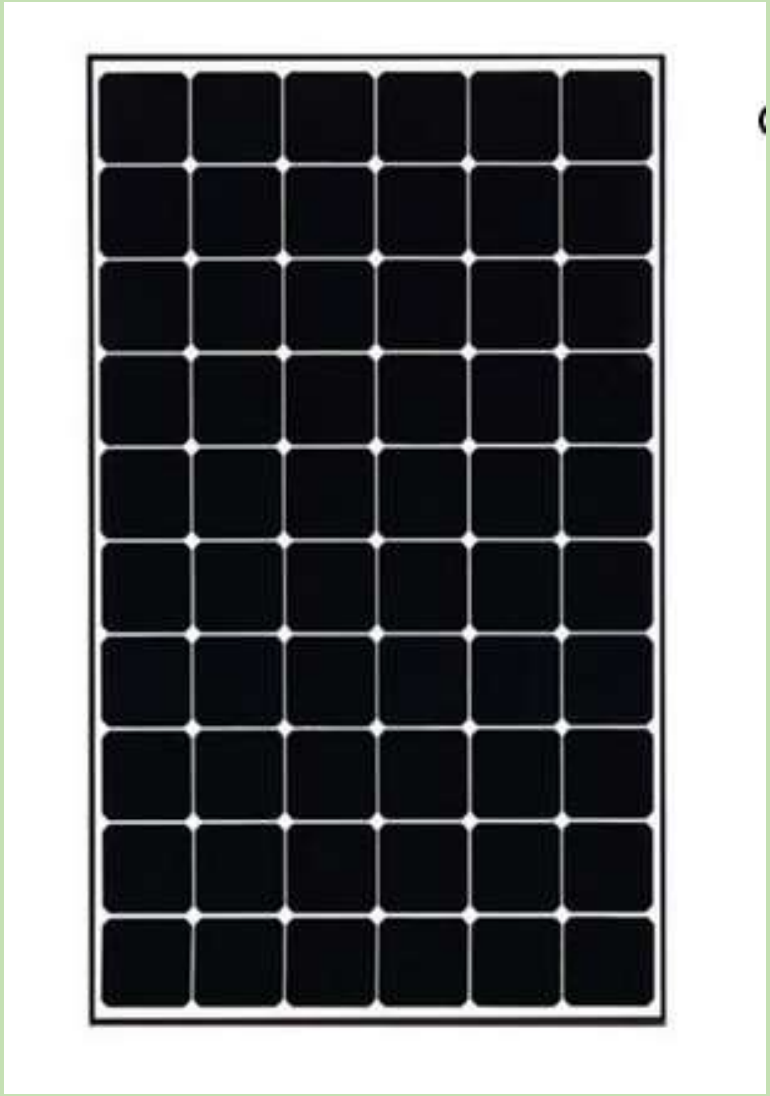


Solar Power

Castlemorton Environmental Action Group

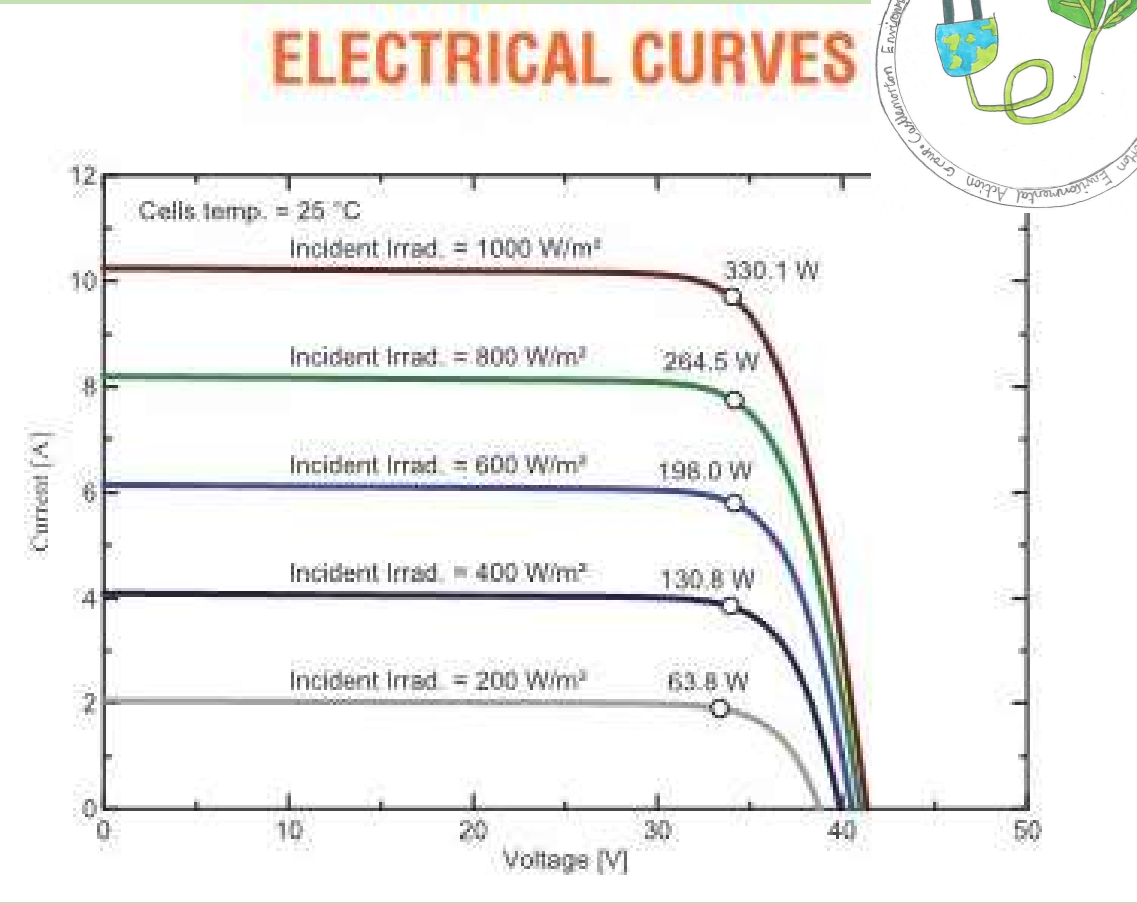
How it works 1

A Solar Panel has Photovoltaic cells arranged in series (strings) to generate electricity from sunlight.



How it works 2

Typical Performance



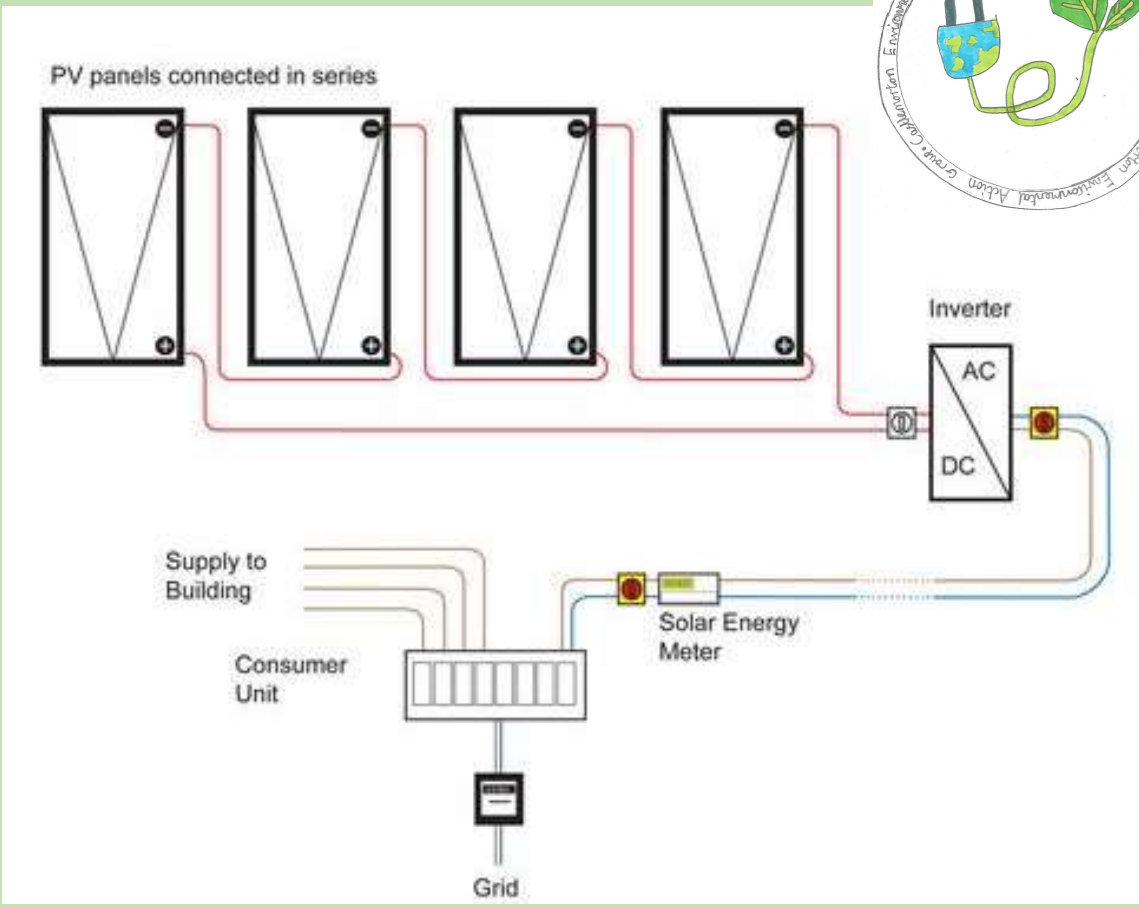
How it works 3

Panels in series

Inverter

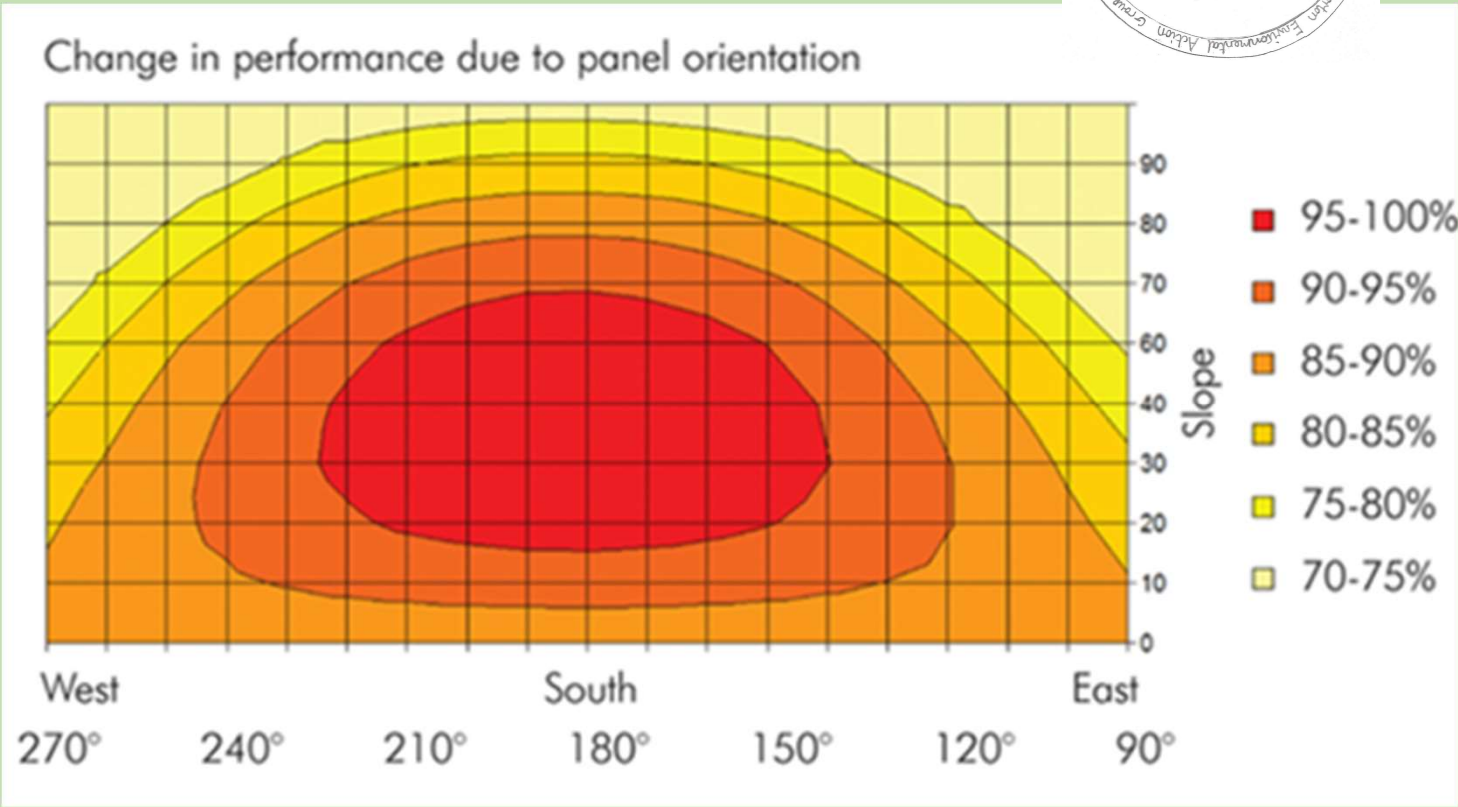
Meter

Consumer unit



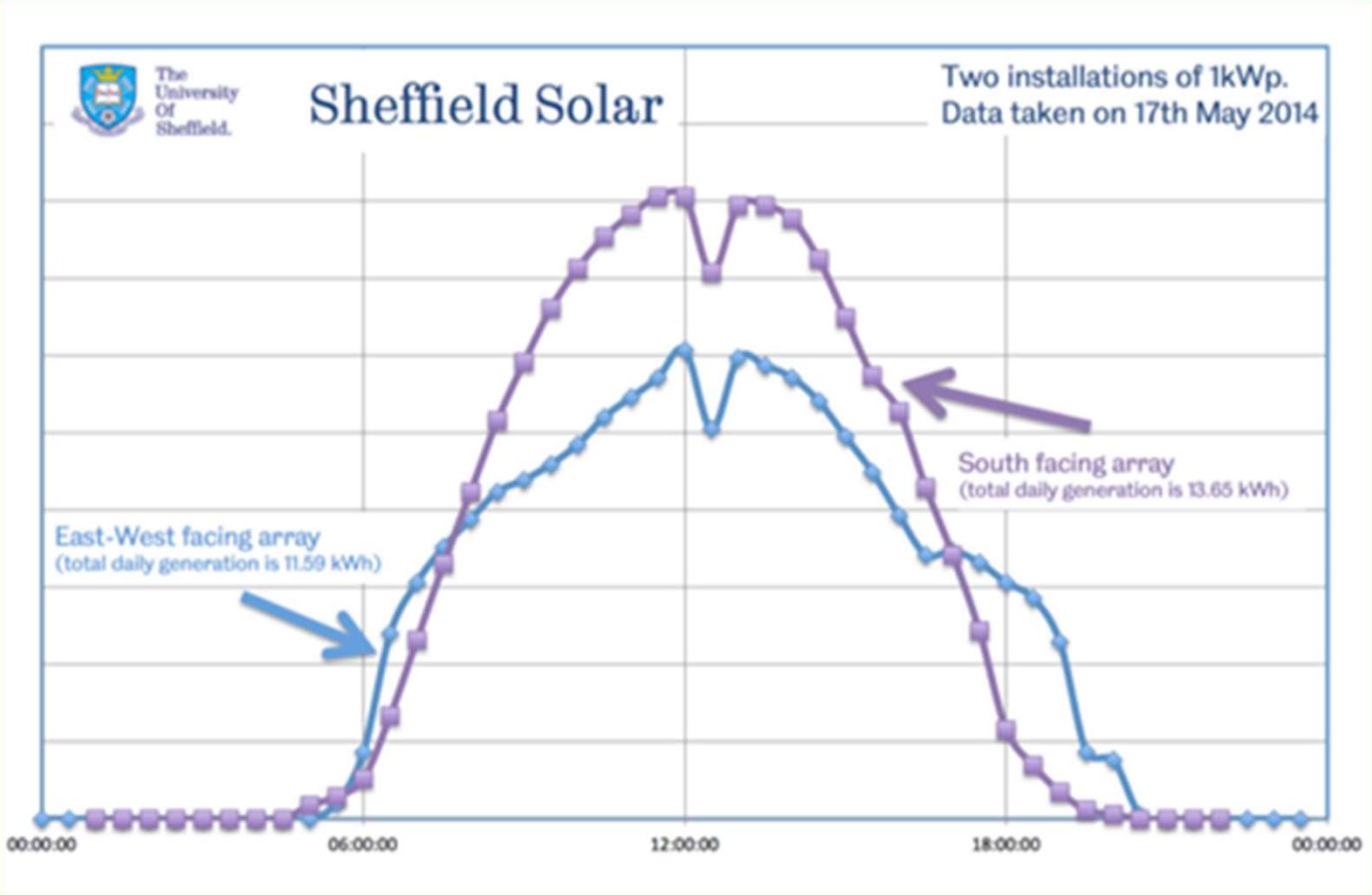
Location 1

Direction and angle



Location 2

East/west array?



Roof/ Ground Mount

Roof mounted generally less expensive and fewer shadow problems



Shadow and Optimisers

Shadow can be very harmful to performance.



Planning Permission

- Generally permitted development for domestic
- Not in curtilage of listed building or road facing in conservation area
- Check with Planning
- https://www.planningportal.co.uk/permission/common-projects/solar-panels/planning-permission

Size

- Permitted domestic size 3.68kW giving 16 Amps onto the grid to comply with G98 standard.
- Submit G 99 form on commissioning
- Can oversize panels up to about 100% to give more production (if inverter allows).
- Larger installations

Annual Electricity Generation



- A South facing system will give about 1000kWh per kWp installed.
- So 4000kWh from a standard 4kWp system

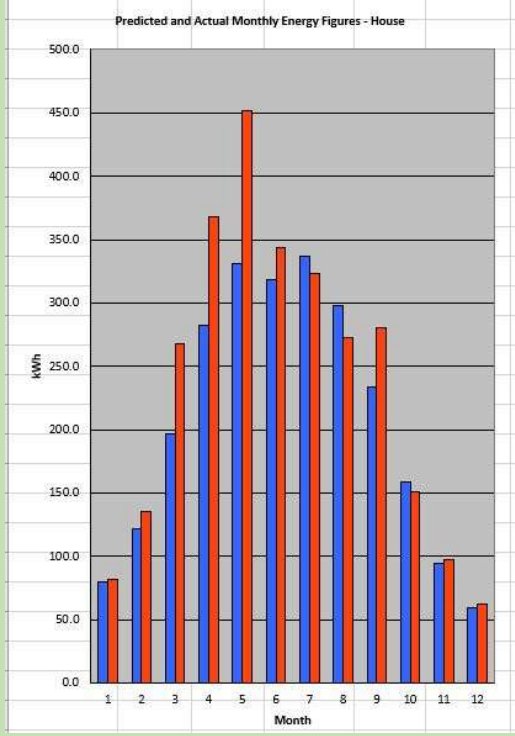


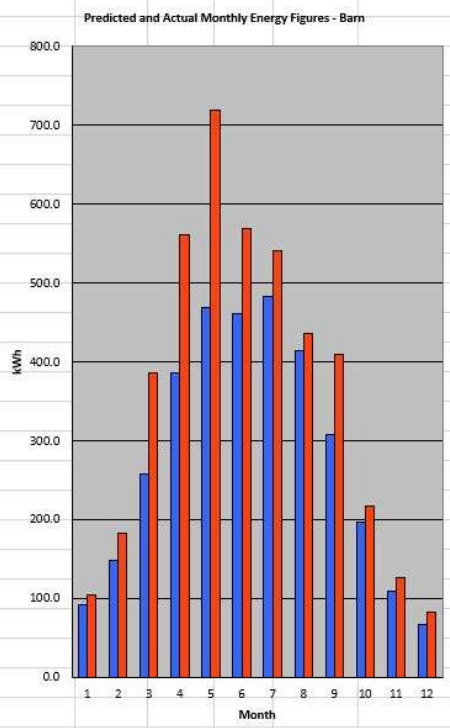
Generation Pattern – Time of Day

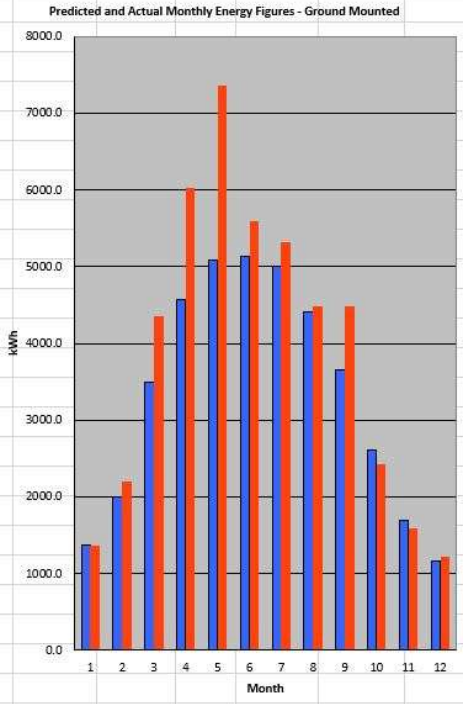
- Daily generation pattern
  http://www.gridwatch.templar.co.uk

Generation Pattern – Time of Year

Total	2511.0		2835.4	113%		3393.1		4335.9	128%		40218.0		46424.0	115%		







£££ - Cost - £££

- Typical system say 12 to 14 * 390w panels roof mounted, giving about 5kWp installed with an inverter limited to 3.68kW say £5000/5500.
- Add a 9.2kWh battery for about say £3300.

Savings

- Usage replaces electricity from the grid at an average 28.3p/kWh.
- Export via a Smartmeter can earn 4.1p/kWh (SEG tariff).

How to Maximise Usage 1



- Change your habits, washing machine, dishwasher, showers/baths, cooking, etc during the day.
- Domestic hot water 4kWh/day for average household. Say 60% provided from PV uses 876kWh/year

Solar Optimiser

- Diverts spare solar power to your hot water tank immersion heater.
- Cost about £300

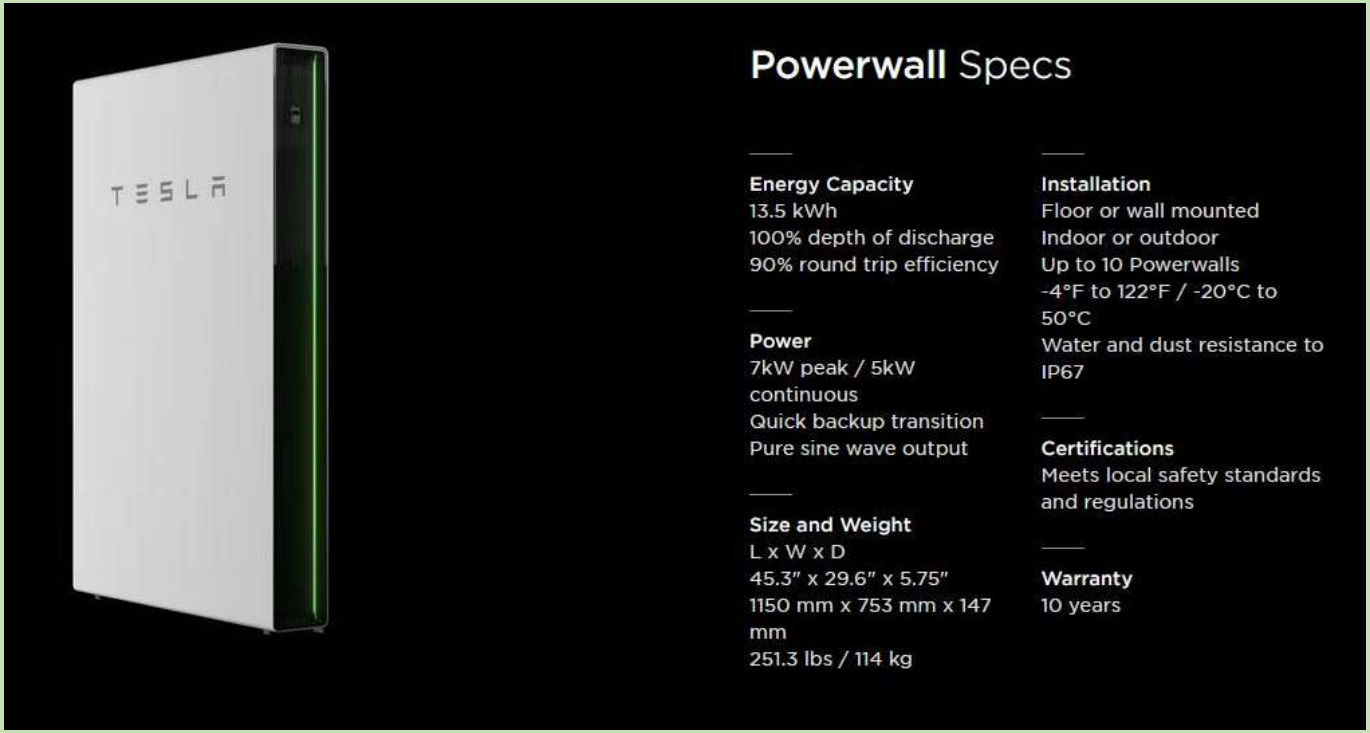


How to Maximise Usage 2

- Change your habits, washing machine, dishwasher, showers/baths, etc during the day.
- Domestic hot water 4kWh/day for average household. Say 60% provided from PV gives 876kWh/year.
- Battery could help seriously increase the amount of solar power you use.

Battery

Tesla this time, bigger and more expensive.



How to Maximise Usage 3

- Change your habits, washing machine, dishwasher, showers/baths, etc during the day.
- Domestic hot water 4kWh/day for average household. Say 60% provided from PV gives 876kWh/year.
- Battery could seriously increase the amount of solar power you use.
- Electric car

Electric Car

- Massive battery on wheels!
- 60kWh will soak up lots of solar power.



Smart Charger

- Will charge the car when you have excess solar power available.
- No fuel cost driving!
- Say £800 for charger



Savings and Payback

- Say 4800kWh/year generated.
- Say 60% used, 40% exported.
- Saving (28.3p/kWh) £815
- Export (4.1p/kWh) £79
- Total £894
- Return on £6000 invested 14.9% per year

Other Points



- Estimated 25 year life.
- Little maintenance but budget for a repair or a replacement inverter every 10 years at £500.
- Panels age at about 0.5% per year.
- The Energy Saving Trust Calculator is conservative but gives a simple tool. https://www.pvfitcalculator.energysavingtrust.org.uk
- Further information from Energy Saving Trust. https://energysavingtrust.org.uk/

The Environment



- Here is an investment which should give you a decent return, help decrease global warming and our dependence on fossil fuels.
- What's not to like??!!

Future Events ?

- Battery talk.
- Solar hot water.
- Visit houses with green technology installed.
- Solar power co-operative.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