



## Case study Underwood Discovery Centre South Hams

RENEWABLE ENERGY 4  
**DEVON**



### Introduction

The Underwood Discovery Centre began with farm walks to introduce children from urban areas to the joys of the farm and rural life. For example, for one group, one of highlights was laying down in a field to be sniffed by cows. Mike Rogers, the owner, developed a barn into the learning centre using straw bale construction and sustainable building materials such as cob. The Discovery Centre is now an exemplar of sustainability, making use of the new renewable energy systems in their regular school and community workshops.

### Project development

- Mike was keen to develop the business further than the farm walks, to offer more learning opportunities and hands on experience of sustainable living. He decided on a combination of solar photovoltaics, a small wind turbine, solar hot water and a biomass boiler for heating. The solar hot water system was installed in advance of the other technologies.
- The centre is within the South Devon Area of Outstanding Natural Beauty, so Mike applied for an informal planning assessment with photos of the wind turbine location and a trial mast was erected. The planning process took about three months which subsequently delayed grant funding.
- An advisor from the Coordinated Woodfuel Initiative visited the centre and encouraged the AONB to offer 100% of the cost of a new boiler through their Sustainable Development Fund.
- Mike was also able to secure mentor support and funding towards the PV and wind turbine from RE4D. The systems were installed in Winter 07/08.

### How the system works

The wind turbine and PV system generate electricity which is stored in batteries. The combination of wind and PV smoothes seasonal variations, as the PV will generate more in the summer and the turbine more in the winter. Solar thermal collectors heat water all year round, although 90% of generation is in the summer months. The collectors are plumbed into a twin coil hot water storage, the second coil is connected up to the biomass boiler for hot water throughout the winter. The biomass boiler is fed with logs that are sourced from the land surrounding the centre and the local area, ensuring fuel costs are minimal, just the time and labour to chop and store them. There are virtually no CO<sub>2</sub> emissions associated with using their own logs for heating, rather than buying in logs to be delivered by road.

### Costs and benefits

- The average wind speed on site is approximately 5.8 m/s at 8m above ground level so the 1kW Rutland should generate approx 2.64MWh pa.
- Annual CO<sub>2</sub> savings of around 1500kg from the wind turbine and 200kg from the PV. A further 3 tonnes of CO<sub>2</sub> will be saved by providing space and water heating with biomass and solar thermal.
- The turbine and PV cost £7238, solar thermal equipment cost £1400, and the biomass boiler cost £5000, installation by the local plumber came to £5000. Mike received £1448 grant from RE4D and the AONB granted £5000 for the boiler. The centre should save £1300 on their energy bill pa, at current fuel prices, meaning approx a 9.4 year payback.

# Technical details

Wind turbine

1kW Rutland 1803-2 12v

PV / Battery storage

6 x 80 W / 10 x Rolls 12 cs11ps 12 v e503Ah batteries

Biomass boiler

25kW log boiler

Installers

Neate Energy Services, Beco Solar, Tim Reavell (local plumber)  
- commissioned by Engenius

## Wider benefits

The ethos of Underwood Discovery Centre is entirely sustainable; visitors are encouraged to be frugal with electricity when on site, and choosing activities. This should get them thinking about where electricity comes from and how it shouldn't be taken for granted. The four technologies also offer schools and community groups the opportunity to see renewable energy in action.

Mike Rogers said: "RE4D helped us with a grant that has helped the Underwood Discovery centre become self sufficient and gives us a great Educational tool to show sustainable living and teach future generations how important this technology is."

"I will be able to market my offices as environmentally friendly, and there will be low running costs which is good for the clients as well"

## Further information

Underwood Discovery Centre: 01548 580165  
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## Contact RE4D

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For independent advice and support

## Image gallery

1Kw wind turbine



Batteries



Control panel

