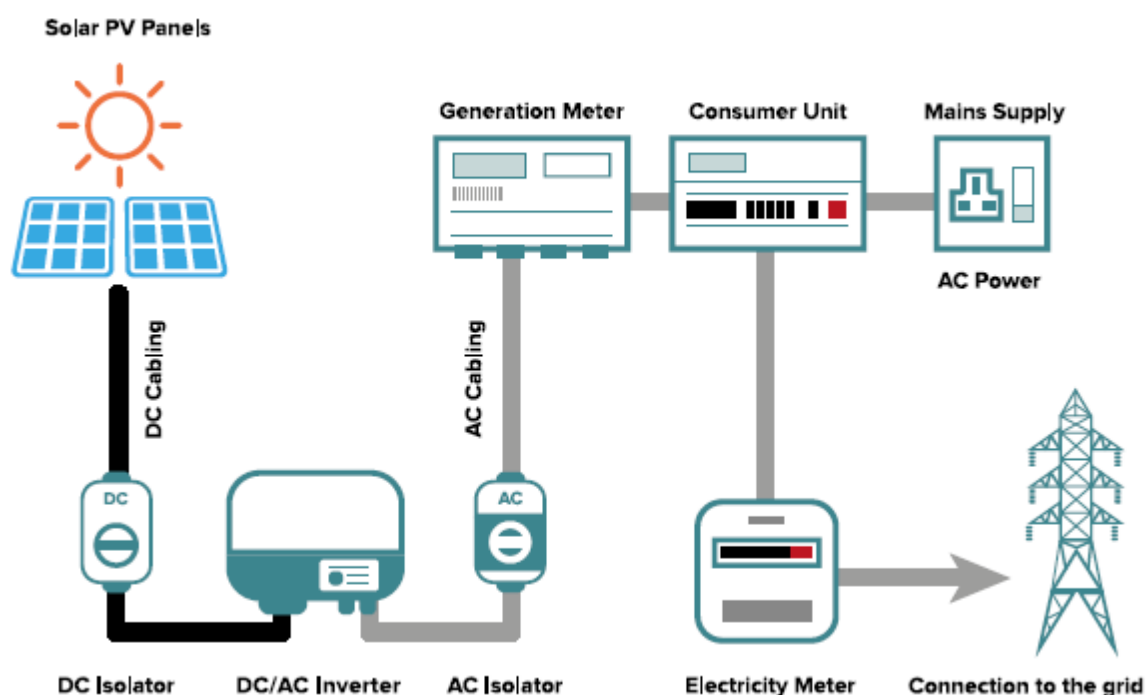




## Sheet 7. Solar PV Panels

Solar photovoltaic (PV) panels create electricity from the sun that can power household appliances and lighting. PV requires daylight – not necessarily direct sunlight – to generate energy.

### How it works



Solar panels are typically attached to the roof of a home, although they can be integrated into the roof instead. When light shines on the panels, this energy is converted into direct current (DC) electricity. The greater the intensity of the light, the greater the flow of electricity. Since most home appliances run on alternating current (AC) electricity, and only AC can be exported to the National Grid, DC is almost always converted to AC using an inverter. The inverter is generally found in the loft. The installation also includes DC and AC isolators on either side of the inverter. These allow the inverter and other parts of the system to be safely disconnected, if needed.

In order to record the amount of solar electricity being produced, the system is hooked up to a PV generation meter. Do not confuse this with your electricity meter when providing meter readings to your energy supplier. Most likely, you won't be able to use all of the solar electricity that you generate, and the extra electricity will be sent to the grid, a community energy scheme or, if you own an electric vehicle for example, a battery.

## Costs and savings

The costs of solar PV panels mainly vary on the size of the panels and their efficiency, although the type of inverter used will also influence the cost. The latest government data suggests that an average UK household can expect to pay close to £6-8,000 for solar panels, including the equipment, installation and connection costs. Solar panels can last 25 years.

A number of financial incentives can help with the cost of this technology. These include the Green Homes Grant Local Authority Delivery scheme, the Smart Export Guarantee tariffs as well as solar buying clubs, like iChoosr.

Save even more money on electricity bills once the panels are installed by maximising the amount of solar energy you use at home. By consuming as much generated electricity as possible, you reduce the amount of electricity you buy from the grid. One way to maximise this electricity is by using a solar diverter. This is also known as a PV booster, solar PV optimiser or solar immersion controller. These divert excess electricity generated by the panels to an immersion heater to heat your hot water. If, during this time, you switch something on that would exceed the amount of electricity produced by the panels, the immersion heater would automatically turn off.

## Key considerations

- **Roof area** Several factors will influence the size of the system, including roof area and home electricity use. An area of about 10-20 m<sup>2</sup> could deliver 20-45% of household electricity needs.
- **Shading** The roof space should be unshaded (e.g., few trees and no tall buildings). This is particularly important when using string inverters.
- **Orientation** The roof will ideally face South to take advantage of maximum daylight exposure. Tilt angle is also important. If you have a flat roof, consider tilt frames or frameless panels to avoid water pooling in the panels and eventually creeping in.
- **Permissions** Solar panels are permitted developments, so households should not need planning permission. Householders should nevertheless check with their local authority, as there may be limits and restrictions.
- **Warranties** Ask installers to include a performance warranty (typically 25 years), an installation warranty (5 years to guarantee workmanship) as well as a product warranty (10 years is good). The product warranty is the one you're more likely to use if there's a problem.
- **Electric vehicles** Consider oversizing your PV system if you plan to get an electric vehicle.
- **Community Energy Networks** Join a community energy group. As a renewable energy generator, you can sell your extra electricity at a competitive price. And as a purchaser, you can often buy local renewable energy at competitive prices.
- **Batteries** You may not get a good financial return on your investment if you add batteries to the mix. But if your goal is to gain energy independence from the grid, batteries may be appropriate. They are also useful in case of power outages. (Tell your installer if you plan to use the battery as back up power since you may only be able to run critical household items on it.