

Getting the best from your solar PV panels



Solar photovoltaic (PV) panels convert energy from sunlight into electricity. They can be a great way to save money and contribute to a clean energy system.

But because solar panels don't produce electricity all the time, there are things to think about if you want to make the most of them.

This leaflet looks at:

- 1) Exporting unused electricity
- 2) Changing when you use electricity
- 3) Kit that can maximise the benefits of your solar panels.

1) Exporting unused electricity from solar PV panels to the grid

On a normal sunny day, solar panels will produce the most electricity from around 11am to 3pm. But this doesn't match most households' daily electricity consumption which is typically high in the morning and evening and low during the day.

So what happens to the unused electricity that the solar panels generate? The answer is usually that it is exported to the grid for other people to use.

You can get paid for this through **export tariffs** that some suppliers offer. However, the price you get paid for exporting surplus solar

Selling your surplus electricity to the grid? Note that the rates for exported electricity vary. You can compare rates by looking at price-comparison websites like The Eco Experts (www.theecoexperts.co.uk/solar-panels/smart-export-guarantee). Some suppliers will pay higher export rates if you also buy your electricity from them.





electricity to the grid is almost always less than the price you pay to buy electricity from the grid. So, to make the most of your solar panels it's usually best to use as much of the electricity you produce as possible.

The following section looks at how you can do this.

2) Changing when you use electricity

By altering the times when you use electricity, you'll be making the best of your solar panels.

Consider running your big appliances – your dishwasher or washing machine – during the hours of 11am to 3pm which is when your solar panels are most likely to be generating. And don't forget the usual advice for running appliances efficiently, for example by waiting until you have a full load, so you need to do fewer washes.

It's also a good idea to **stagger** the time when you use high-energy appliances to maximise the free electricity produced by your solar panels. For example, wait for your washing machine to finish its cycle before running the dishwasher.

To help understand what you can use, consider the following electrical items: laptop (50W); fridge (100W); microwave (750W); and washing machine (2,500W).

Now let's assume your solar panels are generating a steady 1,000W (1kW). Of this,



100W is used by the fridge, which leaves 900W for other things. Based on the ratings above, you could use your 750W microwave for free and still have 150W available to run lower-power items, such as the laptop. You can't run a 2,500W washing machine with only 900W, so you would need to import the extra 1,600W from the grid.

Timers can help you schedule when appliances run. See the section on timers below for details.

3) Kit to help you maximise the benefits of your solar panels

With most home solar PV systems it is possible to tell how much electricity the panels are generating at the time, but not how much is being used in the home or how is being exported.

Below are brief descriptions of various pieces of technology that can help you make the most of your solar panels: **timers and smart appliances; solar energy monitors; home energy management systems (HEMS); diverters; batteries; and heat pumps.**

Timers and smart appliances

Most washing machines, tumble driers, dishwashers and hot-water systems can be programmed using a built-in timer so that they start working when your solar panels are most likely to be generating. But the panels may not be generating *enough* power at the time, so the appliance will be drawing a portion of the energy used from the grid.

A solution to this is a smart appliance that can be turned on remotely when you see adequate solar generation. Smart plugs allow you to turn a socket on remotely in the same way, but this may be of limited use if you still need to turn the appliance itself on.



Solar energy monitors

These track how much electricity your panels are generating, how much is being consumed in the home and how much is being exported. The information is shown on a small display unit in the home, or on a phone app. They cost between £100 and £400 depending on the type. Some can be installed yourself but for others you'll need help from a qualified electrician. Any solar installation company should be able to help with this.

Home Energy Management Systems

An optimal approach would be to automate when your appliances turn on and off using a Home Energy Management System (HEMS). This is a system that enables you to control all the smart technologies in your home from one platform, usually an app on your smartphone.



You could set up your HEMS to automatically turn on particular appliances when solar generation is adequate. Some of these systems may require a particular inverter while others can be universally retrofitted.

An important caveat is that an appliance with a long cycle, such as a washing machine, may start because there is enough PV generation, but it must then complete its cycle even if the PV generation is reduced (requiring you to import power from the grid).

HEMS can also integrate EV chargers, heat pumps and PV diverters. For example, if you have solar PV, an electric battery, and an EV, you could use a HEMS to control when your battery and EV charge, and whether they charge from excess solar or from the grid.

Diverters

PV diverters take any electricity generated by your solar panels which your household isn't using and use it elsewhere in the home, for example to heat water or charge an electric vehicle.

With a typical PV array connected to an immersion heater, you should generate all the hot water you need during summer. As well as saving on fuel costs, this will also prolong the life of your boiler which has to work less hard to bring the water up to the required temperature.



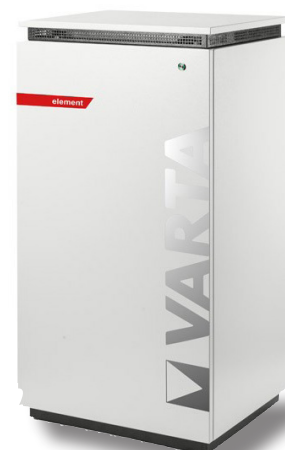
PV diverters are easy to add to an existing PV system. They take less than an hour to fit and cost around £250-500 to buy, or £600-800 with installation costs. And they can help you save around £100 a year on your bills.

Batteries

Batteries store excess electricity generated by your PV system. This can then be used when the panels aren't generating, either in the evening or the following morning. Domestic battery systems can store as much electricity as a household typically uses in a day, enabling a PV system to produce up to 70% of a household's annual electricity demand.

The more expensive battery systems can also provide electricity during a power cut.

Batteries do not make financial sense for every household. They may save on imported electricity costs, but





they're currently very expensive. There are also concerns surrounding the environmental impacts of their production and disposal.

The financial and environmental cases for domestic batteries are complex. If your primary motivation is to reduce your emissions, you would be better off focusing on reducing your heating demand and installing a heat pump.

Read more about battery storage here:
www.cse.org.uk/advice/battery-storage

Heat pumps

You can use PV to power a heat pump. This can sometimes be an effective combination, especially in terms of reducing your emissions. However, there are a few challenges when thinking about PV and heat pumps.

Firstly, your PV system won't be able to power your heat pump at night as it won't be generating electricity. A battery could help you get around this issue.

Secondly, heat pumps use a lot of electricity. You'll need a large array of solar panels to be able to power, for example, a 7kW heat pump in addition to your home's other energy needs.

Lastly, there's a mismatch between the times of year when your PV system will produce the most electricity (summer) and when you need your heat pump most (winter). So, you're likely to end up mostly powering your heat pump with imported electricity during the winter.



PV generation could contribute to powering your heat pump through spring and autumn but won't significantly reduce your heating costs in winter. You could also use your heat pump, powered by your PV system, to provide hot water through the summer months, but you could achieve this with a diverter for a fraction of the cost.

PV, a heat pump and a diverter can work together, meaning your heat pump isn't needed at all over the summer. However, the design, installation and commissioning of this kind of arrangement needs to be carefully considered.

► This factsheet was updated in August 2026. ◀

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We offer free advice on domestic energy use to people in central southern and southwest England.

Contact us:

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See all our energy advice pages at www.cse.org.uk/advice