Guidance note
Photovoltaic panels

ChurchCare

16,000 buildings. One resource

Photovoltaic (PV) or solar panels are made up of cells which convert the sun's energy into electrical energy. PV panels are increasingly popular on church buildings and can be an effective way of generating renewable energy.

Benefits of solar PV electricity

Lower carbon emissions: solar PV electricity is renewable once its installation's carbon payback time is accounted for.

Lower fuel bills: electricity bills can be significantly reduced and Government incentives mean that you get paid to generate and export (see Feed-in Tariffs)

Can export electricity back to the grid: if system is producing more electricity than needed, or at times during the day when church is not occupied, someone else can use it – by either exporting by a private wire or to the grid.

Energy storage options: if a church is not connected to the grid, excess electricity can be stored in batteries.

How does it work?

Panels consist of one or two layers of a semi-conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers causing electricity to flow. The greater the intensity of the light, the greater the flow of electricity. PVs will only produce electricity whilst there is daylight. So the energy must either be consumed as it is being generated, stored for later use or exported to the National Grid.

Type of panel:

Monocrystalline, the most expensive, longest life span (≈25-30yrs) and most efficient at converting sunlight into energy-composed of thin wafers of a refined silicon.

Polycrystalline, similar to monocrystalline but made of less refined silicon.

Amorphous silicon cells or film made of silicon atoms in a thin layer. Least efficient, life span around 15-20 yrs.

Installation: there is no "one size fits all" solution; the best installations are tailored to the specific needs and resources of the church.

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But some of the things to think about are:

The site:

Where can they be seen from, are they intrusive?

Is the site free of shading (just a small amount can radically reduce the panel effectiveness)?

Has the roof structure been assessed by a suitably qualified professional to ensure that it can carry the additional weight of the equipment and is a good state of repair?

Can the panels be easily accessed for maintenance?

Has a discreet and secure space been identified for the inverter equipment?

Note: The church roof is not always the best location for the panels – is there another community building nearby that could be used or could they be located on the ground.

Cost: Cuts in the Government's incentive for generation (Feed-In Tariff) have increased pay back periods significantly but as prices for panels fall PV remains a viable option. However there are still uncertainties about the level of tariff so the parish should be keen enough on the idea not to be doing it just for profit. Factor in the cost of making good the roof and disposal of PV panels when they come to the end of their life.

Energy Performance Certificates: To get the full higher rate Feed-in Tariff it is now necessary to have an Energy Performance Certificate rated D or above. See www.**energysavingtrust**.org.uk

Note: EPC doesn't need to be on the same building as the panels e.g panels on the church roof can be wired into a church hall.

Panels: should have a minimum 25 year performance guarantee and a plan for removal when they cease to work.

Fixing: should ensure that panels do not adversely affect the existing fabric. Several schemes have relied on gravity rather than fixings to prevent damage to the roof but if fixed, ensure the joints are water tight.

Ensure fixings allow natural movement of existing materials and factor in wind lift.

Preparation: there should be a current and competent energy audit of the building and the proposed installation should be part of a wider package of measures already taken towards better environmental stewardship.

Parishes should provide the DAC with statements of need and significance and liaise with the inspecting architect as early in the process as possible.

Contractors should provide a feasibility document identifying the expected efficiency of the installation (%), annual energy production, monetary and carbon payback periods. Issues around insurance, maintenance, removal etc. need to be clarified on installation -see our guidance note on dangers of 'free' panel deals .

Consultation: parishes should consult with (dependent on significance, period etc): EH, SPAB, VicSoc, local planning authority and the insurers (a letter of consent is essential)

Permissions: remember that Solar PV is not covered by de minimis and therefore will require the permission of the Chancellor through the faculty process. It is

important to contact the DAC Secretary for advice on such alterations early in the planning process.

Post-installation: after the first twelve months an evaluation report should be produced detailing the levels of energy produced across the year, FiT earnings, and remaining energy bills. Monitoring should continue throughout the lifetime of the installation, and a summary of that monitoring be provided to the inspecting architect for inclusion in QI reports

Case study:

All Saints, Wing with Grove in Buckinghamshire, Diocese of Oxford. 54 Solar Photo Voltaic panels, 9.9 kWp system producing an estimated 8,392 kWh annual generation installed on the nave and south aisle roofs in December 2010 at a cost of £50,000. The installation company estimate 4,532kg annual CO_2 saving.

Further links:
English Heritage's guidance note (http://bit.ly/KifTgt)
If you are approached by a company wanting to use your roof for solar PV make sure the installers and product are registered with the Microgeneration Certification Scheme (MCS).