

Annex 2
REA's
response to
Biomass
Strategy:
Biomass
Heat Case
Studies



Biomass Heat Case Studies

This document has been compiled by members of the REA Wood Heat Forum to accompany the submission of the REA's response to the Government's Biomass Strategy Call for Evidence.

It provides case studies demonstrating high quality biomass heat installations being used in the UK across a wide range of commercial, industrial and domestic installations.

As stated in the REA's call for evidence response, following the closure of the non-domestic RHI, medium and large-scale biomass heat projects currently have no viable route to market. This means projects like those described here are currently not progressing. We are already seeing cases where sites are reverting to oil or gas boilers, rather than choosing to decarbonise their heat.

Through the Biomass Strategy we are calling on Government to recognise the existing contribution of biomass heat to decarbonisation and commit to continuing support its use particularly in larger residential developments, hard to treat off gas grid properties and for commercial or industrial sites where high heat loads are required.

Biomass heat is a ready to deploy renewable heat technology, providing immediate carbon savings. We hope these case studies help to demonstrate the role it will be required to play as part of wider heat decarbonisation policy, if the UK is going to successfully decarbonise the UK's requirements.



Muntons Plc – Industrial Heat Decarbonisation

Project details: £16.5 million energy centre which will include a biomass boiler and a Gas CHP system with waste heat recovery. It will decarbonise 100,000,000 kWh of heat load each year.

What heat is used for: The energy centre will provide virtually all of Muntons Stowmarket site's steam, heat and electricity requirements. It has replaced gas boilers.

Why is biomass the optimal technology in this situation? : Biomass can be deployed on-site to create the vast amount of steam and heat needed for industrial processes.

What are the estimated carbon savings: Tbc but the project will enable Muntons to meet their science-based emissions reductions targets.

Any other benefits of the project: The project has created new jobs and new opportunities for suppliers.

Describe how Government support has made this possible: The RHI scheme enabled AMP Clean Energy to fund, develop, own and operate the scheme.

Could the project lead to future innovations: It's a great model of what biomass heat can deliver.



Villa Nursery – Renewable Heat for British Fruit Producers

Project details: 1.65MW steam-generating biomass CHP plant, 5MW biomass boilers and a 3MW reserve gas peaking engine.

What heat is used for: The heat and power solution provides 100% of the Essex-based nursery's energy needs. Biomass heat is used to cultivate two million kilos of tomatoes each year under glass, supplied to major UK supermarkets.

Why is biomass the optimal technology in this situation?: On-site requirement for significant heat all year round.

What are the estimated carbon savings: 4,000 tonnes per year.

Any other benefits of the project: Enables Villa Nursery to produce sustainable British produce which can compete with overseas producers with year-round sun like Spain.

Describe how Government support has made this possible: The RHI scheme has enabled AMP Clean Energy to fund, develop, own and operate the project.

Could the project lead to future innovations? : Great role model for British fruit producers.



Willerby Holiday Homes – Industrial Heat Use in Leisure Home Manufacturing

Project details: Willerby Ltd have been manufacturing leisure homes in the UK for over 70 years. They operate from a sprawling 90-acre site in Hull, where a Park Home is produced every 30 minutes on average. They have a strong 'green' conscience and lead in the pursuit of environmental excellence.

What heat is used for?: With this environmental policy in mind, Willerby chose to install 2 x Talbott's MWE 999 biomass heating systems during 2020. The heat generated by the boilers is used to heat their 24,000m² production facility at Hedon Road, replacing the conventional warm air heating system and reducing their use of fossil fuel

What are the estimated carbon savings?: 1000 tonne of CO² in gas reduction alone.

Any other benefits of the project?: Furthermore, they are using wood offcuts from their production processes to run the biomass boilers preventing 840 wagon trips that have, historically, been required annually, eliminating 5000 tons of waste sent to landfill.

Describe how Government support has made this possible: The capital cost for the installation was in excess of £1.1m. This would not have been possible without support from the RHI scheme, and the site would still be landfilling biomass and burning gas.



Scottish Sea Farms – Industrial heat to meet needs of fish hatchery

Project details: 600KW biomass heat installation at Scottish Sea Farm's Barcaldine Hatchery.

What heat is used for: Provides all heat and hot water to the 17,500 sqm facility.

Why is biomass the optimal technology in this situation?: Perfect on-site new installation to generate renewable heat.

What are the estimated carbon savings: tbc

Any other benefits of the project: Once fully staffed, the new facility aims to support over 25 full-time jobs – at least 11 of which are all-new specialist positions that have recently been recruited – plus additional research roles.

Describe how Government support has made this possible: The RHI scheme has enabled AMP Clean Energy to fund, develop, own and operate the project.

Could the project lead to future innovations? : Biomass has the potential to replace oil and gas at other hatcheries and demonstrates that such facilities can run off sustainable heat.



Nuneaton Roof Truss – Promoting a circular economy for waste wood

Project details: 480Kw biomass heat installation

What heat is used for: Onsite installation which will help convert waste wood into wood chip to heat the business's factory and offices

Why is biomass the optimal technology in this situation?: The most suitable technology to convert waste wood into wood chip

What are the estimated carbon savings: Excess waste wood is used by AMP Clean Energy to fuel a nearby biomass heat project. The project prevents 1,700 tonnes of waste wood from going to landfill each year.

Any other benefits of the project: The project has created a circular economy at the Nuneaton Roof Truss and also enabled another business (Villa Nursery) to benefit from excess waste wood, which is therefore not going to landfill.

Describe how Government support has made this possible: RHI scheme. Nuneaton Roof Truss has also been given a grant from Warwickshire County Council's Growth Fund, which covers around 40% of their infrastructure costs.

Could the project lead to future innovations? : It is a great example of how the building industry can benefit from re-using waste wood.



Acharn Biomass (1) – Biomass Combined Heat and Power

Project details (inc. type, size etc): Located near Killin, Stirlingshire, Acharn Biomass is a 6MWe/9MWth combined heat and power plant using advanced downdraft gasification technology. The plant comprises: 8 individual CHP units, each with a Gross Capacity of 780kWe and a Declared Net Capacity of 754kWe. The Generator Station is configured in two blocks of four CHP units, each block having a Gross Capacity of 3,124kWe and a Declared Net Capacity of 3,016kWe.

What heat is used for / is it displacing fossil fuels: Drying allows a fast and efficient conversion of wet, small round wood or industrial wood into useable fuel in days rather than months. Production of high grade biomass fuel to 15-25% moisture content, ideal for biomass boilers for 3rd party customers.

Why is biomass the optimal technology in this situation?: The plant is situated in the heart of forestry around Loch Tay. Acharn Biomass utilises the non-premium forestry materials to produce locally sourced and locally traded chipped biomass. Thus the scheme is wholly in keeping with sustainability requirements and good forestry practice.

What are the estimated carbon savings (CO₂ tonnes per annum)? :The savings in fossil fuel CO₂ are 21,720 tCO₂/a



Acharn Biomass (2)

Any other benefits of the project: We anticipate a total of 16-18 FTE jobs; 3 management, 8-10 skilled trade (process), 2 skilled trade (multi skilled, process and fuel management), 2-4 semi skilled (fuel management); final balance to be based on rota etc plus 1 cleaner. More than 50% of the posts are filled and the remaining posts are scheduled to be filled in the coming months, and would be either local employees, or people relocating from elsewhere in Scotland for work. Jobs of this type are difficult for people in the local community to obtain without travel (e.g. to Grangemouth and Glasgow) and so the project enhances local employment prospects. We have 18.5 man years of work remaining for final completion of commissioning. We have materials to the value of £1.5 million sourced from suppliers within a one and a half hour radius.

Describe how Government support has made this possible: The plant is accredited for ROCs and is seeking accreditation for RHI. Both of these support programmes were essential for the viability of the project.

Could the project lead to future innovations?: Whilst modification to the planning consent and compliance with emission regulations would be required, there is always the possibility that - when operational - a unit of the plant could be reconfigured to gasify (pelletised) waste. Sustainable forestry is key to good land management and exploring innovations to use more of the residual material in the plant would both enhance viability and allow a greater deployment of the biomass resource.



Sunseekers International – Utilising Waste Timber from the Boat Building Industry

Project details: 500kW biomass boiler at the Technology Centre in Mannings Heath, Poole, and a 1MW biomass boiler and ancillary equipment at Osprey Quay in Portland.

What heat is used for: To process waste timber from the boat building operations at the two sites (Sunseeker produces around 1,360 tonnes of usable timber a year) in order to provide a source of low-carbon heat to two sites

Why is biomass the optimal technology in this situation?: Biomass is the perfect solution to convert waste wood into heat.

What are the estimated carbon savings (CO2 tonnes per annum): 1,200 tonnes per annum

Any other benefits of the project: It has created a circular economy and significant carbon savings.

Describe how Government support has made this possible: RHI scheme enabled the project to be funded and developed.

Could the project lead to future innovations?: This is a circular economy in action.



Timber yard and offices – utilising ‘waste’ timber offcuts

Project details: 500kW woodchip boiler

What heat is used for?: Heat treatment of building timber plus space heating of warehouses and offices. Previously timber kilns were heated with mains gas and space heating was supplied by a combination of oil and direct electric heating.

Why is biomass the optimal technology in this situation? As a timber yard, the site produces a large amount of timber residue (off cuts) as part of the production process. This is now used on site.

What are the estimated carbon savings? >190 tonnes CO₂/annum

Any other benefits of the project?: Beneficial use for something that could otherwise be classed as ‘waste’ and need transporting off site.

Describe how Government support has made this possible: Non-domestic RHI support made it economic to invest in the equipment.

Could the project lead to future innovations?: Central plant could easily be converted to alternative fuels if a better use for timber offcuts is found.



Nc'nean Distillery, Morvern Peninsula – using local commercial forestry blocks to decarbonise a distillery

Project details (inc. type, size etc): 850kW woodchip-fired steam boiler

What heat is used for / if it is displacing fossil fuels say here: Provides all the steam for a remote distillery on the west coast of Scotland

Why is biomass the optimal technology in this situation?: The boiler makes use of low grade forestry material from the surrounding commercial forestry blocks, adding value to the forestry crop.

What are the estimated carbon savings (CO2 tonnes per annum): 215 tonnes oil eq.

Any other benefits of the project: The project has created around 1.5 FTE in the supply chain and operation of the boiler, and made the management of some uneconomic blocks of forestry on the estate viable.

Describe how Government support has made this possible: Without the RHI, the project would simply not have been economically viable, and an oil boiler would have been installed in place of the biomass system.

Could the project lead to future innovations?: Not so much innovation, but it has certainly given other process heat users the confidence to opt for biomass as a suitable source of energy to decarbonise their business.



Kingham School – District heating solution throughout a large school complex

Project details: Biomass heat installation and district heating scheme

What heat is used for: To provide heat and hot water to the school buildings, boarding houses and sports facilities including a sports centre and swimming pool. The biomass replaced 13 individual oil boilers

Why is biomass the optimal technology in this situation?: It replaced fossil fuels with sustainable heat and through a 20-year energy supply agreement provided the school with budget certainty.

What are the estimated carbon savings: Around 200 tonnes per year

Any other benefits of the project: Helping educate the students about sustainable energy and climate change.

Describe how Government support has made this possible: The RHI scheme enabled AMP Clean Energy to fund, develop, own and operate the project.

Could the project lead to future innovations?: A good example of how biomass heat can displace fossil fuels at an independent school on a larger site.



Country House Hotel – Decarbonising historic building and driving estate woodland management

Project details: 200kW woodchip boiler

What heat is used for? Heat supply to country house hotel and nearby accommodation. All properties were previously heated by oil.

Why is biomass the optimal technology in this situation? As part of an estate with significant woodlands this provides a beneficial use for thinings and arboricultural residues. Alternative low carbon heating options such as heat pumps would not work in these historic buildings.

What are the estimated carbon savings? Approx. 120 tonnes/annum

Any other benefits of the project?: This has driven significant investment in woodland management creating local jobs and improving biodiversity within woodlands. Ultimately, higher quality timber, suitable for building etc, will be produced from the managed woodlands.

Describe how Government support has made this possible: Non-domestic RHI support made it economic to invest in the equipment.

Could the project lead to future innovations?: Central plant could easily be converted to alternative fuels if a better use for low quality timber is found.



Minsteracres Retreat Centre, Northumberland – Historic building with high heat load requirement

Project details (inc. type, size etc): 200kW wood chip boiler

What heat is used for: Space heating and hot water

Why is biomass the optimal technology in this situation?: The building dates from ~1750, and is poorly insulated and Grade 2 listed, meaning it needs heat at 80 degrees centigrade in order for the heating system to work – something which only biomass can deliver at scale.

What are the estimated carbon savings (CO2 tonnes per annum): 105t

Any other benefits of the project: Project has delivered significant running cost savings, meaning the retreat centre could remain financially viable and provide a valuable service to a wide range of faith and non-faith groups, as well as sustaining c. 15 local jobs.

Describe how Government support has made this possible: The RHI gave the centre the confidence to invest in a renewable heat source, while the alternative would have been for the site to continue to use fossil fuels until the costs became unviable, at which point it is likely that they would have closed.



Newbuild Rural House – Meeting domestic rural heat demand

Project details: 20kW log boiler

What heat is used for? Heating of a single new-build house.

Why is biomass the optimal technology in this situation?: The owner has access to timber that is uneconomic to extract commercially. Electricity supply constraints also precluded installation of a heat pump system.

What are the estimated carbon savings?: approx. 4 tonnes/annum compared to oil.

Any other benefits of the project?: By installing a sophisticated log gasification boiler and accumulator tank rather than relying on wood burning stoves, both fuel consumption and emissions have been greatly reduced. Ongoing assurances of fuel quality, maintenance etc are also provided by the long term RHI support mechanism.

Describe how Government support has made this possible: Domestic RHI support made it economic to invest in the equipment rather than rely on wood burning stoves or an oil boiler which were the alternative solutions.

Could the project lead to future innovations? The system could be converted to run on alternative fuels if required.



Yearle House Hotel, Northumberland – Meeting rural heat demand.

Project details (inc. type, size etc): 80kW wood pellet boiler

What heat is used for: Space heating and hot water, displacing oil

Why is biomass the optimal technology in this situation?: The 100+ year old building has a high heat and hot water demand from guests, and with a poor local electricity grid, biomass was the only viable and reliable option

What are the estimated carbon savings (CO2 tonnes per annum): 45t

Any other benefits of the project: The installation of the pellet boiler strengthens the local biomass supply chain, by contributing towards a critical mass of biomass fuel customers in north Northumberland/Scottish Borders

Describe how Government support has made this possible: Even with the RHI, the project was marginal due to the low rates at scheme closure, but were just enough to get the client to move to a renewable source of heat. Without this, the site would have stayed on oil – it's existing boilers and associated infrastructure were relatively new.



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