

Natural insulating materials

- ▶ **Warmcel** is made from processed waste paper produced as a fluff that can be placed by hand or sprayed for DIY loft insulation. It is fire retardant.
- ▶ **Homatherm Flex** is a very practical flexible insulation material that can be squeezed into the required space. It is made from recycled newspaper and recycled jute sacking which is treated with borax to resist decomposition and to make it fire-resistant.
- ▶ **Wood fibre** insulation boards are made from waste wood and the natural resins bind it together without needing additives – e.g. Multiplex for lining roofs.
- ▶ **Compressed straw slabs** are made by compacting straw with heat and pressure only (without adhesives), and bound together at the edges with paper. These are used as partitions /lining or as thermal roof decking. They must be kept dry.
- ▶ Insulation **cork board** is made by cooking cork granules at high temperature and pressure. The granules bond themselves together with their own resins and become water-resistant.
- ▶ **Wool** can be used in buildings for insulation. Raw unscoured sheep fleeces are simply folded into the wall, with quassia chips to deter moths.
- ▶ **Flax** can be used in walls, roofs, floors and ceilings for both domestic and commercial buildings. The fibres are bound together with potato starch, and borax is added for fire protection and insect resistance.
- ▶ **Porlite** is made from volcanic rock treated with silica or bitumen to make it waterproof.



Further information

Construction Resources Ltd

Tel: 020 7450 2211

Web: www.ecoconstruct.com

Improving and decorating your home

▶ Insulation

Why insulate?

Energy lost through poor insulation is money lost. Adopting good insulation makes the greatest impact on our energy expenditure – and it can be done without sacrificing style or spending a fortune. By conserving energy you will be **reducing greenhouse gas emissions** and will make a significant contribution to tackling climate change.

If you have poor home insulation, it's likely that you are heating the street as well as your home. For many houses, it is possible to reduce the rate of heat lost through the fabric of the house by as much as half.

Improving your home insulation means you can maintain more even temperatures all around your home, improving your comfort. You may find you can remove radiators and air conditioning, and scale down your heating system.

You can also save money. If you have a fully-insulated home, you may be able to install a smaller, cheaper more energy efficient boiler. Putting in more than 25cm of loft insulation in a new

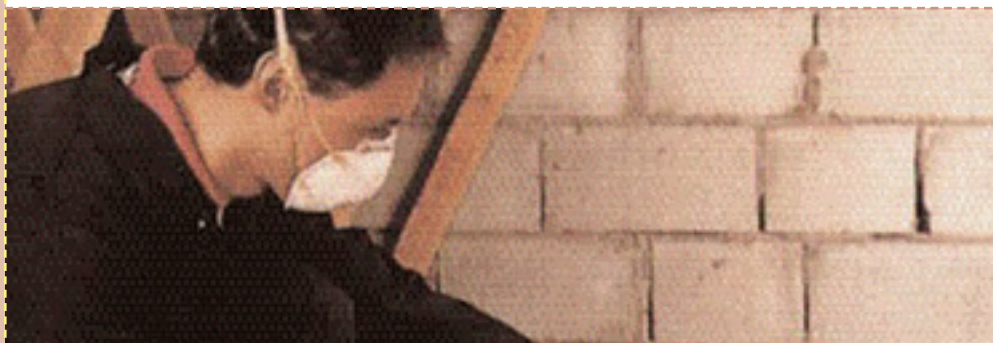
extension, for example, (above the minimum requirements of UK building regulations) could mean that it would need no do additional heating.

Choosing insulation materials

There are numerous ecological problems associated with **conventional insulation materials** such as foamed glass, glass wool, mineral/rock wool, expanded and extruded polystyrene, rigid urethane foams, vermiculite and woodwool, from their manufacture through to their disposal. Many also affect the health of installers and building occupants. Fortunately there are **natural alternatives** available.

All natural insulation materials are made from renewable plant or animal sources, are produced with low energy use, use only natural additives, are biodegradable, and have an ability to 'breathe' meaning that they can absorb airborne moisture.

Different types of insulating material will be suitable for different applications. The table opposite, using the environmental preference method, shows the best environmental options.



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CHOOSING
INSULATION
MATERIALS 

	1st preference	2nd preference	3rd preference	Not recommended
Floor	Aluminium membrane	EPS, mineral wool	Foam glass, perlite	Extruded polystyrene, PUR
Loft	Cellulose	Cork	Mineral wool	Extruded polystyrene, PUR
Cavity wall	Perlite beads	Mineral wool	EPS	Extruded polystyrene
Internal wall	Cork, cellulose	Mineral wool	Foamed glass, EPS	Extruded polystyrene, PUR
External wall	Cork	Mineral wool	Foamed glass, EPS	Extruded polystyrene, PUR
Pitched roof	Cork, cellulose, sheep's wool, wood fibre boards	Mineral wool	EPS	Extruded polystyrene, PUR
Flat roof	Cork	EPS, mineral wool, foamed glass	Foam glass, perlite	Extruded polystyrene, PUR

Source: Sustainable Energy Action

Wall insulation

Although heat rises, in the majority of homes the largest percentage of wastage goes not through the roof but the walls, with up to 35% of heat lost in this way. This makes wall insulation the most cost-efficient way to cut heat loss.

Cavity walls are usually visibly thicker-up to 30cm thick-and may have a different brick pattern (see diagram below right).

Cavity wall insulation

Cavity wall insulation can be installed in just one day by a reputable installer. The process causes little disruption and can be surprisingly inexpensive and can save much money, reducing heat loss through walls by up to 60%. **Insulating material is injected** from outside into the cavity

by drilling small holes in the wall into the gap between the outer and inner layers of brick wall.

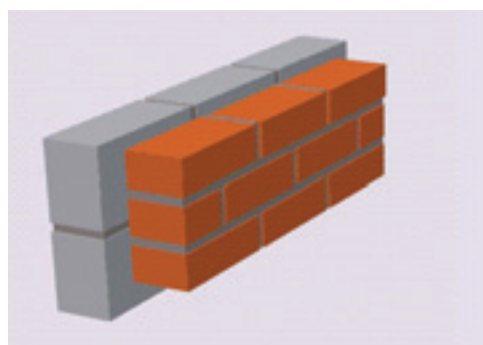
Contact the Building Control section at Woking Borough Council for more information about this type of work.



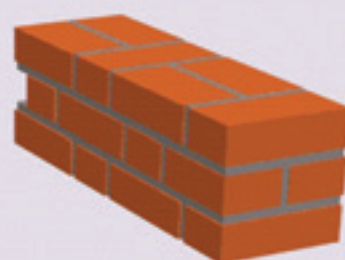
Tel: 01483 743432

Email wokbc@woking.gov.uk

Web: www.woking.gov.uk/council/buildc

Cavity wall

Note: EPS is expanded polystyrene, PUR is polyurethane

Solid wall

Source: www.est.org.uk

Insulation |

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Various types of insulating material can be used: **foam**, **mineral wool** (rock or glass), or **polystyrene beads**, but look out for the **environmentally-friendly** alternatives.

The work should be done by an accredited installer - contact the Surrey and East Sussex Energy Efficiency Advice Centre for details of current insulation schemes. Professional installers will provide a 25-year guarantee to cover defects in materials or workmanship from the Cavity Wall Insulation Guarantee Agency (CIGA).

Solid wall insulation

Solid wall insulation is a more complicated and costly process than cavity wall insulation. It involves **insulating** and then **weatherproofing** the external walls.

Weatherproofing is provided by a layer of render or cladding, onto which a decorative finish is applied, and is particularly cost effective when your outside walls need repairing or re-rendering. You can also insulate the inside of your walls if you are experienced at DIY.

Insulating your roof

There are natural alternatives to the widely used **fibreglass** and **mineral fibre**, such as **wool** and **cellulose**, which are both effective insulators and are great for DIY enthusiasts as they are more appealing to handle than fibreglass.

When insulating your roof you may disturb nesting and roosting places for birds or bats. Sometimes the work

can be modified to accommodate these guests; if not there are ways to provide them with alternative accommodation.



Unlined lofts where rafters are exposed

Your home may already have some loft insulation, but if the material is thin, it won't be saving you as much as it could. Fitting proper loft insulation is an easy and very cost-effective way to save energy. The thicker the material, the greater the saving – if you have older loft insulation only between the joists (i.e. up to 10cm -4") think about adding another layer or replacing it with new material at least 25cm (10") thick. The payback period of loft insulation is just two years: if you install 25cm thickness yourself, you can save around 20% of your heating costs. For this depth you will need to lay the top 15cm of insulation across the joists (which also conduct heat). As the insulation

will then hide the joists, you will need a boarded passage to enable you to reach tanks in the loft. Don't forget to insulate and draught-proof the hatch too.

You'll also need to make sure not to insulate underneath the **water tank** but to insulate around and above it and to insulate all water pipes.

You can buy loft insulation from any DIY store or builders' merchant. Make sure that you wear the correct safety clothing, or ask an installer to do the work for you. There are three main types of loft insulating material: **blown mineral wool or blown cellulose fibre**; **mineral wool quilt**; and **loose fill**, although only the latter two types are suitable for DIY installation.

Good **ventilation** is essential to minimise the risk of condensation and subsequent wood-rot; most homes already have adequate cross-ventilation above the insulation, but it's essential to check. In particular, do not cover the eaves with insulation.



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Lived-in or lined lofts

If your attic space is habitable you can improve heat efficiency by insulating the roof rafters. Insulating can be fitted below the rafters, between them or above.

Draught proofing

Draughts enter your home in **gaps** around doors, windows and floors, accounting for up to 20% of lost heat. Wherever you can feel cold air coming in, warm air is going out. Simply sealing up these gaps will save you money. Most draught proofing materials are cheap and widely available from any DIY store.

There are several specialised types of material, including **foams, brushes, sealants, strips, plastic film and shaped sections of plastic and rubber**. The quality of the material will affect its performance and durability, so try to choose products which meet the standard BS 7386.



You can get further information from **The National Insulation Association**
Tel: 01428 654011
Web: www.ncia-ltd.org.uk.

Insulating windows

Heat is lost through windows at night and in the winter. But any kind of window covering – curtains, blinds or shutters – will help prevent this loss.

- ▶ **Curtains can easily be made more effective.** Use thicker material, or quilted material with an insulating filling, or add a

Loft insulation	Adding 20cm to existing 5cm of loft insulation	25cm loft insulation where none at present
Cost of fitting (installer)	£210-£230	£225-£250
Cost of fitting (DIY)	From £140	From £170
Annual saving	£20-30	£80-£100
Costs recovered (installer)	7-11 years	Around 2 years

Source: Energy Saving Trust

Quick Tips

- ✦ **To cure ill fitting doors, stick draught excluding tape onto the frame or door, making sure that you can still close it.**
- ✦ **Screwing a draught excluding brush onto the bottom of external doors and the letterbox also helps.**
- ✦ **Stripped wooden floors can be draughty in winter so apply a sealant (see Floor Insulation section).**

reflective covering to reflect heat back into the room. You can make sure that escaping draughts from between the window and curtain are reduced: curtains should not drape over radiators or hang in front of them as this funnels heat out through the window. Close curtains at dusk to stop heat loss.

- ▶ **Blinds** can be made to fit the window.
- ▶ **Shutters** can be designed to be both insulating and tight fitting.

Don't forget about **ventilation** when insulating your home – it is needed to help prevent condensation. Trickle vents are inserts that can be opened or closed from inside and are fitted into window frames. In kitchens and bathrooms, extractors can also be used.

Hot water tanks and pipes

By insulating your hot water tank and pipes, you will retain hot water for longer, and save money on heating it. Insulate pipes if you can - especially between the boiler and the hot water cylinder.

- ▶ If your hot water tank has less than 7.5cm (3") of insulation you will save energy if you replace it with an 8.0cm jacket which costs about £10.
- ▶ Insulate pipes in the loft, for around £10, to stop them freezing and bursting in cold weather. This is an easy DIY job, and if you have loft insulation fitted by an installer, they should lag your pipes for you at the same time.



Insulation |

Cost benefit tables

The figures in this table are only an indication of costs: actual quotations could be higher or lower.

NOTES

The costs and savings figures will vary according to the size of the house, its location, the measure (if appropriate), fuel, heating system and the materials used.

Energy savings are estimated from a range of standard house types with gas heating and a standard occupancy.

Actual savings depend on individual circumstances.

Remember that some of the benefit may be taken in improved comfort.

DIY costs are for these measures where an average level of DIY skill is required. If in doubt about any aspect of the installation skills required consult an appropriately-qualified person.

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Detached house or bungalow	Saving (£ / yr)	Installed cost (£ / yr)	Payback (yrs)	DIY cost (£ / yr)	Payback (yrs)
Cavity wall insulation	£115-£145	£360-£550	2-5	-	-
Solid wall insulation (external)	£220-£250	Approx. £2300 (marginal)	9-10	-	-
Solid wall insulation (internal)	£220-£250	£37/sq m	-	£15/sq m	-
Roof insulation (new installation)	£100-£120	£260-£360	2-4	From £220	Around 2 years
Roof insulation (top up)	£25-£35	£230-£310	7-12	From £170	6-9
Floor insulation	£25-£35	-	-	From £100	3-4
Replacement condensing boiler	£40-£50	From £150	3-4	-	-
Hot water insulation package	£10-£20	-	-	From £20	1-2
Full heating controls package	£70-£80	£125-£250	2-4	-	-
Draft-stripping	£10-£15	£125-£150	8-15	From £40	3-4
Lighting (4 x lamps)	Approx. £20	-	-	Approx. £20	1 year

Semi-detached or end of terrace	Saving (£ / yr)	Installed cost (£ / yr)	Payback (yrs)	DIY cost (£ / yr)	Payback (yrs)
Cavity wall insulation	£70-£100	£260-£380	3-5	-	-
Solid wall insulation (external)	£140-£170	Approx. £1500 (marginal)	9-11	-	-
Solid wall insulation (internal)	£140-£170	£37/sq m	-	£15/sq m	-
Roof insulation (new installation)	£80-£100	£220-£250	2-3	From £170	Around 2 years
Roof insulation (top up)	£20-£30	£200-£230	7-12	From £140	5-7
Floor insulation	£15-£25	-	-	From £100	4-7
Replacement condensing boiler	£30-£40	From £150	4-5	-	-
Hot water insulation package	£10-£20	-	-	From £20	1-2
Full heating controls package	£50-£60	£125-£250	2-5	-	-
Draft-stripping	£10-£15	£85-£110	6-11	From £40	3-4
Lighting (4 x lamps)	Approx. £20	-	-	Approx. £20	1 year

Improving and decorating your home

| Insulation

Mid-terraced	Saving (£ / yr)	Installed cost (£ / yr)	Payback (yrs)	DIY cost (£ / yr)	Payback (yrs)
Cavity wall insulation	£40-£70	£210-£300	3-8	-	-
Solid wall insulation (external)	£70-£100	Approx. £800 (marginal)	8-11	-	-
Solid wall insulation (internal)	£70-£100	£37/sq m	-	£15/sq m	-
Roof insulation (new installation)	£80-£100	£210-£240	2-3	From £170	Around 2 years
Roof insulation (top up)	£20-£30	£190-£220	6-11	From £130	6-9
Floor insulation	£15-£25	-	-	From £70	3-4
Replacement condensing boiler	£20-£30	From £150	5-8	-	-
Hot water insulation package	£10-£20	-	-	From £20	1-2
Full heating controls package	£40-£50	£125-£250	3-6	-	-
Draft-stripping	£10-£15	£85-£110	6-11	From £40	3-4
Lighting (4 x lamps)	Approx. £20	-	-	Approx. £20	1 year

Flat	Saving (£ / yr)	Installed cost (£ / yr)	Payback (yrs)	DIY cost (£ / yr)	Payback (yrs)
Cavity wall insulation	£30-£40	£170-£265	4-9	-	-
Solid wall insulation (external)	-	-	-	-	-
Solid wall insulation (internal)	£60-£70	£37/sq m	-	£15/sq m	-
Roof insulation (new installation)	£130-£150	£225-£250	Around 2 years	Around £250	Around 2 years
Roof insulation (top up)	£30-£40	£200-£230	5-8	From £200	5-7
Floor insulation	£10-£20	-	-	From £100	5-10
Replacement condensing boiler	Approx. £20	From £150	Around 8 years	-	-
Hot water insulation package	£10-£20	-	-	From £20	1-2
Full heating controls package	£30-£40	£125-£250	3-8	-	-
Draft-stripping	£5-£10	£40-£60	4-12	From £40	4-8
Lighting (4 x lamps)	Approx. £20	-	-	Approx. £20	1 year

- The installed costs per measure are a range where the lower cost is intended to be representative of the typical cost to the householder in a subsidised scheme (e.g. Energy Efficiency Commitment (EEC)).

- Lighting savings assume a mixture of wattages replaced and hours of use.

- DIY cost of floor insulation assumes the material cost of the insulant required.

- Costs and savings given for condensing boilers are marginal, i.e. the difference between installing an 88% efficient condensing boiler rather than a 78% efficient non-condensing boiler. Allowances or grant aided or subsidised schemes for boilers have not been taken into account as these can vary significantly.

- Source: Energy Saving Trust

Insulation |

Improving and decorating your home

Floor insulation

If you sometimes feel a draught beneath your feet, you may be able to reduce your heating costs by sealing gaps between the floorboards and the skirting.

- ▶ A regular **tube sealant**, like the silicon sealants used around the bath, can be applied to the gap.
- ▶ Whether you have access under the floor (via a cellar for example) or need to take your floorboards up, it is worth **insulating underneath** on the ground floor. Not only will it make the room feel warmer, but you could save up to £25 per year.
- ▶ If you have opted for polished floorboards you are likely to be losing heat underfoot. Warmer natural floor coverings are available (see materials section) such as **cork** or **wood block**.
- ▶ Remember not to block any under floor airbricks in your outside walls. Your floorboards will rot without adequate **ventilation**.

Grants for loft and cavity wall insulation are available through the Surrey and East Sussex Energy Efficiency Advice Centre (see below). Most people are eligible for at least a 50% grant towards the cost of insulation and those receiving benefits could be eligible for a 100% grant.

➤ MORE INFO ON INSULATION

The Bat Conservation Trust publication, 'Bats in houses', which is available from Alana Ecology (01588 630 173), has advice on avoiding harm to bats during renovation work.



For further advice contact the BCT at www.bats.org.uk

Information on environmentally friendly insulation materials.

**Construction Resources Ltd**

Ecological Builders Merchant and Building Centre,
16 Great Guildford St,
London SE1 0HS
Tel: 020 7450 2211
Email: sales@ecoconstruct.com
Web: www.ecoconstruct.com

Energy Efficiency Advice Centres give free, impartial advice on insulation and all other aspects of energy use in your home, including how to contact Energy Efficient Installers.

**Energy Efficiency Advice Centre**

(Surrey and East Sussex)
Tel: 0800 512012
Email: advice@ecsc.org.uk
Web: www.ecsc.org.uk

**Energy Saving Trust**

21 Dartmouth Street,
London SW1H 9BP
Tel: 020 7222 0101
Email: media@est.co.uk
Web: www.est.org.uk

**Insulation Render and Cladding Association Ltd**

PO Box 12, Haslemere,
Surrey GU27 3AH
Tel: 01428 654011
Email: incaassociation@aol.com
Web: www.inca-ltd.org.uk

National Insulation Association provides information on draught proofing, loft insulation and cavity wall insulation including lists of installers.

**National Insulation Association**

PO Box 12, Haslemere,
Surrey GU27 3AH
Tel: 01428 654011
Email: insulationassoc@aol.com
Web: www.insulationassociation.org.uk

Royal Society for the Protection of Birds gives guidance on providing alternative nesting places for birds found in loft spaces, such as house martins and swifts.

**Royal Society for the Protection of Birds**

The Lodge, Sandy,
Bedfordshire SG19 2DL
Tel: 01767 680551
Web: www.rspb.org.uk

**Thermal Insulation Manufacturers and Suppliers Association (TIMSA)**

Association House,
99 West Street, Farnham,
Surrey GU9 7EN
Tel: 01252 739154
Email: timsa@associationhouse.org.uk
Web: www.timsa.org.uk

See also 'Grants and Funding' page 50 for details of possible sources of support for household insulation improvements.

Improving and decorating your home

▶ Windows

Choosing windows

If your home has single glazing or poor window frames, you could well be wasting money on your heating bills. Double- and triple-glazing cut heat loss by trapping air in the gaps between the glass panels. Consider this option when your existing windows need replacing – it will be more cost-effective to fit the replacement frames with double-glazed panes.

You are likely to benefit most if you double-glaze windows in the rooms you heat most often, such as the living room, or particularly draughty rooms.

Double- and triple-glazing have other benefits besides saving energy. Condensation on the panes will be reduced, noise from outside will be less audible, and down draughts from windows will decrease, so you will be able to position radiators more freely. Your home may also be more secure, and your fuel bills will decrease as you use less heating.

Before installing windows of a different design to the originals, check whether planning restrictions apply to your



house or property. This would be the case if you are located in a Conservation Area, or own a Listed Building. It is also important to consider a means of escape in case of fire when installing double-glazing.

Double-glazing needs to be installed by an approved installer or inspected by Building Control. Replacement windows should either be installed by an approved contractor (under the FENSA scheme - Fenestration Self Assessment) or will involve making a Building Regulations submission.

**Contact Building Control for details:**

Tel: 01483 755855

Web: www.woking.gov.uk/council/buildc/
www.woking.gov.uk/council/buildc/apply
(to apply online)

Choosing frames

The insulating properties of frames are important. Proper insulation can help increase the overall insulating efficiency of windows, and will prevent condensation developing.

▶ **Solid metal**

Metal frames such as aluminium conduct heat quickly and should therefore be avoided unless they contain a thermal break.

▶ **Plastic or PVC**

PVC is low maintenance in the short run, but its long-term durability is beginning to be questioned by some.

**Your options**

The insulating layer between the panes of glass in double glazing can be improved by producing a vacuum between the two layers of glass, stopping conduction of heat between the two layers of glass, or by substituting the air for a harmless light gas such as argon or krypton. This can only be achieved when the units are sealed at the factory. Factory-sealed units containing argon or krypton, are now readily-available.

There are other ways of reducing heat loss through windows:

▶ **Low-E (low emissive)**

This is a special type of glass with a transparent coating fused to the inner side of the pane, which reflects heat back into the room. This material acts as a thermal mirror. Low-E glass keeps warmth inside during the winter and keeps heat outside during the summer. It also screens out the sun's ultraviolet rays, which helps

Windows |

to reduce fading of carpets and curtains. Low-E glass can significantly reduce heat loss, giving an effect similar to triple glazing for less cost.

Optimum efficiency can be achieved by using Low-E glass in conjunction with an inert gas in the gap. In colder climates, Low-E/Argon or Low-E/Krypton helps minimise heat loss. In warmer climates, it reflects radiant heat and helps reduce UV damage to furniture, fabric or flooring. Low-E/Argon or Low-E/Krypton glazing can help lower energy bills and keep indoor temperatures pleasant year-round.

▶ **Secondary glazing**

Framed glass panels are attached on top of existing window frames. This is a cheaper alternative to replacement double-glazing, and very effective in reducing heat loss, with DIY kits available with aluminium or plastic frames. They are fitted with draught-proofing strips and are available as either hinged or sliding panes, which can be easily opened and closed.

PVC windows can be difficult to repair, and even slight damage can require the whole unit to be replaced. They are also difficult to dispose of. (See material section for more information on alternatives to PVC).

▶ **Timber**

Timber from a certifiable source provides the best all-round ecological solution. The timber must have been well-seasoned in the first place and must be kept protected.

Quality can vary too, so check with your local Energy Efficiency Advice Centre or Installer.



Repair or replace?

Your windows may be in a poor state of repair, perhaps partly rotten (if wooden) or corroded (if metal), and your decision to replace or repair them will be based on their aesthetic quality as well as the costs and savings involved.

For more information on window repair and replacement, see the material section.

A sympathetic restoration or replacement can often be a feature when you come to sell your home—'original features' being a key selling point for many estate agents.

➤ **MORE INFO**

The Chartered Institute of Building Services Engineers (CIBSE) is a great resource for helpful advice on all elements of good building practice.



Chartered Institute of Building Services Engineers (CIBSE)

Web: www.cibse.org



Energy Efficiency Advice Centre
(Surrey and East Sussex)

Tel: 0800 512012

Email: advice@ecsc.org.uk

Web: www.ecsc.org.uk

English Heritage's Framing Opinions Leaflet 5 - Window Comparisons gives a good insight into the quality of various different materials.



English Heritage

Web: www.english-heritage.org.uk

Greenpeace has detailed information on alternatives to PVC frames.



Greenpeace

Web: www.greenpeace.org/international_en/campaigns/intro?campaign_id=3988