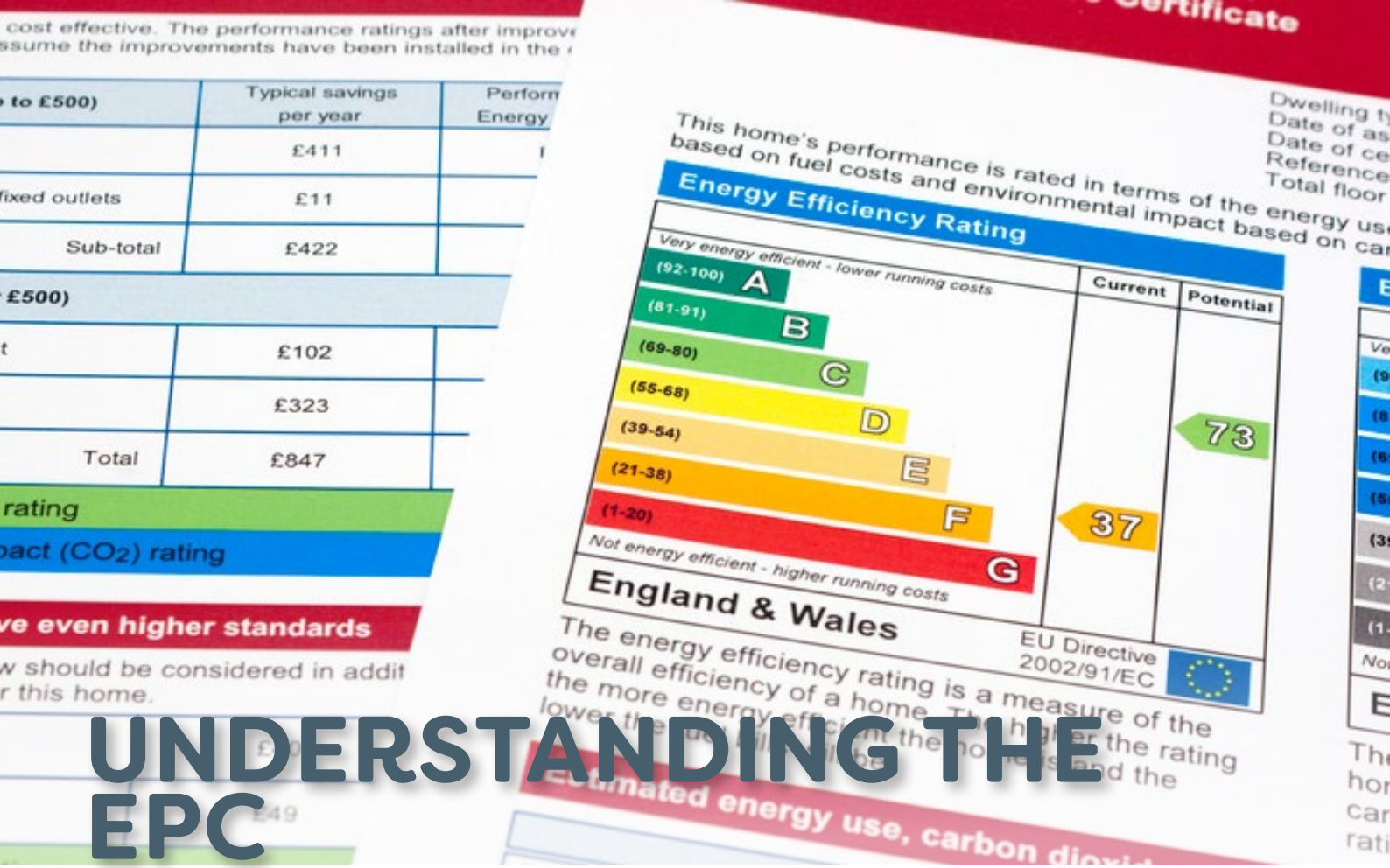

UNDERSTANDING THE EPC

FUEL PRICING AND OCCUPANCY MODELLING

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Energy Performance Certificates, or EPCs, were introduced for all properties in 2008. EPCs use a standard approach to reflect the energy performance of a dwelling which does not consider how specific occupants may use it. This is because their purpose is to enable buyers, renters, and other stakeholders to compare the energy efficiency of different dwellings, based solely on property performance.

Recently there has been a lot of criticism of EPCs in the media, and a lot of this criticism has been due to misunderstanding of the true purpose of the EPC, how the data is collated, and the attributes taken into account. This article aims to address some of these misunderstandings.

Introduction

EPCs provide information on a property's energy use, provide typical energy costs, and make recommendations on energy-saving measures, theoretically providing the occupier information on ways they may be able to save energy and therefore money. An EPC is required every time a property is built, sold, or rented and is valid for 10 years.

EPCs contain a rating to represent a dwelling's energy performance, the energy rating ranges from 1 to 100+ and is banded from A (best) to G (worst). For example, a band C property, which serves as the target band for multiple government policies, has an energy rating between 69 and 80. The rating is calculated through the Standard Assessment Procedure (SAP) methodology for new-build properties and Reduced Data SAP (RdSAP) methodology for existing properties.

SAP vs RdSAP

SAP methodology is used to calculate the energy performance of a new-build dwelling. The SAP

methodology requires information from the building designs and collected data from testing the property once built, this is to ensure design standards are met. Once an EPC has been issued using the SAP methodology, it will be valid for 10 years before it requires updating if the property is going to be sold, or rented out, this new EPC will then use RdSAP methodology.

RdSAP methodology calculates the energy performance of existing dwellings, and as the name suggests, requires less information to do so. This is useful for existing properties – especially much older ones – because there is less information available on the component parts of the building.

The current version of the SAP methodology is SAP 10.2, which was enshrined in Part L of the Building Regulations in June 2022. RdSAP uses SAP 2012, with RdSAP version 10 yet to be released, although it is expected to come later this year or early 2024.

Explaining key sections of the EPC

The SAP rating is displayed under one of the first sections of the certificate, 'Energy efficiency rating for this property'. The rating uses the estimated annual energy costs, divided by the floor area of the property in m2. By also accounting for the floor area in m2, it provides potential buyers and renters with a like-for-like comparison between the energy efficiency of properties, regardless of size. Alongside the SAP rating is a potential SAP rating, which could be achieved if the suggested recommendations, found in a subsequent section, are carried out.

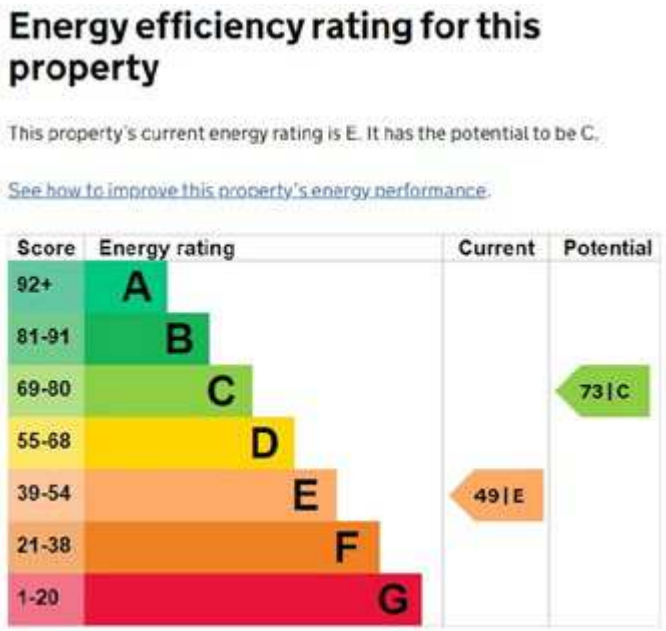

Figure 1: The 'Energy efficiency rating for this property' section from an EPC

Following this is 'Improve this property's energy rating'. This is where the list of recommended measures can be found, along with details on indicative costs of installation, the potential annual bills savings, and the potential SAP rating post installation of each individual measure. It is worth noting that the costs and savings shown are indicative, there to provide a rough idea of how much measures could cost and the savings that could be made.

The indicative installation costs do not consider specific systems, brands, or the property's characteristics, therefore the actual costs of making the improvements may differ quite significantly from the figures quoted. The EPC also makes no mention of the actual appropriateness of the measure recommended (a recommendation for PV panels will be included even if the property is in a conservation area, for example). The justification for this is that the EPC is valid for 10 years, so the appropriateness of a measure can change over time, regulations can change and technologies can improve.

Figure 2: The 'Improve this property's energy rating' section from an EPC

Additionally, the EPC provides an estimate of the annual energy bills for heating, lighting, and hot water. This can be found under 'Estimated energy use and potential savings'. Again, it must be noted that the energy cost estimate is only an 'indicative' and not an 'actual' running cost. To calculate the estimated energy costs, the SAP methodology uses an occupancy model (number of people, heating pattern etc.). Consequently, it is very likely that the modelled costs will be different to the bills the occupants pay.

The purpose of a standard occupancy is to enable buyers and renters to compare the running costs of different properties, based on the dwelling's performance rather than how occupants may use it. For this reason, white goods such as fridges, freezers, and washing machines are not accounted for in the SAP methodology or EPCs. As an increasing amount of energy usage in modern

homes comes from white goods, this is another factor that may cause estimated energy costs to vary from those experienced by occupants.

Below the estimated yearly energy cost is the potential annual energy bill savings. This figure represents how much could be saved on a household's energy costs, if all the measures recommended on the EPC were to be carried out in the stated order.

Heating use in this property

Heating a property usually makes up the majority of energy costs.

Estimated energy used to heat this property

Type of heating	Estimated energy used
Space heating	21462 kWh per year
Water heating	2319 kWh per year

Potential energy savings by installing insulation

Type of insulation	Amount of energy saved
Loft insulation	4216 kWh per year
Cavity wall insulation	1737 kWh per year
Solid wall insulation	4426 kWh per year

Figure 3: The 'Estimated energy use and potential savings' section from an EPC

'Heating use in this property' is another important section which displays an estimate for a property's space and water heating demand, in kWh per year. These figures are irrespective of the property's heating and water systems and reflect the demand of the property using the SAP standard occupancy model. Following this section on some EPCs are figures detailing estimated energy savings offered by different types of insulation. This will only be found on an EPC if there is scope to improve the property's insulation.

Figure 4: The 'Heating use in this property' section from an EPC

Modelling for space and water heating

The estimated energy demand for space and water heating found in the EPC does not reflect a specific household but a modelled 'average household'; because of this several occupancy assumptions are made. This is primarily based on the floor area, which is used to model the theoretical number of occupants in a property.

To calculate the space heating demand, the SAP methodology uses standardised heating hours. For RdSAP version 2012 this is 9 hours on weekdays and 16 hours on weekends. In SAP version 10, 9 hours is assumed for every day of the week. During heating hours, it is assumed that the temperature will be set to 21°C in the main living room and 18°C elsewhere. This information is combined with the modelled number of occupants, the floor area of the property, and the efficiency of its envelope, to provide an estimate for space heating demand.

The reason this figure represents demand and is independent of the heating systems, is to gauge the efficiency of the 'building shell'. This is necessary to provide an understanding of when improved insulation is required, therefore enabling the estimated insulation energy savings found on the EPC.

Heating systems are, however, considered when calculating the estimated energy costs. It should be noted that only the presence of the heating system and controls are recorded and used in the calculation, with the condition of the radiators, how often the boiler has been serviced, and indeed if it is working at all not accounted for. A badly maintained system with old radiators will not work as well as one that is well maintained with new radiators, but the SAP rating will not reflect that, it will use the published efficiency of the system.

The modelled number of occupants is also used when calculating the hot water demand. In SAP 10.2 the actual number of showers and baths present in the property is combined with the modelled number of occupants to generate the theoretical hot water demand. In RdSAP 2012 on the other hand, only the modelled number of occupants is used to estimate water heating demand.

Fuel pricing

The estimated annual energy costs found on the EPC take their fuel prices from the Product Characteristic Database (PCDB), which is maintained and updated by BRE. The PCDB contains the unit costs and standing charges for the various different fuel types used in the UK. In addition to this, the PCDB holds the indicative costs for the EPC recommendations.

The unit costs of different fuel types found in the PCDB are calculated by taking a rolling average from the previous three years, with updated costs added every six months.

Due to the recent, unprecedented increase in fuel costs, the prices in the PCDB became far lower than reality. To account for this, in February BRE took the decision to update the fuel prices outside of the typical six-month timeframe.

In effect this means that EPCs generated during 2022, before this exceptional fuel cost adjustment, will include estimated energy costs particularly out of step with reality. But you should also remember that historically the fuel prices used have changed every six months, so all EPCs would have different energy costs, even with no other material changes, depending on when the EPC is lodged.

Concluding thoughts

When dealing with EPCs, their rating, and the data they provide, it is important to remember the methodology behind the generation of the EPC, and to interpret the data for what it is, a modelled assessment of a dwelling's performance, not a prediction of a specific household's energy usage.

This is a two-bedroom end-terrace with a total floor area of 89 m2. Therefore, the assumed number of occupants by the SAP methodology is approximately 2 (actually it is 2.3). In fact, there is only 1 occupant, meaning the estimated energy costs on the EPC is likely to be higher than the actual bills paid.

Figure 5: The floorplan for an 89m2 property with a SAP modelled occupancy of 2.3

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