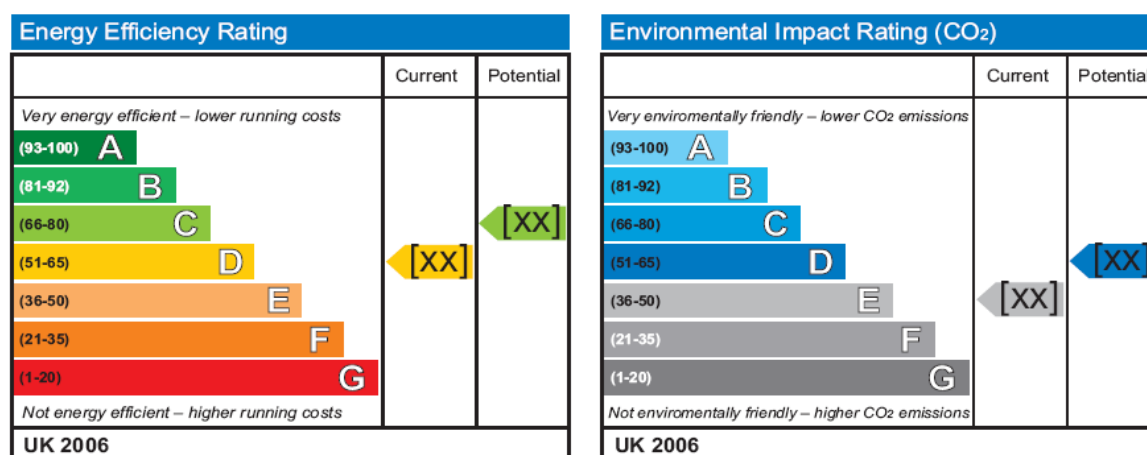


English Heritage Interim Guidance

Home Information Packs

Understanding SAP ratings for historic and traditional homes

The Standard Assessment Procedure or SAP for short is the UK's chosen method for complying with the European Directive on energy-labelling of domestic buildings. For the Home Information Packs, SAP will be used to calculate the energy performance of a home and predict the savings that might be achieved if improvements are made. The rating will be displayed on a label like the one below.



The draw-back with SAP ratings is that they can only estimate a building's energy consumption. Many, if not most, existing buildings will be non-standard in their construction and the way they are used. Real, metered consumption data should always be preferred to SAP calculations.

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. The SAP was originally developed as a simple method of rating the energy efficiency of homes at a time when many different systems were in use.

SAP can be used to produce three distinct ratings for dwellings which are used for different purposes. These are:

- the energy efficiency (or SAP) rating,
- the dwelling CO₂ emission rate, and
- the environmental impact rating.

Under the Building Regulations all new buildings have to meet certain target emission rates and from 1st August 2007 all houses being sold of four or more bedrooms will need to have their energy efficiency ratings calculated as part of the Home Information Pack.

SAP ratings are intended to help owners understand the energy performance of their houses. The building's age, construction, and the nature of its use are entered into a calculation which estimates current energy performance, and indicates how improvements might lead to energy savings. It is important to be aware that this calculation can give very different results to an energy assessment based on real, metered energy consumption data. In particular, SAP ratings automatically assume that

all traditional building types are less energy-efficient than modern ones, an assumption that English Heritage disputes.

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

New buildings

Building Regulation 17C requires that all new dwellings must meet a target emission rate calculated using SAP(2005). A notice stating the SAP rating of the building must be produced and displayed in a prominent place once it is ready for marketing.

New dwellings created by a change of use

Building Regulation 16 calls for the calculation of an energy rating for any dwelling created by a change of use. The energy rating has to be notified to the local authority and, if the building is to be sold or let, displayed in a conspicuous place on the dwelling itself. Historic buildings are not exempt from this requirement.

There is no requirement for the building to achieve a particular SAP rating or environmental impact rating. Instead most dwellings created by a change of use must demonstrate that their services, fittings and thermal elements (the wall, floor or roof) meet the standards set out in the approved documents that accompany Part L of the Building Regulations. This deals with the conservation of fuel and power in buildings. Certain works to historic buildings are exempt from these requirements, but all historic buildings can benefit from special consideration of their historic or architectural value.

Property sales

From 1st August 2007 Home Information Packs are compulsory for all four bedroom homes and larger which are being sold. Home Information Packs for all other dwellings are expected to follow shortly after. These packs will contain, amongst other items, an energy performance certificate (EPC) prepared by a certified Domestic Energy Assessor who has visited the property. The EPC will contain a SAP Rating and an Environmental Impact Rating, also calculated using SAP.

These ratings are not as accurate as the target emissions ratings produced for new dwellings, or the energy ratings for dwellings created by a change in use of a building. Instead they are produced from a reduced set of data items, known as Reduced Data SAPs, or RDSAPs.

The RDSAP process is carried out without a detailed on-site assessment of the building and allows more generalised assumptions to be made. Whilst this speeds up and reduces production costs, it does not provide *accurate* measurements of the energy performance of historic and traditional dwellings. The RDSAP does not directly measure the energy efficiency of older dwellings but makes *assumptions* based upon their age and the nature of their construction.

More contentiously still, EPCs will recommend certain improvement measures generated by an automated system. Some recommendations, such as more efficient boilers or controls, are uncontroversial provided they are implemented carefully. Others, however, such as installing wall insulation, are potentially dangerous and could lead to damp problems. Great care needs to be taken to ensure that the recommendations generated are appropriate for the historic or traditional house in question before they are implemented.

Other property transactions

From the 6th April 2008 EPCs will be needed as part of the sale or renting out of buildings other than dwellings with a total usable floor area over 500m². EPCs will also have to be displayed in public buildings with a total usable floor area over 1000m². From 1st October 2008 they will be required for the sale or renting out of any building.

Development of SAP ratings

SAP was developed to inform the public about the energy performance of a house. The first SAP methodology was published by the Government and the Building Research Establishment (BRE) in 1993. It has been revised several times since, with the latest version published in 2005.

SAP ratings are based on the cost per square metre of floor area of heating and hot water since these were the costs that used to dominate domestic fuel bills. The latest version, SAP(2005), is able to deal with extensively insulated modern properties as well, and even with energy generating systems such as solar photovoltaic or ground source heat pumps. The SAP rating aims to reflect the *financial cost* of lighting and heating so it will be affected by the type of fuel being used: thus a house running on gas will achieve a better SAP rating than one using oil.

The rating scale in SAP (2005) runs from 1 for extremely inefficient buildings to 100 for a dwelling costing theoretically nothing to run. For those buildings which generate surplus energy to sell back to the grid, the SAP rating could rise above 100.

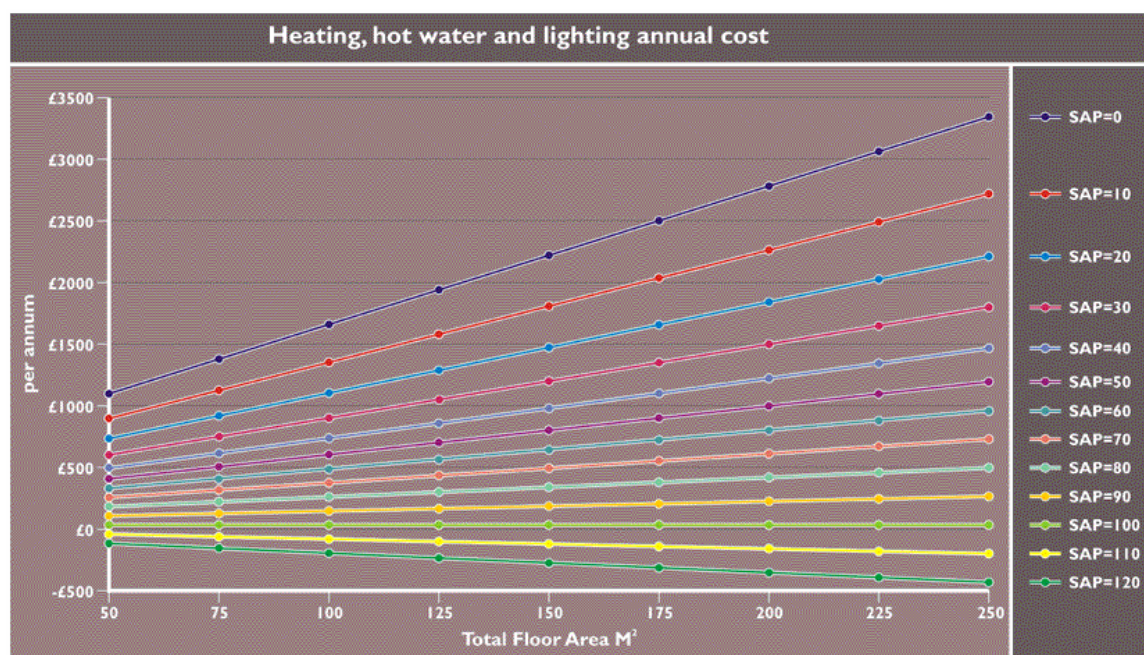
For the purposes of the EPC the SAP ratings are grouped into the following bands:

Band	Rating
A	92 or more
B	81 to 91
C	69 to 80
D	55 to 68
E	39 to 54
F	21 to 38
G	1 to 20

Interpreting SAP ratings

Standard Occupancy is central to SAP calculations: the estimate of energy consumed is based on national averages for appliance and hot-water use, and for space-heating temperatures and periods. Many larger traditionally constructed dwellings are not heated to modern standards and so the actual fuel costs may be much lower than the SAP rating would suggest. Even so, it can provide an interesting insight into theoretical running costs. The figure below shows how the annual fuel cost for heating, hot water and lighting are estimated from the SAP rating and the total internal floor area.

Fuel costs estimated from the SAP rating and the floor area



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

Fuel cost assumptions

SAP ratings assume an average cost for fuel over a period of time. SAP (2005) is based on costs across the UK between 2002 and 2005. Average fuel costs are normally updated only once every three years, so sudden but sustained rises in prices, such as those recently experienced, will not be reflected in the rating until the next update.

Applying SAP ratings to traditional buildings

SAP ratings for traditional buildings often prove very inaccurate. There are a number of reasons for this:

- it is easy to make errors in the basic measurements.
- simplified mathematical models are used to represent complex three-dimensional objects. They cannot hope to reflect all the idiosyncrasies of a real building.
- ratings for existing dwellings are usually calculated with RDSAP, incorporating yet more assumptions and estimations into the result.
- The models use very different materials and constructions to those of traditional buildings: there are simply no boxes to tick for earth walls, thatch roofs, traditional timber framed buildings or even shutters on the windows.

Another problem is that a large building uses relatively less fuel than a smaller building of similar type, because it has *relatively* less surface area through which heat can escape. This can create the impression that smaller buildings are poorly constructed or insulated and lead to pressure to 'improve' them. The SAP rating includes a mathematical adjustment which modifies this anomaly, but it is unable to remove it entirely.

Dwelling Carbon Dioxide Emission Rate (DER)

The DER is an extension of the SAP calculation, designed to estimate the carbon dioxide (CO₂) emissions from heating and lighting a building per unit of floor area. Any savings from energy-generation technologies are subtracted, and the result is expressed as kilograms per square metre per year (kg/m²/year). The DER is only used for: new build, buildings which have been extended, or where there has been a change of use. Broadly speaking, all should be able to demonstrate carbon dioxide reductions of 20%.

Since the DER is calculated using the same generalised assumptions that are built into SAP, once again it will be subject to the same flaws. However fuel costs will be irrelevant since the purpose of the DER is to calculate CO₂ emissions, not the overall energy performance of a house.

Also, like SAP, the rating for a large dwelling will be misleadingly lower than that of a smaller house of the same materials and construction.

Environmental Impact Rating (EIR)

The EIR is intended to overcome some of the scaling problems encountered with both SAP and the DER. It applies a mathematical adjustment which modifies the anomaly although it does not entirely remove it.

Like the SAP rating scale the EI Rating goes from 1 to 100, with 100 representing a building with no net emissions. The EIR will be further simplified by assigning rating bands. These will be the same bands as for SAP ratings (e.g. A is equivalent to a score of 92 or more).

Since SAP ratings are based on the cost of fuel, they are not a close reflection of the overall environmental impact of the building (if fuel costs less, but is therefore used more, emissions will increase, but the SAP rating will nevertheless be better). DERs provide a fairer view, but the EIR is more accurate still. Nevertheless, no calculated value can replace measurements of actual energy and building use.

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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