Our journey towards low carbon living Pt. 4 – the final piece of the jigsaw.

Domestic Battery Storage in simple language.

With an average annual export of over 1,000kW, for which we received less that 10p per kW under the Renewables Obligation Scheme, we decided to complete our retrofit low carbon journey with the installation of a 10 kW storage battery. We opted for the new Solar Edge 10kW D.C. battery which not only matched our Solar Edge Inverter but could be charged from both the grid and our P.V. array. But first a few words about domestic battery storage.

Sizing the battery to match potential P.V. generation is important and it normally needs to have a capacity of approximately 1—2 times the capacity of the P.V. array. E.G. a 4 kW array needs a battery of between 4 kW and 8 kW so it can be fully charged each day. High demand devices such as cooker, ASHP's and immersion heaters will quickly drain a battery so if possible it is better to run some of these during the day with energy from the P.V., leaving the battery to power low consumption items such as lights, fridge's etc in the evenings. Alternatively run as many high demand items, including electric car charging during off peak times. Through the use of time clocks. The Solar Edge battery can be charged not only from excess D.C. generation from our solar panels, but also overnight with off peak A.C. electricity so that, especially in the winter, the daytime demands of the ASHP could be run from the stored cheap rate electricity. In the summer months when there is often surplus D.C. generation from the P.V. this is stored directly into the battery and so very little incoming electricity is required to top it up to 100% overnight. If a D.C. battery system has a disadvantage it is that during a power cut the whole system shuts down and is not able to supply the house. An A.C. battery can continue to supply the house but needs a special relay to isolate the home battery from the grid in the event of a power cut, otherwise it could discharge back to the grid and endanger those working on grid repairs. AC battery systems are however less efficient.

From ordering it took several months for the manufacturers to supply the battery and then on installation it was found that this new to the market battery did not exactly match our Solar Edge Inverter, now several years old. An updated piece of circuity was ordered and again another three months elapsed until it was available. Set up was not quite straight forward. Initially the battery wouldn't charge overnight BUT this was simply remedied remotely by the installer. Because we have a Myenergy smart P.V. controller this also needed updated software to recognise the batteries existence. This was again done remotely as the whole system is internet connected.

The battery has now been running for two winter months with low P.V. output into the system. Most days the overnight off peak charge is exhausted by 20.00 due to the energy demands of our ASHP, but for one gloriously sunny day the P.V. produced enough surplus energy to keep the battery topped up to 50% even by the end of the heating day, (see image 1) below.

The system is set up to use the P.V. output in the following order.

P.V. to House, then Battery , E.V. car charger , Immersion heater , Export. As each one is satisfied, the Myenergy controller moves the surplus generation on to the next stage if required. It is unlikely we will export much, if any P.V. generation in the future.

The Solar Edge App shows real time P.V. output, consumption and level of battery charge. As well as historical data.

Apart from the worst of the winter weather when the ASHP draws heavily from our stored electricity, the battery enables us to run the house almost entirely on “free” P.V. generated electricity or stored low tariff import. We now use very little day time and more expensive imported electricity. We will also make fewer demands on the grid at peak times.

Occasionally we will draw heavily from the grid if, during our off peak time of 00.30—04.30 we charge the battery, run the dishwasher and washing machine and charge our electric car all at the same time. If every one in the road were to do the same simultaneously, I do wonder how well the local grid would cope!! We recently took part in a remote switching trial with our smart car charger. Its output was adjusted remotely to see how such heavy demands on the local grid could be adjusted if the grid risked being over burdened. Perhaps this might become necessary in the future as more homes have electric cars!