



A Scaling Farm



Information on this farm

This is a dairy farm with 250 cows.

Renewables: electricity

Wind turbine: 10 kW

The turbine was installed in July 2008 and was the first to be allowed in the National Park; but since then several others have been installed.

Supplier: Bergey USA <http://bergey.com>

Installer: Winsund - no longer operating as a separate company. Now part of EML Group, Glasgow www.emlgrp.com

Cost: £30,000

Grant: £2,300

Production: 20,000 kWh (90% for own use and 10% exported at 4 p per kWh)

Payback: 8 years (costing the electricity that we use at the price that we buy it for, rather than the price we sell it for).

Issues to consider:- Need a field to site the turbine. Need to be able to run a cable to a building. Must have a grid connection agreement. If you want to use the majority of the electricity that is produced then you need to have a fairly constant demand for electricity.

The turbine was designed for the US prairies with a very basic method of slowing itself down in high winds; this can be noisy. The fact that it is not a sophisticated mechanism means that it is robust and it also means that it continues to produce in high winds when many turbines switch off to prevent damage.

We initially had a lot of problems with the grid connection. Misleading 'spikes' of higher voltage were recorded which resulted in the turbine dropping out of production. We installed the turbine a year too soon to receive FIT, which did reach 27p per kWh but is now down to 16 p for a turbine of this size. We only get 9p per kWh.



Planned solar PV: 50 kW

Installer: Minel Energy, Newcastle, <http://minel-energy.com/> to be installed 2015

Costs:

£35,685 3 phase electricity for 115 kva

£53,000 for 50kw panels

£500 for cost of trench

Total £89,185

Forecast Returns per year:

FIT 43,550 kWh @ 12.13p = £5,282.61

Export 70% 30,485 kWh @ 4.77p = £1,454.13

Usage 30% 13,065 kWh @ 12p = £1,567.80

Total £8,304.54 pa

Component manufacturers:

Panels – Canadian Solar; Inverter - SMA

Issues to consider:-

We have had to pay to upgrade our electricity connection to 3 phase. We have also had to apply to the National Park for permission to build a new shed in a suitable location with a sloping roof so that the panels can be mounted on it.

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Renewables: heat



Ground Source Heat Pump:- 12kw Danfoss

www.heatpumps.danfoss.co.uk/

Supplier:- www.purerenewables.co.uk/

Installer:- N R Pybus Ltd., Whitby

Installation: March 2012

Cost:- £17,500

Financial support:- £1,200 Renewable Heat Premium Payment and Domestic Renewable Heat Incentive annual payments of £3,868 per year for 7 years calculated on assumed heat demand for the house.

Performance:- Data is available for an identical system next door at Scaling Farm. It heats a house and separate annexe, so is monitored to meet the requirements of the Non-Domestic Renewable Heat Incentive. We used 9,975 kWh electricity between 13th August 2013 and 13th August 2014. We produced 30,710 kWh of heat. This gives a Coefficient of Performance of 3.1 which is at the lower end of expectations. The average power usage was 3.95 kW. It is well over 4 kW when it is heating the water and about 3.5 kW when it is heating the house.

The heatpump ran for 2,526 hours in total. The daily hourly total varied during the year. The minimum usage was 4 hours a day in the summer and the maximum was 15 hours during the winter. The electricity costs us about 10p per kWh (average based on imported electricity and generation from the wind turbine). Our bill for the year is therefore approximately £1,000 for heating and hot water for the farmhouse and the annexe.

Issues to consider:- Needs land for the ground loops (we have 600 metres of ground loops, laid in two 300 metre sections) and space for the pump and water tanks (2m x 2m). Under-floor heating is slower to respond than radiators are, particularly through three inch thick flagstones.

Heat recovery system

This system extracts the heat from the milk refrigeration units and uses it to heat hot water for washing out the milking parlour.

Supplier and Installer: Hadrian Farm Services (no longer operating)

Cost:- £6,000

Grant:- 50% if solar panels also purchased.

Payback:- Advertised as 4 years but there is no way of monitoring this.

Issues to consider:- Only applicable to dairy farms or other operations with a large refrigeration unit to take the heat from.

Solar thermal panels

These heat the water for washing and work in conjunction with the heat recovery system.

Supplier and Installer: Hadrian Farm Services (no longer operating)

Cost:- £6,000

Grant:- 50% if heat recovery system also purchased.

Payback:- 12 years.

Issues to consider:- A south facing roof is needed.

Spring Water System

Because this is a dairy farm we consume a large amount of water. The cost of water is greater than the cost of electricity. We were able to find several streams on the farm. These have been tapped and piped into a large storage vessel. From there water is pumped to the troughs for the cattle to drink.

Supplier:- Bespoke system

Installer:- Jeff Hodgson

Cost:- £11,000 **Grant:-** None

Production:- 25 m³ water a day, the majority coming from the spring.

Payback:- About a year.

Issues to consider:- Need a spring and need a use of untreated water. Also need a space for a storage tank. The pump runs all of the time and the filters occasionally get blocked. Having the pump operating all of the time is a good use of electricity from the wind turbine.

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