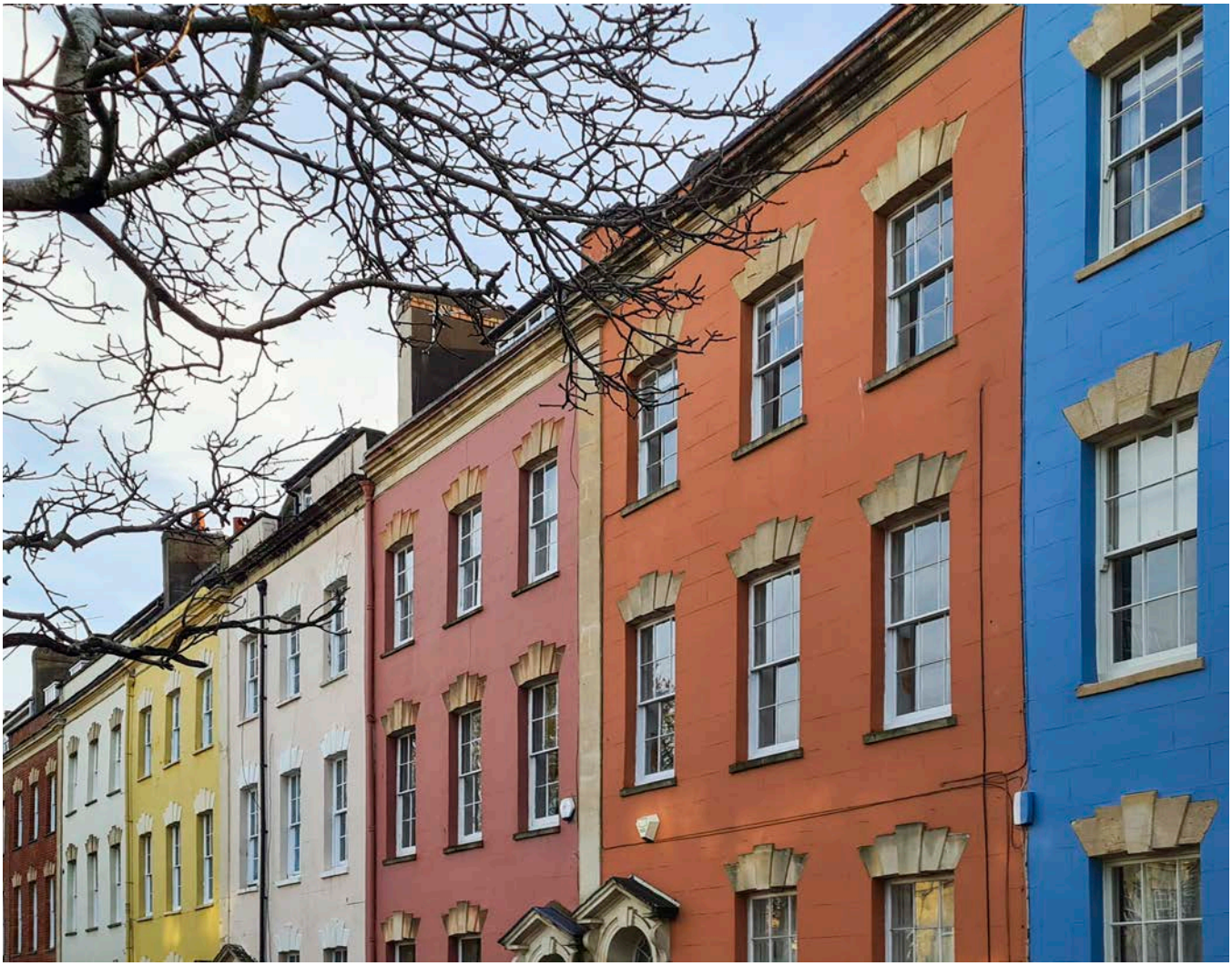
Historic England

Energy Efficiency and Historic Buildings

Application of Part L of the Building Regulations to Historic and Traditionally Constructed Buildings



Summary

Approved Document L, which covers the conservation of fuel and power, was last amended in 2021 and came into effect in June 2022 as part of the Government's measures to reduce the UK's carbon emissions.

Historic England supports the Government's aims to improve the energy efficiency of existing buildings through Part L of the Building Regulations. Improving energy efficiency and reducing carbon emissions will ensure that existing buildings remain viable into the future. These actions also support the Government's commitment to reach net zero by 2050.

Many improvements can be made at a relatively low cost, and with little risk. However, some require more consideration, because they have the potential to harm the building and its occupants.

For historic buildings, a balance needs to be found between improving energy efficiency and maintaining the significance of the building, its fabric and setting. Taking a Whole Building Approach is the best way to minimise the risks of energy efficiency interventions and can achieve considerable improvements, although sometimes not to the standards recommended in Building Regulations.

The Building Regulations Approved Documents (one for dwellings and one for buildings other than dwellings) for Part L make it clear that a reasonable compromise on energy efficiency targets may be acceptable to preserve a building's character and appearance, and to avoid technical risks. They specifically include some exemptions, and also circumstances where special considerations apply to historic buildings and those of traditional construction.

Many energy efficiency measures do not need to comply with Building Regulations and do not require listed building consent. For more information, see Historic England's Energy Efficiency and Historic Buildings.

Front cover: Kingsdown Parade, Bristol
Morwenna Slade, © Historic England

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HistoricEngland.org.uk/energyefficiency

Contents

1. Introduction

What is the purpose of this guidance?

This guidance provides advice on implementing energy efficiency measures and thermal upgrades in historic and traditionally constructed buildings, to comply with Building Regulations Part L – where practicable. Part L of the Buildings Regulations defines 'historic buildings' as those that are listed, in conservation areas or are scheduled monuments[1]. However, not all buildings falling into this category will necessarily be of traditional construction. Some historic buildings date from after the Second World War and have a quite different form of construction.

This guidance also acts as 'second tier' supporting guidance in the interpretation of the Building Regulations (referred to in paragraph 0.13 of the Approved Document L Volume 1 and paragraph 0.17 of the Approved Document L Volume 2) that should be taken into account when determining appropriate energy performance thresholds for works to historic and traditionally constructed buildings.

Who is this guidance for?

- **Building owners and occupiers** who are considering how to improve energy performance, and how to meet or surpass a range of statutory requirements
- **Architects, surveyors and energy advisers** preparing or responding to proposals for work on traditional or historic buildings
- **Building contractors, and materials and component suppliers** needing to understand the implications of their work, and the technical advice they give to their customers
- **Conservation and planning officers, building control surveyors, approved inspectors for building control work, environmental health officers and housing officers**

1 Volume 1, page 3, paragraph 0.8 and Volume 2, page 4, paragraph 0.12

What are Building Regulations?

Building Regulations set standards for how buildings must be designed and constructed. They typically cover health and safety of people in, and around buildings; they also provide energy and water conservation and access to and use of buildings.

The Regulations apply mainly to new buildings, and there is no general requirement for existing buildings to be upgraded to meet these standards. However, certain alterations to existing buildings – such as a change of use or change of material – may need to comply with Building Regulations.

What are approved documents?

Approved documents provide guidance, practical examples and solutions on how to meet Building Regulations requirements. Although you do not have to follow the guidance in approved documents, you still need to make sure your building work meets the legal requirements set out in Building Regulations, as well as any other statutory requirements.

If you decide not to follow the guidance in approved documents, you should discuss and agree your proposals with a building control body before starting building work. British Standards and other technical guidance may suggest alternative measures that adopt higher standards than those recommended in approved documents.

The physical means of controlling energy efficiency impact other aspects of a building's environmental performance such as the buildings indoor air quality, humidity, airtightness and thermal mass. The guidance contained in this document is, therefore, likely to be relevant when interpreting other approved documents in relation to historic and traditionally constructed buildings.

There are 18 approved documents in total which cover various subjects such as fire safety, ventilation and access to and use of buildings.

For further information, see Historic England's Building Regulations, Approved Documents and Historic Buildings.

What is Part L of the Building Regulations?

Approved Document L: 'Conservation of fuel and power' covers the minimum standards for carbon emissions and energy efficiency to ensure that England's new and existing buildings are constructed or renovated to support Government's aim to meet net zero. It is comprised of two volumes: 'Volume 1: Dwellings' and 'Volume 2: Buildings other than dwellings'.

Schedule 1 – Part L Conservation of fuel and power

L1: Reasonable provision shall be made for the conservation of fuel and power in buildings by:

(a) limiting heat gains and losses:

(i) through thermal elements and other parts of the building fabric; and
(ii) from pipes, ducts and vessels used for space heating, space cooling and hot water services;

(b) providing fixed building services which:

(i) are energy efficient to a reasonable standard;
(ii) have effective controls; and
(iii) are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances;

2. Background

The Future Homes and Buildings Standards

The Government is committed to improving the energy efficiency and reducing the carbon emissions of new homes and non-domestic buildings. In October 2019 the Government first consulted on the Future Homes Standard, proposing ambitious uplifts to the energy efficiency of new homes and existing buildings, including changes to Building Regulations and in particular Part L. The latest consultation on the Future Homes and Buildings Standards in 2023 proposed further changes to Part L and F (ventilation) for both dwellings and non-domestic buildings.

The Government has committed to introduce The Future Homes Standard for new homes by 2025. This standard aims to future-proof homes by ensuring that all new dwellings run on low carbon heating and are expected to produce 75-80% lower carbon emissions compared to current levels. Existing homes will be expected to replace and repair parts such as windows and building services with more energy efficient products.

Part L 2023 is an interim step towards reducing carbon emissions. It does not cover all carbon emissions, embodied carbon and emissions from transport, industrial processes and agriculture.

A concern with Part L is that available data on thermal transmittance (U-value) and thermal conductivity of existing building materials is not wholly accurate. This was identified during the Energy Performance 2020 consultation and has resulted in many existing older buildings being deemed less energy efficient than their newer equivalents.

The 2025 Future Homes and Buildings Standards aim to build on the 2021 Part L uplift and set even more ambitious requirements for energy efficiency and heating for new homes and non-domestic buildings.

3. How Does Part L Affect Existing Buildings?

Although new construction is adequately covered by the Approved Documents, the varied typology of existing buildings presents a greater challenge. Part L prescribes measures and materials that are not always appropriate for existing buildings and could result in them being less energy efficient. As the approved documents are only guidance, it is important to identify what materials and measures are appropriate and suitable for an existing building so as not to cause harm or decay whilst improving its energy efficiency.

What triggers the Part L requirements?

Owners of existing buildings need to comply with Part L of the Building Regulations when:

- **Installing, renovating or replacing thermal elements**
  If the renovation or replacement of an individual thermal element constitutes more than 50 per cent of the thermal element's surface area, the whole element must be replaced. It must comply with Paragraph L1(a)(i) of Schedule 1, in so far as that is technically, functionally and economically feasible.

- **Extending an existing building**
  The extension should comply with the energy efficiency standards outlined in Part L, unless the external appearance of the extension needs to match that of the host building. Then, it should comply to a reasonably practical extent.

- **Adding a conservatory or porch**
  Conservatories should be kept thermally separate from the main building. They should have independent temperature controls. Where the heating system is extended into the conservatory or porch, the building work should be treated as an extension.

- **Replacing building services**
  If the existing building services are being replaced with the same or a different fuel type, the new system should not produce more CO_2 emissions or have a higher primary energy demand than the existing. Appropriate heat loss calculations, including associated pipework, and a sizing methodology should be undertaken. A sizing methodology ensures that a system is correctly sized via the Chartered Institute of

Plumbing and Heating Engineering's Plumbing Engineering Services Design Guide. In addition, each room should have a thermostatic control, capable of separately adjusting the heat output.

- **Changing the use or energy status of the building**
  This occurs when a building not previously used as a dwelling now includes a dwelling; or when an existing dwelling was previously exempt from the energy efficiency requirements but now is not. The energy efficiency requirements are those found in Part L Schedule 1 Regulations 23, 25A, 25B, 26, 26A, 26C, 28, 40.

- **Making changes to controlled fittings or services**
  Controlled fittings are windows, external doors, roof lights and roof windows. Controlled services are space heating and hot water systems, mechanical ventilation and cooling, and fixed artificial lighting.

- **Making consequential improvements**
  Consequential improvements are required when an existing building over 1,000m^2 is extended, its capacity for heating or cooling per m^2 is increased, or fixed building services are installed. Consequential improvements may include improving the insulation of thermal elements, upgrading old services systems, or adding zero carbon energy-generating equipment. However, consequential improvements are not required to be carried out where it is not technically, functionally and economically feasible.

Buildings that are exempt

Complying with the guidance set out in Part L does not guarantee Building Regulations requirements will be met. Approved documents do not cover all circumstances. Many of the actions recommended in Part L will need to be carefully considered in relation to historic and traditionally constructed buildings.

The two principal areas of risk when upgrading older buildings to meet Building Regulations requirements are:

- Causing damaging technical conflicts between the existing construction and the energy efficiency improvements, which increase the risks to building fabric from moisture accumulation and the onset of rot or accelerated decay. These fabric risks must be considered in association with connected risks to occupant health and wellbeing from moisture, mould growth and overheating.

- Causing unacceptable damage to the character and appearance of the building via loss of historic significance.

To mitigate these risks, the approved documents contain exemptions for existing buildings.

Certain classes of historic buildings do not need to comply with the energy efficiency requirements of Building Regulations. They include:

- Places of worship - buildings, or parts of a building, that are used primarily or solely for formal public worship, including adjoining spaces used for the same purpose. Parts of the building that are designed to be used separately, such as offices, catering facilities, day centres and meeting halls and accommodation are not exempt.
- Temporary buildings that will be used for two years or less
- Industrial sites, workshops or non-residential agricultural buildings with a low energy demand
- New and existing stand-alone buildings, other than dwellings, with a total useful floor area of less than 50m^2
- Carports that are open on at least two sides, covered yards, covered walkways, or covered driveways if the extension is at ground level and the floor area of the extension does not exceed 30m^2
- Conservatories and porches where:
    - The extension is at ground level
    - The floor area of the extension does not exceed 30m^2
    - The glazing complies with Part K of Schedule 1 to the Building Regulations
    - Any wall, door or window that separates the extension from the dwelling has been retained or, if removed, replaced with a wall, door or windows
    - The heating system of the dwelling is not extended into the conservatory or porch

Listed buildings, buildings in conservation areas and scheduled monuments are covered in Section 0.8 of Volume 1 and Section 0.12 of Volume 2 of the Approved Document L[2].

"Work to the following types of dwellings does not need to comply fully with the energy efficiency requirements, where to do so would unacceptably alter the dwelling's/ building's character or appearance:

- Those listed in accordance with Section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990
- Those in a conservation area designated in accordance with Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990
- Those included in the schedule of monuments maintained under Section 1 of the Ancient Monuments and Archaeological Areas Act 1979"

Works to listed buildings require listed building consent. This is to ensure that alterations do not affect a building's character and significance. It applies to all internal and external fabric, fixtures and curtilage buildings, as well as any objects or structures that are attached to the building or are within the curtilage.

Some changes to buildings in conservation areas may need planning permission, especially where subject to an Article 4 direction under the Town and Country Planning Act 1990. An Article 4 direction removes specified permitted development rights across a defined area. The main emphasis is on external appearance. Surface materials (walls and roofs) and the details of windows, doors and roof-lights are all extremely important. Planning permission is not needed for internal alterations to unlisted buildings.

For all buildings where consent is needed, the local planning authority is required to assess proposals for any impact on the significance of the heritage asset in accordance with the criteria set out in the National Planning Policy Framework Section 16: Conserving and enhancing the historic environment.

Early consultation with the building control body can help to ensure that building performance is not adversely affected by complying with energy efficiency requirements, for instance by using inappropriate materials that could cause damp.

2 Section 0.8 of Volume 1 and Section 0.12 of Volume 2.

4. Issues to Consider

Very few historic buildings or places survive as originally built. The majority are made up of works from different periods, derived from and expressing different values. When simple modifications are proposed to individual building elements, such as walls, windows or floors, they may appear to be uncomplicated. However, caution is still recommended because the consequences of piecemeal changes may be more extensive, and potentially more damaging, than anticipated. There is also a danger that a range of small individual modifications, each of which may be tolerable in its own right, can together cause unacceptable damage.

Understanding significance of the building

When proposing works to an existing building, it is important to understand the building's construction, condition, context, character and significance, as well as the way it performs and how it is used. If a building is properly understood, works can be carried out where they are most needed or where they will do least harm. Not only is a targeted approach better for the building, but it can also be more cost-effective.

In a historic building, the areas that need to be understood and protected are often those that make it special, such as its windows, doors and joinery.

Historic buildings vary greatly in the extent to which they can accommodate change without loss of significance. This affects the range of acceptable energy efficiency improvement measures.

When alterations are proposed, it is important to:

- Ensure that the building's significance is well understood. Advice on assessing significance can be found in Historic England's Statements of Heritage Significance: Analysing Significance in Heritage Assets | Historic England

- Understand the impact of proposals on the building's significance, and then avoid, minimise or mitigate that impact. Information to assist local authorities, planning and other consultants, owners, applicants and other interested parties can be found in Historic England's. Managing Significance in Decision-Taking in the Historic Environment.

- Look for opportunities to better reveal or enhance the building's significance
- Justify harmful impacts in terms of the sustainable development objective of conserving significance and the need for change
- Offset negative impacts on the building's significance by enhancing other areas, through recording, disseminating and archiving important archaeological and historical elements of the heritage assets affected

Understanding the construction and condition of the building

Traditional buildings are normally defined as those built before 1919, although some buildings are being built today with traditional materials and techniques.

Traditional and modern buildings (built with modern materials and techniques) differ fundamentally in how they manage moisture, air and heat. Most traditional buildings use natural materials such as stone, brick and timber that have the capacity to absorb, store and later release moisture and heat. These properties help moderate internal fluctuations in humidity and temperature, providing and maintaining a healthy, comfortable, and more stable indoor environment without harming the building fabric. For more information see: Properties of Traditional Building Construction

Because of the different ways traditional and modern buildings perform, work that is appropriate to a modern building may result in detrimental impact to traditional fabric and occupants' health. Good practice dictates that substituting traditional materials with modern impermeable materials or membranes in permeable traditional construction should be avoided. While the majority of historic buildings are 'traditional' in terms of their construction, there are many thousands of traditional buildings that are not designated. These buildings are more likely to have inappropriate works and materials introduced, as they do not have the same level of protection.

Building condition has a major influence on energy use. It is imperative that the condition of the building is assessed and understood by a competent person, that any repair and maintenance requirements are addressed as a matter of priority, and the building fabric allowed to regain equilibrium prior to implementing any energy efficiency improvements. For more information see: Maintenance and Repair for Energy Efficiency

Removing harmful alterations

A large number of traditional buildings have been adapted or repaired over the years with the best of intentions. However, inappropriate materials have often been used such as cement mortars and renders and synthetic waterproofing treatments. These reduce the building's fabric permeability and impact its ability to manage moisture, which can cause fabric decay and lead to uncomfortable conditions, such as cold, damp and reduced indoor air quality.

Unfortunately, it is not always practical to remove harmful alterations. Certain materials, such as hard cement mortars, can adhere so strongly to traditional materials that removing them would damage the substrate. Synthetic waterproofing treatments are inherently irreversible.

If removing repairs and alterations to a traditional building is likely to cause serious damage, it may be better to leave them in place. However, this will mean that the traditional construction cannot function as well as it once did in the presence of excess moisture and steps may need to be taken to mitigate harmful effects. These might include introducing more mechanical and electrical ventilation to reduce excess moisture and humidity, and undertaking a piecemeal approach to remove unsympathetic alterations as and when it is possible. Such works will need to be specified and installed with care.

Repairs

Repairing a building that has decayed through centuries of use can help to restore its original moisture and thermal performance. Fortunately, this is usually easier and less contentious than removing damaging alterations. The correct and sympathetic repair of a traditional building will bring its technical performance back to the optimum level. It will also provide a sound basis for developing proposals for further upgrading.

Carrying out repairs can provide many cost-effective opportunities for improving thermal performance. Old windows and doors can be draughty. Cracked joints and voids in masonry allow liquid water to penetrate where sound mortar or renders would once have effectively kept it out. Carrying out repairs using materials that match the originals as closely as possible, particularly in their technical characteristics, will greatly enhance the building's performance and durability.

Maintenance

A key principle of building conservation is that all buildings should be well maintained to prevent decay damaging their historic fabric. Many traditionally constructed buildings are inherently more resilient than modern construction, as they are built with materials that have much longer life expectancies and are not manufactured from synthetic materials.

Basic maintenance should include regular inspections, so that defects are discovered when they are still small and easily fixed. This should limit the need for major works (which need to comply with Part L), preserve the historic fabric, and minimise cost and disruption to the building's owners and users.

Regular maintenance helps the building to perform in the way that was originally intended. Damp and significant draughts are often the result of inadequate maintenance or ill-considered changes, rather than original defects in the building's design and construction.

For further information, see Historic England's Maintenance and Repair of Older Buildings. and Maintenance and Repair for Energy Efficiency

Understanding the building as an environmental system

The interrelationship between heat and moisture in traditional buildings is complex. In a well-maintained building that is adequately heated and ventilated, the daily and seasonal cycles of wetting and drying, heating and cooling, balance out. However, the equilibrium may be adversely affected when changes to building fabric, heating or ventilation are made to increase energy efficiency. This can lead to problems such as moisture accumulation, overheating and fabric damage. Occupants may also be affected by poor indoor air quality.

When planning energy efficiency improvements, it is important to understand the way a building is performing as an integrated environmental system. Before thermally upgrading a historic building, it is important to understand the likely impact on the performance and long-term health of its fabric.

Buildings have always been designed to filter the extremes of the external environment, and to generate more benign internal conditions. The external envelope of walls, roofs, windows and doors provide this environmental filtration in the first instance. Together, they keep out rain, snow and wind, moderate the entry of light and air, and regulate internal temperatures utilising thermal conductivity, resistivity and mass.

In most traditionally constructed buildings, internal features such as chimney stacks, cellular room plans and draught lobbies also moderate the internal environment, that together with the external envelope, provide additional thermal mass, and limit heat loss through air infiltration.

This environmental performance cannot compare with that of modern materials and services. However, it can be surprisingly effective and make a valuable contribution to a building's thermal performance.

When planning improvements to the energy efficiency of a historic building, it is useful to begin by working out how it was originally intended to perform. This will allow upgrading proposals to be as compatible as possible with the existing fabric.

5. Implementing Measures

This section describes how to make energy efficiency improvements that meet Buildings Regulations requirements.

Historic England advocates a whole building approach when considering adapting historic buildings. This explores a building's context to find a range of effective solutions that save energy and carbon, sustain heritage significance, and provide a safe and comfortable indoor environment. It considers how these might work together to provide the most energy-, carbon- and cost-effective outcomes.

What is a 'whole building approach'?

A true whole building approach uses an understanding of a building's structure, context and significance, plus all the factors affecting energy use, to inform a robust and holistic energy efficiency plan. It aims to find balanced solutions that save energy, sustain heritage significance, and maintain a comfortable and healthy indoor environment. It ensures improvements are suitable, proportionate, timely, well integrated, properly coordinated, effective and sustainable. It also helps to highlight and resolve uncertainties, reconcile conflicting aims, and manage the risks of unintended consequences. For more information on the whole building approach see: Whole Building Approach for Historic Buildings

Managing Significance and Decision Making

Before planning any works to a heritage building, it is essential to understand the significance of the building and its setting. This should include consideration of the features of the individual building which would be affected by the proposed works, as well as its possible significance as part of a larger group, for example if a house is part of a unified terrace.

Mitigation or adaptation interventions, such as those intended to provide energy or carbon savings, are no different to any other works that may affect the significance of a heritage asset. The same conservation planning principles apply to weighing benefits against potential harm. Managing Significance in Decision-Taking in the Historic Environment provides further information.

Given the right approach, the twin objectives of protecting significance and improving energy performance and climate resilience are both compatible and achievable. It may be tempting to prioritise one over the other, however, a reasonable compromise can usually be reached when decisions are well informed.

Many historic buildings have undergone alterations over the years that may have diminished their significance or put it at risk. Harmful past alterations may, however, present opportunities for more sensitive refurbishment as part of wider energy saving improvements. For example, where a rubble wall has been stripped of its original finish, re-rendering in a compatible material as part of a solid wall insulation project might be considered an enhancement. In fact, energy-saving measures may be used as an opportunity to enhance a building's significance through associated works that might otherwise not have been undertaken.

Historic buildings often incorporate elements that may have differing levels of significance. For example, many have frontages where the majority of architectural detailing is focused, while other elevations of lower status may be less ornate and more functional. Where these are less conspicuous and of lower significance, they may provide opportunities for enhancements that would be considered too harmful on higher status elevations.

Material compatibility

It is a fundamental objective of the Building Regulations to ensure that technical risks are not introduced, as outlined in Regulation 7 of the Building Regulations 2010:

Materials and workmanship

7. Building work shall be carried out

(a) with adequate and proper materials which:
- i) are appropriate for the circumstances in which they are used
- ii) are adequately mixed or prepared, and
- iii) are applied, used and fixed so as adequately to perform the functions for which they are designed; and

(b) in a workmanlike manner.

This is recognised in Approved Document L[3]

Historic and traditional dwellings

0.10 The energy efficiency of historic and traditional dwellings should be improved only if doing so will not cause long-term deterioration of the building's fabric or fittings. In particular, this applies to historic and traditional buildings with a vapour permeable construction that both absorbs moisture and readily allows moisture to evaporate. Examples include those built with wattle and daub, cob or stone and constructions using lime render or mortar.

0.11 New extensions to historic and traditional dwellings should comply fully with the energy efficiency standards in this approved document unless there is a need to match the external appearance or character of the extension to that of the host building. The work should comply with standards in this approved document to the extent that it is reasonably practicable.

0.12 In determining whether full energy efficiency improvements should be made, the building control body should consider the advice of the local authority's conservation officer.

0.13 Additional guidance is available in Historic England's Energy Efficiency and Historic Buildings: Application of Part L of the Building Regulations to Historic and Traditionally Constructed Buildings.In addition

In addition:

Appendix C
Works to thermal elements of Volume 1 of Approved Document L paragraph C2 recognises that it is not always reasonable to meet the target U-values prescribed without causing technical risk to the dwelling or adjacent structures, or it might not be practically possible for the works to be undertaken. In these circumstances the U-value should be as close to the target value as practically possible.

3 Volume 1: Dwellings, paragraph 0.10-013 and Volume 2: Buildings other than dwellings, paragraphs 0.14-0.17.

Limiting heat gains and losses

Part L requires that reasonable provisions should be made to limit heat gain and loss through thermal elements, and other parts of the building fabric (such as doors and windows) and via pipes, ducts and vessels used for heating, cooling and hot water systems.

This can be achieved in several ways:

Insulate hot water pipes

- Whilst the heating demand should diminish during summer months, use of domestic hot water may not. Where possible, insulate any exposed hot water pipework to prevent the heat contributing to the internal temperature. Lagging hot water cylinders and storage tanks will minimise the heat they emit.

Install more efficient electrical equipment

- All electrical equipment generates heat. Replacing traditional or older lighting such as fluorescent or halogen bulbs with more efficient LED lighting will help reduce internal temperature. High efficiency equipment will also reduce heat gain and energy use.

- Where pipework or services penetrate external fabric ensure these are appropriately sealed to prevent draughts.

- Historic England supports the drive to lower carbon emissions, and has produced the following guidance about alternative technologies: Low and Zero Carbon Technologies in Historic Properties and Installing Heat Pumps in Historic Buildings.

Repairing or replacing windows or doors

- Historic England strongly encourages owners to conserve significant historic windows, wherever possible, rather than replace them. Old windows are usually durable, functional and repairable if they are looked after. They are an important part of an historic building's character.

- There are many ways in which windows and doors can be improved without harming their historic context. Such measures are often far more effective in carbon and energy terms than wholesale replacement, such as installing shutters, draughtproofing or where original glass is not present upgrading the glazing pane. It is recognized that not all windows will be able to meet the required U-values prescribed which is acknowledged in Part L Paragraph 4.10. Where windows cannot meet the requirements of Table 4.2, because of the need to maintain the character of the building, then single glazing should be supplemented with low-emissivity secondary glazing. Historic England supports this and has guidance on how to appropriately install secondary glazing.

New and replacement elements

- Wholesale replacement of walls, floors or roofs in an existing dwelling must be of the same or better U-value as that of the element before removal and should achieve a payback within 15 years of less.

- Listed buildings will require consent to undertake these works. This will be reviewed on a case by case basis to ensure the proposed works do not harm the significance of the building, whilst meeting building regulations.

- Generally, a thermal element once upgraded should not have a U-value greater than 0.7W/(m^2K). A lesser standard for the thermal element may be acceptable where work complies with Part C of the Building Regulations on protection from the harmful effects of interstitial and surface condensation.

6. Ways of complying with Part L

Ensure U-values are correct

The U-values of new thermal elements and controlled fittings should meet the minimum requirements described in Approved Document L for any particular circumstance. They should be calculated using the methods and conventions set out in the BRE report BR443 (2019). In the case of windows or doors the whole combined performance of both the glazing and frame should be considered. SAP values can be used for windows and doors.

Consider using area-weighted U-values

Using area-weighted U-values and in-situ measurement (BSI ISO 9869) allows for more flexibility than using basic U-value calculations. An area-weighted U-value allows the value for all elements of a particular type to be averaged.

Check thermal bridges and minimise air leakage

Building Regulations require that thermal bridging be taken into account in SAP and SBEM calculations. Part L notes that this only applies if new thermal elements are being installed. However, it is good practice to confirm the adequacy of all interventions, to ensure solutions account for and improve the thermal performance of junctions, minimise thermal bridges, improve air tightness/draught-proofing and prevent thermal by-pass. All controlled fittings such as sanitation, drainage, combustion appliances and electrics should be inspected to ensure they meet calculated standards of airtightness.

Use set period payback criteria

In some circumstances it is not possible to achieve the U-values set out in Table 4.3 either because it is not technically or functionally feasible; or it would not achieve a payback of 15 years or less. In these circumstances paragraph 4.13 of Volume 1 of Approved Document L allows for the element to be upgraded to the lowest U-value that both:

- is technically and functionally feasible: and
- can achieve a simple payback not exceeding 15 years or less.

Work that will only give an economic payback after this set number of years need not be carried out. This applies to upgraded or renovated existing thermal elements as part of a change of use or renovation. It also applies when an existing internal element becomes part of the thermal envelope.

Test the performance of ducts and fans

This applies to non-domestic services installations where appropriate.

Provide an instruction manual for heating, cooling, ventilation and lighting systems

Manuals help building users to realise the optimum levels of energy efficiency to which their buildings are designed.

Notes

The above list is not comprehensive. For all projects, refer directly to the approved documents themselves.

Building control bodies may accept, as evidence of compliance, a WER (window energy rating) and/or DSER (doorset energy rating) from a certification scheme. The scheme must provide a quality assured process and supporting audit trail, from calculating the performance of the window through to the window being installed.

All improvements undertaken to comply with Part L should duly consider associated interventions for, and compliance with, ‘adequate provision of ventilation’ under Approved Document F: Ventilation.

7. Glossary

Building control body – A local authority building control department or an approved inspector.

Consequential improvements – Those energy efficiency improvements required by regulation 28 The Energy Efficiency (Private Rented Property)(England and Wales) Regulations 2015.

Fixed building services are defined in regulation 2(1) as any part of, or any controls associated with:

- fixed internal or external lighting systems (but not including emergency escape lighting or specialist process lighting);
- fixed systems for heating, hot water, air conditioning or mechanical ventilation; or
- any combination of systems of the kinds referred to in paragraph (a) or (b).

The Future Home and Buildings Standards – It sets out technical proposals for changes to the Building Regulations, the associated Approved Document guidance and calculation methods.

Historic buildings are defined as those that meet at least one of the following criteria:

- Listed in accordance with section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990
- In a conservation area designated in accordance with section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990
- Included in the schedule of monuments maintained under section 1 of the Ancient Monuments and Archaeological Areas Act 1979

SAP – Standard Assessment Procedure

SBEM – Simplified Building Energy Model

Simple payback – The amount of time it will take to recover the initial investment through energy savings, calculated by dividing the marginal additional cost of implementing an energy efficiency measure by the value of the annual energy savings achieved by that measure, taking no account of VAT. The following guidance should be used:

- The marginal additional cost is the additional cost (materials and labour) of incorporating, for example, additional insulation – not the whole cost of the work.

- The cost of implementing the measure should be based on prices current at the date when the application is made to the building control body and be confirmed in a report signed by a suitably qualified person.

- The annual energy savings should be estimated using the Standard Assessment Procedure.

Thermal bridge – Occurs when part of a thermal element has significantly higher heat transfer than the materials surrounding it.

Thermal elements – The ability of a material or system to conduct heat. It depends on the material's properties and its moisture content, as well as the temperatures involved. It is measured in watts per square meter of surface area for a temperature gradient of 1 K per unit thickness of 1 m. The unit is W/(mK)

Thermal transmittance (U-value) – A measure of the ability of a building element or component to conduct heat from a warmer environment to a cooler environment. It is expressed as the quantity of heat (in watts) that will flow through 1m2 of area divided by the difference in temperature (in degrees K) between the internal and external environment. The unit is W/(m^2·K).

Traditional buildings – Those of vapour permeable construction that both absorbs moisture and readily allow moisture to evaporate. Examples include those built with wattle and daub, cob or stone, and constructions using lime render or mortar.

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