



An introduction to Photovoltaics

What is solar PV?

Photovoltaic (PV) panels convert sunlight into electricity. The generated electricity can be utilised in the property, with the excess sold to the National Grid or stored in local batteries for later use.

Two principal forms of PV systems exist:

- Roof mounted - mounted on a frame above an existing roof or integrated into the roof covering
- Ground mounted – mounted on a frame, usually within a building curtilage

The efficiency of the system is dependent on:

- Orientation of the installation - ideally systems should be south facing and angled at 30-50° from horizontal. Systems positioned outside these limits may be viable although less efficient;
- Shading - shading will act to reduce light exposure and drastically reduce generating capacity.

Maintenance of PV panels is limited, requiring external cleaning of the conductive surfaces and ensuring overshadowing from vegetation does not occur.

Why install the technology?

Installation will result in energy and carbon savings. National Government is currently encouraging installation of photovoltaic systems through the Feed-In Tariff (FIT). The income from installation of a PV system comprises three parts:

1. FIT which pays the owner of the system for every kWh of electricity generated;
2. The saving from the electricity generated and corresponding reduction in energy bills;
3. The export tariff for each kWh sold to the National Grid.

This enables a typical 2.2kWh system covering 15m² with an installation cost of £12,500 to payback in 10-15 years whilst saving 1 tonne of carbon per year. (Source: [Energy Saving Trust](#), 2010). The FIT is only applicable if accredited equipment is installed by a [Microgeneration Certification Scheme](#) (MCS) installer.

From 2012 the Government's proposed Green Deal will provide householders and businesses loans for energy efficiency works, repayable through savings on energy bills, with additional help available for vulnerable people and buildings requiring extensive works. For more information visit www.decc.gov.uk

What permissions are required?

Planning Permission: Residential

Photovoltaic systems constitute permitted development for most domestic properties, meaning that full planning permission is not required. In the case of micro renewables, permitted development includes a building which consists wholly of flats or which is used solely for the purposes of a dwellinghouse. Full planning permission would still be required for dwelling mounted installations if:

- the equipment would protrude more than 200mm beyond the plane of the wall or the roof slope;
- it would result in the highest part of the equipment being higher than the highest part of the roof;
- the solar PV equipment would be installed on a building within the curtilage of the dwellinghouse and the dwellinghouse is a listed building.

In the case of land within a Conservation Area or World Heritage Site, permission would be required if:

- the installation is situated on a wall forming the principal or side elevation and would be visible from a highway; or
- the installation is situated on a wall of a building within the curtilage and would be visible from a highway.

Permitted development rights in relation to Solar PV do extend to Listed Buildings; however, listed building consent may be required. Pre-application consultation with the Local Planning Authority (LPA) is advised.

For solar panels mounted on the ground planning permission will be required if:

- there are more than one stand alone solar systems within the curtilage;
- the installation would exceed 4m in height above ground level;
- the installation would be sited within 5 m of the boundary;
- the surface area of the installation would exceed 9 m² or housing 3 m by 3m.

In the case of land within a Conservation Area or World Heritage Site, permission would be required if:

- situated within any part of the curtilage of the dwellinghouse and would be visible from the highway.

Planning Permission: Non-Domestic Properties

In the case of non domestic buildings, solar systems may could be considered as an 'alteration' to an existing building and, subject to meeting the appropriate conditions, it could be classed as 'permitted development' and therefore not require full planning permission. Each building and installation is required to be considered individually; therefore consultation with the planning authority is required.

Agricultural buildings do not have specific permitted development rights to install microgeneration systems; however, if the installation is reasonably necessary for the purposes of agriculture within that unit it can be considered permitted development under Part 6, Class A of the Town and Country Planning (General Permitted Development) Order 1995. Each building and installation is required to be considered on its merits; therefore, it is necessary to consult the planning authority.

Building control

Building regulation approval is required for PV installations, which will consider the suitability of the building for the installation and electrical installation. It is advisable to contact the local authority Building Control Department in the initial stages of the project.

Is PV the correct option for my home/business? What to do next?

- Consider what alternative energy saving or renovation work you could also complete
- Look at your annual energy bills to assess the level of electricity you use and when
- Get quotes from [REAL Assurance Scheme](#) registered installers
- If you wish to be eligible for the FIT ensure the supplier and equipment is [MCS accredited](#)
- Ask for an estimate of potential electricity generation for your property in writing from your installer as well as a quote for the works before you sign a contract to install the equipment
- Contact your LPA to see if you need planning permission and/or building regulations
- Check if your property insurance will cover PV panels
- Get the system installed and start saving both money and carbon!

What should I ask my supplier?

- Whether your roof is strong enough and how the panels will be mounted to ensure complete water tightness of your roof
- If any of the installation needs to be inspected by building control
- Whether they will apply for planning permission and building regulations, if needed
- Where the new wiring will run and how it affects those rooms
- The maintenance, life expectancy and warranty of the system, its parts and workmanship
- About the arrangements needed for installation. i.e. will they arrange the scaffolding, will there be any disruption to your energy supplies, and for how long

Local Case Studies

Case Study One: Domestic PV system, Kirkby-in-Furness

The 2.8kWp system consists of 16 panels and covers a total area of 10m by 2.6m. These are mounted on an aluminium frame above the slate roof to the left and right of the chimneys. The roof faces almost due south at an angle of 30° and panels are only slightly shaded by the chimneys in the early morning and mid-late afternoon.

The scheme involved the installation of 16 Sharp ND175PV modules and an SMA SB2500 inverter. It was installed in August 2010 at an estimated cost of £12,000. They have earned £181 in Feed In Tariffs between September and December 2010.



Image courtesy of Donna Munro

Case Study Two: Penruddock Village Hall, Nr Penrith

A 6.44kWp integrated solar PV system was installed on the southerly aspect roof in February 2011.

- Installation cost was approximately £37,500.
- Estimated generation 5,401kWh per annum (approx 42% of the hall's current electricity usage). Eligible for FITs.

The hall is also installing double glazing, loft insulation and draft proofing.

This installation required planning approval and has a planning condition that if the solar panels cease to generate electricity then within the following six months they will be removed and replaced with slate tiles which match the rest of the roof.



Visit case studies like this during the annual [Cumbria Green Build Festival](#).

For case study information from across the North West visit the Climate Change North West online map. <http://www.climatechangenorthwest.co.uk/northwest-map.html>

Where can I find out more information?

Energy Saving Trust 0800 512 012 www.energysavingtrust.org.uk	Microgeneration Certification Scheme www.microgenerationcertification.org	Department for Energy and Climate Change www.decc.gov.uk
Centre for Alternative Technology 01654 705989 www.info.cat.org.uk	Cumbria Action for Sustainability 01768 210276 www.cumbriagreenbuild.org.uk	REAL Assurance Scheme www.realassurance.org.uk



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Please note: the information provided in this factsheet is guidance only, for use at the client's discretion. We in no way guarantee that should the information be acted upon, that planning permission would be granted or refused. It is recommended that you consult with your local planning authority to ensure that local planning requirements are fully addressed prior to any renewable energy installation.