

Formartine Renewable Energy LLP 800kW Community Wind Project



Allan Smith (left) and David Smith (unrelated)

*Cairnadailly Farm,
Auchnagatt, Ellon, AB41 8QJ*
Landowner (farmer) – Allan Smith
*Developer – Formartine Renewable
Energy LLP*
Project manager – David Smith

Enercon E-53 800kW wind turbine • Hub height: 60 metres • Rotor diameter: 52.9 metres
Total height to blade tip: 86.5 metres • Swept area: 2,198 square metres

Background

Cairnadailly Farm comprises 400 acres of arable land, the majority of which is used for growing cereal crops including oil seed rape and wheat. A small proportion of the farmland is let out to tenants for grazing cattle on. Formartine Renewable Energy LLP plans to use land at Cairnadailly Farm to erect a single Enercon E-53 800kW wind turbine, substation and associated access tracks and hardstandings.

The turbine is gearless and variable speed, with active pitch control on each of its three blades. Another Enercon model, the E-48, was also considered, which costs 10% less than the E-53, but it has a smaller rotor diameter which results in reduced total annual energy output and was therefore ruled out.

Investment costs and returns

The capital cost of the Enercon E-53 turbine is £1.1 million, with the total capital cost for the project being currently estimated at £1.3 to £1.5 million. Annual FIT payments and export tariffs could amount to approximately £313,000, and taking into account annual maintenance and running costs this results in a payback for the scheme of approximately 10 years. The project is likely to be part funded by both private capital supplied by David Smith and by a bank loan. The relative proportions of private capital and bank funding and details of the lender are still to be decided upon.

Profit allocation from the project is proposed to be split 80/20, with 80% of profits going to Formartine Renewable Energy LLP and 20% of profits going to Formartine Community Association which are intended to benefit various community projects and concerns.



It is essential that Scottish farmers grasp the opportunity that renewables present, be it large developments or smaller domestic projects, rather than leave it to corporate investors

David Smith



Wind data

An anemometer was in place on the site between 2002 and 2009 in order to measure wind speeds at the proposed turbine location. This was legacy data from a wind farm developer who decided not to progress the site. The anemometer had not been well maintained and installation records were missing. As such the data from the anemometer was not perfect but still a useful resource.

The data gathered from the anemometer was assessed by the Met Office to prepare a Virtual Met Mast Plus report. This report provided an indication of the long term variation of wind speed at the site and predicted that the site experiences an average wind speed of 7.1 metres per second at 50 metres height. In addition a capacity factor of 31% was calculated for the location, which is very favourable. The expected annual energy generation from the turbine given these wind speeds is 2.17 GWh.

The Met Office Virtual Met Mast Plus combines initial wind estimates from Virtual Met Mast with on-site mast observations to provide revised wind speed statistics with higher levels of confidence

Another Enercon 800kW model, the E-48, was also considered, which costs 10% less than the E-53 is shown in the table below, but it has a smaller rotor diameter which results in reduced energy output and was therefore ruled out. Power output data for E-53 and E-48 turbines is shown in the table below:

	E-53	E-48
Wind speed (m/s)	Power (kW)	Power (kW)
5	77	60
6	141	110
7	228	180
8	336	275
9	480	400
10	645	555
11	744	671
12	780	750
13	810	790
14	810	810
15	810	810

Planning consent

A planning application (reference APP/2011/2468) for a three turbine development (2.4MW capacity) was originally submitted by a specialist planning consultant in July 2011. This application was subsequently revised to a two turbine development and then to a single 800kW turbine development in August 2012 following consultation with the planning authority. Planning was refused in December 2012, but an appeal to Scottish Ministers was submitted and this was granted on the 4th of April 2013 less than three months after submission although it was subject to 20 conditions being satisfied. Although extensive, these conditions are not especially onerous, nor would they be considered unexpected for a turbine development of this size and scale.

In order to set up the project and progress it through planning, specialist consulting work was required. The cost of the specialist work undertaken to date on the project amounts to a total of approximately £62,000, which breaks down as:

1. £11,500 for legal fees mainly related to the formation of the limited liability partnership agreement;
2. £47,000 for feasibility and consultancy work and planning applications;
3. £3,000 for fees related to planning application and advertisements;
4. £500 for accountancy services.

Grid connection

An electricity grid connection for the turbine has been agreed with the District Network Operator Scottish and Southern Energy (SSE) with the proposed date for connection being the 31st of October 2015. To secure the grid connection a deposit had to be paid.

- SSE non-contestable works = approximately £40,800
- SSE contestable works = approximately £306,800
- Independent connection provider contestable works = approximately £190,000-£230,000

This demonstrates the savings that can be made by using an ICP to undertake contestable works – in this case over £76,000