

BUSH PARK BRENTOR / LYDFORD, PL19 0NE



SOLAR THERMAL; INSULATION; MODERN BOILER; RAIN WATER HARVESTING; WOOD BURNING STOVE AND WOOD MANAGEMENT; EXPERIMENTAL WIND; GRANTS

Adrian and Sue Hepworth have a smallholding near Lydford Gorge where they have a few sheep (Portlands), rescue animals (goats, Alpacas and a horse) and assorted chickens.

Very ecologically minded, they are active members of Transition Tavistock Food and Energy group and are committed to sustainable living.

In 2010 a SolarTwin hot water panel was installed. The ingenious design and the thoughts behind its construction helped them choose SolarTwin (see technical details).

Adrian and Sue purchase their electricity from Good Energy who promise that 100% of their supply is from renewables (solar, wind power, hydroelectric or tidal).

An extension had just been completed including a new central heating boiler and controls

Rain water harvesting provides water for the livestock but it is planned to use it for flushing toilets using a wind powered pump to take it up to a loft tank.

Adrian is very innovative and has been experimenting with vertical wind turbine designs for several years.



Energy generation

Solar thermal:

The panel contributes energy to all the hot water in the house, from hand washing & dish washing to baths and showers. Additional electric showers are also available if needed.

Back up immersion heating:

Since English sunshine is not that reliable, Adrian and Sue use a back up immersion heater to top up if the weather is cloudy. The time switch allows this to come on for an hour in the morning and an hour in the evening. An immersion heater is the most efficient way of heating water with electricity. The elements are completely surrounded by water so there can be no loss from heat escaping before it gets to the water. If the water in the tank is hotter than the immersion heater thermostat, then it won't switch on

Biomass:

A wood burner is used in the main living areas and Adrian has a wide range of tools for managing their wood supplies, even using home made firelighters and chippings to start the fires.

Wind: There are numerous plans for small scale wind power that may be suitable for powering the lights. Currently the 'old' CFL bulbs are being replaced with LED bulbs using between 3 and 9 watts each.

The chosen type of turbine is the vertical axis type as it is more suitable for the turbulent wind of countryside littered with hills and buildings. It should be easy to generate up to 1Kw with a small turbine.

Technical details:

The SolarTwin is made in the UK with most components also sourced in the UK. The frame of the panel is aluminium from Norway. This added to its attraction as the smelting plant and factory is powered by hydro-electric power, thus reducing its carbon footprint.

The SolarTwin device has a small solar PV panel that powers the pump and recharges the supercapacitors that run the control unit. Its design, using silicon rubber pipes, means freezing in winter isn't a problem: being flexible, it is frost proof. There is no antifreeze in the system so no repeated top-up or replacement. It runs completely off-grid and requires no maintenance except perhaps wiping clear of leaves every few years. The pump and the rubber tubing are made in the UK. The water passing through the panel is the same that will come out of the taps.

Costs and benefits

The initial cost of the panel was £2700, including fitting kit, PV panel pump and control systems. Fitting cost was about £500 for a total of about £3300. A grant of £400 was received towards this cost.

Adrian has done an analysis to compare energy consumption between quarters in 2010 and 2011. This indicates considerable savings. The table below summarises the output of the analysis, while the whole document is separately available.

To do a cost comparison wasn't easy because the bills use a mix of actual and estimated figures during those quarters which will have been corrected for following quarters. Adrian reckons that the average power usage should not vary as much but a truer comparison could be made over subsequent years.

AVERAGE DAILY POWER CONSUMPTION:

	DEC-JAN-FEB	MAR-APR-MAY	JUN-JUL-AUG
2010	24,9 KWh/day	24,9 KWh/day	16,3 KWh/day
2011	17,3 KWh/day	13,6 KWh/day	12,3 KWh/day
Reduction %	30%	45%	24,5%

Maintenance costs to date are zero.

Although a thermal store is required, these fetch a premium because they use expensive tubing to extract heat from or putting it into the stored water quickly, whether running a shower or taking heat from a boiler. These heat exchangers are not required if the water from the panel is the same that comes from the taps. Thermal stores can hold water at temperatures higher than normally achieved with a boiler or immersion heater so will have thicker insulation. Whatever store you use must have an automatic blender so the water reaching the taps is never above 60C which could scald. They used a normal water tank fitted with 2 coils that could be used as additional heat sources from wood stove or gas boiler.

Additional information

See 'Our growing book of community stories' booklet on www.transitiontavistock.org.uk

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