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Implementation of Energy Performance Certificates in the Domestic Sector

Working Paper

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FOREWORD

Making the existing housing stock low carbon as quickly as possible is a key part of future energy and climate policy. It is likely to require a number of different interventions, including information, advice, incentives and building performance codes and standards. A reliable, well-understood and well-used system for measuring the energy performance of our homes is a potentially an important tool in delivering all of these. That is why the new system of Energy Performance Certificates is an important development.

We are publishing this report to stimulate informed debate about the way that the Energy Performance Certificates (EPCs) are working in practice. These are early days for EPCs – the first were issued in August 2007. However, it is important that any teething problems are identified and rectified as quickly as possible. It was for this reason that Sustain were asked, as active practitioners in delivering Energy Performance Certificates, to undertake this research. I am very grateful for the rigour and commitment that has been shown by Dr Nick Banks and his colleagues in producing an informative and reasoned study about current practice in the delivery and content of Energy Performance Certificates.

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None of the above is responsible for the analysis and recommendations, which are those of the author and the UKERC Demand Reduction Theme.

Executive Summary

Energy Performance Certificates (EPCs) have been a requirement on sale of all domestic property since December 2007 as part of the introduction of Home Information Packs (HIPs). This report examines how this requirement has been implemented by those on the receiving end of the legislation – the software designers, the domestic energy assessors, the estate agents, the conveyancing solicitors and the householder. Bearing in mind the stated objectives of the EPC, the report then makes a number of recommendations for improving the operation of the scheme. These are summarised below.

The EPC is intended to allow buyers to make choices which are informed by knowledge of the building's energy performance. Therefore, if the EPC is to fulfil its role it must be viewed by the buyer at the earliest stages of the house buying process. This means integration with the marketing of property. Consequently many of the EPC duties fall on the estate agents whose compliance and practice is therefore very important to the success of the EPC. However, this study suggests that at present a mix of non-compliance amongst agents and looseness in the existing regulations is impacting the potential effectiveness of the scheme.

The legislation requires that either an asset rating or the full EPC should be included in written particulars. This study finds that agents are not complying with the minimum requirement for an asset rating and that even where the asset rating is included it does not provide sufficient information to allow an informed choice. The interpretation of asset rating as bar charts is itself problematic, as asset ratings are defined in the regulations as giving an assessment of the amount of energy used by the building. The asset rating, as currently interpreted, fails to do this and has many other omissions which would improve its effectiveness for very little additional resource. It is recommended that work is conducted to determine why agents are not complying with this requirement and that the current interpretation of the asset rating is reviewed.

The legislation requires that a full EPC be made available to the prospective buyer once marketing starts. Current practice is to have the EPC available by keeping it at the agent's office, though there is no duty to draw attention to it. The onus is on the prospective buyer to request to see the EPC for any given property. This has resulted in a situation where the full EPC may not be seen by the prospective buyer until much later in the conveyancing process once draft contracts are exchanged and sometimes not even then. Evidently this is after the choice of home has been made and could also be after mortgage lending has been arranged - thus precluding the chance of factoring in the costs of the EPC recommendations into any borrowing. As a result the study makes a number of recommendations. Firstly that a full EPC, not an asset rating be included in the particulars. Secondly, that failing that, the asset

rating should be significantly augmented with additional information. Thirdly, that agents should be required to draw attention to the full EPCs kept on their premises using formal mechanisms such as the placement of posters or similar. This is similar to the requirements already placed on car dealers with respect to the display of fuel consumption labels in the showroom.

The legislation currently places no duties on the buyer's conveyancing solicitor to use the HIP information or pass it onto their clients. The study also finds that because of concerns over the quality of personal searches and, occasionally because the EPC is considered to provide irrelevant information to clients, many solicitors are not disposed to seek out HIP documentation (including the EPC) from the seller's solicitor. The legislation requires that the seller should ensure that the eventual buyer is given a copy of the EPC. However, it is not clear that the seller is best placed to do this as it is the solicitors who are in contact with one another and the buyer and who are handling the flow of documentation. The duty to ensure that the buyer receives a copy of the full EPC should fall on the seller's solicitor where one is appointed. In the meantime, it is possible that if the seller is non-compliant with the duty to ensure a copy of the EPC reaches the hand of the buyer, then the buyer may not see the full EPC at any point in the conveyancing process.

Agents and solicitors are the gatekeepers and interpreters of the EPC. To ensure that these groups understand the aims of the scheme, adopt good practice and support its objectives, it is recommended that training needs are researched for these groups and that a package of CPD training is offered.

The study finds a number of areas where the RdSAP model and the associated certification could be improved. The principal findings are as follows.

The calibration of the A to G scale is such that negative SAP ratings and ratings over 100 are not shown on the certificate. This leads to results which may undermine the credibility of the scheme and cause problems for policy makers seeking to use the EPC as a basis for market transformation. For example, an owner of a very inefficient home (a lot <0) may spend thousands on measures which will have no effect on the SAP score (still <0). However, the environmental impact rating will always be affected by the installation of measures saving fossil fuels. This can lead to confusion for the householder and to difficulties for policy makers. A policy seeking to incentivise refurbishment using improvements to the SAP score would fail for the most in-efficient homes – precisely the homes that should be targeted. Equally, homes which become net renewable energy exporters cannot have their achievement recognised under the current arrangements (> 100). It is recommended that the true SAP scores are shown on the certificate.

RdSAP results for the energy performance of the home are highly conservative - U values may be twice as high as those that are easily achievable using commonly available materials whilst savings from distributed renewable energy systems seem very low. The reliance on threshold improvements in SAP rating (i.e. a minimum number of points) to determine whether measures are recommended (rather than payback or absolute energy savings) generates some surprising results. For example low energy lighting (LEL) is not recommended in some circumstances despite having a reasonable payback and substantial savings over the lifetime of the bulb. Photovoltaics are always recommended whereas Solar Hot Water Systems (SHWS) are not, despite SHWS having a shorter payback.

Various recommendations are made to revisit the assumptions used for micro-generation, to revise the accompanying text so that householders are aware of the factors that affect savings and to change the criteria for making recommendations (e.g. that LEL and SHWS are always mentioned in the certificate by being included in the 'further' recommendations section). The study also calls for the potential to be based on the full technical potential, i.e. to include micro-generation technologies, rather than just the 'cost effective potential'. This recommendation seems more in line with current government policy.

Proposed revisions to SAP2005 to be conducted this year may address some of these factors, however current assumptions do too little to incentivise refurbishment of all buildings or encourage investment in micro-generation.

At present the RdSAP system does not allow for much flexibility. This is an understandable constraint of the design considering that large numbers of comparable EPCs have to be undertaken by individuals who may have only had a few weeks training in energy issues in housing. However, these constraints of the EPC can result in recommendations being missed. For example, domestic energy assessors (DEAs) are instructed to remove the recommendation for loft insulation if condensation is found on the rafters. Loft insulation is the most cost effective insulation measure. It would be unfortunate if it were not recommended because the DEA is not permitted to make a qualified recommendation for improving ventilation in the loft space and then adding loft insulation. Another example is that it is not possible to specify floor insulation or varying thicknesses of wall insulation. A more flexible and sophisticated approach should be allowed soon in revisions of the scheme. This will improve the accuracy of the RdSAP results and ensure that appropriate recommendations are made. The evolution of the scheme will encourage DEAs to remain within the industry and develop into both committed and skilled professionals.

A complete listing of the recommendations in the report is given below. Full justification and context for each is given in the text.

1. Government may wish to review charging VAT at the full rate on EPCs given the EPC's objectives and the need to minimise the cost of the HIP.
2. Further research should be undertaken to understand why agents are not fully complying with the requirement to include the asset rating in the written particulars (hard and electronic copy). Through not including EPC information in the particulars the likelihood of buyers considering the energy performance of the home is reduced at a critical stage in the decision-making process.
3. The register of EPCs should allow searches on a variety of parameters, for example by area or efficiency ranking. This will further improve the effectiveness of the EPC in allowing comparison between buildings and improve access to the data.
4. It is recommended that policy initiatives should focus on incentivising the buyer rather than the seller to use the EPC information. Once the buyer is incentivised the seller will be more disposed to use the EPC information themselves.
5. It is recommended that the responsible person is required to draw attention to the EPC information that they hold. This should be done through a formal requirement for posters or equivalent in the place where the EPC information is held.
6. It is recommended that a review of estate agents training requirements is conducted to ensure that agents understand their duties with respect to the EPC and support its objectives.
7. It is recommended that government review whether the A to G bar chart conforms to the definition of an 'asset' rating and that the information constituting an 'asset rating' is enhanced.
8. It is recommended that the regulations are amended to require that the full EPC is included in the property particulars.
9. At a minimum EPC information on the property particulars should contain:
 - a. some explanation of the A to G graphs including a statement of what ranking an average UK property would achieve;
 - b. additional information on the property's estimated running costs and the assessment of potential running costs;
 - c. the EPC's RRN so that the full document can be downloaded;
 - d. contact information for organisations such as EST able to explain the EPC to a prospective buyer.
10. The duties on provision of the EPC should be reviewed so that the 'relevant person' becomes either the seller or the seller's agent (the seller's conveyancing solicitor).
11. The status of the EPC needs to be separated from the rest of the HIP and the problems of the personal search market. This will increase the likelihood that EPCs are requested, used and passed on to buyers.
12. It is recommended that the feasibility of developing courses in association with professional bodies representing the conveyancing solicitors is explored. Courses should cover the purposes and interpretation of the EPC.
13. The EPC should be clearer about what the calculation covers (ie not the costs of energy use in appliances or moveable lighting) and state the assumed occupancy and location, so that householders can adjust their expectations accordingly. It should also state that the house is assumed to be warm (21/18°C) and that the occupants have a comparably high standard of hot water. Where this is not the case in practice, the savings will be over-estimated.

14. It is recommended that BRE and CLG review the feasibility of accounting for location in the calculations of estimated running costs and savings (not the SAP rating itself).
15. Review feasibility of including energy used by appliances in the overall assessment of household energy use. Alternatively the EPC should be clearer that appliance energy use is not included so that householders can adjust their expectations accordingly.
16. It is recommended that the feasibility of displaying actual SAP scores (derived from the ECF) on the certificate is investigated. This will allow SAP scores greater than 100 and less than 0 to be shown to lie in the 'A' and 'G' bands respectively. This will make visible, and therefore clarify, the effect of energy performance improvements at the extreme ends of the scale and address the issue of the EI and SAP scales being differently calibrated (see recommendation 17).
17. Investigate the feasibility of ensuring that the EI and SAP scales are calibrated such that improvements at the extreme ends of the scales are reflected in both scales.
18. The feasibility of use of the full technical potential (enhanced efficiency rating) in the presentation of the homes 'potential' in the asset rating should be investigated. In the meantime, the certificate should make it clearer that only the 'cost-effective' measures are used in the calculation of potential shown in the bar charts (asset rating).
19. It is recommended that SAP modelling of solar hot water system output is reviewed.
20. Review the pricing and assumptions for calculating PV savings or state clearly the basis for the estimate indicating that greater savings may be possible - for example if ROCs are claimed.
21. Amend the recommendation text for PV so that the basis for calculation of savings is clearer and an indication is given that greater savings are possible.
22. The EPC certificate should always recommend SWHS as it already does with photovoltaics (which have a significantly longer payback). It should be left to the householder to make a judgement as to whether they wish to pursue the recommendation further.
23. Subsequent revisions of RdSAP could usefully consider a wider range of technologies for recommendation than currently included in the model. These should include ground source heat pumps, heat recovery ventilation and underfloor insulation. Domestic scale wind turbines might also be considered once the results of the current field trials are known.
24. Review feasibility of including measures which may not significantly add to SAP because of the circumstances of the particular building (but which do have a good payback or save significant quantities of carbon) in the 'further' section of recommendations.
25. The RdSAP data entry procedures could be reviewed with a view to allowing greater flexibility and more options to be built into subsequent versions of the scheme. The additional training for assessors that this would entail must be considered.
26. Future revisions of RdSAP could include provision for qualified recommendations to be made. Specific examples where this would benefit the scheme are increasing ventilation to lofts and cavities prior to insulation measures and reconnecting mains gas where possible.

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Introduction

The Environmental Change Institute contracted Sustain Ltd to conduct a study examining the delivery and effects of the Energy Performance Certificates (EPC) on domestic property. The study examines:

- the ways in which householders, estate agents and solicitors use the EPC;
- the delivery mechanisms for EPCs;
- the training of Domestic Energy Assessors (DEA);
- the operation of the RdSAP software;
- options for improving the effectiveness of the scheme.

The study intends to provide constructive criticism of the scheme so that it can be improved and made more effective. The study does not seek to reiterate how the scheme should operate according to EU regulations¹. The required operation of the scheme is set out on the CLG website² and the external site for HIPs³.

The study attempts to view the scheme from the perspective of those who will receive and use the EPC – estate agents, solicitors and householder – rather than the perspective of the energy expert or policy maker.

For these stakeholders, the *perception* of the EPC and its delivery will be as important to its effectiveness as the information that is actually contained in the document. Findings should be viewed in this light.

Method

The study was in conducted in four parts:

- Review of procedural guidance and regulations. Key documents relating to the operation of the scheme and setting out the regulations were reviewed.
- Analysis of the generation of EPCs. Sustain employs 4 accredited DEAs and one NHER trainer for domestic EPCs. Interviews were conducted with these staff on the practicalities of training DEAs and the mechanics of delivery of the EPC. The author also accompanied a Sustain DEA on a live site visit to observe the data gathering process.
- Structured interviews with key stakeholders. Three key stakeholder groups were identified: householders, estate agents and conveyancing solicitors. A tailored interview protocol was drawn up for each and structured interviews were then conducted with representatives of each group. Householders were selected from Sustain records – all had had an EPC in the previous 3 weeks prior to interview and were also actively looking for a new house. Consequently this group had recent experience of the EPC both as a seller and a buyer of a 3 or 4-bedroomed property. At least 10 individuals from each group were interviewed. Interviews were conducted over the phone and detailed notes made of the interviewee's response.

¹ The EPBD (2007) regulations are found at:
www.opsi.gov.uk/si/si2007/uksi_20070991_en_2#pt2-l1g6

² See:
www.communities.gov.uk/planningandbuilding/theenvironment/energyperformance/

³ See: www.homeinformationpacks.gov.uk/

- Analysis of the operation of the RdSAP software. Access was gained to the RdSAP on-line calculation tool developed by NHER. A series of base case house types were developed (Victorian terraced house, 1930s semi, 1980's flat). For each base case a range of parameters were systematically varied. Parameters included addition of RdSAP's recommended energy efficiency measures, availability of mains gas, room in the roof etc. This allowed assessment of the operation of the RdSAP software and the resulting EPC. As a result of this exercise a list of features of the RdSAP software and EPC which required further explanation were drawn up. These were then discussed with senior technical staff at NHER and with Dr Brian Anderson of BRE.

Purpose of the EPC

The purpose of the EPC is to fulfil a key requirement of the energy performance in buildings directive whose objective is:

"to promote the improvement of the energy performance of buildings within the Community, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness"⁴.

The role of certification is set out in the preamble to the articles of the directive. It is clear that the commission envisages the EPC to be used as the basis for a package of integrated policy measures designed to transform the building stock. For example, paragraph 16 states:

"The certification process may be supported by programmes to facilitate equal access to improved energy performance. The schemes adopted should be supervised and followed up by Member States, which should also facilitate the use of incentive systems. To the extent possible, the certificate should describe the actual energy-performance situation of the building and may be revised accordingly."

Therefore, in this report, the EPC is understood to have a role that extends beyond simply being a tool for comparison of buildings to something that will form the basis for market transformation of the built environment resulting in energy and carbon reductions. Analysis and recommendations are made with this objective in mind.

Generation and use of the EPC

The way the EPC is delivered, packaged and presented will have a considerable bearing on how it is used and ultimately whether measures are adopted.

Commissioning the HIP/EPC

EPCs for existing houses are required as part of the Home Information Pack (HIP). The HIP must be made available to prospective buyers as soon as the property is

⁴ Energy Performance of Buildings Directive text is found at www.diag.org.uk/media/18832/epd_final.pdf

marketed. However, for a temporary period⁵ the home may be marketed without the HIP so long as it has been commissioned. There are three possible routes by which a HIP is put together. These are reviewed below.

HIP organised by householder

One option is for the householder to assemble their own HIP. This can either be done by contacting a HIP provider directly or by Doing-It-Yourself. Some companies offering EPCs now offer guidance on the DIY route⁶. This will still involve getting a qualified DEA to provide the EPC, however searches and other HIP documents can be assembled by the seller.

There is relatively little price difference between doing it yourself and contacting a HIP provider directly compared with using your estate agent or conveyancing solicitor (especially when set against the overall cost of buying and selling a home). Commissioning a HIP directly from one of the many HIP providers exposes the householder to a degree of risk as compared with using a HIP provider that is recommended by one's estate agent or conveyancing solicitor. Therefore it is anticipated that very few people will go down the DIY route.

HIP organised by estate agent

The householder uses the estate agent who has been instructed to sell the house to organise the HIP. The agent will either use their own in-house HIP team or, more likely, will use a national HIP provider.

Smaller independent estate agents will often refer HIP work to a trusted conveyancing solicitor with whom they may have a long-standing relationship. The conveyancing solicitor will, in turn, have informal or contractual arrangements with companies able to provide the EPC and so the EPC element of the work will be referred on.

Estate agents are keen to offer the HIP service because they want to ensure that the property is marketed for sale as quickly as possible and some clearly feel that if the task is left to the householder or the seller's solicitor there is no guarantee it will be done quickly.

[Are you offering EPCs or offering to organise EPCs for your clients?]

Yes – we have to organise it ourselves because otherwise it wouldn't get done. We know local solicitors, but if we don't use a solicitor we go through 'Really HIP'. We use Really HIP because they are quick. We don't get a referral fee – clients pay the price.

Estate agent 5

As a result, estate agents are keen to ensure that HIP procurement is as painless as possible for the householder. For this reason a variety of easy means of paying for the HIP have been developed. These include no-sale-no-fee and payment once the

⁵ See www.homeinformationpacks.gov.uk/pdf/ExplanatoryMemorandumHIPregs.pdf page 5. Following interventions from RICs, rules were changed in June 2007 to allow marketing without the EPC, as long as it could be shown that the EPC had been commissioned. This relaxation of the rules only extends for a temporary period - initially until 31st December 2007, but this has now been extended until June 2008.

⁶ See, for example: www.eco-survey.com/selling-your-home.htm

house is sold. Estate agents are also offering HIPs very cheaply or even free⁷ as a means of gaining the instruction to sell the home.

HIP organised by seller's solicitor

In a third route, the householder engages the conveyancing solicitor handling the sale of their home to also produce the HIP. Other than the EPC and the searches of the seller's property, the other components in the pack (eg proof of title) are documentation that the seller's solicitor would have had to assemble anyway - when handling the sale of their client's property. The solicitor will simply commission the EPC and searches and add these additional 'disbursements' to their final bill. One solicitor contacted in this study mentioned that some solicitors were now drawing up contracts that require the eventual buyer to pay for the HIP.

Conclusions on commissioning the EPC

It is clear that routes 2 and 3, which will constitute the vast majority of cases, will invariably result in the house being valued before the EPC or HIP is generated. This effectively precludes consideration of the EPC in the initial valuation of the property. In fact, some estate agents are specifically instructed not to include consideration of the EPC ranking in their valuation and to reassure their potential clients that the EPC will have no bearing on their valuation of the property⁸. Therefore, there are structural reasons why the EPC will not be accounted for in the initial valuation of an existing home for sale.

Production and costs of the EPC

Production and cost of the EPC

Once the HIP/EPC has been commissioned an EPC supplier will be contracted to undertake the work. EPCs are delivered in a number of ways:

- companies providing EPCs are instructed by solicitors;
- companies providing EPCs are instructed by HIP providers;
- HIP providers contact an accrediting EPC body such as SAVA which manage a panel of DEAs. For a small annual fee, SAVA then refer work to their members.

The cost of the EPC to the seller will be determined by the time it takes to complete and process each one, plus the overheads and salary expectations of the DEA.

For a standard house, an experienced DEA can complete the site inspection in approximately 30-40 minutes. Transposing site notes into the hardcopy RdSAP form and then uploading the data into the online RdSAP interface may take a further 30-40 minutes. DEAs also have to factor in the time to get to and from the site and to complete other administrative procedures. These time considerations mean that no more than around 3 or 4 EPCs for sales of domestic homes could realistically be completed in a day. The time required per EPC comes down if they are completed on a bulk basis - for example if producing EPCs for a block of flats for a social landlord.

In addition to time costs, overheads such as travel costs, indemnity insurance, professional memberships, administrative support, and office costs must be factored

⁷ e.g. Hamptons

⁸ See for example this set of FAQs produced by Andrews Estate Agents:
www.andrewsonline.co.uk/downloads/HIPs-FAQ-7-SEPT-2.pdf

into the price charged for each EPC. These costs are currently resulting in an EPC cost to the client of around £100 plus VAT. This is the figure predicted by the government's regulatory impact assessments. However, because there are now sufficient accredited DEA's to deliver the workload in a very slow housing market, prices for an EPC have tumbled as DEAs attempt to win instructions. Some solicitors are now being offered EPCs from independent DEA's for as little as £40/EPC. One solicitor stated:

Energy assessors are flooding into the office offering very cheap EPCs. Its something to consider [instructing a very cheap EPC to be carried out] because we might lose business [producing HIPs] if we are £50-60 more expensive [than our competitors] - but that hasn't happened yet.

Solicitor 6

It is unlikely that a £40 EPC makes any profit for the DEA. At this price DEAs are barely covering costs. Aggressive pricing like this may be seen as an attempt to gain new clients who are in existing relationships with EPC providers. It is not a sustainable rate.

VAT on the EPC

VAT on EPCs is charged at full 17.5% whereas on most energy efficiency measures and renewable technologies sold into the domestic sector it is charged at 5%. This seems to be an inconsistency. That the HIP is also charged at 17.5% has provided further evidence to those who wish to claim that the entire EPC initiative is a stealth tax. This undermines the credibility of the scheme and consequently may reduce the chances that the information in the EPC will be acted upon.

1. Government may wish to review charging VAT at the full rate on EPCs given the EPC's objectives and the need to minimise the cost of the HIP.

Cost of the HIP

Perhaps in part because the HIP is widely regarded as an unnecessary or unjust expense (see 'Attitude of the seller' below), there was a widespread view amongst those consulted that provision of a HIP was an obstacle to be dealt with as cheaply and expeditiously as possible.

As a result of this it seems that the market for HIPs has become ferociously competitive with clients only interested in the price of the product. This will also have the effect of driving down the price that HIP providers are prepared to pay for the EPC.

Nobody is interested in a quality product. Everybody is doing the minimum.

Solicitor 4

One means to drive down the cost of a HIP is to employ a personal search company rather than using the local authority search service. For example, whereas a local authority search would cost around £170 a personal search company would ostensibly provide the same information for £90⁹.

⁹ Example figures quoted by solicitor 4.

Consequently, there has been a huge increase in the number of searches done by private companies. Personal searches take much longer than local authority searches - up to 4 weeks rather than a couple of days. Personal searches also do not have the credibility of official local authority searches and some lenders apparently do not accept them.

This has important consequences for the HIP/EPC. Solicitors acting for the buyer are not disposed to use a HIP, based on personal searches as the information is not seen as credible and the marketing process may also be slowed down. This has the opposite effect to what was intended through the introduction of HIPs.

Conclusion on producing the EPC

In this study, solicitors and estate agents unanimously stated that the market had dramatically slowed since the summer. The number of new instructions was estimated at anywhere between 25-50% less than the same time in the previous year. As a result of this slowing of the market, it appears there is insufficient work for the existing trained DEAs. Even offering EPCs at £40 each, some will be unable to continue to practice as DEAs and will leave the market. Eventually prices should stabilise at around £100/EPC. At current costs, this figure appears to be the average that can be offered that still generates a reasonable profit.

In the short term, there will continue to be heavy pressure driving down the cost of the HIP and also, consequently, the EPC. These include the large number of HIP providers and DEAs looking for work and the attitude of the industry and householders towards the HIP as a product.

In a situation where each completed EPC results in only a marginal profit to the DEA, DEAs will be compelled to do as many as they can in a day to ensure a reasonable income or to allow time for other work. This situation will not encourage rigorous assessments or assessments requiring some careful consideration. It is inevitable that DEAs will make mistakes as a result.

As discussed below, some industry commentators have begun to call for RdSAP to become more sophisticated or for full SAP assessment to be used for EPCs in some situations. Pressures to produce EPCs as quickly and cheaply as possible do not sit easily with this option. If full SAP assessment or a more complex RdSAP assessment is eventually required, costs of domestic EPCs must inevitably increase to cover the additional time required to make the assessment and the additional training required.

How is the EPC distributed

The full EPC

Five or six copies of the full EPC are generated for use in the marketing and conveyancing process. These are distributed as follows:

- copy to the seller: often sent electronically;
- copy of the EPC lodged with central government EPC/HCR database. This copy is accessible to anyone having the Report Reference Number (RRN). The RRN is a unique reference code assigned to each EPC;
- another hard copy is kept in the estate agent's office. This copy is to be made available to any prospective buyer, who wishes to see it, where the agent has

- reasonable cause to believe that the prospective buyer genuinely wishes to consider purchasing the property;
- some agents also apparently place the full EPC on their websites as part of the property particulars although research for this study has found no evidence of this;
 - a fourth copy is sent to the seller's conveyancing solicitor. The seller's solicitor will keep a copy and,
 - send a fifth copy to the buyer's solicitor when requested along with the draft contract documentation.

The asset rating in the written particulars

In addition to keeping a copy of the full EPC, agents are required to include either the 'asset rating' or the full EPC with the written property particulars. The requirement only applies where the particulars contain a minimum level of information such as floor plans and a photograph of the building¹⁰. Under the temporary arrangements in force until June 2008 a property may be marketed without the EPC information in the written particulars so long as the EPC has been commissioned.

The requirement for the 'asset rating' has been interpreted as the inclusion of the EPC bar charts showing the A to G rating of the property (Figure 1). However, this interpretation is problematic.

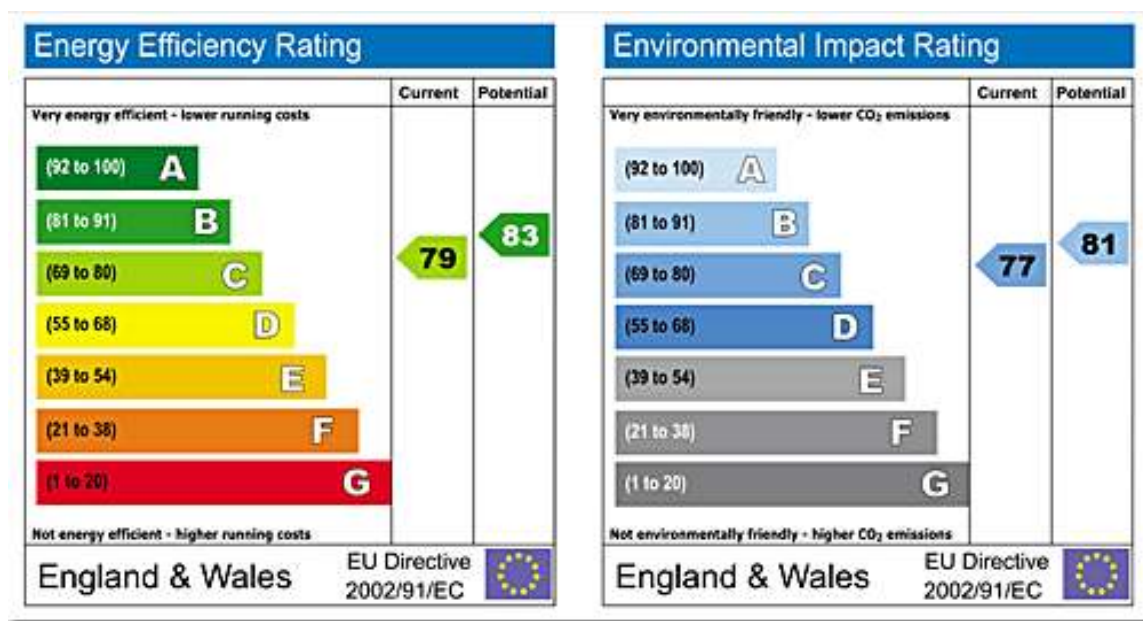


Figure 1: The 'asset' rating

¹⁰ Regulation 6.2 of the EPBD 2007 regs define written particulars as 'a written description of the property where 2 of the following apply':

- there is a photograph of the building;
- there is a floor plan;
- there is a description of the size of the rooms.

The requirement for EPC information in the written particulars extends to both hard copy and electronic particulars. Consequently, to examine how agents were responding to the requirement the websites of 10 estate agents¹¹ marketing their properties on-line were examined for this study. Four bedroom properties were selected on agents' websites to maximise the chance that the property would have an EPC.

The study found that none of the properties examined had particulars with either the asset rating or the full EPC as required. There are four possible explanations for this:

- estate agents have found a loophole which does not require them to show the asset rating. This seems unlikely as the rules are quite explicit. All of the properties examined had associated written particulars which had a photograph of the building and a description of the size of the rooms and/or a floor plan. Consequently all met the criteria triggering the requirement for an asset rating or full EPC;
- for all the property examined there is no EPC as yet available. Given the number of DEAs and the relatively slow housing market this seems unlikely;
- all the properties examined were placed on the market before August 2007. Also very unlikely;
- the agents are not complying with the regulations.

It seems likely that in fact many agents are not complying with the regulations.

2. Further research should be undertaken to understand why agents are not fully complying with the requirement to include the asset rating in the written particulars (hard and electronic copy). Through not including EPC information in the particulars the likelihood of buyers considering the energy performance of the home is reduced at a critical stage in the decision-making process.

Where does the EPC data go

The process of generating an EPC produces 4 types of data. These are: site notes and photographs, completed RdSAP forms, sellers consent form¹² and the EPC itself. The regulations require that these are stored and accessed in different ways as follows:

- site notes and photographs must be kept in some format for 15 years (either hard copy or electronic or both). This is so that, if there is any legal issue arising from the assessment, the raw data are available. If hard copies are retained they must be filed in a locked, fire-proof, filing cabinet owned by the DEA. Many DEAs also take the precaution of scanning their documents and archiving them electronically;
- seller's consent forms are likewise kept in some form for 15 years;
- RdSAP forms are completed in hard copy (using the data from the DEA's site notes) then stored for 15 years by the DEA. As with the other documentation, most DEA's will also make an electronic copy. The RdSAP data is automatically

¹¹ A mix of independent and national estate agents were chosen. All were members of the National Association of Estate Agents (NAEA). The details for two to three properties were examined on each website.

¹² This is a document signed by the seller which confirms that they are happy with the DEA inspection of their property. It is to be used for quality control.

held by the body providing the approved RdSAP online calculation tool. For example, for those DEAs accredited with SAVA¹³, the sister organisation to NHER, RdSAP form data will be held on the NHER database;

- the EPC itself will be stored in three places. The DEA will retain a copy for their records, the provider of the calculation tool will store an electronic copy and a copy will also be lodged with the central government HCR/EPC register¹⁴. This central database allows anyone with the relevant EPC reference number ('RRN' – report reference number) to download a copy of the EPC (or Home Condition Report). To obtain the reference number one must simply be a prospective buyer and request the number from those marketing the property.

Having EPCs kept on a central database accessible through a website opens up numerous possibilities for comparison of buildings using a variety of search parameters. The database could allow searches in a way analogous to those showing CO₂ emissions for new passenger cars (www.vcacarfueldata.org.uk/). For example, all EPCs for property on the market within a particular postcode could be displayed. Alternatively, only property (within a particular postal area) with an efficient ranking could be displayed. Making available information in this form would not infringe the data protection act as the seller's name is not on the certificate.

Allowing searches by postcode, efficiency ranking or other parameter would further equip homebuyers with the means to make comparisons of the energy performance of buildings and increase access to the EPC data.

3. The register of EPCs should allow members of the public to search on a variety of parameters, for example by area or efficiency ranking. This will further improve the effectiveness of the EPC in allowing comparison between buildings and improve access to the data.

Use of the EPC by the seller

Householders contacted for this study were unanimous that they would not use the information in the EPC prior to sale – for example they would not implement the recommendations in the EPC. This was justified for a number of reasons.

Attitude of the seller

None of those consulted had a positive attitude to the EPC or HIP. The general attitude was at best a resigned acceptance of the need for it as part of new regulation. The EPC was usually conflated with the HIP as part of the same package. Consequently, misgivings about the entire HIP rationale also tainted the EPC. There was also a common speculation that the HIP was simply another stealth tax.

It's another tax that's been forced upon us.

Householder 1

Estate agents had a similar view of the views of the sellers. For example,

99% of them [ie sellers] think it's a big con

¹³ www.sava.org.uk/

¹⁴ This is a service run on behalf of CLG by the Landmark Information Group. The register can be found at : www.hcrregister.com/Welcome

Estate agent 2

There was also widespread confusion about its purpose. For example:

What do you gain by doing it? Its £300 unnecessarily spent. It's a waste of money and a waste of time.

Householder 6

It is unfortunate that the EPC is apparently seen in such a negative light by householders. If this attitude remains widespread it may affect the effectiveness of the scheme. For example, householders will be less disposed to improve the energy efficiency of their homes prior to sale, if they place no value in the EPC.

Much of the grievance centres around the perception that it is an additional cost. Therefore, the reduction of VAT, from the full rate currently charged for a HIP or EPC, may go some way to reducing this concern.

The value of the home is not affected by its energy performance

Some sellers expressed the view that the energy performance of a house did not affect its value and consequently there was little point in improving that performance. Also, installation of energy efficiency measures was viewed by both sellers and buyers as something that should be left to the new occupant as a matter of personal preference.

Furthermore, as energy-efficiency measures are relatively easily installed and not necessarily costly, the reported energy performance of the house is not something that can be used to reduce the asking price. Therefore, there was little reason to be interested in the results of one's EPC as it was perceived as having minimal leverage over the seller. For example,

[Do you think your EPC rating will affect the value and saleability of the house?]

No, it's the location and condition of the house. Say the loft insulation wasn't very good. You would do that once you'd moved in. I suppose the A to G could be used as a bargaining tool [by the buyer], but not to any significant extent as energy efficiency can be rectified quite easily.

Householder 4

[Do you think your EPC rating will affect the value and saleability of the house?]

I don't think so. If you like a house, you will buy it regardless of energy efficiency.

Householder 5

These views were reiterated by the estate agents. For example,

[Are buyers using the EPC in the bargaining process?]

Nobody has quoted the HIP or EPC. People negotiate on the necessities – the kitchen and the bathroom etc. The money needed to make house energy efficient is not so great, therefore it is difficult to sell up based on the energy efficiency. Plus, individuals tend to choose a house of a

particular type – they won't change their minds because of the energy performance.

Estate agent 1

[Are buyers using the EPC in the bargaining process?]

No – because at the end of the day, the suggestions are down to personal choice - if you want to make the boiler more efficient it doesn't impact the saleability of the house.

Estate agent 14

Should EPC ratings become linked to council tax rebates or stamp duty, it is likely that these attitudes will change. Similarly, fuel price rises tend to refocus consumer attention on relative energy efficiency.

Particular house types have particular energy performance

A common view amongst the sellers was that buyers know that houses of a particular type will tend to have energy performance in a particular bracket. Therefore, unless the EPC reveals that the home is surprisingly efficient or surprisingly inefficient for its type, the EPC will provide little additional information to the prospective buyer. As the EPC does not give average ratings by different house 'types' it is difficult to judge whether the home is over or under performing.

A related view was that the price of the house was based on 'what could be seen'. As such, the general condition of the energy services (boiler etc) are already priced into the asking price.

...a prospective buyer would expect a Victorian home to have a low energy rating and so they would know what they were buying...

Householder 2

For these reasons, some sellers felt that there was little incentive to implement EPC recommendations prior to sale.

Inappropriate recommendations

A number of sellers felt that the recommended measures in their EPC were not appropriate or were too expensive.

[Will you use the information in the EPC?]

No - it is a modern house and the recommendations were prohibitive. The cost of solar panels in terms of getting your money back is ridiculous. We have modern lighting with a 12 volt transformer. You can't use energy efficient lighting - you can't get the bulbs to fit¹⁵. They are great big things [ie energy efficient light bulbs]...so we are not going to change our light fittings and we are not going to buy a solar panel. The whole HIP thing is useless.

Householder 2

¹⁵ Actually this is not the case. Energy efficient alternatives to tungsten halogen bulbs with GU 10 and pin fittings are available – but are not usually found in mainstream lighting retailers.

Conclusions on the use of the EPC by the seller

These findings suggest that very few sellers will implement EPC recommendations prior to sale - not least because this would require commissioning a new EPC once the measures were in place with no guarantee, under current arrangements, that the house would achieve a better rating (see 'SAP ratings after measures').

The timescales involved, whereby homes are often sold within days or weeks on the market, would also discourage a protracted 'conduct EPC-install measures-new EPC' process. However, some EPC providers clearly feel that there is a role for this kind of service and will re-rate the home for a reduced additional fee - circa £40¹⁶.

In general, it seems the EPC is simply accepted by the seller as something that is now required as part of the HIP. Without a clear 'use' of the EPC for the seller, it can be seen why many responses were so negative. The buyer has a clearer opportunity to use the EPC and to implement its recommendations.

4. It is recommended that policy initiatives should focus on incentivising the buyer rather than the seller to use the EPC information. Once the buyer is incentivised, the seller will be more disposed to use the EPC information themselves.

Use of the EPC by the prospective buyer

The stated intention of the EPC is that it 'should be available to allow potential purchasers to compare the energy efficiency of different properties they are considering buying'. Therefore, 'to be truly effective EPCs should be available at the point where properties are first marketed'. Figure 2 shows the stages in the process of selling a home in relation to the various appearances of the EPC.

¹⁶ See www.eco-survey.com/selling-your-home.htm

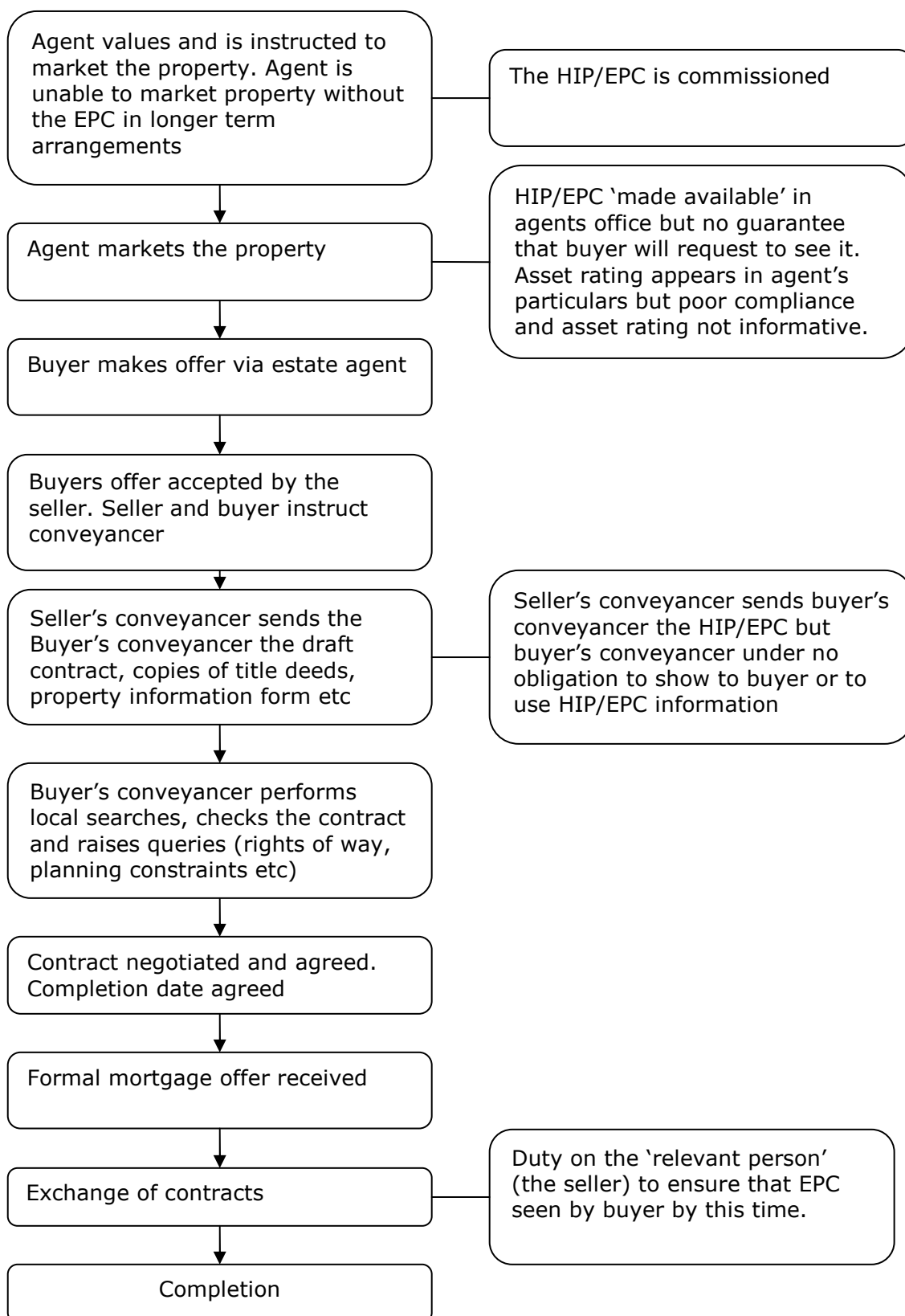


Figure 2: EPC information in the selling process

This study has found that the procedures currently in place do not encourage prospective buyers to review and compare EPC information. This is for a number of reasons as follows.

Attitude of the buyer

When householders were asked to comment on their attitudes to the EPC as a buyer, they were equivocal in their responses. For example, when asked if they would implement EPC recommendations once they had purchased the house a typical response was that they would consider them, but 'only if we were going to do some work anyway'. Some also suggested that they would consider adjusting their borrowing to pay for recommendations. In general, however, responses were non-committal and no great interest in the EPC was evidenced. A number of explanations were offered for this. Two of the most common were:

- There is no interest in the EPC because the energy performance of the home, at present, has no influence on the buyer's decision-making. This was stated again and again as an article of faith by the estate agents in this consultation. 'People buy homes with their hearts' was how one agent expressed it. In other words, running costs and rational calculations of energy performance are not generally evident in the buyer's decision-making.
- There is no interest in the EPC because buyers are aware that, in general, a house of a particular type will tend to have particular energy characteristics. For example, it was claimed that buyers would be well aware that an old solid-wall property would be more expensive to run than a more modern home. As a result the EPC can be seen as largely superfluous.

Whilst this seems reasonable, it is also contended here that the current procedures do not do enough to sufficiently draw the prospective buyer's attention to the EPC and therefore that the chances of it being referred to are minimised. Therefore, at least part of the reason for a lack of interest amongst buyers may lie in the current arrangements for exposure to the full EPC. It is also likely that further rises in fuel price will increase interest in the energy performance of buildings.

Current arrangements resulting in exposure to the EPC are discussed further below.

Viewing the full EPC

As well as an energy and environmental ranking using the familiar A to G scales, the full EPC contains an estimate of the running costs of the building broken down by service type. It also states what an average house is (grade E) and gives an estimate of savings attributable to the recommended measures. A full EPC is shown in Appendix 2: Example EPC .

Information on running costs is highly salient to buyers. It is likely to have a significantly more influential effect on decision-making than the abstract A to G ranking found in the asset rating alone. It is therefore important that this full document is seen at the earliest stages of the marketing process. Under current arrangements this does not seem to be the case. Reasons for this are given as follows.

Once the EPC is available for a property, the agent is under a duty to provide a copy of it as part of the HIP to a *potential buyer who asks for it*. There is a clear onus on the prospective buyer to take the initiative and request to see the HIP/EPC. The estate agent is under no obligation to draw the prospective buyer's attention to it.

This situation is unaffected by the temporary arrangements now in place, which allow the property to be marketed so long as the EPC has been commissioned. Under both the temporary and longer-term arrangements, the agent's duty is only to make the full EPC available if requested. The only difference is that under the longer-term arrangements the EPC must be available at first point of marketing whereas under the temporary arrangements the property can be marketed for a limited period without the EPC being available.

As a result of the onus falling on the potential buyer to request to view the EPC it is perhaps not surprising that the estate agents contacted in this study were unanimous in claiming that not a single prospective buyer had asked to see the full EPC.

[Are buyers interested in the information in the EPC?]

Not a single buyer has asked to see the information in the HIP

Estate agent 5

[Are buyers interested in the information in the EPC?]

No-one has requested to see it therefore they are not using it

Estate agent 2

[Are buyers interested in the information in the EPC?]

They don't ask for it and they don't seem very interested

Estate agent 8

The full EPC may remain in a drawer at the estate agents and never be seen by a prospective buyer without the agent in any way transgressing the law. As mentioned, the prospective buyer must take the initiative and ask to see a copy. Even then the agent may refuse to show the copy, if they feel that the prospective buyer is not serious in their intentions to buy the property of that they feel that seller would not wish to sell to the prospective buyer in question.

The regulations should be amended to require estate agents to draw attention to the EPC held at their offices. There is a precedent for this. When labelling showing relative fuel consumption of new passenger cars was introduced in 2001, the directive required that posters explaining the label were displayed in the dealer's showrooms¹⁷. Similar requirements could be made of estate agents.

5. It is recommended that the responsible person is required to draw attention to the EPC information that they hold. This should be done through a formal requirement for posters or equivalent in the place where the EPC information is held.

¹⁷ The Passenger Car (Fuel Consumption and CO₂ Emissions Information) Regulations 2001 number 8 (1) states that, 'a dealer shall ensure that, in relation to each make of new passenger car displayed or offered for sale or lease to prospective end users by him at or through a point of sale, there is exhibited in a prominent position at that point of sale, a poster or display, which contains the official fuel consumption and official specific emissions of CO₂ figures for every model of that make'. Regulations can be found at www.opsi.gov.uk/SI/si2001/20013523.htm:

Ensuring that agents or other 'responsible persons' are able to explain the EPC and proactive in drawing potential buyers attention to it may require developing training in association with estate agents' professional bodies.

6. It is recommended that a review of estate agents' training requirements is conducted to ensure that agents understand their duties with respect to the EPC and support its objectives.

Quality of EPC information in the agent's particulars

The EPBD regulations 2007 (reg. 6.2) require that either the EPC certificate or the asset rating (the EPC bar charts) showing the A to G rankings of the property must be included in the written particulars⁹ (both electronic and hard copy). An example of an estate agent's particulars where the 'asset rating' is included is shown in Figure 3.

HartsenSmith

Sales, Letting and Valuations hartsensmith.co.uk

Enviably located family home
Hazelwood Drive, St Albans
 Guide Price £400,000 – Subject to contract



**2 Reception Room • Kitchen • Dining Room • 3 Bedrooms • 2 Bathrooms
 Front and Rear Gardens • Garage • Double Glazed**

This stunning three bedroom detached property is situated in a secluded location in the heart of town, within easy walking distance of shops and local amenities. The house is presented in very good decorative condition, boasts a newly fitted kitchen, modern bathrooms and private rear garden. This property offers excellent value for money as a family house.

Energy Efficiency Rating		State-maintained Energy Rating (CDE)	
Current	Potential	Current	Potential
A	B	A	B
B	C	B	C
C	D	C	D
D	E	D	E
E	F	E	F
F	G	F	G
G	H	G	H

174 Oakwood Road, St Albans, Herts, AL4 0UW tel: 01727 456789 email: info@hartsensmith.co.uk

Figure 3: The 'asset rating' in the particulars

As this may be the only EPC information that is seen by the prospective buyer at the earliest stages of the house buying process when comparisons between homes are actively being made, it is particularly important that this information on the particulars is salient and usable. Unfortunately where only an 'asset rating' is included in the particulars (rather than the full EPC), this does not seem to be the case. Presentation of the EPC information in the form of an asset rating gives very little meaningful information to the prospective buyer (see figure 3 above). This is for the following reasons:

- the graphs appear without any explanation;
- there is no indication of the ranking of an average property (a grade E);
- there is no indication of where further information or the full EPC can be found;
- the RRN is not shown which would allow download of the full EPC;
- there is no indication of running costs or the potential savings from implementing cost-effective measures, nor the costs of implementing the 'potential'.

As a result, it is considered that this arrangement does not fulfil a key objective of the EPC - to 'allow potential purchasers to compare the energy efficiency of different properties they are considering buying'.

This 'asset rating' as set out above also does not appear to comply with the definition set out in the regulations. EPBD (2007) regulation 2.1 defines the asset rating as a 'numerical indicator of the *amount of energy* estimated to meet the different needs associated with the standardised use of the building'¹⁸. The bar charts give no indication of the *amount of energy* used by the building – they only show relative energy use and relative environmental impact. It is contended that if figures showing estimated energy use were included as part of the asset rating this would be more salient to users than the current interpretation of the regulation.

7. It is recommended that government review whether the A to G bar chart conforms to the definition of an 'asset' rating and that the information constituting an 'asset rating' is enhanced.

Inclusion of the full EPC in the particulars

The stage of the house buying process where written particulars are reviewed by potential buyers is a critical time for decision-making. It is at this stage that different options are 'spread out on the kitchen table' and choices and trade-offs are made. It is at this stage that finance is considered and borrowing requirements are calculated.

Inclusion of full EPC information in the particulars is particularly important because, under the current arrangements, house buyers do not have their attention drawn to the full EPC kept by the agent (see above). The agent is only under a duty to provide the certificate if it is requested by the householder. Therefore, the full EPC may not be seen at the early stages under the current arrangements and so it is particularly important that the full EPC is included in the particulars at this critical time.

¹⁸ The EPBD (2007) regulations are found at:
www.opsi.gov.uk/si/si2007/uksi_20070991_en_2#pt2-l1g6

8. It is recommended that the regulations are adjusted to require that the full EPC is included in the property particulars.

It is acknowledged that agents may be reticent to attach a four page document to their property particulars (the full EPC). Under a possible transitional arrangement, the existing asset rating alternative could be made more useful and robust through inclusion of the predicted running costs (which are included in the full EPC).

In addition, at a minimum, the information on the particulars should also contain a statement of the ranking of an average UK property and give contact information so that the prospective buyer can gain an explanation of the graphs. The EPC's unique reference number should also be included so that the full EPC can be downloaded from the EPC/HCR register, by any interested party.

9. At a minimum, EPC information on the property particulars should contain:
 - a. some explanation of the A to G graphs including a statement of what ranking an average UK property would achieve;
 - b. additional information on the property's estimated running costs and the assessment of potential running costs;
 - c. the EPC's RRN so that the full document can be downloaded;
 - d. contact information for organisations such as EST able to explain the EPC to a prospective buyer.

Under the current arrangements, the earliest point at which the prospective buyer may see the full EPC is once the conveyancing process is underway – after an offer has been made and accepted and the buyer's solicitor has requested that the seller's HIP be provided. However, there is no guarantee that even at this stage the prospective buyer will have sight of the EPC. This is discussed next.

Request and use of the EPC by buyer's solicitors

Solicitors acting for a buyer are under no obligation to use the HIP or EPC and therefore to request it or to show it to their clients.

[What are your legal obligations regarding EPCs?]

We are under no obligation to use it, no obligation to show it to clients and no obligation to request it. The only responsibility is with the agent who must have a copy in their possession.

Solicitor 1

This is the result of the EPBD (2007) regulation 5.5 which states that 'the relevant person must ensure that a valid energy performance certificate has been given free of charge to the person who ultimately becomes the buyer or tenant'¹⁹. The EPBD regulations also define the 'relevant person' as the seller – not the solicitor acting for the seller or the solicitor acting for the buyer. Therefore, the buyer's solicitor is under no obligation to obtain the EPC and pass it on to their client – that duty under the current arrangements falls to the seller.

It is contended here that the seller is not best placed to ensure that the EPC is given to their buyer. The seller may be absent, unavailable or incapable of fulfilling this duty. In addition, in the usual conveyancing process, the buyer and seller do not

¹⁹ See the EPBD (2007) regulations at www.opsi.gov.uk/si/si2007/uksi_20070991_en_2#pt2-l1g6

necessarily have any contact with one another. All transactions are carried out by the respective solicitors. Consequently, the duty to ensure the eventual buyer is given the EPC by the time contracts are exchanged (if not before) should fall on the seller's solicitor.

If the seller's solicitor were placed under this duty, it would ensure that the buyer received a full EPC prior to contractual exchange. Under the present arrangements there is no guarantee that this will happen. This is because the buyer's solicitors may feel they have little interest in the HIPs contents and therefore may not request the HIP to be sent over to them from the seller's agent or solicitor.

10. The duties on provision of the EPC should be reviewed so that the 'relevant person' becomes either the seller or the seller's agent (the seller's conveyancing solicitor).

EPCs, HIPs and the problem with searches

The drive to reduce HIP costs has resulted in widespread use of personal searches, which are often seen as not credible by conveyancing solicitors.

We won't touch personal searches. You can't trust the information. Why should we be liable for poor search information. We insert an indemnity clause in the contract disclaiming liability. The EPC is also of no interest to my clients, but I am mainly dealing with middle to top end of the market.

Solicitor 3

Like solicitor 3, a number of the others contacted also mentioned that their clients were not interested in the EPC. Consequently, several of the solicitors consulted here said they were not disposed to track down the EPC, if it were not included in the HIP and would order their own local authority searches if the HIP contained personal searches.

[At what stage do buyers receive a full copy of the EPC?]

When they go into an estate agent. It's only ever at the estate agent, if the EPC is not sent on with the other HIP documents.

Solicitor 5

This study has already established that the EPC may not be seen at the estate agents either.

When asked what could be done to improve the system, many solicitors stated that personal search companies should be closed down, that the entire HIP scheme should be scrapped, but that the EPC element should be retained.

It seems that the use of personal searches has tainted the EPC and resulted in a situation where solicitors do not feel motivated to track down complete HIP documentation on behalf of their buying clients. As discussed, the duty to ensure that the buyer is given a copy of the EPC falls on the seller (not the seller's or buyer's solicitor). As a result, the likelihood of this requirement being fulfilled is diminished compared with the same requirement being placed on a professional. Therefore, as a result, it is conceivable that householders may not have sight of an EPC at any point in the conveyancing process.

11. The status of the EPC needs to be separated from the rest of the HIP and the problems of the personal search market. This will increase the likelihood that EPCs are requested, used and passed on to buyers.

Assuming the full EPC is passed onto the buyer, there are a number of potential ways in which it could be used. These are explored below.

Use of the EPC by the buyer once conveyancing is underway

The first the buyer may see of the full EPC is when they receive the HIP and draft contract from the seller's solicitor via their own solicitor. This is after the offer price has been agreed, but before the final contracted price is agreed. Any further movements on price take place once home condition surveys etc have been conducted.

It is at this stage also that the level of borrowing is finalised. Therefore there is an opportunity at this stage of the conveyancing process for buyers to use the EPC to:

- ask for EPC-recommended measures to be implemented by the seller prior to sale. This seems unlikely given current priorities of buyers and sellers, as evidenced in this study;
- ask for reductions in the asking price using the EPC as the lever (for example if the home was revealed to have an unexpectedly poor energy performance for its 'type') to cover costs required to bring it to the average for its type or for all housing. However, given the feedback above on current priorities of buyers and sellers, it seems unlikely that a poor EPC rating would give much leverage over a seller at this stage, unless mandatory minimum standards are introduced²⁰ or the EPC rating becomes linked to taxation (eg council tax or stamp duty);
- budget for recommended measures to be installed by adjusting borrowing from a mortgage lender or selecting a lender that offers special terms for those investing in measures (green mortgages). This offers the most promising route for use of the EPC by the buyer.

As conveyancing solicitors are the gatekeepers of the documentation supplied in the HIP, particularly in advising on the content of the searches, there is a potential role for them to assist homebuyers with interpreting the EPC and with signposting further information etc.

Encouraging solicitors to take on this role would require the support of the various professional bodies and perhaps the development of training to be undertaken as part of CPD. Longer term, the EPC purposes and use of the EPC should be covered in the formal training received by conveyancing solicitors prior to qualification or accreditation.

12. It is recommended that the feasibility of developing courses in association with professional bodies representing the conveyancing solicitors is explored. Courses should cover the purposes and interpretation of the EPC.

This concludes the part of the study examining how EPCs are currently used in the housing market. The study now considers how the certificate itself is generated.

²⁰ See Home Truths: A Low Carbon Strategy to reduce UK Housing Emissions by 80% by 2050, Boardman, B. (2007) ECI Research Report 34, ISBN 1 874370435, University of Oxford

Design and use of the RdSAP software and the Certificate

The necessity to create a tool which can be used by someone with only limited knowledge of energy issues and which is therefore capable of generating a SAP assessment using only limited information²¹ has resulted in a software design which is highly prescriptive and which makes a number of assumptions based on the age and services present at the property²².

However there is a danger that this delicate balance between a simplified data entry procedure on the one hand and accuracy on the other may generate results which appear anomalous or inexplicable to the householder. The design constraints of the RdSAP software have lead to a range of issues which are now explored further.

Energy costs

RdSAP calculates SAP ratings from fuel prices listed in Table 12 of the SAP (2005) specification. These fuel prices are based on a 3 year average (2003, 2004 and 2005). In contrast, the prices used to estimate the quoted running costs of the home and to estimate savings from measures as presented in the EPC are based on current fuel price data. This data is produced by Sutherland Tables²³ and is updated every six months.

This arrangement allows the SAP ratings reported in the EPC to be comparable (as they are based on an unchanging dataset - the fuel price values set out in table 12 of the SAP 2005 specification) but also allows the EPC's estimates of savings and running costs to be accurate (given typical occupancy and middle England location) and therefore credible to householders. Therefore, any variations between predicted and actual running costs and savings will be because of the assumptions in the RdSAP model rather than changing fuel prices.

The SAP rating is based on calculated running costs for heating space, heating water *and fixed lighting*. It does not include electricity use for appliances or moveable lighting. SAP also assumes 'typical' occupancy, a middle England location and a theoretical standard of energy services, ie that occupied rooms are heated to a comfortable level. The result is a standardised 'household' which will generally be different in all or some of its features to the actual household. Therefore it should be expected that there some variance between householders' actual energy use and the predictions of the RdSAP model, but that the model accurately describes the average energy consumption of a UK household.

Other things being equal, households in the colder parts of the country should expect their heating energy to be higher than SAP predicts, whilst households in the south should expect to see their heating energy consumption as a little lower than the

²¹ It is important to emphasize that RdSAP uses the same model as full SAP 2005 – the only difference is that RdSAP has reduced requirements for data entry into the model.

²² SAP 2005 assumptions are set out in the appendices found on the BRE website at: www.projects.bre.co.uk/sap2005/RdSAP.html

²³ See: www.sutherlandtables.co.uk/

RdSAP prediction. However, feedback from householders contacted in this work (all from the south west) suggests that predicted and actual use are markedly different. In some cases RdSAP predicted double what householders reported that they actually use.

This may be a true reflection of the situation (self-reported energy consumption is not always a reliable guide to actual consumption) and occupancy of the households in question may have been entirely different to the assumptions of the RdSAP model. However, if the EPC is markedly over or under estimating consumption and/or there is a perception that it is, because the assumptions are not made absolutely clear, then its credibility may be damaged. The EPC table showing estimated energy use is shown in Figure 4.

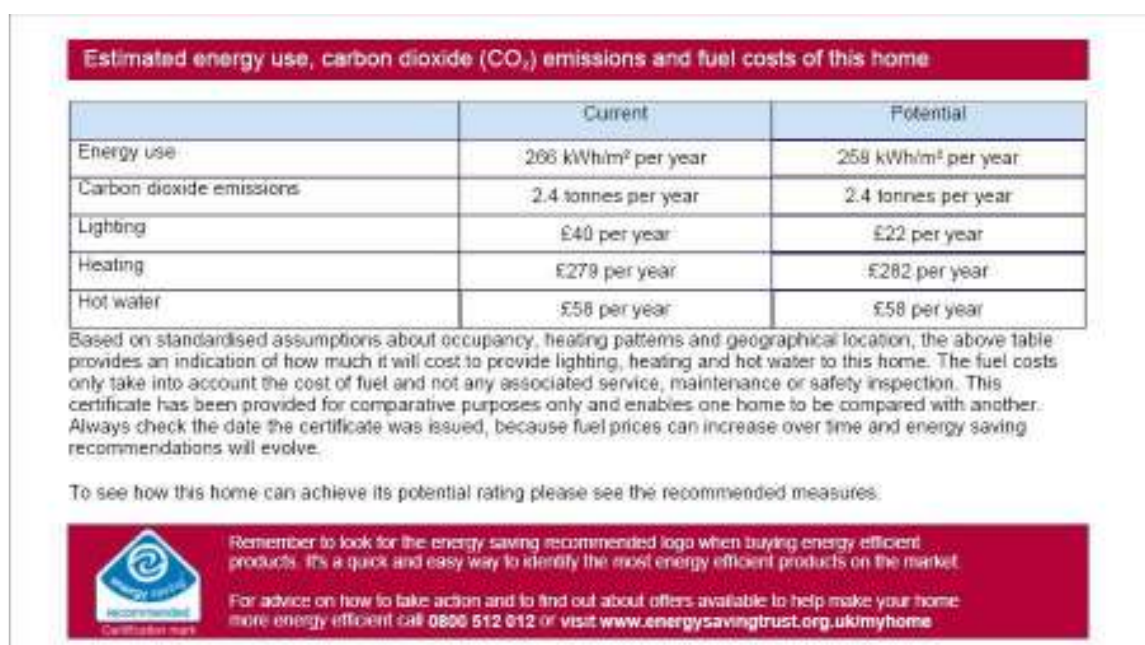


Figure 4: Estimated energy use section of the EPC

The certificate as shown in Figure 4 does contain wording which states that the figures are based on 'standardised assumptions about occupancy, heating patterns and geographical location' and that it provides an indication 'for comparative purposes'. However, the heading for the section, 'Estimated energy use, carbon dioxide (CO₂) emissions and fuel costs for the home' suggests that the figures include all energy use whilst elsewhere in the certificate there is no mention of the exclusion of appliances. There is also no statement of what the standardised occupancy and location assumptions are - only a link later in the certificate to the opening page of the EPBD pages on the CLG website²⁴. A householder would have to be extremely persistent to follow the myriad web links to gain access to the required information from this starting point.

13. The EPC should be clearer about what the calculation covers (ie not the costs of energy used in appliances or moveable lighting) and state the assumed occupancy and location, so that householders can adjust their expectations accordingly. It should also state that the house is assumed to be warm

²⁴ www.communities.gov.uk/epbd

(21/18oC) and that the occupants have a comparably high standard of hot water. Where this is not the case in practice, the savings will be over-estimated.

Inclusion of location in estimate of savings and running costs

An alternative approach to providing clearer qualification of the EPC results is to actually factor in the location of the building to the estimates of running costs or savings so that a more accurate reflection of actual running costs is provided. For example, the NHER domestic energy rating system accounts for location and also includes an estimate of the running costs of appliances.

It is not proposed that the SAP rating itself is adjusted depending on location as this could generate confusion and make comparison more difficult – only that estimates of running costs and savings provided in the certificate reflect the location of the home. In other words, two identical homes – one in the south west and one in the north east should still receive the same SAP rating. However, the colder climate of the north east and consequently the higher running costs of a home there should be shown in the certificate (as would proportionally higher savings from measures).

Adjusting predicted costs and savings by location using degree days will still permit nationwide comparison of the energy performance of the building on the SAP rating scale (which will remain unchanged), but give the estimated savings figures additional credibility because they will more accurately reflect reality.

14. It is recommended that BRE and CLG review the feasibility of accounting for location in the calculations of estimated running costs and savings (not the SAP rating itself).

A standard figure for energy used by appliances could also be factored in to give a more accurate assessment of overall energy use – if energy use from appliance is relatively invariant. Again it is not proposed that appliance energy use is included in the SAP rating itself.

15. Review feasibility of including energy used by appliances in the overall assessment of household energy use. Alternatively, the EPC should be clearer that appliance energy use is not included so that householders can adjust their expectations accordingly.

If appliance use is not included in subsequent revisions of RdSAP, there should be a clearer statement that appliances are not included and perhaps a short statement indicating where further guidance on choosing efficient appliances may be found.

SAP ratings after measures

SAP scores are calculated from an Energy Cost Factor (ECF) according to a logarithmic relationship. The SAP scale of 1 to 100 is designed so that homes which have essentially no heating, lighting or hot water costs due to extreme efficiency receive an ECF of 0 and a corresponding SAP of 100. If the home is a net energy exporter then the ECF becomes negative and the SAP rating increases beyond 100. However, ratings beyond 100 cannot be shown on the EPC. Conversely, if the home is very inefficient and costly to service then the ECF may be greater than 10 and the corresponding SAP rating will be a negative number – for example, an ECF of 11

would return a SAP rating of -3.55. Negative SAP ratings are also not shown on the certificate. Instead, any negative value is shown as a rating of 1(G).

The result of this is that in the case of very inefficient homes, implementation of efficiency measures will improve the theoretical SAP score (from, say -3.55 to 1), but the SAP score as shown on the certificate will remain unchanged. For example, in the case of a solid walled property heated by bottled gas using a pre 1979 boiler, the following cumulative measures:

- loft insulation;
- insulating the hot water cylinder;
- upgrading heating controls; and
- replacing the boiler with a modern condensing type.

will have no effect on the SAP score as shown on the certificate. The reported SAP score will remain at 1. This is despite these measures, according to RdSAP and reported on the EPC, resulting, in this example, in around £2000 worth of savings. This situation has a number of consequences.

Firstly, householders may question the credibility of the certificate if it seems to report that significant financial savings from measures (which are reported on the certificate) do not, apparently, result in any changes or only very insignificant changes to their SAP score or rating.

Secondly, although there are evidently financial savings to be made from the measures, householders may be demoralised if they perceive that despite spending thousands on improvements they can make no impact on their SAP score.

Thirdly, assuming that EPC rating/SAP scores are to be used as a basis for a range of integrated policy measures intended to transform existing stock, then the current scale as used on the certificate has serious shortcomings. For example, if stamp duty were to be linked to a SAP improvement then the current position would discourage those with the least efficient homes to take action, because implementing efficiency measures would have no effect on the score. Conversely, it would also discourage those with the most efficient homes from going one step further to become net energy exporters because this would also not be recognised in the certificate by the existing arrangements.

16. It is recommended that the feasibility of displaying actual SAP scores (derived from the ECF) on the certificate is investigated. This will allow SAP scores greater than 100 and less than 0 to be shown to lie in the 'A' and 'G' bands respectively. This will make visible, and therefore clarify, the effect of energy performance improvements at the extreme ends of the scale and address the issue of the EI and SAP scales being differently calibrated (see recommendation 17).

Calibration of CO₂ and SAP scales

The CO₂ and SAP scales on the EPC are calibrated in different ways. This situation may lead to some puzzling results for the householder. For example, as discussed above, the SAP score may not change or only change insignificantly as a result of implementing measures. In contrast, the same efficiency measures have an immediate effect on the reported environmental impact ('EI' or CO₂ score).

Consequently the householder can see that implementing efficiency measures (not necessarily fuel switching) improves their CO₂ scores, but has no effect on their SAP scores.

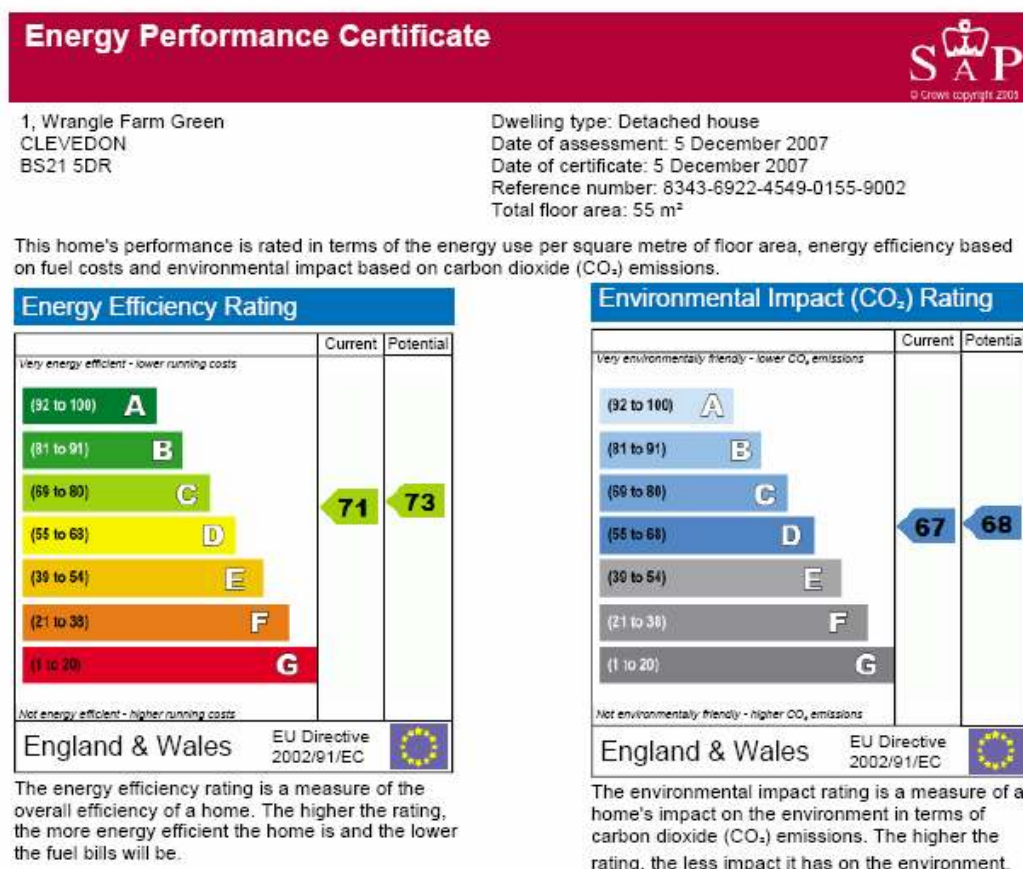


Figure 5: EPC bar charts section showing the EI and SAP scales

An explanation at the bottom of this section of the EPC states that 'improvements to energy efficiency and environmental impact ratings will usually be in step with each other. However, they can sometimes diverge because reduced energy costs are not always accompanied by a reduction in CO₂ emissions'. This is evidently true. For example, switching from expensive bottled gas to cheaper mains gas would have this effect ie there would be an improvement in the SAP score (mains gas is cheaper per kWh), but the EI would remain the same (the same amount of CO₂ would be emitted per kWh).

However, this is not what is happening in those cases where efficiency (not fuel switching) measures generate fossil-fuel based kWh reductions and CO₂ emissions consequently fall. The SAP rating remains the same or barely changes, whilst the EI rating significantly improves. For example, a solid-walled home heated by LPG burnt in a standard boiler has a reported SAP of 1 (in fact it will have a negative SAP rating) and an EI of 1 also. Addition of loft insulation and switching the boiler to a condensing type will result in no change to the apparent SAP rating, but an increase in the EI to 8. This is the result of the SAP and EI scales being differently calibrated and a further argument for changing the G category to show negative SAP values and the A band to show SAP scores better than 100.

This apparent anomaly whereby improvements on the EI scale are not shown on the SAP scale may lead to confusion and undermine the credibility of the EPC.

17. Investigate the feasibility of ensuring that the EI and SAP scales are calibrated, so that improvements at the extreme ends are reflected in both scales.

CO₂ versus cost

The EPC shows A to G ratings for SAP alongside CO₂ emissions (EI scale). In some situations, such as where a house is heated by wood, the SAP rating will be markedly different to the CO₂ rating²⁵. It is important that policymakers are clear about whether their objective is carbon reduction or SAP improvement and therefore that they carefully select which scale to base policy around.

The issue of calibration between the SAP and EI scales described above also suggests that in some circumstances the same efficiency measure (not a fuel switching measure) could move the EI scale a number of points whilst the SAP scale would remain unchanged. In this situation, if tax incentives are linked to changes in EI then taking an efficiency measure is encouraged. If the tax incentives are linked to a change in SAP then there is no encouragement for the measure.

The house 'potential'

The potential improvement level that the house may achieve changes as certain efficiency measures are added to it as part of the specification. For example, a base case mains-gas-heated, solid-walled, Victorian house has a SAP of 12 and a potential SAP of 37. If external insulation is added to the walls the SAP improves to 30 but the potential changes also – to 56.

It might be expected that the maximum technical potential should remain unchanged and that cumulative addition of efficiency measures simply brings the house closer to that potential. The explanation for the shifting of technical potential SAP and EI scores (as shown on the bar charts on the EPC) is that the potential is based only on the low and high 'cost effective measures' *not* the less cost effective, 'further' measures. 'Further' measures such as solar technologies, external solid wall insulation and double glazing are not included in the calculation of potential printed on the EPC. The various categories of recommendation are shown in Figure 6.

²⁵ In SAP 2005 wood fuel is expensive per kWh compared with gas or oil therefore a house using wood as its primary heating fuel would have a poor SAP rating and a good CO₂ rating.

Recommendations

The measures below are cost effective. The performance ratings after improvement listed below are cumulative, that is they assume the improvements have been installed in the order that they appear in the table.

Lower cost measures (up to £500)	Typical savings per year	Performance ratings after improvements	
		Energy efficiency	Environmental Impact
1 Low energy lighting for all fixed outlets	£15	C 73	D 68
Sub-total	£15		
Higher cost measures			
None			
Total	£15		
Potential energy efficiency rating		C 73	
Potential environmental impact (CO ₂) rating		D 68	

Further measures to achieve even higher standards

The further measures listed below should be considered in addition to those already specified if aiming for the highest possible standards for this home.

Higher cost measures			
2 Solar photovoltaics panels, 25% of roof area	£29	C 75	C 71
Enhanced energy efficiency rating		C 75	
Enhanced environmental impact (CO ₂) rating		C 71	

Improvements to the energy efficiency and environmental impact ratings will usually be in step with each other. However, they can sometimes diverge because reduced energy costs are not always accompanied by a reduction in carbon dioxide (CO₂) emissions.

Figure 6: Low and high cost effective measures and 'further' measures

Consequently, when a 'further' type measure is added to a property (eg external wall insulation as in the example above) the actual SAP increases and the potential technical SAP increases by the same amount – the 'cost effective' potential as shown in the bar graphs simply sits on top of any improvements brought about by the addition of non-cost effective 'further' measures.

By contrast, when the low and high cost 'cost effective' measures are installed to a base case there is no, or very little change to the potential – as might be expected. This gives the impression that the potential benefits to a home can increase as a result of the installation of certain measures, but not others. This can be very confusing for those wishing to interpret the certificates and may place doubt in the minds of those using the information as to their credibility.

The full technical potential is shown in the recommendations section for 'further' measures. For example, in Figure 6 above the full technical potential SAP rating (described as the 'enhanced energy efficiency rating' on the EPC) is calculated as 75. This is to be achieved using solar photovoltaic panels. This compares with the potential efficiency rating using only the cost effective measures of 73.

The EPC would be much clearer if the enhanced energy-efficiency rating were used to illustrate the full technical potential of the house. In addition, it can be argued that the technical potential of the house (using currently 'non-cost effective' measures) is the true potential of the house.

In this respect, the EPBD directive does not state how the potential of the building should be calculated. It states only that, 'the certificate shall be accompanied by recommendations for the cost-effective improvement of the energy performance'²⁶.

Inclusion of distributed energy measures (such as solar thermal and photovoltaics - PV) in the assessment of the home's potential seems more in line with current government (and EU) policy which seeks to encourage micro-generation in the domestic sector.

For example, the government's Energy White Paper (2007) particularly identifies improvement of the householder's information environment with respect to distributed energy generation as a key policy aim. Therefore inclusion of micro-generation technologies in the assessment of the house's 'potential' seems congruent with this aim²⁷.

In any event, the cost effectiveness of 'further' measures should be continually reviewed as prices of fossil fuels increase and the capital cost of solar and other technologies comes down.

18. The feasibility of use of the full technical potential (enhanced efficiency rating) in the presentation of the homes 'potential' in the asset rating should be investigated. In the meantime, the certificate should make it clearer that only the 'cost-effective' measures are used in the calculation of potential shown in the bar charts (asset rating).

Further discussion of the assumed cost effectiveness of distributed renewable technologies is given below.

Solar Hot Water System savings

There also appears to be an issue with RdSAP's estimated savings from solar hot water. These estimated savings seem very conservative. BRE guidance²⁸ states that solar hot water systems should save between 40-60% of a typical home's domestic hot water energy demand. Calculations in RdSAP typically generate estimates much less than that. For example, in scenarios run in this study, RdSAP calculates the potential contribution of a SHWS when displacing oil fired water heating as 15%, when displacing LPG as 16% and when displacing electrically heated water (economy 7) as 29%.

²⁶ Energy Performance in Buildings Directive **2002/91/EC**, Article 7 paragraph 2. Available at: http://eur-lex.europa.eu/LexUriServ/site/en/oj/2003/l_001/l_00120030104en00650071.pdf

²⁷ See the government's Energy White Paper (2007) page 97 at www.berr.gov.uk/files/file39567.pdf

²⁸ eg CE102 – 'New and renewable energy technologies in existing housing' available at: www.energysavingtrust.org.uk/uploads/documents/housingbuildings/CE102%20-%20New%20and%20renewable%20energy%20technologies%20for%20existing%20housing.pdf

Fuel type/system	RdSAP calculated water heating cost (A)	RdSAP calculation of potential SWHS saving (B)	RdSAP calculation of % saving on fuel from SWHS (B/A*100)
Electricity fuelling dual immersion water cylinder	£244	£70	29%
LPG fuelled boiler heating water indirectly	£240	£39	16%
Oil fuelled boiler heating water indirectly	£162	£24	15%

Table 1: RdSAP estimates of savings from SWHS

19. It is recommended that SAP modelling of solar hot water system output is reviewed.

PV systems savings

RdSAP calculates savings for PV based on an assumed system occupying 25% of the roof area. For a typical Victorian terraced home with a pitched roof and a plan area of around 55m², savings from a PV system are estimated at around £40 per annum (including VAT).

According to published guidance, 25% of a pitched roof area of this size (around 66 m²) would easily accommodate around 2 kW_{peak} of monocrystalline array²⁹. Assuming 750kWh³⁰ per kW_{peak} suggests a figure of 1500 kWh per annum generated by an array of this size. At current electricity prices of around 10 pence per kWh the system should generate savings of around £150 / annum. Evidently this is nearly a factor of 4 different to the figure provided on the EPC³¹. Therefore, on first inspection, the SAP estimate is very conservative figure and is hardly an encouragement for householders to install this measure. The study has spent some time analysing why this is the case.

The SAP figure is based on an assumed output of 750 kWh per kW_{peak} which is conservative but reasonable. Savings are then adjusted to reflect the approximate quantity of energy generated by the system which is used on site (thereby displacing electricity that would have to be bought from a supplier) and that which is exported to the grid and therefore is sold at the price that energy suppliers are assumed to be prepared to pay for it from micro generators³². The split between the system's output that is consumed on site and that which is exported to the grid is determined by a factor. At present this is 0.3 - ie SAP assumes that only 30% of the system's output is consumed on site and the rest is exported to the grid. Using this factor generates an 'effective' price for the electricity savings from PV.

²⁹ e.g. CE102, op cit.

³⁰ This is the figure assumed by SAP 2005

³¹ In addition, 10 p/kWh does not include further savings resulting from sale of ROCs. However negotiating the paperwork to take advantage of ROC sales is complex.

³² See appendix M of SAP 2005

When calculating estimated savings from PV to report in the EPC both the imported and exported electricity prices are based on data that is updated every 6 months – ie not the table 12 data but data from a source such as Sutherland tables. Bearing this in mind, it is therefore puzzling that the estimated savings still seem so low. However, under proposed revisions to SAP 2005, there will be some changes that will increase the projected savings. The quantity of PV output consumed on site will be increased from 30 to 50% (therefore a larger proportion of the system output will displace higher cost imported electricity) and the annual energy generated per kW_{peak} will be increased from 750 to 800 kWh.

Proposed revisions to SAP2005 should also increase the influence of a PV array on the SAP rating. When calculating the SAP rating the values for imported and exported electricity are drawn from table 12, however in the proposed revisions to SAP 2005³³, the exported value will be “pegged to 80% of the standard tariff to take account of changes in the position adopted by electricity suppliers since the publication of SAP 2005”³⁴. This will increase the export price from the current value of 3p/kWh to 5.7p/kWh³⁵. This will have the effect of increasing the contribution to SAP scores made by PV.

20. Review the pricing and assumptions for calculating PV savings or state clearly the basis for the estimate indicating that greater savings may be possible – for example if ROCs are claimed.

PV recommendation text

The approved text to accompany the recommendation for PV is shown in Figure 7.

About the further measures to achieve even higher standards

Further measures that could deliver even higher standards for this home.

2 Solar photovoltaics (PV) panels
 A solar PV system is one which converts light directly into electricity via panels placed on the roof with no waste and no emissions. This electricity is used throughout the home in the same way as the electricity purchased from an energy supplier. The British Photovoltaic Association has up-to-date information on local installers who are qualified electricians and any grant that may be available. Planning restrictions may apply in certain neighbourhoods and you should check this with the local authority. Building Regulations apply to this work, so your local authority building control department should be informed, unless the installer is registered with a competent persons scheme¹, and can therefore self-certify the work for Building Regulation compliance. Ask a suitably qualified electrician to explain the options.

¹ For information on competent persons schemes enter “existing competent person schemes” into an internet search engine or contact your local Energy Saving Trust advice centre on 0800 512 012.

Figure 7: PV text

This text makes no mention of the assumed demand profile behind the estimate of savings, which may not accurately reflect the reality, nor that demand can be shifted (for example by running washing machines, ovens etc during daylight hours). The

³³ Scheduled for April 2008

³⁴ Brian Anderson, BRE, pers.comm.

³⁵ Scottish and Southern are currently offering 18 pence per kWh for electricity generated by domestic PV and exported to the grid. See: http://www.scottish-southern.co.uk/SSEInternet/index.aspx?id=10612&TierSlicer1_TSMMenuTargetID=1362&TierSlicer1_TSMMenuTargetType=1&TierSlicer1_TSMMenuID=6

recommended text also makes no mention of the potential to claim ROCs: a number of suppliers pay for renewably-generated electricity, whether it is used on site or exported, and thus purchase the ROCs. This transforms the economics of PV.

21. Amend the recommendation text for PV so that the basis for calculation of savings is clearer and an indication is given that greater savings are possible.

It is important that householders are incentivised to buy into micro-generation technologies, once more cost-effective energy-efficiency measures have been implemented. At present the certificate design and current SAP assumptions do very little in this respect.

Selection of measures on EPC

RdSAP will only make a recommendation if it results in an increase of the SAP rating of at least one point (or 0.5 points for low energy lighting). This is to avoid making a recommendation that “does virtually nothing in practical terms”³⁶. As SAP is based on a calculation of the financial costs of servicing a home, this will tend to promote measures that generate financial savings in absolute terms rather than measures which necessarily have a good payback or which save carbon.

Therefore, depending on circumstances, this threshold criterion can result in measures such as solar hot water systems and low energy lighting not being recommended in the EPC certification. For example SWHS are generally not recommended where the domestic hot water is heated by mains gas – ie in the majority of situations.

Solar Hot Water Systems

Evidently, the cost effectiveness of a solar hot water system is reduced when it is displacing mains gas as opposed to more expensive fuels such as electricity. However, PV is always recommended in the RdSAP model, regardless of circumstances, despite having a longer payback than solar hot water (regardless of whether the solar hot water system is displacing gas or electricity). This appears to be an inconsistency. Both technologies are categorised as not cost effective - yet one is always recommended and the other is frequently not recommended.

Solar hot water is probably the most mature and cheap micro-level renewable energy technology. It is unfortunate that the recommendation for its installation is not made when domestic hot water is heated by mains gas, as this is the situation for the vast majority of UK householders.

22. The EPC certificate should always recommend SWHS as it already does with photovoltaics (which have a significantly longer payback). It should be left to the householder to make a judgement as to whether they wish to pursue the recommendation further.

Low Energy Lighting

Low Energy Lighting is not recommended when RdSAP calculates a high Energy Cost Factor - for example when the home is heated expensively using bottled gas or coal.

³⁶ Brian Anderson, BRE, pers. comm.

It is assumed that this is because RdSAP trades off the loss of secondary heating gains (from replacing incandescent bulbs with LEL) with the energy otherwise required to heat the home from the heating system. This begs the question whether it is really cheaper to light and heat the home effectively with incandescent light bulbs than with expensive fuels burned in a heating system plus LEL.³⁷

As with SWHS the threshold criterion of 0.5 SAP points is being applied by SAP and in some circumstances LEL does not meet the threshold. This is despite LEL having a reasonable payback and significant savings over the lifetime of the bulb. It is argued that the recommendation for LEL in these circumstances should still be made but should be included in the 'further' section.

List of measures available for recommendation

RdSAP draws its recommendations from a selected list classified into three categories – low cost, high cost and 'further'. Some commonly considered measures are not included in the list. These include ground source heat pumps, heat recovery ventilation and floor insulation. SAP 2005 can model floor insulation and ground sourced heat pumps, therefore it is surprising that they do not appear on the list of potential measures. Ground source heat pumps in particular are often appropriate for situations where there is no mains gas available.

23. Subsequent revisions of RdSAP could usefully consider a wider range of technologies for recommendation than currently included in the model. These should include ground source heat pumps, heat recovery ventilation and underfloor insulation. Domestic scale wind turbines might also be considered once the results of the current field trials are known.

Conclusion on measures selection

One could argue that the purpose of the EPC is to improve the energy performance of buildings, rather than to save money on running costs in absolute terms and that therefore even where SAP calculates a marginal increase resulting from a measure the recommendation should still be included in the EPC. It is then down to the householder to make a judgement as to whether to install the measure given an indication of its respective financial and carbon savings.

Where a measure, such as LEL does not meet the criteria for inclusion in the cost effective measures (ie its installation results in a SAP increase less than 0.5) it would be beneficial to still make a recommendation for it in the 'further' category of recommendations. SWHS are already classified as a 'further' measure.

24. Review feasibility of including measures which may not significantly add to SAP because of the circumstances of the particular building (but which do have a good payback or save significant quantities of carbon) in the 'further' section of recommendations.

³⁷ As homes become more energy-efficient and the heating season is shorter, then the benefits of LEL will be greater, as a higher proportion of their use will be outside the heating season.

SAP/RdSAP can overestimate U values for particular fabric elements in refurbishment situations where reasonably high specifications are adopted. For example, to simplify data entry, RdSAP assumes that any double glazing installed after 2002 in England and Wales will have a U value of 2. Many double glazing systems can be much lower than that – down to 1.4 or less. There is also no option for specifying triple glazing.

Similarly, in RdSAP, external insulation on a solid brick wall is assumed to be 70mm thick and to deliver a U value of around 0.6. External insulation systems can be thicker than that and use materials that deliver greater thermal resistance. For example, 60mm of polyurethane board (eg Celotex) with 10mm of render (ie an insulating layer 70 mm thick) on a 200mm solid brick wall will return a U value of 0.347³⁸ – nearly half of the U value used in the RdSAP calculation (0.6).

This situation penalises the exemplar homes, which have started out as very inefficient and undergone extensive and expensive refurbishment using high specification materials to improve performance. Precisely the homes that the EPBD is seeking to target to generate maximum energy savings.

The solution to these issues would be to allow the RdSAP assessor to manually enter U values for known fabric constructions or to have a greater number of options available in the data entry screens (for example, allowing different depths of external insulation to be entered). However, this would effectively undermine one of the principle objectives of RdSAP – to simplify the data entry procedure and allow the software to make assumptions. Allowing manual entry of U values etc is essentially how conventional SAP 2005 is set up. Moving to a system where more complex judgments on the quality and quantity of fabric materials can be specified will require additional training for assessors, but is perhaps a valid longer-term goal if the system is to deliver improved accuracy and credibility.

The current arrangements for non-domestic EPCs recognize that there are different levels of complexity in the non-domestic stock and that consequently different levels of training and qualification are required. An analogous system could be employed for domestic EPCs where complex homes or other special cases could undergo a full SAP assessment. Who would decide whether a home fitted the criteria for a full SAP assessment (and therefore a more expensive assessment) remains to be considered.

25. The RdSAP data entry procedures could be reviewed with a view to allowing greater flexibility and more options to be built into subsequent versions of the scheme. The additional training for assessors that this would entail must be considered.

RdSAP conventions

Various RdSAP conventions can lead to anomalous or simplified results which may conceivably damage the credibility of the scheme. These include:

- *heated* conservatories are ignored (not included in the floor area of the house) if an 'external grade' door links the conservatory with the main house. This convention will tend to underestimate the heating costs of the home and therefore attribute a higher SAP score than is justified;

³⁸ Calculated using NHER U Value calculator version 1.0.9 (2006 issue)

- only insulation at joist level is considered in the model. Insulation at rafter level (eg Celotex board lining the rafters of a roof space) is ignored;
- floor insulation is not modeled;
- there is no means of specifying different types or depths of external wall insulation;
- rooms in the roof are defined by whether there is a solid staircase rather than some other means of reaching the converted space - a heated room in the roof would be ignored if it were reached by a ladder. The result of this is that RdSAP will tend to underestimate the home's actual heating costs if a room in the roof was accessed through something other than a solid staircase. However, as rooms in the roof are generally used for guests and are therefore only sporadically heated this is probably not a significant issue;
- if less than 50% of the radiators have TRVs, any installed TRVs are ignored.

These conventions have been put in place to simplify the data entry process; however there is a danger that oversimplification results in inaccuracy and therefore damage to the scheme's credibility. It is argued elsewhere that as the scheme matures and the profession of DEA becomes more established, RdSAP can afford to loosen some of its conventions and increase its sophistication. As it does so, DEAs can keep abreast of changes through CPD. This will ultimately improve the scheme by making assessments more accurate and encourage DEAs to remain assessors as their job will evolve and grow with them.

Use of the software

Training of DEAs

The requirements of the EPBD have dictated that large numbers of EPCs must be delivered in a short space of time. This has necessitated training a large number of people to issue the certificates, many of whom may have no prior experience of buildings and energy issues.

An inexperienced DEA may struggle to make sound judgments in 'grey area' situations. Therefore the software has been designed to minimise the number of judgement calls and to simplify the data entry process.

The balance that must be struck is between providing a means of assessment which is quick, generates results which are comparable, replicable and can be undertaken by an individual who may not be an experienced energy assessor and which are accurate. In some instances it might be argued that the system has sacrificed too much accuracy for the sake of consistency and ease of data entry.

As the scheme matures and DEAs become more experienced, it should be possible to deepen the sophistication of RdSAP perhaps moving to assessment using full SAP. DEAs can undertake the additional training required to deliver a more sophisticated scheme as part of their continuing professional development. New DEAs will have to undergo a more lengthy (and expensive) training procedure. However, this may have the effect of deterring those who may have thought that issuing EPCs was a get-rich-quick scheme.

Making and removing recommendations

The software is designed to make assumptions based on the age of the property, its fabric and services. Occasionally this can generate recommendations which may be

inappropriate. DEAs can remove recommendations they feel to be inappropriate, but cannot add recommendations to what RdSAP suggests. This can occasionally lead to situations where a DEA cannot issue a certificate containing needed recommendations. For example, if a house is built after 1983, the software assumes that its cavity walls have been filled. The DEA may know that in fact this is *not the case*, but cannot make the recommendation to fill the walls – because DEAs are not considered qualified to make this judgement and RdSAP's recommendation process is inviolable. However, in a case like this the DEA could add a note to his official EPC stating that the walls should be cavity filled. Although the owner of the EPC (the seller) might see this, it is unlikely that the unofficial guidance would be passed on to the prospective buyer. The problem of not being allowed to make an appropriate recommendation should be addressed, when data entry becomes more flexible and sophisticated.

Qualified recommendations

There is no scope within the current system to make qualified recommendations. There are some situations in which this would greatly benefit the scheme. For example, if the DEA finds any condensation on the rafters they are instructed to remove the recommendation for any further loft insulation. An option in the software, to make a qualified recommendation such as 'improve ventilation then add further loft insulation', would address this. As loft insulation is the single most effective energy efficiency measure it would be a pity if the EPC were not able to do more to encourage its application.

Similarly, if any pointing seems to be damaged by interstitial condensation the DEA is expected to remove the recommendation to install cavity wall insulation rather than make the qualified recommendation, 'ensure cavity is well ventilated and install cavity wall insulation'.

A third example concerns mains gas. In situations where a home has access to mains gas, but for whatever reason the gas meter has been disconnected, then the DEA's are trained to indicate to RdSAP that mains gas is 'not available'. At present, use of mains gas as a heating fuel, compared with electricity or solid fuel, is one of the most effective means of increasing a home's SAP rating. If it is available (through simply reconnecting the supply at the meter) then tenants and homeowners should be encouraged to reconnect their supply through recommendations in the EPC. In addition, indicating that mains gas is not available will have profound effects on the recommendations that RdSAP will generate for the property. Some of these may be inappropriate given that the single best thing to be done in this situation is to simply reconnect the gas main. A qualified recommendation should be possible, such as, 'ensure that the house can be safely reconnected to the gas main by calling a CORGI registered fitter and then reconnect'.

These qualified recommendations could be easily generated by the software. It only remains for the training to cover these areas.

26. Future revisions of RdSAP could include provision for qualified recommendations to be made. Specific examples where this would benefit the scheme are increasing ventilation to lofts and cavities prior to insulation measures and reconnecting mains gas where possible.

Final conclusions

The objective of EPCs is to allow comparison of the energy performance of buildings and to facilitate a reduction in the energy use of EU buildings, through a range of integrated policy measures. The study has revealed a number of ways in which the domestic EPC, triggered by the sale of domestic property, is not delivering this objective as effectively as it might. A range of issues have been identified some of which indicate serious concerns with the existing arrangements.

It is clear that RdSAP is a relatively blunt instrument. However, it could be argued that it was necessarily so to allow the vast number of EPCs required to be generated reliably and comparably. Now that sufficient DEAs have been trained to deliver the workload, CLG can revise RdSAP to make it more sensitive and accurate. Some structural features of the system also need to be addressed, for instance showing the actual SAP rating of the property, even it is below 0 or above 100.

The study has also found a number of serious shortcomings in the procedural aspects of the scheme. These range from non-compliance (agents are not publishing EPC graphs in particulars) to more 'cultural' issues (solicitors lack of trust in personal searches resulting in little motivation to request complete HIPs, and therefore EPCs, on behalf of clients). A number of recommendations have been made which aim to tackle these shortcomings.

There are clearly numerous unanswered questions and directions for further research. In particular the study has not discussed how the EPC can be used as part of an integrated package of policy measures. Instead it has concentrated on highlighting areas where the existing scheme can be improved.

It is hoped that this study will provide some insights in constructing the policies for market transformation of domestic buildings. The EPC should form the basis of that market transformation, as has its energy-label equivalent in the appliance industry.

Acronyms

BRE	Building Research Establishment
CLG	Communities and Local Government
CPD	Continuing Professional Development
DEA	Domestic Energy Assessor
EI	Environmental Impact
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
FAERO	Federation of Authorised Energy Rating Organisations
HCR	Home Condition Report
HIP	Home Information Pack
LEL	Low Energy Lighting
NHER	National Homes Energy Rating. National energy rating organisation. Trains and accredits SAP assessors
PV	Photovoltaics
RdSAP	Reduced data SAP – version of the SAP energy performance calculation software developed by BRE which requires less data inputs than full SAP to make assessments of the home's energy performance
RICS	Royal Institute of Chartered Surveyors
ROC	Renewable Obligation Certificate
RRN	Report Reference Number
SAP	Standard Assessment Procedure. SAP is the government approved method for assessing the energy performance of domestic property
SHWS	Solar Hot Water System

Appendix 1: Some unanswered questions

The study has not focussed on EPCs triggered by rental agreements or construction of buildings. Both are areas requiring their own detailed study.

Some specific questions that could be explored in subsequent work are:

- How are social housing landlords planning for EPCs – are they going to have EPCs generated for their housing stocks en masse or only as and when they are required when a property become available for rent? What is cheaper and what are the implications of having an EPC that may be up to ten years old?
- Who are the network of actors involved and what are their relationships – eg NHER, energy supply companies, FAERO, HIPs providers, BRE, RICS, estate agents and professional associations. Do these relationships have a bearing on how the EPC is presented and marketed – for example energy supply companies such as British Gas are training large numbers of DEAs. How are these British Gas DEAs going to maintain their professional integrity whilst still promoting British Gas offers and services? How will British Gas EPCs be presented to the customer – in a wallet with publicity materials signposting British Gas grant offers etc? At what point does this transgress the rules on independence?
- How are housing developers planning for EPCs for new build? Is there any evidence that they will respond differently than for the requirement since 2002 to display a SAP certificate, which is rarely implemented.
- How are the energy supply companies looking to use the opportunities/awareness raising from EPCs to sell their services and hit their EEC targets?
- Do conflicts of interest arise and how are they resolved – for example estate agents in contractual/long term relationships with HIP/EPC providers may 'encourage' the DEA to give the benefit of the doubt to improve ratings of homes they are selling? DEAs doing in-house assessments for social landlords of the stock also have a potential conflict of interest.
- Are/will social housing landlords/private landlords changing their procurement and maintenance regimes to target improvements in the EPC rating?

Appendix 2: Example EPC

Energy Performance Certificate

1, Wrangle Farm Green
CLEVEDON
BS21 5DR

Dwelling type: Detached house
Date of assessment: 5 December 2007
Date of certificate: 5 December 2007
Reference number: 8343-6922-4549-0155-9002
Total floor area: 55 m²

This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating

	Current	Potential
Very energy efficient - lower running costs		
(92 to 100) A		
(81 to 91) B		
(69 to 80) C	71	73
(55 to 68) D		
(39 to 54) E		
(21 to 38) F		
(1 to 20) G		
Not energy efficient - higher running costs		

England & Wales
EU Directive 2002/91/EC

Environmental Impact (CO₂) Rating

	Current	Potential
Very environmentally friendly - lower CO ₂ emissions		
(12 to 100) A		
(81 to 91) B		
(69 to 80) C		
(55 to 68) D	67	68
(39 to 54) E		
(21 to 38) F		
(1 to 20) G		
Not environmentally friendly - higher CO ₂ emissions		

England & Wales
EU Directive 2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating, the more energy efficient the home is and the lower the fuel bills will be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating, the less impact it has on the environment.

Estimated energy use, carbon dioxide (CO₂) emissions and fuel costs of this home

	Current	Potential
Energy use	266 kWh/m ² per year	258 kWh/m ² per year
Carbon dioxide emissions	2.4 tonnes per year	2.4 tonnes per year
Lighting	£40 per year	£22 per year
Heating	£279 per year	£262 per year
Hot water	£58 per year	£58 per year

Based on standardised assumptions about occupancy, heating patterns and geographical location, the above table provides an indication of how much it will cost to provide lighting, heating and hot water to this home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection. This certificate has been provided for comparative purposes only and enables one home to be compared with another. Always check the date the certificate was issued, because fuel prices can increase over time and energy saving recommendations will evolve.

To see how this home can achieve its potential rating please see the recommended measures.

Remember to look for the energy saving recommended logo when buying energy efficient products. It's a quick and easy way to identify the most energy efficient products on the market.

For advice on how to take action and to find out about offers available to help make your home more energy efficient call 0800 512 012 or visit www.energysavingtrust.org.uk/myhome

1, Wrangle Farm Green, CLEVEDON, BS21 5DR
5 December 2007 RRN: 8343-6922-4549-0155-9002

Energy Performance Certificate

About this document

The Energy Performance Certificate for this dwelling was produced following an energy assessment undertaken by a qualified assessor, accredited by the NHER Accreditation Scheme, to a scheme authorised by the Government. This certificate was produced using the RdSAP 2005 assessment methodology and has been produced under the Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007. A copy of the certificate has been lodged on a national register.

Assessor's accreditation number: NHER001434
Assessor's name: Mr Ian Shellard
Company name/trading name: Sustain Ltd
Address: 4 High Street, Wrington, Bristol, BS40 5QA
Phone number: 01934 863650
Fax number:
E-mail address: ian.shellard@sustain.co.uk

If you have a complaint or wish to confirm that the certificate is genuine

Details of the assessor and the relevant accreditation scheme are on the certificate. You can get contact details of the accreditation scheme from our website at www.nher.co.uk together with details of their procedures for confirming authenticity of a certificate and for making a complaint.

About the building's performance ratings

The ratings on the certificate provide a measure of the building's overall energy efficiency and its environmental impact, calculated in accordance with a national methodology that takes into account factors such as insulation, heating and hot water systems, ventilation and fuels used. The average energy efficiency rating for a dwelling in England and Wales is band E (rating 46).

Not all buildings are used in the same way, so energy ratings use 'standard occupancy' assumptions which may be different from the specific way you use your building. Different methods of calculation are used for homes and for other buildings. Details can be found at www.communities.gov.uk/epbd

Buildings that are more energy efficient use less energy, save money and help protect the environment. A building with a rating of 100 would cost almost nothing to heat and light and would cause almost no carbon emissions. The potential ratings in the certificate describe how close this building could get to 100 if all the cost effective recommended improvements were implemented.

About the impact of buildings on the environment

One of the biggest contributors to global warming is carbon dioxide. The way we use energy in buildings causes emissions of carbon. The energy we use for heating, lighting and power in homes produces over a quarter of the UK's carbon dioxide emissions and other buildings produce a further one-sixth.

The average household causes about 6 tonnes of carbon dioxide every year. Adopting the recommendations in this report can reduce emissions and protect the environment. You could reduce emissions even more by switching to renewable energy sources. In addition there are many simple every day measures that will save money, improve comfort and reduce the impact on the environment, such as:

- Check that your heating system thermostat is not set too high (in a home, 21°C in the living room is suggested) and use the timer to ensure that you only heat the building when necessary.
- Make sure your hot water is not too hot - a cylinder thermostat need not normally be higher than 60°C
- Turn off lights when not needed and do not leave appliances on standby. Remember not to leave chargers (e.g. for mobile phones) turned on when you are not using them.

Visit the Government's website at www.communities.gov.uk/epbd to:

- Find out how to confirm the authenticity of an energy performance certificate
- Find how to make a complaint about a certificate or the assessor who produced it
- Learn more about the national register where this certificate has been lodged
- Learn more about energy efficiency and reducing energy consumption.

Recommended measures to improve this home's energy performance

1, Wrangle Farm Green
CLEVEDON
BS21 5DR

Date of certificate: 5 December 2007
Reference number: 8343-6922-4549-0155-9002

Summary of this home's energy performance related features

The following is an assessment of the key individual elements that have an impact on this home's performance rating. Each element is assessed against the following scale: Very poor / Poor / Average / Good / Very good.

Element	Description	Current performance	
		Energy Efficiency	Environmental
Walls	Cavity wall, as built, insulated (assumed)	Good	Good
Roofs	Pitched, insulated (assumed)	Good	Good
	Pitched, 100mm loft insulation	Average	Average
Floor	Solid, no insulation (assumed)	-	-
Windows	Fully double glazed	Good	Good
Main heating	Boiler and radiators, mains gas	Very good	Very good
Main heating controls	Programmer, room thermostat and TRVs	Average	Average
Secondary heating	None	-	-
Hot water	From main system	Very good	Very good
Lighting	Low energy lighting in 20% of fixed outlets	Poor	Poor
Current energy efficiency rating		C 71	
Current environmental impact (CO ₂) rating		D 67	

1, Wrangle Farm Green, CLEVEDON, BS21 5DR
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Recommendations

Recommendations

The measures below are cost effective. The performance ratings after improvement listed below are cumulative, that is they assume the improvements have been installed in the order that they appear in the table.

Lower cost measures (up to £500)	Typical savings per year	Performance ratings after improvements	
		Energy efficiency	Environmental impact
1 Low energy lighting for all fixed outlets	£15	C 73	D 68
Sub-total	£15		
Higher cost measures			
None			
Total	£15		
Potential energy efficiency rating		C 73	
Potential environmental impact (CO ₂) rating		D 68	

Further measures to achieve even higher standards

The further measures listed below should be considered in addition to those already specified if aiming for the highest possible standards for this home.

Higher cost measures			
2 Solar photovoltaics panels, 25% of roof area	£29	C 75	C 71
Enhanced energy efficiency rating		C 75	
Enhanced environmental impact (CO ₂) rating		C 71	

Improvements to the energy efficiency and environmental impact ratings will usually be in step with each other. However, they can sometimes diverge because reduced energy costs are not always accompanied by a reduction in carbon dioxide (CO₂) emissions.

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Recommendations

About the cost effective measures to improve this home's performance ratings

Lower cost measures (typically up to £500 each)

These measures are relatively inexpensive to install and are worth tackling first. Some of them may be installed as DIY projects. DIY is not always straightforward and sometimes there are health and safety risks, so take advice before carrying out DIY improvements.

1 Low energy lighting

Replacement of traditional light bulbs with energy saving recommended ones will reduce lighting costs over the lifetime of the bulb, and they last up to 12 times longer than ordinary light bulbs. Also consider selecting low energy light fittings when redecorating; contact the Lighting Association for your nearest stockist of Domestic Energy Efficient Lighting Scheme fittings.

Higher cost measures (typically over £500 each)

None

About the further measures to achieve even higher standards

Further measures that could deliver even higher standards for this home.

2 Solar photovoltaics (PV) panels

A solar PV system is one which converts light directly into electricity via panels placed on the roof with no waste and no emissions. This electricity is used throughout the home in the same way as the electricity purchased from an energy supplier. The British Photovoltaic Association has up-to-date information on local installers who are qualified electricians and any grant that may be available. Planning restrictions may apply in certain neighbourhoods and you should check this with the local authority. Building Regulations apply to this work, so your local authority building control department should be informed, unless the installer is registered with a competent persons scheme¹, and can therefore self-certify the work for Building Regulation compliance. Ask a suitably qualified electrician to explain the options.

¹ For information on competent persons schemes enter "existing competent person schemes" into an internet search engine or contact your local Energy Saving Trust advice centre on 0800 512 012.

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This document has been prepared to enable results of on-going work to be made available rapidly. It has not been subject to review and approval and does not have the authority of a full Research Report.

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