eco2solar

Solar PV System

Homeowner User Manual

Contents

Welcome

Dear Homeowner,

You have purchased a property which has a Solar PV system installed which will generate a proportion of your electricity from the Sun – congratulations!

The following document provides guidance on registering your system and how your Solar PV system works. Please refer to the contents of this document for any questions that you may have. Alternatively, we have a number of resources on our website which can be found here

www.eco2solar.co.uk

If you need assistance, or have any questions, please contact the relevant team, who will be happy to help:

For new customer care or to report a problem: customerservice@eco2solar.co.uk

For Warranties: warranties@eco2solar.co.uk

For DNO and G98 enquires: DNO@eco2solar.co.uk

For MCS enquires: MCS@eco2solar.co.uk

Additional resources can be found on our website:

www.eco2solar.co.uk

Activating your Solar PV system guarantee

It is important that you **register your system within 90 days** of moving in to your new property.

Your solar system has a 12 months parts and labour warranty. There is also a back-to-back parts and labour warranty in line with your housing developer warranty.

To register your warranty please register your details online at:

www.eco2solar.co.uk/registration/

Entering the following password:

Password: PV20020

You will need to enter the following details:

1) The developer you purchased your new home with
2) The development/site name
3) The plot number or house number that you purchased
4) Your name, postal address and contact number

Terms of Warranty

We offer our customers a 12-month parts and labour warranty. There is also a back-to-back parts and labour warranty in line with your housing developer warranty.

If you have any concerns or queries within the warranty period, then please contact our Warranty Team at warranties@eco2solar.co.uk.

Extended Solar PV system guarantee options:

To provide you with additional peace of mind we also offer the following extended warranty packages.

Option 1: An extra 1 year parts and labour warranty over and above your housing developer warranty: £550 (inc VAT)

Option 2: An extra 3 years parts and labour warranty over and above your housing developer warranty: £800 (inc VAT)

Our current call out charge for non-warranty installations is £350 plus mileage costs. Inverters have an estimated cost of around £500-£600 + VAT based on current prices.

How to extend your warranty

If you would like to purchase an extended warranty, please send an email to warranties@eco2solar.co.uk

In the email, please include the following details:

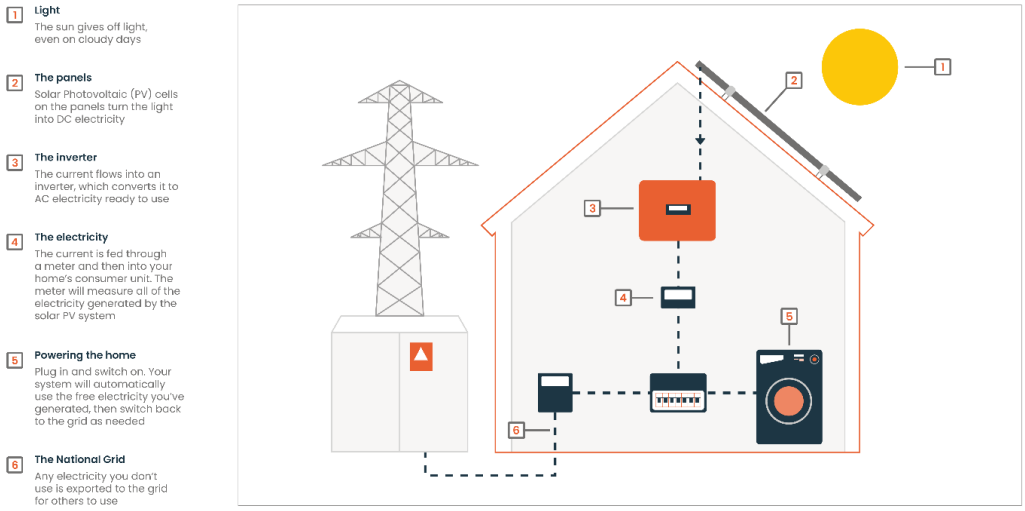
- Contact name
- Warranty Option you'd like to purchase
- Full address

Once received, our warranty team will be in contact to advise how to proceed. A confirmation letter confirming your maintenance plan will be issued upon receipt of payment.

Frequently Asked Questions

What is Solar PV and how does it work?

PV stands for 'Photovoltaics' and means converting light into electricity (as opposed to Solar Thermal which is heating water). The solar panels generate DC electricity from sunlight which is fed through an inverter to convert it into AC electricity. The inverter is connected to your consumer unit (fuse board) so the electricity can be used in your home.



Solar PV systems use cells to convert sunlight into electricity. The PV cell consists of one or two layers of a semi conductive material, usually silicon. When light shines on the cell it creates an electric field across the layers causing electricity to flow. The greater the intensity of the light, the greater the flow of electricity.

PV cells are referred to in terms of the amount of energy they generate in full sunlight; known as kilowatt peak or kWp.

On very sunny days, your PV system may generate more electricity than you use. In this instance, the excess electricity will flow to the grid to be used elsewhere on the electrical network. This is known as 'export'.

A typical Solar Energy System

Here are the main components of your PV System;

Solar photovoltaic (PV) panels

A photovoltaic (PV) panel, also known as a module, is a unit consisting of special cells that generate an electric current in sunlight that are linked together. When the sun shines over the cells, an electric field is created. The stronger the sun, the more electric energy is produced. Nevertheless, the cells do not need direct sunlight to work, and they can still produce electricity on a cloudy day.

A group of modules wired in series is called a string. The cell, the modules and the string formation lead to the end result which is the array.

- **The Inverter**
  The Solar inverter is one of the most important components of the solar PV installation and is the brain of the system. Generally located in the loft space, it converts the direct current (DC) from the panels into alternating current (AC) which can be used in your home. There are isolators either side of the inverter - the black and grey isolators on the DC side and the red and yellow isolators on the AC side. These connect the power from the array into the consumer unit via an RCBO (**R**esidual current operated **C**ircuit **B**reaker with **O**vercurrent protection).

- **Generation Meter**
  The generation meter is where you will be able to monitor what your system is generating. The meter will have a flashing red light when your system is generating, the brighter the day the faster the flashes will be. This is not an export meter or Smart meter.

- **Export Limiters (if applicable)**
  When there is solar electricity being generated but not being used, the excess is usually exported back to the grid. However, on some occasions this export will not be accepted by your Distribution Network Operator. In these cases, an export limiter must be installed. The export limiter caps or completely stops this exportation. The export limiter is fitted next to your consumer unit.

- **Cabling and connectors**
  DC connections and cabling are not the usual PVC/PVC twin and CPC cable used for domestic internal wiring. The PV wiring has to be durable and protected against voltage constraints, mechanical damage, movement, wind, rain and solar radiation (this is not an exhaustive list).

- **Energy Monitoring**
  Monitoring the system provides a good way of verifying correct system operation. Monitoring can be as simple as noting down the output of the PV system once a month and comparing it against the expected output. There are a number of solar PV monitoring systems on the market which can provide you with data on real-time and historic power generation.

Do solar panels need direct sunlight to work?

No, solar panels work in most daylight conditions but the more direct sunshine they receive, the better the generation will be.

How do I know when I am using power generated from the panels?

If there is a demand for electricity in the home (i.e. an appliance is switched on) the inverter makes sure that the solar electricity is used first (if it is available). If there is not enough solar electricity then more is drawn from the grid to top it up. This is automatic and seamless so you do not need to do anything to make it happen. Your electricity meter will continue to record the electricity you buy but it may tick over at a slower rate when your panels are generating electricity.

What happens to solar electricity not used in the house?

Any solar generated electricity which is not used in the home immediately will usually feed back to the grid (export). If you have a smart meter then you can sign up to a Smart Export Guarantee (SEG) tariff with an electricity supplier to be paid for any solar electricity that is exported to the grid.

Sometimes the grid operator advises us that it can't cope with exported power from solar PV systems in the area and they enforce export limitation. This means we would program the inverter to switch off if the home didn't require the electricity being generated, and prevent any excess from being exported to the grid.

Will solar panels power my whole house?

No, your PV system is unlikely to produce enough to meet your home's entire electricity requirements (and certainly not at night) but they will contribute towards lowering your electricity bills by reducing your reliance on the grid. Unless you purchase battery storage for the system, the electricity must be used as soon as it's generated or it will be lost.

Will solar panels save me money?
Yes, you should save money on your electricity bill. How much you can save depends on the utility rates, the size of the solar system installed and how effectively you use the electricity while it's being generated. Try to make the most of the free electricity by setting timers on your appliances (e.,g. washing machine, dishwasher) to run them in sequence throughout the daytime. Here is a useful link to give you quick tips to save energy. → https://energysavingtrust.org.uk/hub/quick-tips-to-save-energy

What savings can I expect from my installed solar panels?
The average domestic solar PV system is 3-4kWp in size and can generate in the region of 2,500kWh per year depending on panel wattage and other physical factors such as shading and orientation.

To get an idea of what 2500kWh will power, a 10kW shower uses approximately 1 kWh of energy in six minutes. In an average sized UK home of four people, assume that everyone is having one six-minute shower per day and you could be using 4 kWh of energy per day, or 1,460 kWh in a year, just on showers.

Visit the Energy Saving Trust for tips and advice on how you can reduce your energy usage. → https://energysavingtrust.org.uk/hub/quick-tips-to-save-energy

My electricity bills are really high?
If your electricity bills seem higher than normal, in the first instance call your energy supplier to check that you are on the most economical tariff. You can ask your energy supplier to install a Smart meter so that you can monitor your electricity usage. This will allow you to make informed adjustments to your usage.

Do I have to forward the generation meter readings to anyone?
No, you don't. If you register for the Smart Export Guarantee, you can ask your utility supplier to supply you with a Smart meter which allows your SEG provider to take readings remotely.

I have two meters, one inside the house (generation meter) and the other in the white box on the outside of the house (electricity meter). How is the electricity meter adjusted to take into account my generated power from the solar panels?

The outside box will be your electricity meter which, if you have a Smart meter installed, will tell your provider how much electricity you are using via modem. As the solar PV is used first within the property before drawing from the grid, your electricity meter will only show what has actually been consumed from the grid and thereby will be the amount you are charged for.

Does the electricity generated from my PV panels show on my electricity bill?

No, any electricity generated by your PV panels is not shown on your electricity bill.

Why are my solar panels positioned where they are?

The PV is designed to meet the developers specific set of criteria. The positioning and layout of the panels are specified having considered many of the following criteria; kWp specific targets, kWh specific targets, aesthetic/planning specific requirements, roofscape availability and many others. If you are unsure about the layout of the PV on a specific plot, please contact the developers technical department for details of the requirements.

I need to register my PV system

Your solar system has a 12 months parts and labour warranty. There is also a back to back parts and labour warranty in line with the housing developers warranty.

To register your warranty please enter your details online at:
www.eco2solar.co.uk/registration

Entering the following password: **PV20020**

You will need to enter the following details:
1) The developer you purchased your new home with
2) The development/site name
3) The plot number or house number that you purchased
4) Your name, postal address and contact number.

Guidance on solar panel maintenance

What maintenance do solar PV Systems require?

There are no moving parts to a solar PV system so they don't require any maintenance or servicing other than an occasional clean. Keep an eye on nearby trees in case they start to shade the solar panels. If you think there may be a problem, please contact Eco2Solar at customerservice@eco2solar.co.uk

Do Solar Panels need cleaning?

Generally solar panel arrays in the UK will not need heavy duty cleaning as they are designed to self-clean in the rain. However, depending on location, they may suffer from a high build-up of dirt, leaves, bird droppings or salt water if near the coast, etc. so cleaning the modules on a regular basis may be required, depending on the amount of soiling. The obvious danger is working at heights therefore, we would recommend you hire a professional – window cleaners often offer this service. No abrasive chemicals should be used, warm soapy water is fine. It isn't worth paying for yearly services or quarterly cleaning that you don't need.

I want to apply for the Smart Export Guarantee (SEG)

What is the Smart Export Guarantee?
The Smart Export Guarantee (SEG) was set up by the Government to replace the Feed-in Tariff and came into effect January 2020. If you generate solar electricity, are not already receiving Feed-in Tariff payments and you have a smart meter then you can sign up to an SEG tariff with an electricity supplier to be paid for any solar electricity that is exported to the grid. All electricity suppliers with more than 150,000 customers must offer an SEG tariff, but the rates will vary between companies. You don't have to apply for the SEG through the same company you buy your electricity from so shop around to find the best deal.

What documents do I need to be able to apply for the Smart Export Guarantee?

Homeowners applying for the Smart Export Guarantee (SEG) will require a copy of their MCS Certificate and proof of ownership of their property. This is to demonstrate their entitlement to the SEG payment. Your developer should provide you with your MCS Certificate with the handover pack when you purchased the property. If you haven't received this, please get in touch with your developer.

Proof of ownership can be obtained from the vendor of the property, in most cases the developer. This should be a copy of a letter from your Developer or Solicitor on their letterhead confirming the ownership of solar panels.

You may also be asked to provide proof of grid connection or a G98 Commissioning Certificate. This is provided to your developer, once your system is installed. If you haven't received this, please get in touch with your developer.

If you would like to access SEG tariffs, you will need to ask your energy supplier to install a Smart meter so that they can track your energy usage.

Eco2solar do not administer any SEG tariffs. Please contact your provider for any help and advice.

For further information, please see our Understanding the Smart Export Guarantee Guide on our website.

I need an Export MPAN. Where do I get this from?

When your PV system is commissioned, the Distribution Network Operator (DNO) is notified that your system is connected. If you decide to apply for the SEG, your provider should contact the DNO to request an export MPAN. The export MPAN is to

help identify the export supply from your meter so your SEG provider knows how much energy you are exporting.

What is the Feed-in Tariff?

The Feed-in Tariff (FiT) ended in March 2019. Homes with solar PV systems installed before this time could sign up to a fixed tariff with electricity suppliers which paid them for each unit of electricity the solar panels generated.

My solar PV system isn't working

How do I know if my system is working?

There will be a generation meter installed, usually near your fuse board, which measures every unit (kWh) of electricity your solar PV system produces. The figure on the display is cumulative, showing the total generated since installation so you should see the reading gradually increase. If you want to monitor how your system is performing you will need to keep a record of the generation readings at regular intervals, perhaps quarterly. You can then compare this figure to the Annual Estimated Generation figure on your MCS Certificate. Bear in mind the system will perform better in summer than in winter but if you think your generation has decreased or stopped then contact Eco2Solar at customerservice@eco2solar.co.uk. It's always a good idea to check your meter readings in the Spring. If there are any issues with your system, there's time to take a look before the sunnier summer months.

What happens in a power-cut?

If mains power is lost, your inverter will detect this and shut down immediately. This is a necessary safety function to protect people who may be working on the mains electrical network. So, during a power cut you won't be able to use any solar generated electricity. As soon as power is restored, your system will automatically switch back on, providing there is still sufficient daylight.

How can I monitor my solar PV usage?

We install a generation meter as part of your solar PV system. This will show you how much energy your system is generating. We do recommend that you check your generation meter regularly and take a note of the reading to ensure that your system is performing as expected. You can track your generation in line with your Annual Expected Generation, a figure that can be found on your MCS Certificate. There are many monitoring systems on the market to allow you to monitor electricity generation and consumption in more detail.

What's the difference between an energy monitor and a Smart meter?

Energy monitors are designed to help customers understand their energy usage. Smart meters are installed by energy companies to track and report a households energy usage.

Is my solar PV system covered under warranty?

What guarantees will my Solar Panels come with?
Your solar system has a 12 months parts and labour warranty. There is also a back-to-back parts and labour warranty in line with the housing developer's warranty.

Your solar panels will come with a manufacturer's guarantee of the panels' performance.

What is MCS and why does it matter to me?

MCS is an independent Government standards organisation; they create and maintain standards that allow for the certification of products, installers and their installations. MCS certified Installers, such as Eco2Solar Limited, have undergone a rigorous vetting process to demonstrate that they adhere to the standards. These standards demonstrate a commitment to quality. An MCS certificate is proof that your installation has been designed, installed & commissioned to the highest standard using only MCS certified products by an MCS certified installer.

What documents should I expect to receive from my developer?

I've just purchased my property. What documents do I need relating to my solar PV system?

Your developer is responsible for providing you with the MCS Certificate for your solar PV installation, together with a User Manual and details of the system installed on your property. This is usually provided in your handover pack.

Moving house?

Will a solar PV system affect me selling the house?

The solar panels installed on your property are owned by you and were purchased as 'fixture and fittings' as part of your property. The panels are not not leased. Solar PV should be seen as a positive feature by prospective buyers as it will contribute to lower energy bills compared to a house without solar. If you are registered for the Feed in Tariff scheme, you will lose any benefit from this. However, any prospective purchaser could potentially still receive these payments. Keep the user manual and MCS certificate as these may be required for the new owners.

I have bought a house from another homeowner where Eco2solar have installed the solar PV. What do I need to do?

In order to be eligible for any remaining warranty on the solar PV system, you will need to provide proof of ownership of the property from the purchase. You can contact us at customerservice@eco2solar.co.uk if you have any concerns about your system.

You also need to advise your energy provider that you have solar panels on your property. If the previous owner was registered for the Feed in Tariff, then you may be eligible to take on any future payments by completing the appropriate Change of Ownership forms supplied by the energy provider.

Does the PV system need to be switched off (as well as switching off the relevant circuit on the fuse board) if changing a socket etc in the house? (i.e working on one circuit and not the fuse board or PV system)

In this situation the PV system should be treated like mains electricity – if work is to be done on the consumer unit eg replacing the consumer unit or the addition of a new circuit, then yes the PV system needs to be isolated (switched off) just as the mains electricity needs to be isolated before works commence.
However, if working on a specific circuit, eg downstairs sockets, then only that circuit needs to be isolated in the consumer board. This will prevent any electricity (from mains or the PV) from being live in the circuit.

If so, can the PV system be turned off at the isolator next to the fuse board, or does it have to be turned off at the isolator in the loft? Or both?

Either AC isolator will disconnect the inverter from the mains and prevent it from working so only one needs to be used, but the one next to the CU is there to be easily accessible.

If the AC isolator in the loft is switched off, does the DC isolator have to be turned off too?

The DC isolator only needs to be switched off if the inverter or panels are to be worked on or replaced. Only qualified electricians should do this.

Useful links

Here are some great information sources and resources if you would like to find out more about Solar PV:

MCS – **www.mcscertified.com**
Solar Trade Association – **www.solar-trade.org.uk**
Energy Saving Trust – **www.energysavingtrust.org.uk**
Centre for Sustainable Energy – **www.cse.org.uk**
OFGEM – **www.ofgem.gov.uk**

Troubleshooting your Solar PV System

SAFETY FIRST

Please do not attempt to repair, disconnect or remove your PV system.

Always consult Eco2solar or a qualified electrician before carrying out any work.

Main components of your Solar PV

Generation Meter (GM)

This unit will show you all the energy that the Solar system has generated. It is also a useful tool for troubleshooting.

Inverter

Sometimes referred to as the 'brain' of the system, this is generally located in the loft space.

Only access the inverter if it is safe to do so. Make sure there are no obstructions with access or egress and ensure there is plenty of light especially when working at height.

Consumer Unit (CU)

Every home has one and it is where all your domestic electrical supplies are powered from.

Example 1. Fuse board and isolation switch

Example 2. - Inverter and isolation switches in loft space

Electrical Isolators

These allow you to switch off the electricity safely.

Troubleshooting

Generation Meter (GM)

The meter will have a flashing red light when your system is generating and this frequency will increase on sunny days. At night the red light will be constantly lit.

Inverter

The 'brain' of the system, this is generally located in the loft space and it is basically maintenance free. Once the inverter detects sunlight it will start up and begin to generate electricity. During start up you may hear several distinct clicks. This is the inverter synchronising with the network and this is normal.

Consumer Unit (CU)

The 230V Mains Supply from the CU to the inverter will be clearly indicated by a 'PV' label. It's important to remember, if your inverter has no mains power then it will NOT send electrical energy back into the CU or network. This is a built-in safeguard which protects engineers while working on the Network during a power outage.

Electrical Isolators

These are used in the unlikely event of an emergency or for safe isolation. The electrical isolators are ON when the switches face upwards to the 12 o'clock position. The A.C. isolators are clearly labelled 'PV System – Main A.C. Isolator'. One isolator will usually be located by your domestic Consumer Unit and the other one is next to the Inverter. The grey and black Isolator is for the D.C. solar panels supply, again clearly labelled as 'PV Array D.C. Isolator' and is located by the inverter.

Power Outage

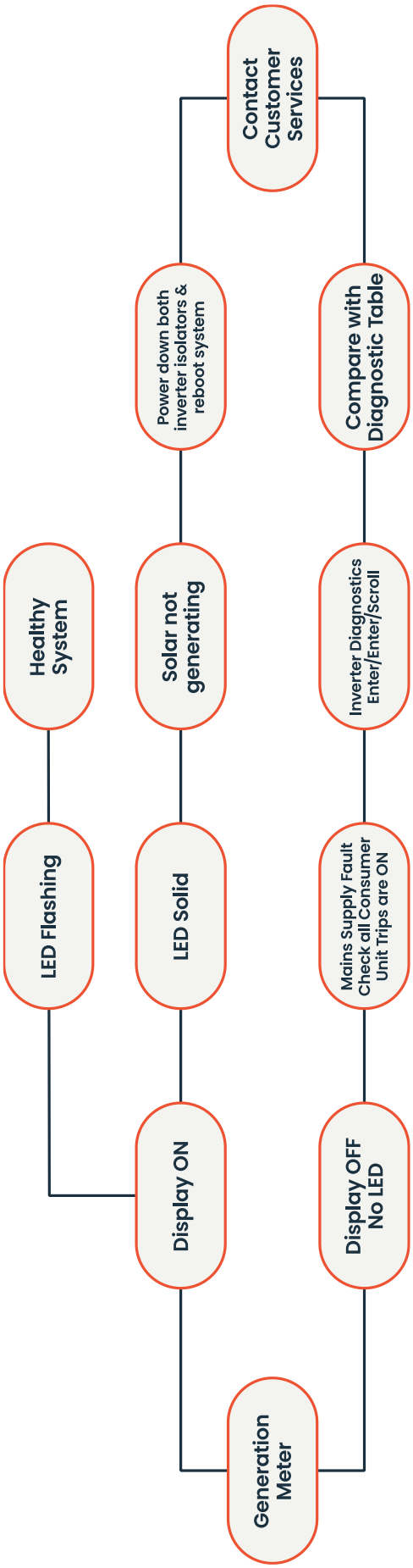
If the mains supply is disrupted to your home the system requires no intervention and will automatically restart.

Troubleshooting table

ID	Device – Description	Healthy State (arbitrary values only)	Mains A.C. fault	D.C. fault/ night time	Home Owners Values?
01	Generation Meter - Display	On	Off	On	
02	Generation Meter - LED	Flashing	Off	Solid	
03	Inverter - LED	Red/Green	Red/Amber	None	
04	Inverter - Display	On	On	Off	
05*	Inverter - V_DC1	300V	300V	~	
06*	Inverter - I_DC1	8.4A	0.00A	~	
07*	Inverter - V_DC2	300V (if applicable)	0000.0V	~	
08*	Inverter - I_DC2	8.4A (if applicable)	00.0A	~	
09*	Inverter - V_Grid:	235V	000.0V	~	
10*	Inverter - I_Grid:	5A	00.0A	~	
11*	Inverter - Status:	Generating/ Waiting	No Grid	~	
12*	Inverter - Power:	1350W	0000W	~	
13*	Inverter - F_Grid	50Hz	00.00Hz	~	
14*	Inverter - Total Energy	1234kwh	1234kwh	~	
15	Inverter – Alarm Message	~	~	~	

* Diagnostics and fault finding can only be carried out during the daytime when the system is generating electricity. Only access the inverter if it is **SAFE** to do so. To access the inverter information screen, press ENTER twice and the screen will auto-scroll, please see table. Use this table to record and check your observations on your solar PV system.

Troubleshooting schematic



Supplementary information

The classic approach to all electrical systems should be taken. First – turn everything off, wait for 1 minute and turn everything back on again. Remember that your inverter will take up to 3 minutes to reconnect to the Grid.

If all the switches and isolators are on and you're still not getting any power from your solar PV system and have checked all of the steps above then please send us an email at **customerservice@eco2solar.co.uk** with your details and photographs of both your generation meter and inverter. Eco2solars highly skilled Customer Service team will assist in getting your system back online and minimise any downtime and if necessary, arrange for an engineer to visit and inspect your system.

Nuisance Trips

If your PV system appears to be causing the household electrics to trip then you should isolate the PV for 7 days. Whilst isolated, please monitor your RCD. If the RCD does not trip whilst the PV is isolated, we would need to attend and investigate. In this instance, please can you report your concern and send us a photo of your consumer board showing the device that is tripping to customerservice@eco2solar.co.uk.

Insurance

We suggest that you contact your insurance provider and add the system onto your current policy.

Fire Brigade

In the event of a fire occurring in a solar powered home, INFORMATION can reduce the risk to fire fighters and allow them to do their job without being impeded.

Informing your local fire services that you have a solar power installation will allow them to be ready to deal with the situation in the best way they can when they arrive.

We recommend you inform the local fire department that your building has been fitted with solar modules. Often, fire fighters only learn that the building is equipped with a solar system when they arrive on the scene. This is a problem because solar rooftop installations demand a different approach both in terms of safety and because traditional extinguishing methods do not apply to electrical systems. Not only does the rooftop position, risk of falling glass and slippery surfaces of the modules need to be considered, but so too does the system's high DC voltage.

In the absence of any kind of national database of systems, the responsibility falls to the owner of the system to inform the local fire department about the location and type of PV on their buildings, preferably as soon as the system is installed and at the very latest when the emergency call is made.

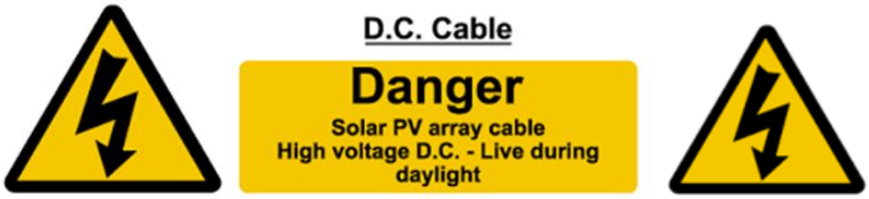
Note: The policy of both the manufacturing and the installing company is not to use any materials that are hazard to the environment.

Specification is subject to change without notice.

Important Notes

Safety

Your solar PV system produces DC electric current. As with all electrical connections and circuit there is a risk of electric shock so circuits should be isolated before they are touched. We strongly recommend that any work is carried out by Eco2Solar or an electrician qualified to work on AC and DC circuits.



Emergency Shut Down of PV System

In case of emergencies, the PV installation can be forced to stop power generation and disconnected from the main building electrical supply by carrying out the following steps:

1. Turn the AC isolator marked EMERGENCY SWITCH to the OFF or "O" position.
2. The AC connection to the inverter will be lost.
3. The inverter will detect the loss of AC, will immediately remove itself from the AC distribution system and will switch its DC inputs to "open circuit" mode.
4. Turn the DC isolator located next to the inverter to the OFF or "O" position. IMPORTANT: There will be no DC current flowing through the cables, however DC voltages will still be present during daylight.

How to contact us

Contact our Customer Service team for questions, queries or to report a solar panel issue.

customerservice@eco2solar.co.uk

Our offices are open 8.30am to 5pm Monday to Friday