

## Generating your own renewable energy

If the UK is to meet its long-term target of reducing its carbon dioxide emissions by 60% by 2050, 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. In certain circumstances it may be possible to set up one of these technologies on a 'micro scale' on your church site. It is, however 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 fewer greenhouse gases which cause global warming.

Installing renewable energy technology can:

- enable you to do your bit for 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.

At present there are relatively few examples nationwide of renewable energy technologies being used on church sites. However, a number have been installed successfully. Most 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. If your building is listed you are likely to need to make every effort to mitigate the visual impact of the proposal if there is to be any chance of gaining permission for the work. Professional advice should be sought. Please see [Making Changes and Faculties](#) for further information.

Below are two detailed sections on solar energy and one on wind 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 benefactors 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 only daylight, not direct sunlight, to generate electricity and so can still generate some power on a cloudy day. 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 and, in exceptional circumstances, it may 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](http://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, it may be a long time (estimates commonly suggest about between 30-60 years) before the money spent is recuperated in savings on your electricity bill. For this reason, PV cells should not be considered unless there is substantial external funding available. Further information about grants can be found on: <http://www.lowcarbonbuildings.org.uk/home/>

If considering any such proposal, early consultation with the relevant bodies 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. A professional architect should be appointed to draw up firm proposals. The view 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 visible from ground level or any public view point.
- 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.

### 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.

There are currently no examples of solar tiles having been used on churches in the Diocese of London but the Diocesan Advisory Committee ([DAC](#)) will give serious consideration to any proposal for their installation if an existing roof covering is in need of replacement.

### **Solar water heating**

Solar water heating is quite 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:

- i) Solar panels fitted to your roof (see above) to collect the sun's radiation
- ii) A heat transfer system (using the collected heat to heat water)
- iii) 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.

## **Wind energy**

Wind turbines use the wind's lift forces to rotate aerodynamic blades that turn a rotor which creates electricity. The UK has a large part of Europe's total wind energy but it's still largely untapped and only 0.5% of our electricity requirements are currently generated by wind power.

Wind power is the UK's most developed form of renewable energy. It is a clean, renewable source of energy which produces no carbon dioxide emissions or waste products. At present most turbines are located off-shore or in carefully selected wind farms. It is, however, possible to set up small-scale turbines.

Wind power is not the most reliable form of electricity supply as it is highly dependent upon the speed and direction of the wind. You should consult a qualified professional regarding the suitability of your site for a wind turbine. Generally speaking the ideal site is a smooth top hill with a flat, clear exposure, free from excessive turbulence and obstructions, such as large trees, houses or other buildings. The Energy Saving Trust recommends that you should only consider a wind turbine under the following circumstances:

- The local average wind speed is 6m/s or more;
- There are no significant nearby obstacles such as buildings, trees or hills that are likely to reduce the wind speed or increase turbulence.

We are not aware of any examples of wind turbines being placed on churches, or indeed within church sites. However, if the circumstances are right, the possibility of doing so should not be ruled out.

There are two types of wind turbines: mast mounted and roof mounted.

### **Mast mounted turbines**

Mast mounted turbines are freestanding and can be located near the church building using the electricity generated. It should be noted that on church sites their installation may have archaeological implications.

### **Roof mounted turbines**

Roof mounted turbines are located on the roofs of buildings. In theory small scale wind turbines would work well on church towers, as these are often the tallest features in their immediate area. However, any proposal would need to be considered very carefully as it is virtually impossible to hide the visual impact of a wind turbine and it may be deemed to upset the historic character and/or setting of a church building.

If considering any sort of wind turbine, early consultation with the relevant bodies is essential. Please see [Making Changes and Faculties](#) for further information.

There are grants available for their installation of wind turbines. Further information can be found on [www.lowcarbonbuildings.org.uk](http://www.lowcarbonbuildings.org.uk).

### **Sources:**

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London Care of Churches Team  
November 2007