Greener Homes Briefing Sheets.

1 Solar Photo Voltaic (PV)

Our PV system is 10 panels each generating up to 0.34 kWhp (peak) so total peak capacity is 3.4 kWh. Total cost of system was £7485 including 5% VAT
Evergreen estimated our panels will generate approx. 2920 kWh/year
Estimated current cost of a kWh including the standing charge is approx. £0.19 per kWh
On that basis, the potential annual saving is £555/year or a theoretical pay back of 13.5 years.
HOWEVER you can't use all the energy you generate, so a lot (say 50%) goes back into the grid at a low saving of 3-5p/ kWh. Hence the average pay back is probably more like 20 years based on today's prices. But electricity costs rose approx. 24% from 2015-2020 (source Statista.com). They are expected to continue to rise at a rate of around 25% every 5 years, giving an average cost over the next 20 years of 28p/ kWh. This would reduce the effective payback time to around 15 years or better. The system is guaranteed for 12 years, with an expected life of 25 years plus.

The payback can be further improved by implementing one or more of the options outlined below.

a) The best option is to use as much of your solar power when it is being generated from late morning until late afternoon. You use most of your electricity during the day anyway, but you can gain further improvements by using the washing machine, dishwasher, vacuum cleaner, etc during this time.
b) If you have a hot water tank, fit a solar immersion heater cost approx. £500 plus labour/wiring. This converts your solar power into hot water.
A typical household according to the Energy Saving Trust, spends about £140 a year on hot water. Others estimate cost of up to £250/year, so payback should be relatively quick.
c) Fit a storage battery to store solar power for later use. The drawback for this is the batteries are expensive (typically £2000) with limited storage capability (typically 3 or 4 kWh), so an estimated payback of over 5 years.

2. Air Source Heat Pump (ASHP) – replaces your gas boiler

Our ASHP system is the Mitsubishi 11.2 kW Ultra Quiet Ecodan (Coastal Version) + a Mitsubishi unvented 250L hot water cylinder + FTC6 controller
Cost £10,665 including 5% VAT
Renewable Heat Initiative (RHI) repayments for approved ASHP installations before March 2022 depend on the Energy Performance Certificate EPC* for your property. For us this should be approx. £9100 (RPI adjusted) payable quarterly over the next 7 years, so it covers most of the ASHP costs.
* If you would benefit from a new EPC the cost is typically £90.

ASHPs run at typically 50 deg C water temperature (Vs 60 deg C+ for gas boilers), so some or all of your radiators will need to be replaced with larger ones, to produce the same heating performance.

For us that additional cost was about £2200 including 5% VAT*
*We did have some other costs unique to our situation so these are not included here.

Western Power may require your electricity supply to be upgraded to cope with the increased electricity consumption. This can be free or anything from £300 to (in extreme cases £3000). For us it was £380 including VAT. (It is possible at some point Ofgem will start to fund this).

ASHPs typically convert every kWh of electricity they use into energy equivalent to 3.67 kWh of heat energy. Evergreen estimated as a guide only that for our 5 bed house our ASHP would have a running cost of £1188 per year, assuming it provides all of our heat and hot water. If an ASHP is combined with a solar PV installation then savings could be made, especially potentially for hot water costs.

3. Electric Vehicle & Home Charger

Model
Our EV is the Renault Zoe i GT Line R135 Z.E. 50 Rapid Charge*
*Rapid charge is useful on long journeys if you want to top up quickly
Typical price** to buy new, if you shop around (e.g. Use CarWow) is £27,000
This includes a reduction from a government grant currently worth £2500
https://www.gov.uk/plug-in-car-van-grants
Leasing deals should be available from around £280/ month
Vehicle Excise Duty is £0 but there may be an annual fee to pay for 5 years depending on the list price of the vehicle. For us this is £55
The car has a 5 year warranty. The battery has an 8 year warranty.
EVs are very reliable as they don't have as many moving parts as a petrol vehicle.
We have owned an EV for 4 years and never broken down or run out of electric power. Like a petrol vehicle you just have to top it up before it has an empty tank/battery.
**the current price includes a £350 contribution towards fitting your 7kWh home charger. https://www.gov.uk/government/collections/government-grants-for-low-emission-vehicles#electric-vehicle-homecharge-scheme A home charger fitted recently cost an additional £500 to fit.
Range
Our estimated range on a full battery is 210 miles (Summer) and 170 miles (Winter). We have happily visited Wales on holiday (190 miles each way) only stopping once on the way there and once on the way back to top up. Normally we top up once a week.
200 miles is approx. 50 kWh so costs £9.50 at 19p/ kWh
With Octopus Go we charge at night for 5p/ kWh, so 200 miles costs us £2.50
Charging time
Our car has a 52 kWh battery so from empty to full on a 7 kWh supply is approx. 8 hours. In practice you don't start with an empty battery and normally only charge to around 90%, so your typical charging time at home would be around 4 hours. The last bit of charging (especially above 98%) takes a lot longer, so you only normally do this in preparation for a long journey.
Most people will charge the vast majority of the time at home (typically more than 95% of the time, in our case nearer 99%).

If you are somewhere without a home charging point, you can charge with a special adaptor cable from a 13amp 3 pin plug socket, but this only charges at 3kWh, so takes more than twice as long.

Rapid charging

There is a large and ever growing network of rapid chargers for use on the go. You can find nearly all of these using the ZAP Maps phone app. Most simply require a contactless debit card. Some will give you a discount if you use their app.

Rapid chargers are typically 50kWh so in theory would take just over an hour to fully charge. In practice you would normally choose to charge from say 30% to 80% which would take a bit more than 30 minutes and assuming a rapid charger cost of 35p/ kWh would cost about £8.75.

Other points of interest

Second hand EVs are much cheaper but normally have much shorter ranges (around 100 miles) so are better suited for shorter journeys. It's a fact that most car journeys are short. EVs are very nippy so you can pull away fast if joining a fast road like the A35.