

## **ENSURING YOUR BUILDINGS ARE ENERGY EFFICIENT**

The design of the buildings we use could have the most significant effect on the amount of energy we use. The latest examples of environmental architecture can create bright, spacious and comfortable spaces that need only the smallest amounts of energy to heat and illuminate. Most of us are not in a position to have access to such a building just yet, but there are many simple measures we can take to significantly reduce the amount of energy we use. Energy is a valuable and costly commodity and should be used as efficiently as possible. A well-insulated building with a correctly designed and controlled heating system will be more comfortable and cost less. In a typical building the space and water heating accounts for approximately 60% of the overall fuel costs. By carrying out energy efficiency improvements there is the potential for most parishes to make significant savings.

### **SPACE HEATING**

It is important to make sure that your heating system is properly designed and maintained. By lowering the room temperature by just 1°C, you could reduce your heating bills by up to 10%. However, take care not to turn the heating down too much, especially if you have young children or elderly people using the building. Recommended temperatures for comfort would be about 20°C (68°F) in living rooms and 16°C (60°F) in bedrooms.

### **Gas Central Heating**

If you are buying a new heating system you should be getting one that uses a condensing boiler, this is one of the most efficient designs. A modern system should have suitable controls to regulate room temperatures. Thermostatic radiator valves can be used to control the temperature in different rooms. A hot water tank thermostat or room thermostat can be used to automatically sense temperature and make adjustments. Avoid covering radiators with curtains. Most radiators work best by circulating hot air in a room. Curtains should fit windows well and be above or behind radiators. A shelf placed above a radiator can direct the rising warm air into the room. Reflective material like foil can be placed behind radiators on outside walls to reduce the heat loss to outside. Regular boiler maintenance will help to minimise running costs. Gas heaters should have adequate ventilation to prevent the build up of carbon monoxide poison.

### **Electric Storage Heaters**

A well designed heating system using storage radiators can consume 90% of its energy during the off peak period. Where appropriate, time switches should be used. In this way rooms which are used less can be heated to a lower temperature. Many storage radiators incorporate

automatic weather sensing controls which optimize the charge on a storage radiator according to the outside temperature. Heaters are better placed next to inside walls.

## **WATER HEATING**

Heating up water requires large amounts of energy. Significant savings can be made in three ways:

- ◆ reducing wasteful loss of heat;
- ◆ reducing the volume of heated water;
- ◆ reducing the temperature to which the water is raised is the minimum required.

There are cheap and simple ways to do this without reducing your comfort in any way. Putting a cylinder jacket round the hot water tank can pay for itself within a few months. Use an approved British Standard (e.g. BS 5616:1985) 80mm thick jacket. Most new tanks are foam insulated during manufacture and do not need further lagging. Exposed hot water pipes should also be lagged. Lagging your hot water tank and pipes can save up to one third of the cost of water heating. You should also lag hot and cold water pipes in roof spaces. Installed cost: from £35 (giving savings of £20 to £40 per year). As with space heating, your water heating system should have suitable controls. A gas or oil fired boiler should have a cylinder thermostat to measure the temperature and control the burner. An immersion heater should be set no higher than 60°C (140°F). If you want hot water, mix in less cold water when filling your sink or bath. Use a shower rather than a bath. It needs less hot water and is quicker. If you do have a bath, don't make it too full or too hot. Avoid cleaning dishes under running hot water. Putting the plug in the sink or using a washing up bowl uses much less water. Turning taps off properly and repairing ones that drip is well worth the money. A single tap dripping once a second could waste 1400 litres of hot water in a year. Consider installing solar panels to heat your hot water. These panels can provide a large percentage of your hot water demand.

## **REDUCING HEAT LOSSES**

Appropriate insulation and draught proofing of a building are very important energy saving measures that can reduce heating bills considerably. Grants are available towards insulation costs for people who qualify for certain benefits or are over the age of 60 (see section on Getting a Grant for Energy Efficiency Measures).

Heat losses from a typical poorly insulated house:

Roof → 25%

Windows → 10%

Draughts → 15%

Walls → 35%

Ground → 10%

### **Insulation**

Basic insulation measures can give the largest reductions in fuel bills relative to the actual cost of the improvement. If you are having a heating system installed it is worth having insulation work carried out at the same time. The following insulation measures will reduce heat loss from your building.

### **Draught Proofing**

Put draught strips around windows and external doors and fit a flap across the letterbox. Floor insulation is not usually practical for existing buildings, although thick carpets with underlay will reduce heat loss. Fill gaps between floorboards and skirting boards with newspaper, paper, beading, mastic and plastic wood. Cost: from £50 (DIY), £150 (Installed). Typical Savings could be £35 to £45 per year.

It is extremely dangerous to block ventilators or air bricks which supply air for gas boilers, gas fires or open flue wall heaters. A supply of fresh air is vital to ensure the efficient and safe operation of these appliances.

### **Loft Insulation**

Where possible, the loft should be insulated with a minimum of 200mm of glass fibre or mineral wool. Specialist advice will be needed for flat roofs and loft conversions. Remember not to block the air space under the eaves, this allows the loft to be ventilated. Cold water tanks and pipes should be insulated for protection from frost damage if the loft floor has been insulated. Cost: from £75 (DIY), £200 (Installed). Saving £50 - £100 per year\*

### **Wall Insulation**

Wall insulation can be carried out for cavity and solid walls. A specialist installer should be used. Sometimes local authority permission is required in advance of the work.

Cost: from £400 (cavity walls). Savings of £75 - £150 per year\*.

Cost: from £1,500 (solid walls). Savings of £90 - £190 per year\*.

\* Savings based upon a 3 bed semi-detached house using off peak storage radiator central heating.

## **Windows**

Consider double-glazing when your existing window frames need replacing. Double glazing cuts heat loss using an insulating layer of trapped air between the two panes of glass. The insulation barrier can also help to reduce noise and condensation. Also ask about low "e" glass, which saves as much energy again by reducing heat radiation from the glass.

An alternative to double-glazing, which costs only a few pounds, is to tape polythene stretch cling film sheets across non-opening window frames. This is almost as efficient as glass and is easy to fit.

Opening windows in the winter will waste a lot of heat; it is better to put an extractor fan in the kitchen or bathroom controlled with a humidistat (a device that measures air moisture content). Curtains with thermal linings will help to reduce heat loss on cold winter nights.

## **Condensation**

Dampness affects many buildings in the UK. It causes mould growth, staining and damage to walls, window frames and furniture. Excess moisture in your house makes it difficult to heat effectively as there are greater losses from the damp materials and drying them out absorbs energy. Condensation generated from washing, bathing and cooking should be minimised by ensuring your bathroom and kitchen have appropriate ventilation. Lids should be used on pans when cooking. Close doors to prevent the moisture from the kitchen or bathroom from filling the rest of the house. Burning gas or coal also produces water vapour so cookers and fires should be well vented.

## **GETTING A GRANT FOR ENERGY EFFICIENCY MEASURES**

### **The Home Energy Efficiency Scheme**

The Home Energy Efficiency Scheme (HEES) provides Government grants towards the cost of improving energy efficiency. The criteria for establishing the extent of a HEES Grant are rather

complicated; it is recommended that you contact the scheme administrators – Energy Action Grants Agency Ltd for further details.

EAGA Ltd, Freepost, PO Box 130, Newcastle upon Tyne, NE99 2RP

Freephone: 0800 072 0150

Textphone: 0800 072 0156

Other grants are available from local authorities and the Energy Saving Trust. It is recommended that before you commence work, you should enquire whether grants are available for your particular circumstances. The Energy Savings Trust can offer energy efficiency audits.

## **SIMPLE DOMESTIC ENERGY SAVING MEASURES**

### **Cooking**

Choose the right size pan. The base of the pan should match the size of the cooker ring. Put lids on pans and turn down the heat when food starts to boil. There is no need to boil vegetables vigorously, turn the ring to a gentle simmer.

Try not to use too much water; most items are best cooked in just enough water to cover them. Food can be cooked more quickly if it is cut into small pieces.

A pressure cooker speeds up cooking times, saves energy, maintains goodness and generates less water vapour in the kitchen.

Cook small items like chops under the grill rather than in the oven.

It is more efficient to use a toaster rather than a grill when making toast.

When using an electric kettle boil only as much water as you need. Make sure the element is always covered.

Microwave ovens are useful for cooking, defrosting or heating food. They use much less energy than conventional ovens.

Many gas or fan ovens need only a short time to pre-heat before cooking.

Cooking with gas rather than electricity is a better use of resources and usually costs less.

## **Fridges and freezers**

- ◆ Put your fridge or freezer in a cool place, away from cookers or heaters.
- ◆ For best operation, position your fridge so that air can circulate around the heat exchanger at the back.
- ◆ Do not leave a fridge or freezer door open for longer than is necessary.
- ◆ Allow any cooked food to cool before putting it in the fridge or freezer.
- ◆ Combined fridge/freezers with one compressor use less energy than two separate units.
- ◆ Defrost your freezer regularly. The ice should never be more than a quarter of an inch or 6mm thick around the icebox.
- ◆ Freezers should be kept at least three-quarters full at all times.
- ◆ Modern frost-free fridge-freezers use considerably more energy than conventional designs.

## **Home Laundry**

- ◆ Ensure you have a full load before using your washing machine. If this is impractical, use the half load or economy programme.
- ◆ Use a minimum temperature (40°C) wash and economy programmes whenever possible.
- ◆ Use the most appropriate spin programme after washing and before tumble-drying.
- ◆ Iron your clothes while they are still slightly damp. Steam irons use more power than dry ones.
- ◆ Tumble dryers which have an electronic moisture sensor control are the most efficient, followed by those which have temperature sensor. Models with simple timer control are the least efficient. Reversing tumble dryers can save energy when drying large items of fabric.
- ◆ Hanging up your laundry to dry outside uses even less energy.
- ◆ Condensing tumble dryers are generally less energy efficient than air vented appliances, although the difference is small.

## **Dishwashing**

- ◆ Washing up by hand uses less hot water than using a dishwasher.
- ◆ Setting the hot water to a lower temperature and then mixing in less cold water will give you the same results more effectively.
- ◆ If you buy a dishwasher ask for information on its energy consumption.
- ◆ Use short or economy wash cycles whenever possible.
- ◆ Use the lowest temperature wash that is required.
- ◆ Ensure you have a full load before running the dishwasher.

## Lighting

Lighting typically accounts for 10-15% of electricity usage. The use of low energy lamps can provide significant energy savings. Low energy lamps are miniature fluorescent tubes, which are designed to replace ordinary lightbulbs. They are made in a variety of shapes, sizes and ratings so they should be selected to suit the fitting and the space available.

A low energy lamp uses about a fifth of the energy of an equivalent ordinary lightbulb which means they can save up to £10 a year in electricity costs if used for about 4 hours a day. They can last up to ten times longer than ordinary bulbs so they don't need to be changed as often. Energy saving lamps can be used anywhere but unfortunately they do not work on most types of electronic timers or dimmer switches. They work fine with mechanical timer switches. The table below is a buying guide for low-energy lightbulbs. It gives the power ratings of the old and new

types of bulb, which give off an equivalent amount of light.

Standard Lightbulb Rating	Equivalent Low-Energy Lightbulb
25w	5w
40w	7 - 10w
60w	11 - 14w
75w	15 - 18w
100w	20w
120w	23 - 25w
150w	32w

To light your building efficiently use as much daylight as possible. Curtains could be drawn well clear of the windows during the day, lamps carefully positioned and bright colours used in darker corners. Consider the use of individually switched "task" lighting for reading or sewing. This is more efficient and will be cheaper than a fitting that is usually used to provide light for an entire room. Keeping lamps and accessories clean is important, especially in the kitchen where grease and grime tends to accumulate.

### TV, Hi-Fi etc.

You will save energy if you avoid leaving equipment left on in standby mode.

## RUNNING COSTS OF YOUR APPLIANCES

A large part of your electricity will be used to power your household appliances. When you buy new products it is a good idea to look for economy features like half-grill settings on cookers and half-load or low temperature options on washing machines.

### **Buying New Appliances - Energy Labelling**

If you are buying a new or replacement electrical appliance you should check the running costs by looking at its energy rating. There are considerable variations between the least and most economical appliances. Energy labels provide a simple indication of the energy efficiency of appliances so you can take this into account when buying new products. Manufacturers of fridges, freezers, washing machines, washer dryers and dishwashers are now required to

provide information about the energy consumption of their appliances. At present energy labels only cover electrical appliances.

The table below shows the scope for energy savings by comparing typical running costs of the most efficient (A-rated) and least efficient (G-rated) appliances.

#### Appliance Typical Annual Running Cost

	'A' Rated model	'G' Rated model
Fridge	£11	£27
Freezer	£13	£34
Fridge/Freezer	£18	£47
Washing machine	£14	£32
Tumble dryer	£23	£45

Actual running costs depend on how appliances are used. These figures give estimated annual running costs based on typical appliances being used under standard conditions.

### **MAKING YOUR PARISH MORE ENERGY EFFICIENT**

Simple domestic energy saving measures are relevant to your parish, but it is likely to be more beneficial if you also arrange to have your parish energy consumption more closely monitored. Best practice programs carried out by the Energy, Environment and Waste Directorate at the

Government's Department of the Environment, Transport and the Regions (DETR) have shown that most businesses could save large amounts of energy. In doing so they would both reduce their costs considerably and minimize their environmental impact. This will equally apply to Church properties.

There is some general advice on energy use, but this information serves more to draw your attention to areas that are well worth addressing on an ongoing basis either by employing a full time energy manager or periodically seeking expert advice.

## **ENERGY MANAGEMENT**

Good energy management will reduce your energy use and provide benefits to your parish in the way of lower operating costs and creating a better environment to worship in. Your energy performance can be assessed by comparing your energy consumption figures with best practice figures produced by the DETR's Energy, Environment and Waste Directorate.

Appointing people to be responsible for energy management in your parish will be a great help to:

- ◆ ensure your parish is always using the most suitable tariff option and receiving the appropriate level of service;
- ◆ analyse quarterly and annual energy usage patterns;
- ◆ employ energy saving measures to reduce the constant base demand of the parish;
- ◆ select the most suitable control systems for heating, cooling, lighting and industrial processes;
- ◆ provide advice on the purchasing of the most suitable new equipment.

## **BUILDING DESIGN**

New buildings can be optimised for their intended purpose if factors such as heating requirements, insulation, use of natural daylight and heating system design and controls are considered from the earliest possible design stage. The energy performance of older buildings is not likely to be as good as in purpose built new buildings, but can be improved by retrofitting new technologies and employing energy management techniques.

## **HEATING SYSTEMS**

- ◆ Space heating systems should be of a suitable size to meet the requirements of the occupied area of a building. It is usually more effective to use heat directly from the

combustion of a fuel such as gas for heating systems but electricity can be suitable for certain heating applications.

- ◆ Water heating systems should be correctly chosen, serviced, positioned and insulated. They are less efficient when operated on a light load, so it can be beneficial to install an additional smaller heater for use during the summer months.
- ◆ Building Energy Management Systems (BEMS) can accurately and effectively control the heating and cooling of buildings in a way, which reacts to the internal and external temperatures. They can be set up to automatically switch systems off during unoccupied periods and preheat buildings in the most effective way.
- ◆ Creation of different temperature zones according to the activities carried out can minimise heat losses.

## **LIGHTING**

The simple measures already described apply equally to parish premises, but there is a wider range of lamp types that are suitable for use in larger buildings. Other energy saving measures would include:

- ◆ • regular checking and cleaning of light fittings;
- ◆ • better use of natural daylight to reduce the need for artificial lighting;
- ◆ • installation of high frequency ballasts.

The following table gives an indication of the efficiency and durability of different lamp types:

Type of Lamp	Light Output in Lumens per Watt	Typical Lamp Life in Hours
Tungsten	8 - 19	1,000 - 2,000
Tungsten Halogen	17 - 25	1,000 - 4,000
Mercury Tungsten	15 - 25	5,000 - 8,000
Mercury Discharge	36 - 54	5,000 - 10,000
Fluorescent (Incandescent)	45 - 65	5,000 - 10,000
Metal Halide	56 - 76	5,000 - 10,000
High Pressure Sodium (SON)	67 - 121	6,000 - 12,000
Low Pressure Sodium	101 - 175	6,000 - 12,000

## **OTHER SOURCES OF INFORMATION AND ADVICE**

Building Research Establishment  
Bucknalls Lane  
Garston, Watford  
Herts WD2 7JR  
Tel: 01923 664 000

Cavity Foam Bureau  
PO Box 79  
Oldbury, Warley

W Midlands B69 4PW  
Tel: 01215 444 949

Combined Heat and Power Association  
3rd Floor, Grosvenor House  
35 - 37 Grosvenor Gardens  
London SW1W 0BS  
Tel: 0171 828 4077

Council for Energy Efficiency Development  
(Draught Proofing Advisory Association)  
(External Wall Insulation Association)  
(National Association of Loft Insulation Contractors)  
(National Cavity Insulation Association)  
PO Box 12, Haslemere  
Surrey GU27 3AH  
Tel: 01428 654 011

Department of the Environment Transport and the Regions  
Environment & Energy Helpline  
(for business use only)  
Tel (free): 0800 585 794

Energy Action Grants Agency  
Home Energy Efficiency Scheme  
PO Box 130  
Newcastle upon Tyne  
NE99 2RP  
Tel (free): 0800 0720 150  
Textphone: 0800 0720 156

Energy Efficiency Advice Centre Network  
(Phone this number to contact your nearest EEAC of about 40 across the UK)  
Tel (free): 0800 512 012

Energy Saving Trust  
21 Dartmouth Street  
London SW1H 9BP  
Tel: 0171 222 0101  
Hotline: 0345 277 200

Glass & Glazing Federation  
44 - 48 Borough High Street  
London SE1 1XB  
Tel: 0171 403 7177

National Energy Services Ltd  
Rockingham Drive  
Linford Wood  
Milton Keynes MK14 6EG  
Tel: 01908 672 787

National Energy Action  
St Andrew's House  
90 - 92 Pilgrim Street  
Newcastle-upon Tyne

NE1 6SG  
Tel: 0191 261 5677

National Energy Foundation  
Energy Efficiency Accreditation Scheme  
(For medium and larger organisations)  
3 Benbow Court  
Shenley Church End  
Milton Keynes MK5 6JG  
Tel: 01908 501 908