GREENING WADSWORTH

Solar Electricity

A quick look at domestic solar panels

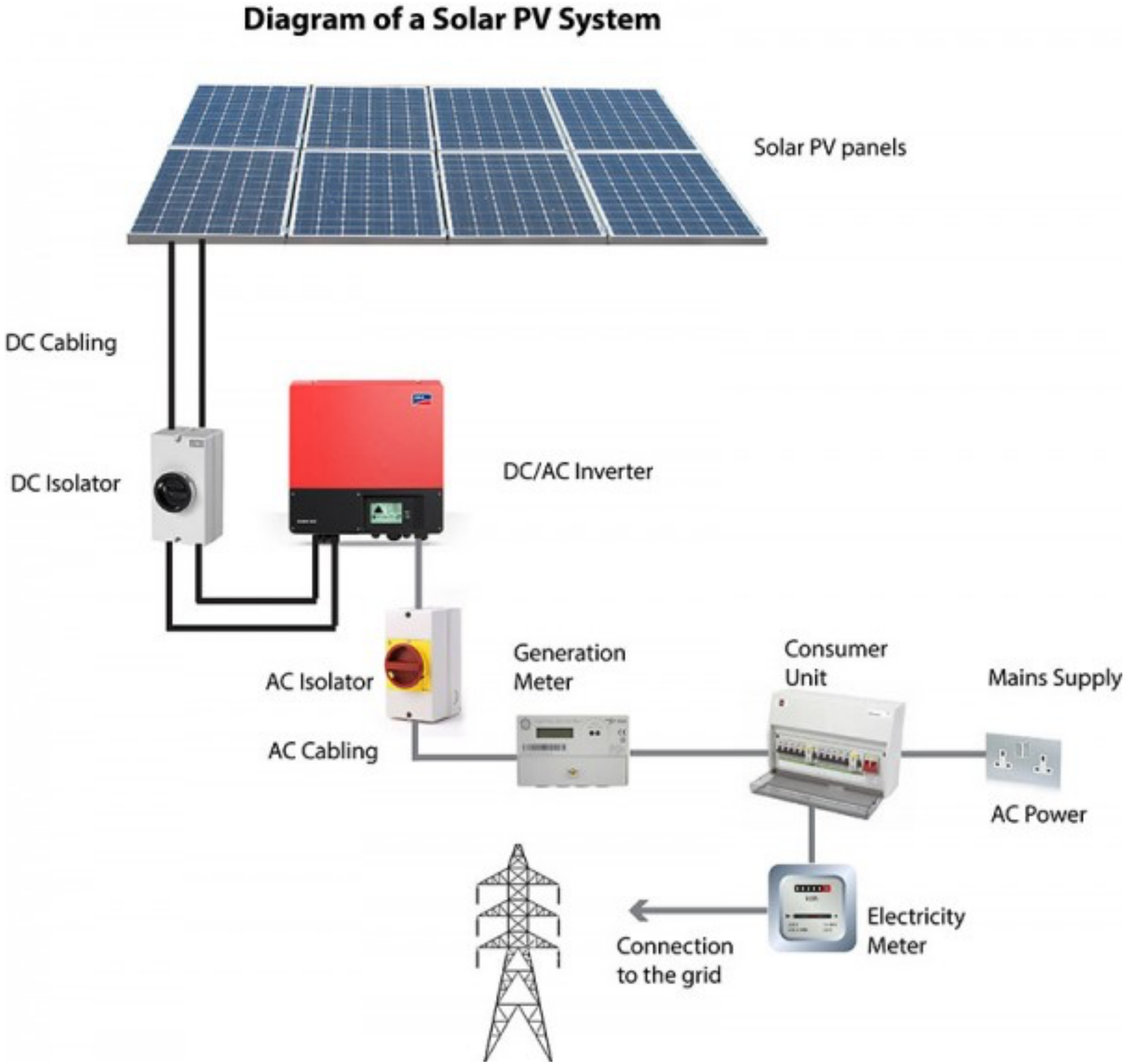
John Butterworth 31 July 2024

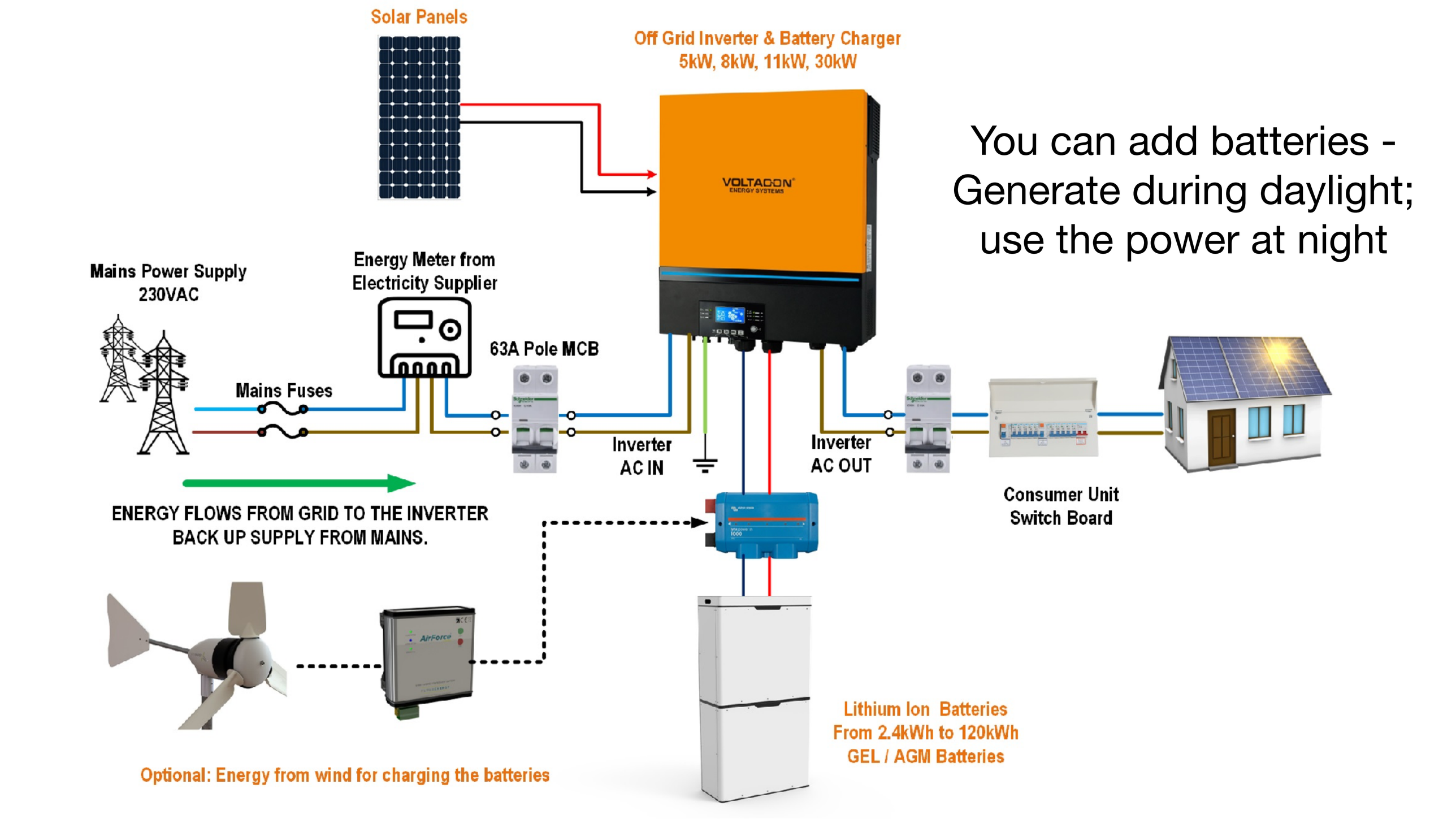
A solar power plant in Qinghai Province, China. lightrain/Shutterstock

Here’s what you get.

Typically, the panels are 250, 330W or 440W

On a house, the normally-fitted max is just under 4kWp, So 16, 12 or 9 panels, though Octopus say ‘4.4kWp is typical’ - DNO must be involved!





You can add batteries - Generate during daylight; use the power at night

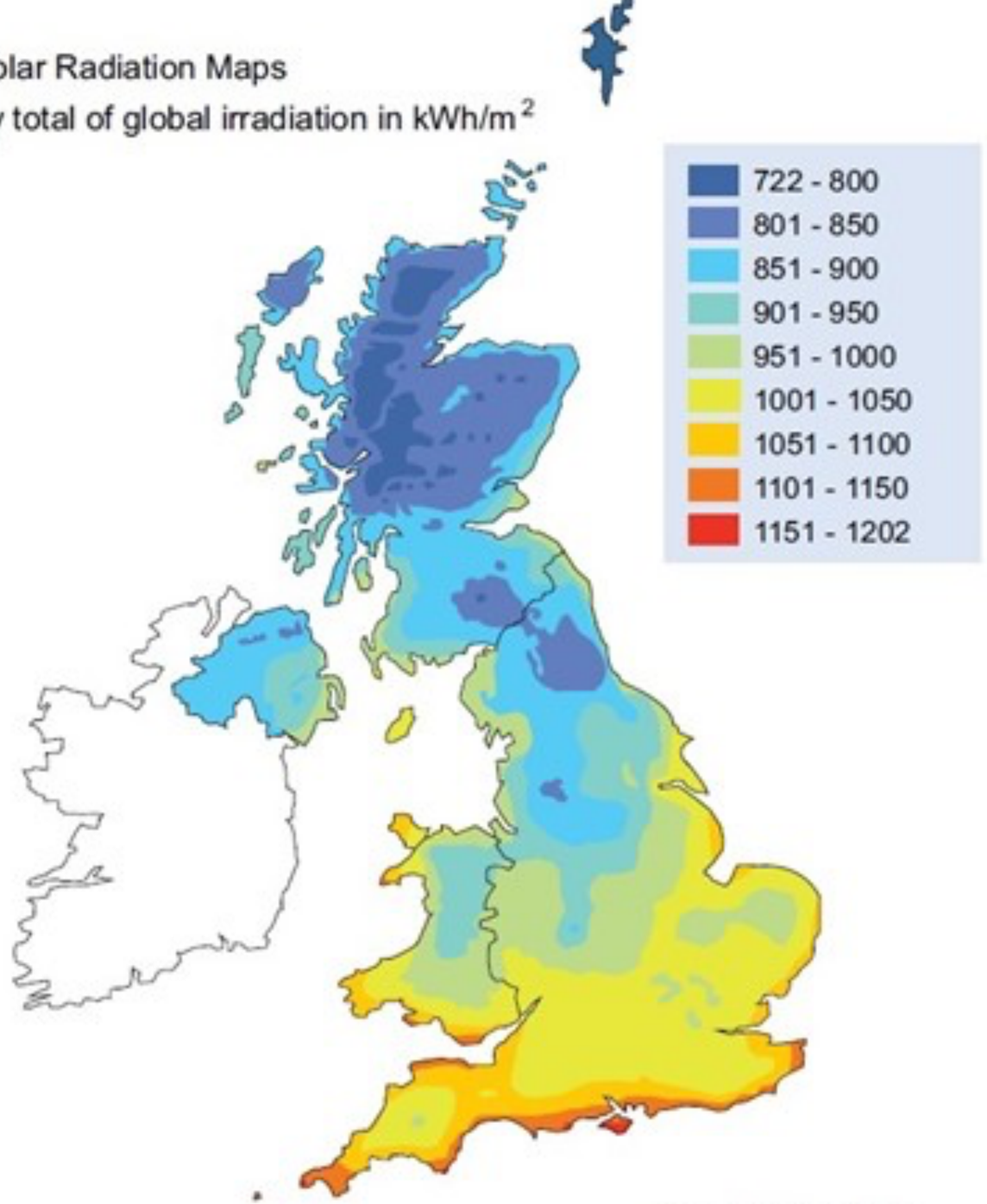
- Most are now monocrystaline. Best efficiency is 24%.
- **Efficiency** only matters if you have a very small roof, or are determined to get the most power on your roof. PRICE and QUALITY are what matters.
- Old ones were as low as 15%, but typically 19-20% Retailers will compare the required area of obsolete panels with new ones!
- Most are made in China (80%)

Top 10 Most Efficient Residential Solar Panels 2024 *

1	SunPower	Maxeon 7	445 W	24.1%
2	Aiko Solar	Neostar Series	470 W	23.6%
3	Recom Tech	Black Tiger Series	460 W	23.6%
4	AEG	BC Premium	460 W	23.6%
5	Longi Solar	Hi-Mo 6 Scientist	455W	23.3%
6	Huasun Solar	Himalaya G12	450 W	23.0%
7	Canadian Solar	TOPHiKu6	470 W	23.0%
8	Trina Solar	Vertex S+	455 W	22.8%
9	TW Solar	Repower N	455 W	22.8%
10	JA Solar	Deep Blue 4.0	455 W	22.8%

UK Solar Radiation Maps

Yearly total of global irradiation in kWh/m^2

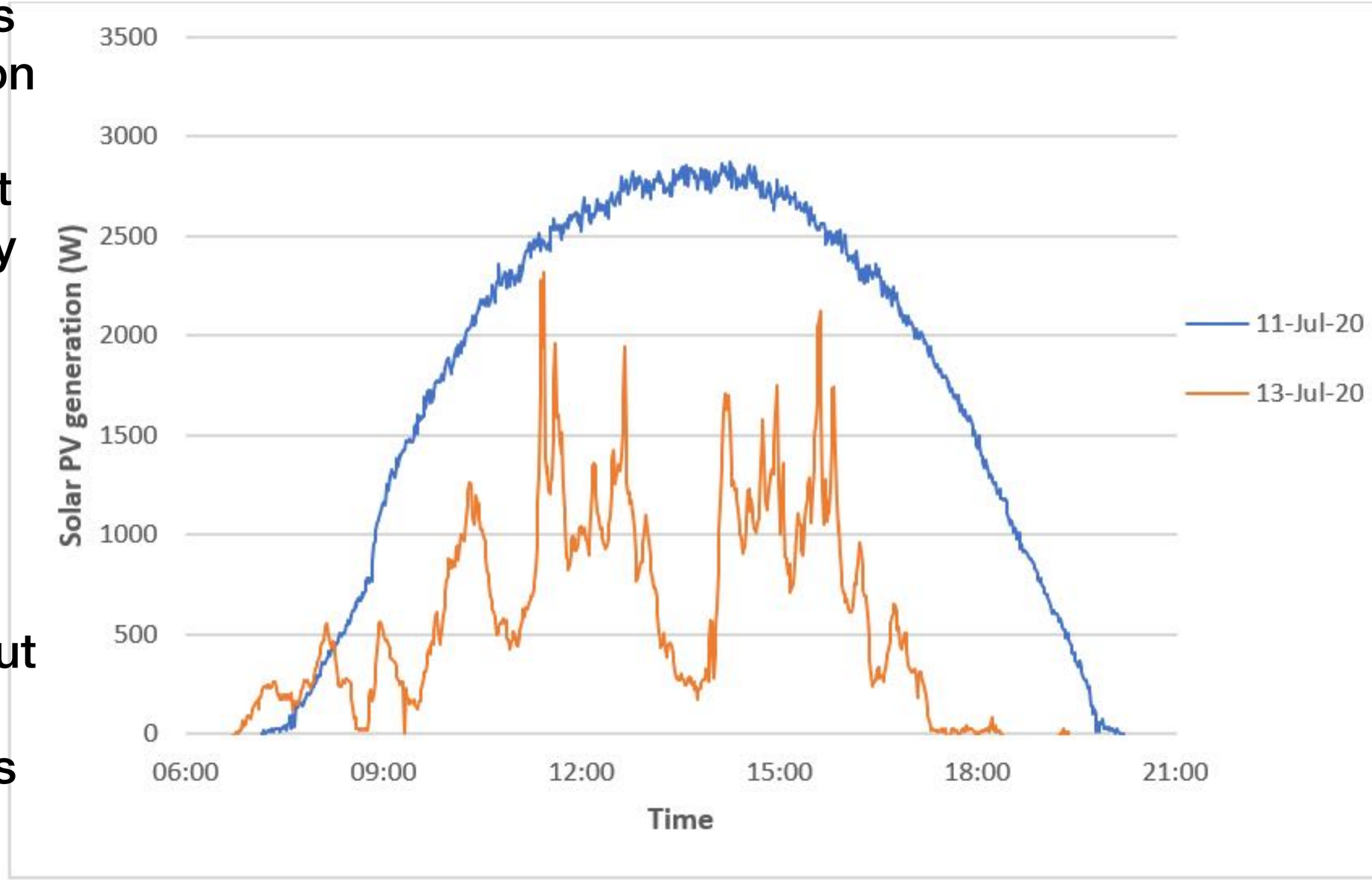


Source: MCS Design Guide

Average period: 1993 - 2007

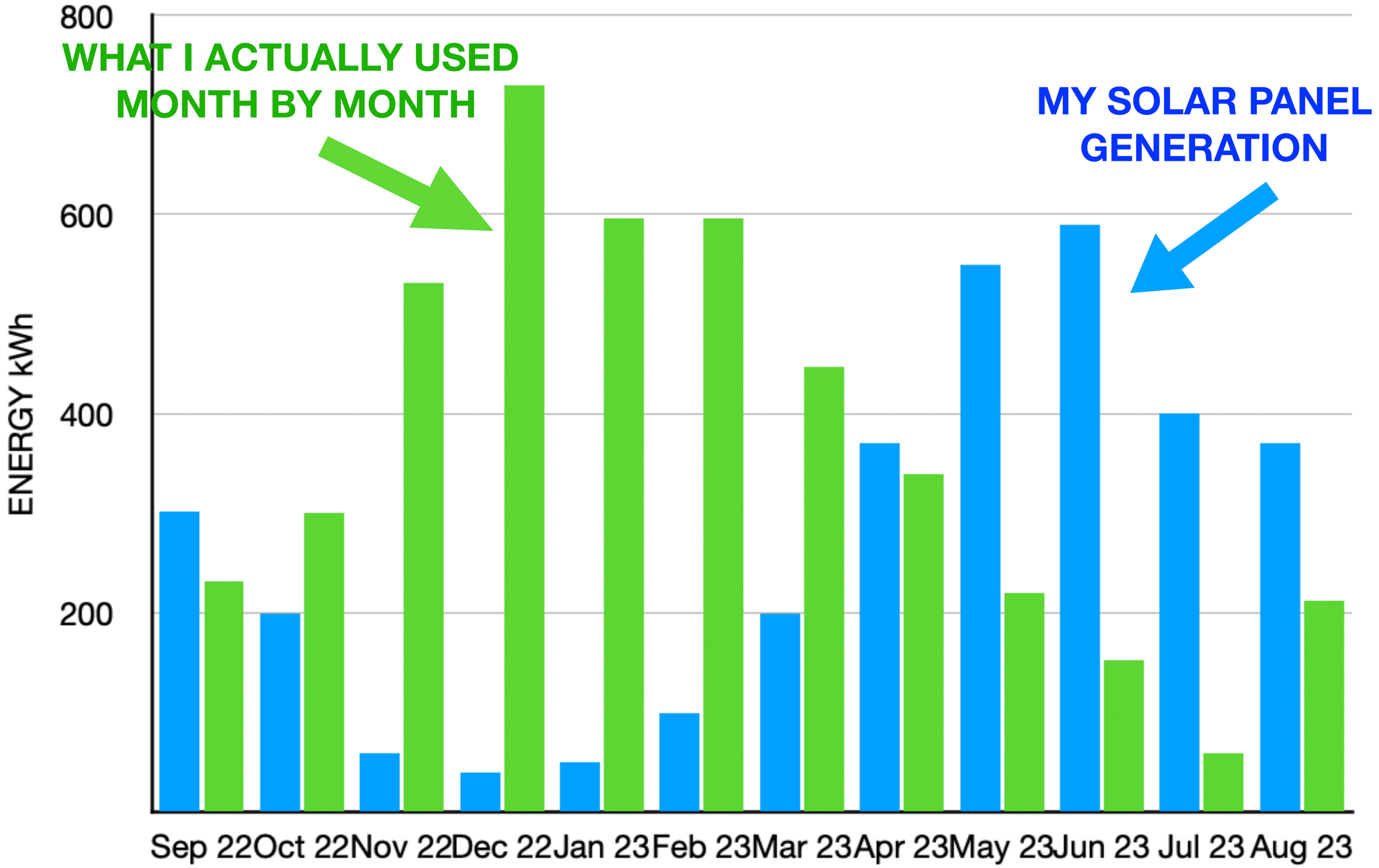
PV generation in watts for a solar PV system on 11 July 2020, when it was sunny throughout the day and on 13 July when there was a mixture of sun and cloud. Source: NEA.Org.uk

A 4kW system at our latitude generates about 3400 kWh per year. Typical residence uses about 3500 kWh per year.



Things to beware of

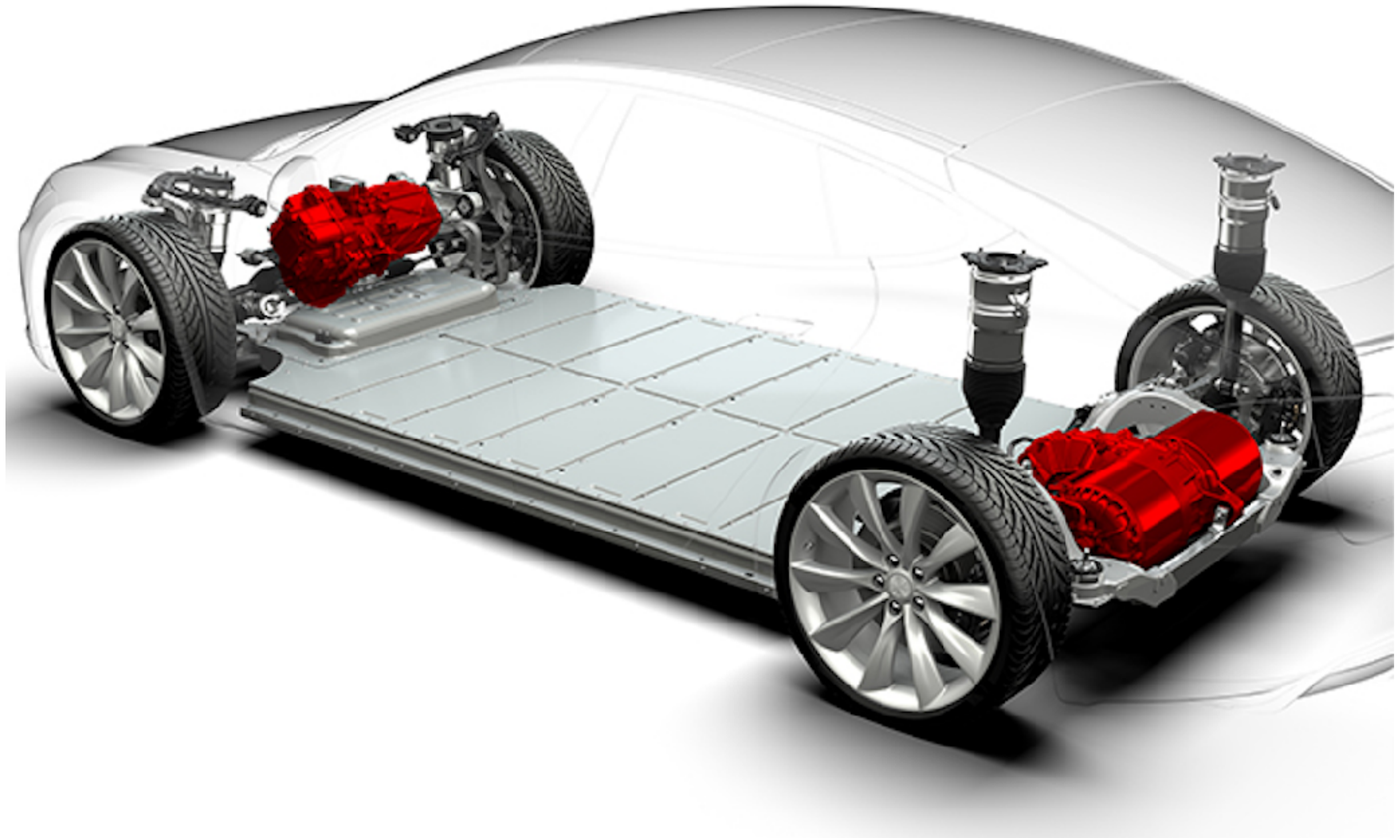
- It appears that you could generate about the same as you use, so all your electricity is FREE - **not so**
- Most of the **production** is in the summer months. Most of your **USE** is in the winter months. Without batteries, you'd use about 22%; with - 55%
- People selling panels quote the average daily production, by dividing 3400 by 365 days an average of 9.3kWh. To use a technical term, using this is cobblers.
- In summer, you'll generate about 12kWh per day. In winter, maybe 3.
- My savings on electricity would be 4000 x 22% x 21.53p = £189


WHAT I ACTUALLY USED
MONTH BY MONTH
MY SOLAR PANEL
GENERATION
ENERGY kWh
800
600
400
200
Sep 22
Oct 22
Nov 22
Dec 22
Jan 23
Feb 23
Mar 23
Apr 23
May 23
Jun 23
Jul 23
Aug 23

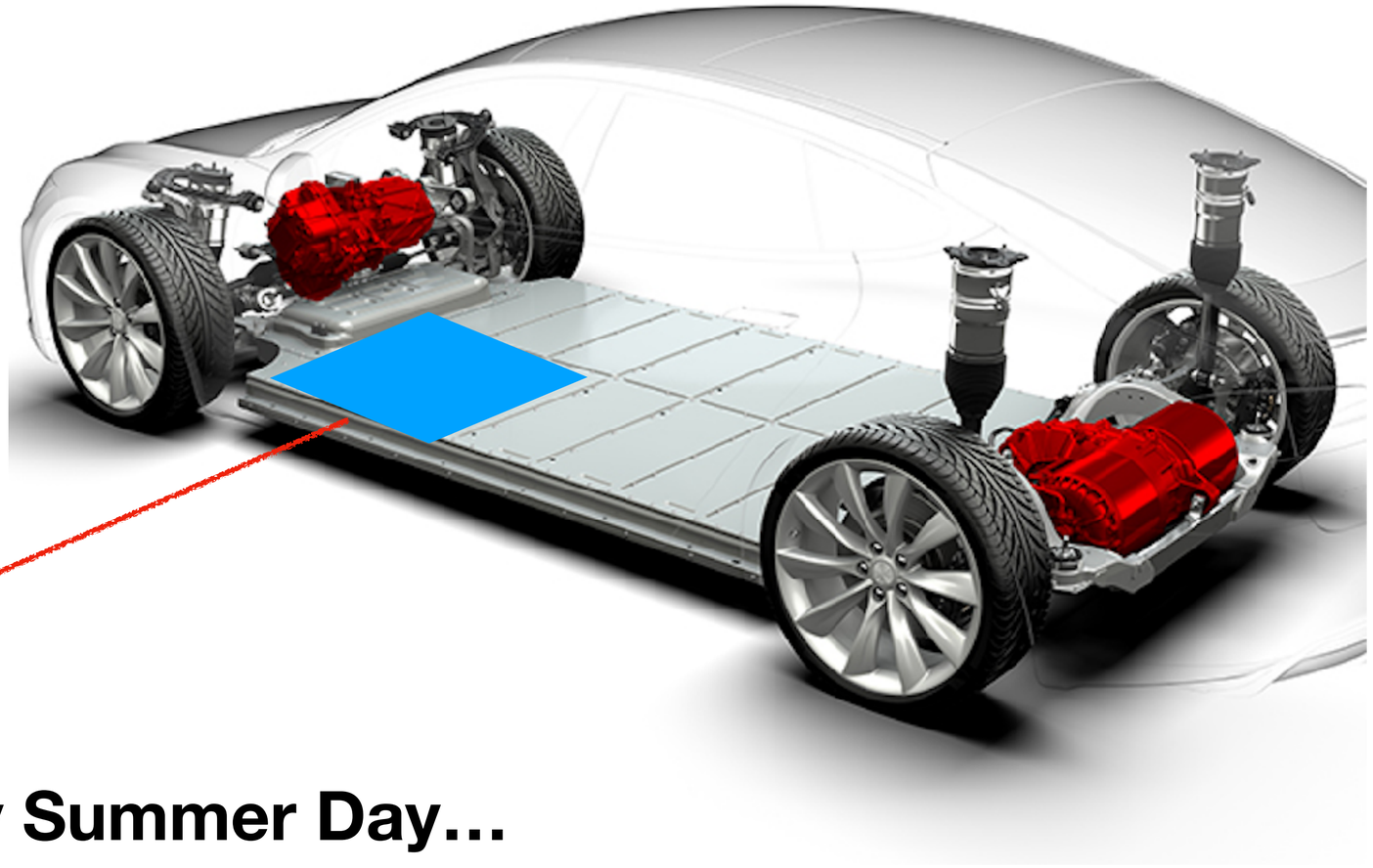
Electric cars and Solar

- Typical Electric car battery pack is 60kWh
- In high summer, you generate about 12kWh per day - it would take 5 days to charge the battery
- In winter, at 4kWh per day, it would take 15 days…
- … assuming that’s all you used the panels for!
- A 9kWp array would do the job.

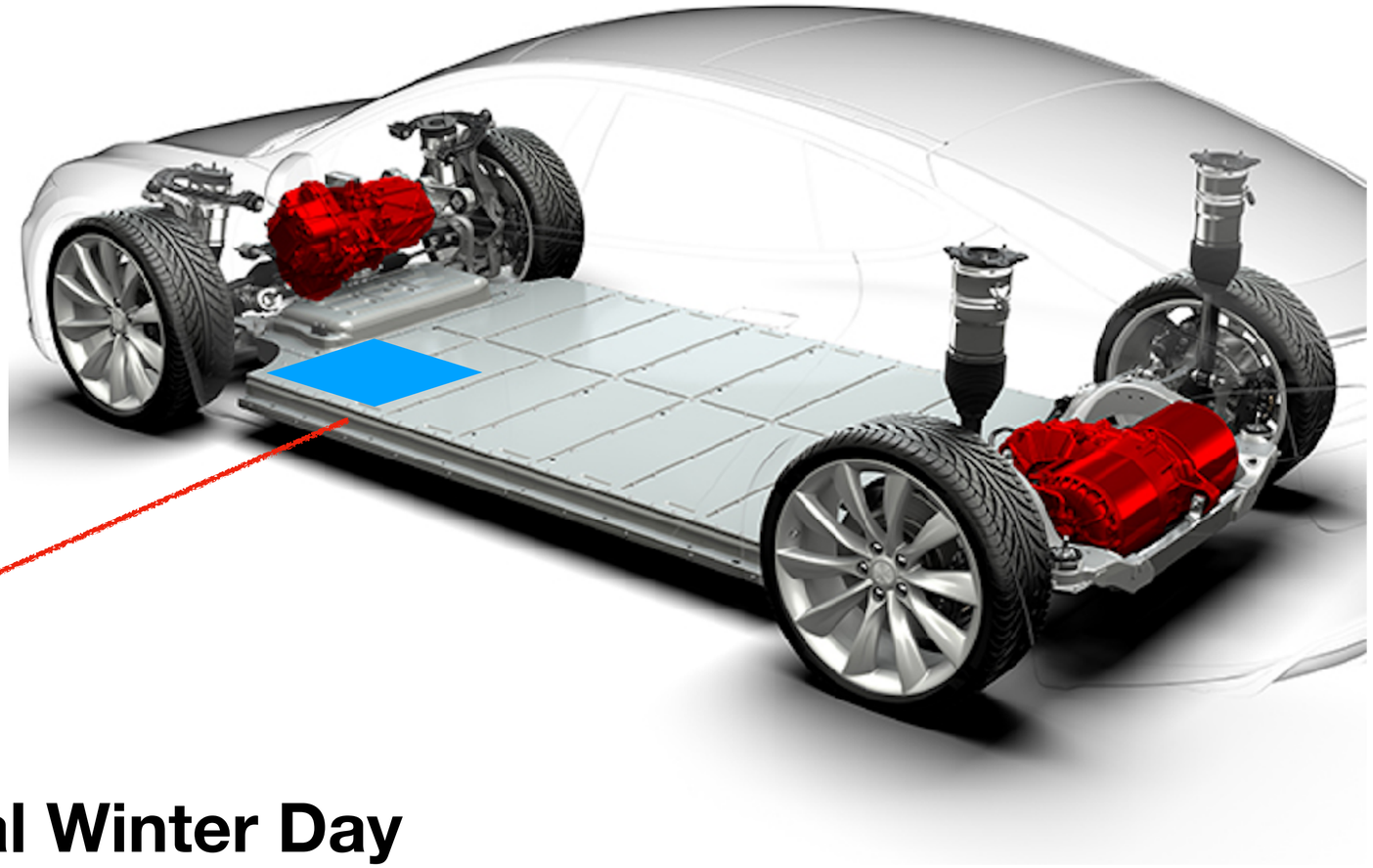
Typical domestic solar array,
4kWp, 15kWh on a sunny day



Typically 60kWh mid-size car battery
eg 12 sections of 5kWh capacity



A Sunny Summer Day…



A Typical Winter Day

On the Plus Side…

- Solar Panels are a GREAT thing as regards global warming
- Your 3400 kWh generation would save the grid from producing 3400 x 129g = 439 kg of CO2
- Of the GREEN ENERGY alternatives these are currently by far the best bet
- All newbuilds should have solar panels - they ‘save’ money on electricity
- **WAIT and see what the new government offers to tempt us!!**

Costs for a 4kW Solar Panel System	
Solar Panel System (inc. installation)	£5,000 – £6,000
Solar battery costs (9 – 10kWh*)	£8,000 – £9,500
Labour costs	£600 - £1,000
Annual service	£100 – £200

**Recommended size for a 4kW solar panel system. Please note the above prices are a guide only and may vary depending on your circumstances.*

Source: solarguide.co.uk

Octopus

- ‘A 10 panel installation and a 5kWh battery (our most popular system) costs £9,199’
- They pay 15p per kWh Export tariff
- ‘With no batteries, you use about 22% of the electricity that you generate; with batteries, 54%’
- With their complicated tariffs, they reckon payback to be 9-10 years

More than 500,000 of the systems have already been set up across Germany, and new laws that relaxed rules around solar panel installation have contributed to a boom in use. In the first six months of the year, the country added nine gigawatts of photovoltaic capacity, the amount of solar power a system produces, according to the Federal Network Agency, a German regulator.

‘PLUG and PLAY’ SOLAR PANELS IN GERMANY