



Case study Beech Hill Community Morchard Bishop, Mid Devon

RENEWABLE ENERGY 4
DEVON



Introduction

Beech Hill is an intentional community near Crediton which is home to some 14 individuals who live and work together. The remote property lies on a 7 acre site and includes a large complex of residential buildings. One large, residential property houses the community, with space for 15 visitors.

The Community has a strong ethos of embracing and promoting sustainable living techniques where possible. However, living standards were less than ideal at the main house during winter months due to its lack of central-heating. The other buildings on the site had space-heating and water-heating fuelled by an oil boiler, electric immersion heaters, electric space heaters and basic wood-fuel installations.

Project development

The community first seriously explored the possibilities of renewable energy options in summer 2005, with a renewable energy site assessment by DARE, funded by the 'Community Renewables Initiative'. Three key technology options were identified: solar-thermal systems, a wind turbine, and a gasifying log-boiler.

The CRI mentor helped the community to weigh-up the pros and cons of different system choices and with applications for funding support. The installations were timed to fit with the dry late summer weather, and were dictated by the results of funding applications.

A full planning application for the wind turbine, boiler-house, and solar-thermal panels was successful. The property was not listed and was not in a protected landscape area which simplified the process.

How the system works

All the systems were installed in September 2007. The 4 2.2m² solar thermal panels feed into three separate accumulator tanks to provide hot water. A log boiler, accumulator tank and new plumbing was installed to provide a full central heating system. A 5kW wind turbine generates electricity and is grid-connected. Fuel supplies for the boiler include fire-wood logs from the site and seasoned split-logs from Newton St Cyres. The existing chimney in the main building was used as flue for log-boiler, but needed lining for safety.

Costs and benefits

- The solar hot water has an output of approx. 5 kWth in total giving an annual power generation of approx. 5,725 kWh per annum. This gives carbon savings of approx 1.29 tonnes CO₂ via displaced oil, plus 0.86 tonnes CO₂ via displaced electricity – 1.57 tonnes of CO₂ in total.
- Cost – approx. £14,000 full installation cost (including new tanks)
- The Log boiler has an output of approx 60 kWth in total, with an annual heat generation of over 90,000 kWh per annum (based on 6 months use, occasional summer use may take system beyond 100,000 kWh). Carbon Savings – approx. saving of 2,500 litres of oil p.a. = 6.7 tonnes of CO₂.
- Cost – approx. £16,000 for plant installation cost; approx. £10,000 for boiler-house construction; approx. £17,000 for central-heating plumbing.
- The wind turbine produces approx 30 kWh / day @ the 5.5 m/sec. average wind-speed giving an estimated annual electricity generation of approx. 10,000 kWh per annum on an ideal exposed site, but probably approx. 7,000 kWh on this site. This turbine has produced 1,858 kWh based on first 4.5 months.
- Carbon Savings –displaced mains-electricity should save approx. 3 tonnes CO₂ per annum.
- Cost – approx. £23,000 for plant installation cost (including turbine; concrete base, 2 x 2.5 kWe 'Windy-Boy' inverters, and trenched armoured-cable).

Technical details

Solar Hot Water	Installer company: 'Eco Exmoor' – Parracombe, North Devon Equipment specification: 5 x 'Roth F2' 2.2 m2 flat-plate solar-thermal panels, feeding three separate accumulator-tanks.
Log Boiler	Installer company: 'Eco Exmoor' via 'G.J. Strong Ltd.' Equipment specification: 'Vigas' log-boiler (supplied by 'Dunster Woodfuels Ltd. '), with 2,000 litre accumulator-vessel Output – Approx. 60 kWth in total
Wind Turbine	Installer company: 'Segen Ltd.' Equipment specification: 'Iskra AT5-1' wind-turbine on a 12 m self-supporting tower (approx. 15 m total installation height) Output – 5 kWe rated output

Costs and benefits (cont.)

Financial savings / pay-back:

Total project cost was approx. £85,000, of which the Community secured approx. £36,000 from 'EDF-Energy - Green Fund', and approx. £6,500 from the 'Low Carbon Buildings Programme'. The balance was made up from a long-term loan taken out by the Community.

Wider benefits

The renewable energy systems fit into a wider sustainable living approach, including: a green-electricity tariff from 'Ecotricity'; a reed-bed sewage system; a community composting scheme; and extensive vegetable and fruit growing areas.

Sue Chantrey (Beech Hill RE contact), wrote: "...our decision was to go for a Centralised Log Boiler rather than Wood Chip boiler... We had continued to research and heard more about the relatively new boilers, and after consultation (again with DARE, etc) as well as installers, decided it would be a better option for us, as we use logs anyway, and have a reliable local supply, and storage space. Also they are much cheaper..."

Further information

For more details on Beech Hill go to www.beechhillcommunity.org.uk/index.html
Eco-Exmoor: www.eco-exmoor.co.uk
Segen Ltd.: www.segen.co.uk

Contact RE4D

www.re4d.org

energy@re4d.org

0800 512 012

For independent advice and support

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