appendix 2

home energy glossary

Not sure what a technical term means? Want to check out the details of different options? Use this alphabetical guide to help you.

Best practice

Doing better than the average. If we are building for 2050, it makes sense to plan for something that will not seem like a dinosaur by then. This means going beyond the minimum requirements of the building regulations. Advice on best practice can be found in the 'Code for Sustainable Homes', guides published by the Energy Savings Trust or in voluntary codes like the Association of Energy Conscious Builders (AECB) Gold standard or the Building Research Establishment (BRE) EcoHomes standard.

Biofuel heating

There are various 'biomass' fuel crops. The one most common in domestic use is wood, in the form of chips or pellets. Wood-pellet boilers work like conventional ones. They are automatic, only requiring the fuel hopper to be filled and the ash to be emptied from time to time. They can be used instead of oil, but take up more room than an oil system. They are a low-carbon option but are not carbon neutral because of the carbon costs of creating chipped or pelleted fuel.

Building regulations

These are legal standards for buildings, set by government and enforced by local authorities. Although they cover the energy efficiency of buildings, you will have to exceed these standards in order to create a truly low-carbon house.

Cavity wall insulation

Between about 1930 and 1982 most houses were built with two skins of brick, separated with a 50mm (2 in) gap. Initially, this was seen as a good way to keep the inside walls dry. Now it is seen as a good place to put insulation. This is blown in through small holes drilled in the outside walls. There are grants available for this.

Combi boilers

These combine central heating (hot water for the radiators) and instantaneous water heating (for the taps). They are popular because they do not need a hot water cylinder or header tank. If you are installing a new one, make sure that it has the highest SEDBUK rating (see below) and that it can accept hot water from a solar water heater, in case you want to install this as well – now or later.

Condensing boilers

These are now the standard for gas heating. They achieve high efficiency by extracting so much energy from the burnt gas that the steam condenses. All new boilers now have to meet the SEDBUK efficiency standard, which means that they are usually condensing boilers. Look for one with an 'A' rating. Oil boilers can also be designed to work in condensing mode but are more expensive as components have to be protected from the corrosive condensates produced by the sulphur in the oil.

Central heating controls

These should help your system work more efficiently. Ideally the controls will: switch the system on and off at times convenient for you; allow you to adjust individual room temperatures as well as controlling the firing of the boiler, so that it works efficiently. If you are installing a new boiler or having other work done on your central heating system, look at also upgrading your controls.

Code for Sustainable Homes

This official government standard is now part of the Building Regulations. It replaces the BRE EcoHomes standard and sets the standards for building new homes. From April 2008, all new homes must have a Code 3 rating and after 2016 all new homes will need to meet Code 6.

Combined heat-and-power

This system uses the extra heat created in generating electricity to produce hot water. The old Battersea power station used to do this. Many hotels have small gas-powered engines that generate electricity and heat their water. Blocks of flats or even whole streets can be designed for combined heat-and-power. Units are now available that are small enough for use by a single house.

Composting loos

These are dry toilets that produce useful compost. They save precious water and remove the need for disposal systems or drain connections. They have to be carefully designed to be convenient and hygienic and are probably more suited to rural locations.

Conservatories and sun spaces

South-facing walls are ideal for conservatories or sun spaces. Designed, built and used properly, these can make a contribution to home heating by trapping the warmth of the sun, even in the winter. Unfortunately some people install them as a cheap way of extending living space and try to heat them in the winter. Even if the conservatory is double-glazed, the amount of energy wasted is huge. Think of your conservatory as a buffer space between indoors and outdoors which is warming the rest of your house.

Controls

Thermostats, time clocks and light sensors can automatically turn things off saving you money and reducing your CO_2 emissions. All are easily fitted by electricians or a heating contractor. Review the times and temperatures from time to time: small changes can make a big difference. See also: Central heating controls, Lighting controls, Radiators.

Curtains

If you have single-glazed windows, curtains are especially important as they reduce heat loss and make the room feel warmer. Make sure they are thick and lined, and that you close them at dusk. A common mistake is to have curtains hanging down over the front of a radiator. This directs the heat straight out the window! A shelf above the radiator will keep the curtain off the radiator and direct heat into the room instead.

Defrosting

If you keep your fridge and freezer defrosted, they will work more efficiently. Cleaning the dust off the fins at the back will also improve their efficiency.

DIY secondary glazing

A range of products available in any DIY store will reduce the heat loss and draughts around windows. Plastic film can be taped up, as a temporary measure, for one or two winters. It is cheap and surprisingly invisible. More expensive framed systems can be fitted with clear plastic panels or glass. Be careful not to put unbreakable plastic over a window that might need to be used as a fire exit in an emergency. Check sufficient ventilation is left for any gas fires or stoves.

Double glazing

Some types of double glazing perform better than others, last longer and are easier to maintain. PVC windows have a high environmental cost in their manufacture and a relatively short life. Wood needs regular maintenance. On a listed building, or in a conservation area, you may need to get windows specially made. There are a number of companies who make properly sealed double-glazed Victorian sashes. Windows and doors now come with A to G ratings, awarded by the British Fenestration Ratings Council (BFRC; see www.bfrc.org). Look for those with an 'A' rating.

Draught stripping/sealing

This is one of the most effective improvements you can make. Draughts are responsible for a huge amount of heat loss. New double-glazed units come with their own draught seals. There are a range of materials to help control draughts around older windows and doors. Look in your local DIY store. Most are simple to fit. If you are redecorating, remember not to paint over existing seals.

Dry lining

Houses built before about 1930 were usually built with solid brick walls. Dry lining adds an inner skin to an outside wall, on top of an intervening layer of insulation. The room becomes slightly smaller but, even in small houses, this is rarely noticeable or a problem. In a cold house, it creates more useable space as it is no longer uncomfortable to sit near external walls. The work itself is disruptive and best done when redecorating or when new windows are being installed. It needs to be done by a competent builder who understands the technical issues of condensation and cold bridges.

Drying clothes

This is best done outdoors! Tumbler driers use a lot of electricity and should be seen as a last resort. Indoors, try to dry your clothes in an unheated space: if you have to open a window to disperse the damp, it won't waste too much energy.

Electrical appliances

All refrigeration and laundry appliances, dishwashers, electric ovens and light bulbs must now carry an EU energy label. These rate appliances from A, A* or A++ for the best, down to G for the worst. Choose the highest rating available every time! If you are buying something without an EU rating, ask about its power consumption.

Embodied carbon

This is the technical term for the carbon or CO_2 emissions that result from manufacturing items that you buy.

Energy Performance Certificate (EPC)

Whenever a home is sold, it now needs an EPC. This gives the house a rating from A to G for its energy efficiency and is part of the Home Information Pack (see below).

External insulation

Insulation can be attached to external walls and then plastered or boarded over to give an attractive finish. It can be expensive but is not disruptive. It's most suitable for flank walls where there are no doors and windows to work around.

Fridge and freezer

See Electrical appliances.

FSC timber

Timber that has been certified by the Forest Stewardship Council (FSC) has come from a sustainably managed source (see http://www.fsc.org).

Full loads

Most appliances will use similar amounts of electricity or water whether they are full or empty. Even the 'clever' ones that adjust for the load are most efficient when full.

Grey-water system

This uses collected rain water or filtered 'waste' water to flush WC's. It requires extra 'grey water' pipework and a storage tank.

Ground-floor insulation

Insulation can be installed under the floor-boards, or under a solid floor, to prevent heat loss. Timber floors have to be lifted. Then, rockwool can be laid over the joists or rigid insulation can be cut and fixed between the joists. Breather paper or plastic sheet placed over the joists before the boards are re-fitted will stop a lot of draughts. Existing solid floors are harder to deal with. It is sometimes possible to install an insulating barrier around the house, against the outside wall above the foundations. These are jobs best done as part of a complete refurbishment, or because the floor needs replacing for other reasons.

Heat pumps

Heat pumps use electricity to extract energy from the air or ground outside and transform it so it can be used to heat the house. Every kilowatt hour of electricity used by the system's heat exchanger and compressor delivers 3–4 kWh to the house. Ground-source heat pumps are more efficient than air-souce heat pumps. Ground-source heat pumps use long coils of water-filled pipe buried in the ground; they are expensive to install and require a large garden. Air-source heat pumps look like small air-conditioning units and are fixed to an outside wall or roof. They are cheaper to install and are gaining in popularity in the UK. Heat pumps are most appropriate for highly insulated houses that are supplied by renewable electricity.

Heat recovery

Heat-recovery systems allow stale air out and fresh air in without losing all the heat. They come in the form of kitchen and bathroom extract fans and as bigger whole-house systems. The best models are quiet and have efficient fans.

Home Information Pack

Since 2008, when selling a house you need to provide a package of information for any potential buyer. This includes an Energy Performance Certificate (see above), rating your house from A to G.

Hot-water cylinder

Gas, oil, wood and solar water systems can all have hot-water cylinders. New cylinders come with some insulation, but you can get 'jackets' to add more. Stuff old duvets round for a DIY solution. For the best performance, you should turn down the cylinder thermostat to about 50 °C. Experiment to find the point where the water does not need to be mixed with much cold when you are using it. If you find you frequently run out of hot water and have to turn the system on again, you have set the thermostat too low.

Hot-water pipes

Pipes are the Cinderella of insulation. Most could do with being wrapped up. If you're having building work done, insist that pipes are lagged. Otherwise, take it on as a DIY job. Use purpose-made pipe insulation (available from DIY stores) and don't forget to tape the joints. In particular, check: the pipes between the boiler and the hot-water cylinder; heating pipes under the floor or in unheated spaces; all hot-water pipes; and any cold-water pipes that suffer from condensation.

Insulation

See Cavity wall insulation, Dry lining, External insulation, Ground-floor insulation, Insulation materials, Loft insulation and Roof insulation.

Insulation materials

There is a huge choice; different materials suit different jobs. The most efficient (by thickness) is polyurethane foam (e.g., Celotex). However it is made from petrochemicals and is not cheap.

The cheapest (for a given level of insulation) is probably fibreglass or rockwool. However fibreglass is an irritant to skin, lungs and eyes and hazardous in exposed areas.

The best environmentally are recycled paper (Warmcell), which is relatively cheap but has a mixed reputation, or sheep's wool (Thermafleece) which is more expensive. Other natural products like flax, cotton waste and hemp are also becoming more readily available.

Landlords Energy Saving Allowance (LESA)

This allows landlords to offset the cost of energy improvements against the tax on rental income.

Lighting

The light delivered to the surface you are lighting is dependent both on the rating of the bulb and on the light fitting. Recessed lights and dark lampshades waste a lot of energy. Up-lighters, which bounce the light off the ceiling, are not as efficient as direct lighting, especially if the ceiling is not a brilliant white. The best strategy is to provide a warm background light and local lighting where it is needed (e.g. on kitchen work tops or where you sit and read). Always choose light fittings that will take low energy bulbs. These are not always easy to find; you may need to search and be persistent.

Lighting controls

Motion and daylight detectors can sometimes be useful in making sure lights are not left on unnecessarily.

Lightbulbs

These are listed below, in order of efficiency, starting with the best.

- LEDs (light emitting diodes): these are just becoming available for domestic lighting and are likely to become the lighting of the future.
- Compact fluorescents (CFLs): often called energy-efficient or low-energy bulbs, these are 400–500% more efficient than ordinary (GLS) bulbs, and now come in numerous shapes, sizes and ratings.
- Tungsten–halogen: often used for spotlights in kitchens, some up-lighters and garden lights, these are 30–100% more efficient than ordinary (GLS) bulbs, but the saving is often illusory because more are installed.
- Incandescent or GLS bulbs: these 'ordinary', old-style lightbulbs are horribly inefficient – over 90% of their energy is lost as heat.

Compact fluorescents are often labelled to show which ordinary lightbulb they should replace. Unfortunately manufacturers sometimes overestimate their power and people complain that they are not bright enough. A 20 watt CFL may be labelled as equivalent to a 100w ordinary bulb but in fact its output is closer to an 80 watt old-style bulb. If you want the equivalent of 100 watts you need to choose a 25 watt CFL.

Low Carbon Buildings Programme (LCBP)

This provides grants for installing micro-generation technologies (e.g. solar water heaters) in households and community buildings.
(http://www.lowcarbonbuildings.org.uk)

Low e coating

A treatment for glass used in double-glazed windows, that increases its efficiency by reducing heat loss.

Loft insulation

Many houses have no more than 50 mm or 2" of loft insulation, although the recommended level is now 270 mm or 10.5". This will stick up over the joists so, if you want to store things in your loft, you will have to construct a platform above the insulation. Don't forget to: insulate and draught seal the loft hatch; be careful not to bury any wiring; and leave a small breathing space between the insulation and the roofing felt by the eaves. Fitting more loft insulation is one of the easiest and most effective things you can do.

In an attic room, you can insulate between the rafters and plasterboard over it. In small attics and older loft conversions, it can be hard to get enough insulation in place this way. It may be possible to consider external insulation when the roof needs replacing (see Roof insulation).

Low energy bulbs

See Lightbulbs.

Merton Rule

A planning requirement adopted by some local authorities that some larger building developments meet 10% of their energy needs from renewable sources.

Pipe lagging

See Hot-water pipes.

Photovoltaics

These are solar panels that generate electricity from sunlight. They are still quite expensive but the price is likely to come down as mass manufacture develops. Like solar water panels, they are usually fixed to the roof and need a south-facing slope.

Radiators

These will not be needed in super insulated houses! In older houses, if they are against an outside wall, you should fit reflecting foil behind them. (This is available in rolls from DIY shops). If they are positioned below a window, a small shelf (or an extension to the sill) that sits at least 50mm above the radiator will stop warm air rising straight up from the radiator and going out the window. The curtains can then rest on the shelf and stop cool air next to the window from dropping down and cooling the room. Fit thermostatic radiator valves to allow control of individual rooms.

Roof insulation

Flat roofs can be insulated on the outside. This is a good job to do when you are re-felting. It is also possible to insulate a pitched roof on the outside by lifting the slates or tiles, fixing insulated sarking board to the rafters and fixing the tiles back to the board. This may be the solution for houses with loft conversions. The detailing needs to be properly designed.

SAP

This stands for 'Standard Assessment Procedure' and is a calculation used in the building regulations to estimate the energy efficiency of a building.

SEDBUK

This stands for 'Seasonal Efficiency of Domestic Boilers in the UK', and is the rating scheme for boiler efficiency.

Sheep's wool

Sheep's wool, flax and hemp are all natural alternatives to plastic foam or mineral-wool insulation.

Showers and baths

Generally, having a shower will use less water and therefore less energy than a bath. Typically, a 5-minute shower will use 35–50 litres and a bath 80–100 litres. However, some power showers can use as much water as a bath.

Shrink-wrap

See DIY secondary glazing.

Solar-powered hot water

Solar panels on your roof can provide about 50% of all your hot water – almost all that is needed in the summer and a significant amount in both spring and autumn. They come in two types: flat glazed panels and groups of evacuated glass tubes. The tubes perform better in winter. Both types work best on south-facing roof slopes. Flat roofs, south-facing walls or east/west facing slopes need larger panels. Roofs shaded by trees or other parts of the building or facing more north than south will not be very useful. The system usually needs a larger, specialised hot water cylinder. This will store a few days' worth of hot water and allow an ordinary boiler to top it up on cloudy and winter days.

Standby

Turning things off standby mode saves a surprising amount of electricity. Appliances tend to be left on standby permanently, so these small amounts quickly add up.

Thermostats

Turning your room thermostat down by 1 ºC will save about 10% of the fuel used (see also Controls).

Turf and sedum roofs

Flat roofs can be covered with turf or sedum moss, which slows the water run off, attracts wildlife and helps the energy performance of the roof. They should be installed over insulation. You need to check the structure first, because of the additional weight.

Turning things off

There is no better way to save energy than to switch things off! Don't be misled by urban myths that fluorescent lights (this includes energy-efficient bulbs) should not be turned off too often.

Under-floor heating

Useful in well insulated houses, a warm floor provides a more comfortable heat than radiators and can use lower temperature heat sources.

Wind turbines

These come in all sizes. Off the coast, machines of 5 MW (5000 kw) have blades 50 m long and feed the national grid. Local wind turbines of about 1.5 MW can supply 1,100 homes. You can buy small units about 2 m across to install on your roof, like a satellite dish! They are designed to produce 1 Kw in ideal conditions and may produce up to 2500 kWh a year. However, they are not ideal in urban areas. They can be noisy, turbulence from other buildings lowers their efficiency, and planners may object. Better designs may appear, especially 'vertical axis' models.

Wood-burning stoves

Wood is seen as a sustainable fuel and a stove is much more efficient than an open fire. There is a great range including stoves that can heat hot water and even run radiators.

Zero-carbon home

A zero-carbon home is one that meets Code 6 of the Code for Sustainable Homes. The term only refers to heating and lighting, not to the embodied energy in the fabric of the building, or to electricity used by appliances.