible Technology</th>
<th>Eligible Sizes</th>
<th>Tier</th>
<th>Registered Pre July 2014</th>
<th>Registered at End of Scheme in March 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Payment per kWh in CAD cents</td>
<td>Payment per kWh in CAD cents</td>
</tr>
<tr>
<td>Small commercial biomass</td>
<td>Solid biomass including solid biomass contained in municipal solid waste (incl. CHP)</td>
<td>Less than 200 kWh</td>
<td>Tier 1</td>
<td>17.43</td>
<td>5.38</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Tier 2</td>
<td>4.57</td>
<td>3.77</td>
</tr>
<tr>
<td>Medium Commercial Biomass</td>
<td>200 kWth and above; less than 1,000 kWth</td>
<td></td>
<td>Tier 1</td>
<td>10.68</td>
<td>5.38</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Tier 2</td>
<td>4.57</td>
<td>3.77</td>
</tr>
<tr>
<td>Large Commercial Biomass</td>
<td>1,000 kWth and above</td>
<td></td>
<td>N/A</td>
<td>1.69</td>
<td>5.38</td>
</tr>
<tr>
<td>Small Commercial heat pumps</td>
<td>Ground-source heat pumps; Water Source heat pumps; deep geothermal</td>
<td>Less than 100 kWth</td>
<td>N/A</td>
<td></td>
<td></td>
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<tr>
<td>Large Commercial heat pumps</td>
<td>100 kWth and above</td>
<td></td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All solar collectors</td>
<td>Solar collectors</td>
<td>Less than 200 kWth</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biomethane and biogas combustion</td>
<td>Biomethane injection and biogas combustion, except from landfill gas</td>
<td>Biomethane all scales, biogas combustion less than 200 kWth</td>
<td>First 40,000kWh</td>
<td>12.72</td>
<td>8.41</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Next 40,000kWh</td>
<td>7.46</td>
<td>4.96</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Remaining 40,000kWh</td>
<td>5.76</td>
<td>3.82</td>
</tr>
</tbody>
</table>
Farmer X raises c. 800,000 chickens, dries grain, warms tatties and has a range of tenanted properties on-farm; 

He has identified an opportunity to provide heat from a single wood fired boiler which could be situated in an existing agricultural building; 

He has limited on-farm resources, amounting to a scattering of unmanaged farm woodlands; 

Across the site, the spend on LPG and kerosene amounted to c. £217,000 in 2010/11.
2021

~140kW Solar PV
2021

~1MW biomass boiler
~180kW Solar PV
2021

~5MW Thermal Output AD plant – biomethane export
~250kW CHP engine
Farmer Y dries grain, keeps beef cattle and has a range of tenanted properties on-farm;

He identified an opportunity to provide heat from a single straw bale boiler situated next to his grain dryer, and for the domestic properties a small grain burner;

He has significant on-farm biomass resources, including substantial farm woodlands and large volumes of straw bales;

Across the site, the spend on LPG and kerosene amounted to c. £150,000 in 2010/11.
TYPICAL FARM SCHEMES

Mixed Arable/Beef Farm, Angus, Scotland

2012

~600kW straw boiler

2014

~60kW chip boiler
MARKET IMPACT
RHI has created a market of:

17,234 Non-Domestic Installations
- 4,459MW installed capacity

12,301 Domestic installations
- 319MW installed capacity

RHI closed to new applicants on 31 March 2021, although Covid impact means government have allowed some schemes to commission up to 31 March 2022.
Compliance scheme for non-woody fuels which are burned in RHI-accredited systems

Costs
- £200 annual fee (covers 100 tonnes)
- £0.50 per tonne for additional tonnage
- Special rates negotiable for large volume users

• 84 fuel registrants
• > 150 users
• 256 applications
• 55,000 tonnes registered
• Avg application 215 tonnes

• 2.27 % of BSL users
• 0.32 % of BSL tonnage

Sustainable Fuels Register
MARKET IMPACT
Sustainable Fuels Register

Straw and miscanthus - 88% of SFR applications
MARKET IMPACT
Sustainable Fuels Register - Tonnages Supplied

Straw and miscanthus - 64% of total
Processing residues - husks and olive pomace - 32% of total
Farming sector dominates, with applications in glasshouses, chicken sheds, farm district heating, holiday cottages, grain dryers, etc...

“Accommodation” is a close second, and includes hotels, holiday homes, care homes, caravan parks, etc...
New added capacity (full applications ND-RHI)

SOURCE: Wood Heat Association analysis of BEIS/Ofgem datasets, September 2017
Full applications Medium Solid Biomass Boiler

Number of applications


~455

~90