

How Solar PV works and the components of Solar PV Systems



Substitute the Kstar inverter and battery for above hybrid and batter visual

Over the past five years Ireland has seen a major uptake on the installation of Solar PV systems to generate electricity for home use with uptake accelerated by grant aid being launched by the SEAI in November 2018 for Solar PV Panels for houses built before 2021. Ireland is following the model of many EU countries like Australia, Germany, and the UK where Solar PV is actively lowering the countries carbon footprint by enticing people with grants to generate their own electricity. The process of converting sunlight into electricity using PV systems produces zero greenhouse gas emissions.

Excess electricity can be directed into the grid where your energy supplier will be happy to pay you a FIT (Feed -In-Tariff), or it can be stored in a rechargeable battery for later use. Batteries can also provide back-up power in the event of blackouts.

A solar PV panel and battery system offer greater energy self-sufficiency. It's also a major step in the transition away from fossil fuels.

Payback period

The cost of a home solar PV panel system starts from around €6/7000 for a basic installation, with SEAI grant aid up to €2,400 subject to the year your home was built. IS YOUR ROOF RIGHT FOR Currently before 2021.

Solar PV is intended to be an investment that, once paid for, will save its owner money by generating free electricity during daylight hours. As units of electricity are now costing up to 50p per unit (kWh) payback periods have improved greatly.

Depending on your requirements and system we can work out a detailed payback for your system but it is currently between 6 -10 years.

For an accurate payback picture we can analyse your last six energy bills and establish the number of Kwh's your home has consumed over a year. This will enable us to calculate the best size and options for your home and advise you on potential savings now and over the next 20 to 30 years.

The optimal Solar PV systems for your

A solar PV system is a long term investment and as such you should ensure that you install the best possible technology tailor made for your home.

Understanding your household energy system is very important when considering a solar system. If your home is occupied throughout the day then a solar system without the benefit of battery storage may be fine, however if like many families your peak demand is in the morning and evenings then a battery system may be the most suitable and efficient system.

As solar energy production peaks during daylight hours you should consider scheduling the use of high electrical consumption items like washing machine, dishwasher, tumble dryer, oven during the daylight hours. This can be achieved using smart timers or apps which will allow you to time the use Dishwashers, Washing Machines and Tumble dryers when solar production is at its peak.

For hot water and heating, a heat pump system is the most energy efficient way to heat your home.

PV systems will contribute towards your general electrical consumption as well as the electrical consumption for heating your home and your hot water cylinder.

Solar PV Panels

Rooftop solar power is a cost-effective solution for your home. Although solar panels come with a significant upfront investment, they have long-term benefits for nature and the community.

Rooftop solar panels rely on how much energy a solar cell (small square-shaped silicon device) can hold to capture the sun's energy and convert it to power. When sunlight reaches a solar cell, chemical processes occur, releasing electrons and generating electric current.

Photovoltaic cells, like those found in solar calculators, make up most rooftop solar panel cells.

Weather conditions such as air temperature and snow have no effect on rooftop solar panels. On the other hand, PV cells must have clear access to the sun's rays to properly collect solar energy.

As a result, shade can diminish output from the solar panel cells. For best results, the panels should be installed on the east or south side of your roof to ensure that they aren't too close to any tall buildings or trees that could block the sun as it moves during the day.

Another factor to consider when placing solar panels on a rooftop is their size. The scale of your PV system is determined by the roof size, the amount of electricity you want to create, and your budget.

IS YOUR ROOF RIGHT FOR SOLAR PANLES

Most roofs are equipped to handle the installation of solar panels. However, key factors will determine the cost, size, and efficiency of your solar energy system.

Direction

North-facing roofs often lack direct sunlight, making them the less desirable choice for solar panels SO South and East West orientation is best.

Shade

Your panels should be exposed to a minimum of five hours of sunlight each day. If large trees or buildings obstruct the sun from shining on your roof, they could prevent solar panels from working effectively.

Angle of the Roof

The ideal angle for installing solar panels is 30 degrees. However, anywhere from 0 to 45 degrees is acceptable. If you have a flat roof, tilted racks are used for mounting your solar panels.

Type of Roof

Rooftop solar systems are most successfully mounted on tile or slate roofs in domestic dwellings while flat roofs can have mounting systems installed and corrugated roofs work well in commercial and farm settings.

Feed-in tariff

Feed-in tariff is the rate you are paid by your energy retailer for electricity that you export to the grid.

Feed-in tariffs differ among retailers and are subject to change, please check rate with your provider, ESB Networks will install a smart meter in your home which will record how much excess electricity you have exported to the grid and a credit will be issued via your electricity bill.

Solar inverters are an essential component of a solar PV system. They convert the direct current (DC) output of solar panels into alternating current (AC) electricity for use in the home.

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Immersion Diverters

An Immersion Diverter sends your excess electricity via your immersion circuit to heat the water in your hot water cylinder.

Hybrid inverters

Hybrid inverters such as the K-Star inverter allow you to add a battery to the system with relative ease. A hybrid inverter can be installed and used before batteries are in place, making it a good option for an expandable system.

Hybrid inverters rather than sending the excess electricity to a water diverter or to the grid, they can read how much is required in the home and send the excess electricity to batteries to be used at a later stage when needed.

Be sure to discuss the options, including future upgrades or expansion possibilities, with your retailer and installer.

Battery Storage

Rechargeable solar batteries store the 'excess' electricity generated from your solar PV system, boosting your energy capacity and making power available for use at night time, on cloudy days, or when there is a higher demand in the house than the PV panels are generating.

If you have battery storage installed, you can also charge your battery from the grid if you have a night rate meter and then use it during the day when required. This is greatly beneficial during the winter months with shorter days and poorer solar radiance.

Cleaning and maintenance