

Case Study: Developing on-farm renewables



Climate change is bringing about a new set of challenges and opportunities for agriculture. While global warming may lead to extended crop growing seasons, it could also lead to unpredictable weather, new pests and diseases, and a requirement for farmers to substantially reduce their carbon footprint.

Soil Association Scotland is running a skills development programme to help farmers and growers improve their business sustainability, cut greenhouse gas emissions, reduce agriculture's carbon footprint and increase resilience to climate change.

Developing on-farm renewables

Renewable energy can replace energy sources generated from fossil fuels and thus reduce a farm's carbon footprint. Balkemback Farm is committed to using renewable energy as a way of reducing their carbon footprint. But it also makes good economic sense. Energy costs on farms are rising significantly. In generating their own electricity, Balkemback Farm is not only reducing their costs, but also generating electricity which they can sell to bring in extra income.

Balkemback Farm, Tealing Angus

Balkemback is a 740 acre mixed farm. The land rises from 150m to 450m above sea level giving a mixture of soil types from good quality arable ground to permanent pasture. There are 160 suckler cows, Simmental X and Aberdeen Angus X and 300 Suffolk Mule ewes. The farm uses a three-year arable rotation of barley-barley-oats, or barley-potatoes-wheat followed by at least three years in grass. All forage is home grown. Red clover, introduced at the start of conversion has given good results. After a staggered conversion the farm gained full organic status in April 2009.

The farm decided the best turbine for their needs and wind speed was the Gaia-Wind 11kW. With an open south-west facing site and an average wind speed of 6.5m/s this should produce 30,000kW per year.

After a successful SRDP application and a more difficult planning application, the turbine was erected in December 2008. Production to end September 2009 is 22,800kW so they are on track to meet the annual target. The farm uses most of the electricity but exports some back to Scottish & Southern to bring in some revenue.



Micro-hydro feasibility Study

Balkemback Farm once used water power to mill grain. A mill-pond with sluice is sited 400m away from the farm, connected by a 20cm pipe. Water is diverted into the mill-pond from a stream. The average flow into the mill-pond is 10 litres per second. This can be increased to 25 litres per second but to the possible detriment of downstream requirements.

The possible enhanced flow of 25 l/s and a head availability of 7m multiplied by 7 (gravity and efficiency) suggests a 1.225kw generator. This is quite small but may be achieved by installing a 3kw device which operates only when the mill-pond is high.

The project would cost between £16,000 and £22,000. This is primarily due to the need for a 'Low-Head' Kaplan turbine which can operate under the low available pressure.

The high costs and uncertainty regarding the flow mean the farm will not pursue this project.

Solar photo-voltaic study

Solar PV qualifies for the highest level of Feed-In Tariff - up to 36.5p for an installation of up to 4kw. This tariff runs for 25 years rather than 20 years for other technologies and makes solar PV a much more realistic option.

Major benefits of solar PV include:

- No planning requirements in normal areas;
- Generation through the day, when you will use it;
- Quick installation;
- Minimal maintenance;
- Aesthetically pleasing;
- Nearly half a tonne of CO2 saved per kwh installed.

Payback is typically between 9 and 13 years. Even in a worst case scenario that means a further 12 years of considerable profit.

Balkemback Farm is looking to fit solar PV to a south-facing, unshaded shed

Sources of further information

Chris Gavin, Gaia-Wind Ltd, 1 Ainslie Road, Hillington, Glasgow, G52 4RU Tel: 0 845 871 4242
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Feed-In Tarrifs (FITS) www.fitarrifs.co.uk

Soil Association Scotland

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