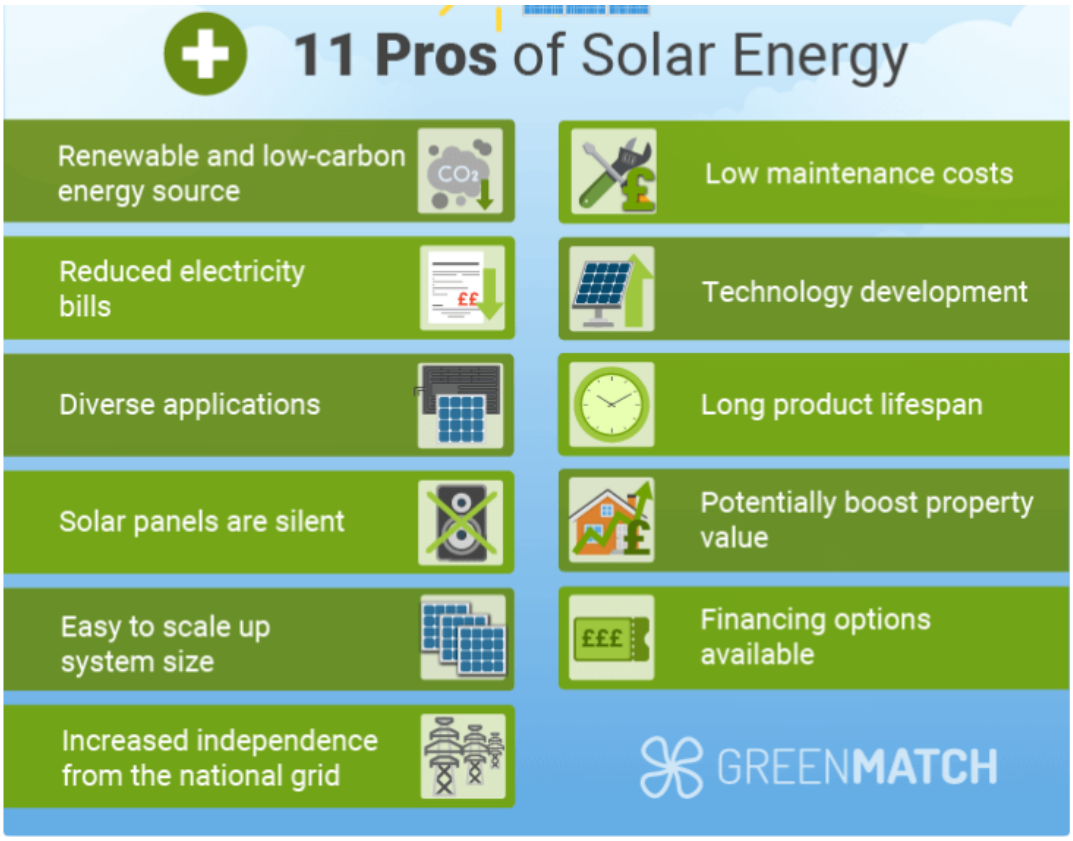
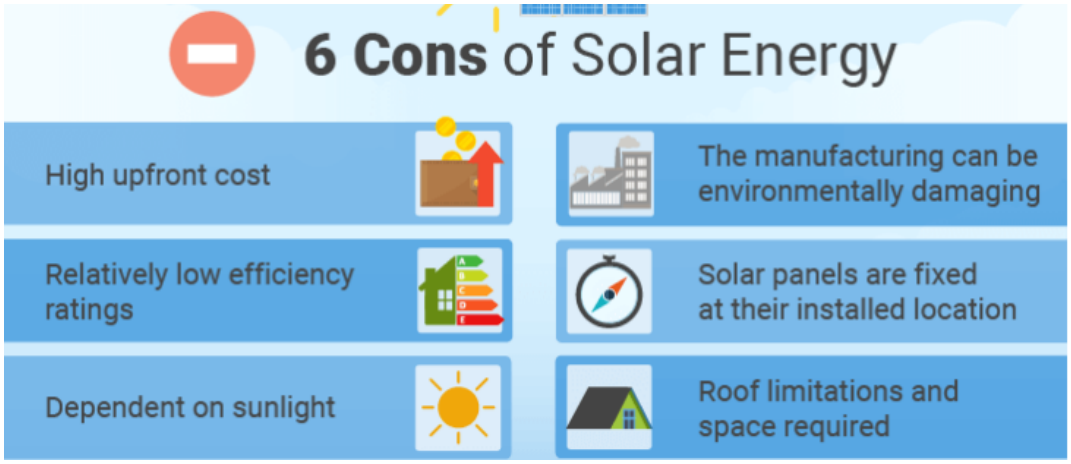
6th January 2024 “Our Environment” Meeting notes

Meeting attendees: Lyn, Helen, Chris, Alys, Ged. Apologies from: Tania, Jeff, Joan S, Joan M.

Topic: Solar Panels and Heat Storage.

Lyn had gathered some information together to steer our discussions (and used the two graphics below from Greenmatch for focus).





From an environmental perspective the main advantage of solar panels is that they provide renewable energy in a domestic context. Thus they reduce CO_2 emissions. [Obviously though there is a carbon cost during their manufacture – as there is for everything manufacture]. A typical home using solar panels could save up to 1 tonne of carbon per year [it is difficult to get precise figures for this, but you could always look at this from Renewableenergyhub.co.uk

Financially they are typically expected to pay back the installation and maintenance cost in 8 to 10 years of use, but have a lifespan of 25+ years.

Advantages highlighted by Ovo Energy (matching with our discussion)..

- Reducing air and noise pollution – Solar panel energy generation is silent, and the silicon used within the panels is non-toxic.
- Earning money from your solar technology – Since April 2020 the Smart Export Guarantee (SEG) has been available to those who produce their own energy. It offers payment for electricity generated and exported back to the grid.
- Cheaper to install year-on-year – Solar power is becoming increasingly mainstream in the residential market. The price of solar power fell by over 80% between 2010 and 2021.
- Easy to install in a day or two – but you may need to have scaffolding for up to a week.
- Low maintenance – panels last for 25+ years (some newer models even lasting up to 50 years). Most modern panels are also self-cleaning.

Disadvantages highlighted by Ovo Energy (matching with our discussion).

- Initial cost – prices are dropping, but installing solar panels isn’t a cheap option yet.
- Weather/daytime dependency – solar systems work on cloudy days, but they reach maximum efficiency when it's sunny.
- Suitability – not all homes can have solar panels installed.
  - If you have a flat or north-facing roof, it’s well worth checking their suitability.
  - A south-facing roof with a 30- to 40-degree angle is ideal. If there are trees or tall buildings around your home, this could also cause issues.
- Aesthetics … and you wouldn’t be allowed to install them in conservation areas. New integrated designs are being developed, which blend in with the roof in a more natural way.
- To take full advantage of solar panel power you need to install storage for it too. This adds to the expense.

In addition we noted:

- panels are made differently: some are composites, it is better to have a single piece panel as they are more efficient.
- It is worth having a service around every 5 years (cost approx £100).
- Panels should last 25+ years but currently the inverter (that converts DC to AC) is more likely to need replacing after about 10 years.
- Helen had found a research project that had software for calculating the performance of solar panel installations (based on location etc.). It can be found at: https://re.jrc.ec.europa.eu/pvg_tools/en/

Case studies of installations from the group

As Lyn, Ged and Helen have solar panels and batteries installed they explained how things work for them.

Lyn: 12 panels on the bungalow’s south facing roof.

- The panels were installed about 2.5 years ago, the batteries were installed later (which meant a 20% VAT additional cost).

- He also bought an electric car (EV) at the same time as the panels.
- He uses Octopus's "Intelligent Octopus Go" tariff to enable car battery charging a the lowest rates overnight and to get a good SEG tariff for whatever energy is fed into the grid.
- He has changed some personal behaviours to take advantage of the "free electricity" for instance boiling a kettle for water for washing up rather than running the water through from the gas boiler.
- He is paying less for electricity that three years ago even though he has the EV.

Ged: .

- Ged: has had his system of panels for about a year.
- Because of problems with his "smart meter" he has to enter the readings manually and for that reason cannot take advantage of the more generous Smart Export Guarantee offerings on the market. Therefore, the amount of energy exported to the grid is of little concern (at approx 4.5p per kW).
- Therefore he focuses on using electricity when it is being generated by the panels. This has changed the way the household behaves. For instance putting on the washing machine during the middle of the day, putting on a half load, etc. when there is plenty of solar energy available.
- He does not use electricity for heating.
- For Ged the advantage of the system is that his grid-energy use has halved and he has predictable bills.

Helen: has 13 solar panels on a south-facing roof plus a storage battery of 8.4kWh capacity.

- The panels have been in place for six months.
- She has the "Octopus Flux" tariff to take advantage of three different bands of import and export costs.
- Grid electricity charges have dropped – but she can't really estimate percentage savings as she has only had the system in place for six months and the SEG in place for five months.
- Because she uses Octopus Flux her battery is set to charge to capacity overnight at the lowest import rate.
- During the day, if little energy is being generated from the panels, the energy needed is drawn from the battery instead: only when the battery capacity reaches 15% does the system switch to drawing from the grid.
- This has only happened a couple of times during the winter months on particularly dreary days … and when the house has been extra busy with visitors and associated cooking/dishwashing.
- With this tariff there is very little benefit in changing the times of using energy (as Ged has done) since there is not direct financial benefit.

Practical Notes

- Payback time typically 8-10 years.
- Install batteries at same time as solar panels for zero VAT. If installed later VAT is 20%.
- Have bird netting installed around the panels as the warmth of solar panels is very attractive to nesting birds.
- The installation of panels and batteries has been fairly straightforward and not too disruptive for each of us.

Heat storage: Thermal Stores and Heat Batteries[1].

It is normally heat batteries that are installed along with solar panels.

“There are two key types of heat storage: thermal stores and heat batteries.

Thermal stores are highly insulated water tanks that can store heat as hot water for several hours. They usually serve two or more functions

- provide hot water, just like a hot water cylinder,
- Store heat from a solar thermal system or wood-fuelled boiler, for use later in the day, etc.”

“Heat batteries store either spare heat or electricity, often generated by renewable energy systems. Heat can be stored in a material when it changes phase from a solid to a liquid. These materials are called phase change materials’ (PCM). Spare heat or electricity is used to charge the PCM inside the heat battery. When the heat is needed, the phase change material changes back into a solid with a release of heat, which is used to provide hot water”.

Trustworthy sites for information about Solar Panels and Heat Storage

- Energy Saving Trust
  - https://energysavingtrust.org.uk/advice/solar-panels/
  - https://energysavingtrust.org.uk/myths-about-solar/
- Which?
  - https://www.which.co.uk/reviews/solar-panels/article/solar-panels/how-do-solar-panels-work-adlBz0X5w5nh

Trustworthy sites for information about Heat Batteries & Thermal Stores

- Energy Saving Trust
  - https://energysavingtrust.org.uk/advice/storing-energy/
  - https://energysavingtrust.org.uk/advice/thermal-energy-stores/
- Which?
  - https://www.which.co.uk/reviews/solar-panels/article/solar-panels/solar-panel-battery-storage-a2AfJ0s5tCyT

[1] https://energysavingtrust.org.uk/advice/storing-energy/