Case study

14 Juniper Walk, Shoreham by Sea, BN43 6JE

Overview

Owners: Warren and Bairbre Philips

Type: Semi-detached

Age: 1971

Beds: 4

Walls: Cavity Walls

Area: 118m^2

Residents: 3

Key Features

Solar PV Array & Battery

Air Source Heat Pump

2 Electric Vehicles and charging points

Other Features

Triple glazing

Cavity wall insulation

Hot composting

Eddi Solar Power Diverter (hot water heating)

Smart Blinds & low energy lighting

Loft insulation

Low energy and low water appliances

Rainwater harvesting

Introduction and approach

Do you want to get your head around solar PV, home batteries, ASHP, and Electric Cars? Then this is the house to visit!

Warren attended the 2016 event, talking to and inspiring two homeowners to install solar panels and another to buy their first EV. Since then, he co-founded EVA England and, in 2025, was named among GreenFleet's 100 most influential for advancing transport decarbonisation.

Warren and his family love technology and

have plenty of knowledge on Solar PV, home batteries, ASHP, EVs, triple glazing and a hot composter, all featured in their home.

In summer, the Philips' home can be 100% energy self-sufficient thanks to a large solar array and battery, including powering two cars! In the days with less sun, they charge overnight with cheap, low carbon electricity to avoid costly, high carbon peak rates.

Don't miss the chance to get inspired and ask your questions, come see what's possible!

Energy Efficiency Measures

Energy and CO2 performance

6.27kW (22 solar panels)
Lifetime generation to date is over 50MWh
Yearly generation: 6MWh
Yearly consumption: 2024 = 10.5MWh
(House + 2 x Car 16,000 miles)

Energy supplier - Octopus (100% Renewable Electricity)

https://share.octopus.energy/frost-goat-598

In 2015, when looking at buying a home, the family prioritised off-street parking for an electric car, and roof space for solar panels. The family moved into Juniper Walk in August and started the process to get energy efficient immediately. The priority was to replace all the light bulbs with LED bulbs and replace any light fittings that needed to be changed to take LED. They also fitted a smart thermostat to control the heating and hot water systems, and smart smoke and carbon monoxide alarms as part

of the initial work on the house.

In September, the solar array was installed. Knowing electric cars and home batteries were in their future, Warren specified a 22 panel, 6.27kW system - more than double the size needed for the average house of this size. The first electric car, a Renault Zoe arrived four weeks later.

Warren then spent the next year researching home batteries trying to find the best fit for their setup. In October 2016, the Tesla PowerWall 2 was announced, and Warren had his order in within hours of the site going live. In 2017 the PowerWall 2 was installed, one of the first in the country, along with a new condensing boiler further reducing their CO2.

Like most people, the family is replacing as required. Through 2015/16, they replaced taps with eco taps, and cisterns and flushes with eco equivalents. Combined with a water butt for the garden, the family have reduced water usage to around 1/2 the usage for a typical similar household.

Where possible, anything electrical is run when the sun is shining, including the washing machine, dishwasher, and even slow cookers on timers to cook, as the power is provided by the solar panels. With the battery, this is no longer a necessity though this is still the most efficient way to use the power generated by the solar panels.

An EPC rating for the house was completed in February 2018. The rating when the family moved in was 62 – D, when evaluated in 2018 the EPC rating was 93 – A.

In 2019 the family went fully EV replacing an ageing diesel estate with a KIA eNiro from Tates KIA. (www.tatescars.co.uk/kia) As part of a move from diesel, they installed a second EV charger and solar energy diverter, alongside some electrical improvements in the house, all in preparation to remove fossil fuels from the house completely and further reduce their CO2 footprint.

In 2020 cavity wall and triple glazing work was completed in preparation for the removal of gas. In 2021 The condensing boiler and gas fire were removed and a Mitsubishi EcoDan 8.5kW Air Source Heat Pump was installed.

With the new cavity wall insulation, triple glazing and ASHP, in September 2021 the house achieved an EPC of 97.

Heating and hot water

With a 22 panel (6.27kW) optimised Solar PV array on the roof, and a 6kW inverter in the loft, the system installed at Juniper Walk is over double the size needed for a 4 bedroom house.

With this array, the house pulls less than 10% of its energy from the grid during the day for 6 months of the year. By adding a battery to store the large excess of energy generated, the house is largely self-sufficient for 6 months of the year, day and night. During the rest of the year, Warren can be confident that they are using or storing 100% of the energy they generate.

The Tesla Powerwall 2 is a 14kW battery, double the storage of the original Powerwall. More importantly it has a much higher output of 5kW with a 7kW peak allowing you to run more appliances at the same time. It has been installed in the garage and linked into the under stairs Consumer Unit. This not only allows the battery to be charged by the solar panels, but also allows charging from the grid at night (cheap rate) to use on days where there will be little solar generation.

Central heating is from a ASHP that can also be used to heat the hot water tank when needed. When there is excess solar electrical power, they can use a solar power diverter to divert power directly into the immersion heater for their hot water.

Insulation

The house has cavity wall and loft insulation and is triple glazed throughout.

Electric Cars

Like 30% of households in the UK, the Philips family have two cars.

Bairbre's car is a Renault Zoe. They decided to lease the battery, dramatically reducing the initial cost of the car – approx. £6,000 instead of £10,00-12,000! Second hand these can now be purchased (battery owned) for about £2000.

The 10 year old Zoe will still do 60 miles in winter and around 90 miles in summer.

In 2019 Warren replaced their second car, a 13 year old diesel estate, with a new fully electric Kia e-Niro. 6 years on the range is 240 miles in winter and 280 in summer.

As their electricity provider is 100% renewable, their cars are Zero Emission and in the summer the majority of the electricity for charging the car comes from their solar panels and Powerwall

It's very cheap motoring, about 2p per mile.

For a few weeks in the summer, all the power for the cars comes from the solar panels and Powerwall 2 making driving the cars not only Zero Emissions, but also Zero Cost.

Warren has also participated in the London to Brighton EV rally and has won the SUV class for efficiency in 2022, 2023 and 2025.

www.londontobrightonelectricvehiclerally.com

What's next?

Vehicle to Home – when it becomes available, the family are looking at a V2H car and charger so they can use the power in their cars, to power their home. This will allow them to store more low carbon, low cost electricity to offset their electrical needs during the grids peak carbon periods.

Air pressure testing – to further insulate the house, Warren is looking at pressure testing to find the air leaks so they can be addressed.

More efficient appliances - as they replace appliances in the house, everything will be rated "A" or higher

Office and workshop improvements - solid insulation for office and workshop to make the space usable in the winter

Lessons learned

Going big on the solar array was a good move, with hindsight Warren feels they could have gone bigger still.

Professionals/ Materials

Warren is a co-founder of EVA England, volunteering his time alongside a full-time job. At EVA England he has led national initiatives to accelerate EV adoption, enhance charging accessibility, and influence policy development.

He has worked on complex policy areas and engaged with Parliament and the media - collaborating closely with the House of Lords Environment and Climate Change Committee, the Office for Zero Emission Vehicles (OZEV) at the Department for Transport, the British Standards Institute(BSI), the Renewable Energy Association (REA), Charge UK, the British Vehicle Rental and Leasing Association (BVRLA), the Green Finance Institute (GFI), and the Electric Vehicle Energy Taskforce (EVET), amongst others.

www.evaengland.org.uk

Solar Install and Maintenance - Stephen and Daniel Collins - Sussex Energy Advisors.
www.sussexenergyadvisors.co.uk

Electrical improvements - James Harding - Harding Electric Company

James upgraded the consumer unit in the house, rewired the garage and office and fitted the new smart EV charge point and Solar power diverter.

James now runs UK EV Installers, sharing technical advice, manufacturer and supplier recommendations and relationships, with a highly active network of electrical professionals in the renewable energy sector.

www.ukevinstallers.co.uk

ASHP install and maintenance - PDP Services

Paul and his team at PDP removed the gas fireplace and boiler from the house and replaced the heating with a Mitsubishi EcoDan 8.5kW Air Source Heat Pump (ASHP).

www.pdp.services

Electric Vehicles

Warren's KIA eNiro is maintained by Tates KIA

www.tatescars.co.uk

Bairbre's Renault Zoe is maintained by Cleevely EV mobile

www.cleevelymobile.co.uk

Carbon Literacy Project

Warren completed his Carbon Literacy Project Training this year and highly recommends it to anyone who wants to learn and be able to talk about why moving to a more Eco way of life is so important.

https://carbonliteracy.com/

https://leadwithsustainability.co.uk/