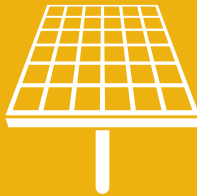


Renewables Factsheet #5

SOLAR



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SOLAR HOT WATER SYSTEMS

OVERVIEW

Solar Water Heating Systems (SHWS) use the heat content of sunshine to warm water up to a temperature where it can be safely used at home or in offices. Sometimes, for example in winter, the warmed water may need to be topped-up to usable temperature by conventional heating systems such as boilers. The technology uses materials called collectors to absorb the heat content of sunshine. These collectors can either be evacuated tubes or flat plates. Evacuated tubes are a little more expensive than flat plates, but are also more efficient.

The collected heat is then subsequently used to warm water through a heat exchanger. There are two configurations of Solar Water Heating System. One is a passive system whereby the natural pressure differences at different heights and of water at different temperature is used to circulate water in the system. The second type is an active system whereby a pump is used to circulate water through the system.

The warmed water is usually stored in a cylinder. The cylinder is usually oversized to be able to hold enough hot water from the SHWS.

The collectors are normally mounted on rooftops, but can also be installed as a stand-alone system with separate supporting structures.

SUITABILITY FOR SOLAR HOT WATER SYSTEM

Solar Hot Water Systems can work with both diffused light and direct sunshine, but usually work better with direct sunlight. In the UK, the optimum orientation for installing the collectors is Southwards, or South-South. However, South-East and South-West are also good, with only minor loss in efficiency. The roof space where the panels need to be mounted also need to be free from shading.

The property will also need to have space to accommodate a large boiler. It will also need to have a boiler that is compatible with SHWS.

SCALE AND TYPE OF DEVELOPMENT

Solar Hot Water Systems can be installed for both domestic and office use. The scale of installation depends on the hot water needs of the premises where it will be installed. The scale can be between 2m² and 5m². SHWS can usually provide all of a home's hot water needs during the summer months.

TYPICAL INSTALLATION COSTS, CO₂ SAVINGS, AND FINANCIAL SAVINGS

The cost for a typical installation of two panels is about £4,800 (including VAT of 5%).

The financial savings from a SHWS depends on the type of fuel displaced. The table below shows typical savings:

Fuel Displaced	£ Saving per year	CO ₂ saving per year
Gas	£50	250 kg
Electricity	£80	570 kg
Oil	£55	310 kg
Solid	£60	520 kg

All savings are approximate and are based on the hot water heating requirements of a 3 bed semi detached home with a 3.4m² panel (EST website, link provided below). There may also be additional income from the Renewable Heat Premium Payments and subsequently, the Renewable Heat Incentive.

PLANNING

Solar Hot Water Systems are one of the microgeneration technologies covered by Permitted Development Rights on domestic properties. Therefore generally they do not need planning permission, unless:

Roof Mounted:

- Panels protrude more than 200mm when installed

Stand Alone

- More than 4 meters in height
- Installed less than 5 meters away from any boundary
- Above a maximum area of array of 9m²
- Situated on a wall within any part of the cartilage of the dwelling house and would be visible from a highway in Conservation Areas and World Heritage Sites

Further information on planning considerations is provided later in this factsheet.

SOURCES OF FURTHER INFORMATION AND ADVICE

a. Energy Saving Trust:

<http://www.energysavingtrust.org.uk/Generate-your-own-energy/Solar-water-heating>

b. Direct.gov.uk:

http://www.direct.gov.uk/en/Environmentandgreenerliving/Energyandwatersaving/Renewableandlowcarbonenergy/DG_072593

c. Department for Energy and Climate Change:

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/explained/microgen/solar_h20_heat/solar_h20_heat.aspx

b. The Microgeneration Certification Scheme:

<http://www.microgenerationcertification.org/mcs-consumer/installer-search.php>

c. Local Government Improvement and Development:

<http://www.idea.gov.uk/idk/core/page.do?pagelid=23051802>

SOLAR PHOTOVOLTAICS

OVERVIEW

Solar photovoltaic (Solar PV) is the use of solar energy to generate electricity. The technology uses special materials called solar cells, which generate direct current electricity when hit by solar rays. Individual cells are arranged together into what is called a solar panel. A solar PV installation may involve just one solar panel or more than one panel, depending on the size of the installation. Solar PV can work in both diffused and direct sunlight, but works better with direct sunlight.

Solar PV can be installed as a stand-alone system or can be integrated with the national distribution grid. If installed as a stand-alone system, it needs to have means of storing power so that power can be available when it is not possible to produce it. This can significantly increase the overall cost of the system. If installed and connected to the distribution grid, it does not have to have a means of storing power, as excess power produced can be exported to the grid, and shortfall imported from the grid. Either way, an inverter is usually employed to convert the direct current produced by the system to alternating current, which is what the grid supplies.

Solar PV can be installed on roof-tops or on the side of a building, or it can stand on its own (free standing).

SUITABILITY FOR SOLAR PV

Whether installed on part of a building or standing alone, Solar PV needs to be installed in an orientation where it'll have the most exposure to direct solar radiation. In the UK the optimum orientation is South, but South-East and South-West, equally offer good effectiveness, with only slight loss in the efficiency of the system. The area where the system will be installed will also need to be free from shading.

SCALE AND TYPE OF DEVELOPMENT

Solar PV is a versatile system. It's practical to install the system wherever the conditions are right as discussed above, and wherever electricity is needed. For domestic developments, rooftops are the most suitable locations for installation. For larger developments, such as office buildings or apartment blocks, they can be installed as a stand-alone (with separate supporting structures) or on rooftops if there is space, or used as cladding on the sides of the building.

TYPICAL INSTALLATION AND COST

There is no limit to the size of a solar PV system that can be installed. However, most domestic installations are between 1.5kW to 3kW and can usually produce around half a domestic property's annual electricity requirement. A solar PV system can cost between £4,000 and £5,000 for every unit of kWp installed. Thus, a 2.7kW system can cost about £12,000 (including VAT at 5%). With the introduction of Feed-In Tariffs, some people can oversize their system for the purpose of generating income.

ACHIEVABLE ENERGY PRODUCTION, CO₂ SAVINGS, AND FINANCIAL SAVINGS

A 2.7 kW system can achieve electricity production of around half of a domestic property's annual electricity requirement. It can also reduce CO₂ emissions by about 1.2 tonnes annually, and around 30 tonnes over its lifetime of 25 years.

The introduction of the Feed-In-Tariff provides a financial incentive, through cost savings and income, for electricity generation by technologies such as Solar PV. The incentive is comprised of three parts.

- The Feed-In-Tariff itself, currently paying approximately 43 pence for every kWh generated by systems up to 4kW. This is a 25 year contract and is index linked.
- The free use of electricity generated.
- Payment for each kWh fed into the grid, through a contract with a Utility Company.

A 2.7 kW system can generate an income of £1,170 annually and with the optimum installation, can achieve a payback of 10 years.

To qualify for Feed-In-Tariffs, equipment will need to be installed by a Microgeneration Certification Scheme accredited installer. Further information on Feed-In-Tariffs can be found on the Department of Energy and Climate Change's website at:

www.decc.gov.uk.

PLANNING

Solar PV is one of the microgeneration technologies covered by Permitted Development Rights on domestic properties. Therefore generally it does not need planning permission before it is installed, unless:

Roof Mounted:

- Panels protrude more than 200mm when installed

Stand Alone

- More than 4 meters in height
- Installed less than 5 meters away from any boundary
- Above a maximum area of array of 9m²
- Situated on a wall within any part of the curtilage of the dwelling house and would be visible from a highway in Conservation Areas and World Heritage Sites

Further information on planning considerations is provided later in this fact sheet.



SOURCES OF FURTHER INFORMATION AND ADVICE

The following websites provide further information and advice on solar photovoltaics:

a. Energy Saving Trust:

0800 512 012

<http://www.energysavingtrust.org.uk/Generate-your-own-energy>

b. Direct.gov.uk:

http://www.direct.gov.uk/en/Environmentandgreenerliving/Energyandwatersaving/Renewableandlowcarbonenergy/DG_072593

c. Department for Energy and Climate Change:

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/explained/microgen/solar_pv/solar_pv.aspx

d. Local Government Improvement and Development:

<http://www.idea.gov.uk/idk/core/page.do?pagelD=23051802>

e. The Microgeneration Certification Scheme:

<http://www.microgenerationcertification.org/mcs-consumer/installer-search.php>

PLANNING CONSIDERATIONS

Permitted Development Considerations

Since April 6, 2008, the permitted development rights for domestic properties have been extended to include installing Solar PV and Solar Thermal generating equipment (with provisos).

Part 40 of the Town and County planning (General Permitted Development) Order (GPDO) allows for the installation of Solar Thermal/PV equipment on dwelling houses or buildings within the garden of dwellings (Class A) or free standing solar PV/thermal equipment within the gardens of dwellings without the need for applying for planning consent (Class B), but there are a number of exceptions to this rule.

The permitted development rights for dwelling houses in Conservation Areas are also slightly more restricted than what is allowed for ordinary domestic properties. There are no permitted development rights for Listed Buildings. In addition to any requirements for planning permission, properties that are listed may also require listed building consent.

Generally, permitted development rights for solar PV and thermal equipment do not currently extend to non-domestic properties.

For further information on permitted development rights, please refer to the:

Planning Portal website:

<http://www.planningportal.gov.uk/permission/commonprojects/solarpanels>

Advice should always be sought from your local planning authority if you are unsure whether your development falls under permitted development rights. Your local planning authority will be able to advise you on the need to obtain planning permission.

If you want certainty that your renewable energy proposal is considered permissible (in that you do not need to make a planning application) you should apply for a Lawful Development Certificate (LDC).

Development Management and Planning Policy Considerations

If planning permission is required the main planning consideration is likely to be the location of the PV and solar hot water elements and their visual impact on the building, the area where it is located and on neighbourhood amenity (reflection). Proposals are likely to be assessed on how well they relate to the character of a building and its surrounding area, with the potential proliferation of visual clutter on roofscapes and in street scenes being an associated issue.

Visual impact is likely to be a key consideration in Conservation Areas. Particular care needs to be taken in Conservation Areas where panels will not be acceptable if visible on prominent roofs, when viewed from the street or other public vantage points. Their acceptability on less prominent roofs may depend upon their size, number and on careful alignment.



Conservation Area or Listed Building Considerations

If a proposal affects a Listed Building, which are protected for their special historical or architectural interest, planning consent will be required. In this situation, a proposal would be assessed against the extent to which it would interfere with the appearance, structure, design or character of the listed building in question.

When this would have a negative effect on a listed building's special interest, it is unlikely that a proposal would be acceptable.

It is more than likely that listed building consent will also be required when proposing development which affects a listed building. This is in addition and separate to the granting of planning permission, but similarly seeks to ensure that any alterations to a listed building, whether internal or external, do not alter the special interest of the building.

A solar PV/thermal panel on a building in a Conservation Area should not need planning permission if it is sited at the rear, or side of the property, such that the panel is not facing onto, or visible from, the road.

Where permission is required, a proposal is unlikely to be acceptable if it would be visually intrusive or prominent, affecting the appearance of the area.

You should always consult your local planning authority before submitting an application if you think it could affect a listed building or a Conservation Area.

In terms of visual impact, placing panels on side or rear pitched roof slopes, concealed valley roofs and on flat roofs hidden by parapets is less likely to affect the appearance of the property and character of the area (including Conservation Areas). Where they are visible, flush integral PV installations that form part of the roof covering are likely to be preferred to panels that are mounted above the original roof covering. Modern buildings, with hidden flat roofs offer good opportunities for incorporating solar panels in ways that are not visible, or form part of the architectural design of the building.

It is important that the historic roofing materials of Listed Buildings, unlisted traditional buildings in Conservation Areas and Buildings of Local Interest are retained and reinstated where lost.

Your local planning authority will be able to assist you in identifying the issues and planning policies that will be need to be taken into account for a particular proposal. Advice should always be sought from your Local Planning Authority before submitting an application.

PLANNING APPLICATION REQUIREMENTS

In addition to listed buildings and Conservation Areas, the installation of solar panels could affect scheduled monuments, historic parks and gardens, historic battlefields and World Heritage Sites. There will be other considerations to take into account when proposing development within or in the vicinity of these sites and areas. Local designations may also apply to specific sites and buildings.

Advice should always be sought from your Local Planning Authority before submitting an application.



When planning permission is required, the following information will normally be required in support of a planning application on a domestic or non-domestic property. Guidance on how to make a planning application can be obtained from the:

Planning Portal website:

<http://www.planningportal.gov.uk/planning/applications/howtoapply>

National requirements for all planning applications will apply to any proposal. These can be found at:

<http://www.communities.gov.uk/publications/planningandbuilding/validationguidance>

Alternatively, this information can usually be obtained from your local planning authority, along with details of the application fee that will apply.

It is recommended that you contact your local planning authority for further advice before submitting an application.

Local planning authorities can also set out local requirements for the information that will be required in support of a planning application, but in most cases it is likely that the following information would be needed to support an application:

BUILDING CONTROL REQUIREMENTS

- Design and Access Statement
- Visual Assessment
- Conservation Statement and Heritage Impact Assessment
- Energy Statement

Please note that this is not an exhaustive list and additional information may be required to assess an application depending on the characteristics of a site. It is likely that additional information would also be required to support larger scale schemes.

It is recommended that you contact your local planning authority for further advice before submitting an application.

When it is believed that equipment is permitted development and considered permissible (in that you do not need to make a planning application) you should apply for a Lawful Development Certificate (LDC). The fee for LDC applications relating to proposed development is half of that payable for a planning application. Further information on LDCs can be found at:

<http://www.planningportal.gov.uk/planning/applications/howtoapply>

or alternatively you should contact your local planning authority.

If you wish to install a solar panel on your roof building regulations will normally apply.

The ability of the existing roof to carry the load (weight) of the panel will need to be checked and proven. Some strengthening work may be needed. Building regulations also apply to other aspects of the work such as the electrical installation.

It is recommended that you contact your local authority Building Control section for further advice when considering a particular proposal.



FURTHER INFORMATION ON PLANNING
REQUIREMENTS WILL BE AVAILABLE FROM
YOUR LOCAL COUNCIL.

CHESHIRE EAST COUNCIL

Development Management

T: 0300 123 5014

E: planning@cheshireeast.gov.uk

CHESHIRE WEST AND CHESTER COUNCIL

Development Management

T: 0300 123 7027

E: planning@cheshirewestandchester.gov.uk

WARRINGTON BOROUGH COUNCIL

Development Management

T: 01925 442819

E: devcontrol@warrington.gov.uk

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