SevernWye ENERGY AGENCY

Case Study: 6kW wind turbine in the Forest of Dean

Key Points

- Property with high electricity use - average 17kWh per day
- Elevated position with good wind resource and few nearby neighbours
- Some administrative challenges to overcome before installation
- Expected to generate 7 - 10 MWh of green electricity per year

Background

Forest of Dean residents Mr & Mrs Gale own a home in the elevated location of The Pludds, where they have a small field adjacent to the house and garden. With relatively high electricity use of around 6,000kWh per year, generating their own electricity to reduce costs whilst limiting their reliance on the national grid seemed a logical step. As they live in an elevated position with few obstructions, and the nearest neighbours are not particularly close by, the Gales felt that a wind turbine would be an appropriate technology for the location, without negatively impacting on their neighbours.

Challenges

Planning permission was required for the installation; following a pre-submission meeting in August 2008 full planning permission was granted in October 2008. This was a relatively short timescale as there were no significant objections to the wind turbine. However, there is a significant amount of information required by the planning authority, so this needs to be built into any planned installation timescales.

One issue that could have been considered earlier in the process was consultation with the relevant Distribution Network Operator (DNO). The DNO needed to check that when the turbine was operating at maximum output it would not cause an over voltage condition on the local supply. Fortunately, this was confirmed by the DNO.

The 6kW Proven turbine

The System

The turbine chosen was a 6kW Proven WT6000 model, mounted on a 9m mast and installed by Aeolus Power Ltd.

As it was felt that a taller mast (15m or taller) would be less likely to obtain planning permission without significant objections, a 6kW turbine was chosen as this would yield the greatest electricity production on the chosen 9m mast.

Although wind speed data suggests that this location has a relatively low average wind speed, the site for the turbine is near the top of the hill within the 1km square area cited, with very good wind speeds affecting the exact location; it is estimated that the turbine could produce 7 - 10 MWh per year.

Case Study: domestic wind turbine

Costs and Funding Sources

Installation costs would be around £25,000 to £30,000, including all groundworks. However, costs were reduced for this installation as Mr Gale organised both the power cabling and foundation works himself.

A local authority funded grant of £1,000 is available via Severn Wye Energy Agency, for further details see: http://www.swea.co.uk/grants_domestic.shtml
Government grants of up to £2,500 are also available; for further details see:
http://www.lowcarbonbuildings.org.uk/home/

Maintenance

The system is almost entirely maintenance-free. A regular service will be undertaken but it is not expected that the turbine will require any other maintenance during its expected 25+ year lifespan.

Financial Benefits

Having changed to their fuel supplier's green tariff (a requirement when exporting electricity back to the grid), the Gales will read their generation meter twice per year. In this case the fuel supplier makes an assumption about the proportion of electricity consumed by the householder and will pay the householder 10p per unit (kWh) for the assumed exported electricity. However, there are other tariff options available and shopping around is recommended; better deals may be offered via feed-in tariffs from 2010. The supplier will also pay the Gales £72 per MWh generated, as their electricity generation helps the supplier to fulfil their renewable energy generation obligation (known as Renewable Obligation Certificates or ROCs). The Gales now enjoy 3 financial benefits: reduced 'imported' fuel costs, payment for exported electricity, and the ROCs payments.

Environmental Benefits

A wind turbine generates completely clean electricity, with no direct carbon emissions. Based on the predicted total generation of the system, it will save around 3,000 - 4,300kg of CO_2 per year compared with mains electricity.

Above left: inverter and switchgear

Left: view of turbine from field, with the house behind

Further Information:

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