

Domestic Batteries

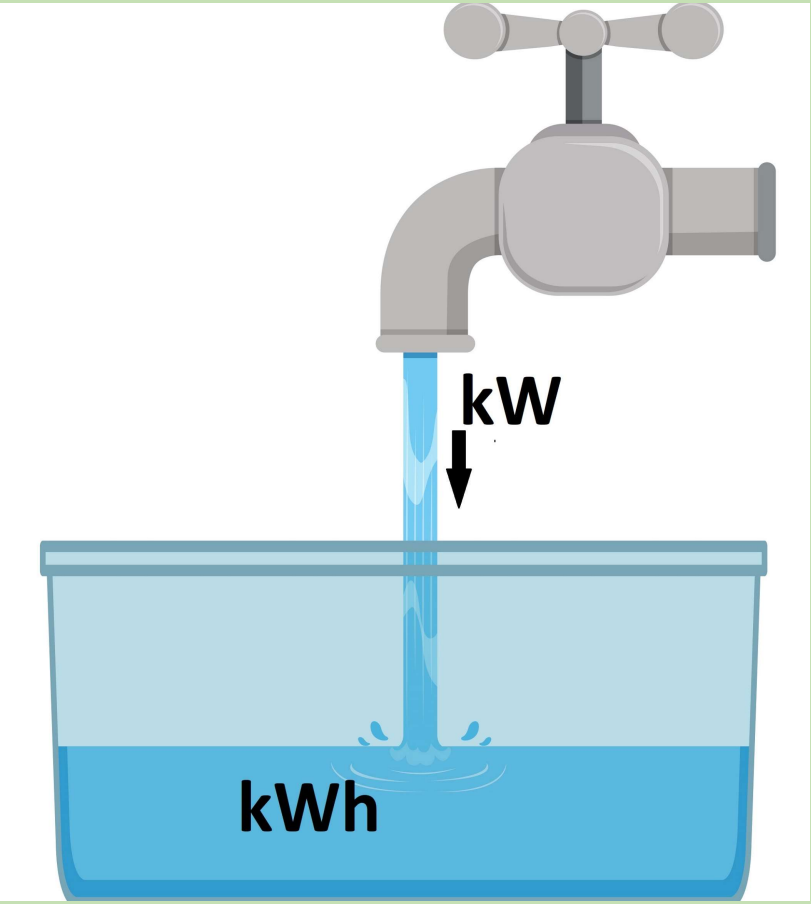
Castlemorton Environmental Action Group

kW and kWh

kW – flow of electricity

kWh – amount of electricity

A flow of 1kW for 1 hour gives 1kWh



What a battery can do 1



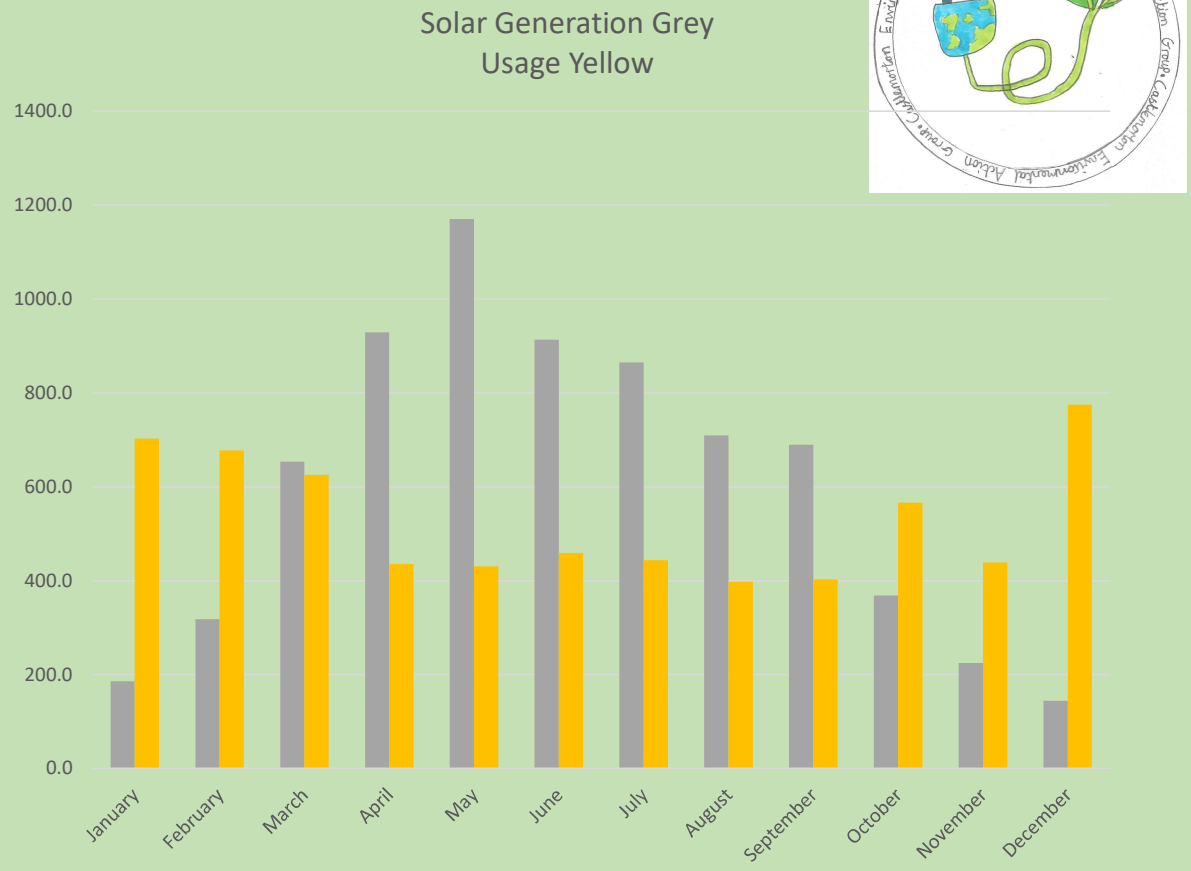
Typical annual generation from PV 4000kWh+

Average UK annual usage 3731kWh (2021 figure)

What a battery can do 2

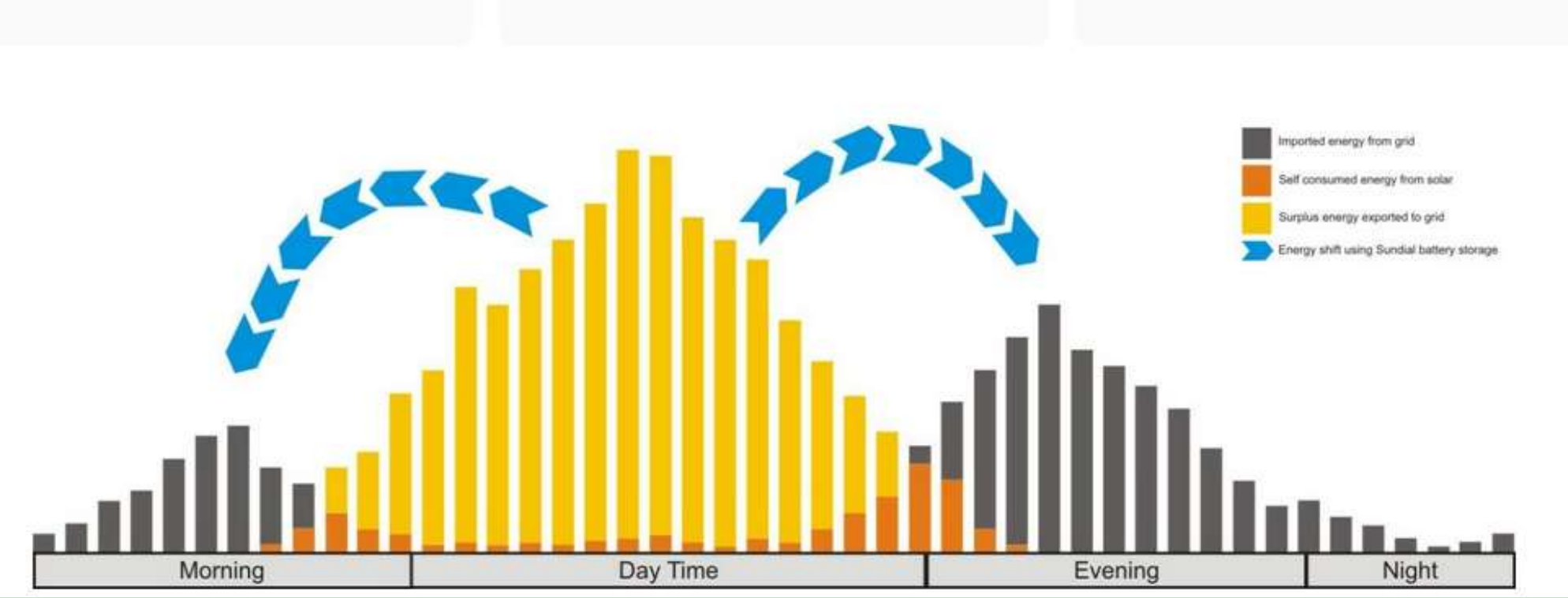
Annual distribution of generation and use is not well matched.

A battery cannot meet the annual mismatch.



What a battery can do 3

Daily distribution



What a battery can do 4



Average winter daily usage 13kWh

Typical solar power available 6kWh

Average summer daily usage 8kWh

Typical solar power available 20kWh

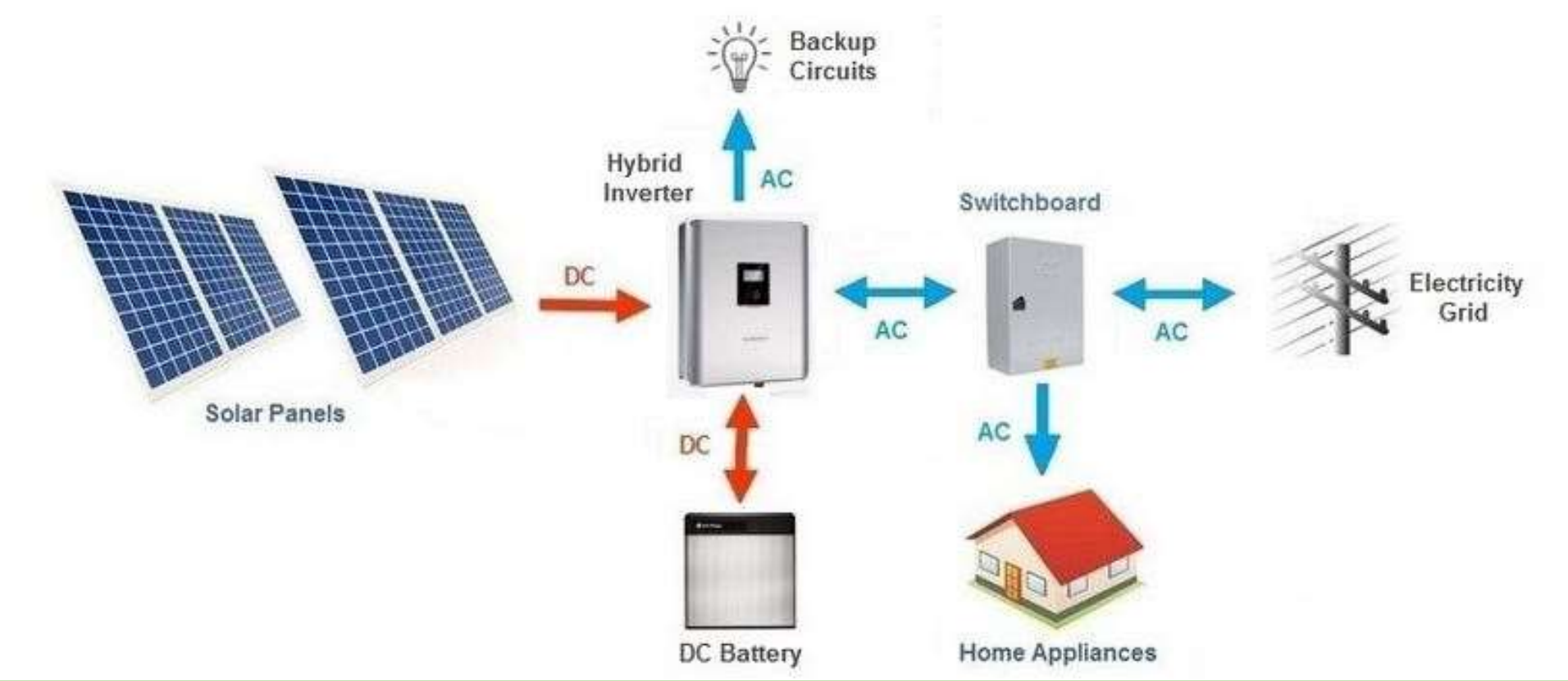
Based on average usage and a typical good solar power array.

What a battery can do 5

The maximum power which can be drawn from the battery and charge rate depends on the inverter rating.

Not generally a problem for charging but may not meet high loads.

DC Linked Battery



AC Linked Battery



Savings and Payback PV Only

- 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
- But this % usage may not be achievable!!

£££ - Cost - £££

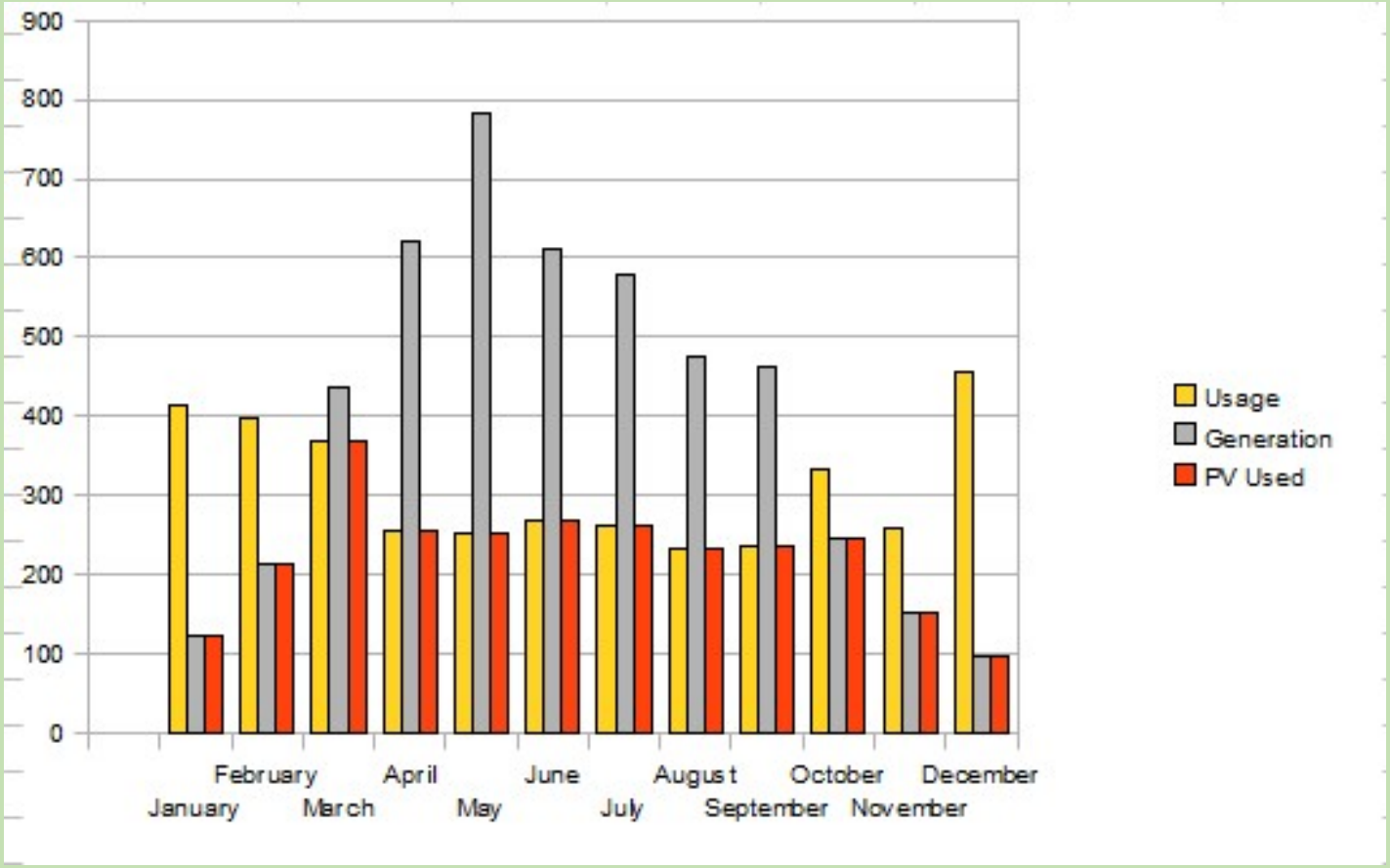
- Typical system say 12 to 14 * 390w panels roof mounted, giving about 5kWp installed with an inverter limited to 3.68kW say £5000/5500.
- Add a 9.2kWh battery for about say £3300.

Payback with Battery

Meets all usage in summer.

Uses all PV in winter.

PV used 2706 kWh 56%



Savings and Payback PV with battery

- Say 4800kWh/year generated.
- Say 56% used, 34% exported.
- Saving (28.3p/kWh) £765
- Export (4.1p/kWh) £86
- Total £851
- Return on £8800 invested 9.6% per year
- With new price cap (34p/kWh) 11.4% per year!!

Additional Savings and Payback?



- Use a day/night tariff to charge the battery on cheap night time electricity to use during the day.
- Say 7.5p/kWh night and 40p/kWh day.
- In our typical example we have said annual usage 3731kWh of which 2706 kWh is supplied by the solar PV and battery.
- If the remaining 1025kWh were purchased at 34p /kWh that would cost £348.
- If provided by a battery charged at 7.5p/kWh that would cost £77.
- A further saving of £271.
- A larger battery would be needed than the 7kWh we suggested initially to meet winter demand when solar generation is low.
- Potential for improved overall payback.

Summary



- Complicated and hard to assess real potential.
- In most cases, PV with battery may give a better return than PV alone.
- Hugely dependent on individual circumstances. A large or poorly insulated house with high electricity usage should certainly justify a PV with battery installation.
- In all cases will help save the planet.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