

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: 118m²

Residents: 2 adults, 1 child a large retired greyhound!

Key features

Large solar PV Array

Tesla Powerwall 2 battery

Electric car and 32A charging point

Other features

NEW for 2020 - Cavity Wall insulation

NEW for 2020 - Triple Glazing

NEW for 2019 - Zappi Smart charger

NEW for 2019 - Eddi Solar Power diverter (hot water)

NEW for 2019 - Smart lighting

Smart heating controls

Condensing boiler

TRV's on radiators

Low energy lighting throughout

Loft insulation

Low energy appliances

Low water appliances

Rainwater harvesting

Introduction and approach

This is the second time that Juniper walk has been open for Eco Open houses and if you want to get your head around solar PV, home batteries, electric cars, and how they can work with each other, this is the house to visit!



Warren's philosophy is "make the future we want" and he and his wife Bairbre want to make their daughter's future as secure as possible by being ahead of the game regarding self-sufficiency. Warren loves technology and he has a wealth of information about solar PV, home batteries and electric cars, all three of which feature in their home.

Warren came to the 2016 event and his enthusiasm was so infectious that two of our homeowners chose to get solar panels, and another got their first electric car! And that's what this event is about – inspiring others to become more sustainable, resilient and more self-governing, and events like this help to enable that to happen.

In 2017 he added a 14kW Tesla Powerwall 2 battery, one of the first in this country, to their house. The Powerwall stores energy produced by their solar PV and is used to power the house when there is no sun. This, coupled with a home that is energy efficient, means that Warren's aim to be 100% energy self-sufficient for the summer months is achievable, and that includes running two electric cars!

Since the 2018 Eco Open Houses event Warren has joined the leadership team of Sussex EVs, a community for people who are interested in electric vehicles and renewable technologies. In 2019 the Club was the winner of the Best Electric Vehicle Club at the inaugural Electric Vehicles Festival. This year instead of opening his house up on the Sunday he will be hosting the first "EVs By The Sea" event in Lancing as part of the Worthing Eco Open Houses Event. Come along and meet some local EV owners and talk to them

about owning and living with an electric vehicle in Sussex.

Energy efficiency & water measures

Energy and CO2 performance

6.27kW (22 Solar panels)

Lifetime generation to date is over 25MWh

Yearly generation: 6MWh

Yearly consumption: 2019 = 6.2MWh (House + 2 x Car 16,000 miles)

Energy supplier – Octopus (100% Renewable Electricity + Carbon Offset Gas)

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

In 2015, when looking at buying a home, Warren 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 first priority was to replace all the light bulbs with LED bulbs and replace any light fittings that needed to be changed to take LED. Warren also fitted a Nest Smart Thermostat to control the heating and hot water systems, and Nest Protect 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, Warren is replacing as required. Through 2015/16, he 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.

In 2019 Warren has installed a Zappi Smart charger and Eddi energy diverter alongside some electrical improvements in the house, and in 2020 cavity wall and triple glazing are scheduled to be installed, both before this year's event in April.

An EPC rating for the house was completed in February 2018. The original rating was 62 – D, the 2018 rating is 93 – A

With the new cavity wall insulation and triple glazing the house rating now should be over 97

Insulation

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

Heating and hot water - solar PV and powerwall

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. In January, their lowest producing month, a quarter of the household electrical power was provided by solar and battery.

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.

Further in the future it could be used to sell power back into the grid at peak times, potentially earning money during the day.

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

Electric car

Like 30% of households in the UK, Warren's household has two cars.

Bairbre's car is a Renault Zoe. They decided to lease the battery, which comes with a warranty, breakdown cover and dramatically reduces the initial cost of the car – approx. £6,000 instead of £10-12,000!! The car has held its value incredibly well purchased at £6000 in 2017 it is still valued at £6000 in 2020!

Fully charged, the Zoe will do 65 miles in winter and around 100 miles in summer. The family manages their car usage to ensure they are maximising use of the Zoe, particularly for local driving.

In 2019 Warren replaced their second car, a 13 year old diesel estate, with a new fully electric Kia e-Niro. This can manage 250 miles in winter and over 300 in summer on a full charge.

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 2. It's very cheap motoring, about 1p 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.

Lessons learned/further Improvements

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

What's next?

Change Tesla Powerwall Gateway - to allow back-up power option

Induction hob - replace the cooker that was there when they moved in with a super-efficient induction hob

Smart lighting - upgrade the light switches in the house to smart switches

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

Wood burner - replace gas fire in the front room with a super-efficient log burner

Air Source heat pump - replace gas boiler with air source heat pump

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

Professional team & technical info

Warren works for Mott MacDonald – check out this video if you want to find out more about this fantastic company who are leading the way in sustainability: <https://www.youtube.com/watch?v=eNjRhnuBads&t=1s>

Solar Install and Maintenance - Stephen and Daniel Collins - Sussex Energy Advisors.
<http://sussexenergyadvisors.co.uk/>

Stephen and his team installed the solar panels and have looked after them since. As part of ongoing maintenance Daniel recently came over to health check and clean the panels.

Powerwall supported and maintained by Tesla UK www.tesla.com

After a difficult installation Tesla UK stepped in to resolve the issues directly. The Powerwall receives regular over the air updates adding new functionality.

Condensing boiler, heating upgrades and maintenance - Rich Atkins - Atkins Gas Services
<http://www.atkinsgasservices.co.uk/>

Rich Atkins and his team have worked to replace the old boiler with a new super-efficient condensing boiler and improve the heating.

Electrical improvements - James Harding - Harding Electric Company
<http://www.hardingelectriccompany.com>

James has upgraded the consumer unit in the house, rewired the garage and office and fitted the new smart EV charge point and Eddi Solar power diverter. (<http://myenergi.com>)

