

Case Study – Sarah and Pete

Title:

Sarah and Pete's upgrades for a greener, warmer home

- **Home:** Detached, 4 bedrooms, built 1965
- **Insulation:** Loft, flat roof and internal wall insulation added
- **Windows & doors:** Double-glazed PVC units throughout; A+ rated replacement windows installed in 2025
- **Solar PV:** 21 panels (9.3kW capacity)
- **Battery:** 6.9kWh capacity
- **Heating:** Condensing gas boiler
- **Impact:** Grid electricity use reduced from 5,566kWh to 2,100kWh per year
- **Savings:** £796 bill savings plus £505 export income in their first 12 months of solar PV (£1,301 better off)



Overview

Sarah and Pete moved into their current home in 2015, having been on the hunt for more space for their family. They'd looked at numerous four beds, but were immediately drawn to their Downend home because it was so interesting and unique – the house backs onto the craggy cliff face of an old quarry.

One thing they hadn't considered when they moved in was how difficult the house's open-plan downstairs would be to heat. On top of this, they found that some upstairs rooms in their detached house also got very cold in winter.

They set about improving the warmth of the house, and in May 2024 took advantage of their large roof to add 21 solar panels. They're motivated by the environmental benefits, but have also seen a difference in their bills since making the upgrades.

'On the whole, if you do the things that're right for the environment, they will often be good financially as well.'

Installing Solar PV and a Battery

Sarah and Pete heard about the Solar Together scheme – a group-buying initiative which unlocks lower prices for neighbourhoods (now called [Switch Together](#)) – and thought it sounded like a sensible way to get solar panels installed.

The process installation caused minor disruption, and as Pete says:

'we're not the sort of people who would buy a house as a doer upper, so I think it's a testament to the fact it was quite straight forward getting the solar panels done that we did it.'

At the same time as installing their solar panels they decided to also add a 6.9Kwh battery, allowing them to store the excess energy they produce.

The system is also earthed, so their panels and battery can operate even in a power cut.

Improving Warmth and Ventilation

A particularly cold winter prompted Sarah and Pete to add internal wall insulation to their son's bedroom - as he was unable to sleep in there when temperatures in the room dropped as low as 10°C.

They've also insulated the floor of their bathroom, as the room is above an unheated utility space, as well as adding internal insulation to two of the walls.

On top of this they've installed a humidistat in the bathroom, to improve ventilation and prevent damp and mould.

Downstairs Sarah and Pete have found the house is definitely warmer following upgrades to the carpets and front windows, which they replaced with A+ rated windows endorsed by the Energy Saving Trust.

The Challenges

Heating an open-plan home

Sarah and Pete have found that the open-plan layout downstairs makes it difficult to heat. This was something they hadn't considered when they bought the house, but has become apparent since living there.

Difficult to make 'Heat Pump ready'

Sarah and Pete had a survey from Octopus to assess whether a heat pump would be suitable for their home.

However, following the heat loss calculations, they were told that a heat pump wouldn't be suitable for their house (largely due to the open-plan layout of the ground floor)

Solar PV maintenance

The solar panels themselves have been relatively straightforward to have installed, but Sarah and Pete have experienced an issue where the fuse can trip following extremely heavy rain.

On some occasions, they haven't realised this has happened for several days, particularly if they haven't been checking their app regularly.

This is an issue they'll be investigating, though overall they say it hasn't affected them much.

The Results

Sarah and Pete have noticed a number of improvements to the warmth of their home following the changes they've made.

Insulating their son's bedroom means it retains heat much better despite having two external walls – no more having to move out in winter! They've also noticed that insulating the bathroom floor has helped improve warmth in the room and made it much more comfortable.



The solar panels have helped them become more aware of how much energy they are using and when they are drawing electricity from the grid.

Becoming more energy conscious, using their own home-made energy, and exporting to the grid has helped lower their energy bills - and Sarah and Pete are expecting the solar panels to have essentially have paid for themselves over the course of about ten years.

Seeing their bills go down has also encouraged them to think about what other changes might help to improve their home.

[A HEEP survey from Retrofit West](#) has given them some practical ideas for further improvements to their home.

What They'd Do Differently

Choose a larger battery

Sarah and Pete have a relatively large number of solar panels, so on sunny days they can generate more electricity than their current battery can store.

In hindsight, they would have chosen a larger battery, which would allow them to store more of their solar generation and use it later rather than exporting it to the grid.

A larger battery could also give them more flexibility to make the most of cheaper electricity tariffs – charging from the grid when prices are low and then using or exporting that stored electricity when prices are higher.

They think the additional cost of a larger battery could have paid for itself more quickly by allowing them to make better use of the electricity their panels generate and take greater advantage of different electricity tariffs.



Next Steps

Sarah and Pete have had both a thermal imaging survey from [the CHEESE Project](#) and a HEEP survey, which have helped them identify a number of smaller improvements they could make to further improve their home's energy efficiency.

The surveys have given them practical things to think about for the future, including areas where additional insulation or draught proofing could help reduce heat loss.

They've found it useful having a list of smaller energy improvements they could explore, knowing they can tackle them as and when they have the opportunity.