

# Biomass



Application: hot water

**Biomass most often refers to organic matter such as timber and crops grown specifically to be burnt to heat water. Biomass also refers to agricultural by-products such as straw, grain husks, forest products, waste wood and animal wastes such as slurry and chicken litter.**

**The most likely applications on a pig farm are heating hot water for creep mats, washing and office central heating.**

Biomass is sustainable and generally carbon neutral because the carbon released in the combustion process is offset by the carbon trapped in the organic matter by photosynthesis during its growth. To be truly carbon-neutral the products must be sustainably sourced and re-planted after harvest or allowed to regenerate so carbon is reabsorbed in a continuous and virtuous cycle.

The most popular biomass crops in the UK are Short Rotation Coppice willow and poplar, Miscanthus (Elephant Grass), Reed Canary Grass and Oil Seed Rape. These can be used after drying and shredding, or processed further for efficient handling:



*Willow dried & chipped having been grown and coppiced every 3 years.*

## Wood chip

Approximate costs and output:

Capacity:	30 kW
Fuel consumption:	12,614kg per annum at £0.10 kg not incl delivery
Capital cost:	~ £8,000 including boiler; wood store and hopper
Annual output:	52,560 kWh
Annualised payback:	~ 4 years (at £0.069 per kWh achieved by an oil-fired boiler; not including fuel inflation).

Given that delivery cost increases with distance, wood chip biomass is most economic within proximity of a wood chip supply, and with covered storage facilities capable of taking a 60 m<sup>3</sup> load from an HGV. Wood chip can be blown into a silo but check with suppliers if their lorries have this facility. In the absence of covered storage facilities, polyethylene bagged pellets may be a better option...

*Images courtesy of Koolfuel, copyrights apply*

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## Processed pellets

Approximate costs and output:

Capacity:	26 kW
Fuel consumption:	9,110 kg pa at £0.22/kg (bagged pellets)
Capital cost:	£8,907
Annual output:	45,552 kWh
Annualised payback:	~ 9 years (at £0.069 per kWh achieved by an oil-fired boiler; not including fuel inflation)

Grant funding or the proposed Renewable Heat Incentives should greatly reduce payback.



Wood by-product from the timber industry can be compressed and extruded under high pressure to small cylindrical pellets. The pellets are usually untreated, 100% natural wood, without any extra binders – the natural lignin present in wood acting as a glue, binding the pellet together. Pellets can be supplied in sacks or in bulk. Two kg of pellets can generate the same heat energy as one litre of oil.

### Grant funding

The Rural Development Programme funds larger renewable energy projects via the Regional Development Agencies:

<http://www.defra.gov.uk/rural/rdpe/rda.htm>

Funding may also be available from the next round of the Bio Energy Capital Grants Scheme:

<http://www.bioenergycapitalgrants.org.uk>

Micro generation may be funded via the Low Carbon Buildings Programme:

[www.lowcarbonbuildings.org.uk](http://www.lowcarbonbuildings.org.uk)

Grant funding may forfeit support from tariffs, so check with the funding body before accepting a grant.

### Tax relief

The Enhanced Capital Allowances scheme provides 100% first year tax relief on capital expended on many renewable technologies.

<http://www.carbontrust.co.uk/energy/takingaction/eca.htm>



BioLyt wood pellet boiler by Hoval

### Power

Alternatively, biomass can be pressurised to produce gas – a process called gasification. This gas can be used to fuel turbines that generate electricity, and technologies of this type below 5MW will qualify for 'Feed In Tariffs' from April 2010. These will be paid for total electricity produced (Generation tariff) plus a supplement for electricity actually fed into the grid (Export tariff). In addition, money will be saved by not buying-in electricity off the grid. The following tariffs may be available:

Technology	Scale	Generation tariff (p/kWh)	Export tariff (p/kWh)	Buy-in tariff (p/kWh)
BiomassGas	<50kW	9	5	12
BiomassGas	50kW – 5MW	4.5	5	12
BiomassGas	Combined Heat & Power (CHP)	9	5	12

### Renewable Heat Incentive

Tariffs for renewable heat produced on-site are also being proposed under the Renewable Heat Incentive, even though such heat cannot be exported. The incentive is under consultation until April 2011 when figures will be confirmed. Progress can be monitored at

[http://www.decc.gov.uk/en/content/cms/what\\_we\\_do/uk\\_supply/energy\\_mix/renewable/policy/renewable\\_heat/incentive/incentive.aspx](http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/policy/renewable_heat/incentive/incentive.aspx)