Energy performance certificates for homes – the consumer perspective

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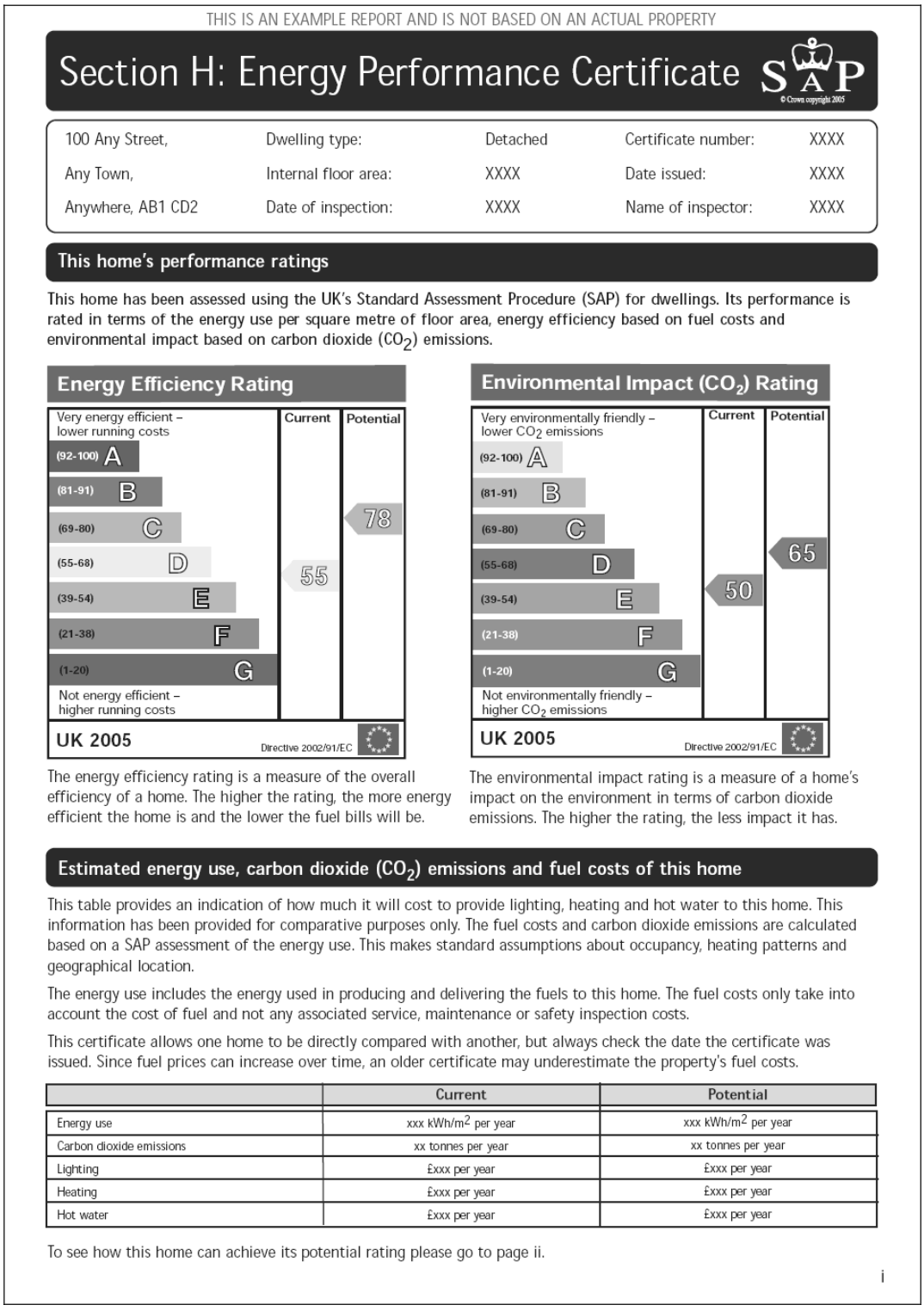
Abstract
In England and Wales, from June 2007, Energy Performance Certificates will be provided as part of a Home Information Pack whenever an existing home is sold, thereby complying with the requirements of the Energy Performance of Buildings Directive. The design and content of these certificates was the result of extensive research and consultation which was undertaken over a period of several years. The final design was completed early in 2006 and this was then subjected to testing in a consumer trial, in order to check the understanding and views of ordinary homebuyers, and thereby ensure that it was fit for purpose. This paper presents the main findings of the trial.

In the trial, Energy Performance Certificates were issued to participating homebuyers, who were then requested to complete and return a questionnaire that tested their understanding of, and views on, the various sections of the overall Energy Performance Certificate. One key result was that most people found the (A to G format) Energy Efficiency and Environmental Impact ratings contained within the certificate either easy or very easy to understand. Nobody reported finding them very difficult to understand. Equally, most respondents found the suggested measures to improve the home's energy performance easy or very easy to understand. Nobody reported finding them very difficult to understand. Overall, the majority of respondents thought the Energy Performance Certificate was interesting, easy to understand and useful. These very positive results suggest that the introduction of Energy Performance Certificates for homes in England and Wales will be welcomed by most consumers.

Introduction
In England and Wales, from June 2007, Energy Performance Certificates will be provided as part of a Home Information Pack whenever a home is sold, thereby complying with the requirements of the Energy Performance of Buildings Directive. The design and content of these certificates was the result of extensive focus group research with consumers, as well as consultation with interested parties from industry and academia, over a period of several years. The final design was completed early in 2006 and this was then subjected to testing in a consumer trial, in order to check the understanding and views of ordinary homebuyers, and thereby ensure that it was fit for purpose. This paper presents the main findings of the consumer trial.

The consumer trial made use of an existing proprietary system of energy reporting developed by Elmhurst Energy Systems Ltd. In this, an energy report is provided as part of an overall home survey, undertaken at the time of purchase, by Ekins surveyors. The idea was to offer to homebuyers who would be receiving such an energy report an additional report using the new Energy Performance Certificate format. If the homebuyer agreed to this offer, which was explained fully in a letter, the data collected for the existing energy report would be translated as necessary by Elmhurst to produce an Energy Performance Certificate. This Energy Performance Certificate would then be sent by Elmhurst to the homebuyer together with a questionnaire seeking their views and testing their understanding. To encourage homebuyers to complete and return the questionnaire to BRE for analysis, there was a prize draw,



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Section H: Energy Performance Certificate

SAP

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100 Any Street,	Dwelling type:	Detached	Certificate number:	XXXX
Any Town,	Internal floor area:	XXXX	Date issued:	XXXX
Anywhere, AB1 CD2	Date of inspection:	XXXX	Name of inspector:	XXXX

This home's performance ratings

This home has been assessed using the UK's Standard Assessment Procedure (SAP) for dwellings. Its 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 (CO_2) emissions.

Energy Efficiency Rating

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.

Environmental Impact (CO_2) Rating

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

Estimated energy use, carbon dioxide (CO_2) emissions and fuel costs of this home

This table provides an indication of how much it will cost to provide lighting, heating and hot water to this home. This information has been provided for comparative purposes only. The fuel costs and carbon dioxide emissions are calculated based on a SAP assessment of the energy use. This makes standard assumptions about occupancy, heating patterns and geographical location.

The energy use includes the energy used in producing and delivering the fuels to this home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection costs.

This certificate allows one home to be directly compared with another, but always check the date the certificate was issued. Since fuel prices can increase over time, an older certificate may underestimate the property's fuel costs.

	Current	Potential
Energy use	xxx kWh/m^2 per year	xxx kWh/m^2 per year
Carbon dioxide emissions	xx tonnes per year	xx tonnes per year
Lighting	£xxx per year	£xxx per year
Heating	£xxx per year	£xxx per year
Hot water	£xxx per year	£xxx per year

To see how this home can achieve its potential rating please go to page ii.

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Figure 1. *The front page of the Energy Performance Certificate as used in the consumer trials.*

with two prizes of vouchers for £ 500 (approx. 700 Euros) to spend on energy efficient products.

Altogether, 156 surveys were undertaken and 64 questionnaires (41 %) were returned. Although far too small a sample to be fully representative, the distribution of energy ratings was nonetheless found to be reasonably similar to that found in the entire stock. Moreover, there appeared to be no bias in the return of questionnaires depending on the dwelling rating. For example, although the questionnaire for the least energy efficient dwelling was not returned, neither was the questionnaire for the most energy efficient dwelling. Thus, the responses obtained in the questionnaires should broadly reflect the views of homebuyers across all standards of dwelling energy efficiency. The front page of the final design as used for the consumer trial is shown in Figure 1. [Note that the design that will actually be used from June 2007 differs slightly from this but only in a cosmetic way. It will use a larger font and will have a different overall colour scheme – red rather than blue - but the content will be essentially unchanged.]. This is the most important page as it presents the current ratings of the dwelling and what they could

Table 1. How easy is it to understand the Energy Efficiency Rating chart?

Reported rating		1 Very easy	2	3	4	5 Very difficult	Total
Correct	Count	61	35	11	0	0	107
	%	90%	80%	79%	0%	0%	83%
Incorrect	Count	7	9	3	2	0	21
	%	10%	20%	21%	100%	0%	17%
Total	Count	68	44	14	2	0	128
	%	100%	100%	100%	100%	0%	100%

Table 2. How easy is it to understand the Environmental Impact Rating chart?

Reported rating		1 Very easy	2	3	4	5 Very difficult	Total
Correct	Count	56	34	20	0	0	110
	%	88%	89%	83%	0%	0%	86%
Incorrect	Count	8	4	4	2	0	18
	%	12%	11%	17%	100%	0%	14%
Total	Count	64	38	24	2	0	128
	%	100%	100%	100%	100%	0%	100%

potentially be if improvements were made, as well as providing an indication of the present energy use, running costs and CO_2 emissions (using standard assumptions about how people use their homes). Further pages, discussed later, provide detail on the current standards of individual elements, list recommended improvement measures (split into "lower cost", "higher cost" and "further measures" with the effects on the ratings shown), provide guidance on the recommended measures, and present general information explaining the ratings and providing contact details, etc.

Consumer understanding of the ratings

The key feature of the Energy Performance Certificate, which consumers need to understand if the document is to serve its intended purpose, is the ratings. As shown in Figure 1, there are two different ratings presented.

The first of these is referred to as the Energy Efficiency Rating. It is based on the UK Standard Assessment Procedure (SAP) [(1)] which is derived from the cost of energy (for space heating, water heating and lighting) per unit floor area and ranges from 1 (extremely inefficient) to 100 (extremely efficient). This scale is shown on the Energy Performance Certificate but it is secondary to the A to G bands (the bands being defined by set ranges of SAP ratings). Focus group research had previously shown a clear consumer preference for the A to G approach, since this was already widely understood because of the similar labelling on refrigerators, freezers and other major appliances. The same focus group work also indicated that the underlying scale running from 1 to 100 was seen by consumers as entirely logical (although people do tend to assume that this equates to "percentage energy efficient", which it does not, but this does not really matter - it still means that they intuitively understand that a larger number is better).

The other rating, referred to as the Environmental Impact (CO_2) Rating, is also based on SAP but, as the name suggests, it reflects the carbon dioxide emissions that result from the energy use (using another 1 to 100 scale with a similar definition). To distinguish this rating from the Energy Efficiency Rating, which uses the conventional colours for the A to G bands, a different colour scheme is used for the A to G bands. There was initially some concern that consumers would find two ratings on the one certificate confusing, but the consumer trial findings indicate that they actually did not have any difficulty with this.

In the trials consumers were asked to report how easy, on a scale of 1 (very easy) to 5 (very difficult), the ratings were to understand and they were also asked to reproduce both the letters and the numbers corresponding to the current ratings and the potential ratings. About 84% of respondents found the ratings either very easy or easy to understand. Nobody reported finding them very difficult to understand.

Tables 1 and 2 present the detailed findings showing the number of correctly and incorrectly reported ratings according to the stated level of ease of understanding (note: the totals in each case are 128 because each of the 64 respondents was asked about both the current rating and the potential rating, and their responses for these have been combined).

These tables show that the more difficult people found it to understand the ratings the more likely they were to make a mistake in reporting them, but even those who found them very easy to understand made a few mistakes. They also show that people found the Energy Efficiency Rating marginally easier to understand than the Environmental Impact Rating, although there were in fact slightly more correctly reported ratings for the Environmental Impact Rating. Overall, more than 80 % of respondents correctly reported the ratings, indicating a good level of understanding.

Table 3 shows the results considering the reporting of numbers and letters separately. Overall, only 3.5 % of rating letters were incorrectly reported, whereas 12 % of numbers were in-

Table 3. Frequencies of correct and incorrect reporting of rating numbers and letters

	Correct	Incorrect
Energy Efficiency Rating number	87%	13%
Energy Efficiency Rating letter	96%	4%
Environmental Impact Rating number	89%	11%
Environmental Impact Rating letter	97%	3%

Table 4. Overall, how would you rate the whole of the first page?

Too much information	3%	19%	71%	5%	2%	Too little information
Too much technical detail	0%	16%	70%	13%	2%	Not enough technical detail
Very interesting	29%	41%	27%	2%	2%	Not interesting at all
Very easy to understand	27%	40%	27%	5%	0%	Very difficult to understand
Very useful	32%	37%	25%	6%	0%	Not at all useful

Table 5. Understanding of technical terms

Understand	Directive 2002/91/EC	SAP	kWh/m2	Environ-mental Impact Rating	Energy Efficiency Rating	Carbon dioxide (CO_2)
Yes	42%	75%	80%	94%	98%	98%
No	58%	25%	20%	6%	2%	2%

correctly reported. Although based on a relatively small sample of consumers, this clearly demonstrates the advantage of using the A to G scale as the main means of conveying ratings in the Energy Performance Certificate.

Further questions asked consumers for their own subjective ratings (on a scale of 1 to 5 again) of the home's current performance. These also indicated a good understanding of the ratings in that, when the subjective ratings were plotted against the numbers of the formal ratings, they correlated fairly well ($R \approx 0.7$).

Consumer understanding of the whole of the front page of the Energy Performance Certificate

In addition to being asked about the ratings, consumers were also asked to rate the whole of the first page of the Energy Performance Certificate. Table 4 indicates that the difficult balance between providing too much and too little information or technical detail was quite well achieved. It also demonstrates that consumers were favourably disposed towards the information in terms of how interesting, understandable and useful they thought it was. Nobody reported finding it very difficult to understand.

Although nobody reported finding the first page very difficult to understand, it was recognised that there were some technical terms used (mainly on the front page but elsewhere in the document as well) which needed to be there, but which consumers would not necessarily be expected to understand. For this reason, consumers were also asked to indicate, for six technical terms, whether they had any such difficulties. Table 5 shows the results of these questions.

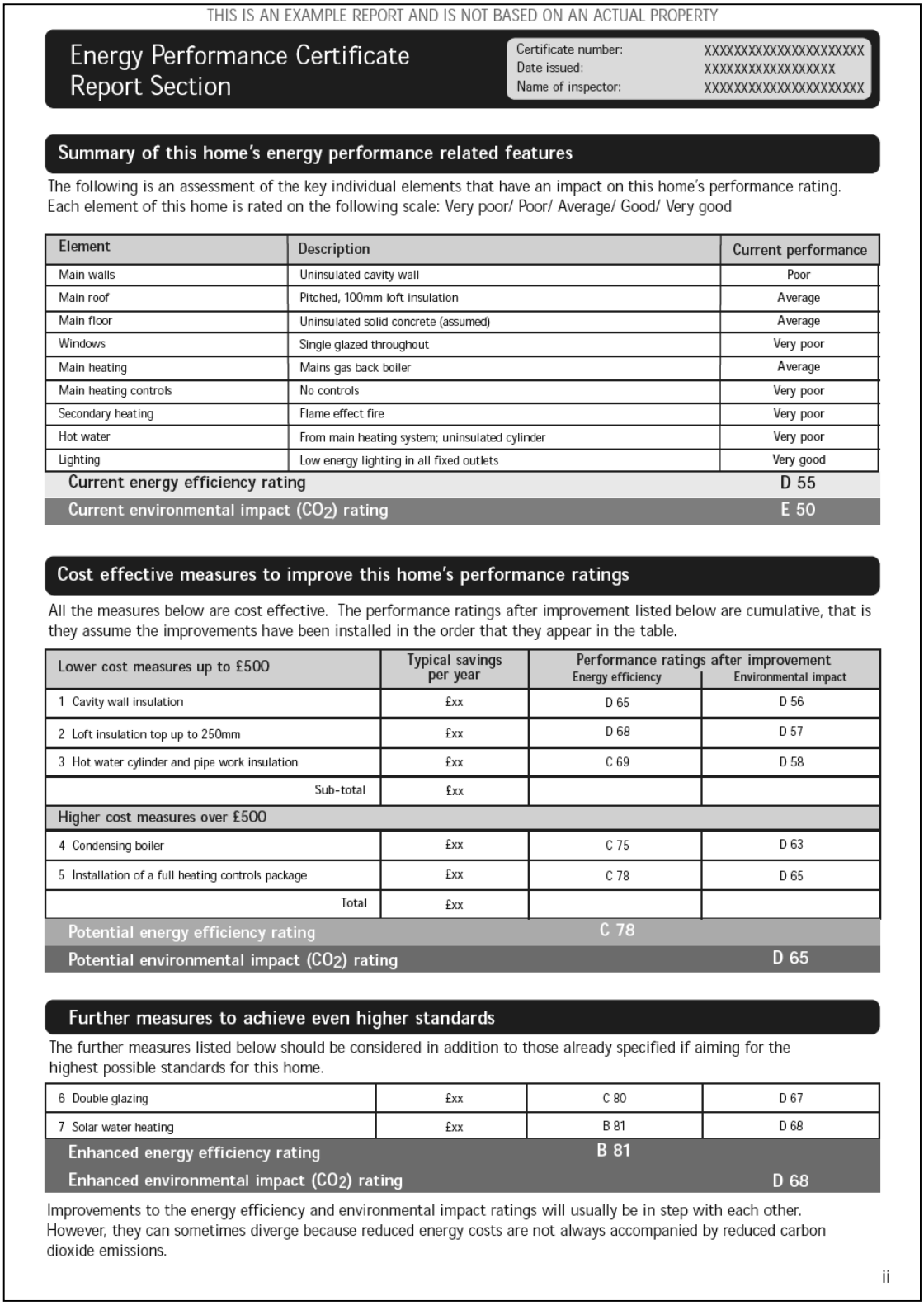
For the two ratings this just serves to confirm the findings from other questions, indicating good understanding. The respondents also reported a good understanding of carbon dioxide, suggesting that Government campaigns related to climate change and carbon dioxide emissions have successfully reached householders and raised their awareness. Not surprisingly, very detailed technical terms such as kWh/m^2 and SAP were less well understood, with up to 25 % of consumers not understanding them. This, again, emphasises the importance of the A to G rating approach as a way of ensuring maximum consumer understanding. However, by far the least well understood term was "Directive 2002/91/EC", which more than half of consumers did not understand. Fortunately, the lack of understanding of this really has no consequences for the Energy Performance Certificate.

Consumer understanding of other pages in the Energy Performance Certificate

SECOND PAGE

The second page of the Energy Performance Certificate is shown in Figure 2. It summarises the energy performance of the home's structural components, heating system and lighting, and estimates future performance ratings after the installation of improvement measures. The improvements are split into lower cost, higher cost and further measures (further measures being things that would not normally be cost-effective). The ratings improvement achieved by each measure, as well as typical cost savings, are shown.

Clearly, the recommendations for improvement are very important if the Energy Performance Certificate is to result in actual improvements to energy efficiency. Table 6 shows that in over 90 % of cases, consumers found the recommendations easy or very easy to understand. Nobody found them very difficult to understand. Not surprisingly, the results showed a relatively high likelihood of implementing low cost measures, and a lower likelihood of implementing higher cost measures. The likelihood was lower still for the further measures, but even so around 20 % of consumers indicated that they were likely to implement such measures.



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Energy Performance Certificate Report Section

Certificate number: XXXXXXXXXXXXXXXXXXXX
Date issued: XXXXXXXXXXXXXXXXX
Name of inspector: XXXXXXXXXXXXXXXXXXXX

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 of this home is rated on the following scale: Very poor/ Poor/ Average/ Good/ Very good

Element	Description	Current performance
Main walls	Uninsulated cavity wall	Poor
Main roof	Pitched, 100mm loft insulation	Average
Main floor	Uninsulated solid concrete (assumed)	Average
Windows	Single glazed throughout	Very poor
Main heating	Mains gas back boiler	Average
Main heating controls	No controls	Very poor
Secondary heating	Flame effect fire	Very poor
Hot water	From main heating system; uninsulated cylinder	Very poor
Lighting	Low energy lighting in all fixed outlets	Very good
Current energy efficiency rating		D 55
Current environmental impact (CO_2) rating		E 50

Cost effective measures to improve this home's performance ratings

All 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 improvement: Energy efficiency	Environmental impact
1 Cavity wall insulation	£xx	D 65	D 56
2 Loft insulation top up to 250mm	£xx	D 68	D 57
3 Hot water cylinder and pipe work insulation	£xx	C 69	D 58
Sub-total	£xx		
Higher cost measures over £500			
4 Condensing boiler	£xx	C 75	D 63
5 Installation of a full heating controls package	£xx	C 78	D 65
Total	£xx		
Potential energy efficiency rating		C 78	
Potential environmental impact (CO_2) rating			D 65

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.

6 Double glazing	£xx	C 80	D 67
7 Solar water heating	£xx	B 81	D 68
Enhanced energy efficiency rating		B 81	
Enhanced environmental impact (CO_2) rating			D 68

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 reduced carbon dioxide emissions.

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Figure 2. *The second page of the Energy Performance Certificate as used in the consumer trials.*

Consumers were asked for their overall views on the second page of the Energy Performance Certificate. Table 7 shows that the difficult balance between providing too much and too little information or technical detail was again quite well achieved. 63 % thought that the amount of information given was about right, although 29 % thought there was too much, and 8 % thought that there was too little. 67 % were satisfied with the amount of technical information, 22 % thought that there was too much, and 12 % that there was too little. 67 % thought that the page was interesting, 55 % found it easy to understand and 62 % found it useful. Nobody reported finding the page very difficult to understand or not at all useful.

Table 6. Opinions on measures to improve the home's performance ratings

How easy to understand?						
Very easy	44%	49%	3%	3%	0%	Very difficult
How likely to implement?						
Low cost measures: very likely	25%	44%	22%	6%	3%	Very unlikely
Higher cost measures: very likely	9%	25%	40%	25%	16%	Very unlikely
Further cost measures: very likely	3%	19%	23%	25%	30%	Very unlikely

Table 7. Overall, how would you rate the whole of the second page?

Too much information	5%	24%	63%	8%	0%	Too little information
Too much technical detail	3%	19%	67%	10%	2%	Not enough technical detail
Very interesting	27%	41%	28%	3%	2%	Not interesting at all
Very easy to understand	23%	31%	39%	6%	0%	Very difficult to understand
Very useful	25%	37%	33%	5%	0%	Not at all useful

Table 8. Overall, how would you rate the whole of the third page?

Too much information	11%	0%	63%	14%	11%	Too little information
Too much technical detail	0%	5%	71%	21%	3%	Not enough technical detail
Very interesting	23%	27%	39%	9%	2%	Not interesting at all
Very easy to understand	29%	38%	29%	5%	0%	Very difficult to understand
Very useful	27%	19%	44%	9%	2%	Not at all useful

Table 9. How easy to understand are the recommendations for improvements?

How easy to understand?						
Very easy	44%	49%	3%	3%	0%	Very difficult

Table 10. Overall, how would you rate the whole of the fourth page?

Too much information	7%	15%	66%	11%	2%	Too little information
Too much technical detail	2%	15%	68%	15%	2%	Not enough technical detail
Very interesting	27%	38%	25%	6%	3%	Not interesting at all
Very easy to understand	25%	48%	19%	8%	0%	Very difficult to understand
Very useful	25%	38%	27%	10%	0%	Not at all useful

THIRD PAGE

The third page of the Energy Performance Certificate describes the recommended lower cost and higher cost improvement measures, as well as the further measures, and gives advice about their installation. It is shown in Figure 3.

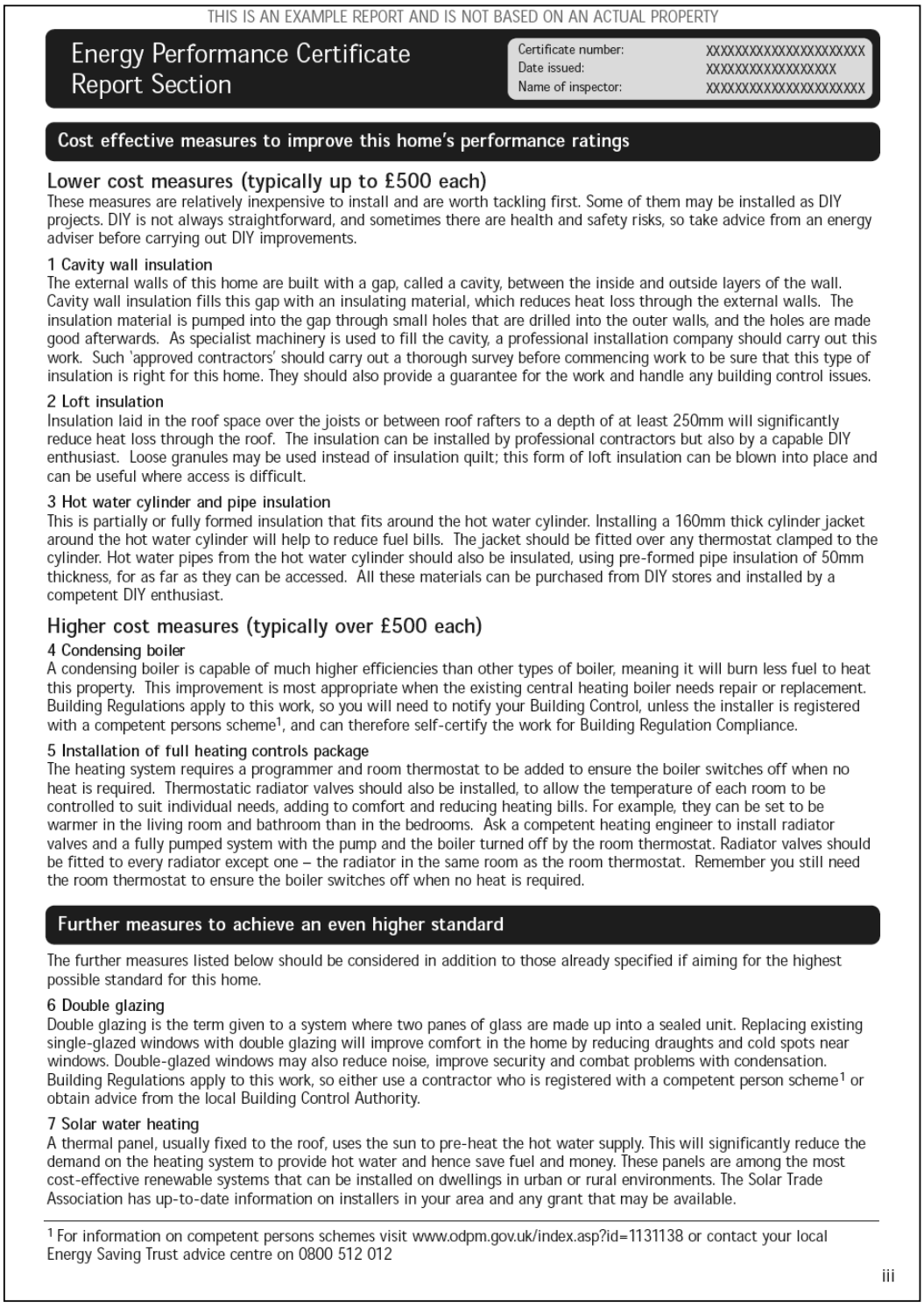
Table 8 indicates that 63 % were satisfied with the amount of information on the third page of the Energy Performance Certificate. 71 % thought the amount of technical detail supplied was about right, while 24 % thought there was too little. 50 % thought that the page was interesting, 66 % thought it was easy to understand and 45 % found it useful. Again, nobody reported finding the page very difficult to understand.

The specific comments in Table 6 regarding the ease of understanding the recommendations for improvements are also related to the content of page 3, and so they are repeated below in Table 9. Over 90 % found the recommendations easy or very easy to understand. Nobody found them very difficult to understand.

FOURTH PAGE

The fourth page is shown in Figure 4. This provides general information regarding the energy inspection that has been undertaken on the home, explains how the home's energy performance ratings were calculated, and suggests some simple zero cost measures that can also improve the home's energy performance. It also provides details of how to obtain further advice from the Energy Saving Trust, and how to contact the home inspector that carried out the survey if there are any queries.

As Table 10 illustrates, 66 % thought that the amount of information was about right, and 68 % were satisfied with the amount of technical detail. 65 % found the page interesting, 73 % found it easy to understand and 63 % useful. Nobody found the information very difficult to understand or not at all useful.



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Energy Performance Certificate
Report Section

Certificate number: XXXXXXXXXXXXXXXXXXXX
Date issued: XXXXXXXXXXXXXXXX
Name of inspector: XXXXXXXXXXXXXXXXXXXX

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 from an energy adviser before carrying out DIY improvements.

1 Cavity wall insulation
The external walls of this home are built with a gap, called a cavity, between the inside and outside layers of the wall. Cavity wall insulation fills this gap with an insulating material, which reduces heat loss through the external walls. The insulation material is pumped into the gap through small holes that are drilled into the outer walls, and the holes are made good afterwards. As specialist machinery is used to fill the cavity, a professional installation company should carry out this work. Such 'approved contractors' should carry out a thorough survey before commencing work to be sure that this type of insulation is right for this home. They should also provide a guarantee for the work and handle any building control issues.

2 Loft insulation
Insulation laid in the roof space over the joists or between roof rafters to a depth of at least 250mm will significantly reduce heat loss through the roof. The insulation can be installed by professional contractors but also by a capable DIY enthusiast. Loose granules may be used instead of insulation quilt; this form of loft insulation can be blown into place and can be useful where access is difficult.

3 Hot water cylinder and pipe insulation
This is partially or fully formed insulation that fits around the hot water cylinder. Installing a 160mm thick cylinder jacket around the hot water cylinder will help to reduce fuel bills. The jacket should be fitted over any thermostat clamped to the cylinder. Hot water pipes from the hot water cylinder should also be insulated, using pre-formed pipe insulation of 50mm thickness, for as far as they can be accessed. All these materials can be purchased from DIY stores and installed by a competent DIY enthusiast.

Higher cost measures (typically over £500 each)

4 Condensing boiler
A condensing boiler is capable of much higher efficiencies than other types of boiler, meaning it will burn less fuel to heat this property. This improvement is most appropriate when the existing central heating boiler needs repair or replacement. Building Regulations apply to this work, so you will need to notify your Building Control, unless the installer is registered with a competent persons scheme[1], and can therefore self-certify the work for Building Regulation Compliance.

5 Installation of full heating controls package
The heating system requires a programmer and room thermostat to be added to ensure the boiler switches off when no heat is required. Thermostatic radiator valves should also be installed, to allow the temperature of each room to be controlled to suit individual needs, adding to comfort and reducing heating bills. For example, they can be set to be warmer in the living room and bathroom than in the bedrooms. Ask a competent heating engineer to install radiator valves and a fully pumped system with the pump and the boiler turned off by the room thermostat. Radiator valves should be fitted to every radiator except one – the radiator in the same room as the room thermostat. Remember you still need the room thermostat to ensure the boiler switches off when no heat is required.

Further measures to achieve an even higher standard

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

6 Double glazing
Double glazing is the term given to a system where two panes of glass are made up into a sealed unit. Replacing existing single-glazed windows with double glazing will improve comfort in the home by reducing draughts and cold spots near windows. Double-glazed windows may also reduce noise, improve security and combat problems with condensation. Building Regulations apply to this work, so either use a contractor who is registered with a competent person scheme[1] or obtain advice from the local Building Control Authority.

7 Solar water heating
A thermal panel, usually fixed to the roof, uses the sun to pre-heat the hot water supply. This will significantly reduce the demand on the heating system to provide hot water and hence save fuel and money. These panels are among the most cost-effective renewable systems that can be installed on dwellings in urban or rural environments. The Solar Trade Association has up-to-date information on installers in your area and any grant that may be available.

[1] For information on competent persons schemes visit www.odpm.gov.uk/index.asp?id=1131138 or contact your local Energy Saving Trust advice centre on 0800 512 012

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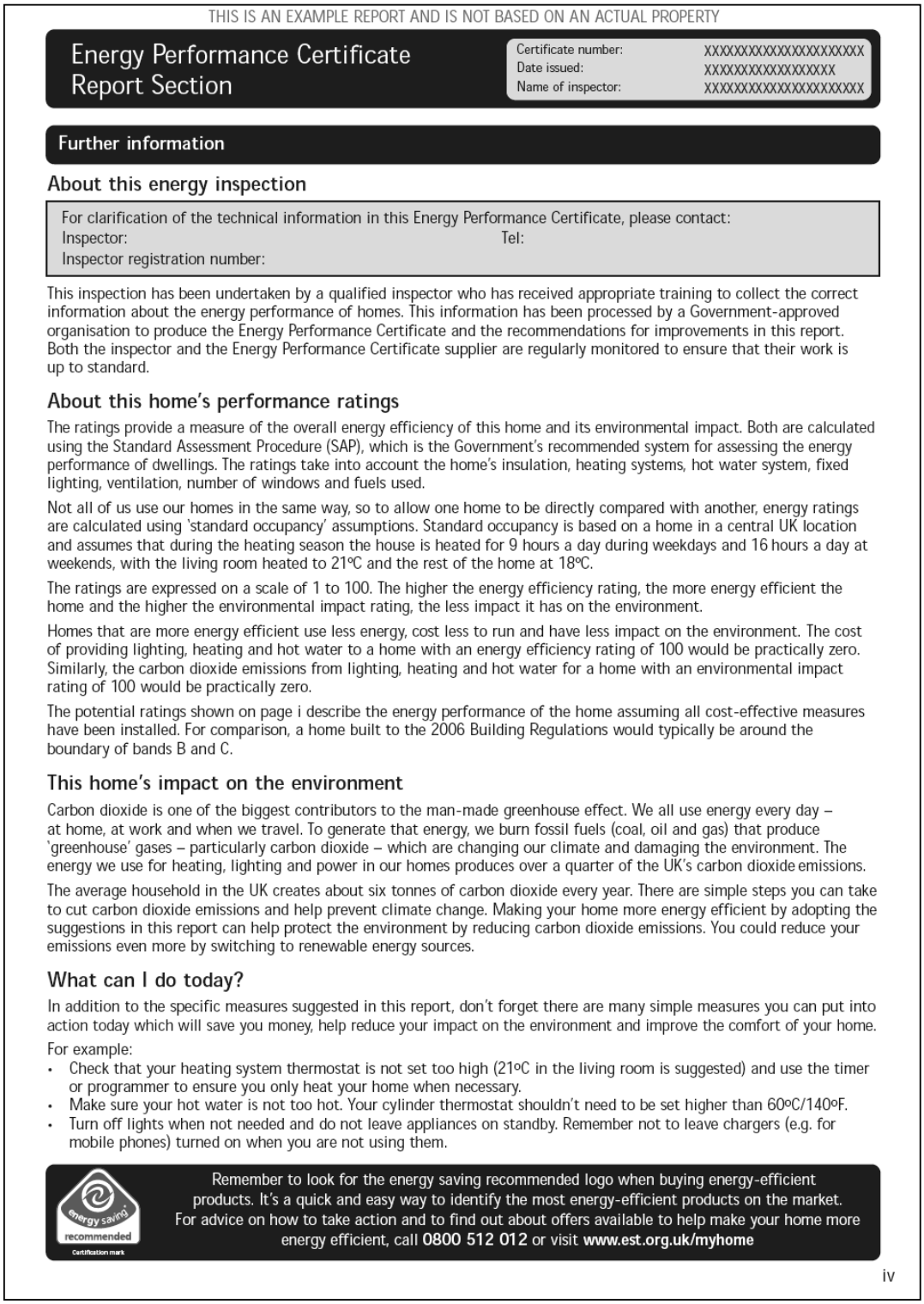
Figure 3. *The third page of the Energy Performance Certificate as used in the consumer trials.*

Overall impressions of the Energy Performance Certificate and respondent opinions

In addition to the specific questions relating to the content of each page there were some more general questions designed to gauge the overall impressions of consumers. Table 11 summarises these. Consumers were asked to give their level of agreement with various statements on a five-point scale. The scores indicate that people do not think the performance ratings are the only things worth noting, and they do think that the summary on page 2 is the most important part. The report has to be read carefully, but it does not take too long to read, is not too long or detailed, and the findings are interesting. Prior to the consumer trial, there had been strong arguments from some quarters that the Energy Performance Certificate was too long and detailed and that people would therefore ignore it, but these responses demonstrate that the consumers in this trial did not generally share such views.

Other questions revealed that, at the time of completing the questionnaire, one respondent had already consulted the free-phone number or website for advice. Seven were considering using the phone and twenty five were considering using the



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Energy Performance Certificate
Report Section

Certificate number: XXXXXXXXXXXXXXXXXXXX
Date issued: XXXXXXXXXXXXXXXX
Name of inspector: XXXXXXXXXXXXXXXXXXX

Further information

About this energy inspection

For clarification of the technical information in this Energy Performance Certificate, please contact:
Inspector: Tel:
Inspector registration number:

This inspection has been undertaken by a qualified inspector who has received appropriate training to collect the correct information about the energy performance of homes. This information has been processed by a Government-approved organisation to produce the Energy Performance Certificate and the recommendations for improvements in this report. Both the inspector and the Energy Performance Certificate supplier are regularly monitored to ensure that their work is up to standard.

About this home's performance ratings

The ratings provide a measure of the overall energy efficiency of this home and its environmental impact. Both are calculated using the Standard Assessment Procedure (SAP), which is the Government's recommended system for assessing the energy performance of dwellings. The ratings take into account the home's insulation, heating systems, hot water system, fixed lighting, ventilation, number of windows and fuels used.

Not all of us use our homes in the same way, so to allow one home to be directly compared with another, energy ratings are calculated using 'standard occupancy' assumptions. Standard occupancy is based on a home in a central UK location and assumes that during the heating season the house is heated for 9 hours a day during weekdays and 16 hours a day at weekends, with the living room heated to 21ºC and the rest of the home at 18ºC.

The ratings are expressed on a scale of 1 to 100. The higher the energy efficiency rating, the more energy efficient the home and the higher the environmental impact rating, the less impact it has on the environment.

Homes that are more energy efficient use less energy, cost less to run and have less impact on the environment. The cost of providing lighting, heating and hot water to a home with an energy efficiency rating of 100 would be practically zero. Similarly, the carbon dioxide emissions from lighting, heating and hot water for a home with an environmental impact rating of 100 would be practically zero.

The potential ratings shown on page i describe the energy performance of the home assuming all cost-effective measures have been installed. For comparison, a home built to the 2006 Building Regulations would typically be around the boundary of bands B and C.

This home's impact on the environment

Carbon dioxide is one of the biggest contributors to the man-made greenhouse effect. We all use energy every day – at home, at work and when we travel. To generate that energy, we burn fossil fuels (coal, oil and gas) that produce 'greenhouse' gases – particularly carbon dioxide – which are changing our climate and damaging the environment. The energy we use for heating, lighting and power in our homes produces over a quarter of the UK's carbon dioxide emissions.

The average household in the UK creates about six tonnes of carbon dioxide every year. There are simple steps you can take to cut carbon dioxide emissions and help prevent climate change. Making your home more energy efficient by adopting the suggestions in this report can help protect the environment by reducing carbon dioxide emissions. You could reduce your emissions even more by switching to renewable energy sources.

What can I do today?

In addition to the specific measures suggested in this report, don't forget there are many simple measures you can put into action today which will save you money, help reduce your impact on the environment and improve the comfort of your home.

For example:

- Check that your heating system thermostat is not set too high (21ºC in the living room is suggested) and use the timer or programmer to ensure you only heat your home when necessary.
- Make sure your hot water is not too hot. Your cylinder thermostat shouldn't need to be set higher than 60ºC/140ºF.
- 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.

energy saving recommended
Certification mark

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.est.org.uk/myhome**

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Figure 4. *The fourth page of the Energy Performance Certificate as used in the consumer trials.*

website. Sixteen respondents (25 %) consulted one or more other people to explain parts of the report. Ten of these consulted their partner, four their family, and three a friend. Only one consulted an energy company, which indicates that most people did not feel that they needed further professional help to understand the report.

Finally, respondents were asked their level of agreement with a series of statements. As Table 12 shows, there was more agreement than disagreement with the following.

- It is good to know how to reduce the property's fuel costs
- The overall condition of a property is very interesting
- Environmental issues are important
- A budget for home improvements should be considered when buying property
- Homes with a good energy efficiency rating will be popular

Table 11. Overall impressions of the report

	Strongly agree		Neither agree nor disagree		Strongly disagree
The performance ratings are the only thing worth noting	3%	17%	32%	27%	21%
The report needs to be read carefully to be understood	27%	39%	17%	13%	5%
The summary, on page 2, is the most important part	8%	39%	28%	22%	3%
The report can be skim-read and understood	8%	31%	19%	28%	14%
Reading the whole report takes too much time	2%	11%	16%	33%	38%
The report is too long	5%	6%	14%	36%	39%
The report is too detailed	2%	9%	16%	34%	39%
The findings are very interesting	42%	41%	11%	6%	0%

Table 12. Please indicate your level of agreement with each of the following statements.

	Strongly agree		Neither agree nor disagree		Strongly disagree
It is good to know how to reduce the property's fuel costs	69%	25%	6%	0%	0%
The overall condition of a property is very interesting	63%	30%	8%	0%	0%
Environmental issues are important	50%	36%	11%	2%	2%
A budget for home improvements should be considered when buying property	38%	42%	14%	2%	5%
Homes with a good energy efficiency rating will be popular	17%	52%	20%	6%	5%
The home's environmental impact should be discussed in price negotiations	17%	21%	40%	13%	10%
A home with a low energy efficiency rating will be sold at a lower price	9%	23%	36%	23%	8%
Disputes about the ratings will delay the sale of the home	5%	19%	48%	13%	16%
The energy performance of homes is not interesting	5%	9%	11%	34%	41%

Table 13. Are you a first time buyer?

Age group	Yes	No	Total
Under 30 years of age	17%	3%	20%
30+ years of age	14%	66%	80%
Total	31%	69%	100%

- The home's environmental impact should be discussed in price negotiations

Opinions were evenly spread over whether disputes about the ratings would delay the sale of a home, and whether a home with a low energy efficiency rating would be sold at a lower price. There was strong disagreement with the statement that the energy performance of homes is not interesting.

Respondents were also asked about their age and whether they were first time buyers. Of the 64 respondents, 20 (31 %) were first time buyers, 13 (20 %) were under 30 years of age. Only one was aged over 65. Unsurprisingly, respondents under 30 years of age were significantly more likely than older people to be first time buyers, as shown in Table 13.

Further analysis indicated that the questionnaire responses were, with just two exceptions, not dependent on age or experience of the housing market. There was only one opinion in the questionnaire that was found to be significantly related to age. This was the statement that "Disputes about the ratings will delay the sale of the home", with those aged under 30 being more likely to agree. It may be that older people have based their responses on their greater experience of the housing market. Likewise, there was also only one question to which the response was found to be significantly related to past experience of the housing market. First time buyers were more likely than others to say that the Energy Performance Certificate contained too much technical detail (on the first two pages).

Conclusions

The responses to the questionnaire that have been presented in this paper indicate that the Energy Performance Certificate is not too long and detailed for people to read, and on the whole it is well understood. Overall, the majority of people found it interesting, easy to understand and useful. When asked about the report page by page, a maximum of 11 % thought there was too little information or technical detail, and a similar maximum of 11 % thought there was too much information or technical detail. However, between 63 % and 71 % thought that the amount of information and technical detail was about right.

About 84 % of respondents found the Energy Efficiency Rating and the Environmental Impact Rating either very easy or easy to understand. Nobody reported finding them very difficult to understand. When asked to reproduce the ratings, people got the rating number wrong occasionally but they were consistently much better at getting the rating letter right. This clearly demonstrates the advantage of using the A to G scale as the main means of conveying ratings in the Energy Performance Certificate.

Most people found the suggested measures to improve the home's performance easy to understand. Not surprisingly, the proportions of people considering implementing the measures decreased as their cost increased, but around 20 % of consumers reported that even the further measures (i.e. generally non-cost-effective measures) were things that they were likely to consider. This indicates that people are probably more aware and concerned about the environment than is often assumed. Indeed, the questionnaire revealed that people tended to agree that both environmental issues, and a home's energy performance and environmental impact, are important.

Overall, the findings of this study suggest that the introduction of Energy Performance Certificates for homes in England and Wales will be welcomed by most consumers. Certainly, some of the comments that trial participants were invited to enter at the end of the questionnaires give cause for optimism. For example:

- "Until your suggestion to conduct this survey I hadn't given much thought to energy performance. The results of the survey have been illuminating. It has clearly shown the areas where the property is weak and what can be done to improve it."
- "Very interesting – showed how much potential there is and at what starting point I have! Currently having central heating installed."
- "Overall the report was precise, clear and easy to understand. It was definitely useful in all aspect and any difficulties I had encountered was made clearer as I continued to read through the report."
- "I found the report very useful and it pointed out several items which I did not realise had not been fitted, e.g. boiler thermostat."
- "The information attached is very useful in planning the home improvements. We have done further investigation of efficiency measures and are looking to implement as much as is practical and cost-effective in the house."
- "I found the report very interesting and I will definitely implement some of the recommendations however a low/poor report would not have stopped me purchasing the flat."
- "All very clear, easily understood. Information is useful and give me an idea of low cost improvements that can be done immediately and longer term potential benefits."
- "This report was very useful and will be of help in our new home. Thank you."

Reference

1. The Government's Standard Assessment Procedure for Energy Rating of Dwellings. 2005 Edition. Published on behalf of Defra by BRE. May be downloaded from: www.bre.co.uk/sap2005/

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