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Department of  
**Agriculture, Environment  
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## Heat from Biomass

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Poultry farmer Tom Forgrave describes his use of biomass heat in his broiler unit.

### Introduction

Tom Forgrave from Ballymoney has been directly involved in the family poultry business for over twenty years. He currently manages a successful 110,000 broiler chicken farm consisting of six sheds. This year Tom was declared runner-up in the Marks and Spencer Farming for the Future Awards and the winner of this year's Action Renewables Most Successful Renewable Heat Installation.

Tom writes about installing six 99kW wood pellets boilers on his unit within the last year. "Previously I had a gas bill of £30-40k per annum". It took an average of 35 days to achieve a target weight of 1.85kgs and pododermatitis (footpad



lesions) were an issue. Profit is determined primarily by the feed conversion ratio (FCR), that is the kilograms of meal fed to the birds versus the kilograms of flesh sold. Historically this has been in the region of 1.65 for a 2.1kg bird.

Tom states that it was a major decision to convert from gas to biomass heating costing approximately £55k per shed. However, the benefits of using a dry heat system are significant. With a dry heat system carbon dioxide, carbon monoxide and water levels in the shed are reduced. Ultimately this leads to reduced ammonia providing a much healthier environment for the chickens. Blow heaters transfer the heat from hot water via a fan and radiator into the shed.



This compares with the more traditional gas canopy brooder system, which burned gas within the poultry shed creating carbon dioxide, carbon monoxide and water vapour within the environment.

According to Tom, since installing the biomass boilers, the farm's gas bill is minimal, with the gas only there as a backup. He has very low incidence of pododermatitis and hock burn. The feed conversion ratio has improved to around 1.58 on average and the average age of birds achieving a weight of 1.85kgs is now 33 days. This has improved the profitability of the farm, reduced the carbon footprint and generated an additional income from the Renewable Heat Incentive (RHI).

Tom would point out that the quality of the boiler, the installation and the fuel used, in this case pellets, are very important.

The potential benefits from this project are summarised below:

- reduction in Carbon Dioxide, carbon monoxide and water vapour within the environment
- lower incidence of pododermatitis and hock burn
- improved feed conversion ratio from 1.65 to 1.58
- average age of birds achieving 1.85kgs reduced to 33 days
- reduced carbon footprint by 165 tonnes CO<sub>2</sub>eq
- taking into account the improved profitability of the birds, fuel costs and the potential RHI payment, profitability improved overall for the business
- a payback of 4-6 years is anticipated

## Overview of biomass heating

The most common biomass fuel is wood pellets or wood chips but can include other materials such as logs, straw bales or even waste wood.

The most important characteristic of wood used for the production of heat is the moisture content. At a moisture content above 30% woodchip cannot be stored safely as it will rapidly start to degrade. Woodchip is generally dried to between 20% and 30% moisture. At this level it can be safely stored, giving good energy production when burnt. Wood pellets are normally supplied with moisture content between 7% and 10%.

## Biomass heating systems

The biomass boiler is at the centre of any biomass heating system. There are many types and models ranging from simple room heaters, log boilers and pellet stoves to pellet and wood chip boilers. Boilers can provide a combination of space heating for buildings, hot water for various processes including domestic hot water and steam. Boiler

sizes range from 10kWth to 45kWth for domestic use and from 50kWth to several MWth for commercial use.

## Renewable Heat Incentive

This support mechanism is dealt with more fully elsewhere in the booklet. The information provided in this article is based on the RHI current up until 3rd November 2015. From 4th November 2015 the RHI commercial Tariff will be set as follows for biomass:

- a tiered tariff structure for new non domestic biomass installations will be introduced from 4th November 2015 where the first 1314 peak hours be paid at the standard tariff and hours thereafter reducing to 1.5 pence per kWh
- the existing 6.4p non domestic biomass tariff to installations will be extended up to 199kw in size from 4th November 2015
- a cap of 400,000 kWh will be applied as a maximum annual heat payment. Any additional heat over this cap will not be eligible for payments

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