



A Homeowner's Guide To Solar PV

What are Solar Photovoltaics (Solar PV)?

The term 'solar panel' is often used interchangeably to describe the panels that generate electricity and those that generate hot water.

- Solar panels that produce electricity are known as solar photovoltaic (PV) modules. These panels generate electricity when exposed to light. Solar PV is the rooftop solar you see on homes and businesses. Solar electric panels capture the light from the sun and convert it into the electricity that is used in your home to power your TV, kettle, toaster, phone charger, radio, oven, and so on.
- Solar panels that produce hot water are known as solar thermal collectors or solar hot water collectors.

SEAI provides grant support for both Solar PV and Solar Hot Water Collectors. This guide focuses on Solar PV for renewable self-consumers.

How can you benefit from investing in Solar PV?

- Reduce your electricity bills by generating your own renewable electricity.
- Increase the efficiency and add to the value of your home
- Reduce your reliance on electricity generated from fossil fuels
- Support the environment by reducing your greenhouse gas emissions.

Solar PV is a reliable and sustainable source of renewable energy that can help reduce your reliance on grid electricity and the related cost volatility. Once installed, solar PV will provide electricity quietly, cleanly and affordably for 25 or more years with minimal maintenance requirements.

Installation of domestic solar PV system

A domestic solar PV system consists of a number of solar panels mounted generally to your roof and connected into the electrical loads within your building. The solar panels generate DC (direct current – like a battery) electricity, which is then converted in an inverter to AC (alternating current – like the electricity in your domestic socket). Solar PV systems are rated in kilowatts (kW). A 1kW solar PV system would require 3 solar panels on your roof.

Any excess electricity produced can be stored in a battery, or other storage solution like your hot water immersion tank. It can also be exported from your house into the electrical network on your street.

Generating electricity from solar PV

Solar PV systems generate electricity during daylight hours only, predominately around the middle of the day. In Ireland, around 75% is produced from May to September. If this electricity is not used in the home, it is exported to the grid.

It is desirable to maximise the amount of solar electricity you use in your home. You can do this by sizing the solar PV system to meet your demand.

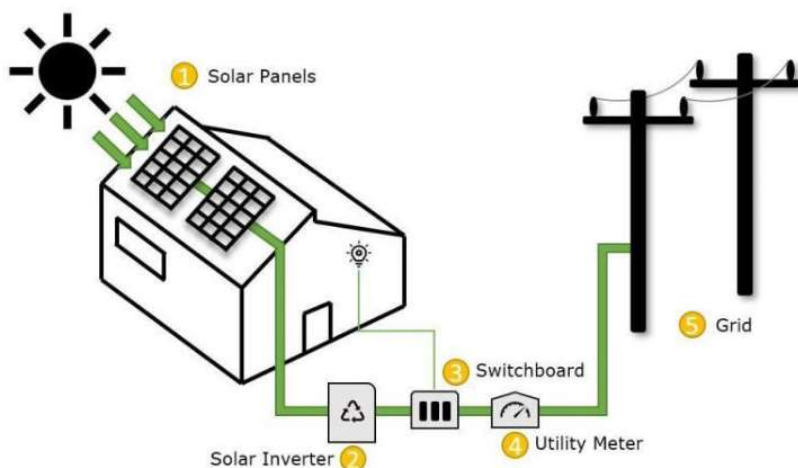


Figure 1: Solar PV arrangement including inverter and battery

Considerations

When to invest

Before considering an investment in solar technologies, it is also important to assess the energy performance of the whole home. We recommend the following approach to improve the comfort of your home and reduce your carbon footprint:

1. Ensure your home has a good energy performance rating (BER). This means insulating walls, attic and ensuring that you have good double or triple glazed windows.
2. Upgrade your heating system by installing a heat pump.
3. Consider Solar PV or Solar Thermal.

Roof orientation

- The most suitable roof is south facing and generates the most electricity. However, any roof in good condition with no shading could work well. Shadows on solar panels can greatly reduce their ability to generate electricity, especially those caused by objects less than 10 metres from the panels.
- Solar panels are expected to last over 20 years. Your installer should check that your roof is in good condition for a PV system.
- Installing solar panels on your roof will typically mean that additional timber roof support needs to be added to you roof. The solar panel racking system is attached to these new timber supports.

Sizing the array

The size of the Solar PV system you purchase will depend on a number of factors,

- Amount of electricity you use in your home
- Time of day you are at home
- Orientation of your roof
- Available area: the available roof area may restrict the system size, particularly in smaller homes.
- Self-consumption: for a given installation the more of the energy that can be used on site the better.
- Budget: often the available budget is the dominant constraint.

Your selected installer should discuss all of the above factors with you. Your installer will also check your current and past electricity consumption to calculate the appropriate system size.

Equipment

SEAI offer guidance to solar PV companies on the type of systems that are eligible for grant funding under the solar PV scheme. This includes guidance on performance eligibility, installation, certification and design.

- A typical solar array consists of several solar PV modules. These modules are typically 1.8m x 1.0m, approximately 40mm thick and weight in the region of 20kg each.
- The modules are fixed to the roof by a mounting system, a metal system of rails, clamps and hooks that keeps the array securely fixed to the roof. Modules can be arranged in in both landscape (horizontal) or portrait (vertical) orientation. This depends on the orientation of the roof, the required number of panels and existing roof obstructions (chimney, skylights etc).
- The cabling generally runs from the PV array and into the home to the inverter. The inverter is the mechanism that converts the PV generated DC current to AC. This inverter will be sized to suit the size of your solar array. If you are installing a battery, or plan to at a future date, you will need a hybrid inverter.
- Optional extras include batteries and hot water diverter.
- The battery is an energy storage solution that allows you to store the energy generated from your solar for later use in your home. Batteries can also allow you to charge from the grid at night, further reducing your energy costs. There are several variables when deciding on whether to install a battery and these should be researched and discussed thoroughly with your Solar PV company.
- A hot water diverter allows you to divert energy generated from your solar PV to heat hot water in your tank. It is a cost-effective way to maximise the energy produced from your solar PV system.
- Most Solar PV systems now come with an energy monitoring system or are compatible with monitors that can be added later. These are an effective way to monitor the energy produced, energy consumed, and energy exported.
- You do not need a smart meter to avail of the SEAI grant.



Figure 2: PV Module



Figure 3: Inverter



Figure 4: Diverter



Figure 5: Battery

Operation and Maintenance

Solar panels generally require very little maintenance in order to function, given the fact that they are effectively self-cleaning. They may occasionally need is a light cleaning to make sure dirt, leaves, and other debris are not obstructing sunlight.

- Maintenance of your electrical system should follow the advice of ESB Networks (<https://www.esbnetworks.ie/docs/default-source/publications/the-safe-use-of-electricity-in-the-home-booklet.pdf>)
- After installation, your solar PV company will provide you with an operation and maintenance manual as well as data sheets and warranty information for the components.

- Make sure your company/installer shows you how the system works and how to operate the system to achieve consistent optimum system performance.
- Ask your solar PV company about their after-sales service and replacement parts should they be needed.

Installation Costs and Payment

- To understand the financial benefits, you should consider payback period cost of installation and the reduction in electricity required from utility provider
- Ask your Solar PV company for the detail of what is and is not included in their quote, including parts and labour costs, VAT and extras like battery, hot water diverter or monitoring system.
- Make sure you are clear on whether the grant is included or not and what the expected value of the grant is based on the size of your system.
- Ensure you are clear on any additional cost to the above quoted figures to complete the installation and whether there are financing options and payment terms.
- Grant payments from SEAI will only be processed when all documentation has been received from your solar PV company. Please make sure your installer provides you with *all* essential documents and uploads this to your online application..

Requirements for SEAI Grants

- The Applicant must first apply for and receive grant approval, they will then have 8 months to complete the works and submit the Declaration of Works and required documentation.
- All systems installed must comply with the requirements set out in the Code of Practice as published on the SEAI website and the Declaration of Works must be completed and signed off by a Solar PV Scheme Registered Installer. In addition, registered Installers must provide homeowners with the following in order to achieve compliance under Scheme Rules:
 - Datasheets for components
 - Warranties for components
 - Operation & Maintenance (O&M) Manual
 - Basic start up, shut down, safety, operation and maintenance instructions
 - Estimation of system performance
- The maximum grants levels are outlined on the SEAI website <https://www.seai.ie/grants/home-energy-grants/solar-electricity-grant/>
- Homeowners are required to complete a Building Energy Rating (BER) on their home after the supported works have been completed and signed off.
- Grants may only be claimed after the measures are fully completed and the company has been paid by or has entered into a financing agreement with the homeowner.
- The contract of works agreed is between the Homeowner and the Contractor only. SEAI accepts no liability or responsibility for any breach of contract between the Homeowner and the Contractor. SEAI does not approve the contractors/installers.

For the full list of Terms & Conditions please refer to the Solar PV Scheme Application Guide, available at: <https://www.seai.ie/grants/home-energy-grants/solar-electricity-grant/Solar-PV-Scheme-Guide.pdf>

How to sell electricity back to the grid

Homes with PV systems that generate more energy than they consume can now export that excess to the grid and benefit from a payment for that exported electricity. This payment is known as the Clean Export Guarantee (CEG) and is essentially a feed in tariff. This tariff will be paid at a 'competitive market rate' from your electricity supplier. Each supplier will set their own rates so you will need to contact your electricity supplier directly for details of their CEG rates.

The CEG will be available to both new and existing micro-generators, subject to the eligibility criteria.

You will need to have a suitable ESB Networks export grid connection to avail of the CEG.

You will also need to have a smart meter installed to get paid precisely for what is exported. If you do not have a smart meter installed, you will get paid based on a *deemed volume* assumption determined by the CRU.

You will continue to be able to apply to the Sustainable Energy Authority of Ireland (SEAI) for a grant towards the cost of installing equipment.

- for information on the Clean Export Guarantee (CEG) contact your electricity supplier in the first instance
- for information on grid connections, contact ESB Networks
- for information on grants, contact the Sustainable Energy Authority of Ireland

