

Biomass Heating (and CHP) on Farms and Rural Estates

A large, stylized graphic of a leaf is positioned in the background. It features a light green base color with a white vein structure. A pinkish-red section is visible on the left side of the leaf, and the overall shape is elongated and pointed at the top.

Richard Harvey
Managing Director, Rural Energy Ltd

FARMING FUTURES

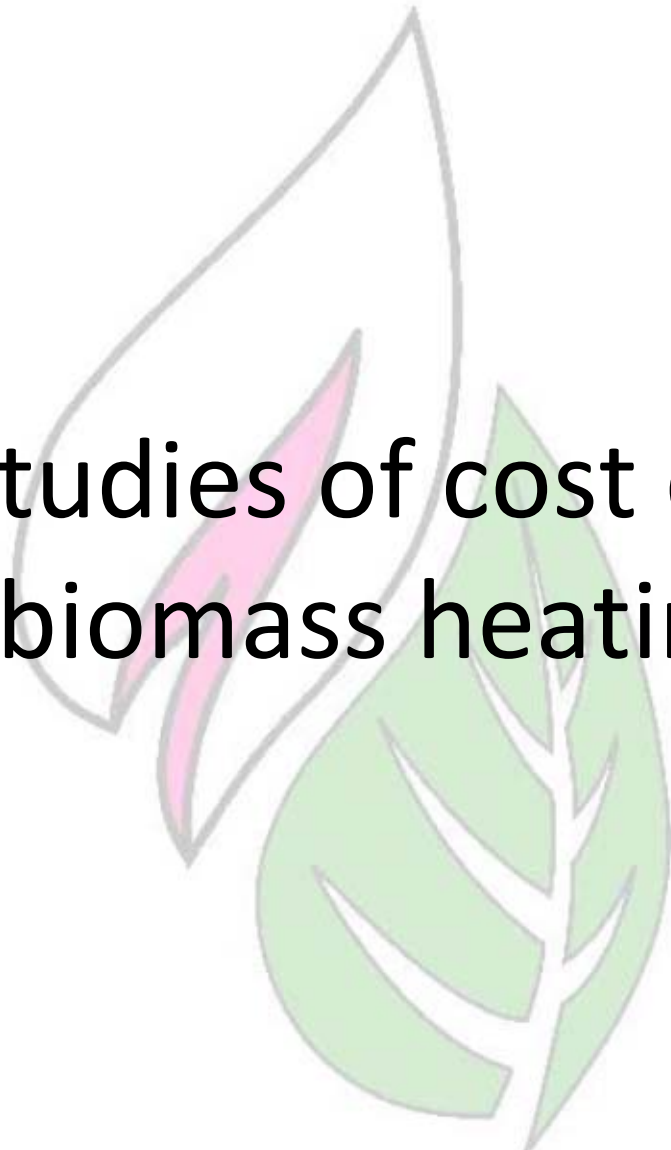
**Profitable business in a changing climate:
The case for on-farm renewable energy generation
2nd December 2009 – Burrough Court Estate**



Cost effective biomass heating

- Biomass heating projects are not cost effective and sensible in every situation.
- Capital costs are high; therefore the heating systems need to be fully utilised for a high percentage of the year.
- Crucial for the biomass fuel source to be low cost
- Usually larger scale is more attractive



The background features three stylized leaves. One is a large, light green leaf with a white vein structure. To its left is a smaller, pink leaf. Above the pink leaf is a large, white leaf with a thin grey outline.

Case Studies of cost effective biomass heating



Case Study 1: Domestic Log Stove



- Low cost
- Attractive visual effect
- No electricity or water services needed
- Reasonably thermal efficiency - 60%
- Logs easy to access and cure low cost fuel on a farm



Summary

Likely costs and returns

Annual fuel used	1.0 tonnes
Annual heat production	2,000 kW hours
Gross capital cost installed	£1,500
Value of heat (8p/kWhr)	£160
Cost of Fuel	Little cost
Payback period	10 years



Case Study 2: **Log Boiler:**



- Central heating system
- Relatively low cost
- Buffer tank recommended
- Separate plant room needed
- Manual fuel loading
- Good thermal efficiency - 80%
- Logs easy to access and cure low cost fuel on a farm
- Up to 400kW available
- Can be adapted for hot air space heating



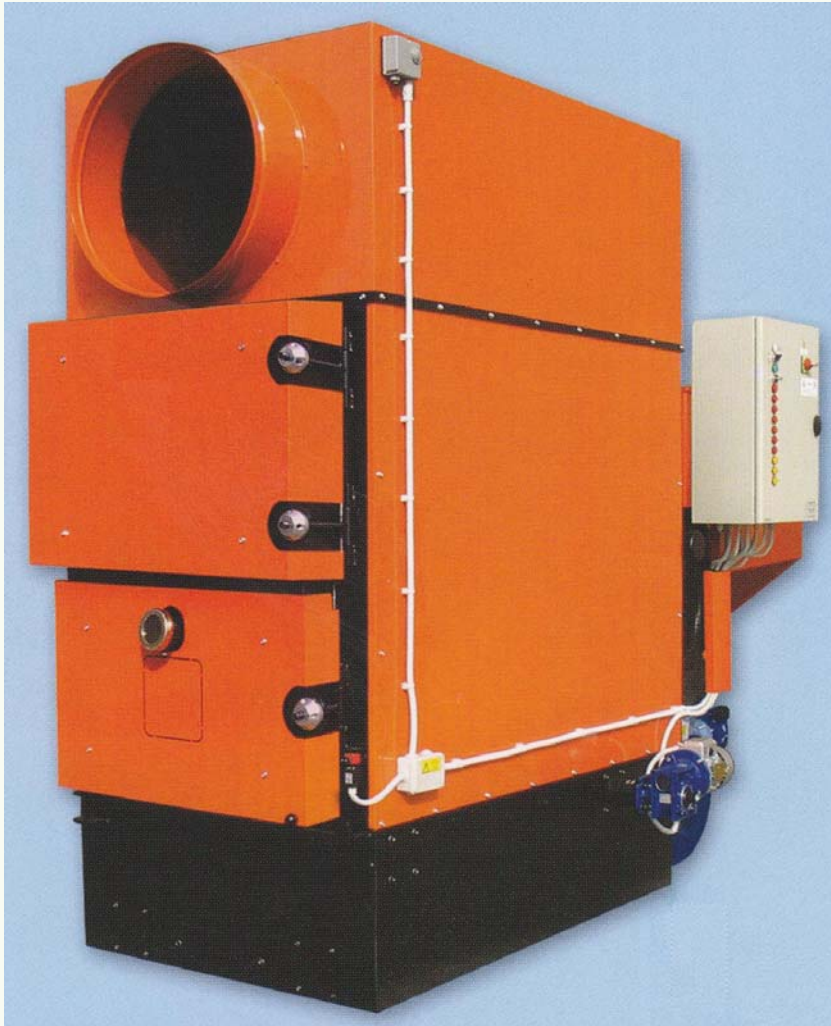
Summary

Likely costs and returns

Annual fuel used	5.0 tonnes
Annual heat production	12,000 kW hours
Gross capital cost installed	£6,000
Value of heat (8p/kWhr)	£960
Cost of Fuel	Little cost
Payback period	5-7 years



Case Study 2a: **Log Boiler + hot air space heating**



Suitable for
workshops and
packing sheds

Manual fed with logs,
broken pallets etc



Case Study 3:

Domestic/Small business wood automatic chip system



- Provides heat for a central heating system
- Relatively expensive system
- Wood chip fuel, grain fuel
- Good thermal efficiency 85-90%
- Wood chip may be expensive to provide in small quantities
- Wood chip needs to be dry and graded
- Significant manual intervention and maintenance



Summary

Likely costs and returns

Annual fuel used	5.0 tonnes
Annual heat production	12,000 kW hours
Gross capital cost installed	£8,000 - £20,000
Value of heat (8p/kWhr)	£960
Cost of Fuel	Depends on owner access to fuel
Payback period	Variable



Case Study 4: **Chip boiler + District Heating**

Alma Business Park: Wibtoft, Leics



Woodchip District Heating System

Alma House Business Park



Energy Centre



Plant Room

150kW wood chip boiler + 150kW oil boiler

	
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Poplar Coppice for fuel

Alma House Business Park



Harvesting Poplar Coppice



Summary

Likely costs and returns

Annual fuel used	100 tonnes
Annual heat production	300 MWh
Gross capital cost (Current)	£150,000
Income from selling heat PA (Charged per sq. ft)	17,500
Potential RHI income PA (3p/kWhr)	£9,000
Payback period (Current energy costs)	8 years



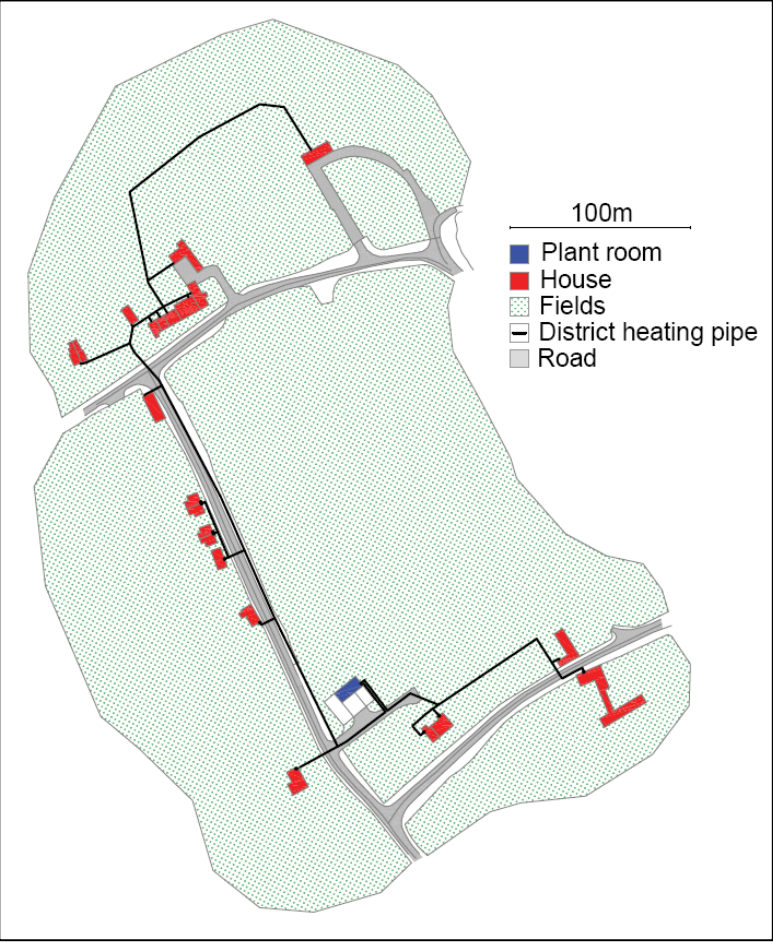
Case Study 5:

Village: District Heating South Carlton, Lincoln



Woodchip District Heating System

South Carlton Village



Heating Mains

District Heating Network - 23 properties

Woodchip District Heating System

South Carlton Village



Energy Centre in Redundant Barn

250 kW Wood chip + 250 kW oil boilers



Summary

Likely costs and returns

Annual fuel used (wood chip at 30%)	200 tonnes
Annual heat production	550 MW hrs
Current gross capital cost	£350,000
Income from selling heat PA	£27,500
Potential RHI income PA (3p/kWhr)	£16,500
Payback period (Current energy costs)	12 years



Case Study 6: Large scale heat- low cost woodchip

Bells Bros Nurseries, Boston, Lincs



6 acres of heated glasshouses



Major producer of potted plants for Supermarkets all year round

<input type="checkbox"/>	<input type="checkbox"/>
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Heating Systems

Bells Bros Nurseries, Boston, Lincolnshire




Plant Room

2MW biomass step grate boiler

5MW oil peak load boilers



Hydraulic walking floor fuel discharge system

	
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Heating Systems

Bells Bros Nurseries, Boston, Lincolnshire



Purpose built Energy Centre



Summary

Likely costs and returns

Annual fuel used (Wet and dry wood chip)	1,200 tonnes
Annual heat production	3,500 MW hrs
Current gross capital cost	£500,000
Value of heat per annum (5p/kWhr)	£175,000
Potential RHI income PA (3p/kWhr)	£105,000
Payback period (Current energy costs)	2 yrs



Combine Heat and Power from Biomass

- Large scale technology; not viable on small/medium scale.
- Minimum economic scale: 2MWe – 4MW h
- Huge capital cost – must generate power 24/7 to be viable
- Must have all year round heat demand
- Very few viable scenarios and these are all large scale industrial.





Thank you!

Any Questions?

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