



ENERGY EFFICIENCY IN THE HOME

Centre for
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Technology

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Why save energy?

There are two reasons why we should try and save energy – for the planet and for ourselves. When we burn fossil fuels (to produce electricity, heat our homes or fuel our cars) carbon dioxide is released into the atmosphere. Since the industrial revolution the amount of carbon dioxide that is released each year has increased. Even more worrying than this, the rate of this increase has also increased, year after year. Carbon dioxide is classed as a ‘greenhouse gas’ – that is it forms a dense layer around the earth, which prevents heat escaping. The rising temperature that results is leading to climate chaos and we are already beginning to see the effects of this. Latest studies show that within the next 15 to 40 years the effects of climate change will start to feedback on themselves causing a runaway effect by which time it may well be too late to make amends.

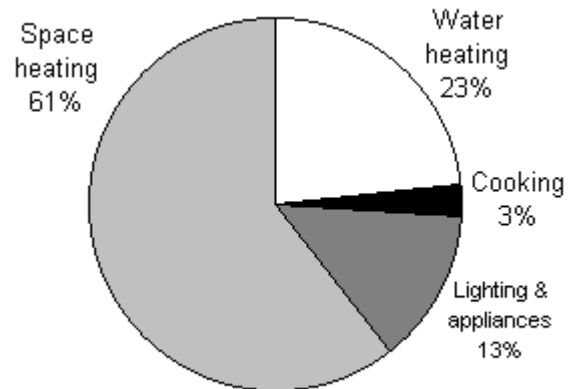
On a more personal note, saving energy will save you money, and make your life more comfortable and more healthy. You can reduce your energy bills, improve the warmth of your home and reduce condensation. The amount of money you save depends on the cost of your heating fuel, and although current electricity and oil prices are higher than gas, it is a matter of great speculation as to what the relative prices will be in years to come.

New houses are now SAP (Standard Assessment Procedure) rated. This assesses a buildings efficiency and covers thermal insulation, efficiency and control of heating, fuel used, ventilation and solar gain (but not lighting and appliances). Another rating, the NHER (National Home Energy Rating), looks at running cost so includes lighting and appliances and accounts for geographical location. It is predicted that in the future whenever a house is sold it must be efficiency rated and obviously a higher rating (showing greater efficiency) will make a house more valuable.

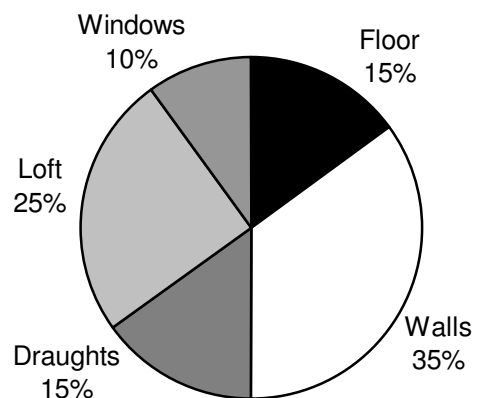
Where is energy lost?

In the UK, around 30 per cent of all carbon dioxide emissions released into the atmosphere come from the energy used in our homes. Energy efficiency measures can easily reduce this impact by a third, reducing yearly emissions of carbon dioxide by two tonnes. The following charts show where this energy goes.

Average energy use in the home



Heat Loss from an average home



Minimising Heat Loss

Walls - if you have cavity walls you can easily get insulation blown in. This takes less than a day to do and causes minimum disruption. If you have solid walls it is more difficult and more expensive to insulate but may still be worthwhile. You can insulate externally or internally. External insulation is less disruptive and it means you keep the thick thermal mass of wall inside. Stone and brick are solid, heavy materials that absorb heat and then slowly release it making a comfortable living environment. However external insulation does change the outside appearance and can be very expensive. If you are decorating your house you should think about insulating the walls on the inside.

Loft insulation is even cheaper to install and in most cases can be done by the householder. The more insulation you install, the less heat that is lost, although eventually the cost of the insulation (both environmentally and financially) becomes as great as the savings. The optimum thickness has been shown to be 350mm, Building Regulations insist on a minimum of 250mm. If your loft space has been converted into a room then you will need to insulate in the sloping roof. High levels of insulation can be hard to achieve because a free air space of 50mm must be left between the insulation and the tiling felt, unless this felt is of a low-vapour resistance type. The most economic way of achieving a good thickness of insulation in the roof slope is to have two layers of timber: the first to support the roof finish, the second to support the insulation and ceiling finish. Insulation can then fill in between the timbers, providing a thermal break between the timbers.

Floor insulation is easy to install if you can gain access to the space below the floorboards and can fit insulation bats between the floor joists. It is more difficult if there is no easy access to this space or you have a solid floor. It can be done by either lifting floorboards or raising the floor level.

Draught-proofing is a very simple home efficiency job. Draughts will occur down chimneys, around window and door frames, through letterboxes and cat flaps, where services enter, at skirting boards, and between floorboards. As a simple test to find out where there is unwanted ventilation, carry around a smoking stick (incense or cigarette) - if held near a draught you will see the smoke blown horizontally. Some ventilation is essential, for example providing air to rooms with fuel burning appliances and ventilating timbers in the roof and floor, but it is easy to minimise unwanted ventilation. Use a sealant paste to fill in gaps around skirting boards, between floorboards and around service ducts. Unused chimneys should be boarded up – or if you would like a more temporary measure then inflate a balloon into the chimney, in this way if a fire is lit the balloon will burst freeing the chimney. Compression seals and wiper seals are available from your local ironmonger and can be used on openings such as windows, doors, cat flaps and letterboxes. Insulating curtains will greatly reduce night-time heat loss from windows – if drawn!

Central heating will work more efficiently if controls such as thermostatic radiator valves and room thermostats are included.

Hot water energy needs can be reduced by giving your hot water tank an extra jacket and wrapping all hot water pipes in insulating foam. Why not consider solar water heating? - this can provide up to 50% of your hot water needs (for more details see our information sheet on the subject).

The Potential Savings

Measure	Cost (£)	Payback
Low-energy light bulbs	5	7 months
Lag water tank and pipes	20+	1-2 years
Lagging loft	140+	2 years
Draught-proofing	40+	3-4 years
Cavity Wall insulation	260-380	3-5 years
Central heating controls	125-250	2-5 years
Floor insulation	100 (DIY)	4-7 years
Double glazing (per unit)	120 (DIY) 600 (prof)	24 years 120 years

Future upgrades

When buying any new appliance, from light bulb to boiler, ensure they are suitable sized and are the most efficient model on the market. Most are now rated with an Energy Rating that allows you to calculate energy used per year. Any extra cost will soon be compensated for by energy saved.

Many appliances are left on standby all day, every day – adding up to about 6% of your electricity bills. Where possible avoid such appliances or switch them off at the plug. When necessary buy a product that has low standby power.

If you are planning on replacing your windows the most efficient type are argon filled triple glazed units made with low emissivity (low-E) glass. Argon is an inert gas that conducts heat less well than air. Low-E glass reflects heat back into the house. A simpler, cheaper alternative is to fit secondary glazing which can be as basic as sticking a clear plastic film around the frame. Your local DIY store will be able to advise you.

Plant a hedge on the windward side of your house and build a conservatory or porch to act as a buffer zone between warm house and cold exterior.

Further information

CAT publishes a number of tipsheets on energy efficiency including: *Insulation*, *Come Clean* (choosing a washing machine), *Bright Ideas* (about lighting), *Cool It* (about fridges and freezers). These are available to download, payable by PayPal, from our website. For further energy efficiency ideas 'The Energy Saving House' is full of useful tips. 'The Whole House Book' is a comprehensive guide to environmental building if designing a new home or renovating an old one.

Practical advice is available on CAT's **residential course**, *The Whole House*. Detailed technical advice is available through **CAT Consultancy**.

For local advice contact your **Energy Efficiency Advice Centre** (0800 512 012 or www.est.org.uk)