

RENEWABLE ENERGY SOURCES

November 2004

The concept of faithful stewardship of God's creation is fundamental to our belief. The 'Green' agenda is therefore not new to us, but in the circumstances in which we find ourselves today the need to think through our obligations becomes all the more compelling.

The Church of England is widely recognised as an exemplary steward of its physical resources. Its quinquennial inspection system of church buildings is admired, but not copied, by many. It is important to extend the life of buildings, but it is also highly desirable to minimise the use of non renewable energy to heat and light them. This briefing paper has been produced in response to queries received from parishes about renewable energy resources. It outlines options and also some of the constraints which we have to face as the stewards of a priceless architectural heritage.

Systems available on a commercial basis

- a) Flat plate or evacuated tube solar collectors – for the production of hot water.
- b) Photovoltaic solar panels – for the production of electricity.
- c) Wind generators – for the production of electricity.
- d) Geo-thermal heat pumps – produces heating using heat collectors in the ground and a pump to concentrate the low grade heat.

Solar Collectors

How they work

Water is pumped through panels on a south facing roof or wall and is heated by solar energy. This then flows through a heat exchanger warming the water stored in the hot water cylinder. A conventional water heater is required to top up the heat when necessary but typically the solar panels (4 sq.m) supply about 50% of the need in a domestic system.

Cost

Installation costs between £2,500 and £4,000 ¹.

Photovoltaic solar panels

How they work

The photovoltaic cells are linked together and mounted on a south facing roof or wall and convert solar power to direct current 12 V electricity which is then converted to Alternating Current at 230V by an inverter. When connected to the National Grid any excess power generated is fed into the mains supply and the cost credited. The efficiency and effectiveness depends very much on the weather and the orientation of the panels. As a guide, 1 sq.m of collector should provide 100 watts. Therefore assuming a typical church requires 3 KW of lighting (30 x 100 watt lamps) around 30 sq.m of collector would be required. A larger installation would be required to provide power for other equipment.

Cost

A typical price for a grid connected system is between £4,000 and £9,000 per KWp. So the above example would cost between £12,000 and £27,000 depending on the type of system installed and the type of building itself²

¹ The Oxford Solar Initiative

² Energy Saving Trust

Wind Generators

Wind generators, while commercially available tend to be of the larger type (say 30 – 40 metres high with 10 – 15 metre diameter blades) of the type used for generation on a large scale for feeding into the national grid. Small scale installations are available to operate on a single building but substantial battery systems are necessary to work with the wind generator and this has to be linked into the main supply to the building which is costly and requires considerable space for the batteries etc.

Geo-thermal systems

These are expensive to install require a lot of space and would need considerable maintenance.

Grants available

The Department of Trade and Industry are providing grants of about 50% of installation costs. For further information visit www.solarpvgrants.co.uk or www.est.org.uk

Factors to take into account when considering a renewable energy installation

- a) Environmental factors
 - benefits of harnessing unlimited energy from the sun as against utilising conventional fuel which causes climate change and pollution
- b) Costs – will high installation costs be recouped by lower running costs?
- c) Effects on the building particularly if it is listed. Each application is considered on its merits.
 - Unless solar collectors or panels can be fitted out of view, their size and appearance will detract from the visual character of the building.
 - Even if they can be hidden (for example on a shallow roof behind a parapet) their fixing is likely to be controversial and they could be said to affect the historic character of the church.
 - When re-roofing is necessary photovoltaic cells in the form of slates with an embedded solar electric panel (similar in appearance to Welsh slate) might be considered if a supplier can be found. However while these have been suggested by an English Heritage engineer each case would be considered on its merits and they may not be considered suitable for listed buildings.
 - Independent solar panels in the churchyard could perhaps be considered but they may well affect the setting of the listed building if in an open position to catch the sunlight. They would also be susceptible to vandalism.
 - Wind turbines would almost certainly adversely affect the setting of a listed building.

Other considerations for making better use of resources

- Consider using low energy and long life light bulbs to reduce energy consumption.
- Consider changing power supplier to one of the greener suppliers. Further information from www.greenelectricity.co.uk
- Consider better insulation although this can upset the equilibrium of old buildings.
- Is there a district heating supply which can be utilised?
- When installing a new heating system, seek advice about the efficient use of energy and make sure the control system installed is understood and easily operated by a lay person.