

English Heritage Interim Guidance

Home Information Packs

Energy Performance Certificates for Historic and Traditional Homes

Energy Performance Certificates (EPCs) assess the *likely* energy performance of homes. They rely on making generalised assumptions about all homes, using as their basis standard, usually modern, methods and materials of construction. Little allowance is therefore made for the way historic and traditional homes are built and perform. They should therefore be applied with caution.

Introduction

Promoting a wider awareness of energy efficiency in buildings is part of the UK Government's plan to reduce fuel usage and carbon emissions from heating, lighting and cooling. Approximately a quarter of existing dwellings are of traditional construction, and this includes most listed buildings (see the box 1 below for a definition of 'historic' and 'traditional' buildings).

From 1st August 2007 Home Information Packs will be compulsory for all homes being sold which have four or more bedrooms, and other homes are expected to be included soon after. The EPC is a mandatory feature of the Home Information Pack. Energy certification will be extended to cover all other buildings, including those for rent, in the course of the next two years. The UK Government hopes that the introduction of energy certification will spur building owners to make energy efficiency improvements to enhance the marketability of their properties.

Historic buildings have been defined in the Building Regulations as:

- a. listed buildings,
- b. buildings of local architectural and historical interest, which are referred to as a material consideration in a local authority's development plan,
- c. buildings of architectural and historic interest situated in conservation areas, national parks, areas of outstanding natural beauty, and world heritage sites.

The local planning authority will be able to confirm if a particular building falls into any of those categories.

Most historic buildings are built traditionally, but an increasing number of modern buildings are being recognised as having historic significance.

Traditional Buildings: are all buildings of a solid wall construction built with permeable fabric that both absorbs and readily allows the evaporation of moisture. These mostly predate the 1920's when cavity wall construction and the use of damp proof membranes became widespread.

Box 1: Historic and traditional Buildings

While committed to the Government's energy efficiency aims, English Heritage is concerned that improvements should enhance rather than harm the special interest and performance of traditional and historic buildings. English Heritage has a statutory

obligation to protect historic buildings, and it advocates a sensible and reasonable approach to energy improvements: in some cases it is not feasible or cost-effective to add every possible improvement, but a more restrained approach can still produce substantial energy savings.

Energy Performance Certificates

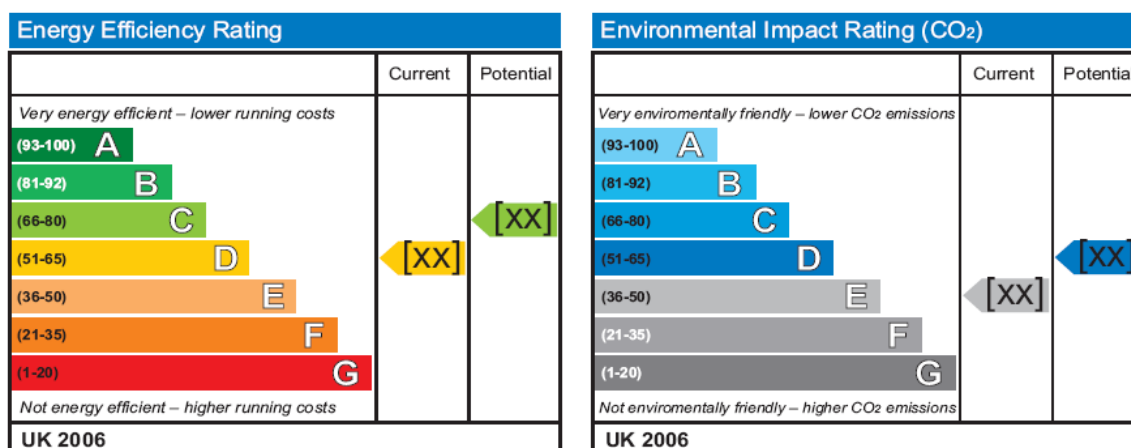
EPCs may form part of a Home Condition Report prepared by a Licensed Home Inspector, others will be stand-alone documents prepared by an accredited Domestic Energy Assessor (DEA). The EPC should give prospective buyers an idea of the energy efficiency of a particular property, and provide a list of potential improvements that will reduce energy bills and carbon emissions.

EPCs are generated by a software package which takes data from a survey completed on site by the Domestic Energy Assessor or Home Inspector. All EPCs follow the same format for ease of comparison.

What is in the EPC?

The EPC includes two types of performance ratings. The first is an overall **energy efficiency rating** on a scale of 1-100, grouped into bands A-G. This reflects the estimated cost of energy use per square metre of floor space. A rating of 100 indicates that a building will cost nothing to heat and light because it generates all its own energy from free sources or because it sells enough energy back to the grid to offset the cost of all the energy it consumes.

The second rating is the **environmental (CO₂) impact rating**, which measures the building's impact on the environment in terms of carbon dioxide emissions per square metre of floor space. It is also on a scale of 1-100, and grouped into bands A-G, with a rating of 100 indicating a building with zero carbon dioxide emissions attributed to lighting and heating rooms and water. The rating will be displayed on a label like the one below.



The two performance ratings differ because of differences in fuel costs and the amount of carbon emitted. Consequently, a house using a cheap form of fuel, like mains gas, could have a good energy efficiency rating, but still emit more carbon dioxide than an otherwise more expensive means of heating, such as bio-gas or bio-mass.

Estimated energy use

The EPC estimates the current energy use of the building and compares this with potential energy use if recommended energy efficiency measures were introduced. Estimated energy use, carbon dioxide emissions and fuel costs for heating, lighting and hot water are given.

Summary of the performance features

A summary of the home's energy performance related features follows. These include the walls, roof, floors, windows, heating systems and controls, as well as the hot water and lighting systems. These will have a key impact on the home's performance rating.

Recommended measures

The EPC will contain some or all of the following recommended measures for improvement. These are automatically generated by the software package, but can be over-ridden by the assessor if they are deemed inappropriate.

- Hot water cylinder insulation*
- Draught proofing*
- Loft insulation*
- Cavity fill wall insulation*
- Solid wall insulation[†]
- Double glazing[†]
- Heating control upgrade[†]
- Heating system upgrade[†]
- Fuel change[†]
- Solar water heating[†]
- Solar photovoltaics[†]

The report will indicate the likely cost of the recommended measures by dividing them into three categories:

- measures costing less than £500 (those marked * in the list above)
- measures costing over £500 but which may still be cost effective (marked [†] in the list above), and
- further measures which are typically more expensive and may not be cost effective, but will deliver even higher standards of energy efficiency.

These cost guidelines are offered only as a general guide. Their purpose is to show the relative expense of each measure. Prices are not guaranteed and are based on averaged historical data.

EPCs for traditional and historic buildings: the reason for caution

EPCs are intended to inform homeowners about the energy efficiency of their homes, and to encourage them to make improvements. Care is required when interpreting them for historic and traditional buildings because the energy efficiency information can be misleading or incorrect. More importantly, some of the recommended measures could be harmful to the building.

However, almost every traditional and historic home can accommodate some energy improvements without harming either its special interest or physical performance. Simple repairs to windows and doors can generate some of the most significant improvements. Appliances and fittings (heating systems and controls, hot water heating and lighting) can often be changed without altering the historic fabric (although cabling and pipe runs can be very disruptive).

Efficiency ratings

The UK has used the Standard Assessment Procedure (SAP) system for many years to rate the energy efficiency of dwellings. Further information on SAP ratings is contained in a companion information sheet *Understanding SAP Ratings for historic and traditional buildings*. To help speed up the EPC process a Reduced Data SAP (RDSAP) was developed and introduced in 2005. The RDSAP system uses a standardised method for “inferring data” which cannot easily be assessed in existing buildings.

The RDSAP process is designed to strike a balance between accuracy, which requires a more detailed assessment of the building, and cost, which is lowered by making more assumptions. The system of assessment must also generate consistent results from all energy assessors, so the amount of specialist knowledge required to produce a rating is minimised.

The drawback with the RDSAP model is that it was designed with modern dwellings in mind, not those of traditional construction. Its accuracy, therefore, is limited when applied to measure energy use in historic buildings. For example, the RDSAP model makes certain assumptions about *all* buildings constructed before 1900 that are often not true, such as:

- all ground floors are solid and uninsulated
- all brick walls are of the same thickness, all stone walls are uniform and of the same thickness
- no walls are made of earth
- all timber-framed walls are of modern stud construction
- there is no draughtproofing
- all roofs are tiled or slated and have roofing felt
- all buildings are used in the same way
- buildings have one of three fixed proportions of window area

Consequently RDSAP is likely to generate a low energy efficiency rating and a correspondingly high estimate of fuel consumption when applied to traditional dwellings. This may have a negative effect on a home's perceived value, and could trigger a programme of unnecessary and potentially harmful improvements. Conversely, the RDSAP model could generate ratings which are inaccurately high in some traditional dwellings, resulting in certain improvement works not being carried out which could actually be beneficial for the dwelling.

If faced with poor efficiency ratings in an EPC, owners could commission a full SAP evaluation by a qualified surveyor. While this cannot replace the EPC rating generated by RDSAP, it would provide prospective purchasers with a more accurate rating, although not necessarily a higher one. This is usually worthwhile when owners have already made energy efficiency improvements which will not be accounted for by the basic RDSAP (e.g. draught-proofing, floor insulation) or when their buildings have certain features which are conducive to good energy efficiency (e.g. thick walls or a thatched roof).

Nevertheless, even a full SAP assessment still relies on making assumptions about an existing dwelling. A more accurate assessment can be achieved by conducting a fan pressurisation test to measure air-tightness. These tests are compulsory for all new housing and specialist firms can be found in all regions.

Owners may be encouraged to question the reliability of ratings in the EPC because the estimated fuel usages are higher than actual, metered levels. However the fuel consumption of any building may be lower than predicted because the occupants may choose to keep the heating down, heat fewer rooms or they may have an open fire. In such cases it may be better to pass on fuel bills to prospective purchasers rather than commissioning a full SAP assessment. Even so, this will provide only an indication of what it might cost to run the home, because the new occupants may use the dwelling very differently from the previous ones (for example they may have more children; they may be elderly or be comfortable at lower temperatures).

The way traditional dwellings were built means that they will tend to record low scores on certain efficiency scales. English Heritage is concerned that a low rating will trigger a disproportionate response by an owner anxious to reduce energy bills or to enhance the market value of the property.

How the EPC assesses traditional building elements

The performance of the majority of the physical elements of a traditional dwelling (its walls, roof, floor, windows etc) will tend to be classified as poor or very poor. This may be because the EPC software has insufficient flexibility built into it to reflect the good performance of certain traditional elements (e.g. thatched roofs), but more often than not it is an accurate reflection of the poor thermal performance of these building elements (e.g. standard solid brick walls) compared with modern, energy efficient alternatives (e.g. insulated cavity walls with aerated blockwork).

Although many of the basic building elements of traditional homes will be classed as performing poorly they are, however, key parts of the building's character and historic significance. Before rushing to replace single-glazed, timber-framed windows with modern double glazed alternatives owners are strongly urged to weigh up all the costs involved; including the impact on the appearance of their building and on the street as a whole, the loss of historic fabric, the need to obtain consent in some cases, and the cost of installing new glazing. Many such interventions are costly to carry out, generate only small savings in fuel bills, and could reduce the value of the property either because the works have been poorly executed, or because they detract from the building's appearance.

Recommended measures

Many of the improvement measures generated automatically by the EPC software will be unsuitable for traditionally constructed dwellings. The DEA or Home Inspector will probably be able to identify and delete some measures which are inappropriate, but because they will have spent only a limited amount of time at the building, suggested improvements may well remain in the EPC which are still unsuitable.

Therefore, before deciding what energy efficiency improvements can safely be made, the homeowner should consider the following key issues:

- **Compatibility** with the fabric of a traditional building
- **Conservation** of the historic interest of the building
- **Statutory protection** of listed buildings.
- **Cost** of the works

Compatibility

It is important to judge whether the improvement would result in long term damage to the building fabric. A fundamental difference between modern and traditional buildings is that while modern buildings are designed to keep moisture out with impervious materials (e.g. cement, plastic membranes etc) traditional buildings were built to absorb and release moisture through breathable materials such as lime plaster. Fitting modern impervious materials (such as aluminium foil backed plaster board wall insulation) into traditional buildings can dramatically change airflows and moisture movements resulting in damper walls which could cause long term damage to the fabric (see box 2).

Traditional materials and structures have stood the test of time: any historic building of a reasonable age has proved itself well able to withstand the pressures of the internal and external environment. The primary purpose of the building is to keep moisture away from the contents, and from entering the fabric itself: this “waterproofing” is called the *building envelope*. Water comes from rain, drainage, and building use. Most modern buildings attempt to keep it out entirely, by using impermeable materials such as damp-proof courses and vapour membranes, cavities in walls, or protective coatings. In practice these often fail, and can introduce unexpected complications (for example membranes in the roof cavity can cause moisture to collect in the roof, condensing on the plastic and dripping onto the timbers, causing rot).

By contrast traditional buildings rely on the natural resistance of materials to rain (even driving rain cannot penetrate more than a few millimetres into even the most permeable stone or brick if the wall is not soaking wet to begin with), and their ability to readily absorb even large quantities of water vapour, releasing it back into the atmosphere as the ambient humidity drops once again. Timber in roof beams, for instance, can absorb a great deal of vapour and still show only a tiny rise in moisture content: experiments have suggested that the moisture content of the roof timbers of a typical house would be only 1% greater even after they have absorb 260kg of water!

To keep the building envelope intact, of course, maintenance must be scrupulous. It is as important to make sure the gutters, rainwater goods, and drains of an historic building are kept clear and functional as it is for a building of modern construction.

Box 2: How traditional buildings perform

Conservation

Most traditional and historic buildings vary greatly in the extent to which they can accommodate change without loss to their special interest. Some are sensitive to the slightest alteration; others may have changed significantly during their lives and could accept more. Before making any changes to a historic building its significance should be identified.

Alterations should be designed in such a way that they can be reversed without damaging the existing fabric. This is especially important for building services which are rapidly evolving technologies and subject to more frequent upgrading.

Statutory protection

Checks should be made with the local planning authority to see if the building is listed, in a conservation area, or if other planning controls are in place. The local planning authority will be able to explain the implications of such considerations. Failure to do so might result in illegal works which could result in prosecution.

Listed buildings, scheduled monuments and buildings in conservation areas are subject to greater controls on development than other buildings. A recommendation in an EPC to

take a particular measure does not obviate the need to obtain the appropriate permission or consent to carry out the work.




Cost

It is important to remember that some works may cost substantially more than the EPC has suggested, especially when undertaken by a suitably competent specialist

Assessing the suggested improvement measures

Each traditional building is unique and works should be approached carefully. Where alterations are to be made to older buildings it is advisable to seek the advice of a suitably qualified professional and the local planning authority conservation officer.





















The table below lists the standard improvements generated by EPC software. The next two columns assess the suitability of each improvement measure using a traffic light coding system. The award of a green light indicates a measure that is likely to be benign, while a red light indicates one which should be avoided in almost all circumstances. The grading scheme is only intended to provide a general guide. For example, the award of a green light does not necessarily mean that improvement will be acceptable in all circumstances. Equally, measures awarded a red light may be acceptable in some, albeit rare, situations.

| | |
|---|--|
|  | Unlikely to be a problem but by no means guaranteed. |
|  | May be practical but needs careful consideration. |
|  | Invariably detrimental. To be avoided. |

The second column grades the likely compatibility of the improvement measure with the fabric of a traditional building. The third column indicates the likely loss of character of a historic building as a result of the measure. The award of a green light in this column does not mean that consent would not be required. The fourth column highlights some of the most important issues for consideration associated with the various measures.

If a measure has been omitted from this list it does not imply that it is altogether inappropriate. Owners could still choose to implement a specific energy saving measure once they have fully assessed its likely impact.

The data in HTML format is available at: <http://www.helm.org.uk/server/show/ConWebDoc.11599>.

| Improvement measure | Compatibility with traditional building performance | Risk of loss of character | Reasons for caution |
|--|---|---|---|
| Hot water cylinder and pipework insulation |  |  | <ul style="list-style-type: none"> • Building fabric can be damaged during installation • Old parts of the heating system may be protected by the listing |
| Draught proofing |  |  | <ul style="list-style-type: none"> • In most cases windows should be repaired prior to draught proofing • Difficult if the windows have moved far out of shape • Difficult if the windows are older, metal-framed windows • Inappropriate if the doors or windows are particularly fine or delicate |
| Loft insulation |  |  | <ul style="list-style-type: none"> • It is important that cold loft spaces are properly ventilated - insulation should not block ventilation • If the roof space has signs of condensation or water ingress - insulation will be ineffective and may worsen the problem • Insulation must not be laid over electric cables since they may overheat and cause fire |
| Cavity fill wall insulation |  |  | <ul style="list-style-type: none"> • The risk of damp could be serious in houses with early cavity walls |
| Solid wall insulation |  |  | <ul style="list-style-type: none"> • Treatments are often incompatible with traditional building performance • There are very few instances where this will not harm the historic significance or appearance of the wall, either internally or externally • the cost is often prohibitive |
| Double glazing |  |  | <ul style="list-style-type: none"> • Will often result in significant change to the appearance of the building, and irreversible loss of character • The works are unlikely to be given consent if building is listed, in a conservation area, or is a traditional building in a national park, area of outstanding natural beauty or world heritage site • In rare cases some old windows may have a structural role (ie they support the wall above) |
| Secondary glazing |  |  | <ul style="list-style-type: none"> • Where installation might stop the operation of functional shutters • If the secondary glazing will be difficult to open, to clean, or remove (if required) • Inappropriate where windows are used as emergency exits |
| Heat control upgrade |  |  | <ul style="list-style-type: none"> • Take care not to damage historic fabric when laying new pipe or running wires |
| Fuel change |  |  | |
| Solar water heating |  |  | <ul style="list-style-type: none"> • Unlikely to be granted permission if the building is listed, in a conservation area, or is a traditional building in a national park, area of outstanding natural beauty or world heritage site, unless it can be sited unobtrusively • If the roofline is deflected |

Comments

English Heritage would value comments from Domestic Energy Assessors and members of the public on the usefulness (or otherwise) of this interim guidance note. We would also be interested in hearing about your experiences using Home Information Packs and especially the SAP process and its applicability to your building.

Please send these to conservation@english-heritage.org.uk . We will not be able to acknowledge individual submissions, or give advice, but we will do our best to incorporate your comments into future editions of these guidance notes.

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