

Improving the Welsh Dairy Supply Chain

Renewable Heat Incentive




Cronfa Amaethyddol Ewrop ar gyfer Datblygu
Gwledig Ewrop yn Buddsoddi
mewn Ardaloedd Gwledig
The European Agricultural Fund for
Rural Development: Europe Investing in
Rural Areas


FARMING
connect
cyswllt
FFERMIO


Canolfan Datblygu Uweth
Dairy Development Centre

DairyCo


Llywodraeth Cymru
Welsh Government

Dairy Development Centre

Gelli Aur

Carmarthen

Carmarthenshire

SA32 8NJ

Telephone: 01554 748570

E-mail: ddc@colegsirgar.ac.uk

www.ddc-wales.co.uk

November 2013

The Dairy Development Centre (DDC) acknowledges the contribution made by Farm Energy to the technical content of this booklet.

This project has received funding through the Rural Development Plan for Wales 2007-2013 which is funded by the Welsh Government and the European Agricultural Fund for Rural Development.

No part of this publication may be reproduced or transmitted in any form by any means without the prior written consent of the Dairy Development Centre.

Whilst all reasonable care has been taken in its preparation, no warranty is given as to its accuracy, no liability accepted for any loss or damage caused by reliance upon any statement in or omission from this publication.

Renewable Heat Incentive	4
Tiered rates	5
Applying for a Scheme	5
A biomass boiler	6
Combined Heat and Power (CHP)	6
Heat pumps	7
Solar thermal	8
Heat storage	8



Renewable Heat Incentive

The Renewable Heat Incentive (RHI) is the Government support system for encouraging the adoption of renewable heat installations. It pays a tariff for each kiloWatt hour (kWh) of renewable heat used and applies to a range of technologies including biomass boilers (which mostly use wood or straw as a fuel), ground source heat pumps, solar water heating and biogas from anaerobic digestion.

Farmers are particularly well suited to take advantage of the RHI as they often have the necessary resources like straw, wood or digestible waste and some good applications where they can use the heat.

The RHI works by giving a payment for each unit of heat supplied by the renewable technology. Currently 'Phase 1' of the RHI is only available to business applications (although a system feeding both a business and domestic installation or one which feeds multiple domestic installations can be included). A full roll-out of 'Phase 2', to include single domestic installations has been proposed (July 2013) with the first domestic RHI payments due to be made in April 2014.

Technology	Tier 1	Tier 2
Biomass and CHP		
<200kW	8.6p	2.2p
>200 to <1000kW	5.3p	2.2p
>1000kW	All energy -	1p
Heat pumps Ground and Water source)		
< 100kW	All energy -	4.8p
>100kW	All energy -	3.5p
Solar thermal		
<200kW	All energy -	9.2p
Biomethane		
<1.5kW	All energy -	7.3p

The proposed tariff rates for domestic RHI are as follows:

Technology	Tariff p/kWh
Air source heat pumps	7.3
Biomass boilers	12.2
Ground source heat pumps	18.8
Solar hot water	19.2

Please note that the UK Government intend to adopt a tariff degression (i.e. will lessen over time) similar to that used with Feed in Tariffs (FiT), whereby tariffs may be lower for those people who start later in the scheme, depending on technology uptake. Visit the Dairy Development Centre website for up to date rates: www.ddc-wales.co.uk/energy

At the moment, all outputs from a system have to be metered using a heat meter, to establish the energy supplied. When the domestic scheme comes on stream it is proposed that the output for small systems can be estimated or 'deemed' based on a fixed energy output associated with the rating of the heating system.



Tiered rates

The 'Tiers' referred to in the table indicate the initial and secondary rate you get for the heat produced. Tier 1 covers energy use calculated from the rating of the device multiplied by 1,314 hours.

Example

If you installed a 60kW boiler that provided 100,000kWh heat per year, you will get paid for heat used as follows:

$60\text{kW} \times 1314 \text{ hours} = 78,840\text{kWh}$ at 8.3p/kWh

$100,000\text{kWh} - 78,840\text{kWh} = 21,160\text{kWh}$ at 2.1p/kWh

Total income would therefore be £6,988 per year

Applying for a Scheme

It's necessary for any heating installation to be accredited with Ofgem. For bigger biomass schemes (>200kW) preliminary accreditation is available, before the installation takes place.

To make sure an application will be accepted the equipment and also the use of the heat generated must be considered eligible and the layout of the heat metering must be correct.

Making an application requires filling out an online form and submitting relevant documents such as a boiler warranty, system heating schematic and details of how the heat is being used.

Applications in dairy farming

Renewable heat applications are relatively small in scale for dairy farming and are associated mainly with water heating and domestic/office heating.

A biomass boiler

Biomass boilers can be used to heat domestic premises, offices and to generate hot water for the parlour. However, in sizing the system it's important to note that the load on the boiler during the summer will be little more than the water heating, so the system needs to be configured to work effectively under low load conditions. Generally biomass boilers do not favour rapid cycling and low loads. Note also that where loads are split between different buildings then a heat metering and/or pipe heat loss assessment will be required by Ofgem if the system is to be accredited.

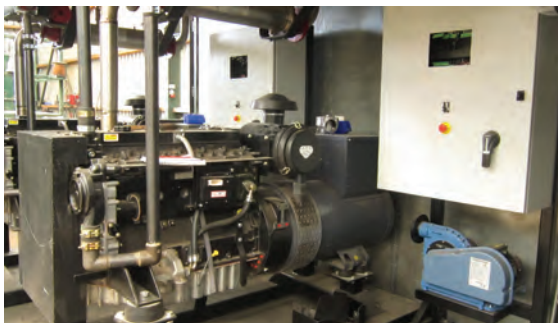
Consideration should also be given to the type of fuel used by the boiler, its source, quality and water content.

Self-feed technology is available on practically all of the larger biomass systems.



Combined Heat and Power (CHP)

CHP systems are usually associated with anaerobic digestion plants. They use the biogas produced to run an engine which turns a generator thus producing electricity (FiT's are available for this energy). The heat given off by the engine is also collected through a heat exchanger system and transferred to water (RHI is available for this heat if used beneficially). Smaller light commercial/domestic units are now available which run off natural gas or LPG.



Heat pumps

Heat pumps are essentially refrigeration systems operating in reverse. Instead of removing heat – they provide it through the compression of a refrigeration gas. This heat is then transferred to water via a heat exchanger. Currently, shared buildings can benefit from this heat source as can water heating systems for your dairy under the RHI scheme. As the delivered temperature from a heat pump is limited, water heating will need extra input from another source, such



as an immersion heater to provide the correct temperature for circulation cleaning. Also space heating systems need to have high radiator surface area or an underfloor heating system to achieve acceptable levels of occupancy comfort.

Ground (GSHP) and water (WSHP) source heat pumps are currently included in the commercial RHI and air source heat pumps (ASHP) are due to be included in the domestic RHI scheme from April 2014.

It is important to remember that a heat pump will require electricity to operate. A heat pump should have a Coefficient of Performance (COP) of at least 2.9 to qualify. This means it must be capable of delivering 2.9kWh of heat for every 1kWh of electricity consumed on average. As a comparison, an electric water heater would have a COP of 1.0 and the most efficient gas or oil boiler a COP of around 0.9.

Solar thermal

Solar thermal works well for water heating especially in the warmer months of the year. Note though that the water temperature from solar will generally fall short of that required for circulation cleaning and therefore top-up from a separate water heater will be required.



Heat storage

As a general rule all three systems will require that heat is stored before being used. An independent tank of water (called a buffer tank), which is heated by the technology is required. The heat is then supplied from this tank of water to wherever it is needed.

