Farming for a Better Climate

Stewart Tower

Run by Neil and Linsey Butler, Stewart Tower is a mixed dairy and arable farm covering 170 ha near Stanley, Perthshire.

Both winter wheat and spring barley are grown for feed with some malting barley plus grass silage. Land is also rented out for vining peas or potatoes.

The majority of milk from the 70 cow Dutch Holstein dairy herd at Stewart Tower is sold to Sainsbury's, but some is reserved for the award winning ice cream. The Italian gelato style ice cream is made and sold on site through the ice cream parlour and café within the converted 1840's horse engine house which also contains the farm shop. Stewart Tower Dairy ice cream is also supplied to local hotels and restaurants.

Milking twice a day, plus running the café and farm shop means there is a significant demand for electricity on site.

After identifying energy needs, and putting in measures to reduce energy demand across the business, Neil and Linsey looked at a range of renewable energy options suitable for Stewart Tower, eventually settling on a 100kW wind turbine.

Name	Neil and Linsey Butler
Farm	Stewart Tower Dairy
Locality	Nr Stanley, Perth-shire
Farm type	Mixed dairy and ara-ble
Farm size	170 ha

How might climate change affect Stewart Tower?

Its predicted that Scotland will see warmer, wetter winters and hotter, drier summers, with more 'extremes' in our weather patterns. There has definitely been more unpredictability in the weather of late, for example the wet and cold start to 2013. This variability may impact on routine farming practices, meaning we need to look at all aspects of the farm business and make sure we are being as cost effective and efficient as possible.

One of the aspects we have looked at is renewable energy. Installing the wind turbine has reduced our use of electricity produced by fossil fuels, enabled us to put energy back into the grid and contributed to a reduction in the farm carbon footprint.

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

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

Websites

www.farmingforabetterclimate.org

www.scotland.gov.uk

www.ipcc.ch

www.carbontrust.co.uk

www.energysavingstrust.org.uk

www.bwea.com

www.decc.gov.uk

www.microgenerationcertification.org

www.planningrenewables.org.uk

www.snh.gov.uk/docs/A301202.pdf

www.stewart-tower.co.uk

Case Study last updated April 2015

Stewart Tower Farm Case Study

Making best use of electricity

Before we looked at renewables, an energy audit was carried out on the farm.

This was a useful activity, as it identified how we could reduce energy consumption on site, allowing us to make best use of both energy from the grid and renewable energy supplied by the wind turbine.

Site selection; points to consider

There were some key points to consider when thinking about possible sites for the wind turbine on the farm:

- Wind speed - was there enough wind speed at the site to make the project viable?
- Planning - What local and national planning restrictions existed at the site?
- Grid connection - could we get a grid connection point and how much would this cost?
- Access requirements - could delivery vehicles reach the intended site?
- Neighbours - was the intended location of the turbine going to cause issues for others?
- Electromagnetic interference - could the chosen location affect air traffic or radar installations?

Options for renewables at Stewart Tower

Our scope for renewables on the farm was limited, with no watercourses that would support a micro-hydro installation and the position of roofs around the steading didn't lend themselves to the installation of PV panels. Wind energy was deemed to be the best option.

There were only a few sites suitable on the farm with a required wind speed of 7 m/s. The best site for the turbine was close to the steading and road, making it ideal in terms of construction access and transfer of electricity from the turbine to the site supply point at the farm steading.

Planning permission

Our biggest hurdle was getting the required planning permission; it took over two years to get the go-ahead to install the turbine from the Local Council. This could be in part due to the size of the turbine, as at 100kW it falls between the smaller systems and those used on the more commercial wind farms.

Choosing the turbine

We investigated a number of manufacturers and suppliers to see what would be the best fit for our site.

We wanted to make sure that the turbine would supply a reasonable percentage of our daily electricity requirements and could operate in a range of wind conditions, maximising potential output. We looked at our annual electricity consumption and broke this down into daily use. We estimated how much daily output we could reasonably expect from the turbine and then looked at what size machine we would need to match our energy needs.

Reliability and on-going support was also a key consideration. The model we chose uses a gearless direct drive design, meaning there should be less to go wrong and makes for quieter operation. The turbine is also linked to the internet, allowing outputs and daily performance to be monitored plus real-time diagnostic support from the turbine manufactures if needed.

Operation and financial benefits

Energy used in the dairy, ice cream production and farm shop accounted for around 130,000 kWh per year. Calculations suggested that on an average year, the wind turbine would produce over 200,000kWh. We estimate we would use half of this, potentially giving us a saving of around £12,000 per year on the electricity bill at 2013 prices. With the energy we sell back to the grid, plus the feed in tariff, the turbine could generate around £50,000 per year.

We estimate that payback should be achieved within around 8 years. By generating energy from wind rather than fossil fuels, the turbine could offset in the region of 120 tonnes of carbon annually, equivalent to taking around 24 cars off the road per year.

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