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The demonstration Ecohome at CREATE is full of information and inspiration – more details at:

[www.bristol.gov.uk/ecohome](http://www.bristol.gov.uk/ecohome)



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## Eco-refurbishment and the historic environment



## Introduction



Bristol's unique character owes much to the quality and diversity of historic buildings within the city. Historic buildings can be inherently sustainable in their design, as they tend to be constructed from natural, locally sourced materials, maximise natural light and ventilation and offer a balance between high density and privacy. They also offer robust and adaptable internal spaces.

Older buildings can be draughty and inefficient, but retaining and refurbishing these houses is potentially a more sustainable option than demolition and new building. Eco-refurbishment of older buildings gives savings in embodied energy, and can also achieve home energy ratings at least as good as new build

housing. Importantly it preserves the buildings that contribute so vitally to Bristol's townscape.

Measures to improve energy efficiency in historic buildings need not be in conflict with principles of conservation: there is considerable scope for retrofitting which is sensitive to aesthetic and historical qualities. Eco-refurbishment needs to take account of the fabric of the building – so, for example natural materials are preferred for insulation, and uPVC should be avoided on both aesthetic and environmental issues. It is particularly important to ensure that older buildings 'breathe' as they were designed to, to avoid the risk of damp and damage to the structure.

## References

### English Heritage

'Climate Change and Your Home' website and 'Hearth and Home' project

[www.english-heritage.org.uk](http://www.english-heritage.org.uk)

### Energy Conservation in Traditional Buildings

English Heritage, 2007

[www.english-heritage.org.uk](http://www.english-heritage.org.uk)

### Sustainable refurbishment of Victorian housing,

Tim Yates, BRE, 2006

Detailed technical information on methods and materials.

[www.bre.co.uk](http://www.bre.co.uk)

### Sustainable Refurbishment Case Studies,

Sustainable Homes, 2004

[www.sustainablehomes.co.uk](http://www.sustainablehomes.co.uk)

### Green Street

This website was created for housing associations, but has tailored advice for different ages and styles of housing which can also be used by householders.

[www.greenstreet.org.uk](http://www.greenstreet.org.uk)

### 40% House

Research project to relate the government target of reducing carbon emissions by 60% by 2050 to an individual house.

[www.40percent.org.uk](http://www.40percent.org.uk)

### Old Home Superhome

This project is promoting exemplar projects to make older housing energy efficient and reduce carbon emissions.

[www.sustainable-energyacademy.org.uk](http://www.sustainable-energyacademy.org.uk)

### South Yorkshire Energy Centre

Case study describing the eco-refurbishment of a building dating from 1880 to house the SYEC.

[www.syec.co.uk](http://www.syec.co.uk)

### Flagship Home Project

Eco-refurbishment of a five storey Victorian terrace in a conservation area in the Borough of Kensington and Chelsea.

[www.rkbc.gov.uk/flagshiphome](http://www.rkbc.gov.uk/flagshiphome)

### Nottingham Ecohome

Eco-refurbishment of a Victorian semi-detached house.

[www.msarch.co.uk/ecohome](http://www.msarch.co.uk/ecohome)



## Heating

- choose an efficient boiler, sized correctly for the house
- fit zoned heating controls to heat only those areas in use
- fit programmable heating controls which can be set for the day time and weather
- a heat exchange unit can be fitted to recover heat from kitchens and bathrooms
- consider the impact on historic fabric (floorboards/lath and plaster walls/decorative plasterwork) when installing new heating systems

## Solar thermal hot water

- solar thermal panels may be acceptable in a concealed location such as a central valley roof or behind a parapet
- solar thermal panels need a tank to work and are only compatible with some combi boilers

## Photovoltaic panels

- may be acceptable in a concealed location or a rear elevation

- consider locating on a separate structure to avoid damage to historic building
- choose panels fitted over roof tiles, avoiding a permanent change to the roof
- avoid the loss or damage of historic fabric such as natural slate tiles or clay pantiles

## Wind turbines

- these may not be suitable for listed buildings, or in sensitive parts of conservation areas
- need to consider noise and vibration
- need to consider impact on wildlife
- consider general amenity issues such as impact on neighbours and surrounding area

## Water

- choose water efficient appliances – eg spray taps
- consider ways to maximise rainwater collection and re-use
- consider the use of traditional or reclaimed rainwater goods to avoid the use of plastic guttering

## Key principles

- Reduce energy consumption to a minimum before considering renewable energy
- Prioritise energy improvements which have the least impact on architectural integrity or surrounding context
- Use natural, locally-sourced, materials wherever possible

Note that planning permission (and/or listed building consent) is likely to be required for most alterations and is essential for

listed buildings – advice should be obtained from Planning Services. Works should comply with building regulations and these are considered in the context of listing or conservation area status – Building Control officers are happy to provide advice.

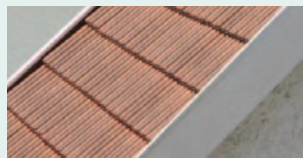
The table below sets out the impact of different energy improvements.

## Energy saving measures and aesthetic impact

Measures	Energy saving	Aesthetic impact
Loft insulation	High	Low
Ground floor insulation	High	Low
Central heating improvements	High	Low
Draughtproofing	High	Low
Energy efficient lighting	Moderate	Low
Internal wall insulation	High	Moderate
External wall insulation	High	Moderate/High
Window improvements	High	Moderate/High
Solar thermal hot water	High	Moderate/High*
Photovoltaic panels	Moderate	Moderate/High*
Wind turbine	Moderate	High*

\*The aesthetic impact of renewable energy technology will vary considerably with location, and these measures may not be suitable for buildings which are listed or in a conservation area. If a measure is sensitively sited the aesthetic impact can be reduced from high to moderate, depending on the building and location.

## Eco-refurbishment measures



### Loft insulation

- use at least 250mm of insulation where possible
- ensure adequate ventilation and breathability are preserved
- use natural materials (wool, hemp)

### Floor insulation

- insulation can be suspended below ground floors if there is access from the cellar
- gaps between floor and skirting, and between floorboards, can be filled to reduce draughts
- avoid blocking airbricks and take care to maintain cross ventilation beneath suspended timber floors
- consider potential loss of historic fabric (floor boards/skirting/door surrounds/doors) that may occur if insulation increases floor height

### Wall insulation

- on a single house within a terrace avoid external wall insulation
- consider the impact on window and door reveals of external wall insulation – this is likely to be most suitable for the rear elevation or single storey extensions
- consider a combination of insulation to internal walls at the front and external insulation at the rear
- consider ‘breathability’ of historic fabric - insulation should be made from permeable materials, to avoid the risk of damp
- avoid losing or damaging historic fabric (especially lath and plaster walls and decorative plasterwork such as cornices and coving) with internal wall insulation



### Doors

- ensure external and porch doors fit well and draughtproof
- avoid irreparable damage to original doors - consider heavy and interlined curtains and draught excluders
- always avoid the use of uPVC – repair doors where possible, and if replacing, specify timber or material appropriate to the historic building

### Windows

- always avoid the use of uPVC – maintain and repair traditional windows and shutters where possible, and if replacing specify timber
- timber windows can be renovated and repaired – regular maintenance improves performance
- consider secondary glazing internally, this is less visually intrusive and is easily reversible

- double glazed argon filled sash windows may be appropriate
- sash windows can be draught proofed using rail and sill brushes or rubber tubing
- in sensitive locations consider a combination of retaining and draught proofing single glazed sash windows at the front, and fitting double glazed sash windows at the rear

### Lighting

- choose low energy lighting, and avoid halogen lights
- avoid recessed downlighters, or multiple light fittings
- consider LED lights for task lighting as they are highly efficient and have a long life span
- consider loss of historic fabric when installing new lighting systems (especially lath and plaster walls and decorative plasterwork)