

Conserving your Historic Building

Sustainability and Historic Buildings

A guide for owners and occupiers



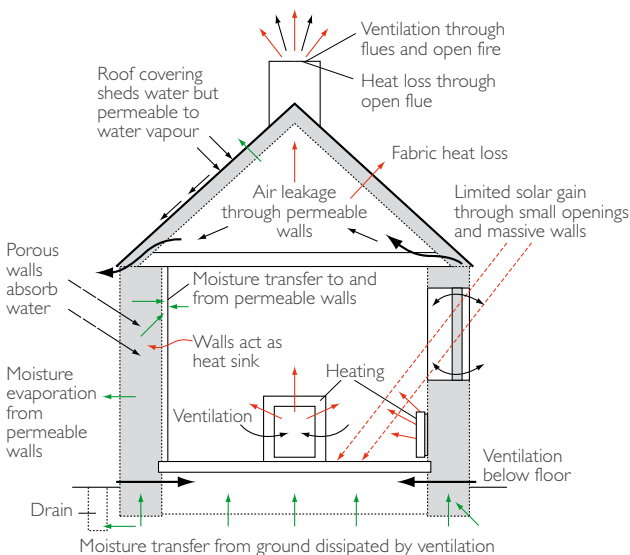
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Energy use in buildings accounts for 46% of the UK's carbon dioxide (CO₂) emissions, with about a third of this produced in our homes. The Government has set targets to reduce CO₂ emissions, and believes National Parks should lead the way in promoting sustainability.

Heat loss in historic buildings

Heating accounts for most of the energy use in our homes. In traditionally constructed buildings: 60% of heat loss is through walls and roof (35% and 25% respectively); 15% is due to draughts; and only 10% is through windows.

Improving thermal efficiency to reduce heat loss, for example through draught-proofing and insulation, is crucial. With historic buildings special care should be taken to ensure that such measures avoid damaging either their character or fabric.



Moisture, air movement & thermal behaviour of a traditional building

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Insulating materials in historic buildings

Historic buildings need to breathe. Their fabric must be able to absorb and release moisture.

Impervious wall coverings, renders, modern plasters and insulation materials are unsuitable for use in historic buildings as they can trap moisture inside the building's fabric, increasing the risk of damp and timber decay.

Natural insulation materials such as sheep's wool and hemp fibre are permeable and therefore suitable for use in historic buildings. They have good thermal properties, enable the movement of moisture and prevent condensation.

The energy hierarchy

National planning policy has prioritised action on energy use in buildings, as follows:

Priority 1: Reduce the need for energy

Priority 2: Use energy more efficiently

Priority 3: Use low carbon and renewable energy

Reducing energy use and improving energy efficiency are much more cost-effective than renewable energy measures. They also have minimal impact on a building's character.

Draught-proofing

This is one of the best and least intrusive ways of reducing heat loss, with little or no change to the property's appearance. In historic buildings, the main sources of draughts can be easily tackled:

- Suspended timber ground floors – insulation can be installed beneath these (avoid insulation on top of timber floors, which can lead to rot).
- Open chimneys – these can be blocked using inflatable chimney balloons (leaving a small gap to ventilate the flue).
- Gaps around windows and external doors - draughts can be reduced or eliminated by adding draught-stripping.

Insulating external walls & roofs

Adding insulation to solid external walls can cause problems and must only be done with care.

On the internal face of solid external walls, insulated lime plaster is currently the only wall treatment that can be recommended unreservedly: modern insulating linings can lead to damp and rot, and can also alter the character of the room, compromising original internal features such as fireplaces, architraves and skirtings. Insulating the outside of solid external walls is more effective, but is only an option if the house is rendered.

Adding insulation to roofs is the most cost-effective option, the outlay being recouped by savings in heating bills in as little as three years. Adequate ventilation must be provided above the insulation layer, however, to protect the roof structure from damp and rot.

Improving thermal efficiency of windows

Existing historic windows should always be repaired and draught-proofed, wherever possible.

The character of historic buildings can easily be destroyed by inappropriate, modern windows. Such works are not always cost-effective. For example, it can take many years for energy savings to recover the cost of installing double glazing.

More appropriate options for improving the thermal efficiency of historic windows include:

- Blinds or heavy curtains – fitting these almost halves the heat loss.
- Internal shutters – these reduce heat loss slightly more.
- Secondary glazing – this improves thermal efficiency (and sound insulation). A secondary window can also be double-glazed, effectively providing triple glazing to the opening as a whole.
- Combining shutters and curtains, or curtains and secondary glazing – provides better insulation than a double-glazed unit.

Low carbon and renewable energy

The Government believes that National Parks should set an example in supporting the positive role that low carbon and renewable energy can play in sustainability. The valued characteristics of the National Park, however, must always take priority.

In historic buildings, there may be scope for small-scale renewables. However, these may require formal approval – please consult the Authority's Planning Service.

Low carbon and renewable energy solutions which potentially have the least visual impact include:

- ground-source heat pumps
- air-source heat pumps
- water turbines

Low carbon and renewable energy solutions which may have greater impact include:

- wood-chip boilers
- wind turbines
- solar panels
- photo-voltaics

It is always preferable to incorporate solar panels or photo-voltaics while a building is being re-roofed. This will make the panels much less obtrusive (see our Design Guide for advice).

Sustainable use of materials

Sourcing materials and products from around the world contributes significantly to air pollution and environmental damage. Some modern materials require large amounts of energy to be used ('embodied energy') in their extraction, processing, manufacture and transportation.

We can use materials more sustainably by following these principles wherever possible:

- Repair rather than replace.
- Use salvaged or recycled materials and products, including aggregates, where appropriate.
- Buy materials and products locally.
- Minimise use of non-renewable resources.
- Avoid products whose manufacture, use or disposal causes harmful by-products.
- Choose materials with low embodied energy.

Specifically:

- Use plant- or water-based paints labelled with a low VOC rating (volatile organic compounds, harmful to health), rather than oil-based paints.
- Avoid plastics and upvc. Made from oil, a non-renewable resource, these require large amounts of energy in production and emit toxins when incinerated (many European countries have restricted the use of upvc in buildings on environmental grounds).
- Wherever possible use local materials, such as stone, slate and tiles: imported stone and slate from other continents are often a poor visual match to our traditional materials.
- Specify timber from independently certified, well managed forests bearing the Forest Stewardship Council (FSC) logo.

References

Relevant publications and websites giving more information include:

- www.peakdistrict.gov.uk/energy.htm
Peak District National Park Authority Supplementary Planning Guidance for Energy Renewables and Conservation.
- www.peakdistrict.gov.uk/designguide
Peak District National Park Authority Design Guide, 2007.
- www.changeworks.org.uk
Energy Heritage: A Guide to Improving Energy Efficiency in Traditional and Historic Homes, by Changeworks for Historic Scotland.
- www.historic-scotland.gov.uk/thermal-windows.pdf
Improving the Thermal Performance of Traditional Windows, Glasgow Caledonia University, for Historic Scotland.
- www.english-heritage.org.uk
English Heritage publications:
 - *Energy Conservation in Traditional Buildings*
 - *Research into the Thermal Performance of Traditional Windows: Timber Sash Windows*
 - *Draught-proofing and Secondary Glazing*
 - *Microgeneration in the Historic Environment*
- www.energysavingtrust.org.uk
See the free Home Energy Check on the Energy Savings Trust website.
- www.sedbuk.com
Check the efficiency of your current boiler on the Boiler Efficiency Database.
- www.energysavingtrust.org.uk/nottingham/Nottingham-Declaration/Events-resources/Adaptation-extras
Adapting to climate change: guidance for adaptation extras.

Further information:

For further advice on these issues or on the need for approvals, or to discuss any specific proposal you may have, contact the Built Environment Section of the Cultural Heritage Team at:

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