

## Carley's Organics – Energy Positive!

You've probably seen [Carley's organic](#) nut butters, mustard, chocolate spread and other products in your local wholefood shop. I went to visit John and Shirley Carley and was really impressed to learn that, beyond supplying organic food, their aim is complete energy independence, 100% renewable, and they're putting some pressure on their supply chain to fall into line with the company ethos.

Carley's moved to the current property outside of Chacewater, near Truro, in 2014. The building had had a chequered past – a gun club, a cannabis factory, a travellers' camp – and the fact that it needed stripping out was actually a plus-point for John and Shirley.



Having satisfied the Local Authority with an up-market bat-house (the building of course had bats, and they needed protection,) John and Shirley started on the factory building. It was substantially rebuilt with a timber frame, allowing for 300ml of insulation throughout, a mix of sheep wool and hemp fibre. All windows were replaced with triple-glazing. The cold store for the nuts was given a 6" concrete floor over 6" of insulation.

On the roof there are now 225 PV panels, installed in three stages. Each is 260 W, giving a peak capacity of 56 kW.

'Only 122 of them face south,' explained John. 'It's a myth that they all have to do so. We really needed more early morning and late afternoon power, so one bank faces east and one west – and we even have some facing north. They do fine. Western Power Distribution, who had to OK it all, weren't in the least bit worried about which way the panels faced.'



Then came the batteries. Carley's installed a bank of lead acid batteries that work best when charged and discharged every day, and are guaranteed for 10 years. In total they have 36 kWh of storage. Once the batteries are fully charged, the electricity is switched to heat an extremely well-insulated immersion tank set at 65-70 degrees. If there is electricity to spare, it is exported to the grid for which Carley's are paid the standard 5p/kWh. Of course, if they buy electricity back from the

grid it costs them 16p/kWh so clearly the batteries and the water tank are really minimising the electricity that has to be imported, and cutting costs.



To help the heating of water, John has also installed three solar thermal units. As he explained, 'This is far more productive than PV power – these units provide about 7% of all our energy requirements. But electricity is more versatile – we can run anything on it – so that has a different value.'



Interestingly, the transition to LEDs has been phased in, even though each LED uses a quarter of the power of the old tubes. But all unnecessary lighting and equipment gets switched off, and the fork-lift trucks run on home-made electricity.

To boost generation outside of daylight hours John has now installed six small vertical-axis wind turbines on top of the roofs. He admits this is a bit of an experiment, something he wanted to do simply to see how much they could add. Although Carley's did have to go through planning permission, this was not an issue because the turbines are both silent and discreet. There have been difficulties dealing with the supplier and the wiring has been complicated but John is hopeful that they will remove the remaining energy deficit. They are pre-lubed and should last 3 – 4 years before any maintenance is required.



The factory has a big need for water and a large proportion of that is harvested rainwater. This is used in the washing machines and looms, but all handwashing has to be mains-supplied.

For heating, Carley's has a biomass boiler, installed under the Renewable Heat Incentive. It uses around six tonnes of wood a year, mainly waste wood and trimmings from the local estate, kiln dried using their own fuel. All heat is used to top up the temperature in the water tank (whenever the solar thermal, PV, and now wind, are insufficient). None of the pipework is outside the building and all pipework is very well insulated.



John and Shirley are extraordinary pioneers for a low carbon future. They drive a Renault Zoe themselves and John also rides an electric 'Brompton' bike. Carley's has requested that all delivery vehicles, up and down the supply chain, should be electric by 2025. The factory offers recharging for any vehicles arriving on site.

On top of all this, John heads up the Chacewater Energy Group. They've had me down to talk and held a very successful electric vehicle show day last month. In September they plan a Renewable Energy Fair, and in autumn they will be thermal imaging homes around the village to help individuals cut their heating. Next year a tree-planting day is planned and a second electric vehicle day.

I know that if you have any questions, John would be very happy to hear from you.