

CHRISTIAN ECOLOGY LINK

ENERGY USE IN CHURCH BUILDINGS

BRIEFING PAPER

Foreword

There is no doubt now that global warming is really under way, with potentially disastrous consequences for all life on Earth. The principal cause is the use of energy, which puts more pollution into the upper atmosphere. Christians should be especially conscious of the need to minimise their use of energy. Churches are substantial users of energy, mainly for heating. Economising on energy use need not involve deprivation, since it may very well be possible to save energy and money, even while providing a more comfortable church.

The chief problem is that most churches are massive buildings, often of historic value, and used for only a few hours each week. This makes the economics of heating a different problem from that of most other buildings.

Much the most forward-thinking denomination in respect of heating is the Church of Scotland. For over twenty years it has been offering its churches surveys by an expert in order to enable them to take stock of their energy use. Though these studies are not detailed, it is estimated that there is a saving of half a million pounds a year! Recently a research programme, mounted by the Methodist church with Carbon Trust funding, has quantified some of the factors and identified new approaches.

1. Take Stock

First of all find how much energy you are currently using. Get the treasurer to produce recent bills for gas (or oil or coal) and electricity so that you have a clear idea of the level of expenditure you are faced with. This should convince you of the need to appoint someone with at least a little technical competence as 'Energy Manager'. The Energy Manager will find opportunities for saving energy, regularly monitor the consumption of energy, and raise the subject at church meetings.

Ideally, meter readings should be plotted against 'Degree Days' for your area. 'Degree Days' are an attempt to quantify local climate. They are the number of degrees the outside temperature is below that at which you do not need heating, totalled for all the days in the month.

CEL asks churches to put the **environmental impact** of their energy use first, rather than picking the cheapest supplier. CEL's Operation Noah scheme encourages churches to switch their electricity supplier to a renewable source (electricity produced from wind, sun and water). Suppliers of green electricity offer different rates and it is worth asking them about cheaper evening and weekend rates.



2. Prevent Waste

Curing draughts is important. Search for them on a windy day. Leaded-light windows often let in draughts. Plastic sheeting, sometimes installed as an anti-vandal measure, may also reduce draughts. Doors leading to the outside should certainly be double, to create an airlock. A heater over the entrance door conveys a 'warm' welcome.

Insulation of the congregation with cushions and carpet strips in the pews is an important contribution to perceived comfort! Conventional domestic insulation, such as double glazing, may not be allowed in some churches, and may not be cost-effective where higher temperatures are needed for short periods only.

3. Heat only when you need it

Bear in mind that the most effective way to save energy is to turn it off. The least possible energy is used if a building is completely unheated when not in use and has heating equipment which is powerful, thus rapid-acting, and turned on at such a time as will achieve comfort conditions just as occupants enter and turned off again as they leave. But this would involve elaborate control and there may be reasons why it would not be allowable.

A vital factor is to prevent water freezing. However, heating the whole building is a luxurious way of doing this and not always effective. Water pipes and cisterns can have tracing heating elements with a 'Frost-stat'. More subtle is the protection of masonry, woodwork, and

furnishings from the effect of moisture or of temperature cycling. Sudden changes from warm to cold to warm can affect stonework, fabric and church organs, especially if there is dampness. This is important, but again, continuous heating may be an expensive solution. Ventilation may be sufficient, or heating of vulnerable areas only. A pipe organ is a particularly critical item. You may need specialist advice for this.

Another reason for heating between major occupancies is the need for reasonable conditions for cleaners, caretakers, choir practice, flower arranging etc. It is certainly pleasant to be able to do these under warm conditions, but this is expensive. It may be possible to heat only the part of the building being used. Otherwise, the cost of heating for ancillary work must be accepted, though preferably only to a 'Set-back' temperature, say 10° C. A steady low temperature may be better than periodic bursts of full heat.

4. Control of Heating

The main heating (sometimes called 'Boost') will need a thermostat and must have a timer. Most timers can easily be overridden if there is a need for heat for a special event such as a funeral. Set-back heating has to be controlled by its own thermostat. With a set-back system, the time to heat the space further for a service will be roughly constant, whatever the outside temperature (unless that is actually warmer than the set value.) Measure this advance time and set the main heating timer accurately. If starting

from cold, then estimate this time, depending on the ambient temperature. There are electrical controls for this, but they are not very good for a massive building. In the case of turning the heat off again, the time for this will be immediately after each service or even slightly before.

Ancillary rooms will make a significant contribution to the total energy consumption and, as with the church itself, full heating in each space should be provided only when it is actually needed, possibly also with set-back. Programmers for control of this kind are available but they are rather complicated. It is usually adequate for the heating of each room to be initiated manually by a leader or caretaker. Ideally the temperature set should be appropriate to the usage; old people will need warmth but a disco may be almost self-heating.

5. Equipment

(Detailed commercial information cannot be given here, but the following general points may be useful.)

The main heating and that for set-back may be carried out either by the same equipment or by separate systems. For set-back, a fast response is not needed and so under floor heating, classic hot-water radiators, or even night storage heaters may be used. For boost, overhead radiant units (preferably of the medium-temperature 'black heat' type) are very good for enabling portions of a building to be heated separately, but they do not heat feet which are under the pew in front. They should therefore be

used in conjunction with under floor heating or fanned convectors which blow at low level. (Before purchasing the latter, listen to units in use: some types are too noisy to run during a sermon or prayer.) Condensing boilers are more efficient, but they need large radiators or else the return water will not be cool enough to condense the flue moisture.

Systems are available with which heating of the whole building is provided by a large unit mounted outside and blowing hot air. These give dramatically rapid, quiet, and uniform heat, but can deposit moisture in cold corners.

For most heating, the fuel may be gas, oil, or electricity. Bottled gas is rather expensive. Electricity is too, but the better control possible and the easier installation may compensate for this, especially if an off-peak tariff is available.

6. Other Services

The cost of electricity, and therefore the energy used, for lighting and power will usually be much less than that of heating. Nevertheless the consumption should be watched. Fluorescent strip lights are economic and the usual choice for halls. Church lighting, used only for short periods, is usually chosen mainly for effect, but again consumption should be considered. Preferably do not choose a system for which scaffolding is needed to replace bulbs. Do not use fluorescents for toilets or stairs, because of the time they take to light up -- use ordinary bulbs, preferably with an infra-red occupancy sensor. Wherever practical on

the church premises use low-energy light-bulbs.

Similarly, have a water meter fitted to monitor the consumption of that too. For hot water, local 'instant' heaters use much less energy than a central tank.

7. Set an Example

The total consumption of energy of all kinds by the members of the congregation will certainly be many times that of the church itself. Further, some members may have influence in their jobs, in the community, or as school governors. Therefore make sure that they know what is being done in the church so that they may take action themselves towards conservation. You might even consider measures which are not strictly cost-effective in the church context, such as solar panels or a wind turbine, for demonstration purposes.

Minimise car mileage on church business and share cars when possible. Encourage members to do likewise and discourage air travel. Provide a cycle rack at the church.

8. Care for Others

Some people known to the church, especially the elderly, may need help in keeping *warm enough* for health. Those visiting them should be able to give at least some basic information about heating and insulation. A good scheme which provides training is starting: see *Health Through Warmth* below. Below are some hints on how to keep warm and save money in wintertime.

- Wear warm clothes. Several layers are better than a thick coat. A lot of heat can be lost from the head, so wear a hat, indoors as well, even in bed. Knit yourself a woolly hat. Knit some others to give away.
- At home, cure draughts. Sealing strip for doors and windows is quite cheap. If you have a gas cooker, or a fire which does not have a balanced flue, an air intake is essential and must on no account be blocked up. (A carbon monoxide detector tab is a good thing, too.) Otherwise, you only need a very little ventilation, so keep most windows and doors closed. If you are too hot, do not open a window – turn down the heating.
- If you have a spare bedroom or other room which you are not going to use for some time, turn off the heating and keep the door and window closed. (Most people are horrified if a light is left on. In fact it will cost less than 1p an hour. Leaving a radiator on costs at least 5p an hour, an electric fire 15p.)
- For heaters of all kinds, try to get ones fitted with a thermostat. It is much better than remembering to turn them down. If you have central heating, learn how to control the temperature. If you don't have thermostatic valves on most radiators, it is well worth having them fitted.
- Thermal insulation. You can't have too much lagging around a hot-water tank. Wrap it with any old eiderdowns or blankets. Draw all curtains

at dusk, but they must not cover a radiator. Tuck them up on the windowsill, or have a shelf to stop the heat going up behind the curtains. For any central-heating radiator against an outside wall, stick baking foil to the wall to reflect the heat. Your loft should have at least 10cm (4 inches) of insulation on the ceiling surface, preferably twice that.

- Further safety points. You can dry clothes or towels on a hot-water radiator, but with gas or electric units, keep things well clear and don't leave them unattended. Get electrical appliances checked and don't have long trailing cables. If you have an electric blanket, turn it off before getting into bed. Do use fluorescent lamps, but only where they are on for a long time, not on stairs or toilets where you need immediate light.
- Central heating again: make sure your timer is properly set – it should come on a little while before your getting-up time and go off an hour or so before you go to bed, before you have an evening bath.
- You may be able to get grants to assist with the cost of some of these measures. Enquire from a Citizens Advice Bureau or Post Office.

Operation Noah

You can use your energy saving actions to show the Government you care about climate change. CEL's Operation Noah campaign shows you how. For free leaflets for your congregation, write to CEL (address below), call 01949 861516, or visit www.christian-ecology.org.uk/noah

Operation Noah recommends you switch to renewable electricity from two suppliers: Good Energy – formerly known as Unit(e) – or Green Energy UK.



Further Information

Book: *Heating Your Church*, by Bordass and Bemrose, Church House Publishing, Great Smith Street, London SW1P 3NZ.

Booklet: *Energy Efficiency in Community Buildings*, National Energy Agency, 90 Pilgrim Street, Newcastle-on-Tyne NE1 6SG. 0191 261 5677.

Magazines:
Energy & Environmental Management, DEFRA, 123 Victoria Street, London SW1E 6DE.

Church Building Magazine, 1st Floor, St James Building, Oxford Street, Manchester M1 6FP.

Leaflet: *Church Heating and the Organ*, Institute of British Organ Building, 13 Ryefields, Thurston, Bury St Edmunds IP31 3TD.

The Good Energy Guide from the Ethical Marketing Group offers advice on choosing 'green' electricity suppliers and tips for improving energy efficiency. 0845 456 1640.

'Health Through Warmth' scheme, funded by Innogy and operated by npower, in co-operation with the National Health Service, trains health professionals to offer energy advice to vulnerable people. www.iweinnogy.com

Energy Saving Trust for plenty of energy saving tips: www.est.org

For energy efficient products to buy: www.saveenergy.com

European Christian Environmental Network for news on what churches in Europe are doing: www.ecen.org

Centre for Alternative Technology, Machynlleth, Wales, for advice on funding for solar panels. 01654 702400.

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