

Diocese of London



Shrinking the Footprint GENERATING YOUR OWN ENERGY

This guidance note is an introduction to how a church can install renewable energy systems to generate electricity or heat. For fuller information and guidance, visit the Diocese's web page on Generic Building Solutions, at www.london.anglican.org/Shrinking-the-Footprint-Generic-Building-Solutions.

If the UK is to meet its long-term target of reducing its carbon dioxide emissions by 80% by 2050 – the national and also Church of England target – then a major increase in the generation of energy from renewable sources is a necessity.

There are several sources of renewable energy technologies, including Solar PV (photovoltaic) cells, wind turbines, biomass, ground source heat pumps and hydroelectricity. It may be possible to set up one of these technologies on a 'micro scale' on your church site.

First it is always best to begin with the most cost effective and simple ways of reducing carbon emissions, such as switching to low-energy light bulbs, turning down your heating by 1 degree and recycling waste. Once these more simple changes have been acted upon you may, using the involvement of professionals, wish to look more seriously at the feasibility of generating your own electricity.

The benefits of renewable energy are that it:

- is clean and occurs naturally
- is infinite
- produces few waste products and pollutants
- causes little damage to the environment
- can be available in areas where electricity and gas networks don't reach
- produces less greenhouse gases which cause global warming.

Installing renewable energy technology can:

- enable you to make a big contribution to helping the environment
- be a rewarding project
- turn 'waste' into a resource
- attract visitors
- reduce the environmental impact of a site
- be an educational tool
- make a statement to the outside world that your church, and more broadly the Church of England, is taking the care of the environment seriously.

As well as bringing environmental benefits, in the term long installing renewable energy may also save you money – but you should be aware that micro-generation technology is relatively new, and as such can be expensive to install.

There are a growing number of examples nationwide of renewable energy technologies being used successfully on church sites in London and around the UK. Ask the [Head of Environmental Challenge](#) for suggestions to look at.

Some of these technologies will involve a significant alteration to the visual appearance and/or fabric of a building. Both a faculty and planning permission (if there is a material change in external appearance) would normally be required. There is no automatic bar to making changes which affect a church's appearance – if it is done well. In particular, if your building is listed or in a conservation area, you are likely to need to make every effort to mitigate the visual impact, in order to gain permission for the work. Professional advice should be sought. Please see [Making Changes and Faculties](#) for further information.

Energy may be generated using the sun or the wind. Wind power on a church is not considered viable in London. Solar power is the most viable method currently available. Below are some basic details on solar energy.

Solar power

If predictions prove true that the UK will receive more intense sunlight in future years, solar power may well be one of our best sources of sustainable energy. Churches have commonly been designed in the past so that one half of the roof faces in a southerly direction, making them ideal recipients of sunlight and potentially beneficiaries of solar energy.

There are two key uses for solar power: to generate electricity through Solar PV (photovoltaic); or to use the sun's radiation to heat water.

Solar PV

Solar PV uses energy from the sun to create electricity. PV requires bright daylight, not necessarily direct sunlight, to generate electricity - and so can still generate some power in lightly clouded weather. However, the greater the intensity of light the greater the flow of electricity.

The amount of energy generated by solar electricity on a building depends on a number of circumstances, including amount of sunlight received and the number of cells installed. Enough energy can usually be generated to run appliances and lighting; it may even be possible to sell energy to the National Grid.

By way of example, in 2005 St James Piccadilly installed 34 PV panels on the south aisle roof of the church, plus 6 additional ones over the south lobby. It is estimated that these panels will generate 4,100 KW hours per year, and save about 1.8 tons of carbon dioxide annually (for further information on this scheme see www.simondawson.com/sjpenv/sjppv1.htm).

Installing solar PV cells is at present expensive, although in future the prices may drop as it becomes more popular and as technology improves. Depending on the number of panels fitted, and any financial assistance, it may be a long time before the money spent is recovered from savings on your electricity bill. The time may range from 15-100 years – and if no external funding is received, the system may never pay back.

For this reason, PV cells should not be considered unless there is substantial external funding available.

The first source is the Feed-in Tariff established by the government. See the website of the DECC ([Department of Energy and Climate Change](#)), and [Generic Building Solutions](#). The Feed-in Tariff provides a generous return on per unit generated. The government currently

undertakes to hold the rate for new entrants up to April 2012 for 25 years after installation (index-linked). There is to be a review of conditions from April 2012 on.

The Feed-in Tariff does not help with raising initial capital. There may still be grants or loans available; speak to the [Head of Environmental Challenge](#), (020) 7932 1229 about this, and other options available to pay for your solar panels.

If considering any such proposal, early consultation with the relevant authorities is essential. Please see [Making Changes and Faculties](#) for further information.

There are two key ways of using solar power to generate electricity are through solar panels and solar tiles. These are gone into more detail below.

Solar panels

Normally solar panels are placed on top of the existing roof covering, ideally on southerly facing roofs where they will receive the most sunlight. They usually need to be set at a pitch of between 30 and 50 degrees. An architect should be appointed to draw up firm proposals.

The opinion of a structural engineer should also always be sought as solar panels are not light and the roof must be strong enough to take their weight.

You consider the following issues when considering installing solar panels:

- It will be easier to get planning permission and a faculty for the installation of solar panels on historic churches if the panels are not obtrusive from ground level or any public view point – if they are visible, they need to be carefully designed.
- If it is possible to place the panels on a flat roof, behind a parapet or balustrade, this is likely to negate their visual impact from street level. Using a flat roof area also means that the panels can be self supporting, avoiding any unnecessary damage and allowing their easy access once their life expires.
- A space inside or outside the church for an electricity plant will need to be provided, together with cable runs.
- Does your church need to be re-roofed in any event? This will save money relatively, and may reduce the pay-back period to as little as 15 years (see above). Indeed, the Diocese's policy is to encourage any church needing to replace its roof to consider solar panels at the same time.
- Make sure at least the roof will not need major work soon *after* you have installed solar panels – which would mean disturbing your new panels.

Solar tiles

Solar PV tiles carry out the same job as solar panels. They can be designed to imitate as closely as the present technology will allow the size, shape and colour of the roof covering they are replacing, e.g. tiles or slates.

They are expensive to install and it has to be remembered that the manufacture of the tiles does itself carry a notable carbon footprint. However, if your existing church roof covering needs replacing anyway, that is the time to think about using solar tiles.

The first such scheme for solar tiles is at [St Silas Pentonville](#) – and this has become iconic nationwide. The Diocesan Advisory Committee ([DAC](#)) will give serious consideration to any proposal for their installation, especially if an existing roof covering is in need of replacement.

Whether installing panels or tiles, a device known as an 'inverter' connects to the national grid – this needs replacing every 5 years or so. And make sure you have a real-time display of electricity generated publicly visible in the church!

Solar water heating

Solar water heating is a well developed technology, that uses heat from the sun's radiation to work alongside your conventional water heater. It could provide up to about a third of your church buildings' hot water all the year round, whilst reducing carbon dioxide emissions.

There are three main components to a solar water heating system:

- A solar collector (a pipe grid or flat plate collector) fitted to your roof to collect the sun's radiation
- A heat transfer system (using the collected heat to heat water)
- A hot water cylinder (storing the hot water that is heated during the day and supplying it for use later).

Solar water heating generally comes with a 5-10 year guarantee and requires little maintenance

Sources

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