

# Farming for a Better Climate



## Woodend Farm

I'm John Seed. I farm at Woodend Farm near Duns, a 200ha arable unit, in partnership with my wife, Louise, son Donald and daughter Lindsay.

We try to run Woodend Farming Partnership (WFP) as a contemporary agricultural unit that aims to be self-sufficient and sustainable in its use of natural resources. As well as farming, I'm also a bio-energy specialist with over 20 years' experience in the renewables industry.

To date, we have installed a biomass boiler to dry our grain and heat the houses on the farm via a district heating system. We have solar panels which can provide enough power to run the grain dryer and farm during a summer day. We have plans for a wind turbine, which with the solar would provide enough power for the whole farm all year and let us replace two cars with electric vehicles.

We have installed energy efficient measures such as double glazing

and insulation together with using soft-start and variable speed motor controllers to help us make the best use of renewable energy generated on the farm.

All these things will help us to save on fuel bills, protect us from future fuel price rises and reduce the farm carbon footprint whilst improving overall farm efficiency.



<b>Name:</b>	John Seed
<b>Farm:</b>	Woodend
<b>Locality:</b>	Nr Duns, Scottish Borders
<b>Type:</b>	Arable
<b>Size:</b>	200ha

## How might Climate Change affect our farm?

Climate change could affect Woodend in a number of ways. For example, extremes of weather mean we have to be able to establish, harvest and dry our crops quickly and efficiently. Recent winters have seen power cuts and problems in getting heating fuel delivered through the snow, having our own fuel and on-farm energy systems should insulate us from those problems.

For us, it's about making our business more resilient to external factors that we have no control over, such as rising energy and fertiliser

prices. Farms, rural businesses and communities have become dependent on fossil fuel derived inputs and lost their ability to cope with sudden increases in costs. If farm businesses do not restore that ability, then they will find it increasingly difficult to remain viable.

I believe that by reversing this trend and investing in energy saving and production systems, farm resilience and profitability can be restored to Woodend and other farms like it in Scotland.

## Case Study

Find out what other farmers are doing to improve profitability and adapt to a changing climate in our series of case studies.

There are five sets of Practical Guides covering :

Use energy and fuels efficiently

Develop renewable energy

Lock carbon into soils and vegetation

Optimise the application of fertilisers and manures

Optimise livestock management and the storage of manure and slurry

Find further information, including links to other Practical Guides and Case Studies, at



[www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org)

Funded by the Scottish Government as part of their Climate Change Advisory Activity

## Websites

[www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org)  
[www.sac.co.uk/climatechange](http://www.sac.co.uk/climatechange)  
[www.farmingfutures.org.uk](http://www.farmingfutures.org.uk)  
[www.bbc.co.uk/climate](http://www.bbc.co.uk/climate)  
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[www.ipcc.ch](http://www.ipcc.ch)  
[www.carbontrust.co.uk](http://www.carbontrust.co.uk)  
[www.energysavingtrust.org.uk](http://www.energysavingtrust.org.uk)  
[www.biomassenergycentre.org.uk](http://www.biomassenergycentre.org.uk)



Case Study last updated April 2015

# Benefiting from Renewables at Woodend Farm

## Wind turbines

To complement the biomass system, Woodend is considering a 75kW wind turbine. The selected turbine can be supplied at two different heights, we have chosen the smaller one which will provide up to 75kW of electrical energy.

Once installed, it will be able to supply the whole requirement of the farm's Grain Drying Plant at full capacity (37kW warm air fan and 14kW roof ventilation fans) and provide power for electric vehicles.

## Solar panels

Working with Borders Machinery Ring (BMR), we helped to negotiate a 'free solar' deal worth over £2 million with a leading provider of solar power to the agricultural and residential industries. Under the deal, farmers get to use all the power generated by the panels and the Solar company collect the income from the Feed in Tariff (FIT).

We have 49.68kWp installed, which is estimated to produce around 41,400kWh/year. In terms of energy cost, production is equivalent to £4,000 based on current electricity prices and a saving of 23 tonnes CO<sub>2</sub> per year.

## What next?

We are about to build a 16,000 bird free-range egg unit which will provide an alternative source of income and employment, it will utilise some of the heat and power we produce and also provide up to 50% of the annual fertiliser input we need for the farm, which will be worth circa £12,000 year to us. We are also adopting minimum and low cost crop establishment systems, co-operating with our neighbours to reduce costs. We have established new woodlands, grass margins and conservation areas to enhance and underpin the wildlife and environment on the farm. If we can use electric vehicles and cut overall road-fuel costs by 60% then we will be producing more energy than we consume and have a negative carbon balance on the farm.

## Overdahl Biomass Boiler

We've installed a 450kW thermal mass-burn biomass boiler and 50m<sup>3</sup> hot water storage tank, mainly to dry arable crops at harvest time (replacing an oil-fired Carrier 36t/hr high temp continuous flow dryer). In addition to grain drying, it also supplies heat and hot water to the farm office, workshops and houses, so it operates 365 days/year and saves over 150 tonnes of CO<sub>2</sub> emissions annually.

The system is specifically designed to take fuel produced on the farm. At present this is mainly rape straw, although the plant can burn other cereal straw, light grain, energy crops and other suitable biomass feed stocks such as wood chips. We mostly use baled rape straw in round bales. The system is well automated; fuelling the unit and the removal of ash are easily performed by one person using a fork lift.

The boiler is built together with the storage tank for maximum efficiency and is a standalone unit to reduce installation costs and eliminate the danger of fire in respect of the farm buildings. It is a well proven technology commonly found in northern Europe.

## Biomass — costs and savings

The plant will utilise less than 170 tonnes of straw per year, which is otherwise chopped and ploughed-in. Ash from the unit is used as a soil conditioner on the farm to recover phosphate and potash and reduce fertiliser purchases.

In 2011, we dried over 3,000 tonnes of cereals, beans and rape which would have required over 60,000 litres of gas oil in the old system and would have cost over £30,000. The residents on the farm used to spend around £8,500/year between them for heating oil. The fossil fuel bill that will be avoided as a consequence of installing this system will be approximately £38,500/year at current prices.

Using rape straw to provide the same energy will require approximately 169 tonnes of straw at an average moisture content of 20% at a cost of less than £2000, potentially saving over £36,000/year. We also expect to receive Renewable Heat Incentive (RHI) payments of circa £25,000 per annum. The Overdahl system, district heating and central heating systems cost around £250,000, while the on-floor grain dryer cost a further £95,000, so we are looking at a payback of around 7 years.

