

Solar Panels Case Study – 8 The Ridings, Bramber



The panels: hot water in centre, PV to right and left



The inverter in our garage

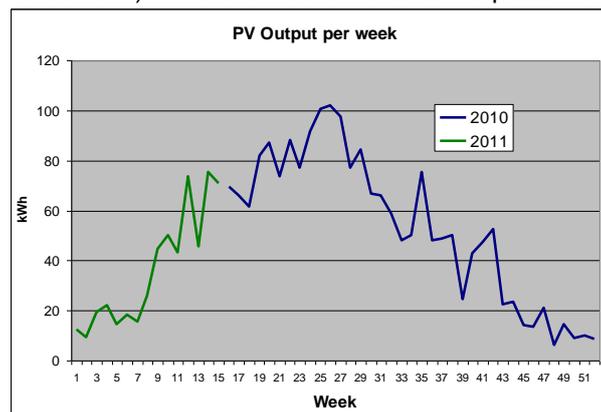
Photovoltaic Panels

We had 2.9kW photovoltaic system installed in April 2010. We have panels on two roofs – facing South East and South West facing – so we don't have the ideal orientation. We have 14 panels all together (not all visible from photograph) – each of them measuring about 1m x 1.4m. They're made by an Australian firm, Sun Grid, and the inverter, which turns direct current into alternative current, is made by a German company, Diehl.

Fitting was very quick. Once the scaffolding was up, the system was installed in a day. The team had 5 people on the job and had to be quite ingenious in figuring out a route for the cabling that was not too obtrusive, given our very cramped loft. The inverter is fairly bulky – but it's good to have it in the garage so we can check reading on how much is generated. There's a display panel of the front that shows what's been produced that day, yesterday, that week, month, and year. There's a separate meter that logs the total amount generated – and this is what gets read to claim the money back from the government under the new Feed in Tariff (FIT) introduced on 1 April 2010.

The company that installed it prepared all the paperwork – which we then submitted to our electricity supplier to sign up for the tariff. We are responsible for reading the meter and reporting the readings. The tariff is refunded by our electricity supplier once a quarter, and is tax free. The initial tariff was 41.3p per kWh, and is guaranteed by law for 25 years. It's also index linked so will go up year by year. In April 2011 it went up to 43.3p per kWh, and in April 2012 it's gone up to 45.4p. This rate is only available for people who sign up during the first two years, up to March 2012, and will taper down after that – on the assumption that installation costs should gradually drop once the industry picks up.

The system is working well. I'm really enjoying seeing the electricity meter run backwards! It's now been in place for a full year. On average we're generating 49 kWh per week. As one would expect, it varies greatly depending on how sunny it is. Our best week so far generated 102 kWh, but in mid-winter this dropped to less than 10kWh per week (it's not much good in the snow!). The chart below shows the pattern over a full year.



We have an old fashioned meter, so it's quite hard estimating how much of the electricity we generate we end up using ourselves. From May to August last year, with two people in the house, we were net exporters of electricity. But for the rest of the year we were net importers. Our electricity supplier (Scottish Electricity) assumes we'll use 50% of the power we generate over the course of the year, so we are being credited an additional 3p per kWh to allow for this. And we are saving about 11p/kWh for all the grid electricity we are not using.

The rated annual yield of our system is 2484 kWh but we slightly exceeded this, and generated 2565 kWh in the first year. Based on these numbers, the economics work out approximately as follows:

Approximate Economics of PV System	Actual <i>Per year</i>
PV electricity generated (kWh)	2,565
Total electricity consumption (kWh)	3,500
Amount of PV exported to grid (assume 50%)	1,283
Amount of PV used on site	1,283
Feed in tariff (pence/kWh) - first year	41.3
Cost of electricity we buy from grid (pence/kWh)	11.0
Refund for selling electricity back to grid (pence/kWh)	3.0
<u>Income/Savings</u>	
Income from feed in tariff	1,059
Income from selling power back to grid	38
Saving from reducing electricity bought	141
Total income/savings	<hr/> 1,239
Capital cost of system	12,971
Payback time (not allowing for inflation or energy price rises)	10.5 years
Rate of return	9.6%

Since our system was installed, that the tariffs have been reduced substantially, but capital costs have fallen considerably too. So installers are still quoting payback periods of under 10 years for a good south-facing roof.

Details of Installation company

Our system was installed by Solar Advanced Systems. They were very quick to come and size things up and give us a quote, and were able to give us an early installation date. They did a good job and came back later at my request to fit some end caps on the supporting framework, which makes them look less obtrusive. So I'd give them top marks. This is in contrast to another outfit who came to quote and gave us the ultra hard sell, you must sign up today, routine – and were much more expensive. Their pitch was to use us as a 'demonstration house' which would involve us getting a refund for every referral that turned into a firm order. Not a good advert for the industry!

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Solar Hot Water Panels

We had a solar hot water system fitted in April 2007. It's an evacuated tube system that circulates a coolant liquid through the panels and into our hot water tank. It required a new hot water tank, There's several expansion tanks in the loft, and quite a bit of pipework to be fitted, so it's a more complex fitting job than the PV system. We had some initial problems with the system overheating, but these have been fixed. We were very happy with the suppliers who are a very straightforward and competent Lancing-based firm.

It works well when the sun's out! So we hardly use our gas boiler from April to October – we have it set on a timer to come on in the morning if the thermostat shows that the tank is not warm enough. Without this, after a couple of cloudy summer days in a row we find the solar system doesn't cope and the water is luke warm. In the winter it preheats the water to some extent – but only comes into its own on a very sunny day.

It is very hard to judge the economics of the system because we can't measure how much heat it's generating. Our gas consumption has gone down since we installed it – but we've also got a wood burning stove and have turned the thermostat down, so we can't isolate how much of this is a result of the hot water system. The system cost £4,000 to install and I think the payback period will be quite long – maybe 20 years. When we bought it we were mainly thinking of our carbon footprint, and the company that sold it to us made a point of not pushing the immediate financial benefits.

The economics are due to change in the next year, however, since the government has plans to introduce some kind of tariff for solar hot water systems. I haven't seen the details yet.

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How much are we reducing Carbon dioxide emissions?

These are approximations, but I reckon we are saving around 1.6 tonnes a year in total, or 0.8 tonnes per person.

PV system (assuming 58 kg CO2 per kWh)	1,441
Hot water system (assuming we save 66% of emissions of average UK hot water)	200
Total reduction in CO2 emissions (kg/yr)	<hr/> 1,641

If you would like to come and see our system in practice, or talk about it further, please feel free to get in touch.

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