RISE | Retrofit information, support & expertise

Solar PV in domestic retrofit

Supply chain advice pack

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Introduction

Solar Pholtovoltaic (PV) is a highly cost-effective solution that utilises otherwise unusable space within the home. For retrofit projects adding solar has one of the minimum installation disruption for the occupants, as well as helping to improve the EPC ratings as part of a decarbonation program. A 2-3kW solar system can improve the EPC of a property by 1-2 bands, for example a D rated property may be improved to a EPC band C or B[1].

The addition of solar PV onto a building can help to reduce the energy bills in a medium sized home by an average of £330 annually. [2]

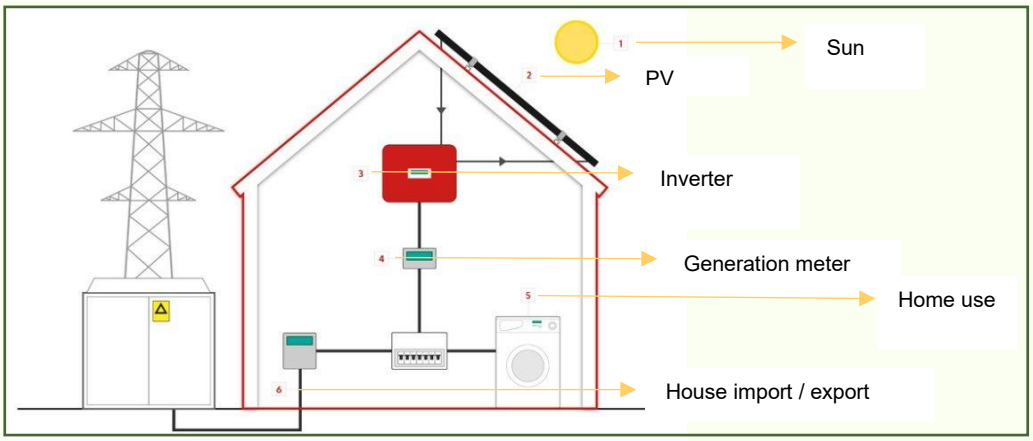
This advice pack will cover the basics of solar PV, funding requirements, technical considerations, battery storage and resident engagement.

The basics of Solar PV

The standard size of a residential solar panel is 1.7 metres long and 1 metre wide, with a thickness of 3-5 centimetres. Each panel can generate around 400W-450W of electricity when the sun shines [3].

Unlike solar thermal panels, which generate hot water, solar PV converts sunlight into electricity using solar 'cells'. These cells are made from thin layers of silicon and semi-conductor materials sandwiched together and encapsulated between layers of glass[4]. Electricity leaves the panel and passes through an inverter system that makes it ready for use in the home. Solar panels are typically installed on roofs to maximise exposure to the sun.

The diagram below shows the typical components in solar PV system [5].



[1] The Impact of Solar Panels on EPC Ratings: What You Need to Know - EPC Rate
[2] Price assumptions are based on OFGEM data. 1-2beds=2kw solar, 2-3 beds = 3kW solar, 4-5 beds = 4kW solar, with 20% solar energy used in the house
[3] Solar Panel Sizes & Dimensions UK (2026)
[4] How does solar power work? | National Grid
[5] British Gas Feed-in tariff (FIT) rates and guide - Numbers

Components of Solar PV panels

Solar PV panels consist of 6 unique components, these are; the frame, glass, an encapsulant, the solar cells, a back sheet and the junction box. The **solar cells** convert the energy from sunlight into electricity.

Smart Export Guarantee (SEG)

SEG enables residents to sell unused solar energy back to the grid. If they generate more solar energy than they need, SEG allows them to earn a small amount of income by exporting this excess energy back into the national grid.

In order to sign up for a SEG, residents will usually have to provide their chosen energy company with;

- Micro generation certification (see below for more information)
- District Network Operator (DNO) applications
- Homeowner permission

Microgeneration Certificate Scheme (MCS)

MCS certification ensures that solar PV panels are installed correctly and meet high industry standards. This ensures assurance that the system will operate efficiently and safely. As an MCS-certified installer you will issue a certificate once installation is complete, confirming that the system complies with the required standards. You should also make sure the resident understands how to operate the system and provide all relevant handover information.

Adherence to MCS guidance is required for any projects which make use of either of the Warm Homes funding schemes.

Battery storage

Battery storage is typically used in conjunction with solar PV, allowing surplus electricity generated by the solar panels to be stored for later use. This is beneficial as when electricity is generated by solar PV it doesn't often align with when a household will typically use more energy. The peak time for electricity usage is typically between 6pm and 8pm [6], whereas solar are generate most energy between 10am and 2pm [7].

It is worth noting that under the WH:SHF scheme, PV batteries should "only be installed "where it complements existing or new Solar PV", and "where it drives energy bill savings for the household to achieve the objectives of the scheme.

[6] Average electricity usage in the UK: how many kWh does your home use? - OVO
[7] When Are Solar Panels Most Efficient? – Heatforce

Average annual electricity bill with solar PV and battery				
Household size	**Annual electricity usage**	**Average electricity bill**	**Average electricity bill with solar PV**	**Average annual electricity bill with solar PV and battery [8]**
1-2 bedrooms	1,800	£698	£426	£256
2-3 bedrooms	2,700	£947	£539	£285
4-5 bedrooms	4,100	£1355	£790	£451

Source: Price assumptions are based on OFGEM data. 1-2beds=2kw solar, 2-3 beds = 3kW solar, 4-5 beds = 4kW solar, with 20% solar energy used in the house

Funding solar PV

Solar PV **is eligible** for funding under both the Warm Homes: Local Grant (WH:LG) and Warm Homes: Social Housing Fund (WH:SHF) grant schemes.

Funding Solar PV in Warm Homes: Local Grant projects

Warm Homes: Local Grant cost caps	
Energy performance cost cap	**Low carbon heat cost cap**
£15,000	£15,000

Within WH:LG Solar PV and PV batteries both fall within the energy performance cost cap, which is £15,000 on average per home in a project. In addition to Solar PV, this cost cap also covers fabric measures (e.g. insulation, double glazing and doors) and other smart measures [9].

[8] Assumes same figures as previous table, with 80% of solar energy used in the home
[9] Warm Homes: Local Grant policy guidance

Warm Homes: Social Housing Fund cost cap			
	Maximum grant funding	**Minimum co-funding requirement**	**Total per home**
Base cost cap	£7,500	£7,500	£15,000
Off gas grid low carbon heating cost cap uplift	Additional £7,500 on top of base	Additional £7,500 on top of co-funding	Additional £15k on top of total spend.
On gas grid low carbon heating incentive offer (up to 10% of homes in the application)	£20,000 (cannot be used in addition to the base £7,500 cost cap).	£0	£20,000

Within the WH:SHF scheme Solar PV technologies are eligible for funding under the base cost cap total [10].

Technical considerations

Roof and structural considerations

It is vital that before installation of solar PV panelling that the structural integrity of the building is considering during the retrofit assessment. A typical residential solar PV system (10-12 panels) will add around 200-300kg to a roof [11]. In most cases this is very unlikely to cause a problem. However, some roofs may require reinforcement. It's the responsibility of the installer to ensure that the roof is strong enough.

A Shading analysis should also be performed if there are local shading objects such as tall buildings or trees. This can ascertain how much impact there will be on annual energy generation.

System design

There is no "correct" solar system size, and the designer should consider several factors when considering the best outcomes. This will include available roof area, number of occupants, and other electricity using equipment in the building. For example, it might be better to install a larger system where a heat pump or EV charger is also present.

Placement of the inverter and batter equipment should also be considered: they should be installed in accordance with both manufacturer and MCS guidance in

[10] WH:SHF Wave 3 Scheme Guidance
[11] How Much Do Solar Panels Weigh? - Your Guide... | EcoAnswers

areas which are well ventilated to prevent overheating and reduce fire risks. This could be areas like a garage, a utility room or even outside.

Compliance and safety

The installation of solar PV and batteries should be installed in compliance with the UK wiring regulations (BS7671), and follow the guidance set out in the MCS solar and battery installation standards.

When installing solar PV measures under Warm Homes funding scheme, installation must also comply with the PAS2035 standard.

Complying with the UK wiring regulations (BS7671)

The regulations specify that all electrical equipment installation must include adequate protection from environmental conditions. This includes adequate ventilation, as well as being able to demonstrate that fire risks have been mitigated. This includes demonstrating that batteries (if installed) are not located in high-risk areas which could serve as fire escape routes.

BS7671 also specifies that any cabling should have sufficient protection against mechanical damage. For example, if cables need burying underground, an appropriate cable type must be specified. All cables from the solar system to the inverter must also be adequately labelled.

Complying with MCS guidance for solar and battery installations

The MCS standards cover solar energy generation and storage systems up to 50kW, which encompasses all domestic solar PV systems. It ensures safety, performance and safety for installation of solar PV.

MCS installation standards ('MIS' series documents) are quality assurance standards that offer a simple route to compliance under the wiring regulations. Under Warm Homes schemes you **must adhere to the guidance**.

If, in any case, a conflict between BS7671 and MIS3012 was to occur during installation then the specifications in BS7671 are to take precedence [12].

[12] MCS 202 Battery Installation Standard (MIS3012:2025), Issue 1.0

Design considerations

In addition to the considerations that are needed in order to remain compliant with standards. Installers and retrofit designers should also take various scenarios that could impact performance of solar PV systems.

Risk	Impact	Mitigation
Surrounding trees and buildings shading the panels	Reduces sunlight exposure, impacting on solar generation potential	Carry out shade assessment at site survey
Weight of solar panels too great for the building roof	Serious structural damage	Ensure roofs have an adequate structural assessment pre-installation
Pest and birds	Can damage wiring and increase soiling, leading to reduced efficiency and potential system faults.	Specify bird and pest guards on array, ensure correct materials for the environment
Fire safety	Slowing down occupants escaping from a building	Risk assessment of equipment locations pre-installation

Resident engagement

Resident engagement is vital for the success of any retrofit project. Early engagement alleviates resident worries and reduces the number of resident dropouts. Listed below are several considerations to make when engaging with residents regarding solar PV.

Resident engagement consideration	Impact
Early engagement and communication	Helps create relationships and build trust between project personnel and residents.
Identify knowledge levels and address accordingly	It is important to relay what solar PV is and how it works. This should cover any questions the resident has and how the measure will improve their quality of life.
Manage disruption	Due to the nature of installing solar PV, often requiring scaffolding, you must manage disruption accordingly and communicate this early with residents

Effective resident handover	It is vital that you provide residents with an adequate handover to ensure that they can take advantge of the benefits the measure brings. This will also increase the likelihood of positive testimonials. There are formal handover processes documented in the MCS standards.

Conclusion

Solar PV is a proven, cost-effective measure that can play a significant role in improving energy performance, reducing household bills, and supporting wider decarbonisation goals in domestic retrofit projects. When designed and installed correctly, it offers minimal disruption to residents while delivering long-term value.

It is of the upmost importance that, when installing solar PV and batteries, you maintain full compliance to ensure safe installation. [13]Equally important is effective resident engagement, which underpins project success by building trust, managing expectations, and enabling households to fully benefit from the technology.

Resources

Podcast: All RISE podcasts are available here.

Podcast: "The value of PAS 2035" available here.

Masterclass: All RISE masterclasses are available here.

Masterclass "Battery Installation Standard MIS (3102:2025)" available here.

Advice pack: All RISE advice packs available here.

Advice pack: "Smart Export Guarantee" available here.

This pack aims to share insights, good practices, and lessons learned from the sector. It is intended for informational purposes only and does not constitute as recommendations or endorsements of specific suppliers, products, or services or as legal advice. Please always check the latest regulations.