

48 WEST STREET

TAVISTOCK, PL19 8JZ

RICHARD BAKER



WOOD PELLET BOILER, SOLAR PV, INSULATION, BATTERY STORAGE FOR ELECTRICAL DEVICES,
TECHNICAL ADVICE AVAILABLE

Richard Baker is a Chartered Building surveyor working in Building Control. He has a great deal of knowledge in sustainable building design including a postgrad. certificate in Sustainable Design from De-MontFord University, Leicester.

A number of circumstances presented Richard with the opportunity to invest in sustainable products for his home, an 1840's stone building.

These include a high level of insulation, low energy lighting with battery support, a pellet heater and pellet boiler for domestic hot water and space heating and a sophisticated thermal store. PV panels have also recently been installed. As a result Richard's gas and electricity bills are now £0.00 (with the feed in tariff).



Energy reduction and conservation

Insulation:

The home is highly insulated on the internal walls and in the loft. The windows are double glazed.

- Walls are some 600mm thick including 50 mm of celotex to give a u-value of 0.28W/m²C
- Floor is insulated to meet 0.2W/m²C - some 80mm of insulation.
- Roof is insulated with 300mm of glass fibre to give a u-value of 0.16W/m²C
- Glazing meets 1.8W/m²C

Energy saving devices:

- An underfloor heating system is in place reducing the temperature of the water required to circulate around the system.
- Low energy lighting (LED and Fluorescent) (No self regulating switching)
- Battery storage to run lights and upstairs plug circuits and TV
- Energy monitoring and temperature control devices
- All appliances are AA or AAA rated

Energy generation

Investment in renewables and energy reduction within the property have been driven by Richard's interest in sustainable design, the economics of ongoing energy and fuel costs and by the belief that at some stage inefficient houses will be taxed on their CO² emissions.

Solar PV:

An array of Sharp Solar PV panels were installed on the roof in Feb 2012, together with a SunnyBoy Bluetooth enabled inverter 20 panels providing 3.9 Kw maximum output on a 4.11Kw inverter.

Battery installation;

The Solar PV charges an installation of four 110 Elecsol batteries which are used to power the lighting and upstairs plug circuits.

Solar Thermal:

Solar thermal is not installed. However, the heating and hot water system could accommodate this and the option remains to install some panels in the future.

Green electricity supply:

The household electricity is provided by Green Electricity, who sources their supplies from renewable sources.

Biomass:

A pellet heater produces considerable amounts of hot air into the open plan accommodation, which is time and temperature controlled; a pellet boiler heats the hot water and heating system. These were installed in May 2011. The pellet boiler is an Extra flame 23KW pellet back boiler producing the domestic hot water and supply for the under floor heating system.

This has been combined with a sophisticated hot water cylinder in the form of a thermal store. It is designed to use stratification of heat and ensure the gas backup boiler remains in condensing mode and operating at maximum efficiency.

The gas boiler has only been used for one week in late January, as the stock of pellets was running low. These are purchased from Devon Bio fuels in North Tawton.

To date the Baker's have used their first ton of pellets since May last year, but still have more than 0.5 of a ton left. Expect to use around 1.5 ton over a 12 month period.



Pellet boiler



Pellet heater

Costs and benefits:

The investment costs for the project are summarised below:

Boilers:	£ 8.000
Cylinder:	£ 2.000
Under floor heating:	£ 2.000
Photovoltaic:	£10.000
Battery backup system:	£ 500
Insulation to house:	£ 2.000 (approx)

The payback period for the PV is believed to be approx.10 years. Payback periods have not been rigorously assessed.

Running costs:

The pellet heaters uses approximately 1.5 ton of pellets over a 12 month period at a cost of £210.00 per ton including vat at 5%.

In October 2012 the Renewable Heat Incentive (RHI) is expected to be implemented. This will provide financial support based on the KW's of heat generated from the pellets and used within the home. This will reduce the running costs further.

Installer:

The boiler and heating system were self installed. PV Installation : Matt Rutherford (an independent who is Part P and MCS registered).

Fuel supply:

Pellets are supplied by Devon Bio fuels, based in North Tawton.

Advice sought from:

Leicester University and Mike Castle from sun Gift solar.

Lessons learnt

Maximize the efficiency of the insulation to the dwelling and ensure good levels of air tightness. before considering all the bolt on renewables.

Richard also regrets not waiting for the new LED TVs to come out before making his purchase!

Problems and solutions

The house did have a ventilation and heat recovery system. However, this went wrong and has since been removed. The technology in this area has changed a lot since Richard installed it some 10 years ago, and there are some good little systems available today at not such a great cost. It may be time to revisit this for in the near future.

Plans for the Future:

Richard would like to build a new sustainable house using all the technologies he is currently testing out. He is also considering a small 500W vertical turbine which looks quite interesting.

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