

Renewable energy

U 3 A Climate Change Group: Wednesday 6
December

Jan Davis and Tom Broughton

Renewable Energy

- Tom Broughton is a director of Solesco a community energy company and Meadow Blue Solar Farm and has many years experience in the installation of both home and industrial solar energy projects in the region.
- Jan Davis is a retired engineer and has worked 30 years in Norway on Oil and Gas industry projects.



- Both Tom and Jan are passionate about influencing the progress to reduce emissions to allow our grandchildren to thrive on our planet



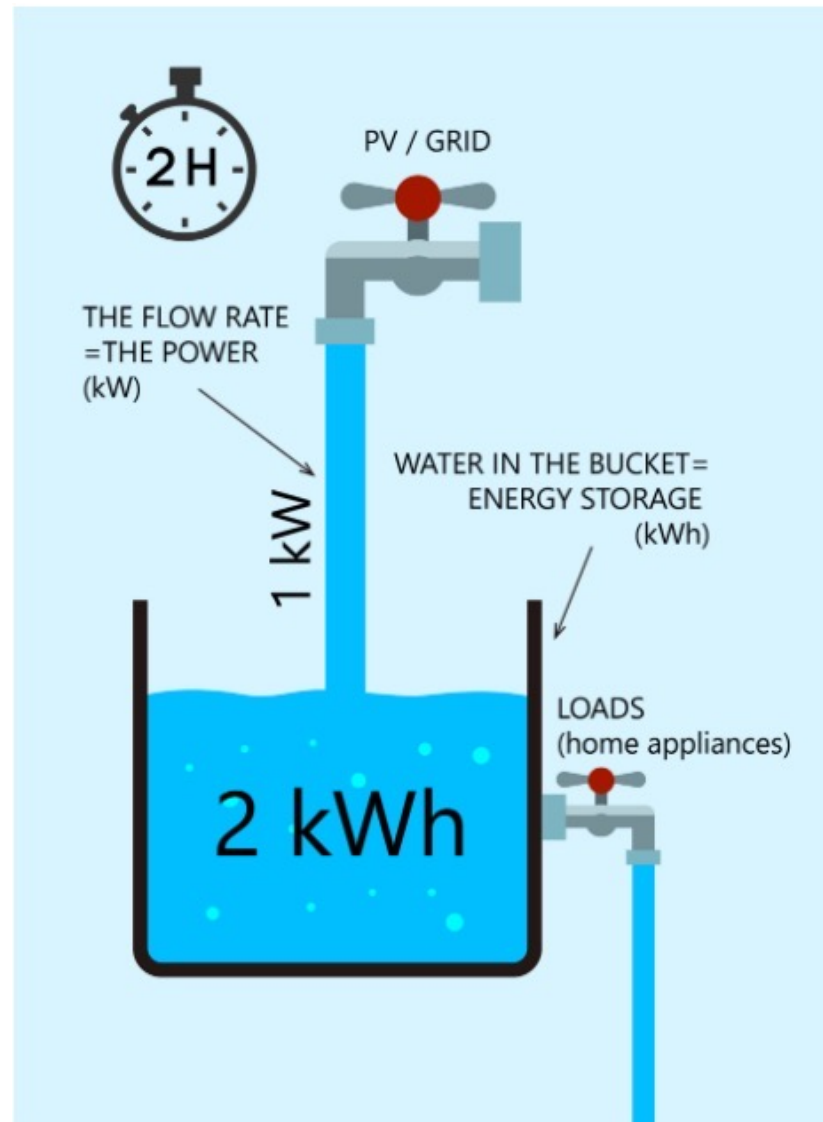
Renewable Energy

- Renewable energy from a national level and in our home and why it is so important for the control of our climate.
- Increase energy efficiency, electrification of all energy sectors, and decarbonization the grid through a mix of generation sources.
- Residential rooftop solar and solar plants, onshore and offshore wind farms, wave energy, geothermal energy, and hydroelectric and tidal energy could meet up to 80 percent of global energy demand by 2030.
- The drop in the price of renewable energy and efficiency is such that it now costs less to achieve net zero than to mitigate consequences of not reaching net zero

Renewable Energy in the Home

- Items to be covered
 - Kilowatts KW and Kilowatt Hours
 - Home EPC, Insulation,
 - Solar Photovoltaic panels, PV
 - Battery
 - Air Source Heat Pump Air to Water ASHP
 - Hot Water
 - Energy Providers, Smart tariffs
 - Electric Car EV
 - Costs
 - References, Web, YouTube,

Renewable Energy in the Home: KW



Renewable Energy in the Home: EPC

- EPC, Energy Performance Certificate

- The lower the insulation the more it costs to heat either gas boiler or Heat Pump

SAP
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Energy Performance Certificate

1, Green Lane, CHICHESTER, PO19 7NS

Dwelling type: Detached house
Date of assessment: 25 May 2012
Date of certificate: 28 May 2012

Reference number: 2358-1081-6295-6532-8930
Type of assessment: RdSAP, existing dwelling
Total floor area: 166 m²

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing improvement measures

Estimated energy costs of dwelling for 3 years:	£2,934
Over 3 years you could save	£357

Estimated energy costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£258 over 3 years	£258 over 3 years	<div style="background-color: #0070C0; color: white; padding: 10px; border-radius: 50%; display: inline-block;"> You could save £357 over 3 years </div>
Heating	£2,277 over 3 years	£2,088 over 3 years	
Hot Water	£399 over 3 years	£231 over 3 years	
Totals	£2,934	£2,577	

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.

Energy Efficiency Rating

The graph shows the current energy efficiency of your home. The higher the rating the lower your fuel bills are likely to be. The potential rating shows the effect of undertaking the recommendations on page 3. The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
1 Replace boiler with new condensing boiler	£2,200 - £3,000	£252	✔
2 Solar water heating	£4,000 - £6,000	£105	✔
3 Solar photovoltaic panels, 2.5 kWp	£9,000 - £14,000	£714	✔

To find out more about the recommended measures and other actions you could take today to save money, visit www.direct.gov.uk/savingenergy or call 0300 123 1234 (standard national rate). When the Green Deal launches, it may allow you to make your home warmer and cheaper to run at no up-front cost.

GOV.UK
Find an energy certificate

Energy performance certificate (EPC)

Certificate contents

- Rules on letting this property
- Energy rating and score
- Breakdown of property's energy performance
- How this affects your energy bills
- Impact on the environment
- Changes you could make
- Who to contact about this certificate
- Other certificates for this property

Share this certificate

- Email
- Copy link to clipboard
- Print

1 Green Lane
CHICHESTER
PO19 7NS

Energy rating
C

Valid until
2 July 2032

Certificate number
21379511-2611-5210-6100

Property type Detached house
Total floor area 169 square metres

Rules on letting this property

Properties can be let if they have an energy rating from A to E.
 You can read [guidance for landlords on the regulations and exemptions](#).

Energy rating and score

This property's current energy rating is C. It has the potential to be B.

[See how to improve this property's energy efficiency.](#)

The graph shows this property's current and potential energy rating.

Properties get a rating from A (best) to G (worst) and a score. The better the rating and score, the lower your energy bills are likely to be.

For properties in England and Wales:

- the average energy rating is D
- the average energy score is 60

Step 1: Floor insulation (suspended floor)

Typical installation cost	£800 - £1,200
Typical yearly saving	£65
Potential rating after completing step 1	80 C

Step 2: Low energy lighting

Typical installation cost	£25
Typical yearly saving	£28
Potential rating after completing steps 1 and 2	81 B

Step 3: Solar water heating

Typical installation cost	£4,000 - £6,000
Typical yearly saving	£40
Potential rating after completing steps 1 to 3	82 B

Breakdown of property's energy performance

Renewable Energy at Home: Better EPC

Reducing home heat loss

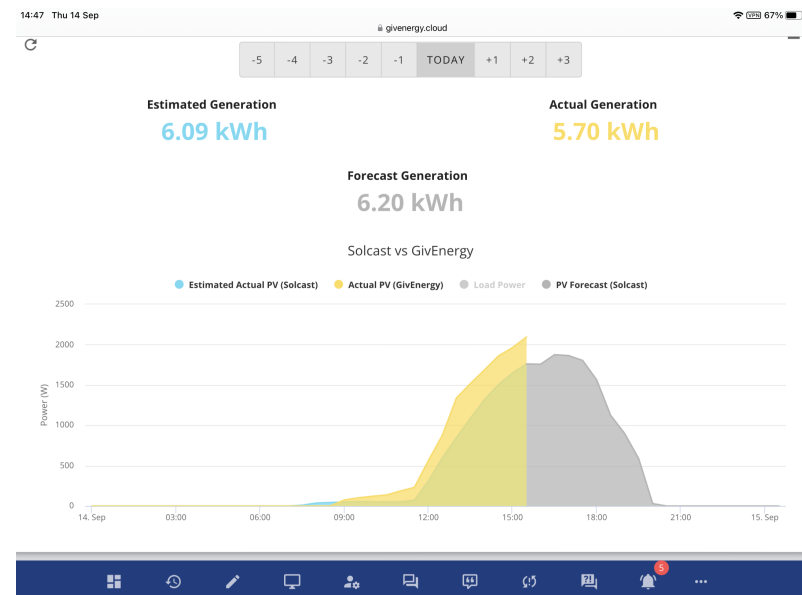
- Cavity wall insulation.
- Solid wall insulation.
- Floor insulation.
- Roof and loft insulation.
- Draught-proofing.
- Windows and doors.
- Insulating tanks and radiators.

Renewable Energy in the Home: Solar PV Panels and Battery



Solar panels here 13 installed on west facing roof produce up to 3,1 KW and 2 700 kwh per year cost £12 000 in 2012 pay back 7yrs based on FIT contribution and saved own power cost. Quote for south roof 2023 [future] 9 panels and 3.78 KW generating about 4 000 KWH per year about £6 000. Only battery and inverter actually installed at about £6 000.

Solar PV array planned on south facing roof aborted due to neighbour preventing scaffolding access



Renewable Energy in the Home: Battery Connected to Solar forecast



-5 -4 -3 -2 -1 TODAY +1 +2 +3

Estimated Generation

13.10 kWh

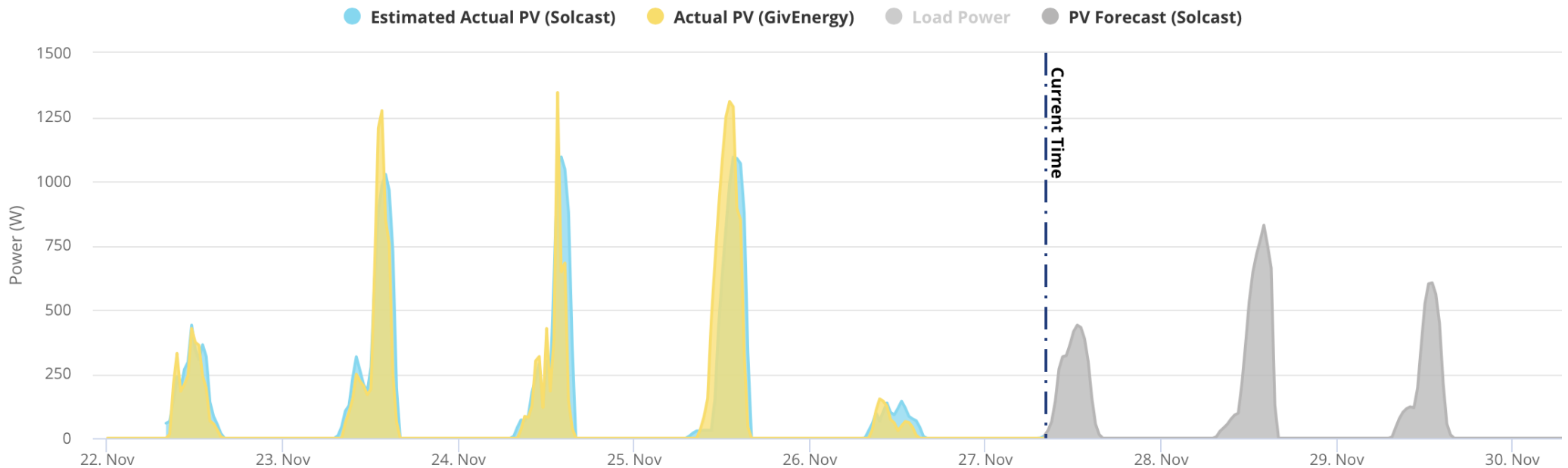
Actual Generation

12.50 kWh

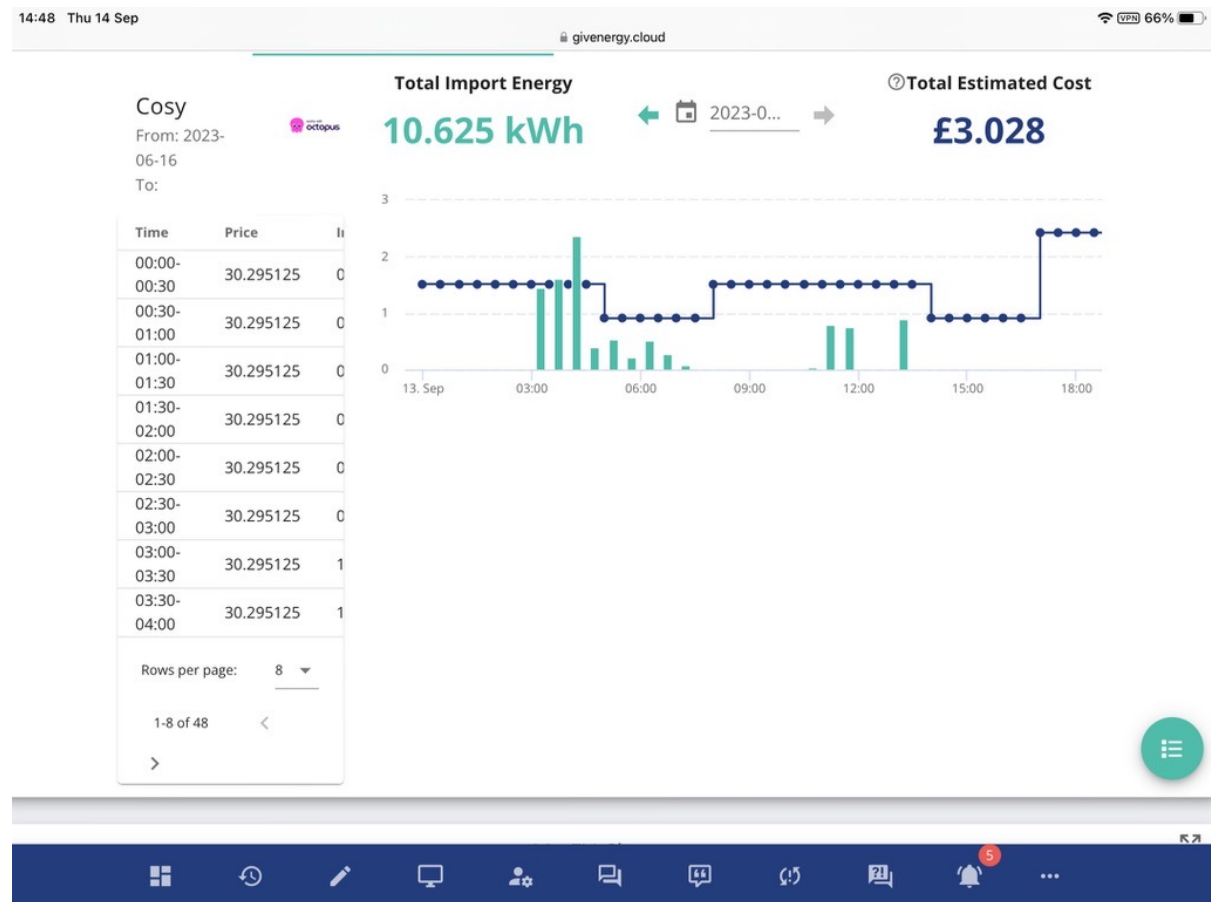
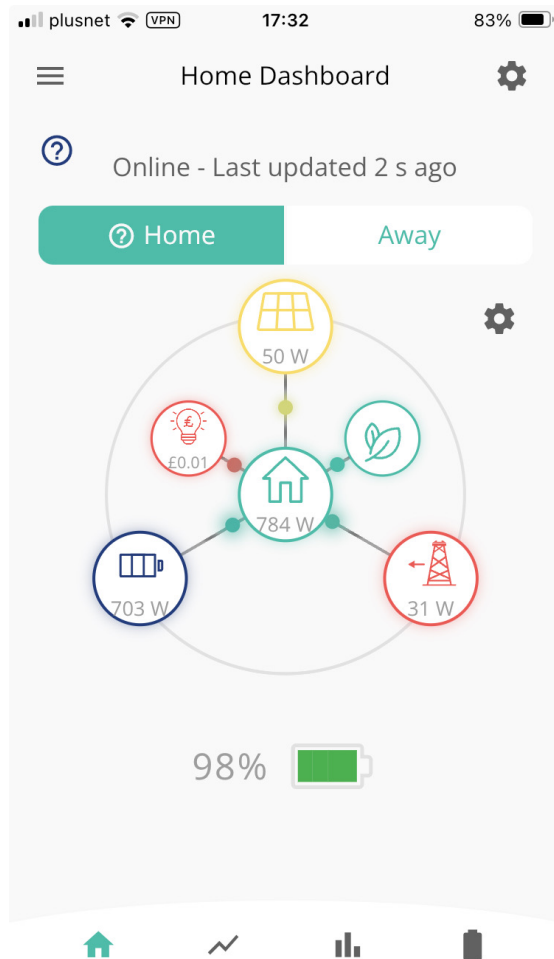
Forecast Generation

6.95 kWh

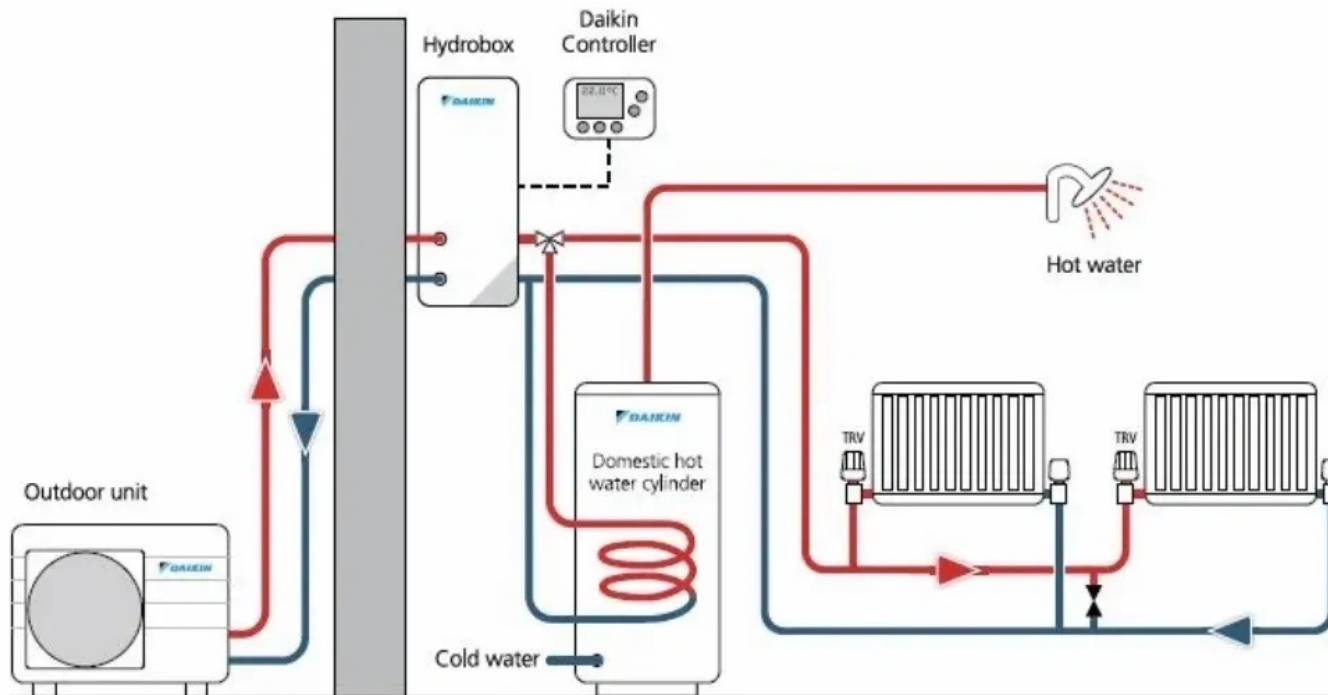
Solcast vs GivEnergy



Renewable Energy in the Home: Solar PV Panels and Battery



Renewable Energy in the Home: Air Source to Water Heat Pump ASHP



Renewable Energy in the Home: Heat Pump Installation

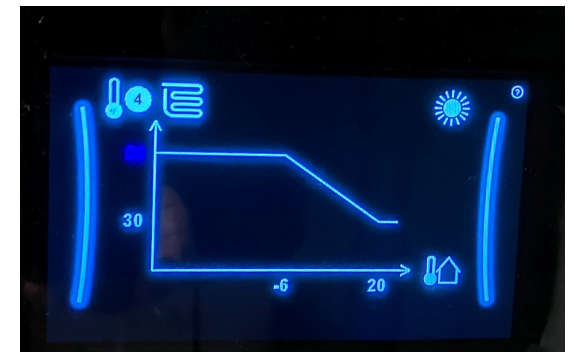
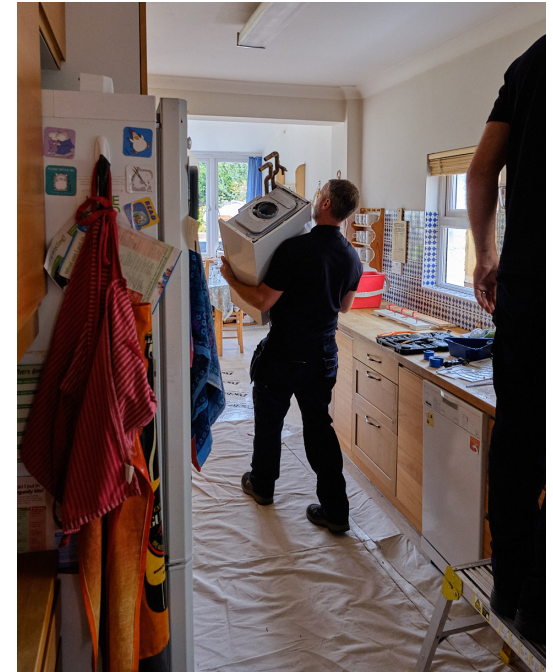
- Home survey by installer:
 - to map routing pipes
 - placing Heat Pump
 - hot water cylinder
 - estimate heat requirements to size radiators and heat pump.
- Location of hot water cylinder can just as critical as well as the heat pump.
- Check radiator sizes and replace some based on lower water temp of 45 deg C
- Notify DNO, electric grid operator, to get connection and export approval. For this area SSEN Scottish and Southern Electricity Networks.
- Installation and commissioning 5 men one week



Renewable Energy in the Home: Air Source to Water Heat Pump ASHP

Key Experiences

- Painless and effective Octopus installation and follow up
- Good comfort and control throughout year with weather dependant setting that sets water circulation as function of outside temperature without need of adjustment
- Hot water uses heat pump set by myself only at time of day when Solar PV generates
- Octopus Cosy tariff with 2 x 3 hour periods of 17p per KWH electricity reduces cost with my new battery to date my overall average is 26p



Renewable Energy in the Home: Air Source to Water Heat Pump ASHP

Heat Pump Experience July 2022 to today.

Key Figures:

- Installation cost by Octopus £7 000 including £ 5 000 grant
- Total Electricity Consumption 1st year 12 000 kwh at about £ 2 700 at all in average 22.5p/Kwh
- Solar generated £ 710 for 2 700 Kwh FIT deducted
- EV charging included about 1 100 kwh
- Gas consumption 2013 to 2019 21 000 kwh + Elec 3 000 kwh Total 24 000 KWH
- COP = 3, for 2023, Efficiency, heat Produced divided by Electrical input.

Renewable Energy in the Home: Electric Car, EV



Renewable energy: Useful links

- Heat Geek lots of good advice
- <https://youtu.be/RlcvncWvNUQ?si=htoTCIDK-ffmtwo9>
- Interview with Octopus heat pump people
- <https://youtu.be/e-M0oCSbp8Y?si=HIG4j1dYktoYyh8U>
- Air to air heat pumps Tim and Kat keeping cool
- https://youtu.be/tStlklv1jcE?si=d9_1LHaVw9-hv8lq
- National Energy Foundation run membership group
- <https://superhomes.org.uk>
- MCS defines, maintains and improves quality by certifying low-carbon energy technologies and contractors
- <https://mcs-certified.com>
- Battery GivEnergy Interview
- https://youtu.be/15jsPUeeVy0?si=k_TdrZ-NzyyCmPGe