



RISE

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Fitting Solar Photovoltaic (Solar PV) Systems

Toolkit

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Introduction

Solar panel systems can be fitted to current homes to provide electricity to the home during sunlight hours. This energy can really help the resident reduce the amount of electricity that they need to buy from their energy supplier, reducing their energy bills and helping the resident's financial situation.

The systems can be fitted directly onto the roof of homes, roofs of outhouses, garages or storage areas as well as being ground mounted in the garden. Ideally the PV panels need to face south, but they can also face east/west and still create enough energy. North facing may be suitable BUT you need to do research as to how much energy you are likely to produce and if it's worthwhile.

Different ways of fitting Solar PV panels

Bolt on panels

Bolt on panels are, as they sound, bolted onto the existing roof. There are two main methods of Installation.

One installation option involves lifting several tiles to attach rails to the roof's rafters, then the tiles are refitted around the brackets and then the solar panels are fitted to the rails.

Alternatively, rails can be attached to the rafters by drilling through the tiles. The solar panels are then fitted to the rails. It is important to note that this method of installation is made watertight using sealant around the drilled tiles.

Key things to check when these are fitted.

- The bolts hit the rafters and are driven into them for secure fitting.
- Any cabling/piping along the rafters are not impacted upon by the bolts going into them.

Inlaid panels

Inlaid solar panels are fitted as part of the roof system. This means that the roof tiles are fitted around the solar, which in turns mean they are less visible because they don't stand proud of the main roof tiles. If you are replacing the roof at the same time as fitting solar PV, then this is a great option for the roof.



Source: Marley Solartile;
marley.co.uk

The costs of the system could offset the price of new tiles for the roof, which could make the roof replacement and solar fitting together cheaper.

Alongside this, if this system is completed together by one contractor, then you have more assurance about guarantees and warranties. Whereas if the roof is fitted by one contractor, and then a bolt on system is added afterwards it may invalidate the warranty for the roof.

Solar PV tiles

As with all technology, there are ongoing technological developments. In this case, there are solar PV tiles, that replace the roof tiles.

Tile systems can be advantageous in conservation areas, national parks and on heritage buildings because they detract less from any special character being conserved. But the costs of these panels are much higher than the other systems. They are also less efficient, harder to keep clean and require more maintenance so are only an option for areas where there are restrictions.



Source: Nulokoroofing.com

Flat roofs

On flat roofs, solar systems can be mounted using a frame. This frame can either be secured by bolts to the roof or with weighted frame systems. These frames hold the panels so they can gain the most benefit from the sun.

Ground mounted

In some areas, it is cheaper and more convenient to have ground mounted solar panels. In an area of your garden, you can mount traditional solar PV panels into a frame to hold the panels at the required angle. This makes fitting easier, as there are no costs for scaffolding, etc., and easier to clean. But you will need to ensure that they are not shaded by plants/trees.

Inverters

An inverter is what transforms the Direct Current (DC) produced by a solar panel, to Alternating Current (AC). Alternating current is the type of electricity that can be used within our homes. Inverters can come in a variety of different forms.

String inverters

These are used when the solar PV panels are all connected in series. It means that the energy circulates through the system to a central inverter, which is fitted in the home. Both the contractor and landlord need to decide where best to install this inverter within the home. This is generally the cheapest way to do this. However, as

all the panels are in series, if one panel is shaded it can reduce the energy creation across the whole array. If a panel breaks or there is a wiring problem all panels stop working.

String inverters are not recommended to be fitted into loft spaces, due to changes in temperatures. You need to think about where is best to fit the string inverter in a home. This may also lead to your decision making on the type of inverter you fit.

Micro Inverters

This is when each solar panel has its own small inverter. It does not apply to PV tiles. This removes the need for a central inverter to be fitted in the home. It also means that the panels operate separately, which removes the risk of the system being affected if one panel is less efficient or breaks. However, it can increase costs for any maintenance or replacements. Microinverters typically cost around 50% more than string inverters, where for a system comprising of 10 panels, a string inverter would cost around £1200, whereas micro inverters would cost closer to £1900.

There are some other variations of these inverter systems that can help optimise production. Before deciding what to do, take advice in relation to that specific home.

Microgeneration Certificate Scheme (MCS)

"...MCS sets, defines and maintains the standards for low carbon energy technology products, contractors and their installations." Mcscertified.com

MCS certification helps ensure that the Solar PV panels have been fitted correctly, to the best standards. This gives you confidence that the panels will work in the most effective way and are safe. An MCS installer will provide you with a certificate at the end of the install to show that the system has been fitted and meets the standards required. They should also ensure that the resident knows how to use the system and handover all relevant information.

As MCS installer should assess the condition of the roof, particularly its capacity to hold the weight of the panels and any potential wind loading. This may affect the decisions you make on the type of panels that you fit to that roof.

If you want to export any unused electricity to the grid, you will be asked for your MCS certificate by the Distribution Network Organisation (DNO). The energy provider will ask to see this MCS certificate, alongside the consent from DNO and if relevant permission from the landlord.

Distribution Network Organisation (DNO) applications

The DNO owns and manages the infrastructure that carry electricity throughout the region. They need to be aware of, and in some situations approve, all micro generation happening on homes that they provide the infrastructure to.

Each DNO has slightly different approaches as to how they consent Solar PV being fitted to homes. It's important to contact the DNO early to discuss what you are aiming to do and what the process will be.

Generally, for small solar PV arrays a G98 application is required. This is purely a notification process, so they are aware of the solar PV generation. For larger arrays permission is required before connection.

These can take time, so start early and talk to the DNO as soon as possible.

Planning applications

In many places solar PV can be fitted as part of permitted development, with no need for planning permission. However, if you live in a conservation area or a national park, you may need to ensure you work with the local planning authority to ensure you don't fall foul of any local regulations. In this situation many of these authorities have guidance available on fitting solar PV and solar thermal.

They may require you to use inlaid solar panels to reduce the visual impact of the solar panels, or position them on certain roof slopes.

Bird caging

This is a netting or similar system that goes around the solar panels to prevent bird nesting in the solar panels, which can impact residents and the efficiency of the panels. For example, as well as being a nuisance, foul from nesting birds can affect the panels' efficiency and lead to damage.

Maintenance and checks

The systems need some regular servicing, maintenance and eventually replacement. It's important to ensure you understand and plan for the regular servicing and maintenance of all elements of the systems you have fitted. All checks and maintenance should be in line with manufacturers recommendations.

Cleaning of solar PV panels may need doing more regularly in some areas of the country. For example, if you live on the coast, the panels may be covered in dust and sand and become less efficient. It is recommended to hire professional solar panel cleaning companies to maintain your solar panels, however it is important to check with your manufacturer before cleaning solar panels.

Lifespan

The lifespan of different elements of the systems can all be different. Solar PV panels are individual micro inverters are both expected to have a lifespan of 25-years. Sting inverters have a shorter lifespan of around 8-10 years.

At time of fitting, ensure you understand the different elements of the systems, so you can plan for the necessary ongoing replacement.

Fire risk assessments

If you are fitting solar PV in rented accommodation, it is important to revisit your fire risk assessment for the home. The fitting of an inverter and battery creates risk, which needs to be taken into account in your fire risk assessment.

Smart Export Guarantee

Excess energy created by solar PV can be sold back to the grid. The rate that the energy supplier buys the energy from you is much lower than you pay for energy from the grid. So, it is always much more economical to use as much energy from the solar PV as you can, instead of selling energy to the grid. For example, running your high energy appliances during the day, when the solar is creating energy instead of an evening when there is no energy being created by the solar.

The Smart Export Guarantee is a way of selling any excess energy back to the grid. You enter a contract with an energy supplier in the same way that you do to buy your energy. They then pay for all energy that is exported. The resident can do this, with the landlord's permission or the landlord can set this up for each of their homes with solar PV.

To do this, it relies on the home having an export meter, which is part of the specification at time of ordering.

Conclusion

Solar PV can make a huge difference to residents' energy costs, while also reducing the carbon footprint of those homes and supporting the grid with their Net Zero ambitions.

By taking some time thinking through what you want, how it can fit with any short or long term replacement systems, and ongoing maintenance and repair you can manage the fitting of solar PV to your homes in a way that will make a huge difference to the people living in those homes alongside reducing fitting costs.

Key aspects to consider:

- The type of solar panel that is best suited to your property.
- Which inverter suits your solar system, this could include the cost or lack of space to install a string inverter within the home.
- Pre plan aspects prior to installing your solar system including DNO approval, any planning restrictions, maintenance costs and the solar export guarantee.



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