



# ENERGY LABELLING

The New European Energy Label: Assessing Consumer Comprehension and Effectiveness as a Market Transformation Tool

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BY

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in Partnership with  
**The Collaborative Labeling and Appliance  
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## **About CLASP**

Established in 1999, CLASP's primary objective is to identify and respond to the analytical needs of S&L practitioners in selected countries and regions while making the highest quality technical information on S&L best practice available globally.

To this end, CLASP provides technical analysis and expertise to national governments and local partners; aggregates resources; assembles project teams from diverse and highly-qualified organizations; oversees projects; partners and collaborates with policy makers and members of industry alike; and disseminates information for maximum impact.

CLASP has provided technical assistance on standards and labelling in over 50 countries, supporting and promoting energy efficiency in appliances, lighting and equipment. Currently, CLASP has programmes in China, the European Union, India, and the United States.

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## Foreword

The European energy label for lighting, appliances, and equipment is increasingly ubiquitous. In Europe, the familiar design has been extended to vehicles and to buildings, and many diverse countries around the world have adopted key elements of the European label. Yet, the role of the energy label in transforming product markets towards greater energy performance, and above all its full potential in this respect, is often not well understood. It performs a very basic function: by providing information about the energy consumption and energy performance of products, it provides transparency where, previously, there was very little or none. It corrects one of the classic market failures: lack of information. But this is just the beginning.

The calculations that grade models according to energy performance, and the measurement standards that allow for the testing of that performance, are fundamental building blocks in an effective energy labelling scheme. These are also at the heart of minimum energy performance standards. The energy label, as we have come to know it in Europe, is the not unattractive interface communicating technical information in a manner which must strike a balance between the highly technical and the accessible.

The effectiveness of any energy label depends on the way buyers (whether private consumers or professionals) use it in their purchasing decisions and on the way sellers (such as retailers) and manufacturers use it in their decisions to stock and to produce different models. This is a dialectical relationship: manufacturers and retailers seek to anticipate the choices of the consumer, and in doing so they also structure those choices. It is, after all, difficult to choose a model that is not in stock, and even more difficult to choose a model that is not produced. Each part of this chain is important.

At the end of 2011, after much discussion, important changes were made to the content and design of the energy label. In this report, commissioned by CLASP from Navigant, the focus is on the response of the private consumer to these changes. Fundamental to the way the consumer responds to the information on the energy label are, inter alia, understanding of the information provided, trust in the information, the importance of energy/environment in purchasing decisions, and willingness to pay. Navigant has examined the effect of the changes to the European energy label on the ability of consumers to understand the energy label and on the extent to which it now influences their purchasing decisions. This has been done through market research in ten locations across the EU.

The study finds that while most consumers understand the new design, there is significant scope to increase this comprehension. It also finds that some of the recent changes to the energy label, in particular the subdivision of the A class, have reduced the capacity of the energy label to motivate consumers to buy more efficient products. This suggests that the contribution of the energy label to the transformation of product markets towards greater energy performance has been weakened. The full effect of the changes can only be understood with reference also to the way these have (or not) affected retailer and manufacturer practices. Nevertheless, it will be important to ensure that any future changes to the energy label are tested with consumers before being implemented.

By the end of 2014, less than two years from now, the European Commission will have reviewed the effectiveness of the labelling scheme as it exists today. In parallel, it must also have completed its review of the framework for setting minimum energy performance standards in the EU. In this context, it will be important to bring together an understanding of the building blocks that support a well-functioning

energy label with an understanding of the European energy label itself as an important building block in a more strategic approach to the transformation of product markets.

The European energy label is part of a well-established toolbox of market transformation policy instruments working with the grain of product markets to encourage manufacturers to produce more energy efficient products, sellers to stock them, and buyers to buy them. Over the last 20 years, much work has been done on both sides of the Atlantic to show how energy efficiency indices, test standards, energy labels, minimum energy performance standards, incentives, (public) procurement, point of sale information, and adequate monitoring and enforcement can be aligned for maximum effectiveness. Moreover, a substantial and increasingly international body of experience has built up with respect to what does and does not work. In addition, since energy labelling and the setting of minimum energy performance standards for vehicles, buildings, lighting, appliances, and equipment are covered by different legislative frameworks, there may well be opportunities for policy learning between sectors.

This means that there is a rich heritage to draw on as we discuss how to put in place the best possible framework for enhancing the energy performance of products in Europe. Furthermore, there is an opportunity to influence the way energy-related product policy evolves beyond Europe in future, since this is an area where Europe has been a front runner, and other jurisdictions look to inform their own policy in this field.

With the publication in March 2013 of the European Commission's Green Paper on 2030 targets, discussions about the EU's post-2020 energy and climate policy architecture will gather pace. We know that reducing energy consumption makes it easier to achieve greenhouse gas emission and renewable energy targets. The EU's framework for energy labelling and setting minimum performance standards has the potential to deliver a substantial part of not only the 2020 targets but also future targets. For this to happen, however, the post 2014/2015 framework for energy-related product policy must deliver more of its potential. If we get it right, the environmental, economic, innovation, security, and health benefits will be substantial. The report presented here offers a significant piece of new research to inform the discussion on one important part of such a framework, namely the design and content of the European energy label.

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## Contents

<b>Foreword</b> .....	<b>ii</b>
<b>Contents</b> .....	<b>iv</b>
<b>List of Figures</b> .....	<b>vi</b>
<b>List of Tables</b> .....	<b>vii</b>
<b>Notes for the Reader</b> .....	<b>viii</b>
<b>Glossary</b> .....	<b>ix</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>EXTENDED EXECUTIVE SUMMARY</b> .....	<b>6</b>
<b>1 INTRODUCTION: BACKGROUND AND OBJECTIVES</b> .....	<b>25</b>
<b>2 METHODOLOGY</b> .....	<b>28</b>
2.1 Project methodology .....	28
2.2 Data analysis.....	31
2.3 Project roles .....	33
<b>3 FINDINGS</b> .....	<b>35</b>
3.1 Importance of energy: unprompted responses .....	36
3.2 Who do the general public think has issued the energy label? .....	38
3.3 What do the general public consider to be the primary purpose of the energy label? .	41
3.4 What is the most salient information on the energy label as far as the general public are concerned?.....	43
3.5 The ‘Energ[y]’ text .....	44
3.6 Comprehension of the highest energy efficiency class an appliance may have .....	47
3.7 Comprehension of energy efficiency classes: quantitative results .....	51
3.8 Comprehension of the label energy efficiency classes: qualitative findings.....	72
3.9 Comprehension of the label icons .....	79
3.10 Comprehension of elements of the energy efficiency scale .....	92
3.11 Comprehension of other elements of the energy labels .....	95
3.12 Appeal of the top energy label class compared to the middle class .....	99
3.13 What is the minimum efficiency class consumers say they would choose? .....	101
3.14 How much extra are consumers prepared to pay to have the energy efficiency class they want? .....	104

3.15	What do the public like and dislike about the label? .....	108
3.16	Perception of the relative strengths of the old and new energy labels .....	110
3.17	Preference for energy and water usage values: per annum versus per cycle .....	112
3.18	Is the label missing anything? .....	114
3.19	Is there anything on the label that is confusing or should be changed? .....	118
3.20	Overall usefulness of the labels.....	120
<b>4</b>	<b>CONCLUSIONS AND POLICY RECOMMENDATIONS .....</b>	<b>122</b>
4.1	Key findings .....	122
4.2	Principal policy conclusions.....	123
4.3	Recommendations.....	123
	<b>REFERENCES.....</b>	<b>126</b>

## List of Figures

Figure ES1. The new (left) and old (right) energy labels. ....	2
Figure ES2. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer (RF; Top class = A+++) or television (TV; Top class = A); responses given with no group discussion. ....	4
Figure EES1. The new (left) and old (right) energy labels. ....	7
Figure EES2. The new refrigerator-freezer (left) and washing machine (right) energy labels. ....	8
Figure EES3: The new dishwasher (left) and television (right) energy labels. ....	9
Figure EES4. Share of participants willing to pay incremental increases in price for a highest energy efficiency class product compared to a mid-range energy efficiency class product costing €300 in rounded local currency units (RF = refrigerator-freezers, n = 120; TV = televisions, n= 118). ....	19
Figure EES5. The new (left) and old (right) washing machine energy labels. ....	21
Figure 1.1. The new refrigerator-freezer (left) and washing machine (right) energy labels. ....	26
Figure 1.2. The new dishwasher (left) and television (right) energy labels. ....	27
Figure 3.1. Show Cards 1a (left) and 1b (right) depicting energy labels for a refrigerator-freezer and television. ....	40
Figure 3.2. Show Cards 3, 4, 5 and 6, depicting energy labels for refrigerator-freezers, washing machines, dishwashers and televisions, respectively. ....	46
Figure 3.3. Show Cards 2a and 2b (not actual size), depicting three models of refrigerator-freezers and televisions for which rank order of energy consumption inversely relates to rank order of energy efficiency classes. ....	53
Figure 3.4. Show Card 9, depicting four refrigerator-freezers for which rank order of energy consumption is not directly inversely related to rank order of energy efficiency class. (Most energy efficient (a) = Option 3; second (b) and third (c) most efficient = both Option 1 and Option 4; least efficient (d) = Option 2.) ....	58
Figure 3.5. Show Card 11, depicting four televisions for which rank order of energy consumption is not directly inversely related to rank order of energy efficiency class. (Most and second most energy efficient (a and b) = both Option 1 and Option 3; third most efficient (c) = Option 4; least efficient (d) = Option 2.) ....	64
Figure 3.6. Show Card 10 (not actual size), depicting four televisions, including one carrying the A+-to-F scale due to become the standard label scale from 2014 (Option 2) and three carrying the 2011 label (A to G). (Most energy efficient (a) = Option 2; second most efficient (b) = Option 3; third most efficient (c) = Option 1; least efficient (d) = Option 4.) ....	69
Figure 3.7. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer (RF; Top class = A+++) or television (TV; Top class = A); responses given with no group discussion. ....	102
Figure 3.8. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer (RF; Top class = A+++) or television (TV; Top class = A); responses given after group discussion. ....	103
Figure 3.9. Show Cards 7 (refrigerator-freezers) and 8 (televisions), showing two same-brand models with identical storage volume or screen size but differing energy efficiency classes and levels of energy consumption. ....	104
Figure 3.10. Share of participants willing to pay incremental increases in price for a highest energy efficiency class product compared to a mid-range energy efficiency class product costing €300 in rounded local currency units (RF = refrigerator-freezers, n = 120; TV = televisions, n= 118). ....	107
Figure 3.11. Show Card 12, depicting the new and old refrigerator energy labels. ....	111

## List of Tables

Table 2.1. Dates and locations of in-depth interviews and focus groups for assessment of European appliance energy labels.....	29
Table 3.1. Share of participants <sup>a</sup> mentioning energy or energy-related performance as a factor when considering an appliance purchase, and the rank order of that factor among all factors listed.....	37
Table 3.2. Ability to identify the highest energy efficient class an appliance may have when presented with energy labels for refrigerator-freezers and televisions.....	47
Table 3.3. Ability to identify the most energy efficient appliance from a choice of either three refrigerator-freezers (Rotation 1; Show Card 2a) or three televisions (Rotation 2; Show Card 2b) at first presentation of any energy labels (no discussion) and after re-presentation (with discussion) .....	54
Table 3.4. Ability to identify the most energy efficient appliance from a choice of either three televisions (Rotation 1; Show Card 2b) or three refrigerator-freezers (Rotation 2; Show Card 2a) at first presentation of any energy labels (no discussion) and after re-presentation (with discussion) .....	54
Table 3.5. Ability to identify the least energy efficient appliance from a choice of either three refrigerator-freezers (Rotation 1; Show Card 2a) or three televisions (Rotation 2; Show Card 2b) at first presentation of any labels (no discussion) and after re-presentation (with discussion).....	56
Table 3.6. Ability to identify the least energy efficient appliance from a choice of either three televisions (Rotation 1; Show Card 2b) or three refrigerator-freezers (Rotation 2; Show Card 2a) at first presentation of an energy labels (no discussion) and after re-presentation (with discussion) .....	56
Table 3.7. Ability to correctly rank four refrigerator-freezers by order of energy efficiency, where rank order of energy consumption was not directly inversely related to rank order of energy efficiency class. For both questions, ranking options ran from most efficient (a) to least efficient (d).....	60
Table 3.8. Ability to correctly rank four televisions by order of energy efficiency, where rank order of energy consumption was not directly inversely related to rank order of energy efficiency class. For both questions, ranking options ran from most efficient (a) to least efficient (d).....	65
Table 3.9. Ability to correctly rank televisions by order of energy efficiency when faced with four choices, including one model carrying the A+-to-F scale due to become the standard label scale from 2014 (Option 2) and three carrying the 2011 label (A to G). For both questions, ranking options ran from most efficient (a) to least efficient (d).....	70
Table 3.10. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer or television. The number of participants and share of responses are given in relation to the top energy efficiency class (A+++ for refrigerator freezers; A for televisions) .....	102
Table 3.11. Willingness to pay for an appliance in a higher energy efficiency class in the St. Gallen consumer study (Heinzle & Wüstenhagen, 2010) .....	108



## Notes for the Reader

### ***Marginal notes***

This research was performed with the aid of guides for focus group and in-depth interview moderators, with numbered questions that were put to the study participants. For those readers wishing to link any one set of results with the relevant question to be found in the moderator guides (included in Appendix A), marginal notes have been used throughout the Findings section. These notes specify the number of the question(s) put to focus groups, followed by the number of the corresponding question(s) put to the in-depth interviewees; the focus group question(s) are separated from the interview questions with a semi-colon. For example, focus group questions 13, 15, 28 and 40, plus interview questions 4d and 5f are denoted in the margin as:

Q13, 15,  
28, 40;  
4d, 5f

### ***Boxed comments***

Throughout the focus group and interview sessions, participant comments were collected. In many instances in this report, examples of these comments are presented in boxes that may be read for extra insight or detail, but are not essential reading.

## Glossary

Nominal data	Data that cannot be ordered or measured, but can be assigned a code in the form of a number that allows the data to be sorted into a limited number of categories.
Non-parametric data	Data where there is no assumption of an underlying (normal bell-shaped) distribution.
Parametric data	Data such as a mean that describes a population where there is an assumption of an underlying normal (bell-shaped) distribution.
Qualitative data	Qualitative data cannot be counted or measured but is descriptive.
Quantitative data	Data that can be counted or measured.
Rotation	Regular and uniform variation in a sequence or series, or a regular cycle of events in a set order or sequence. Participants viewed energy labels for different appliances and of differing formats, as depicted on 'show cards,' by rotation according to a sequence predefined by country (see Appendix B) for focus groups and consecutively for in-depth interviews within any one country. This was designed to avoid any bias in the presentation of the different show cards.
Screener	Comprising specific questions to determine the eligibility of a potential study participant.
Show card	In this study, show cards depicted one or more appliance energy labels that were shown to participants for them to describe and evaluate.

## EXECUTIVE SUMMARY

The European Union's (EU's) energy labelling programme dates back to the mid-1990s, and is one of the most influential and successful energy labelling programmes in the world. The original label design was the first leading energy label design to be informed by consumer research, which helped to guide the adoption of key elements, including the A-to-G energy efficiency classification scale with stacked horizontal bars coloured from green to red (Figure ES1).

This iconic design was originally applied to refrigerators, then other domestic appliances, and has since been adopted in EU energy labels for lighting, cars and buildings. Outside the EU, countries around the world have adopted key elements of this design – economies as diverse as Algeria, Argentina, Brazil, China, Columbia, Iran, Korea, Russia, South Africa, Tunisia, and Turkey.

Impact assessments of European equipment energy efficiency policy measures have historically found that the EU energy label has been the most influential instrument in driving forward the energy efficiency of European equipment markets; therefore, it is important to assess its continuing effectiveness each time changes are made to its design and implementation.

In recent years, a decision was made to modify the household appliance energy label to bring it up to date with evolving market trends. These changes include updating the label's appearance and introducing additional high efficiency classes up to the A+++ class for household refrigerators, washing machines, and dishwashers. They also include an important design change, moving from a two-part label with a language-specific background to a single, language-neutral label that is the same across the whole EU (Figure ES1). This latter change – which allows the label to be printed on a single backing and thereby helps minimise the risk of retailers failing to assemble and display the two components of the old label correctly – has been achieved by using illustrative icons (pictograms) in place of the former explanatory text to indicate which product performance parameter is being referred to.

Given these significant changes and the active debate which preceded them, especially with regard to the choice of label classifications, it is important to establish how well the revised labels work with consumers in order to assess their likely energy saving impact.

This report presents the findings of a comprehensive consumer research study which does exactly that. Consumer focus groups and questionnaires were conducted in ten cities across the EU<sup>1</sup> and were complemented by three sets of in-depth interviews held in London, Prague, and Paris. This research was carefully designed to establish:

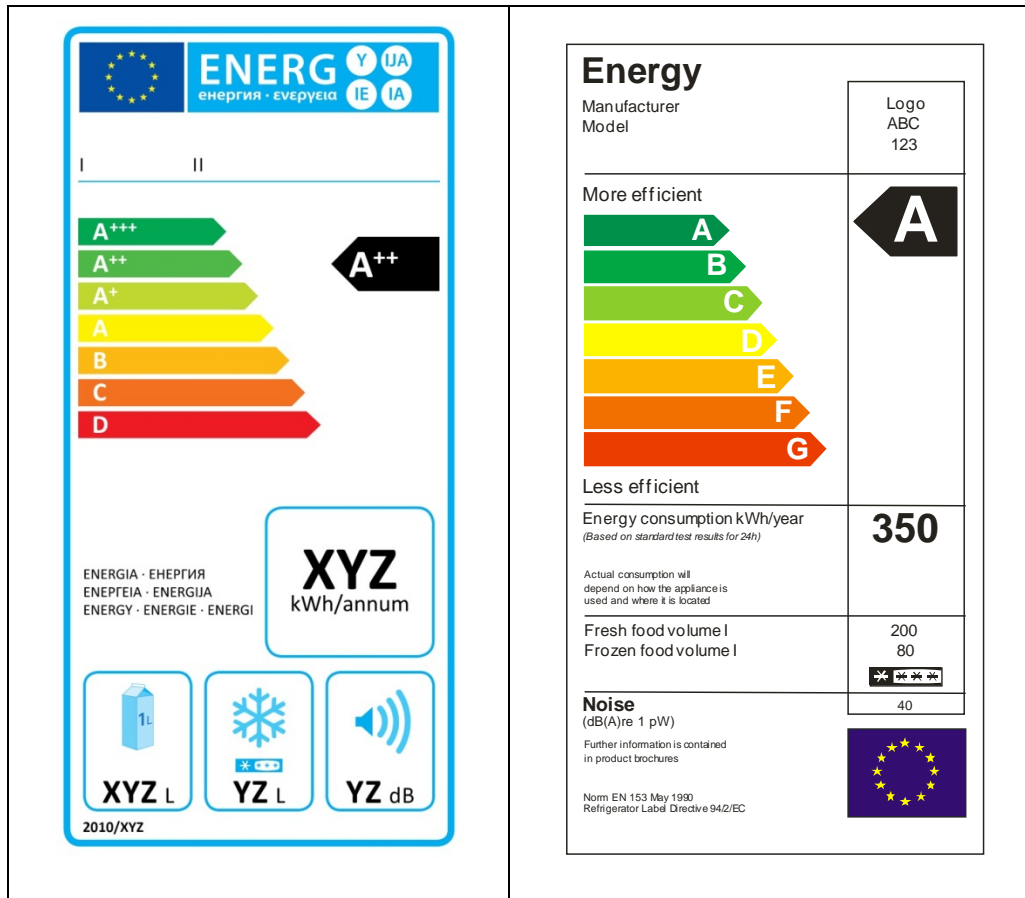
- i) The ability of consumers to comprehend the information on the label;
- ii) How salient and motivating they found this information; and
- iii) To what degree they were likely to use the information on the label when making future appliance purchases.

The details of the research methodology are discussed in the main body of the report and summarised in the Extended Executive Summary, but in brief, a mixture of qualitative and quantitative market research techniques were designed to extract the maximum amount of information in an unbiased and non-leading research plan.

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<sup>1</sup> London, Prague, Madrid, Athens, Warsaw, Frankfurt, Paris, Copenhagen, Milan and Sofia.

Figure ES1. The new (left) and old (right) energy labels.



## Key Findings

### Comprehension of efficiency rankings

The overall level of comprehension of the energy efficiency scale was in line with previous studies of the comprehension of energy labels used in other economies, and most consumers were able to use the label to identify the most efficient products. Specifically:

- About 77% of participants were able to correctly identify the energy efficiency order of three appliances under a simple test where the energy consumption order matched the efficiency ranking order.
- Depending on the label, between 48% and 57% of participants were able to correctly identify the energy efficiency order of four appliances under a more exacting test where the energy consumption order did not necessarily follow the inverse of the energy efficiency order.

In a real shopping environment, it is likely that the real efficiency ranking order comprehension rates would be somewhere between the simple three-label example and the more complex, four-label example levels – i.e., between 53% and 73% without the benefit of discussion or assistance.

### Comprehension of other label information

Aside from the changes in the efficiency scale, the key change made to the new label design is the replacement of language-specific text with illustrative icons to convey performance information in a

language-neutral manner. A comprehension test of these icons found that most were eventually understood by the majority of participants, but it often took quite a long time for their meaning to be deciphered. Even when correctly surmised, participants were often quite unsure of whether their interpretation was correct or not. The most easily understood icons were for noise, capacity, and water use. About 80% of participants correctly interpreted the meaning of the noise icon, but the share fell to two-thirds in the case of the washing machine wash-cycle noise icon. Comprehension of the various capacity or size icons was always higher than 70% and sometimes as high as 100% (for washing machines and television screen size). Over 70% of participants correctly interpreted the meaning of the water use symbol on the washing machines and dishwashers, but many questioned its usefulness and queried how it was possible to predict the frequency of use of dishwashers or washing machines. Many said they would prefer to know water use per wash cycle rather than per year, for this reason.

Three icons gave participants particular difficulties:

- i) Less than 30% correctly interpreted the meaning of the dishwasher drying icon and A-to-G grading scale in the one-to-one interviews;
- ii) Only a small minority were able to correctly interpret the on/off icon on the televisions label as indicating the presence of an on/off switch; and
- iii) Only 20–30% of participants were able to correctly interpret the meaning of the television on-mode power demand icon. The most frequent incorrect answer was that the numerical figure represented energy consumption in standby mode.

Aside from the icons, most consumers did not understand that the text across the top of the label says 'Energy' in each national language. Many were confused by the different word endings and thought that they were letters symbolising the names of countries, similar to the country abbreviations seen in oval labels on the back of cars.

Most participants did not appreciate that the label was an EU scheme administered by the European Commission; many, albeit a minority, thought it was administered by manufacturers.

The majority of participants were unsure what the length of the arrows in the A-to-G scale signified, but most thought (correctly) that the longer the arrow, the more energy the product would consume.

Finally, in some countries (notably the Czech Republic and France) there was a very low comprehension of the word 'annum,' as used to indicate annual energy or water consumption (e.g. kWh/annum), and this hindered participants' comprehension of this critical parameter.

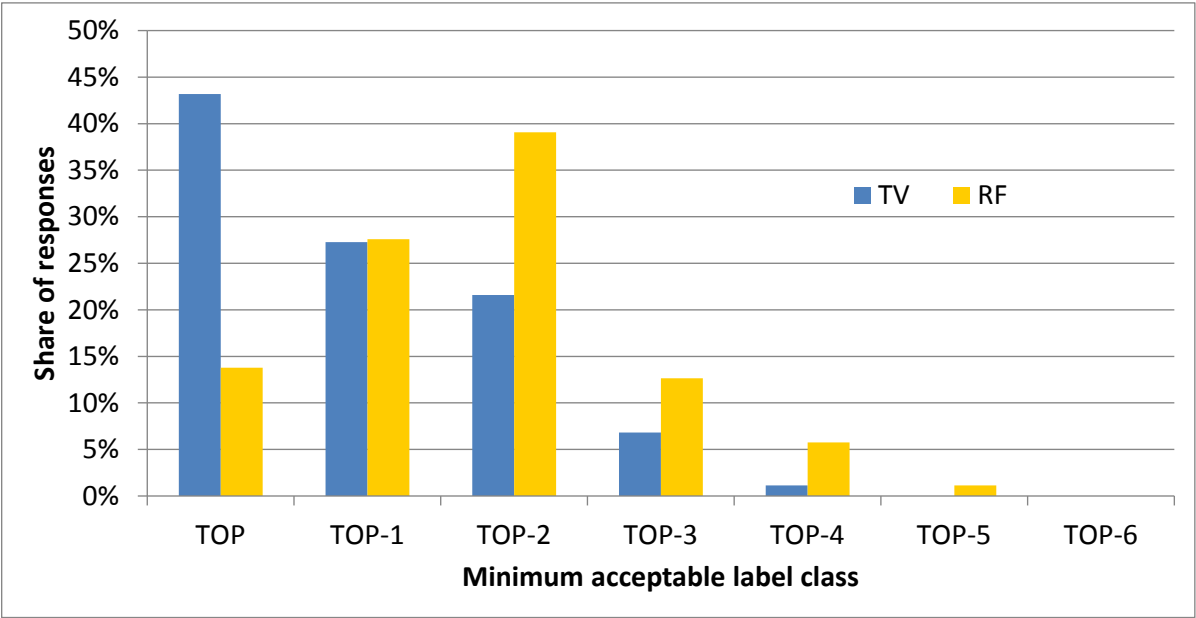
### **Salience and motivational impact of the new label**

European consumers are generally quite strongly motivated by the energy performance of products when they consider purchase decisions. Almost half of the participants mentioned energy performance as an important criterion in their purchasing decisions before they had been prompted to think of energy or the energy label. Most participants also stated that they considered the energy efficiency classifications and energy consumption to be the most important information on the energy labels.

- Almost all participants found the colour graduations used in the efficiency scale to be salient, with the desirable, environmentally friendlier, or energy efficient products being at the green end of the scale and the least desirable, less energy efficient products being at the red end.
- Participants often compared the colours to traffic lights. Colour clearly had a very strong influence on participants' views of the product concerned, such that some even doubted whether products in the red part of the efficiency scale were still produced or were permitted to be sold.

- Notably, the majority of participants were motivated by the information on the label, especially the colour scale, such that many asserted they would only consider buying an appliance ranked in the green part of the scale.
- It was equally apparent, however, that the strength of this sentiment was less pronounced for the revised energy labels, with the grades A+ to A+++ in the green part of the scale, than for the new television label, on which the grades A, B, and C are all in the green part of the scale. Many participants said that while A+++ was better than A, the latter was already a good grade and there were diminishing returns from going to higher efficiency levels.
- This latter finding was confirmed by a test of what efficiency level participants considered would be the minimum acceptable to them if they were buying a television or a refrigerator-freezer. Class A (the top label class) was comfortably the most common choice for televisions, the label for which uses an A-to-G scale, whereas the A+ class (the third class from the top) was the most common choice for refrigerator-freezers, the label that uses an A+++-to-D scale (Figure ES2). Thus, when A+++ is at the top of the scale, it is clearly less compelling to consumers than when A is at the top of the scale.

**Figure ES2. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer (RF; Top class = A+++)** or television (TV; Top class = A); responses given with no group discussion.



- When asked how much more they would be prepared to pay for a higher efficiency appliance compared to a mid-range efficiency model costing €300, on average participants were willing to pay 44% more. This indicates that the label is motivating and that most people are prepared to pay more for a product that will be less costly to operate and less harmful for the environment.

## Principal Policy Conclusions

In general, this research demonstrates that the new label works quite well and that most consumers are able to understand the more important elements and use this information to inform their purchasing decisions. The use of icons and language-neutral imagery works for the majority of users in most instances, but creates a problem for an important minority. Furthermore, some icons are appreciably less self-explanatory than others.

Overall, the research shows that comprehension rates measurably increased with explanation by peers. It is likely that if Member States strengthened their education and outreach efforts, labelling comprehension rates – and therefore label market transformation impacts – would be raised. Outreach and educational efforts are also likely to increase confidence in the label, as most consumers are unsure who operates the scheme, and this causes its independence and credibility to be questioned.

Most consumers find the information on the label helpful and informative and generally appreciate the aesthetics of the design. The colour scale is particularly appreciated and important to consumers, and it is clear that the single most important threshold on the energy label, from a motivational perspective, is not the lowest or highest efficiency class, but the point at which the label turns from yellow to green. Most consumers said they would only consider purchasing a product in one of the green efficiency classes. Thus, if market transformation impacts are to be maximised, much more attention needs to be focused on the choice of efficiency threshold that delineates this boundary in future label design exercises.

It is clear that consumers generally thought that if a label class was shown on the label, products in that class were still available on the market. The fact that in some cases lower efficiency classes indicated on the label are prohibited from sale by Ecodesign regulations was not understood by any of the participants. It would therefore be appropriate for efforts to be made to either discard redundant classes or use some other means to indicate when efficiency levels are no longer permissible, in order to avoid misleading consumers and to maximise market transformation effects.

While there was no significant difference in the ability of consumers to comprehend the label efficiency rank order if either an A-to-G scale or an A+++ to-D scale is used, there is a significant difference in the motivational effect that this scale has. When A is the top of the label scale, it is much more motivating to consumers than when A+++ is at the top. This conclusion may be unwelcome, but the research findings are definitive that this change has weakened the market transformation impact of the label. It is therefore proposed that the Commission's recently commissioned study to evaluate the revised energy label should explicitly examine this effect, and if its findings confirm those in the current study, reconsideration should be given to moving to a regular re-grading of the A-to-G scale in preference to adding new, higher efficiency classes. The research findings indicate that the lowest energy efficiency class that the majority of consumers say they are willing to purchase is two label classes lower when A+++ is the highest efficiency class on the label compared to when A is the highest class.

Appreciable problems in comprehension were also identified with (i) three specific icons used on different labels and (ii) with the word 'Energy' and its associated national language suffixes. It is therefore proposed that work be undertaken to develop and test improved means of communicating the information that these elements are intended to convey.

In general, it is strongly recommended that all future proposed design modifications for the energy label be tested for efficacy with consumers prior to any decision being made on their deployment.

## EXTENDED EXECUTIVE SUMMARY

The European Union's (EU's) energy labelling programme dates back to the mid-1990s and is one of the most influential and successful energy labelling programmes in the world. The original label design was the first leading energy label design to be informed by consumer research, which helped to guide the adoption of key elements, including the A-to-G energy efficiency classification scale with stacked horizontal bars coloured from green to red (Figure EES1).

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Impact assessments of European equipment energy efficiency policy measures have historically found that the EU energy label has been the most influential instrument in driving forward the energy efficiency of European equipment markets; therefore, it is important to assess its continuing effectiveness whenever changes are made to the label's design and implementation. These impact assessments have also focused on issues of implementation, e.g. the original energy labelling framework directive was first reviewed in the late 1990s (Winward *et al.*, 1998).

In 2010, the original Energy Labelling Directive was recast. Its scope of applicability was broadened. Many of the existing labels – specifically those applying to refrigerators and freezers, washing machines and dishwashers – were redesigned (Figure EES1). A new label was launched for televisions. All four of these new labels were implemented in November 2011 (Figures EES2 and EES3).

Much discussion preceded the adoption of these new labels with respect both to aspects of the design and how to effectively address the concentration of the markets in the highest label classes for products that had been labelled for some time (DGET, 2009; Heinzle & Wüstenhagen, 2010; Ipsos Marketing, 2008; Which?, 2009). This discussion centred on whether it would be better to re-grade the old A-to-G energy efficiency scale or to add new higher efficiency classes above class A. Finally, a decision was made to add higher efficiency classes for products becoming concentrated in the higher efficiency classes and to adjust the label such that it was made of a single entity and was language-neutral – i.e. the label being identical across all of the Community. The main changes in these labels compared to the earlier EU designs are that:

- They are issued as single labels (as opposed to the old two-part labels);
- They are the same for all markets – that is, they no longer contain national language-specific information (except for the word 'Energ[y]', which is written in all major EU languages);
- They make use of icons to communicate a variety of performance factors; and
- The energy efficiency classification used varies across products. Most of the revised labels range from A+++ to D; however, the scale for the new television label is A to G.



Figure EES1. The new (left) and old (right) energy labels.

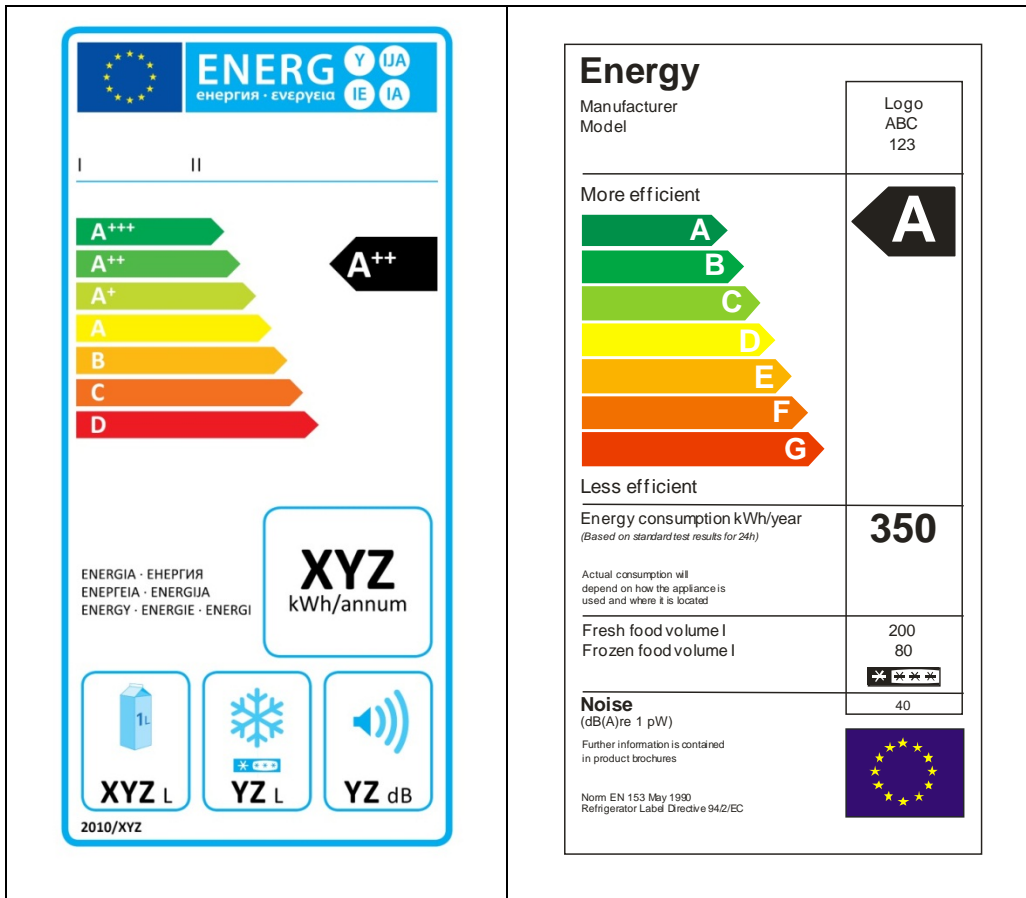


Figure EES2. The new refrigerator-freezer (left) and washing machine (right) energy labels.

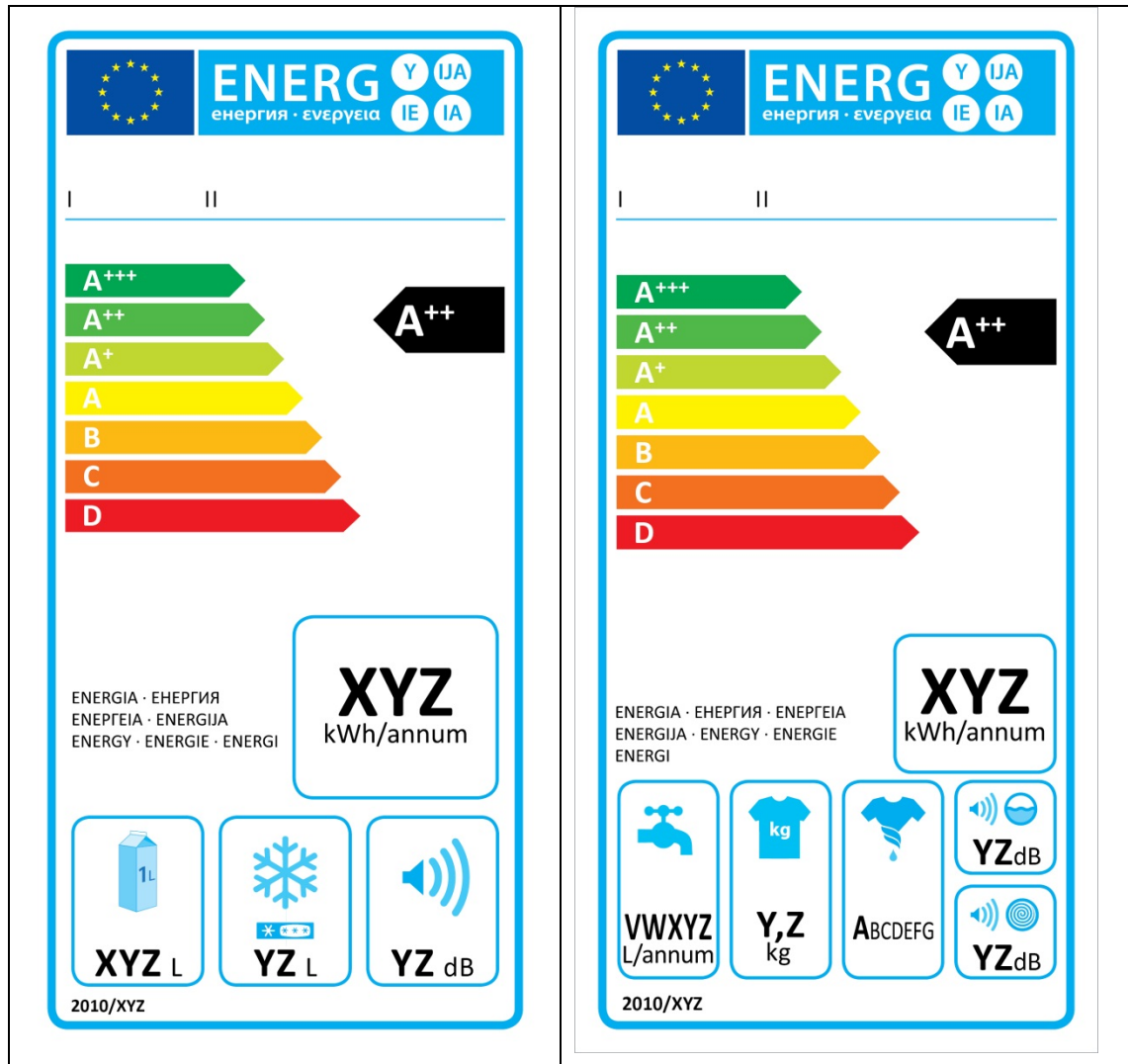
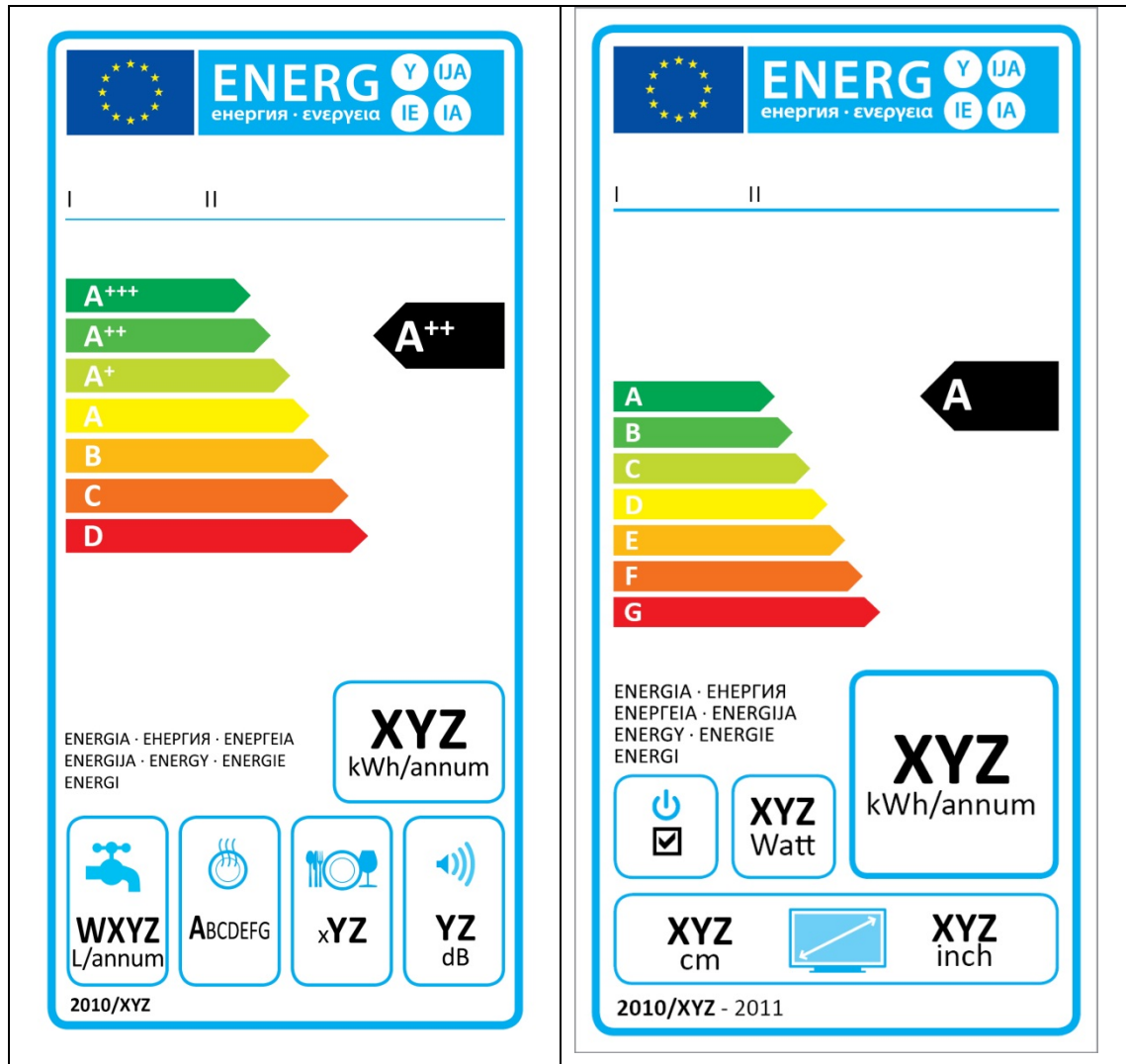


Figure EES3: The new dishwasher (left) and television (right) energy labels.



Against this context, the current project examines the effectiveness of the new labels with regard to how well they work in practice with consumers. The research was not designed to examine the issue of whether or not any competing designs would be more or less effective than those finally adopted; rather, the aim was to examine the effectiveness of the current designs in relation to their purpose, which is to support consumers in making informed choices about the energy efficiency of appliances when making a purchase decision. To this end, a mixed research methodology was applied that used questionnaires, consumer focus groups, and in-depth consumer interviews to gather quantitative and qualitative data on how consumers use, understand, and are motivated by the new and revised labels.

Ten consumer focus groups and 30 in-depth interviews were conducted at ten different locations across the EU to determine the degree to which consumers comprehend and make use of the new and revised energy labels introduced at the end of 2011. The research was conducted, in chronological order, in London, Prague, Madrid, Athens, Warsaw, Frankfurt, Paris, Copenhagen, Milan, and Sofia.

After preparation of the research methodology and the related moderator guides, questionnaires, and show cards, ten in-depth interviews and a focus group were conducted in London as a pilot exercise.

This was successful and was then repeated with very minor refinements in the remaining locations. Focus groups were conducted in the ten locations above, and ten in-depth interviews were conducted in each of London, Prague, and Paris. Questionnaires were completed by all participants, and DVDs were made of the focus groups and/or in-depth interviews. English transcripts of the conversations recorded on the DVDs were produced for all locations except the UK and were verified by a researcher fluent in the original language. The resulting questionnaires and transcripts were then analysed transversally to determine the responses to a broad, yet targeted set of questions designed to determine the effectiveness of the labels and probe how consumers use and understand them.

## Key Findings

It is clear that the new labels are generally appreciated and have a reasonably high level of comprehension thanks to the overall effectiveness of the label efficiency scale, use of colour, efficiency classification, and energy consumption information. Most consumers were able to use them to correctly rank the efficiency of products in simple, three-label tests, but a significant minority had difficulty in doing this. However, there was evidence that this could be overcome through explanation, which implies that public education programmes to better explain how to use the energy labels would be useful.

Efficiency was a reasonably important parameter for participants, with the majority being strongly motivated by the information on the label such that they would not consider buying products in lower efficiency classes and were prepared to pay roughly half as much again on average for higher efficiency products, compared to those with mid-range efficiency.

The choice of colours, especially green, in the efficiency scale had a large impact on consumer preference, such that the single most important division in motivating consumers was the division in the efficiency classification scale between the three green classes and the rest. This implies that the demarcation of the efficiency threshold between the green grades and the rest will have a larger market transformation impact than any other efficiency threshold demarcations on the label and should therefore merit very careful consideration when devising efficiency thresholds.

There is no significant difference in comprehension between the A-to-G label formats and the A+++-to-D formats, but there is evidence to suggest that the higher efficiency classes in the A-to-G label formats are more motivating than their corollaries in the A+++-to-D label formats. The labels were generally well liked and appreciated, and participants preferred the look of the new labels compared to the old. However, participants expressed the most dissatisfaction with the elements of the new labels that they had difficulty in understanding. These were often easier to understand in the old label because nationally specific language was used in each country to explain the parameters.

The decision to move toward a universal language-independent energy label was taken to address different issues, and policy-makers must have always thought it likely this would result in some loss of comprehension. The results from this survey support this but demonstrate that in many cases the icons used to convey what was previously conveyed in words are successfully understood and that it is only certain icons that present significant difficulties. In principle, these deficiencies could be addressed in part through targeted educational efforts such as in-store leaflets and sales staff training.

Difficulty in comprehension was also found with regard to the word 'annum', which was understood in many markets but barely at all in others.

Somewhat surprisingly, most participants were unaware that the energy labelling scheme is an EU-wide initiative initiated by the European Commission, and many thought the labels are issued or managed by other entities such as manufacturers. This suggests there may be benefit in promoting the role of government in authoring and managing the labelling scheme to increase its credibility among consumers. Many were also unclear that the label is principally about energy and efficiency, although most made this connection; however, this did not seem to greatly hinder how participants used or understood the label.

## **Detailed Findings:**

### **1. How top-of-mind is energy efficiency?**

When asked to mention up to seven criteria they would consider when purchasing a major household appliance, 53% of participants spontaneously mentioned energy, energy efficiency, or a closely related parameter. These aspects were included within the top two criteria by 30%. Energy efficiency had not been raised as a topic at this point in the focus groups or interviews; nor had any energy labels been seen. This finding suggests that energy-related performance is a top-of-mind concern for consumers, as it was the most frequently mentioned purchasing consideration (along with price) among the top two purchasing criteria listed by participants and was mentioned more than twice as frequently as appliance brand.

### **2. Who is issuing the energy label?**

Many participants expressed confusion over who was behind the labelling scheme, and there was a wide variety in responses to a question regarding which body had issued it. The most common answer was that manufacturers issued the labels (27%), closely followed by the EU (26%). Other common choices were standardisation bodies, consumer bodies, and national government agencies. When participants who stated that they thought the EU had issued the label were asked why they thought this, their rationale was the presence of the EU flag in the top left corner of the label. Some of those who said that manufacturers had issued the label recognised that they would have to be guided or monitored by an independent organisation to control the information. However, an important minority of participants queried the trustworthiness of the label information, which suggests that the label's credibility would be enhanced if it were more generally understood that national governments are responsible for the implementation of an EU-wide scheme.

### **3. Purpose of the energy label**

When asked about the primary purpose of the label prior to any discussion or leading information, 55% of participants answered 'energy consumption and/or energy efficiency', 35% 'technical specifications and features of the product', and 9% 'how "green" the product was/environmental information'. 'Energy class' was noted by 8% of participants. Thus, a majority appreciate that the primary purpose of the label is to inform people about the product's energy performance, but a sizeable minority see the label as a general technical label.

### **4. Most salient information on the label**

The majority of participants in the focus groups considered the most important information on the label to be the energy rating/class (90% of the groups discussed this). Energy consumption and capacity were also discussed more than other elements of the label, such as size, colours, and 'energy' as a general term. The in-depth interviews also showed the energy efficiency or energy class of the product to be the most important piece of information on the label (40% of participants for both the refrigerator and the

television). Energy consumption was the second most popular answer. Other answers were size, capacity, freezer stars, and brand. This confirms that most users of the label focus upon the energy and energy efficiency information.

## **5. The word 'Energ[y]'**

Only a minority of participants, with a strong variability by focus group, understood right away that the word at the top of the label is 'Energy' in all European languages. This may have affected the share of participants who were correctly able to determine the primary purpose of the labels. In particular, many participants did not make a connection between the language-specific suffixes in the bubbles and the preceding prefix 'Energ'.

## **6. Ability to recognise the highest energy efficiency class an appliance may have**

The highest energy efficiency class it is possible to have was correctly identified by 80% of participants without conferring. After discussion among focus groups, the share of correct answers rose to 92%. No significant difference was found between the refrigerator-freezer and television label cases.

## **7. Ability to correctly understand energy efficiency classifications**

### ***Comprehension with no prior exposure or discussion***

#### *Efficiency ranking tests*

When presented with a choice among three labelled products, averages of 85% and 81% of participants were able to correctly identify the products with the highest and lowest energy efficiency classes, respectively, on first exposure to the labels without assistance or discussion. The share of participants who correctly identified both the highest and the lowest efficiency products was 77%. Re-exposure to the label made little difference to the results, with a slight but statistically insignificant increase in the share of correct values.

The above tests were performed with simple choices where the energy consumption rank order followed an inverse relationship with the energy efficiency class order. While this will sometimes be the case when shopping for appliances, there are many instances where the efficiency rank order is not simply inversely related to energy consumption because of differences in the capacity (size or volume) and features of an appliance. To test this more complex but common situation, the rank order comprehension tests were repeated with more complex examples comprising four labelled products where the efficiency order did not follow a simple inverse relationship with energy consumption. In this case, with regard to refrigerator-freezers, 73% of participants were able to correctly identify the model with the highest energy efficiency class, and 63% could correctly identify the model with the lowest energy efficiency class without assistance or discussion. For the television label, 78% of participants were able to correctly identify the model with the highest energy efficiency class, and 71% were able to correctly identify the model with the lowest energy efficiency class.

The share of participants who correctly identified the energy efficiency ranking of all four models was 55% for the refrigerator-freezer label and 47% for the television label. In a real shopping environment, it is likely that the rank order comprehension rates would be somewhere between the simple three-label example and the more complex, four-label example levels (i.e. 51–77%) without the benefit of discussion or assistance.

#### *Explanation of the comprehension levels observed*

Questions to probe participants' interpretation of the energy efficiency classifications found that they would generally rank product efficiency through inspecting the coloured bar scale, the letter and plus

signs (if present), and the annual energy consumption. The explanations given by those who misunderstood the efficiency ranking did not reveal any clear patterns for why they misunderstood, except that in some cases participants had focused purely on the annual energy consumption to make their rankings and had ignored the energy efficiency class. It was clear, however, that the relative focus given to the label information varied among participants such that some would make a decision by looking at which product had the highest vertical rank on the scale, some through the colour coding (where deeper green was almost always seen to be more efficient), some by the grade of the letter and plus signs and some by the annual energy consumption.

#### *Influence of the type of efficiency scale end points on the comprehension of efficiency rank order*

The share of correct responses to these tests was found to be statistically inseparable for the television energy label (which uses a simple A-to-G efficiency scale) and the refrigerator-freezer label (which uses an A+++-to-D efficiency scale), suggesting that there is no significant difference in consumer ability to comprehend either scale. It is possible that significant differences would be discovered if larger sample sizes were used, but the results already indicate the average difference is likely to be small.

#### *Influence of mixing A+-to-F with A-to-G scales on rank order comprehension*

A four-label efficiency rank order comprehension test was also conducted for televisions using a mix of products such that most were on the current A-to-G scale but with one being on an A+-to-F scale (this is already permitted if a product meets the A+ requirement, but will be the mandatory scale for televisions from 2014). The share of correct answers for all four labels was 63%, but was 71% for each label individually (much the same as for the more complex, four-label test). There was no evidence from this test that mixing the A+-to-F scale with the A-to-G scale created significant difficulties in comprehending the order of the efficiency class ranking.

#### ***Comprehension following prior exposure and discussion***

The proportion of correct answers for all the efficiency ranking tests improved significantly when the tests were repeated after participants had discussed their thinking as a group. On average the proportion of incorrect answers fell by 54% following group discussion. The increase in correct comprehension is statistically significant in all cases that were compared.

Much smaller and statistically insignificant improvements in the proportion of correct answers were found when participants were simply presented with another label rank order test without discussion or assistance. Thus, simple familiarity with the labels was not shown to increase comprehension rates.

In general, these findings support a thesis that consumer education would be likely to improve the effectiveness of the energy labels through explaining how to use them, thereby lowering the proportion of incorrect rank order decisions.

#### **8. Comprehension of the magnitude of the numerical values**

When presented in isolation, the absolute figures on the labels (whether expressed in watts, kWh/annum or dB) have little meaning to most participants; however, almost all participants found this information helpful when they could compare the values to those for other products, i.e. the relative values were much more salient than the absolute values. Participants were most likely to express an understanding of the magnitude of the wattage values (given only for the on-mode power of televisions), which they could relate to more familiar entities such as the power used by light bulbs. Some also had an understanding of what the absolute magnitudes of kWh/annum implied. In general, while there was a certain level of recognition that 'dB' indicates decibels and a minority expressed awareness that it is a logarithmic scale, none of the participants had any idea what value constituted a



high noise or a low noise. Thus, its informational value was only through relative comparison with the noise indicated on other products and whether consumers thought noise was likely to be significant (which for most appliances they did not).

## **9. Comprehension of label icons**

### *Noise icons*

The meaning of the noise icon on the refrigerator-freezer and dishwasher labels was correctly identified by 80% of in-depth interviewees.

In the case of washing machines, noise icons are indicated separately for the noise during washing and during spinning, respectively. For the washing cycle noise icon, 66% of the in-depth interviewees and all the focus groups made the correct interpretations. Among the incorrect answers, half made a connection between the symbol and sound levels. However, they thought 'noise' related to water supply/discharge, to when the drum is stationary or to when the drum is half full, or they did not have any explanation. Other participants who could not make correct interpretations did not know what the symbol meant but thought it was related to water, the speed of the rotating drum, the rinse cycle, or the temperature of the cycles.

With respect to the spin cycle noise icon, 73% of the in-depth interviewees and all the focus groups ascertained the correct interpretation. Among the in-depth interviewees, 13% appreciated that the icon indicates noise in decibels but were unable to correctly specify that it relates to the spin cycle of the machine.

### *Refrigerator-freezer capacity icons*

In general, most participants were able to correctly interpret the volume, capacity, and noise icons. The meaning of the refrigerator compartment and freezer compartment volume icons was correctly interpreted by 75% and 86%, respectively, of the in-depth interviewees. The most common error by those who misinterpreted them was in thinking that refrigerator volume refers to the volume of the entire appliance rather than just the refrigerator compartment. Half of the focus groups incorrectly concluded that the refrigerator compartment volume refers to the volume of the whole appliance, even though they all correctly interpreted the sense of the freezer capacity icon.

### *Water use icon*

All of the focus groups and two-thirds of the in-depth interviewees correctly identified the meaning of the annual water use icon on the dishwasher and washing machine labels. Among those who did not make correct interpretations, while most knew the icon relates to water, they either did not understand what 'annum' means or did not appreciate that it specifically indicates water consumption.

The majority of participants had an opinion on how the information on water consumption should be displayed. Most queried how the figure was calculated and assumed it was based on an average family's usage pattern, which many doubted was of direct relevance to them. It seems that only a minority appreciated that the primary value is in having information on the relative consumption of one product compared to another. Some participants thought that an icon showing water consumption per cycle would be more meaningful and useful to them, while a smaller proportion (of those who reflected on this issue) expressed a preference for average annual water consumption, as is currently shown.

### *Washing machine capacity icon*

All participants correctly interpreted this icon.



### *Dishwasher capacity icon*

This icon was generally well understood, with 70% of in-depth interviewees and all the focus groups correctly understanding the icon. Of those interviewees who did not understand, 63% simply said they did not know and did not attempt to guess, while the remaining 37% thought the icon refers to a particular washing cycle for delicate objects such as china and glassware.

### *Washing machine spin-drying efficiency icon*

Interpretation of this icon was generally correct. The t-shirt icon appears to effectively communicate laundry, and the twisting of the t-shirt and water droplet at the bottom of the t-shirt effectively communicates drying. For the A-to-G scale, the majority of responses showed an understanding that there is a sliding scale/best to worst in performance, and most participants correctly understood that it refers to the drying efficiency of the spin cycle rather than to its energy efficiency.

### *Dish-drying efficiency icon*

This icon on the dishwasher label was more difficult for participants to interpret than most of the other icons. Dish drying was correctly mentioned in only two of the ten group discussions and in approximately eight of the 30 in-depth interviews. Many participants said they had no idea, while others advanced diverse theories about what the icon could mean.

In some cases, participants correctly interpreted the function being alluded to but imagined that the A-to-G classification refers to the energy efficiency of that function rather than the quality with which the service is performed (the correct interpretation).

### *Television screen size*

This icon was universally understood. Most participants understood that the size was given in inches and centimetres, but in some countries the younger age groups were not familiar with inches; however, this did not prevent them from understanding the icon in metric units.

### *On/off icon on the television label*

The on/off icon on the television label caused the most confusion among all the icons, with only a minority of participants correctly interpreting it as indicating the presence of an on/off switch. Many either thought it refers to the presence of standby mode functionality or had no idea of its meaning.

### *Television on-mode power demand icon*

This icon was rather poorly understood. Only 30% of the in-depth interviewees and two of the ten focus group discussions correctly interpreted its meaning. The most common incorrect answer was that the figure represents energy consumption in standby mode. Other incorrect answers linked the figure to energy and power consumption but could not categorically say what the figure refers to.

## **10. Interpretation of specific label elements**

### *Colours in the energy efficiency scale*

Almost all participants found the colour graduations used in the efficiency scale to be salient – with desirable, environmentally friendlier, or energy efficient products being at the green end of the scale and the less desirable, less energy efficient being at the red end. The colours were often compared to traffic lights and clearly had a very strong influence on participants' views of the product concerned, such that some even doubted whether products in the red part of the efficiency scale are still produced or permitted for sale.

### *Significance of the length of the arrows*

The lengths of the arrows were often described as looking like a pyramid, which seemed to reinforce the notion that the scale should be read from the top downwards, with the highest efficiency products at the top. The majority of participants were unsure what the length of the arrows signify, but most said that the longer the arrow the more energy they expected the product to consume, which is a correct interpretation. Some speculated that the difference in energy consumption between classes should be proportional to the difference in arrow length (which it is not), but others thought that the difference in energy consumption is less between the most efficient classes than between the lower efficiency classes. This was especially the case for the A+++ to A part of the scale on the refrigerator-freezer label. Most participants who speculated on this issue seemed to think a consistent approach would be used across the labels, although this is not currently the case. The issue of whether the revised energy labels should use a constant increment of energy or a constant increment of efficiency to demarcate the efficiency steps between classes was first considered in the COLD II study in 2000 and has yet to be resolved in a consistent manner.

### *Significance of the letters*

Nearly all participants recognised that the letters represent the coding of the energy class and constitute an alphabetical ranking. They were often described as 'differentiators'. It was understood that A stands at the top of the group and is the best class and that G is the worst. Many spontaneously linked the A-to-G scale to school grades and other pre-existing/familiar ratings. There seemed to be no specific difficulty in interpreting the significance of these letters in countries that do not use Latin characters, such as Greece and Bulgaria.

### *Significance of the black arrow and letter*

Around 90% of the in-depth interviewees and all those vocal in the focus group discussions were able to link the letter in the black arrow to the product itself, showing very high comprehension that it indicates the product's actual efficiency. In some cases, explored more individually in the in-depth interviews, it was apparent that participants did not always connect the ranking in the black arrow with the ranking of the specific product in question, nor did they associate it with the alphabetical rankings in the efficiency scale on the left of the label. It is possible that failure to associate the two elements in the scale has been slightly compounded by the design change in the revised labels, where the letters within the coloured arrows are now at the left edge and no longer at the right end of the arrow (Figure EES1). This increased gap between the letters on the coloured arrows and that in the black arrow has potentially weakened the cognitive association between the two.

### *Interpretation of the efficiency range*

Usually participants were not informed about either the range in efficiency of products on the market or about Ecodesign requirements, so they often imagined that the label shows the same range of efficiency classes that can be found on the market. In reality, however, this is often not the case as lower efficiency classes may be prohibited from sale because of Ecodesign regulations. Whether the labels should be modified in some manner to indicate when classes are no longer permitted for sale is a point for discussion, but it is clear that at present many consumers will falsely interpret an efficiency class as being present on the market if it is indicated on the label. This could weaken the market transformation effectiveness of the eligible classes.

Many consumers anticipated that the highest efficiency classes might be too expensive for them and that the bottom classes would not meet their requirements, thus it was common for them to state they would be satisfied with a product at the bottom of the green-arrowed label classes.

### *Significance of the plus (+) signs*

Most participants appreciated that the inclusion of a + sign next to the letter A indicates it is a higher grade than an A alone; however, they were often unsure why three options (+/++/+++ ) are mentioned, why the plus signs are only applied to the A class, and why this is used for only some appliance types. Some participants seemed to find it slightly difficult to see exactly how many plus signs were included, sometimes mixing up ++ and +++. Some participants queried the point of the plus signs and could even find them annoying or patronising.

In general, while almost all participants were able to correctly interpret the top and bottom of the efficiency scales, there was some evidence that participants found the A to be a more definitive top of scale when used on an A-to-G scale compared with the A+++ used on an A+++-to-D scale. Equally there was a tendency for the difference in energy efficiency between A and D (as applied to televisions) to be considered more significant than the difference between A+++ and A (as applied to the other products); however, participants also often said they did not know what the difference between classes is, i.e. how big the difference is between them.

There was often an interpretation that there is less difference in energy efficiency between adjacent A, A+, A++, A+++ classes than between adjacent classes using different letters. Some seemed to think the plus signs indicate subdivisions within a class rather than a whole new class, and some asked why there are plus signs for the A class but not for the other lettered classes. With regards to terminology, most participants referred to the + signs as 'plusses' but many referred to them as 'stars'. Some participants also queried why the plus sign is used for some products but not others, and found this usage to be inconsistent.

### *Annual energy consumption*

Annual energy consumption is written as 'kWh/annum' on the label. Almost all participants recognised that 'kWh' refers to energy, although many used the term 'kilowatts' rather than 'kilowatt-hours'. Most participants also understood that 'annum' refers to 'year' and that the whole value is annual energy consumption; however, there were specific difficulties in understanding this term in the Czech Republic and French focus groups (although not so much in the in-depth interviews). It is therefore possible that there will be a systematic difficulty in the Czech Republic in understanding that the figure refers to annual energy consumption.

## **11. Directive number**

The directive number on the bottom left of the label was correctly interpreted by only a very small proportion of participants.

## **12. Appeal of the top energy label class compared to the middle class**

When asked to compare the A class to the D class for televisions and the A+++ to A for refrigerator-freezers, most participants appreciated that appliances at the top of the scale, whether an A or A+++ , are the most efficient. Participants were more expressive when discussing the merits of an A+++ appliance, calling it 'superior' and 'positive'. However, the difference between A+++ and A caused some confusion and some referred to the colour rather than the letters to make sense of the scale. One or two participants expressed a preference for the A-to-G scale, describing it as 'nice and easy'.

Comparisons were drawn between the television and refrigerator-freezer labels, with some participants describing them as being the same; others considered the mid-point better for refrigerators (A class) when compared to televisions (D class).

The difference perceived by participants with regard to efficiency between the middle and top classes appeared to be greater for televisions than for refrigerator-freezers. Participants were more likely to describe the difference between A and D as being 'big' or 'great'. For the A to A+++ scale, they were more likely to say there is no difference or that there is a difference but they did not know what it was.

### **13. Minimum acceptable energy efficiency class**

When asked about the minimum energy efficiency class they would consider acceptable when purchasing an appliance for their own use, the majority of participants indicated a level among the top three classes (91% for televisions and 82% for refrigerator-freezers). A very common answer to justify this response was that they would only choose an appliance in the green range of the efficiency scale. This finding is extremely important as it indicates that the position of the green to yellow colour threshold might have the largest impact on purchase decisions.

There was a significant difference in the choices participants made for the television labels as opposed to the refrigerator-freezer labels. In the case of televisions, the A class was comfortably the most common choice, with 45% of participants saying that they would not accept anything less. The B class was the next most common choice, with 25% of participants indicating they would find this the minimum. In the case of refrigerator-freezers the third class from the top (A+, occupying a position on the refrigerator-freezer energy label equivalent to that of the C class on the television label) was the most common choice, at 39%. The top two classes (A+++ and A++) were selected as the minimum acceptable class in 15% and 28% of cases, respectively. These results indicate that:

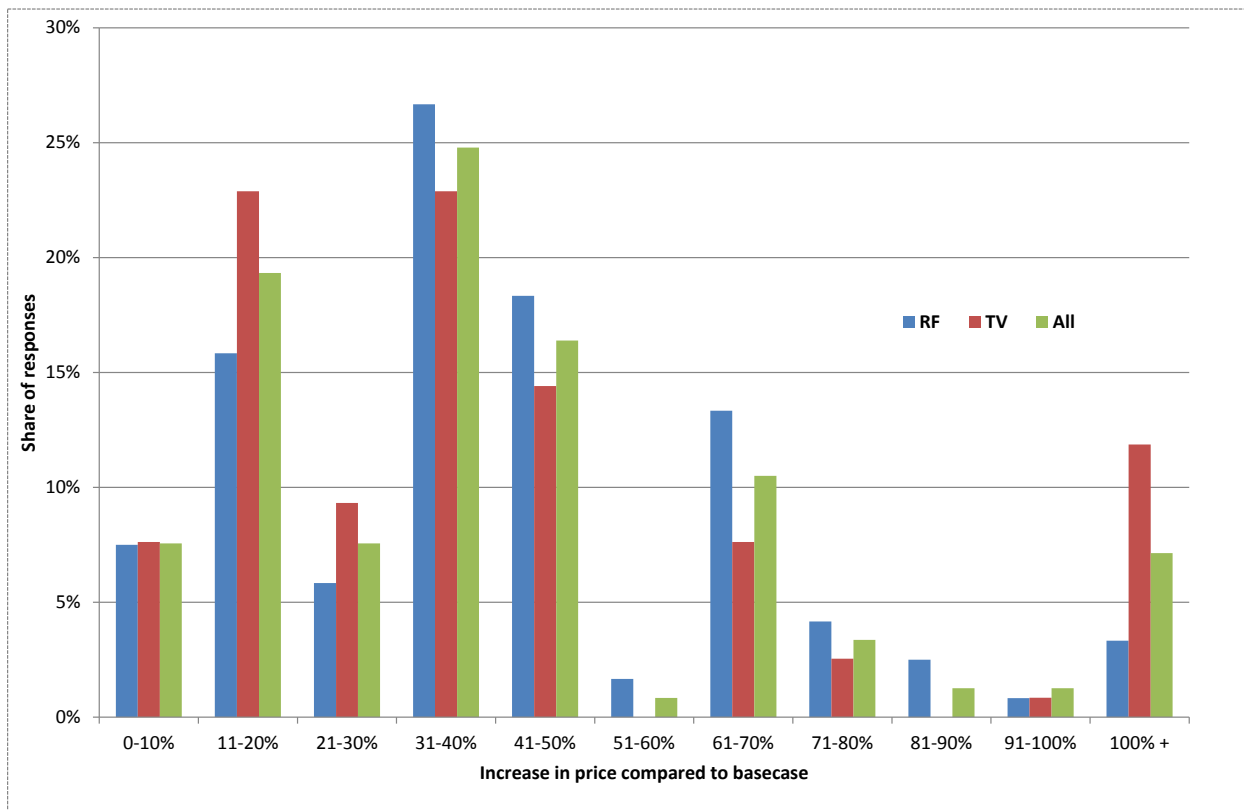
- The label efficiency classification has a large influence on consumer decisions regarding the acceptability of products;
- The large majority of consumers will only consider selecting a product in the green part of the efficiency scale (this covers the top three label classes on all the labels); and
- The top efficiency classes of the television label, which uses the A-to-G scale, are significantly more motivating for consumers than the top classes of the refrigerator-freezer label, which uses the A+++ to-D scale.

The last point is further reinforced by a body of comments where consumers made it clear that they considered energy consumption and efficiency to be more important for refrigerator-freezers than for televisions. In other words, the fact that they were more motivated by the top A class on the television label than by the top A+++ class on the refrigerator-freezer label, despite a perception that energy consumption is less significant for televisions than for refrigerator-freezers, emphasises the importance of the choice of scale with regard to consumer motivation.

### **14. Willingness to pay for higher energy efficiency**

When asked how much more they would be prepared to pay for a higher efficiency appliance compared to a mid-range efficiency model costing the equivalent of €300 in rounded local currency units, on average participants stated that they were willing to pay 44% more (with a standard deviation of 30%) for the higher efficiency refrigerator-freezer and 50% more (with a standard deviation of 59%) for the higher efficiency television (Figure EES4).

**Figure EES4. Share of participants willing to pay incremental increases in price for a highest energy efficiency class product compared to a mid-range energy efficiency class product costing €300 in rounded local currency units (RF = refrigerator-freezers, n = 120; TV = televisions, n = 118).**



The base-case model was a class D for televisions, while the higher efficiency model was a class A. For refrigerator-freezers, the base-case model was a class A and the higher efficiency model was a class A+++ . In other words, the higher efficiency model was three classes higher than the base case for each appliance type. In both cases, the same fictional brand was used, and all the non-energy-related information on the labels was identical for the two choices.

This finding confirms that consumers are indeed prepared to pay significantly more for a product that is clearly more energy efficient than another one. The extra amount that consumers expressed a willingness to pay in this study is less than the incremental amounts reported in the St. Gallen study (Heinzle & Wüstenhagen, 2010) but is still appreciable and shows that when information on efficiency is clearly communicated, consumers are willing to invest in it.

It is also pertinent that the average increase participants said they were prepared to pay for higher efficiency televisions was greater than it was for refrigerator-freezers, despite the fact that they frequently commented that they considered refrigerator-freezer energy efficiency to be more important than television energy efficiency as the former was ‘on constantly’ and ‘used more energy’. This evidence supports the related hypothesis expounded in the discussion of minimum acceptable efficiency class – that consumers are more motivated by the top efficiency classes in the A-to-G label formats than they are by those in the A+++ -to-D label formats.

The discussions to probe participants’ thinking about the relative difference in efficiency between classes often provided corroborating evidence for this. Many participants asserted that A was already a

good grade and that better classes are very impressive and desirable but that the difference between them is not likely to be as great as it is between lower efficiency classes.

### **15. What is liked and disliked about the labels?**

Participants in all the countries said that they found the label informative, clear, and often easy to use. The most common reason stated for this was the use of the graded colours, which seemed to be appreciated in all the markets. The colours were considered to make the label easy to use when comparing across products and to help determine the relative performance of the product quickly. They also stated that the fonts and layout are clear and sometimes remarked that the labels are easy to interpret at a glance, which is useful in a real shopping environment when comparing goods. Many participants also said that they appreciated the selection of information presented on the labels.

Participants tended to dislike label elements that they had difficulty understanding or for which they could not see the point. In general, participants did not understand some of the label elements, most commonly some of the icons and the foreign languages at the top of the label, but also the word 'annum' and the efficiency scale. To address these problems, participants often requested for more explanation to be included on the label or for guidance about how to read the label to be offered. The most frequently disliked element of the label across the focus groups was that they did not understand the rating scale and energy classes (an average of 30% of the groups across both questions did not understand this); the second least liked element was the plus signs on the refrigerator-freezer labels (25%). The third most unfavourable element commented upon was the difference in the scales between the television and refrigerator-freezer labels, and that the A+++to-D scale for the latter is too complicated. The label layout was rarely criticised, but some participants mentioned that they thought there is too much white space above the efficiency scale for the television label.

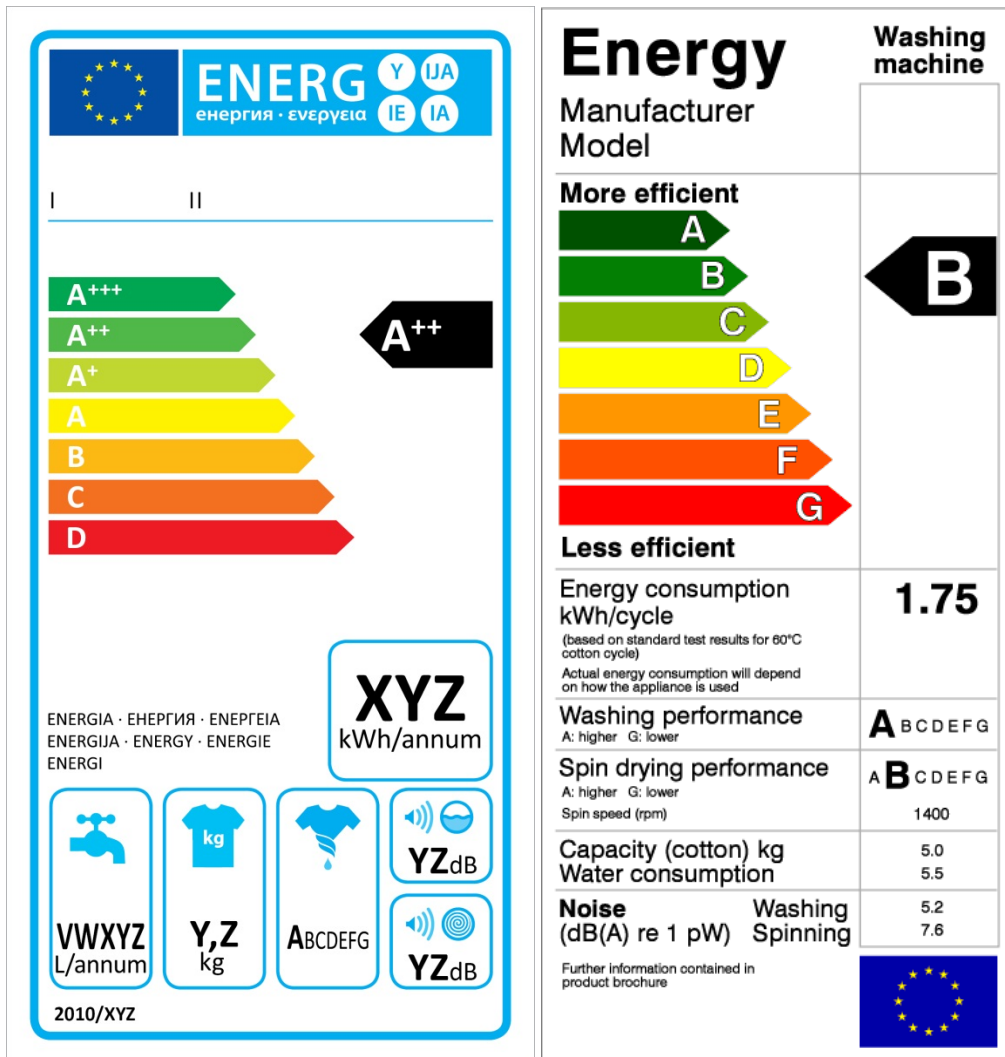
### **16. Old versus new energy labels**

None of the participants appeared to be aware that the new labels represent a change in the labelling scheme – i.e. the new design for most products and a wholly new label for televisions. When comparing the new and old energy labels, the new labels were often considered to have a better design (nice layout, big icons), but the old label was often considered significantly better in the following aspects.

#### *Energy consumption (cycle/annum)*

Energy or water consumption per cycle (such as on the old washing machine label) was considered to be more relevant by most participants than yearly consumption, as many people commented that they did not understand how their real household usage patterns could be estimated and averaged and that in any case such an average would be meaningless for them. Not all agreed with this, however, and some expressed a preference for annual values in order to gain a sense of the overall importance of the energy or water use for a particular product compared with others, including those that might serve a different function. The Greek focus group expressed a preference for the use of 'per annum', because the Greek word for 'cycle' means 'revolution' and is confusing.

Figure EES5. The new (left) and old (right) washing machine energy labels.<sup>2</sup>



*Annum*

Comprehension of the word ‘annum’ was often low (it varied strongly by focus group) and hence many participants were unsure what value was being reported for the annual energy consumption or water use figures. The responses suggest that there are likely to be systematic differences in comprehension of this issue by market depending on national cultural and educational factors. ‘Annum’ was least well understood in the Czech Republic.

Participants also mixed the terms ‘kWh’ and ‘W’, both being considered to indicate consumption.

*Textual information*

When asked to compare the old and new refrigerator labels, the focus groups did not often agree as to their preferred label. It was generally acknowledged that the design is better in the new label, in terms of the icons and the orientation, but that the information is less easy to understand. With regard to the

<sup>2</sup> This image is illustrative only. The old washing machine label image was only alluded to in the original survey, not shown to participants.



old label, the design was described as more cluttered and containing too much text, but the information was considered much simpler to understand, particularly for those who were not 'technical'. This is mostly because the old label included national language-specific explanatory text.

On balance, more people expressed a preference for the old label to the new one for these reasons, but most said they would like the new design with more textual explanation added. Many participants reported that they would welcome an explanatory legend or key in their language to explain key elements on the label.

### **17. Is the label missing anything?**

In summary, the items most commonly suggested as being missing from the label, by appliance type, were:

- Refrigerator-freezers – size, cooling temperatures, and price.
- Washing machines – energy and water consumption per cycle, and size.
- Dishwashers – calculation of per annum figure, water consumption per cycle, and size.
- Televisions – price, explanation of the icons, and product features.

Throughout all responses, size was mentioned most frequently – with the exception of televisions, the labels for which already include this information. Price was often mentioned with regard to refrigerator-freezers and televisions, and energy and water consumption per cycle was mentioned in respect to products with 'cycles'. In both cases, many participants in the group discussions countered that this information was likely to be present in brochures or adjacent to the label and hence need not be included on the label.

Participants were more likely to reply that there is sufficient information on the labels for refrigerator-freezers and washing machines (36%) than for either dishwashers (29%) or televisions (24%). This could mean that they understood more of the elements on the label and why they appear on the label.

### **18. Is there anything on the label that is confusing or should be changed?**

The most likely element that participants wanted to change or have explained more was the icons, specifically the ones that were poorly understood. The text on the label was also the subject of confusion, and some participants wanted all the language to be country-specific. The items that were most commonly cited as missing from the current label design were pricing information, price ratio, and cost per cycle data.

### **19. Overall usefulness of the label**

The large majority of participants thought that the energy labels were useful. They particularly appreciated the energy grades and coloured scale and found these to be the most useful elements to use in comparisons with other labels, even if they did not understand the entire contents of the label.

Some people expressed confusion over some elements of the label, mainly the icons, and said that if they fully understood those elements they would find the labels more useful. They thought that they would need to ask for more information from a shop sales assistant.



## Principal Policy Conclusions

In general, this research demonstrates that most consumers are able to understand the more important elements of the new label and use this information to inform their purchasing decisions. The use of icons and language-neutral imagery works for the majority of users in most instances, but creates a problem for an important minority. Furthermore, some icons are appreciably less self-explanatory than others. Overall, the research shows that comprehension rates measurably increased with explanation by peers. It is likely that if Member States strengthened their education and outreach efforts, labelling comprehension rates – and therefore label market transformation impacts – would be raised. Outreach and educational efforts are also likely to increase confidence in the label, as most consumers are unsure who operates the scheme, and this causes its independence and credibility to be questioned.

Most consumers find the information on the label helpful and informative and generally appreciate the aesthetics of the design. The colour scale is particularly appreciated and important to consumers, and it is clear that the single most important threshold on the energy label, from a motivational perspective, is not the lowest or highest efficiency class, but the point at which the label turns from yellow to green. Most consumers said they would only consider purchasing a product in one of the green efficiency classes. Thus, if market transformation impacts are to be maximised, much more attention needs to be focused on the choice of efficiency threshold that delineates this boundary in future label design exercises.

It is clear that consumers generally thought that if a label class was shown on the label, products in that class were still available on the market. The fact that in some cases lower efficiency classes indicated on the label are prohibited from sale by Ecodesign regulations was not understood by any of the participants. It would therefore be appropriate for efforts to be made to either discard redundant classes or use some other means to indicate when efficiency levels are no longer permissible, in order to avoid misleading consumers and to maximise market transformation effects.

While there was no significant difference in the ability of consumers to comprehend the label efficiency rank order if either an A-to-G scale or an A+++to-D scale is used, there is a significant difference in the motivational effect that this scale has. When A is the top of the label scale it is much more motivating to consumers than when A+++ is. This conclusion may be unwelcome, but the research findings are definitive that this change has weakened the market transformation impact of the label.

It is therefore proposed that the Commission's recently commissioned study to evaluate the revised energy label should explicitly examine this effect, and if its findings confirm those in the current study, reconsideration should be given to moving to a regular re-grading of the A-to-G scale in preference to adding new, higher efficiency classes. The current research indicates that the majority of consumers are willing to purchase higher efficiency products that are two label classes lower when A+++ is the highest efficiency class on the label compared to when A is the highest class.

Appreciable problems in comprehension were also identified with three specific icons used on different labels and with the word 'Energy' and its associated national language suffixes. It is therefore proposed that work be undertaken to develop and test improved means of communicating the information these elements are intended to convey.

Based on these findings, the following recommendations are made:

- For future label revisions, consider re-grading the A-to-G efficiency scale in preference to adding more plus signs;
- Maximise the impact of the demarcation between the green and yellow parts of the scale;
- Ensure that all efficiency classes indicated on the label are still permitted for sale;

- Review problematic icons;
- Revisit the 'Energ[y]' text;
- Raise awareness that labelling is an EU scheme operated by the European Commission with support from Member States; and
- Strengthen label comprehension through educational communication campaigns.

In general, it is strongly recommended that all future proposed design modifications for the energy label be tested for efficacy with consumers prior to any decision being made on their deployment. This concern arises because around the world there has been an extensive history of energy label designs being decided upon by technical or regulatory committees without testing their effectiveness with consumers first. This has often resulted in suboptimal outcomes where the market transformation impact of the label is weakened as a result of deficiencies in design.

## 1 INTRODUCTION: BACKGROUND AND OBJECTIVES

The European Union (EU) has implemented a highly effective and internationally influential energy labelling programme for household appliances since 1995. In 2010, the original Energy Labelling Directive was recast. Its scope of applicability was broadened. Many of the existing labels – specifically those applying to refrigerator-freezers, washing machines and dishwashers – were redesigned, and a new label was launched for televisions. All four of these new labels were implemented in November 2011 (Figures 1.1 and 1.2).

Much discussion preceded the adoption of these labels with respect both to aspects of the design and how to effectively address the concentration of the markets in the highest label classes for products that had been labelled for some time. This discussion centred on whether it would be better to re-grade the old A-to-G energy efficiency scale or to add new higher efficiency classes above class A (DGET, 2009; Heinzle & Wüstenhagen, 2010; Ipsos Marketing, 2008; Which?, 2009). Finally, a decision was made to add higher efficiency classes for products becoming concentrated in the higher efficiency classes and to adjust the label such that it was made of a single entity and was language-neutral – i.e. the label being identical across all of the European Community.

The main changes in these labels compared to the earlier EU designs are that:

- They are issued as single labels (as opposed to the old two-part labels);
- They are the same for all markets – that is, they no longer contain national language-specific information (except for the word 'Energy', which is written in all major EU languages);
- They make use of icons to communicate a variety of performance factors; and
- The energy efficiency classification used varies across products. Most of the revised labels range from A+++ to D; however, the scale for the new television label is A to G.

Against this context, the current project examines the effectiveness of the new labels with regard to how well they work in practice with consumers. The research was not designed to examine whether or not any alternative designs would be more or less effective than those finally adopted; rather, the aim was to examine the effectiveness of the current designs in relation to their purpose, which is to support consumers in making informed choices about the energy efficiency of appliances when making a purchase decision.

Specifically, the research set out to:

- Determine the level of comprehension with regard to the new label formats;
- Determine how motivating the label formats are in making consumers consider energy efficiency when purchasing household appliances;
- Ascertain consumer perception regarding the labels and their sub-elements with respect to the ease of understanding, credibility, appeal and usefulness; and
- Determine how consumers use the energy label to inform their purchasing decisions.

Figure 1.1. The new refrigerator-freezer (left) and washing machine (right) energy labels.

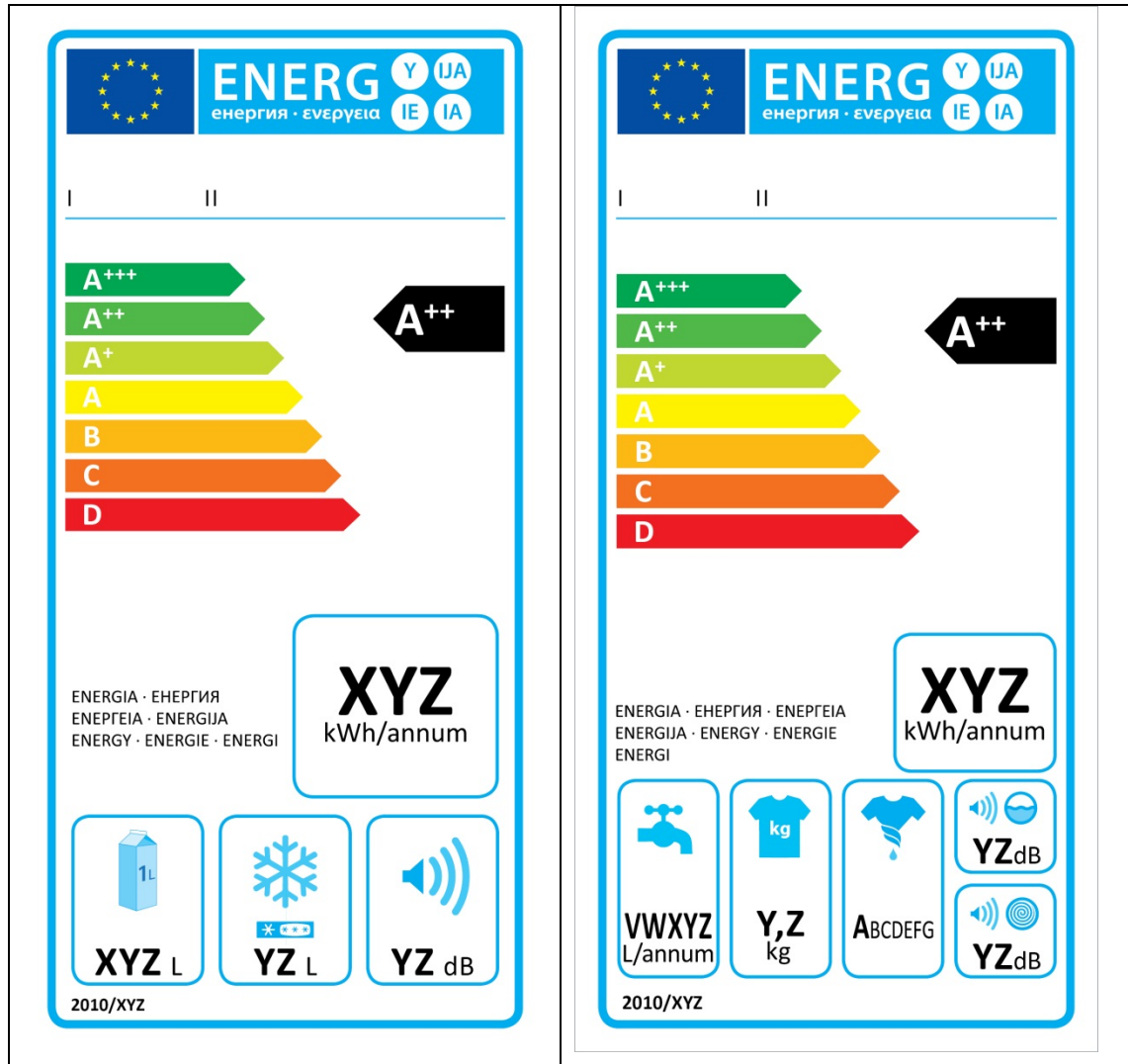
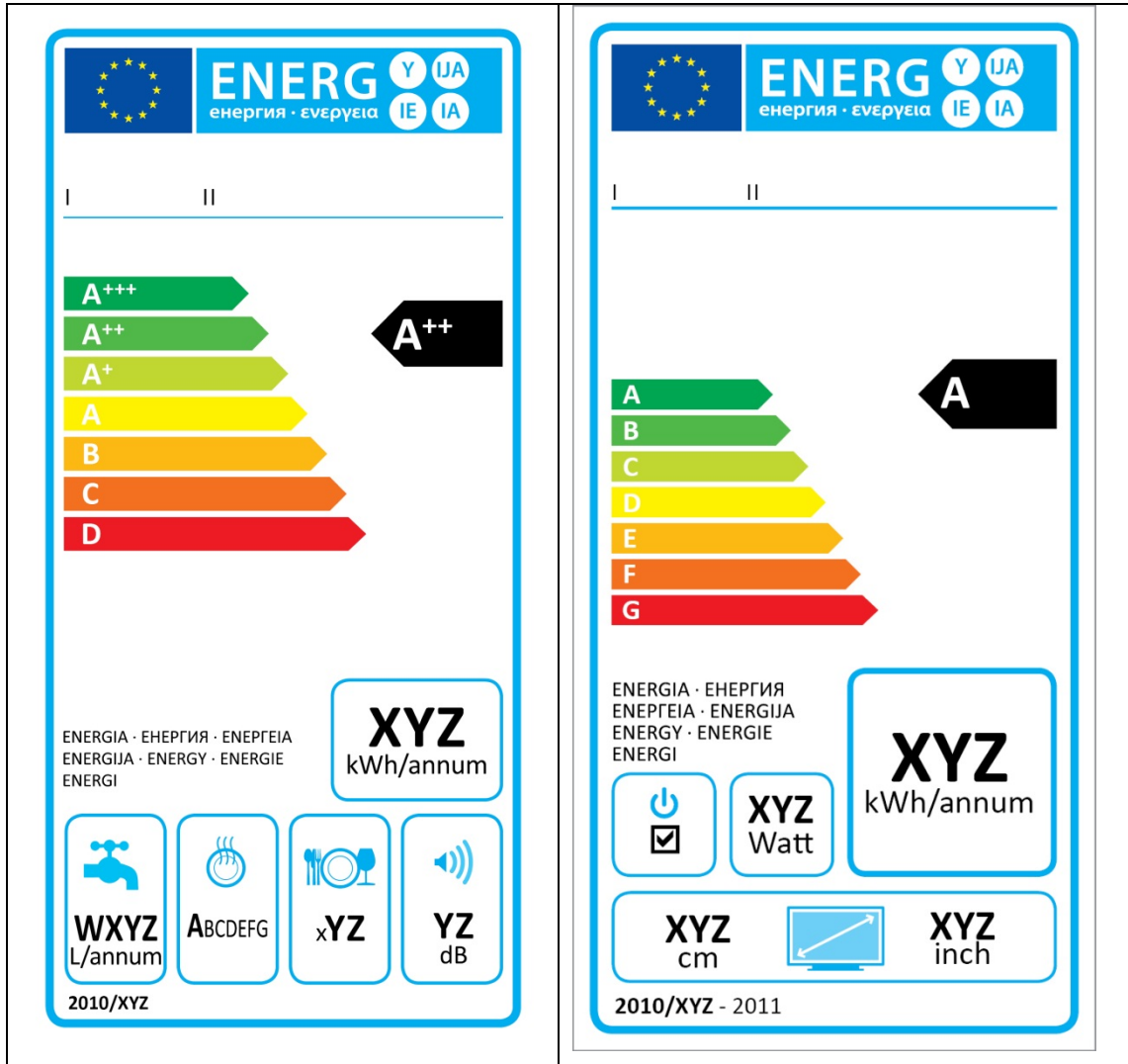


Figure 1.2. The new dishwasher (left) and television (right) energy labels.



## 2 METHODOLOGY

### 2.1 Project methodology

The research methodology used in this project applied a mix of qualitative and quantitative ways of collecting data. Qualitative methods are concerned with describing meaning, rather than with drawing statistical inferences, while quantitative methods focus on numbers and frequencies rather than on meaning and experience. Data of both types is needed to determine the existence and significance of differences in observed label design performance and to help explain the underlying causes of those differences.

Accordingly, a mixed research methodology was developed, using consumer focus groups and in-depth consumer interviews to gather data on how consumers use, understand, and are motivated by the new and revised labels, as well as to assess the energy label's effectiveness as a market transformation tool. The research design was carefully structured to gather the maximum amount of useful information (both quantitative and qualitative) from the research participants within the available research budget. It was further structured to avoid posing leading questions and to minimise unwanted influence from earlier discussion or questions that might otherwise affect the results.

Questionnaires were used in both the in-depth interviews and focus group sessions to organise the entry of answers suited to quantitative analysis. These data were most commonly used to allow quantified analysis of how well the labels were understood and of other pertinent label performance parameters. In cases where any difference in comprehension of two label designs was examined, the data were also assessed using statistical tests to see whether any difference was a real effect (i.e. statistically significant) or a statistical anomaly (i.e. not statistically significant).

Qualitative data in the form of group discussions or stated responses to individual questions were gathered to help gain a broader understanding of how consumers use the labels, their appreciation of the different label elements, and how and why they interpret these as they do.

Research participants were invited to examine all four of the new energy labels, i.e. those for refrigerator-freezers, televisions, washing machines, and dishwashers, and were asked questions regarding aspects of their design. While labels for any one of the four appliances were used in the opening stages of the in-depth interviews or focus groups when participants were asked what considerations were important to them when purchasing the stated appliance, most questions thereafter concerned either the refrigerator-freezer label or the television label. Questions concerning the other two labels (for dishwashers and washing machines) were confined to comprehension of the icons that are unique to those labels. The refrigerator-freezer and television labels were singled out for more detailed questions addressing the energy efficiency scale (i.e. the A+++-to-D and A-to-G scales, respectively) because they cover the two archetypal efficiency-scale designs. Equally, the refrigerator-freezer and television labels also sufficed for questions regarding design features that are common to all the new energy labels.

The questions posed were designed to provide either quantitative or qualitative data on comprehension of appliance energy labels in a non-leading way. Many questions were the same in both the in-depth interviews and focus groups, such that the responses could be analysed collectively; however, a more extensive set of questions was included for the focus groups, which were longer than the in-depth interviews. In general, the focus groups and in-depth interviews are highly complementary. In the case of the in-depth interviews, it was possible to probe responses to ascertain the reasons that participants answered as they did more fully than was usually possible with the focus groups, although it was often possible to ascertain the same type of insights from the focus group responses. Furthermore, the

responses given in in-depth interviews were completely free of any external influences, whereas many of the responses given in the focus groups would have been influenced by comments from other participants. Both cases reflect real situations that consumers may face; while many would buy appliances in isolation, many would also buy them in a group or following discussions with peers.

As mentioned above, questionnaires were also used for both in-depth interviews and focus groups to gather specific responses suitable for quantitative analysis. In the case of the in-depth interviews, quantitative questions were always answered without any discussion; that is, the moderator (who was the only other person present) provided no assistance or input that might guide or influence participant responses. By contrast, focus group participants were first asked to answer a set of questions about the stimulus they were shown – a set of show cards depicting different energy label formats – without conferring. The same questions were then posed again, but this time answers were given after participants had conferred and were therefore influenced by the group discussion. The distinction between both sets of responses is carefully maintained during the analysis of the responses and was used to ascertain whether there was any group learning effect.

### ***Management of the focus groups and in-depth interviews***

A series of focus groups and one-to-one in-depth interviews with the general public across ten European countries were arranged by Navigant and conducted in the locations and on the dates listed in Table 2.1. Each focus group comprised 8–10 people and ran for approximately 2 hours. In-depth interviews were conducted with ten participants in each of the three designated countries, giving a total of 30 overall, and ran for an average of 1 hour.

Each focus group and in-depth interview was conducted by an experienced, professionally qualified moderator provided by the market researchers Millward Brown. Moderators were not energy experts, but they were extensively briefed by Navigant prior to each session to ensure that they could guide and manage the groups effectively.

All sessions (focus groups and in-depth interviews) were conducted in consumer research facilities comprising a room for the participants and moderator to sit in that could be viewed and listened to

**Table 2.1. Dates and locations of in-depth interviews and focus groups for assessment of European appliance energy labels**

Session type	Country	City	Date	No. of participants
In-depth interviews	UK (Pilot)	London	7–8 November 2011	10
	Czech Republic	Prague	14–15 November 2011	10
	France	Paris	28–29 November 2011	10
Focus groups	UK (Pilot)	London	11 November 2011	10
	Czech Republic	Prague	16 November 2011	10
	Spain	Madrid	21 November 2011	9
	Greece	Athens	24 November 2011	9
	France	Paris	30 November 2011	8
	Poland	Warsaw	5 December 2011	10
	Germany	Frankfurt	8 December 2011	10
	Denmark	Copenhagen	14 December 2011	10
	Italy	Milan	15 December 2011	9

by researchers through a sound-insulated, one-way mirrored wall. In accordance with professional practice, participants were informed that the sessions were being recorded and that researchers were watching them from an adjacent room and would analyse the responses in order to try to understand how effective the information they were about to be shown was at communicating its central purpose.

In each case, moderators displayed 'show cards' depicting individual appliance energy labels or sets of energy labels, asked questions and facilitated the discussions in strict accordance with the moderator guides (see Appendix A). In the case of in-depth interviews, moderators recorded quantitative responses in a questionnaire, whereas in the case of focus groups questionnaires were given to each participant, who wrote their own answers to questions.

The order in which the questions were asked and the show cards were displayed complied with a strictly defined sequence ('rotations'; see Appendix B) designed to avoid any bias in the presentation of the different show cards depicting the various energy label formats. The English versions of the show cards are reproduced in the main text, while the checklist detailing the rotation order of appliances and the moderator guides/questionnaires are presented in Appendices C and A, respectively; each of these documents or stimuli was translated into the relevant local language by professional translators before the research took place, so that all research was fully conducted in the local language.

Each research event was filmed and dubbed with two sound tracks: (a) in the original language, and (b) in a simultaneous English translation provided by professional interpreters. Copies of the DVDs were then sent to a professional transcription service. The draft English-language transcriptions thus produced were then verified against the original language version recorded on DVD by a native language speaker to ensure accuracy and completeness. The English transcripts were then codified and organised such that the response to each question could be analysed transversally across the focus groups and in-depth interviews.

In the nine locations where the sessions were conducted in a language other than English, an energy expert fluent in the local language also observed each focus group and in-depth interview to ensure the transcript was correct and to steer the moderator where appropriate.

A pilot focus group and in-depth interviews were held in the UK between 7 and 11 November 2011 and were used to confirm the viability and salience of the research methodology and ascertain whether any changes or refinements to the research design and methodology were required before the main programme began. In the event, the pilot sessions ran smoothly, so the same research design and materials were used in the subsequent in-depth sessions.

Overall the total sample sizes were 95 participants for the focus groups and 30 for the in-depth interviews, giving a total sample size of 125 for questions that were asked in both session types.

### ***Supporting materials***

A number of supporting materials were produced to guide and inform the moderators running the session:

- Moderator guide
- Checklist
- Questionnaire
- Show cards depicting individual appliance energy labels or sets of energy labels



The moderator guide comprised the questions to be posed and which show card should be displayed at which point in the session, and a general introduction and briefing for the moderator to give to participants at the start of the session.

The checklist explained the order in which show cards were displayed and which products were discussed for each question and were organised by question series; for example, questions 3 and 4 for the UK pertained to refrigerator-freezers and corresponded to Show Card 1a. Appliances were rotated in sequence by focus group and interviewee in order to reduce bias, and thus the checklists varied by country for focus groups and by interview within any one country. The checklist to be used in in-depth interviews also contained a small questionnaire to be completed by the moderator as the participant provided their answers.

The focus group questionnaire was a template to be used by each participant. It did not capture every answer, focusing only on the quantitative questions. Participants were prompted by the moderator to write down their answers to specific questions and the questionnaires were then collected at the end of the session.

The show cards were a series of A3 boards with enlarged images of energy labels for various appliances and a variety of energy classes. Participants were asked questions about the show cards pertaining to their interpretation and understanding of the icons, language used, energy information and energy efficiency classes.

### ***Participants***

Market research agencies in each research location were used to recruit participants, who were screened beforehand to provide a good representative sample of the major appliance purchasing population in each country. Recruitment in accordance with a participant eligibility screening questionnaire ('screener'; see below) and with accepted industry standards and practices maximised the overall cultural, geographic, age, gender and socioeconomic representatives of the focus group and interview samples and minimised sample bias. Recruitment incentives were used to encourage participation.

The outputs from the sessions included confidential 'screeners' (Appendix E) and participant lists. The screener is the questionnaire that potential participants completed to establish whether they had the required profile to enable the sample to be broadly representative of the appliance-buying public in each country. It asks participants basic information (contact details, age, gender, occupation), their history in participating in market research, social grade and their purchases of electrical appliances in the last 12 months. Care was taken to ensure that no participant had bought one of the appliances subject to the new energy labels within the last 2 years, in order to be sure they had not inadvertently already been exposed to the new energy label and hence been pre-informed. The participant lists include information on participants' age, gender, occupation and socio-economic group.

## **2.2 Data analysis**

Conventional market research techniques were used to analyse the responses gathered through the interviews and focus groups. These techniques differed for the quantitative and qualitative data.

### ***Quantitative analysis***

Quantitative data were gathered principally through questions designed to assess comprehension and motivational impact of the labels. The sample size was 95 for the focus groups and 30 for the in-depth interviews, giving a total sample size of 125 for certain questions.

Multiple measures, such as comprehension scores, were collected with the aim of more completely understanding the performance of each label format. These included ability to:

- Correctly identify the highest and lowest energy efficiency label classes that either the refrigerator-freezer or television label may have
- Correctly identify both the most and least energy efficient appliances from a choice of three refrigerator-freezer or television labels
- Correctly rank the order of efficiency of four refrigerator-freezer or television labels where:
  - i) The order of efficiency does not follow the inverse order of energy consumption
  - ii) There is a mix of label formats using an A-to-G scale and an A+to-F scale (televisions only).

The motivational impact of the labels was assessed (in part) by determining:

- The minimum acceptable energy label class on either the refrigerator-freezer or television label
- The additional amount that participants were willing to pay for a more efficient refrigerator-freezer or television.

Refrigerator-freezer and television labels were used because they encompass the main variation in the label energy efficiency scales: three of the new energy labels (refrigerator-freezers, washing machines and dishwashers) have an efficiency scale ranging from A+++ to D, whereas the television label ranges from A to G (except where an appliance has already reached the A+ level, in which case it is entitled to use the A+to-F scale that will become mandatory for all televisions from 2014).

The data produced from such tests were invariably nominal<sup>3</sup> and hence not suited for analysis via conventional parametric statistical tests.<sup>4</sup> Thus, non-parametric statistical tests were used; these tests generally require very large samples – much larger than gathered here – to produce statistically significant results, but the research design adopted ensured that a large number of matched pairs of nominal data were generated, i.e. data where the same participant had delivered answers to related or similar questions. This allows the McNemar test<sup>5</sup> to be applied to determine the statistical significance of differences in paired responses and to produce statistically meaningful results with much smaller samples than are required for other non-parametric tests. Accordingly, a large number of paired responses were analysed via this test and the statistical significance determined. This test was particularly useful to determine the statistical significance of:

- Any learning effect from repeated exposure to the labels;
- The impact of group discussion; and
- Differences in the comprehension or motivational effect between label formats.

All differences reported as statistically significant are at the 95% confidence level ( $P < 0.05$ ).<sup>6</sup>

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<sup>3</sup> Nominal data cannot be ordered or measured, but can be assigned a code in the form of a number that allows the data to be sorted into a limited number of categories.

<sup>4</sup> In the field of statistics, 'parametric data' refers to a quantity, such as a mean, that is calculated from data and describes a population (in this case European appliance consumers as a whole) where there is an assumption of an underlying normal distribution. Non-parametric data are the data where there is no assumption of an underlying normal distribution.

<sup>5</sup> [http://en.wikipedia.org/wiki/McNemar\\_test](http://en.wikipedia.org/wiki/McNemar_test)

<sup>6</sup> A finding drawn from a sample of responses (the study participants) of a larger population (the EU population as a whole) is considered to be statistically significant if there is a 95% or greater probability that the same result would be found among the population as a whole as was found in the sample. Thus if the  $P$  value is less than 0.05 then the finding is considered to be statistically significant.

### **Qualitative analysis**

In some instances moderators also probed participants to explain why they answered as they did through the use of directly related qualitative follow-up questions. This was only done in such a way that it would not influence future responses, e.g. in the case of the focus groups such questions were only asked after an initial questionnaire was completed.

In addition to the above, purely qualitative questions were posed to ascertain:

- Whether energy or energy efficiency is one of the factors consumers spontaneously mention when considering product features that would affect their purchase decision;
- How high they would rank this among all such product features;
- What consumers believe the label is about;
- Who participants thought issued the label (i.e. which body is behind the energy label scheme);
- What is considered to be the most important information on the label and therefore their priorities and what information is most emphasised;
- What they liked and disliked about the label;
- How energy efficiency of a product is determined from the information presented on the label and how the information presented in the different elements within the energy efficiency scale is used;
- Whether the presence of white space above and below the scale signifies anything to consumers;
- What is understood by the inclusion of the text 'Energ[y]' at the top of the label;
- What is understood by the text 'kWh/annum' and 'L/annum';
- What each individual icon is believed to signify;
- What the text '2010/XYZ' at the bottom right-hand corner is thought to signify;
- Whether the label considered to be missing anything and, if so, what other information should be shown;
- How motivating the top efficiency class is compared to the middle efficiency class for different efficiency scale ranges;
- What is considered good or bad about the new label compared to the old one, and vice versa;
- Whether energy consumption presented per cycle or per year is preferred for intermittently used appliances such as dishwashers and washing machines;
- Whether there is anything confusing about the labels;
- Whether anything should be changed on the labels; and
- How useful the labels are thought to be.

The qualitative answers to these questions were grouped question by question across the research venues and were analysed to gain clarity not only about what consumers thought in response to each of these questions but also why they thought what they did. The analysis principally entailed assessing any evidence of commonality among the answers, i.e. assessing the frequency of types of responses to determine common factors or patterns that help prioritise, explain or clarify the responses to the research topics.

### **2.3 Project roles**

As well as providing overall project management, Navigant:

- Designed the research, including the moderator guides, questionnaires and checklists/rotations (Appendices A, D, and C, respectively);
- Designed and produced the show cards;
- Supplied the parameters for the recruitment screener (Appendix E);
- Briefed the moderators and translators;

- Monitored the conduct of each research event and ensured proper procedure was adhered to for consistency of each event;
- Checked the transcripts for accuracy and completeness;
- Transcribed the transcript responses from each research event so that each question could be analysed transversally; and
- Conducted the analysis and wrote up the report and findings.

The consumer research agency Millward Brown:

- Provided research venues in each of the locations;
- Developed the country-specific recruitment screeners;
- Recruited the focus group and in-depth interview participants;
- Hosted the focus groups and interviews in their facilities;
- Provided moderators and translators;
- Arranged for the moderator guides and questionnaires to be translated into each local language;
- Produced DVDs of each research event; and
- Arranged for the production of English transcripts to be used for the subsequent analysis.

CLASP:

- Assisted with refinement of the research design;
- Directly participated in the conduct of half of the research events to ensure correct procedures were followed, took notes, supported briefings, verified translations of moderator guides and questionnaires;
- Helped to verify the accuracy of the simultaneous translations and English transcriptions.

SEVEN staff participated at half of the focus groups and in-depth interviews in the Czech Republic, where they:

- Briefed moderators and translators;
- Ensured correct procedures were followed;
- Took notes on participant responses;
- Helped verify the translations of the moderator guides and questionnaires; and
- Helped verify the accuracy of the translations and English transcriptions.

SEVEN also assisted Navigant with the analysis of the findings.

In addition, the following agencies provided direct assistance in specific countries, as indicated:

- SoWatt (France and Italy)
- Escan (Spain)
- KAPE (Poland)
- Öko-Institut (Germany)
- EnEffect (Bulgaria)

The role of each of these partners was to provide energy efficiency literate local-language support for the conduct of the research events in the relevant countries. This entailed:

- Ensuring the translations of the moderator guides and questionnaires were accurate;
- Helping to brief the moderator and translators;
- Making detailed notes (to be used to ensure the English transcripts were accurate and complete) on participant responses;
- Reviewing the transcripts and producing a short summary report of each research event.

### 3 FINDINGS

The results of the study are reported in this section and organised in themes as follows:

- i) General consumer priorities and understanding of the originator (i.e. the body that developed the label) and purpose of the label;
- ii) Comprehension of label elements; and
- iii) Appeal/motivational effect and preferences.

First, consumer priorities and comprehension of the originator and purpose of the label are assessed in sections 3.1–3.5:

- 3.1 – Importance of energy: unprompted responses.
- 3.2 – Who do the general public think has issued the energy label?
- 3.3 – What do the general public consider to be the primary purpose of the energy label?
- 3.4 – What is the most salient information on the energy label as far as the general public are concerned?
- 3.5 – The ‘Energ[y]’ text.

Second, consumer comprehension of specific label elements is examined in sections 3.6–3.11:

- 3.6 – Comprehension of the highest energy efficiency class an appliance may have.
- 3.7 – Comprehension of energy efficiency classes: quantitative results.
- 3.8 – Comprehension of the label energy efficiency classes: qualitative findings.
- 3.9 – Comprehension of the label icons.
- 3.10 – Comprehension of label elements.
- 3.11 – Comprehension of other elements of the energy labels.

Third, the appeal and/or motivational impacts of the label and consumer preferences regarding aspects of label design are assessed in sections 3.12–3.20:

- 3.12 – Appeal of the top energy label class compared to the middle class.
- 3.13 – What is the minimum efficiency class consumers say they would choose?
- 3.14 – How much extra are consumers prepared to pay to have the energy efficiency class they want?
- 3.15 – What do the public like and dislike about the label?
- 3.16 – Perception of the relative strengths of the old and new energy labels.
- 3.17 – Preference for energy and water usage values: per annum versus per cycle.
- 3.18 – Is the label missing anything?
- 3.19 – Is there anything on the label that is confusing or should be changed?
- 3.20 – Overall usefulness of the labels.

The examination of all these elements provides a comprehensive picture of consumer understanding of the label, how salient and motivating they find it, and their preferences regarding the aspects of its design. Through the assembly of this information, an understanding of the overall effectiveness of the energy labels is developed, and information regarding their potential to transform product markets is obtained. In addition, the relative merits of various design elements are evaluated.

Questionnaires used in both the in-depth interviews and the focus groups permitted participants to provide definitive answers that are suitable for standard quantitative assessment. The results from this assessment are reported here, as are the related qualitative responses to each question.

The results from the focus groups and the in-depth interviews are reported separately and collectively whenever it is appropriate to do so.<sup>7</sup> In addition, whenever appropriate, results are similarly reported:

- i) Separately for each appliance type (mostly for refrigerator-freezers or televisions, but also for washing machines and dishwashers);
- ii) Collectively for all the appliance types combined;
- iii) Separately for each rotation – e.g some groups were presented with material about refrigerator-freezers in the first instance and later presented with information about televisions (Rotation 1); Others received information in the opposite order (Rotation 2), all according to a strict sequence designed to avoid bias, as explained on page 33; and
- iv) Collectively for all the rotations combined.

### 3.1 Importance of energy: unprompted responses

Q1, 1a,  
2; 1,  
QC1a

At the very start of the focus groups and interviews, and before they were shown any energy labels, participants were asked to list the characteristics they would be most interested in knowing about in the event that they were shopping for a new appliance. They were then asked to rank the relative importance of those characteristics from most important to least important. The appliances they were asked to consider were one of (a) televisions, (b) refrigerator-freezers, (c) dishwashers, or (d) washing machines, where the specific appliance considered was rotated by focus group and in-depth interview according to a pre-assigned sequence (see Appendix B).

In this way, the features that matter to consumers about the appliances with the new energy labels could be assessed without having given any indication that the research topic concerned energy or energy labels. At the end of the focus group and interview sessions, any participants who had not mentioned energy consumption or efficiency were asked why these factors had not been an important requirement for them in the first exercise.

#### **Results**

Among the focus groups, 53% of participants said they would consider energy- or environment-related performance factors in their purchasing decision, including:

- Energy consumption;
- Energy efficiency;
- Energy class;
- Eco-label;
- Energy savings programmes;
- Ecology/ecological properties;
- Energy rating; and
- Environmental friendliness.

Energy-performance related factors (e.g. energy consumption, energy efficiency, etc.) were listed in the top three by 39% of focus group participants, in the top two by 34%, and as the top priority by 18%.

Among in-depth interviewees, 57% listed energy-performance related factors as being a characteristic they would consider in the purchase of a new appliance, with 35% listing these in their top three, 21% in the top two, and 14% as their top priority.

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<sup>7</sup> Throughout this report, unless 'focus groups' or 'in-depth interviews' are specified, 'participants' refers to both sets of participants collectively.

For both focus groups and in-depth interviews together, 53% of participants spontaneously mentioned an energy-related performance factor as one of the criteria they would consider when purchasing an appliance (Table 3.1). There was evidence, albeit from very small sample sizes, of possible cultural differences by market. For example, 9 out of 10 Danes spontaneously mentioned energy performance, while 0 out of 10 Poles did.

For those countries where televisions comprised the appliance used as the subject, participants were far less likely to list energy performance-related factors as a top requirement. It was listed by only 15% in the focus groups (within the top three by 5%) and by 25% in the in-depth interviews (within the top 3 by 13%).

Participants who had not mentioned energy efficiency as a purchasing factor were asked at the end of the sessions why this had not been an important requirement for them. They tended to reply either that they had forgotten about energy or that they did not consider it a priority. These participants cited size, brand, price, design, and volume as being more important to them. Some examples of these responses are listed in the box on the next page.

### Synopsis

Participants were asked to compile their list before any discussion of energy labels and energy efficiency had occurred; the majority of participants did not consider energy efficiency to be an important characteristic for them in a purchasing scenario, with only 18% of focus group participants and 14% of in-depth interviewees placing it as their priority characteristic across all appliance types. Among those who did mention energy efficiency as a product selection criterion, it usually featured in the top three, which suggests that it is a factor people generally consider once the primary criteria have been addressed.

The reasons for this selection pattern were that (i) they did not consider efficiency a priority against other criteria, (ii) they overlooked it/forgot about it or (iii) they did not think that energy consumption was significant in relation to the type of appliance they were discussing. When

**Table 3.1. Share of participants<sup>a</sup> mentioning energy or energy-related performance as a factor when considering an appliance purchase, and the rank order of that factor among all factors listed**

		Market <sup>b</sup> (sample size)									
		CZ (20)	DK (10)	FR (18)	DE (10)	GR (9)	IT (9)	PL (10)	ES (9)	UK (18)	All (113)
Rotation/appliance		TV	DW	RF	WM	DW	RF	TV	WM	RF	All
Rank order	1	15%	50%	11%	30%	0%	22%	0%	22%	10%	17%
	2	15%	10%	6%	30%	11%	22%	0%	33%	0%	12%
	3	0%	0%	17%	0%	22%	0%	0%	11%	10%	7%
	4	0%	20%	6%	0%	22%	11%	0%	0%	5%	6%
	5	20%	0%	6%	0%	0%	0%	0%	11%	10%	7%
	6	5%	10%	0%	0%	0%	0%	0%	0%	5%	3%
	7	0%	0%	0%	0%	0%	0%	0%	0%	5%	1%
Overall share of participants mentioning energy		55%	90%	46%	60%	55%	55%	0%	77%	45%	53%

Abbreviations: DW = dishwasher; RF = refrigerator-freezer; TV = television; WM = washing machine.

a) No data are available for Bulgaria.

b) Participants comprised focus groups in each country mentioned, plus in-depth interviews held in the Czech Republic, France and the UK.

### ***Reasons why participants did not list energy efficiency as an important factor when purchasing a new appliance (prior to being shown any energy labels)***

- “It simply slipped my mind, and I don’t always look at that. If I am completely taken by the piece of equipment or the appliance, I shall buy it regardless of how effective or ineffective it is.”
- “When I buy appliances, what is important for me is brand and size. And energy consumption, it’s well, one of the final, one of the last criteria that I would check, because okay, these labels are fine. The producer here tells us that we should start with energy, but me, when I go to the store, I first of all choose according to brand and size, and not according to energy consumption.”
- “I’ve never thought about it very much in the past because I kind of thought that the money I pay for consumption for those appliances is not so significant.”
- “Well, I was thinking about a television, we weren’t talking about a different product. That was the product we were talking about. For me, that’s something that’s pretty obvious for a clothes washer. I think with clothes washers it is something that you think about immediately if you choose a product. You’re going to very quickly look at how much water it uses and how much electricity it uses. With a television, quite frankly, no, that’s not what comes to mind first.”
- “I’m really bad about the carbon footprint. I’m one of those really guilty consumers. It’s not in the forefront of my mind. I’m one of those people who just thinks, how can the energy I consume or save make a difference to the world?”

breaking responses down by appliance type, energy efficiency was mentioned less frequently for televisions than for dishwashers, washing machines and refrigerator-freezers in the focus groups and less frequently for televisions than for refrigerator-freezers in the in-depth interviews.

Overall, it seems that energy is a very important consideration for about one-fifth of consumers, an important factor for two-fifths and a lesser priority, or at least less top-of-mind, for the remainder.

### **3.2 Who do the general public think has issued the energy label?**

Q3, 17;  
2a Participants were shown either the refrigerator-freezer energy label (Show Card 1a; Rotation 1) or the television label (Show Card 1b; Rotation 2) (Figure 3.1) at the very beginning of the focus group and in-depth interview sessions and asked who they thought had issued the label. Focus group participants were later presented with the same energy labels again and asked the same question, providing their answers after group discussion. This was done to determine whether having more exposure to the labels and the opportunity to discuss with peers would lead to a revision of their thinking.

#### **Results**

Within the focus groups, when answering this question with no discussion, the majority (33%) thought the label was issued by the manufacturer, 16% thought it was issued by the EU (also described as the EC, EU standards, EU/European Body and the Commission), and 7% thought it was issued by consumer associations. Other parties mentioned were:

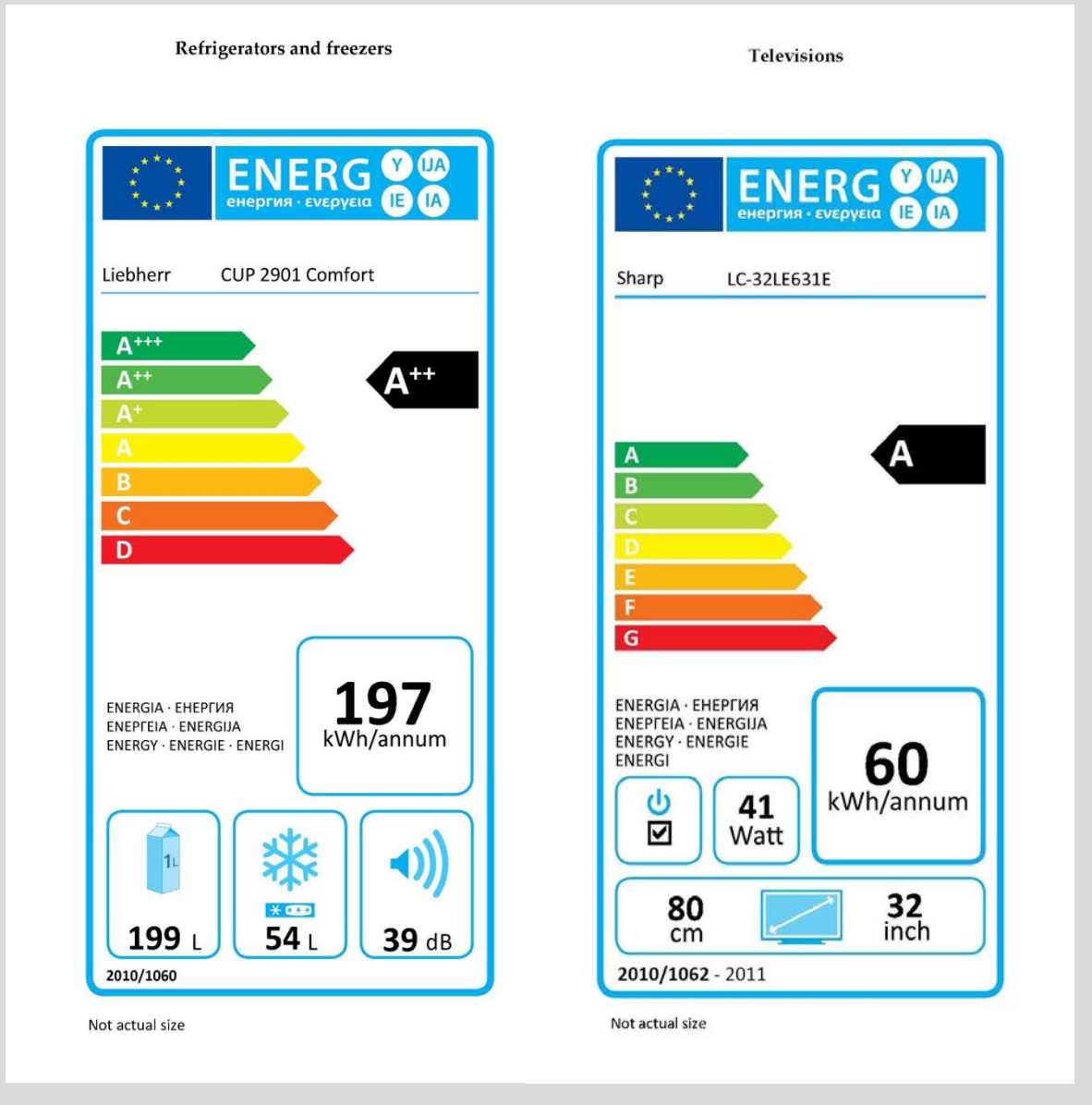
- ‘Energy’ (taken from the text at the top of the energy labels);
- Energy auditors;
- Energy companies;
- Environment office;



- Experts;
- Manufacturers operating under EU standards;
- Organisation with a responsibility for energy;
- 'Professional institutions' quality control authorities;
- Regulators/energy auditors;
- Retailers/distributors;
- State ministries;
- State/national standards;
- Test laboratories; and
- Trade associations.

The second time the question was asked, and after group discussion, the weighting switched to the EU/EC/ EU/European Body/Commission as the most common answer (44%), while the share who thought it was issued by manufacturers declined to 13%. This illustrates that discussion provided benefits and increased the chances of an accurate conclusion being drawn. However, even in this case the majority of participants thought the label was issued by some entity other than the EU.

Figure 3.1. Show Cards 1a (left) and 1b (right) depicting energy labels for a refrigerator-freezer and television.



### **Who did participants think issued the energy label?**

- Participant (P): “Well, I think these labels are issued by the European Commission. I can see the European Union logo. I think that this is the job of the EU.” Moderator (M): “Why do you think so?” P: “Well, I can see the flag of the EU, and I know that they are, kind of, bureaucrats and they want everything to be described. I think Brussels is really very particular about that. That’s why.”
- “I don’t know. I think it should probably be issued by the manufacturer. I can see the logo of the EU, so I think that it should be certified by the EU. Is that right? I don’t know.”
- P: “The European Union?” M: “Okay, why is that?” P: “Well, because of the flag that you see in the upper left.”
- P: “Well, I would imagine that it’s the manufacturer. This is about energy consumption.” M: “Why do you think it’s the manufacturer who made this?” P: “I don’t see who else would. It’s either the distributor or the manufacturer. It’s just trying to emphasise the energy consumption, which is rather low.”
- P: “The government.” M: “You say that because?” P: “Because I’m assuming it’s them who says we should try and be as energy saving as we can. Which ones do they get their information from, though? Environmental people.” M: “The UK government has issued this kind of labelling? Okay. You make that assumption because...?” P: “I highly doubt that the people that make the televisions or sell the televisions really care about that. For them to put something on this, it would have to be from high up.”

The second time the question was put to the focus groups, the participants were fully immersed in the subject and process and had had the opportunity to discuss the possible answers with the group; this change clearly influenced their decision-making.

During the in-depth interviews, the most common answer was the EU/Europe/EC (37%), followed by manufacturers and producers (35%). Others answers included regulators/energy auditors and ministry/state organisations.

The in-depth interviewees showed less variety in their answers, with a slightly higher proportion spontaneously opting for the EU as the issuer of the label.

### **Synopsis**

On average across all the responses, the majority of participants (27%) thought that manufacturers issued the labels, closely followed by the EU (26%). The connection between the EU and the label was through recognition of the flag in the top left corner of the label. Some expressed some confusion over its origin and responses varied widely.

### **3.3 What do the general public consider to be the primary purpose of the energy label?**

All participants viewed the energy labels for refrigerator-freezers and televisions (Show Cards 1a and 1b, respectively; see Figure 3.1) by rotation and were asked what they thought the label was about. Focus groups were asked initially with no opportunity to discuss with the rest of the group; they were shown the labels again later in the sessions, with the opportunity for group discussion.

Q4, 7,  
18, 35;  
2b, 5a

## **Results**

Within the focus groups, the first response to this question without any discussion was 'energy consumption' and/or 'energy efficiency' from 55% of participants, followed by 'technical specifications'/'features of the product' (35%) and 'how green the product was'/'environmental information' (9%). 'Energy class' was noted by 8%. Individual responses typically included a list of more than one factor and included:

- Brand;
- Capacity;
- Energy data;
- Energy savings;
- Installation;
- Legislation;
- Noise;
- Performance;
- Price;
- Product quality;
- Size/dimensions; and
- Type of product.

When participants were shown the alternative show card (for televisions or refrigerator-freezers), 'energy consumption' and 'energy efficiency' were still the most frequent answers (60% of participants), followed by 'specification'/'features of the product' (18%) and 'size'/'dimensions' (18%). Energy classes were mentioned more frequently (13%).

The third time this question was asked, participants had the opportunity to discuss the question with the group before writing down their answers: 63% answered 'energy consumption'/'efficiency', 26% noted 'technical features', 9% 'size'/'dimensions', 9% 'energy data' and 6% 'energy class'. The fourth time the question was asked, it was as part of a group discussion that did not require participants to write down an answer: 90% of the groups discussed energy consumption/efficiency; 70% discussed energy class; 50% capacity and 50% noise (capacity and noise were discussed in reference to refrigerator-freezers only).

In-depth interviewees were also asked this question with reference to both refrigerator-freezers and televisions by rotation. Energy consumption and efficiency were raised by 63% during the first round of questions and by approximately 80% in the second (much later in the question series). Reference was made to energy class in the first round by 53% and in the second round by 63%. Capacity was mentioned by a third of participants in the first round of questions and by 17% in the second, while size and dimensions were identified by 17% and 40%, respectively.

### **What did participants think was the primary purpose of the energy label?**

- “Well, according to this picture, it’s the kind of information that I related to the efficiency and other characteristics. It looks like the volume, freezing... It should tell us about what the volume of the refrigerator is, water consumption, energy efficiency and so on.”
- “So it’s the size, then there’s some scale, but I cannot tell what kind of scale that is. It’s category A on the scale, but I don’t know whether it’s the top category or the lowest category.”
- “It describes characteristics or parameters of the product, in particular in terms of the energy efficiency.”
- “Well, it’s about a Liebherr appliance, refrigerator freezer. So I’d say it’s a combined unit, I guess. It talks about its energy performance based on a scale that goes from very, very, very good to less good with annual usage or energy usage plus the noise it makes, and also I would say how much it can freeze in maybe 24 hours. No, excuse me, it’s the volume of the freezer and the volume of the refrigerator.”
- “Energy consumption and its energy class. We’re all into green stuff and everything and so I guess this was done through the European Community.”
- “Well, you have your energy efficiency here, right across, what power consumption. I’m guessing that’s the capacity of the fridge, and that’s the capacity of the freezer compartment. I can’t remember the stars. Three stars means to keep something fresh for three months? I think, and of course, its noise rating.”

### **Synopsis**

Overall, comprehension of the subject of the energy label was high in both the focus groups and in-depth interviews. Efficiency and energy consumption were spoken about frequently, and reference was often made to the energy classes. Most appeared to understand that the label contains more information than just energy consumption as they discussed the meaning of the icons and technical features of the appliances.

Among the focus groups, energy consumption and energy efficiency were given as answers with increasing frequency as the questioning continued. However, the frequency of ‘energy class’ as an answer varied a little, increasing in the second round and decreasing in the third. In-depth interviewees were more likely to make reference to energy consumption/efficiency and energy class in the second round as their knowledge and understanding of the subject grew.

### **3.4 What is the most salient information on the energy label as far as the general public are concerned?**

Q19; 2c Participants viewed the energy labels for either refrigerator-freezers or televisions (Show Cards 1a and 1b, respectively; see Figure 3.1) by rotation and were asked what they considered to be the most important information on the energy labels and why.

### **Results**

The majority of focus group participants considered the energy rating/class to be the most important item (90% of groups discussed this). Energy consumption and capacity were also discussed more than other elements of the label such as size, colours and ‘energy’ (as a general term).

In-depth interviewees also considered product energy efficiency or energy class to be the most important information on the label (40% for both refrigerator-freezers and televisions); energy consumption was the second most important. Other answers were size, capacity, freezer stars and brand.

### **What did participants think was the most important information on the energy label?**

- “The ‘A’ is there to attract you, to catch your eye. Efficiency takes half of the sticker, plus it’s colourful so obviously, it is what people should read first. It is information about energy efficiency.”
- “There is nothing of this that is most important to me. I would look for the properties that would fulfil my needs. If I wanted a television set of 22 inches, for instance, it’s important that it meets my needs. First I would look at size and next energy consumption.”
- “I don’t really have good notions about watts and kilowatts, but the scale is just easier to understand. Certainly, we know quite well that if it’s A, it doesn’t consume a lot of energy, and G consumes a lot. So I’d have to say that that’s the symbol you look at first, just because it’s easy to read.”
- Participant (P): “For me, I suppose it’s just the words that I understand, so ‘comfort’ and ‘energy’ and the pictures and because some of the font’s quite big, I’m guessing that’s probably the most important. So the 197, keep looking at that figure and thinking it means something.” Moderator (M): *So, it seems to be important to you?* P: “Yes, I’m not sure what it means but I’m thinking because it’s big, I know you said it’s not the actual size, but I’m not sure.”
- “The ‘A’ thing is the most visually, sort of, easy for someone to understand, comparing like for like, you’ve got two fridge freezers, and one’s an ‘A++’ and one’s a ‘B’, then you’d think, ‘Oh, well the A++ must be more energy efficient’, but you don’t know how much more, or why. If you had two numbers to compare you still might not really know the difference, because you don’t know what the numbers represent.”

### **Synopsis**

‘Energy class’ and ‘energy efficiency’ were most commonly reported as the most important piece of information on the energy labels, being described as the most eye-catching and most easy to understand element on the label. Participants also described the font size of certain elements and deduced that the bigger they were the more important they were.

It was also considered that some of the other information on the label, such as size and capacity, would be obvious after looking at the product, so these aspects were deemed less relevant than energy consumption or efficiency class, neither of which would be clear to the consumer on inspection of the product.

Screen size appeared to be an important consideration in television purchases, as was capacity for refrigerator-freezers.

### **3.5 The ‘Energ[y]’ text**

Participants were presented with the energy labels for refrigerator-freezers, washing machines, dishwashers and televisions (Show Card 3, 4, 5 or 6, respectively; Figure 3.2) by rotation. The moderator pointed to the text reading ‘Energ’ at the top of the label being shown and asked participants what they thought it meant and why.

Q44, 51,  
60, 68;  
SC3a,  
SC4a,  
SC5a,  
SC6a

## **Results**

All focus groups were able to associate the text 'Energ' with 'energy' and 'Europe'. The majority also correctly identified that the letters in the circles to the right of 'Energ' are suffixes to the text. The words under the 'Energ' text were most commonly attributed to Greece and Russia.

Among in-depth interviewees, only 40% thought the text was the word 'Energy' in different European languages. A common misconception was that the text in the circles represents particular countries. Most participants recognised the European flag so made the connection between Europe and the energy label.

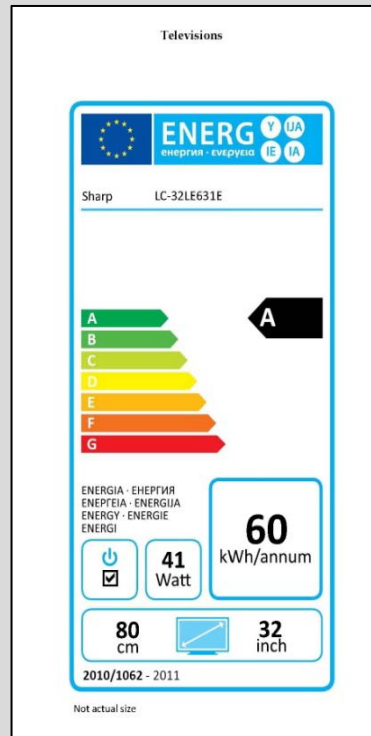
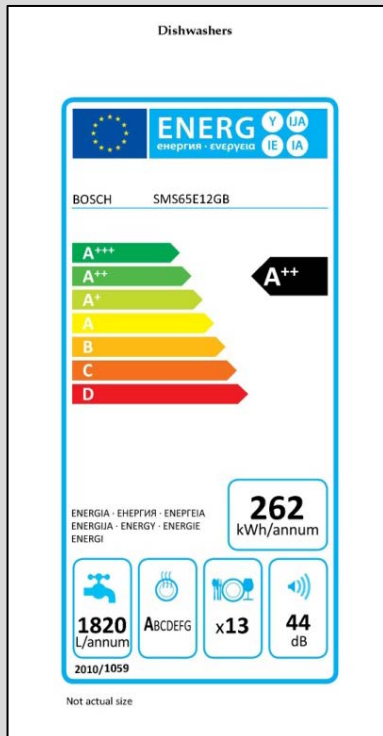
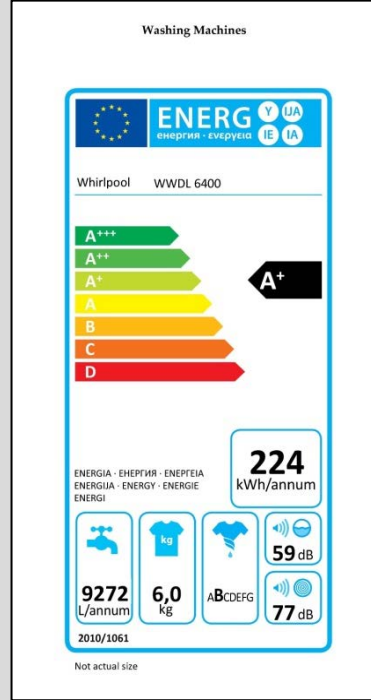
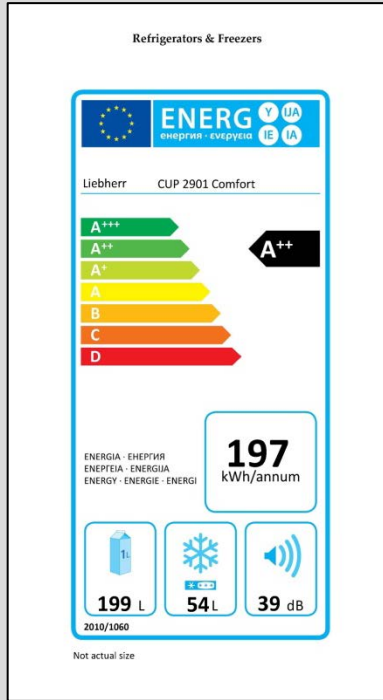
## **Synopsis**

The text was interpreted correctly in all focus groups; however, this understanding was usually only reached after much discussion of the possible explanations allowed those who had correctly interpreted the text to articulate their view to the group, and comprehension was low among in-depth interviewees, who did not have the benefit of discussion. The majority of participants understood there is a connection between Europe and a European Directive and the energy label.

### ***What did participants think was meant by the text 'Energ' at the top of the energy label?***

- "I think it is 'energy' written in all European languages. This means it is all EU legislation. I believe that this is the standard EU labelling policy."
- "Those are the countries that are abiding by that directive, so those four circles are the four countries that are abiding by the directive."
- "Is it like an energy company, perhaps? Like an energy manufacturer? I don't know – it could be a new name for an energy company. Yes, it looks like an advertisement."
- "I think it tells you where it's made, the country of origin."
- "Well, that means that the standards are the same across all European countries, no matter what alphabet they use."
- "I don't know. Maybe it's the name of the company. I don't know."

Figure 3.2. Show Cards 3, 4, 5 and 6, depicting energy labels for refrigerator-freezers, washing machines, dishwashers and televisions, respectively.





These answers reveal that the presentation of the wording is not as successful as policy-makers would presumably wish at conveying the central purpose of the label, which is to communicate energy performance. While many did draw the correct conclusion, there was also considerable confusion over the meaning of this text.

### 3.6 Comprehension of the highest energy efficiency class an appliance may have

Q13, 15,  
28, 40;  
4d, 5f

Participants were presented with the energy labels for refrigerator-freezers and televisions (Show Cards 1a and 1b, respectively; see Figure 3.1) by rotation and asked what is the highest energy efficiency class an appliance may have. These two label types were chosen for this exercise because the refrigerator-freezer label has an A+++ to D scale, whereas the television label has an A to G scale, and thus it is instructive to measure any difference in comprehension rates between them. In the case of focus groups, the show cards depicting the energy labels were presented again later in the sessions and discussion was allowed.

#### Results

Viewed across both the focus groups and in-depth interviews, 80% of participants were able to correctly identify the highest energy efficiency class that it was possible to have under the current labelling schemes (Table 3.2). When the answers given by focus group participants without conferring are compared to those made following group discussion, the share of correct responses increases from 81% to 92% ( $P < 0.0001$ ).

The share of correct answers for the focus group and in-depth interviews without conferring was 81% for refrigerator-freezers and 78% for televisions. Thus there was no statistically significant difference in comprehension with regard to the labels for the two appliance types.

**Table 3.2. Ability to identify the highest energy efficient class an appliance may have when presented with energy labels for refrigerator-freezers and televisions**

Appliance type	Questions <sup>a</sup>	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	In-depth interview	60	46 (77%)	14 (23%)	3.3
	Focus group ND	190	153 (81%)	37 (19%)	4.1
	Focus group WD	190	174 (92%)	16 (8%)	10.9
	In-depth interview + Focus group ND	250	199 (80%)	51 (20%)	3.9
Refrigerator-freezers	In-depth interview	30	27 (90%)	3 (10%)	9.0
	Focus group ND	95	74 (78%)	21 (22%)	3.5
	Focus group WD	95	89 (94%)	6 (6%)	14.8
	In-depth interview + Focus group ND	125	101 (81%)	24 (19%)	4.2
Televisions	In-depth interview	30	19 (63%)	11 (37%)	1.7
	Focus group ND	95	79 (83%)	16 (17%)	4.9
	Focus group WD	95	85 (89%)	10 (11%)	8.5
	In-depth interview + Focus group ND	125	98 (78%)	27 (22%)	3.6

Abbreviations: ND = no discussion; WD = with discussion.

a) Questions asked: in-depth interview Q4d and Q5f, and focus group Q13 and Q15 (ND); focus group Q28 and Q40 (WD).

### ***Participants' rationales for identifying the highest energy efficiency class an appliance may have***

Comments from those who correctly identified the highest energy efficiency class offered on the energy label:

#### *Refrigerator-freezer labels*

- "I think A three stars. You can't get more stars [plus signs]."
- Participant (P): "It's going to be A three plus, triple plus. Maybe one day there'll be an A four pluses, in which case that would be even better. You know, 20 years ago, that was the best you had." Moderator (M): "So, 20 years ago there was just an A?" P: "Yes. Now there are three more lines possible."
- P: "Well, it's got to be A..., the very first one." M: "A+++?" P: "Yes." M: "Why do you say that?" P: "Well, because, once again, there's nothing higher than that and so it's got to be the best."
- P: "The A+++." M: "I think maybe the price is going to be higher for that." M: "Why do you say that's the best energy efficiency class?" P: "Well, ... it's the best one, it's the highest one. Visually, it's the highest one."
- P: "Just A with +++." M: "You say that because?" P: "[I]t's the top of the colour chart, on the label."

#### *Television labels*

- "A for excellent."
- "I presume there's no A+, so A."
- "'A'. I mean it's the highest one on the diagram."
- P: "As of today? I would have a tendency to say that A probably exists, but since I haven't looked in a long time, I'm not sure." M: "So you would figure it's A, based on what you remember?" P: "Yes, I would assume so. I dare to believe that A exists."
- P: "Well, A." M: "A?" P: "I would assume so. Maybe I'm barking up the wrong tree. I don't think it would be G."

Some participants had a sophisticated appreciation of the issues regarding both appliance types:

- "On this scale of values, it would have to be A+++." M: "I think if they wanted to be very transparent with the customer, they should..., maybe it would become a little bit too complex, but beyond that rule that I did where you add the volume of the refrigerator plus the freezer divided by the annual consumption, I would say you practically almost need next to each refrigerator, each one has..., depending on how big the freezer is, you'd have to have really a formula because you have a bigger freezer, that's why you're going to consume more energy. So you really want to have a simple formula that just clearly indicates to us the energy that's necessary to refrigerate 1 litre, effectively, plus how much energy is consumed to freeze 1 litre of food. Then have a simple formula that would weight each compartment in terms of importance."
- "How many pluses can you fit into the arrow, you'd just keep going, wouldn't you? ... I don't know how they're measuring it, but there'd be a theoretical maximum efficiency for any kind of object like that, any kind of heat pump type device, which is kind of the basics of engineering physics thing. So there would be a maximum you could reach, but it depends how the grading is done. If it's done in clumps of units of, you know, 10 kilowatt hours per unit of time then you just run out of space, but if it's done so that, like the decibel scale it's done logarithmically, you could get asymptotically closer but never quite get there and just keep on having one more level that's better than the last one by a minute fraction."

- *M: "That's in your hypothetical world, but right now in this world what's the highest classification?" P: "You mean what? Can I see one there?" M: "Yes, from there." P: "Oh, well, there are only three plusses. 'A+++' from your point of view. Sorry I didn't realise you were asking me something as simple as that."*

Some participants had the right answer but had some difficulty rationalising it or were confused about other aspects of the label:

- [Refrigerator-freezer:] *P: "I think it's D." M: "You think it's the highest energy class?" P: "I don't know. I would go to see a shop assistant to advise me." M: "Spontaneously, when you look at it, how do you perceive that?" P: "I think D is the highest." M: "And the lowest? Which refrigerator would be least energy efficient in your opinion?" P: "Then it would be D." M: "But then you said the highest." P: "I meant D is the highest consumption." M: "I thought you were talking about the highest savings. So the most efficient is A, and the least efficient D?" P: "Yes."*
- [Refrigerator-freezer:] *P: "It'd have to be a triple A." M: "So that'd be the highest one it could have?" P: "Well, maybe not, because they eat energy, don't they? So maybe, on second thoughts, something with a triple A rating is something that doesn't exhaust that much energy, so maybe it'd be another electrical product that could be a triple A. Maybe it's impossible to have a fridge-freezer that's a triple A, maybe the highest is a double A, an A++, possibly, because it consumes a lot of energy in the home, doesn't it? It's on 24 hours a day. It's the only appliance you'd have on 24 hours a day. It is. 24 hours a day. You never switch it off."*
- [Television label:] *P: "I don't know, is A the highest? I've seen A and some stars, or plus plus, A+, A++. So A is probably not the highest." M: "So highest is AA, or triple A?" P: "Double A or triple A. I don't remember. Either double A or triple A or A with two or three stars or plusses, that is what I recollect. Definitely it's that you want an A. It's a new thing, of course. Ten years ago I wouldn't look for anything like that."*

Comments from those who gave wrong answers:

#### *Refrigerator-freezer labels*

- *P: "Are you speaking about a number or on a scale of those letters?" M: "It's up to you." P: "Now you've confused me. I'm really starting to think that it's D, that the refrigerators were just small ones. In my opinion, the scale goes from A to D, but I can't tell looking at the picture whether A or D is the best, now when I look at the coloured arrows." M: "What do you think they stand for?" P: "I think they should inform about energy consumption of the refrigerator, but I don't know if A or D is the highest. I don't know." M: "Why do you think they show the energy consumption?" P: "I don't know. Somehow, I feel it's related."*
- *"Well, you are asking me things that I have no idea about... Well, you know, in my opinion, there are some little men who go one way and the other, and I think that in this case, they work much faster. I think that in this case, when I keep the refrigerator case closed, then it will maintain the temperature for a long time, while the lower efficiency refrigerator has to switch on, has to work more. That's why it consumes more energy."*

#### *Television labels*

- *P: "I don't know. Perhaps if it could be 'E', I don't know." M: "What do you think the coloured arrows indicate?" P: "Well, definitely not quality because quality must be..., well, it's probably not like that. We're still talking about efficiency. It's the efficiency." M: "Why do you think it's the energy efficiency?" P: "Because everyone has got a number of appliances, so they should all work somehow."*

- P: "Can I look at the one that was underneath here? Because it gives me an indication of how they defined. If D is 100 watts, let's say, I would say the best class – what's the question?" M: "The best energy efficiency class." P: "Well the best class is the television that's going to have the lowest energy consumption number, but for me a television that goes from A to D, from let's say zero watts which obviously doesn't exist, up to 100 watts, is just fine. Now beyond that then you get to the yellow and the red then that's not as good. It's clearly less good." M: "However, in terms of class do you see what I'm talking about here?" P: "Yes. Just the letter. The class is the letter." M: "In your opinion which is the best letter?" P: "Well for me there isn't one best one. I could say there would be three that would be in the top three obviously, and that would be... televisions A, B or C are very good televisions in terms of energy class. Otherwise it deteriorates a little bit." M: "Why do you say it's A, B, C?" P: "Well, because you're still going to be inferior to 100 watts, and you're going to be close to 100 watts maximum, which seems just fine to me versus what televisions consume today."
- "Again, I don't know. No idea. There are claims there. One is Sony, I mean these are all well-known brands, Panasonic and Sony and Samsung. I mean, these are only the three I know I've heard of and they can make claims of B, C, D. I don't think they can. I'm not sure. Can they make a claim for A if that means the most efficient?"

While most participants were able to determine the highest acknowledged efficiency class, some questioned whether any products currently on the market are at that high an efficiency level and some noted that new classes could be added in the future as technology evolves. Some participants mentioned they had previously seen energy labels with plus signs added to the top A class and speculated that these might be added in the future for televisions (note: at this point participants had not seen a television label with an A+ in the course of either the in-depth interviews or focus groups).

Various rationales were given by participants for their choices regarding the highest energy efficiency class an appliance may have (see box above). Most participants used a mixture of the energy efficiency class (the letter and plus signs) and the relative position on the stacked arrow scale (where the top of the scale is associated with the highest efficiency and the bottom the lowest). The colour scale and energy consumption information were used to determine the relative efficiency, but not the highest permissible class.

### **Synopsis**

The number of participants who could correctly identify the highest efficiency class it is possible for an appliance to have increased significantly following group discussion, demonstrating that real learning occurred through the process of conferring with peers in the focus groups. There was no difference in the rate of correct identification between the two label types, despite the difference in the efficiency scales used.

These results are fully consistent with those gained with questions regarding ability to correctly identify the most and least energy efficient products from a choice of three, where in both cases about four out of five participants made the correct choice without assistance (see sections 3.7.1 and 3.7.2). There was no statistically significant difference between the television and refrigerator-freezer labels with respect to participants' ability to correctly identify the highest possible label class, despite the difference in the efficiency scales used, but some questioned whether A was the highest possible class for televisions and speculated about the possibility of having A+ or higher.

The way participants reported using the label to make their decisions about the highest efficiency ranking is consistent with how they used the information on the label to evaluate the energy efficiency ranking (see section 3.7).

### 3.7 Comprehension of energy efficiency classes: quantitative results

This section presents quantitative label comprehension findings that examine how well consumers are able to correctly understand the efficiency rankings when presented with a choice between three or four different products, depending on:

- The choice of efficiency scale used (as typified by the A+++-to-D scale used on the refrigerator-freezer label and the A-to-G scale used on the television label);
- In the case of televisions, a mix of A+-to-F and A-to-G scales (note: it is already permissible for televisions to be rated A+ even though the A+-to-F scale does not come into effect until 2014; thus a television that already meets the A+ requirement may already display an A+ label class on an A+-to-F scale even though televisions that are not A+ graded would be displayed on an A-to-G scale); and
- Whether or not the rank order of the energy efficiency class is the inverse of the rank order of the energy consumption.

A priori, it can be anticipated that consumer understanding of the efficiency rank orders will decrease when:

- The number of products they are asked to rank increases (e.g. four products compared to three);
- The rank order of energy consumption is not inversely proportional to the rank order of efficiency; and
- The choice of end-points on the efficiency scales are mixed up.

All of these situations may occur when consumers are shopping for products covered by the new label designs, so they were included in the comprehension tests conducted. The results are reported in the remainder of this section.

Participants in both the focus groups and the in-depth interviews were first asked to inspect a set of three energy labels for either refrigerator-freezers (Show Card 2a; Rotation 1) or televisions (Show Card 2b; Rotation 2) and were then presented with the energy labels for the alternative appliance (Figure 3.3). In each case they were asked to choose the label corresponding to the most and least energy efficient appliances. Participants were later asked to inspect four labels in a more complex test of comprehension.

In the case of the focus groups, participants were asked to write their answer to the question put to them without having any opportunity to confer or discuss the topic; the question was asked again later, following which they had the opportunity to discuss their reasoning among the group before writing down their answers. In-depth interviewees simply gave their answers and reasoning. Thus, the in-depth interview responses can be compared directly with the focus group participant responses to the equivalent initial question answered with no discussion.

### 3.7.1 Ability to identify the most energy efficient appliance (when faced with three choices)

Q5, 8,  
22, 38;  
3a, 5d

Participants were asked which of a set of three refrigerator-freezers or televisions, respectively (Show Cards 2a and 2b; see Figure 3.3), was the most energy efficient.

#### **Results**

##### *Choice of most energy efficient appliance with no discussion*

Q5, 8;  
3a, 5d

Without any discussion, the refrigerator-freezer or television with the most energy efficient label class was correctly identified from a choice of three by 85% of interviewees and focus group participants (n = 125 participants for both refrigerator-freezers and televisions combined) at first exposure to the labels (Table 3.3) and by 85% (Table 3.4) at second exposure (using the alternative appliance type label).

##### *Choice of most energy efficient appliance after discussion*

Q 22, 38

Upon re-exposure to the original energy labels shown (Show Card 2a for refrigerator-freezers, Rotation 1; Show Card 2b for televisions, Rotation 2) and after discussion with peers within their focus group, correct identifications were made by 96% (n = 95 focus group participants for both refrigerator-freezer and television labels combined; see Table 3.3). Upon further exposure to the alternative appliance labels and after discussion, the corresponding rate was 97% (see Table 3.4).

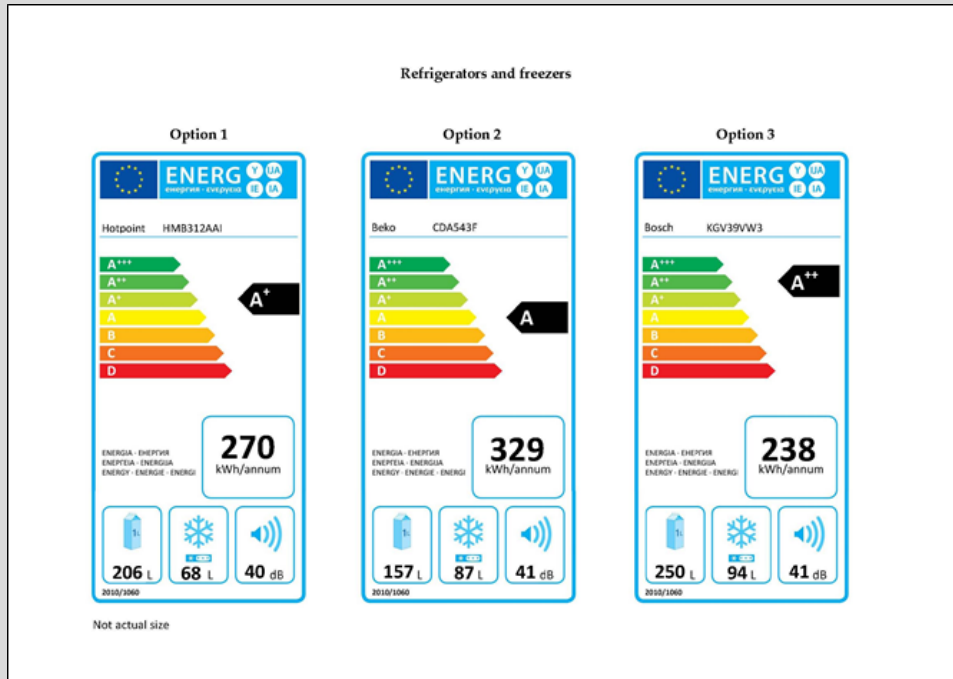
#### **Synopsis**

These results suggest that slightly more than four people in five across the EU can correctly identify the appliance with the highest energy efficiency when inspecting three energy labels where the order of the energy efficiency class is inversely related to the annual energy consumption and when they have not had the benefit of any training or discussion about the new energy label.

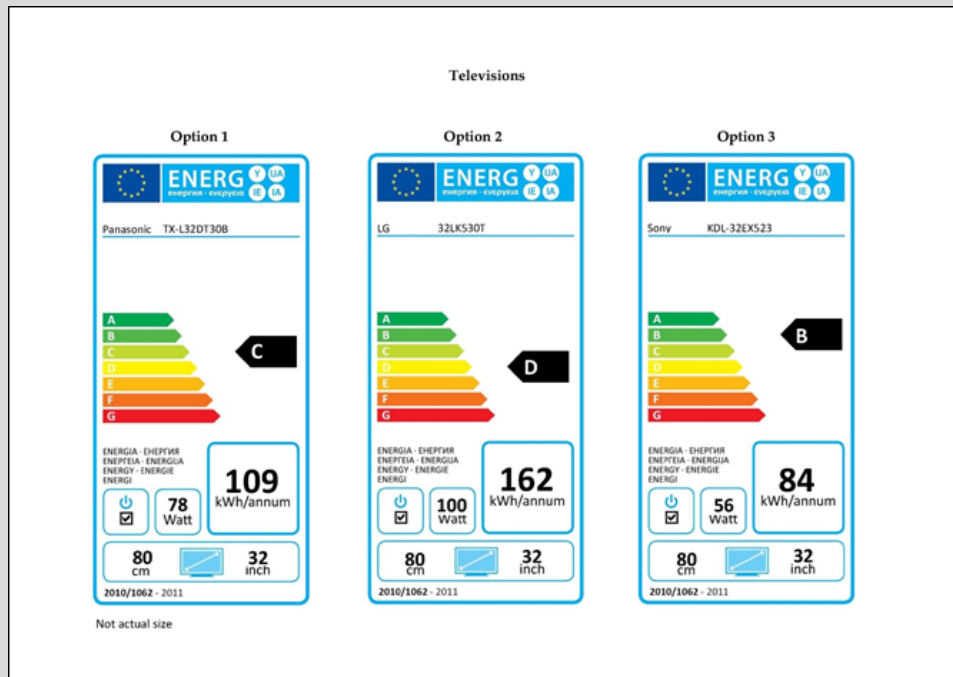
There appears to be no benefit to more sustained exposure to the label without discussion, as the share of correct responses remained unchanged at 85% when the test was repeated with the alternative appliance energy label (either televisions or refrigerator-freezers).

Figure 3.3. Show Cards 2a and 2b (not actual size), depicting three models of refrigerator-freezers and televisions for which rank order of energy consumption inversely relates to rank order of energy efficiency classes.

Show Card 2a



Show Card 2b





**Table 3.3. Ability to identify the most energy efficient appliance from a choice of either three refrigerator-freezers (Rotation 1; Show Card 2a) or three televisions (Rotation 2; Show Card 2b) at first presentation of any energy labels (no discussion) and after re-presentation (with discussion)**

Appliance type	Rotation <sup>a</sup>	Questions <sup>b</sup>	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	All	In-depth interview	30	28 (93%)	2 (7%)	28.0
		Focus group ND	95	78 (79%)	17 (21%)	4.6
		Focus group WD	95	91 (96%)	4 (4%)	22.8
		In-depth interview + Focus group ND	125	106 (85%)	19 (15%)	5.6
Refrigerator-freezers	1	In-depth interview	15	14 (93%)	1 (7%)	14.0
		Focus group ND	46	37 (80%)	9 (20%)	4.1
		Focus group WD	46	45 (98%)	1 (2%)	45.0
		In-depth interview + Focus group ND	61	51 (84%)	10 (16%)	5.1
Televisions	2	In-depth interview	15	14 (93%)	1 (7%)	14.0
		Focus group ND	49	41 (84%)	8 (16%)	5.1
		Focus group WD	49	46 (94%)	3 (6%)	15.3
		In-depth interview + Focus group ND	64	55 (86%)	9 (14%)	6.9

*Abbreviations:* ND = no discussion; WD = with discussion.

- a) Rotation 1 includes focus groups in 5 countries and interviewees presented with energy labels for refrigerator-freezers at the very first presentation of any labels; Rotation 2 participants were presented with labels for televisions at the very first presentation.
- b) Questions asked: in-depth interview Q3a and focus group Q5 (ND); focus group Q22 (WD).

**Table 3.4. Ability to identify the most energy efficient appliance from a choice of either three televisions (Rotation 1; Show Card 2b) or three refrigerator-freezers (Rotation 2; Show Card 2a) at first presentation of any energy labels<sup>a</sup> (no discussion) and after re-presentation (with discussion)**

Appliance type	Rotation <sup>b</sup>	Questions <sup>c</sup>	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	All	In-depth interview	30	27 (90%)	3 (10%)	9.0
		Focus group ND	95	79 (83%)	16 (17%)	4.9
		Focus group WD	95	92 (97%)	3 (3%)	30.7
		In-depth interview + Focus group ND	125	106 (85%)	19 (15%)	5.6
Televisions	1	In-depth interview	15	14 (93%)	1 (7%)	14.0
		Focus group ND	46	35 (76%)	11 (24%)	3.2
		Focus group WD	46	44 (96%)	2 (4%)	22.0
		In-depth interview + Focus group ND	61	49 (80%)	12 (20%)	4.1
Refrigerator-freezers	2	In-depth interview	15	13 (87%)	2 (13%)	6.5
		Focus group ND	49	44 (90%)	5 (10%)	8.8
		Focus group WD	49	48 (98%)	1 (2%)	48.0
		In-depth interview + Focus group ND	64	57 (89%)	7 (11%)	8.1

*Abbreviations:* ND = no discussion; WD = with discussion.

- a) These were the alternative appliances to those shown at the very first presentations of any labels.



- b) Rotation 1 includes focus groups in 5 countries and interviewees presented with energy labels for refrigerator-freezers at the very first presentation of any labels; Rotation 2 participants were presented with labels for televisions at the very first presentation.
- c) Questions asked: in-depth interview Q5d and focus group Q8 (ND); focus group Q38 (WD).

The share of correct responses on first exposure to labels for both refrigerator-freezers and televisions rose from 79% with no discussion among focus group peers to 96% following consultation ( $P = 0.0036$ ), and from 83% to 97% when the test was repeated with the alternative labels ( $P = 0.0019$ , no discussion vs discussion). Combining the results for exposure to labels for both appliance types shows a significant increase in the rate of correct identification of the most efficient appliance following discussion (83% vs 96%<sup>8</sup>;  $P < 0.0001$ ).

Collectively these results demonstrate that real learning occurred through group discussion, such that the share of those unable to correctly identify the most efficient appliance fell from 21% on first exposure to the labels to 4% following re-exposure and group discussion, i.e. a reduction of over four-fifths. This suggests that greater exposure to the label combined with educational efforts would appreciably increase the level of comprehension of the energy labels and reduce the proportion of consumers drawing incorrect conclusions about the relative energy efficiency of appliances. This is an important finding as a lack of understanding of the energy efficiency label could lead consumers to buy less efficient appliances in error and hence undermine the energy saving benefits of the energy label.

#### *Interpretation of the responses for the refrigerator-freezer and television labels independently*

When participants were first exposed to the energy labels for refrigerator-freezers, the share of those who were able to correctly identify the highest energy efficiency class was 86% ( $n = 125$ ); the corresponding share for televisions was 83% ( $n = 125$ ).<sup>9</sup> Thus the rate for correctly identifying the most energy efficient product is very similar for both the television and refrigerator-freezer labels. This result is interesting as the television label uses an A-to-G scale, whereas the refrigerator-freezer label uses an A+++to-D scale.

### **3.7.2 Ability to identify the least energy efficient appliance (when faced with three choices)**

Participants were asked which of a set of three refrigerator-freezers or televisions, respectively (Show Cards 2a and 2b; see Figure 3.3), was the least energy efficient.

Q6, 9,  
23, 39;  
3b, 5e

#### **Results**

##### *Choice of least energy efficient appliance with no discussion*

Without any discussion, the refrigerator-freezer or television with the lowest energy efficiency class was correctly identified from a choice of three by 81% of interviewees and focus group participants ( $n = 125$  for both refrigerator-freezers and televisions combined) at first exposure to the labels (Table 3.5) and by 84% (Table 3.6) at second exposure (using the alternative appliance type label).

Q6, 9;  
3b, 5e

##### *Choice of least energy efficient appliance after discussion*

Upon re-exposure to the original labels shown (Show Card 2a for refrigerator-freezers, Rotation 1; Show Card 2b for televisions, Rotation 2) and after conferring with peers within their focus group, correct identifications were made by 96% ( $n = 95$  participants for both refrigerator and television labels

Q23, 39

<sup>8</sup> Results from focus group Q5 + Q8 vs Q22 + 38.

<sup>9</sup> Results from interview Q3a + focus group Q5 + Q5d + Q8 for each of refrigerator-freezers and televisions.

combined; see Table 3.5). Upon further exposure to the alternative appliance labels and after discussion, the corresponding rate was 95% (see Table 3.6).

The rate of correctly identifying the least efficient appliance among the three options presented was significantly greater ( $P < 0.0001$ ) when respondents were able to discuss them than when they had to make a choice with no conferring.

**Table 3.5. Ability to identify the least energy efficient appliance from a choice of either three refrigerator-freezers (Rotation 1; Show Card 2a) or three televisions (Rotation 2; Show Card 2b) at first presentation of any labels (no discussion) and after re-presentation (with discussion)**

Appliance type	Rotation <sup>a</sup>	Questions <sup>b</sup>	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	All	In-depth interview	30	29 (97%)	1 (3%)	29.0
		Focus group ND	95	72 (76%)	23 (24%)	3.1
		Focus group WD	95	91 (96%)	4 (4%)	22.8
		In-depth interview + Focus group ND	125	101 (81%)	24 (19%)	4.2
Refrigerator-freezers	1	In-depth interview	15	15 (100%)	0 (0%)	NA
		Focus group ND	46	36 (78%)	10 (22%)	3.6
		Focus group WD	46	44 (96%)	2 (4%)	22.0
		In-depth interview + Focus group ND	61	51 (84%)	10 (16%)	5.1
Televisions	2	In-depth interview	15	14 (93%)	1 (7%)	14
		Focus group ND	49	36 (73%)	13 (27%)	2.8
		Focus group WD	49	47 (96%)	2 (4%)	23.5
		In-depth interview + Focus group ND	64	50 (78%)	14 (22%)	3.6

*Abbreviations:* ND = no discussion; WD = with discussion.

- a) Rotation 1 includes focus groups in 5 countries and interviewees presented with energy labels for refrigerator-freezers at the very first presentation of any labels; Rotation 2 participants were presented with labels for televisions at the very first presentation.
- b) Questions: in-depth interview Q3b and focus group Q6 (ND); focus group Q23 (WD).

**Table 3.6. Ability to identify the least energy efficient appliance from a choice of either three televisions (Rotation 1; Show Card 2b) or three refrigerator-freezers (Rotation 2; Show Card 2a) at first presentation of an energy labels<sup>a</sup> (no discussion) and after re-presentation (with discussion)**

Appliance type	Rotation <sup>b</sup>	Questions <sup>c</sup>	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	All	In-depth interview	30	27 (90%)	3 (3%)	27.0
		Focus group ND	95	78 (82%)	17 (18%)	4.6
		Focus group WD	95	90 (95%)	5 (5%)	18.0
		In-depth interview + Focus group ND	125	105 (84%)	20 (16%)	5.8
Televisions	1	In-depth interview	15	14 (93%)	1 (7%)	14.0
		Focus group ND	46	35 (76%)	11 (24%)	3.2
		Focus group WD	46	43 (93%)	3 (7%)	14.3
		In-depth interview + Focus group ND	61	49 (80%)	12 (20%)	4.1

Refrigerator-freezers	2	In-depth interview	15	13 (87%)	2 (13%)	6.5
		Focus group ND	49	43 (88%)	6 (12%)	7.2
		Focus group WD	49	47 (96%)	2 (4%)	23.5
		In-depth interview + Focus group ND	64	56 (88%)	8 (12%)	7.0

*Abbreviations:* ND = no discussion; WD = with discussion.

- These were the alternative appliances to those shown in the very first presentations of any labels.
- Rotation 1 includes focus groups in 5 countries and interviewees presented with energy labels for refrigerator-freezers at the very first presentation of any labels; Rotation 2 participants were presented with labels for televisions at the very first presentation.
- Questions: in-depth interview Q5e and focus group Q9 (ND); focus group Q39 (WD).

## Synopsis

These results suggest that roughly four people in five across the EU can correctly identify the appliance with the lowest energy efficiency when inspecting three energy labels where the rank order of the energy efficiency class is inversely related to annual energy consumption and when they have not had the benefit of any training or discussion about the new energy label. This finding is fully consistent with the results for the share of people who could correctly identify the most energy efficient appliance in this test (see section 3.7.1).

Without the benefit of consultation among peers, the share of correct identifications of the least energy efficient appliance rose from 81% at first exposure to 84% when the label comprehension test was repeated with the alternative appliance type (either televisions or refrigerator-freezers). These results are similar to the findings in the test of ability to identify the most energy efficient appliance (85% for both no discussion and discussion). There was no significant difference in the result in either case; thus, if there is an increase in comprehension from increased exposure to the label it is not a strong effect.

The learning effect is notably stronger when consultation among peers is permitted. In this case the share of correct responses rose from 76% at first exposure to the originally presented label to 96% following exposure to the same label and focus group discussion (see Table 3.5), and from 82% at first exposure to the alternative appliance label to 95% following re-exposure to the same label and focus group discussion (see Table 3.6). These findings are highly statistically significant ( $P < 0.001$ ).

In general, therefore, the ability to identify the least energy efficient appliance appears to be consistent with that regarding the most energy efficient appliance, with a clear increase in comprehension when discussion among peers is permitted. Both sets of results imply that educational efforts would increase the level of comprehension of the energy labels and reduce the proportion of consumers drawing incorrect conclusions about the relative energy efficiency of appliances.

### *Interpretation of the answers for the refrigerator-freezer and television labels independently*

When participants were first exposed to the energy labels for refrigerator-freezers, 84% were able to correctly identify the model in the lowest energy efficiency class ( $n = 61$ ) (see Table 3.5). The corresponding share for televisions was 78% ( $n = 64$ ). There was no statistically significant difference in the level of comprehension of the least efficient appliance (among the three choices offered) between the energy labels for the two appliance types. This result is again consistent with the findings for identifying the most energy efficient appliance and implies that the difference in the efficiency scales for the two appliances (A+++ to D for refrigerator-freezers, and A to G for televisions) does not affect ability to determine the efficiency ranking of the products presented in the simple three-choice test.

### 3.7.3 Ability to correctly rank the order of energy efficiency of appliances (when faced with four more complex choices)

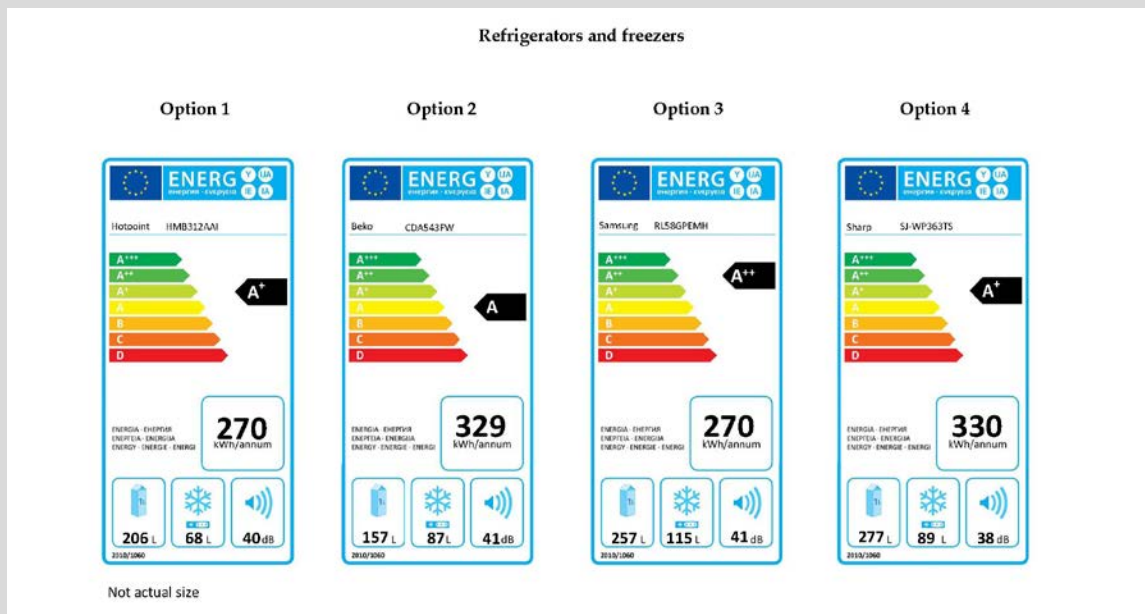
#### Refrigerator-freezers

Q10, 79 Focus groups were shown the energy labels for four refrigerator-freezers and asked to rank them in order from the most energy efficient to the least energy efficient (Show Card 9; Figure 3.4); the rank order of energy consumption was not directly inversely related to the rank order of energy efficiency class.

This test was considered to be more difficult than the ranking of the three refrigerator-freezers that had previously been presented (see Figure 3.3 and sections 3.7.1 and 3.7.2) because:

- The rank order of energy efficiency does not follow the inverse of the rank order of energy consumption;
- Two appliances had the same energy consumption; and
- Two appliances were in the same energy efficiency class.

**Figure 3.4. Show Card 9, depicting four refrigerator-freezers for which rank order of energy consumption is not directly inversely related to rank order of energy efficiency class. (Most energy efficient (a) = Option 3; second (b) and third (c) most efficient = both Option 1 and Option 4; least efficient (d) = Option 2.)**



The complexities included in this test are all true to life and the products tested are real products with their correct energy and technical characteristics indicated on the label. The order of energy consumption need not inversely follow the order of energy efficiency because the products do not have

the same adjusted storage volume (storage capacity) and thus a larger refrigerator-freezer may use more energy than a smaller one but still be more energy efficient.

### **Results**

Q10, 79 Upon first exposure to the four refrigerator-freezer labels and without the benefit of conferring, 55% of focus group participants correctly ranked the order of energy efficiency of all four models (Table 3.7). On average, 68% of participants gave a correct ranking for any one individual refrigerator-freezer, but since one or more of the four choices were incorrectly ranked by some participants, the rate of correctly ranking all four labels is lower.

The incorrect responses were analysed to see if there was any tendency to make a false assumption that the correct energy efficiency order was the inverse order of energy consumption (i.e. from lowest to highest energy consumption). Responses consistent with this logic were found in 18% of the incorrect cases; while this is a higher share than would be expected from a purely random ordering given the number of possible incorrect permutations, it does not explain the majority of incorrect answers.

**Table 3.7. Ability to correctly rank four refrigerator-freezers by order of energy efficiency, where rank order of energy consumption was not directly inversely related to rank order of energy efficiency class. For both questions, ranking options ran from most efficient (a) to least efficient (d)**

Rotation <sup>a</sup>	Questions	Options	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	10 (ND)	a	95	69 (73%)	26 (27%)	2.7
		B	95	70 (74%)	25 (26%)	2.8
		C	95	58 (61%)	37 (39%)	1.6
		D	95	60 (63%)	35 (37%)	1.7
		All	95	52 (55%)	43 (45%)	1.2
All	79 (WD)	A	95	87 (92%)	8 (8%)	10.9
		B	95	87 (92%)	8 (8%)	10.9
		C	95	81 (85%)	14 (15%)	5.8
		D	95	79 (83%)	16 (17%)	4.9
		All	95	75 (79%)	20 (21%)	3.8
1	10 (ND)	A	46	34 (74%)	12 (26%)	2.8
		B	46	32 (70%)	14 (30%)	2.3
		C	46	29 (63%)	17 (37%)	1.7
		D	46	28 (61%)	18 (39%)	1.6
		All	46	26 (57%)	20 (43%)	1.3
1	79 (WD)	A	46	41 (89%)	5 (11%)	8.2
		B	46	40 (87%)	6 (13%)	6.7
		C	46	40 (87%)	6 (13%)	6.7
		D	46	38 (83%)	8 (17%)	4.8
		All	46	36 (78%)	10 (22%)	3.6
2	10 (ND)	A	49	35 (71%)	14 (29%)	2.5
		B	49	38 (78%)	11 (22%)	3.5
		C	49	29 (59%)	20 (41%)	1.5
		D	49	32 (65%)	17 (35%)	1.9
		All	49	26 (53%)	23 (47%)	1.1
2	79 (WD)	A	49	46 (94%)	3 (6%)	15.3
		B	49	47 (96%)	2 (4%)	23.5
		C	49	41 (84%)	8 (16%)	5.1
		D	49	41 (84%)	8 (16%)	5.1
		All	49	39 (80%)	10 (20%)	3.9

Abbreviations: ND = no discussion; WD = with discussion.

- a) Rotation 1 includes focus groups in 5 countries presented with energy labels for refrigerator-freezers at the very first presentation of any labels; Rotation 2 participants were presented with labels for televisions at the very first presentation.

**Summary of discussions regarding ranking of four refrigerator-freezers where rank order of energy consumption was not directly inversely related to rank order of energy efficiency class**

- Moderator (M): "Why did you say Option 4?" [in response to a question regarding which was the least efficient appliance of the four choices] Participant (P): "I was looking at the figures more than the classes, but the classes are probably more important. I looked at the size as well, just when comparing the first and third one."
- M: "Okay, some of you put [Option] 4 in second place. Why?" P: "Well, you calculate between the [Option] 4 and the [Option] 1. Maybe it's not a very good calculation, but..." M: "Calculation based on what?" P: "You look at the volume that it can hold versus – you have to look at the energy – consumes 30 kilowatt hours versus the capacity." M: "So there's a ratio between the consumption kilowatt hours versus the number of litres?" P: "Yes. That's almost the same number as what's on Option 4 in terms of the refrigerator."
- M: "Okay, and next, why is it that Option 2 went in the place you put it in? Some of you put it in third place, for instance. Why?" P: "Well, because I looked at the total capacity as well, you know, between the consumption and the total capacity."

In one group only one person produced the correct energy efficiency rank order. The discussion about the ranking among the groups went as follows:

- M: "How have you decided what the order of energy efficiency is?" P1: "First of all, the letters on the black background. Then the arrow and the second most important factor was the energy consumption in the box." M: "Oh, so first of all, your most important criterion was the black arrow?" P2: "That's right, and the letter in it." P3: "I, on the other hand, looked at these letters here." P4: "Yes and what is also important is the volume of a fridge." M: "Okay, so for you, the most important thing was the letter on the black background, then you look at the information about the kilowatt hours in the square, and then you also compare that with the volume of the fridge, right?" P4: "Right." M: "Okay, so getting back to the show card. Which option, in your opinion, is the most energy efficient one?" All participants: "Three." M: "Why?" P5: "Because it is big." Another participant: "Three because it's big and it has a big freezer, and it has a plus, and it consumes the least electricity." M: "Okay, and the least energy efficient one is which one?" P6: "The second one. It has, 'A,' and it has a much smaller volume than that one."

There is nothing in this conversation that explains why almost all the members of this group erroneously indicated Option 4 as being the most energy efficient option, followed by Option 2, even allowing for some potential confusion through possibly gauging the impact of storage volume.

Upon later exposure to the labels and discussion with focus group peers, 79% of participants correctly ranked the order of energy efficiency of all four labelled refrigerator-freezers (see Table 3.7), versus 55% at first exposure and no discussion ( $P < 0.0001$ ); thus the absolute share of correct answers increased by 24 percentage points. This result demonstrates that the increase in correct comprehension following group discussion is linked to the process of discussion and implies that there is likely to be a similar potential to increase comprehension via public education efforts.

*Choice of most energy efficient refrigerator-freezer with no discussion*

Q10 Upon first exposure to the four energy labels (Show Card 9; see Figure 3.4) and without conferring, 73% of participants correctly identified the model with the most energy efficient label class (n = 95 participants). The absolute share of correct responses is 12 percentage points lower than for first exposure to the simpler, three-label choice, where 85%<sup>10</sup> of participants correctly identified the most efficient refrigerator-freezer (see section 3.7.1 and Table 3.3). This difference in rates of correct identification between the four- and three-label cases is statistically significant ( $P = 0.0060$ ) and demonstrates a real effect. Thus this analysis shows that the four-label case is more confusing and liable to result in lower overall comprehension of product energy efficiency rankings.

*Choice of most energy efficient refrigerator-freezer after discussion*

Q79 Upon re-exposure to the four refrigerator-freezer energy labels and after having conferred with peers, 92% of participants correctly identified the model with the most energy efficient label class (n = 95 participants). The share of correct responses is slightly lower than for the equivalent case of the simpler, three-label choice following conferring (98% of responses correct<sup>11</sup>) (see section 3.7.1 and Tables 3.3 and 3.4).

As real-world choices (i.e. when shopping for an appliance) are likely to involve choices of both the simpler and the more complex varieties and will often be unaided, the real-world ability to identify the most efficient appliance is likely to be somewhere in between the two examples considered for the unaided example.

*Choice of least energy efficient refrigerator-freezer with no discussion*

Q10 Upon first exposure to the four refrigerator-freezer energy labels and without conferring, 63% of participants correctly identified the model with the least energy efficient label class (n = 95 participants). The share of correct identifications is 20 percentage points lower than for the simpler, three-label choice for refrigerator-freezers (83%<sup>12</sup>) (see section 3.7.1 and Tables 3.5 and 3.6). This difference in the rate of correct identifications between the four-label and three-label cases is statistically significant ( $P = 0.0003$ ) and demonstrates a real effect. Thus this analysis shows that the four-label case is more confusing and liable to result in lower overall comprehension of product energy efficiency rankings.

*Choice of least energy efficient refrigerator-freezer after discussion*

Q79 Upon re-exposure to the four-label case (Show Card 9) and after having had the benefit of conferring with peers, 83% of participants correctly identified the least efficient appliance (n = 95 participants). The share of correct responses is 13 percentage points lower than for the case of the simpler, three-label choice for refrigerator-freezers (see section 3.7.1), where 96%<sup>13</sup> of participants made correct identifications; this difference between the four- and three-label cases is statistically significant ( $P = 0.0095$ ), demonstrating a real effect. Thus this analysis shows that the four-label case is more confusing and liable to result in lower overall comprehension of product energy efficiency rankings.

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<sup>10</sup> Results from focus group Q5 + Q8 for refrigerator-freezers.

<sup>11</sup> Results from focus group Q22 + Q38 for refrigerator-freezers.

<sup>12</sup> Results from focus group Q6 + Q9 for refrigerator-freezers.

<sup>13</sup> Results from focus group Q23 + Q39 for refrigerator-freezers.



## **Synopsis**

It is apparent that the four-label example is more complex than the three-label example and that without the opportunity for discussion participants found it more difficult to correctly rank the energy efficiency of the refrigerator-freezers in this test (55% fully correct responses for the four-label example and 80% fully correct responses, i.e. ranked all three options correctly, for the three-label example;  $P < 0.0001$ ). Most real-world choices will be a blend of the types of cases seen with the three- and four-label cases; thus, it might be expected that 55–80% of the European general public will be able to correctly rank the order of energy efficiency from the information presented on the refrigerator-freezer label without additional assistance.

When peer discussion was permitted, the ability to rank the four refrigerator-freezers (depicted on the complex, four-label Show Card 9; see Figure 3.4) according to order of energy efficiency rose from 55% to 79%, which implies that there is considerable potential to improve the comprehension of the label and thereby its beneficial impact through greater public education.

It can be surmised that the increased difficulty in correctly rank ordering the energy efficiency of products in the four-label example is related to the impact of storage volume and features such that the rank order of energy consumption is no longer inversely related to the rank order of the label energy efficiency classes and that of the annual energy consumption. However, there is nothing in the reported discussions with participants about their choices to confirm or refute this hypothesis.

## **Televisions**

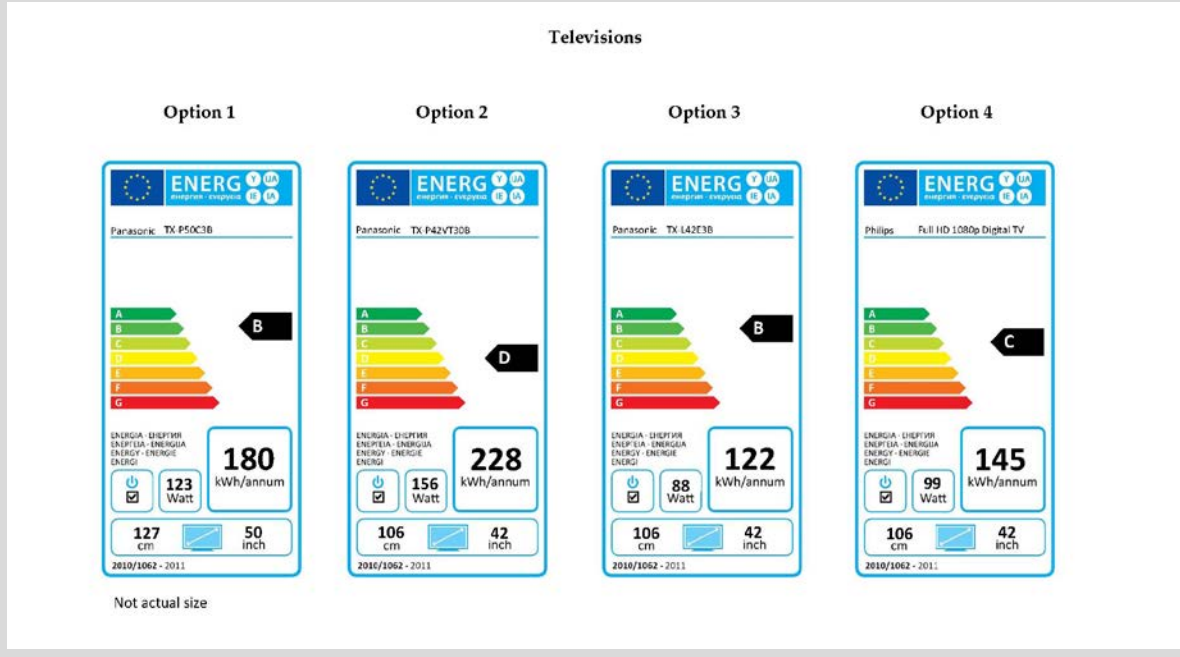
Q12, 81 Focus groups were shown the energy labels for four televisions and asked to rank them in order from the most energy efficient to the least energy efficient (Show Card 11; Figure 3.5); the rank order of energy consumption was not directly inversely related to the rank order of energy efficiency class.

This test was considered to be more difficult than the ranking of the three televisions that had previously been presented (using Show Card 2b; see sections 3.7.1 and 3.7.2) because:

- The rank order of energy efficiency does not follow the inverse of the rank order of the energy consumption; and
- Two appliances were in the same energy efficiency class.

The complexities included in this test are all true to life and the products tested are real products with their correct energy and technical characteristics indicated on the label. The order of energy consumption need not inversely follow the order of energy efficiency because the products do not have the same screen size and thus a larger television may use more energy than a smaller one but still be more energy efficient.

Figure 3.5. Show Card 11, depicting four televisions for which rank order of energy consumption is not directly inversely related to rank order of energy efficiency class. (Most and second most energy efficient (a and b) = both Option 1 and Option 3; third most efficient (c) = Option 4; least efficient (d) = Option 2.)



## Results

Q12, 81 Upon first exposure to the four television labels and without conferring, 47% of participants correctly ranked the order of energy efficiency of all four models (Table 3.8). On average, 70% of focus group participants correctly ranked any one individual television (almost the same as for refrigerator-freezers), but some of these incorrectly ranked one or more of the four televisions. The incorrect responses were analysed to see if there was any tendency to err in the efficiency ranking by making a false assumption that the correct energy efficiency order was the inverse order of energy consumption (i.e. from lowest to highest energy consumption). Responses consistent with this logic were found in 29% of the incorrect cases, which suggests that this was a common misinterpretation.

By contrast, some 15% of the incorrect answers were consistent with responses where the answer was ranked in terms of highest to lowest energy consumption as opposed to energy efficiency. Among the remaining 56% of incorrect answers, there were no apparent patterns that enabled any particular reasoning to be discerned.

**Table 3.8. Ability to correctly rank four televisions by order of energy efficiency, where rank order of energy consumption was not directly inversely related to rank order of energy efficiency class. For both questions, ranking options ran from most efficient (a) to least efficient (d)**

Rotation <sup>a</sup>	Questions	Options	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	12 (ND)	A	95	74 (78%)	21 (22%)	3.5
		B	95	67 (71%)	28 (30%)	2.4
		C	95	58 (61%)	37 (39%)	1.6
		D	95	67 (71%)	28 (30%)	2.4
		All	95	45 (47%)	50 (53%)	0.9
All	81 (WD)	A	95	84 (88%)	11 (12%)	7.6
		B	95	72 (76%)	23 (24%)	3.1
		C	95	67 (71%)	28 (29%)	2.4
		D	95	83 (87%)	12 (13%)	6.9
		All	95	66 (70%)	29 (30%)	2.3
1	12 (ND)	A	46	36 (78%)	10 (22%)	3.60
		B	46	31 (67%)	15 (33%)	2.1
		C	46	27 (59%)	19 (41%)	1.4
		D	46	32 (70%)	14 (30%)	2.3
		All	46	20 (41%)	26 (59%)	0.8
1	81 (WD)	A	46	40 (87%)	6 (13%)	6.7
		B	46	34 (74%)	12 (26%)	2.8
		C	46	33 (72%)	13 (28%)	2.5
		D	46	40 (87%)	6 (13%)	6.7
		All	46	33 (72%)	13 (28%)	2.5
2	12 (ND)	A	49	38 (78%)	11 (22%)	3.5
		B	49	36 (73%)	13 (27%)	2.8
		C	49	31 (63%)	18 (37%)	1.7
		D	49	35 (71%)	14 (29%)	2.5
		All	49	25 (51%)	24 (49%)	1.0
2	81 (WD)	A	49	44 (90%)	5 (10%)	8.8
		B	49	38 (78%)	11 (22%)	3.5
		C	49	34 (69%)	15 (31%)	2.3
		D	49	43 (88%)	6 (12%)	7.2
		All	49	33 (67%)	16 (33%)	2.1

Abbreviations: ND = no discussion; WD = with discussion.

- a) Rotation 1 includes focus groups in 5 countries presented with energy labels for refrigerator-freezers at the very first presentation of any labels; Rotation 2 participants were presented with labels for televisions at the very first presentation.

Upon later exposure to the labels and discussion with focus group peers, 70% of participants correctly ranked the order of energy efficiency of all four labelled televisions (see Table 3.8). The absolute percentage of correct answers is 23 points higher than for the corresponding answers given upon first exposure to the labels and no discussion (47%;  $P = 0.0002$  for discussion vs no discussion). This result demonstrates that the increase in correct comprehension following group discussion is related to the process of discussion and implies that there is likely to be a similar potential to increase comprehension via public education efforts.

*Choice of most energy efficient television with no discussion*

Q12

Upon first exposure to the four-label case and without conferring, 78% of participants correctly identified the television with the most energy efficient label class ( $n = 95$  participants). The share of correct responses is 2 percentage points less than for the case of the simpler, three-label choice, where 80%<sup>14</sup> of participants correctly identified the most efficient appliance (see section 3.7.1 and Tables 3.3 and 3.4). This difference between the four- and three-label cases is not statistically significant, thus the increase in correct identifications cannot be confirmed as a real effect.

*Choice of most energy efficient television after discussion*

Q81

Upon re-exposure to the four television energy labels (see Figure 3.5) and after having conferred with peers, 88% of participants correctly identified the television with the most energy efficient label class ( $n = 95$  participants). The share of correct responses is 7 percentage points lower than for the case of the simpler, three-label choice for televisions following conferring (95% of responses correct<sup>15</sup>) (see section 3.7.1 and Tables 3.3 and 3.4). The difference between results for the three-label case and the four-label case is statistically significant ( $P = 0.0265$ ), thus this analysis confirms that participants still found it harder to identify the most efficient appliance in the more complex, four-label example even though they had the opportunity to discuss the questions as a group. As real-world choices are likely to involve choices of both the simpler and the more complex varieties and will often be unaided, the real *in situ* ability to identify the most efficient appliance is likely to be somewhere in between the two cases when there was no discussion.

*Choice of least energy efficient television with no discussion*

Q12

Upon first exposure to the four-label case and without conferring, 71% of participants correctly identified the television with the least energy efficient label class ( $n = 95$  participants). The share of correct responses is 4 percentage points lower than for the case of the simpler, three-label choice for the television rotations, where 75%<sup>16</sup> of the responses were correct (see Tables 3.5 and 3.6). This difference is not statistically significant; therefore, this analysis does not confirm that the decrease in the share of participants who correctly identified the least energy efficient television between the three-label case and the more complex, four-label case is a real effect.

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<sup>14</sup> Results from focus group Q5 + Q8 for televisions.

<sup>15</sup> Results from focus group Q 22 + Q38 for televisions.

<sup>16</sup> Result from focus group Q6 + Q9 for televisions.

**Summary of discussions regarding ranking of televisions where rank order of energy consumption was not directly inversely related to rank order of energy efficiency class**

- Participant (P): “I looked at the combination of the two. Also the number of letters, but then I was also wondering about the size of the screen of a television, the 106 cm. I was just wondering if that is the right ratio, size and class. I am wondering how they relate to each other, the base, the class.” Moderator (M): “What do you mean by ‘class?’” P: “The letter. Then I looked at what they say about the black letter. For example, if I have a 2B class, then I looked at the number first but not at the size, because I assume that the energy efficiency has been calculated in relation to the size, not forcing me to calculate. I would think that they have already done that. Then in B122, the energy efficiency is higher than in the other one, but this is wild guessing. I don’t know if that is right.”
- M: “Anybody here who did it differently?” P: “Basically, I based myself on the black letters because I assume that they already are in a certain ratio vis-a-vis the television. That there already is – whether that is a ‘plus’ or ‘B’, energy from the letter to kilowatt. I neglected volume, size, a bit. The question is, is that enough, the screen size? I mean, you decide first, when you buy a television, on the screen size. Then you look at the other things. So I looked first at the kilowatt. That is what I looked at and it did fit. It made sense, kilowatt per year.” M: “So do the letters fit?” P: “They match, yes, and that is simpler than when I look at this thing here. I have a focus on consumption but if you have two different sizes, you can’t – but what is totally confusing is this standby, the watt number. If I look, I see that [option] number 2, for example, which is the best anyway. I look and it says 56 watts, here 48, here 78 and there 100, only in standby.”
- M: “So the question is, what in terms of energy efficiency?” P: “The kilowatt. For me, efficiency is a look at the kilowatt, and that is where the combination – because the letters are the same and the next criterion would be performance, and then size.”

In this dialogue the middle participant explains how they based their decision (incorrectly) on just the annual energy consumption. This reasoning seems to have been common to an appreciable proportion of the incorrect answers. One of the later participants, however, discusses (correctly) how the energy consumption combined with the size collectively has an impact on the energy efficiency shown by the letters.

*Choice of least energy efficient television after discussion*

Q81

Upon re-exposure to the four television labels and after having had the benefit of conferring with peers, 87% of participants correctly identified the appliance with the least energy efficient label class (n = 95). The share of correct responses is 8 percentage points lower than for the case of the simpler, three-label choice for televisions, where 95%<sup>17</sup> of participants made correct identifications (see section 3.7.2 and Tables 3.5 and 3.6). This difference is statistically significant ( $P = 0.0002$ ), therefore the decrease from the share of participants who correctly identified the least energy efficient television in the three-label case to that in the more complex, four-label case is confirmed as a real effect; the four-label case is confirmed as being more confusing or liable to result in lower overall comprehension of product energy efficiency rankings than the three-label case.

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<sup>17</sup> Result from focus group Q23 + Q39 for televisions.

## **Synopsis**

As was found with refrigerator-freezers, the four-label example is more complex than the three-label one; it was statistically significantly more difficult to correctly rank the energy efficiency of the televisions presented (47% fully correct responses for the four-label example with no discussion versus 74% for the three-label example). Most real-world choices will be a blend of the types of cases seen in the three- and four-label cases: for the television label it might be expected that 47–74% of the European general public will be able to correctly rank the order of energy efficiency from the information presented on the label without additional assistance.

When peer discussion was permitted, the ability to rank the televisions in the complex, four-label case according to order of energy efficiency rose from 47% to 70%, which implies that there is considerable potential to improve the comprehension of the label and thereby its beneficial impact through greater public education.

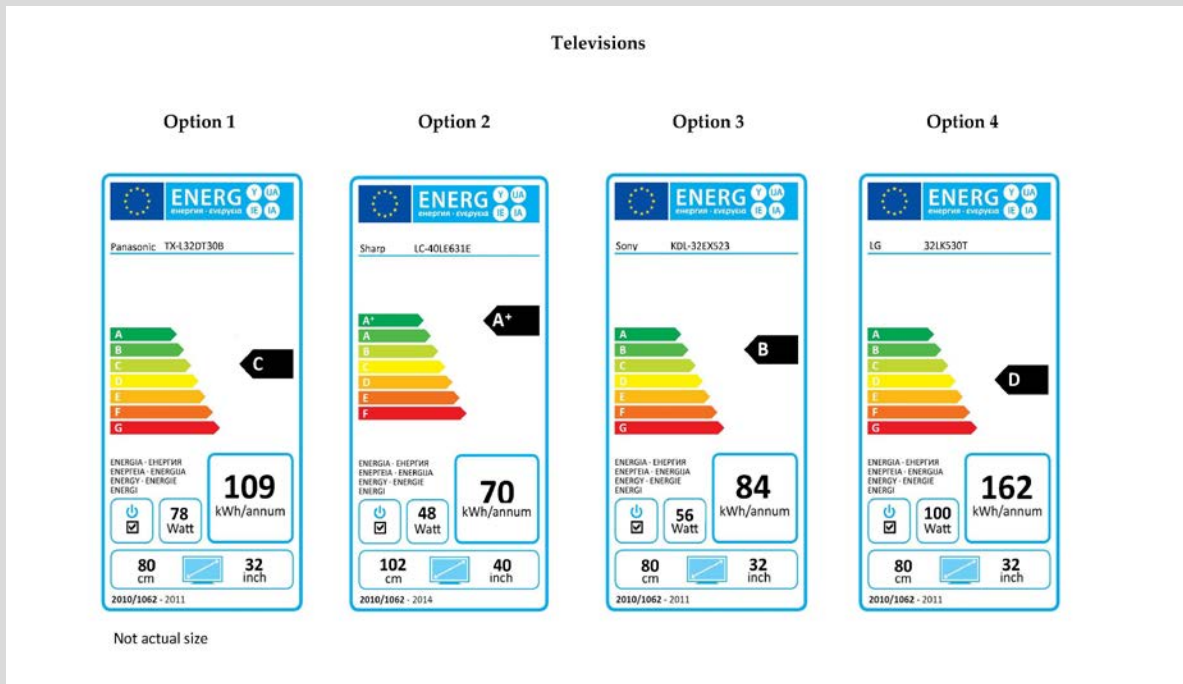
Part of the reason why some participants erred in ranking the energy efficiency of the four televisions is that they ranked the order in terms of energy consumption and did not take account of size impacts on appliance consumption. This accounted for 30% of the erroneous ranking answers. Another potentially confusing factor with regard to the televisions was the high prominence given to the on-mode power demand figure.

### **3.7.4 Ability to correctly rank the order of energy efficiency of televisions when faced with a mix of A+-to-F and A-to-G scales**

Q11, 80 Focus groups were asked to rank four televisions energy labels in order from the most energy efficient to least energy efficient (Show Card 10; Figure 3.6). This rank order test was considered to be more difficult than the ranking of the three televisions discussed in sections 3.7.1. and 3.7.2 (Show Card 2b; see Figure 3.3) because in the four-label test, three of the labels use the current standard A-to-G scale and one is on the A+-to-F scale that is due to become the standard label scale from 2014. This label scale can already be used in the event that an existing product meets the future A+ requirement (as is the case here).

The complexities included in this test are all true to life and the products tested are real products with their correct energy and technical characteristics indicated on the label.

Figure 3.6. Show Card 10 (not actual size), depicting four televisions, including one carrying the A+ to F scale due to become the standard label scale from 2014 (Option 2) and three carrying the 2011 label (A to G). (Most energy efficient (a) = Option 2; second most efficient (b) = Option 3; third most efficient (c) = Option 1; least efficient (d) = Option 4.)



## Results

Upon first exposure to the labels and without the benefit of conferring, 63% of participants correctly ranked the order of energy efficiency for all four television models (Table 3.9). On average, 71% of participants gave a correct ranking for any one individual television (similar to the previous example in section 3.7.3), but some of these incorrectly ranked one or more of the four televisions.

Upon later exposure to the labels and discussion with focus group peers, 79% of participants correctly ranked the order of energy efficiency of all four labelled televisions (see Table 3.9). The absolute share of correct answers is 16 percentage points higher than for the corresponding answers given upon first exposure to the labels and no discussion. The difference between the rate of ranking all options correctly following discussion vs no discussion was statistically significant ( $P = 0.0071$ ), so the increase in correct comprehension recorded following group discussion is confirmed to be caused by the process of peer discussion.

**Table 3.9. Ability to correctly rank televisions by order of energy efficiency when faced with four choices, including one model carrying the A+-to-F scale due to become the standard label scale from 2014 (Option 2) and three carrying the 2011 label (A to G). For both questions, ranking options ran from most efficient (a) to least efficient (d)**

Rotation <sup>a</sup>	Questions	Options	Total no. of participants	Correct answers	Incorrect answers	Ratio of Correct/Incorrect
All	11 (ND)	a	95	68 (72%)	27 (28%)	2.5
		b	95	65 (68%)	30 (32%)	2.2
		c	95	66 (70%)	29 (30%)	2.3
		d	95	69 (73%)	26 (27%)	2.7
		All	95	60 (63%)	35 (37%)	1.7
All	80 (WD)	a	95	81 (85%)	14 (15%)	5.8
		b	95	79 (83%)	16 (17%)	4.9
		c	95	79 (83%)	16 (17%)	4.9
		d	95	81 (85%)	14 (15%)	5.8
		All	95	75 (79%)	20 (21%)	3.8
1	11 (ND)	a	46	36 (78%)	10 (22%)	4.1
		b	46	36 (78%)	10 (22%)	3.6
		c	46	33 (72%)	13 (28%)	2.5
		d	46	33 (72%)	13 (28%)	2.5
		All	46	32 (70%)	17 (30%)	1.9
1	80 (WD)	a	46	39 (85%)	7 (15%)	5.6
		b	46	39 (85%)	7 (15%)	5.6
		c	46	39 (85%)	7 (15%)	5.6
		d	46	39 (85%)	7 (15%)	5.6
		All	46	38 (83%)	8 (17%)	4.8
2	11 (ND)	A	49	32 (65%)	17 (35%)	1.9
		B	49	29 (59%)	20 (41%)	1.5
		C	49	33 (67%)	16 (33%)	2.1
		D	49	36 (73%)	13 (27%)	2.8
		All	49	28 (57%)	21 (43%)	1.3
2	80 (WD)	A	49	42 (86%)	7 (14%)	6.0
		B	49	40 (82%)	9 (18%)	4.4
		C	49	40 (82%)	9 (18%)	4.4
		D	49	42 (86%)	7 (14%)	6.0
		All	49	37 (76%)	12 (24%)	3.1

*Abbreviations:* ND = no discussion; WD = with discussion.

a) Rotation 1 includes focus groups in 5 countries presented with energy labels for refrigerator-freezers at the very first presentation of any labels; Rotation 2 participants were presented with labels for televisions at the very first presentation.



## **Synopsis**

Comprehension of the energy efficiency rank order was higher in this test, where a label for a television with an A+-to-F scale is mixed with three with A-to-G scales, than in the test with the four television labels where the order of annual energy consumption is not inversely related to the rank order of the energy efficiency class (see section 3.7.3 and Figure 3.5 (Show Card 11)). This implies that consumers face greater difficulties in interpreting more complex mixes of energy consumption and energy efficiency class than they do in understanding how mixed A-to-G scales combine with A+-to-F scales.

None of the discussions around this question gave any insight into why some people gave incorrect energy efficiency rank orders. The discussions generally correctly identified that the A+ product was the most efficient and that the rank ordering was based mostly upon the energy efficiency class indicated through the letter grade rather than on the energy consumption, power demand or size of the screen.

### **3.7.5 Comprehension of the four energy labels for refrigerator-freezers versus those for televisions**

The test of ability to rank-order four energy labels where there is no inverse energy consumption correlation with energy efficiency class according to energy efficiency is directly comparable for the cases of the four refrigerator-freezers and four televisions. In both cases extra complexity was introduced by including products with characteristics that result in the simple inverse rank order of energy consumption and energy efficiency class no longer applying.

#### **Labels using the A-to-G scale**

##### *Comparison of results with no discussion*

Q10, 12 When no conferring was permitted, the percentage of participants achieving fully correct rankings was 55% for refrigerator-freezers and 47% for televisions. This difference was not statistically significant and therefore the null hypothesis (that comprehension of both product labels is the same) cannot be rejected.

##### *Comparison of results after discussion*

Q79, 81 When conferring was permitted, the percentage of participants achieving fully correct rankings was 79% for refrigerator-freezers and 70% for televisions. This difference was not statistically significant; therefore the null hypothesis (that comprehension of both product labels is the same) cannot be rejected.

## **Synopsis**

The test of comprehension between matched pairs of results reveals no statistically significant difference in the ability to correctly rank order the energy efficiency of the refrigerator-freezer and television energy labels, when using the typical label format currently in existence.

#### **Comparing television labels where the A+-to-F scale is mixed with the A-to-G scale**

Ability to correctly rank order the energy efficiency of television energy labels was examined with the addition of the television A+-to-F label format (this is permitted for televisions now if they meet the A+ criteria but will become mandatory for all televisions from 2014) to the standard A-to-G format currently required for all but A+ (or A++) televisions.

### *Comparison of results with no discussion*

Q5, 6, 8, 9, 11 When no conferring was permitted, fully correct rankings were achieved by 63% of participants when shown a mix of the A+-to-F and A-to-G scales (see section 3.7.4), and by 74% when only the A-to-G scale was used (three-label case; see sections 3.7.1 and 3.7.2). This difference is statistically significant ( $P = 0.0001$ ), indicating that participants did find the A-to-G scale labels easier to rank than the mix of labels with an A+-to-F or A-to-G scale.

### *Comparison of results with discussion*

Q22, 23, 38, 39, 80 When conferring was permitted, fully correct rankings were attained by 79% of participants when the A+-to-F and A-to-G scales were mixed and by 89% when only the A-to-G scale was used (three-label case; see sections 3.7.1 and 3.7.2). The difference between results is not statistically significant and so this does not confirm that there was a real difference in the ability to comprehend the efficiency rank order between label formats.

### **Synopsis**

The results show a statistically significant difference in comprehension when conferring was not permitted, and found no statistically significant difference when it was. It can be concluded from this that when participants are unaided in making their assessment they find the pure A-to-G scale easier to understand than the mix of A+-to-F and A-to-G scales. The difference in comprehension diminishes when consultation is permitted. This suggests that the mixing of A+-to-F and A-to-G scales for the same product type is likely to introduce some reduction in comprehension of the efficiency scales and may diminish the market transformation impact of the television label.

## **3.8 Comprehension of the label energy efficiency classes: qualitative findings**

In an attempt to probe the underlying causes of the comprehension levels that were reported quantitatively in section 3.7, participants were asked to clarify their reasoning regarding their efficiency ranking choices and to specify what information on the label they used to make their choices.

### **3.8.1 Reasoning behind ranking appliances by energy efficiency**

Q22, 38; 3a, 5d When participants were asked to explain what information they used to make their assessments in the tests to identify the most and least efficient appliances (refrigerator-freezers or televisions; see sections 3.7.1 and 3.7.2, respectively), they generally reported that they used a mixture of information from the label (see boxes on the following pages), by drawing from:

- The energy efficiency class letter and/or plus signs (sometimes described by participants as stars);
- The annual energy consumption (sometimes described as just the energy consumption, the energy, the kilowatts or the power – even when referring to the kWh/annum values); and
- The colour of the scale the black arrow points towards, with green clearly being seen to be the most efficient and red the opposite.

## ***Rationales behind ranking refrigerator-freezers by energy efficiency***

### *Most efficient*

Comments from those who correctly identified the most efficient refrigerator-freezer included:

- “When you see it [the A++], you think that it might be something better. At least it’s the perception I’ve got.”
- *Q. Why do you think it’s option three?* A. “Because I see the A with the double plus there.” *Q. What gives you the impression that this information really refers to the fact that it’s the most energy efficient refrigerator?* A. “It’s the top value.”
- *Q. Why do you think it’s option three?* A. “If I were to compare the kilowatt hours, the value is the lowest in this case.”
- “Well, because it’s A plus plus, so I think that that means, if it’s plus plus, that probably means that that’s the one that has the least wasted energy.”
- “Well, just to answer quickly, I would have to look at the colour codes of the pyramid and I would say that it’s option three, without looking – because it’s the one that has A++. It’s the one that has the best ranking on the label.”
- “Well, because it’s A++ and it’s – how can I put this? The number of kilowatt hours per year is lower so I think that fits well together. I think it goes well together, and that means that it is more economical.”
- “I would say the third one.” *Q. Why is that?* A. “Well, because of the – you see, the number 238 versus the other two, which are much higher. You also see the A, you know, where the black hair [*sic*] lies. Plus the storage volume is bigger.”
- “I’m going to go for option three, only because I’m looking at that black arrow again with the A++, and I’m thinking that the two +s might mean that it’s more efficient than the other two, I think.”

Only one participant who gave an incorrect answer gave an explanation:

- “Well, I’d say this one because it seems to have the lowest figures overall. I mean, the litre or whatever that is, is higher, but the kilowatts is lower and..., I’m sorry, no, this one is lower. It’s quite confusing, looking back and forth. Okay, so this one is lower but then these figures are higher, so overall [Option 1].”

### *Least efficient*

Comments from those who correctly identified the least efficient refrigerator-freezer included:

- “It’s got the lowest co-efficient, A, and it’s got the biggest energy consumption. Plus, the effective volume is smaller.”
- “It’s A. It’s just a sole A.”
- “It’s small, but it takes 329 kilowatts.”
- “It consumes more energy and, therefore, it’s catalogued as an A.”
- “Just because there wasn’t a plus next to the A and the arrow.”
- “It’s rated ‘A’, and the running consumption is higher. When you consider its internal volume is lower, that’s actually very high.”
- “It must be A because everything else is better rated.”

Only one participant who gave an incorrect answer gave an explanation:

- “Because you compare the kilowatt hours and look at the total capacity, if you add fridge and freezer up. Option one has fewer kilowatt hours, but at the same time has less capacity.”

This suggests that this participant had not focused on the energy efficiency grades but tried to determine energy efficiency by assessing the appliance capacity (storage volume) and energy consumption and become confused.

### ***Rationales behind ranking televisions by energy efficiency***

#### *Most efficient*

Comments from those who correctly identified the most efficient television included:

- “I look at the colours. Green, it tells me ‘buy’. Red, it tells me ‘don’t buy’.”
- “Option three, the one with the least kilowatt hours.” *Q. The one with the least kilowatt hours?* A. “Yes, when the televisions have the same size.”
- “All the time, I’m letting these squares, these boxes guide me, and not the colours. They show you the energy consumption here, and the power. Whereas these colours, there’s just a visual reference, they quickly allow you to see. So thanks to these colours, you don’t need to read what’s in the boxes, but if you know what they mean, then that’s enough.”
- “I would look at the kilowatts per annum.”
- “When they know that A is the highest efficiency product and D is the lowest efficiency product, they know that A identifies or marks the highest efficiency, the lowest consumption.”
- “Well, the lowest power consumption is option three.”

Only one participant who gave an incorrect answer gave an explanation for their answer:

- “It’s option two.” *Q. Why do you think that?* A. “Because it’s D and D is in the middle.” *Q. Why do you think it’s D in the middle?* A. “I don’t know. Because I’m not able to evaluate the information in the lower part of the box. They will not give me any information that will help me decide whether any of the options is better than the other, so I look at the scale of the colours. As I’m not able to say whether D is good and G is worse, and D is in the middle, then I think D is probably the best.”

#### *Least efficient*

Comments from those who correctly identified the least efficient television included:

- “It’s a class D and it’s 162 kilowatt hours.”
- “D, class D, that doesn’t sound good. Maybe I am misled, but it should be at least A or B, isn’t that right? D, class D, that doesn’t sound credible. Plus, I look at these figures and this figure is pretty high. This indicates to me it is a high consumption of energy.”
- “It has the letter that is farthest from A, and the numbers are the highest concerning the watts.”

A fairly typical discussion on this topic in the in-depth interviews ran like this:

- P: “I guess it’s this one, isn’t it?” M: “You’re choosing option two because? You’re looking at the black arrow with D in it.” P: “Yes.” M: “That indicates that it’s the least energy efficient?” P: “Could be. Again, I really just don’t know enough about...” M: “I’m interested in how it seems to you, so why do you think the black arrow with D indicates low energy efficient, not energy efficient?” P: “Well, because you associate green with being green, so I guess, when you associate red with high energy. So the higher, the more it goes towards the red, the more

energy it uses up, so this seems to be a little lower, this is much lower.”

Again, only one participant who gave an incorrect answer gave an explanation for their answer:

- “I think it’s option one for example.” *Q. Why do you think it’s option one?* A. “I don’t know. I like it least. There’s something that I don’t like about it.” *Q. What is it that you don’t like about it?* A. “I don’t like the combination of the number 109 and C. I kind of feel it. I cannot explain it.” *Q. Could you try to explain what you mean by ‘feeling it’, this combination of the number 109 and the letter?* A. “Well, I think that 109 is like the middle of the values, and then when it’s connected to the letter C, I think it’s the worst option for me.” *Q. I’m trying to understand why this is the worst option for you. Why is 109 worse than the other numbers?* A.” Well, from the technical point of view, it’s probably not worse, but it’s the middle of those three values. I don’t know. I don’t think it can be either good or bad, but I’m kind of convinced that the letter A will be the best option and then B follows A, and that’s why I chose C and 109 as the worst option.”

It is difficult to interpret this response but it may be that the participant had not noticed that one of the labelled products was a class D and hence had a lower efficiency rating than the class C option.

### 3.8.2 Reasoning behind identifying the energy efficiency of an appliance

Q25; 4a

Participants viewed either the refrigerator-freezer energy label (Show Card 1a; Rotation 1) or the television label (Show Card 1b; Rotation 2) (see Figure 3.1) and were asked how they could tell the energy efficiency of the product from inspection of the label. In the case of focus groups, participants discussed their views.

#### **Results**

Participants were able to identify the energy efficiency of the product from the various elements of the label:

- Class/letters/black arrow
- Scale/chart
- Consumption numbers (kWh and watts)
- Colours
- Icons
- Arrows

All the focus groups mentioned the black arrow or efficiency class, 80% of the groups discussed the consumption numbers, 20% the scale or chart and 20% the colours. Neither the icons nor the arrows were discussed. Among in-depth interviewees, energy class, letters and/or black arrow were mentioned by 63%; 60% discussed the numbers, 20% the colours, 17% the scale or chart, 7% the icons and 3% the arrows.

Overall, the top indicator was the class/letters/black arrow, followed by the consumption figures.

#### **Synopsis**

The energy class and energy consumption figures were identified as the top indicators for product energy efficiency. Very little emphasis was placed on the icons, with only two in-depth interviewees mentioning them.

Many participants combined the efficiency class and energy consumption information to rank the efficiency of the product. This helps to explain why the share of correct efficiency ranking answers was appreciably lower in the comprehension tests in which rank order of efficiency was not simply inversely related to energy consumption (see section 3.7.3). It takes an extra level of understanding to separate energy consumption from efficiency.

Participants who had difficulty in ranking the efficiency of products often had difficulty in interpreting the efficiency classification and in relating the black arrow on the right of the label to the coloured scale on the left. In some cases these participants mentioned that they did not understand

#### ***Participants' rationales behind identifying the energy efficiency of an appliance***

- “If you had just this sticker, you’d have to look at this letter in the black arrow.”
- “I think it is important to watch this letter, because I don’t know – if it says ‘energy consumption, this many kilowatts’, I don’t know what it means, but A class, I know what it means.”
- “This is very energy efficient because it’s A and that’s the best.” [For televisions]
- “I established that because I have information here which says, ‘Class A’. Class A is the most energy efficient [television], and there’s also the low usage of kilowatt-hours, so that’s basic. The basic information, though, is the, ‘A’, in the black arrow. This suggests that this appliance is energy efficient.”
- “A, B, C. That’s the most important information, isn’t it? That’s what I would look for.”
- Participant (P): “Well, still, you’re looking at the letters. Also, looking at the number.”  
Moderator: “Is that meaningful to you?” P: “Yes, I mean, if I’m able to compare it to others. You know, by itself, no.”

what the black arrow was for and they did not appear to appreciate that it points back to the coloured arrow scale to indicate where the specific product being labelled falls on the overall scale.

The majority of participants understood that the energy class/letter indicates the overall energy efficiency of the product; very few said they did not know how efficient the product was. Some mentioned that if viewing the label on its own they would not find the energy consumption figures useful in determining the energy efficiency of the product. The numbers were only deemed useful when used as a comparator between labels.

#### **3.8.3 Comprehension of the relative efficiency of a product on the energy efficiency scale**

Q26, 27;  
4b, 4c

Participants were shown the energy label for either refrigerator-freezers (Show Card 1a; Rotation 1) or televisions (Show Card 1b; Rotation 2) (see Figure 3.1) and were asked how good they thought (i) class A and (ii) class D, respectively, were compared to the other classes, and why they thought as they did. In the case of focus groups, participants discussed their views.

#### **Results**

Focus group participants described the A class as ‘superior’ and ‘the best’ when discussing televisions and as ‘basic’, ‘normal’ and ‘average’ when discussing refrigerator-freezers. With regard to the latter, they compared the yellow colour of the A arrow with the green used for the A+ to A+++classes. In-depth interviewees responded in a similar way: for televisions they were very clear that A was the top class, the most energy efficient and consumed the least energy compared to the other classes. For

refrigerator-freezers, the A class was again described as being 'in the middle', 'average', 'fine' and 'acceptable'; it was also described as 'not that good', and once as 'good'.

When asked how good they thought A was compared to the other classes, some participants showed confusion and said they did not understand the ranges. Generally, they believed that the difference was not that great between the A grades (A, A+, A++ and A+++) for refrigerator-freezers or between A and C for televisions as they were all green. They thought the difference was fairly large between the top and bottom grades (A+++ and D, and A and G, respectively).

When asked how good they thought class D was compared to the other classes, price was discussed more often, with a D appliance thought to be cheaper. For televisions, participants were more likely to say that D was a mid-range product (80% among focus groups and 33% of in-depth interviewees): D was described as being 'average', 'in between' and 'in the middle'. D was described as 'bad', 'the worst' and 'poor' more often for refrigerator-freezers, but these descriptions were also used with regard to televisions. D was also associated with being of low quality.

In terms of the difference in the scales between D and the other classes, participants considered there was a big difference between the top classes and D, and between D and the bottom class, but a smaller difference between B and D.

The difference between the lowest and highest energy classes was described as 'drastic'. Other participants said that they could not know how much difference there was because they had nothing to compare it with. Others said the length of the arrows indicated a 25–50% difference in efficiency between the lowest and highest grades. Participants reported using the difference in arrow colour and length as indicators to inform their view of how big a difference there was in the energy efficiency of different label classes.

Some confusion was observed with regard to the plus signs. It was thought that the intervals between A+ and A+++ would be smaller than between the A, B and C grades. Grade G was generally described as being 'old fashioned' and/or 'very badly performing'.

### ***Synopsis***

Across all responses, A was acknowledged as being the best class, and it was understood that this meant that the product consumed the least amount of energy and was the most energy efficient.

With regard to refrigerator-freezers, some participants did not answer the question directly and discussed A+++ rather than A. D was described as being a higher energy consumer than A and less energy efficient. When compared to the lowest class, G, it was described as being middle or average. However, D was more likely to be described as 'poor', even when it was mid-range.

Some participants expressed confusion over how the ranges were formulated. They said the difference in values was high between an A product and a D, and smaller between an A+ and A++ or between an F product and a G.

## **How good did participants think classes A and D were on the energy labels, relative to the other classes?**

### *Refrigerator-freezers*

- “That ‘A’ product is bang in the middle there. There are three in front of it, three below it. That is middle of the road. Why on earth it should be called an A rating is beyond my comprehension. It’s purely set out to confuse and to blindside us.”
- “[A] is median, it is in the middle class. It is not so bad then.”
- Participant (P): “Well, for me, A is just barely enough. It’s sort of average. For me, I wouldn’t even say that it’s good. Moderator (M): “How would you qualify that?” P: “Acceptable. You know, it’s yellow. A, for me, is really the very minimum legal, quote unquote. You know, green in terms of colour codes in society is what’s authorised, what’s allowed, and seeing that A, in fact, for one, it’s in the middle of the scale, and in addition it’s yellow – well, that’s sort of like borderline acceptable.”
- “Well, at one time it was probably quite good, but obviously they introduced three extra layers. Without knowing what would earn a ‘D’, you know, would it have, for the same amount of internal space, would you have a running cost of 400 kilowatt-hours? So it’s difficult to really answer that based on what I’ve got there.”
- “What’s the reference point? If ‘A’ is the minimum standard I have for fridge freezers, then you’ve got four grades, haven’t you? You’ve got ‘A’ to ‘A+++’, which kind of defeats the object of having ‘A’ as the base. You might as well reduce the base to ‘D’ and define ‘D’ differently, but then no manufacturer wants to be a ‘D’.”
- “I wouldn’t even buy it. Fingers off ‘D’, it’s junk.”
- “I think [D is] the worst class, just again because of the letter and the colour.”

### *Televisions*

- “Well, [A’s] superior.”
- “If we say A is indeed top of it, obviously the rest that come lower are inferior for one reason or another.”
- “A is better. A is the best.”
- “Well, it’s better to be first than last, so, I would imagine that A is better. It consumes less, it uses less energy.”
- “Well [A’s] the best class. At the same time B is very close, you know? It could be a one unit difference between B and A. So B could be just as good as A. That’s why you see that’s a little bit difficult, like a snake eating its own tail. Sometimes two things can be identical, and still be in different classes.”
- “Well, class D consumes a lot of energy. I don’t know if it’s two times or three times less, but there’s a big difference.”
- “Well D is three below [A], so in terms of energy consumption it’s a little bit less good, but it’s not terrible.”
- “D is neither good nor bad. Neither here nor there. If somebody wants something to be green you want it to be A, B, C. If somebody doesn’t really care then maybe they would say, maybe, a G.”



### 3.9 Comprehension of the label icons

Participants were shown a total of 13 icons that appear on the various appliance energy labels, working through all four label types (refrigerator-freezers, televisions, dishwashers, washing machines) by rotation, and asked what they thought they signify and why.

Q46;  
SC3c

#### Icon A: refrigerator capacity (refrigerator-freezers)



#### Results

All of the focus groups understood that Icon A represents the capacity, also referred to as volume, of the appliance, and most understood that capacity and volume are measured in litres.

However, only half of the groups correctly identified that it describes the capacity of the refrigerator not including the freezer compartment; many made this deduction by looking at Icon B and deciding that Icon A is for the fridge and Icon B for the freezer. Three groups were undecided about whether the icon describes the capacity of the refrigerator and freezer combined or just the refrigerator alone. The remaining two groups incorrectly decided that it describes the capacity of the entire unit or the capacity of the deep freeze, respectively.

Among the in-depth interviewees, approximately 75% correctly identified the intended meaning of the icon. Of those who gave incorrect answers:

- 13% thought it denotes the combined capacity;
- 3% were undecided as to whether it signifies capacity for the fridge alone or the combined fridge-freezer;
- 3% thought it represents the amount of water that passes through the refrigerator's system; and
- 3% made reference to the size of the unit but did not know how the figure in litres relates to the size.

In cases where it was thought that the icon represents refrigerator capacity, it was often not ascertained by the moderator whether they thought it was for the refrigerator only or for the refrigerator and freezer.

Upon looking at the icon, many participants imagined fitting 199 cartons/boxes of milk into the refrigerator and equated that to the unit's size and capacity.

The icon itself was as described as:

- A carton/pack of milk;
- A carton of orange juice;
- A standard picture 'with a little roof'; and
- A beach hut.

### **Synopsis**

The majority of participants recognised that the icon represents refrigerator volume, even though the interpretation of the icon itself varied. There was some confusion over whether it shows the refrigerator and freezer or just the refrigerator alone. Most participants understood that volume is measured in litres. Only a very small percentage could not understand the icon, which indicates that it is clear and comprehensible.

Q47;  
SC3d

### **Icon B: freezer capacity (refrigerator-freezers)**



### **Results**

All focus groups and 86% of in-depth interviewees correctly concluded that Icon B presents the volume of the freezer compartment of the unit. Of those who gave incorrect answers, 75% spoke about the freezer, freezer possibilities and ice but did not understand the meaning of '54 L'. The remaining 25% understood the meaning of '54 L', but not the meaning of the icon overall.

The snowflake symbol was very easily understood by all participants, with typical comments being:

- “Icon B is just fine. It’s absolutely clear. ... Because of the flock. It’s always been so. Flock means freezer. It’s universal knowledge.”
- “This is the freezer capacity now. You know that because you have that little snowflake symbol which is specific to freezers.”
- “That little snowflake that you associate with cold and with ice.”
- “You automatically think of a freezer when you see the ice symbol.”

There was some debate over the freezer star rating, which was described as denoting:

- Freezing capacity;
- Freezing speed;
- Freezer performance;
- Capacity of the deep freeze;
- Storage potential; and
- Temperature of the freezer.

The majority of participants mentioned having seen this icon before.

### **Synopsis**

The responses indicate that Icon B is generally clear and that most people can correctly deduce its meaning. It was described as being much clearer than the refrigerator capacity symbol.

### Icon C: acoustical noise (refrigerator-freezers, dishwashers)



#### Results

All but one focus group correctly identified Icon C as representing acoustical noise, measured in decibels. The remaining group offered no alternative suggestion.

The correct meaning was deduced by 80% of in-depth interviewees. Among the remainder, four had no explanation for the icon, one identified that it is a measurement of sound but thought it was the sound of the refrigerator door alarm, and the sixth also recognised that the symbol signifies an aspect of sound but was confused about what element of the refrigerator made a sound.

Some participants queried the meaningfulness of the numerical value:

- “I understand it’s about the noise, but I don’t understand whether this is a noisy appliance, yes or no? It doesn’t say anything.”
- “The amount of noise it produces when it’s functioning, when it’s running, and that’s calculated in decibels. I don’t know if that’s a lot or not.”
- “I think it’s important to have some sort of comparison if you don’t know how much 39 [decibels] is. It’s all based on comparisons. If you had a symbol indicating that 39 decibels was the same as a moped or whatever, you just needed to know what the highest decibel was. Then you could choose.”
- Participant (P): “I wouldn’t know what 39 decibels... I mean, what it sounded like, what it was related to. It could sound like a lawnmower. I’ll have to check what they sound like, what their decibels are.” Moderator: “So you’ve no idea whether it’s very loud or very soft or in between?” P: “I haven’t got a clue.”

#### Synopsis

Icon C was clearly and easily identified in the majority of interviews and groups sessions as representing the acoustical noise emitted by the appliance. However, some confusion arose over the meaningfulness of the numerical value and the suggestion of denoting something with which to compare the noise level was popular.

## Icon G: water consumption per year (washing machines, dishwashers)



### Results

All focus groups and two-thirds of the in-depth interviewees correctly identified the meaning of Icon G. Among those who gave wrong answers, most knew the icon related to water but did not understand what 'annum' meant or that water consumption specifically is denoted; one thought it related to the water supply/waste water discharge to and from the appliance; and one thought it was related to the capacity of the unit.

The majority of participants had an opinion on how the information on water consumption should be displayed. Most queried how the figure was calculated and assumed it was based on an average family's usage pattern. Examples of statements made are:

- "I think they assume a typical four-head family. I think they have taken that as a benchmark, a family of four. I think that's what it is supposed to mean. For you to understand the ratio, a four-head family perhaps. So you know what you pay... but you don't really know what to do with it. It would be nice if they distinguished between how often and so on."
- "It's so irrelevant because they don't have information on how many times people wash their clothes on a regular basis."
- "9272 litres per year. Now, here, what you don't know is how many loads of wash you're doing per week. It's 9272, but how many loads? That's a question you would have is how many loads? Yes, if it's just one load, well, then, obviously that would be a lot. If it's 1000 loads, well, then, it's not very much. If it's one per week, well, that would mean 52 loads of wash per year, so there's a piece of information missing. Litres per year, or they'd have to say, just, tell me how many litres per load of wash. You know, I think that might be a little bit more open."
- Participant (P): "I have no idea what that's supposed to mean. I would love to know how much it consumes per load of wash." Moderator: "That would be cool for you?" P: "Well, yes. It's meaningless otherwise."
- "It must be amount used but it's got to be stamped on as in terms of number of washes per annum, typical usage. People would have to know what they're comparing, if there's a standard thing that would explain the loss figure there, the water usage figure for X number of washes, maybe it's one wash per day, seven days a week, then people would kind of have an idea. They'd know how many washes they might do in a week."
- "I think this is, on average, litres per year. 10 000 litres a year. It's crazy. It's too much. I'd rather know average consumption per one wash."

The majority of participants were able to easily link the icon to a metric related to water. It proved to be clear and easily comprehensible:

- “You have litres per year written with a little faucet, which is pretty explicit.”
- Participant (P): “I have never seen it, this is new to me.” Moderator (M): “Surprising positively or negatively?” P: “Positively. The more we know the better.”
- P: “Annual water consumption.” M: “Is that clear?” P: “Yes.” M: “Why is it clear?” P: “Because that’s a faucet [tap].”

### **Synopsis**

In summary, while the fact that this icon refers to water usage was clear, some participants (this seemed to vary by location) were confused by what ‘annum’ meant and hence had trouble understanding the data, and some issues arose as to how the metric was calculated. Of those who knew what ‘annum’ meant, there were many who questioned the relevance of annual water use when it is dependent on how often the machine is used. Participants said they used their machines a lot less than the average four-person family. Four of the ten focus groups and two of the 30 in-depth interviewees thought that an icon showing water consumption per cycle would be more meaningful and useful to them.

Q54;  
SC4d

### **Icon H: capacity (washing machines)**



### **Results**

All participants correctly identified that Icon H signifies the capacity of the washing machine in kilograms. Responses included:

- “[T]hat would be the capacity of the machine – when you load it up.”
- “The maximum capacity of the washing machine is 6 kg of clothes. It’s useful.”
- “It’s the maximum amount of laundry you could put into the drum expressed in kilograms.”
- “You see it’s laundry – there is a t-shirt, so you know that’s what that is – and the number of kilograms, the weight.”

The t-shirt icon was described as clear and was easily associated with laundry. All but one in-depth interviewee recognised ‘kg’ to be ‘kilograms’: the remaining interviewee knew that ‘kg’ is related to weight but thought that it means ‘kilohertz’.

## Synopsis

All participants correctly understood the icon and its meaning, instantly recognising it as capacity in weight and describing it as being clear.

Q55;  
SC4e

## Icon J: spin efficiency (washing machines)



## Results

Two focus groups correctly identified that Icon J denotes spin efficiency and that the large, emboldened letter represents the efficiency class. Another group also discussed this option but did not reach agreement. Yet another group discussed the spin speed but did not discuss spinning efficiency in any depth. The most common understanding of the icon was that it represents the rotation/spinning speed; others mentioned crumpling and twisting of clothing and some mentioned the dryness of the clothing at the end of the cycle.

Among the in-depth interviewees, the most popular explanation of the icon was the quality of the spin/spin efficiency (related not to energy efficiency but to how well the appliance spins the clothes), followed by the wringing or how wet the load is after the spin cycle, the spin speed, the power of the spin (G being the weakest) and the requirement for ironing. Some 23% of interviewees said they did not know the meaning of the icon. The energy efficiency of the spin cycle was mentioned by 20%.

All participants understood that the icon related to the spinning and or wringing of clothing. The majority of participants (80% for focus groups and 56% of in-depth interviewees) understood that there was an A-to-G class system, with A being the best, and correctly interpreted it as denoting the best spin cycle, the best dryness, the most powerful spin, etc.

Examples of the descriptions of Icon J are:

- “What helps me understand is there’s a portion of the pictogram where you see it’s a t-shirt that’s been knotted, water’s dripping out of it, then ... the numbers underneath it.”
- “It’s for wringing. It looks as if I were wringing the t-shirt. At the bottom it shows me – there is a scale from A to G. It gives me a scale of how well the laundry will be wrung.”
- “I have no idea, it looks like a t-shirt being, sort of, wrung out, but I don’t know what the letters mean and why the ‘B’ [on the viewed label] is bold compared to the other letters.”

## Synopsis

This t-shirt icon received a mixed reaction. While it appears to effectively communicate laundry and the twisting of the t-shirt, the water droplet at the bottom of the t-shirt effectively communicates drying, and all participants recognised that it relates to the spin cycle, only a small percentage correctly identified that it specifically denotes the energy efficiency of the spin cycle.

In the majority of responses the A-to-G scale was understood to mean there was a sliding scale/best to worst in performance, but a direct link to energy efficiency and the overall label was only made in a minority of responses.

Q56;  
SC4f

## Icon K: wash cycle noise emission (washing machines)



## Results

All of the focus groups understood that Icon K represents the noise level of the wash cycle in decibels. In most cases, having Icons K and M side-by-side made the deduction easier.

The correct interpretation was ascertained by 66% of in-depth interviewees. Of the remainder, half made a connection between the symbol and sound levels but either thought they denote noises related to water supply/discharge, to when the drum is stationary or to when the drum is half full, or did not have any explanation. The other half of the participants who did not correctly interpret the icon did not know what the symbol meant but thought it relates to water, the speed of the rotating drum, the rinsing cycle or the temperature of the cycles.

The following remarks were made about this icon:

- “The top one, [Icon] K, that’s wash because there’s water [in the symbol].”
- Participant (P): “That stands for noise level.” Moderator (M): “Noise level when?” P: “Well, there’s some water there. I think it’s during the washing cycle, and then the next one is during the spin cycle or wringing cycle.” M: “Why do you think so?” P: “I can see the water here, and then down there is the spiral that’s used for wringing.”
- P: “I think it’s decibels or the noise level. I don’t know what this icon stands for, whether it’s water supply and water discharge and the decibels, the noise level.” M: “Why do you think it’s the noise level?” P: “Because I can see the decibels here.”
- “It’s noise level during the wash cycle because I can see the symbol of water here.”
- “I would say that’s the acoustic performance of the appliance when it’s washing, during the wash cycle. Well, for [Icon] K, it’s just the fact that you see this little circle with a wave that shows the appliance is filled with water, so it’s washing.”

## Synopsis

Overall, the symbol’s interpretation was very clear, as indicated by the 100% comprehension in the focus groups. The majority (66%) of in-depth interviewees understood the icon’s meaning and 83% understood that it relates to noise.

### Icon M: spin cycle noise emission (washing machines)



#### Results

Icon M was well understood in all of the focus groups to represent the noise level of the spin cycle in decibels.

The in-depth interviewees also showed a strong understanding of the icon, with 73% correctly identifying its meaning; 86% correctly related the icon to a noise measurement, but they were not all able to correctly specify that it is for the spin cycle of the machine. Those who did not make correct interpretations made suggestions such as:

- A wringing programme after the spin cycle or spin cycle/spin speed;
- Noise levels when the drum is moving (a spin cycle was not specified);
- Noise levels when full/at capacity;
- How hot the machine becomes; and
- Noise related to the 'delicate' programme.

Descriptions of the icon included:

- "It's wringing again because I've got a spiral on my washing machine too. So it's something that's related to wringing."
- Participant (P): "Well this is for delicate clothes of some sort I think." Moderator (M): "So the circle says 'delicates' to you?" P: "Delicate, silk, yes." M: "Again, this symbol here?" P: "I think it's still a noise thing." M: "So we're talking about decibels?" P: "Yes."
- P: "It's the noise during spinning." M: "How can you tell that?" P: "Well you have a circle showing the spinning cycle and the noise."

#### Synopsis

Comprehension of this icon was quite high and was better than that for Icon K in the in-depth interviews. Comprehension was assisted by the fact that participants were already relatively familiar with the spin cycle symbol, and some mentioned that they had seen it previously on their own machines. They were also aware that a spin cycle makes more noise than a wash cycle so were able to deduce which cycle was which between Icons K and M.

The fact that this was the third time participants saw the decibel symbol during these sessions would also have assisted understanding of the icon.



## Icon P: drying efficiency (dishwashers)



### Results

Only two of the ten focus groups and eight of the 30 in-depth interviewees mentioned the drying efficiency of the dishwasher. That it symbolised something associated with drying was identified by 60% of all participants, but they went on to discuss drying temperatures or the energy efficiency/energy consumption during the drying cycle. Temperature was discussed by 60% in relation to the water, drying temperatures or generally the highest temperature the machine achieved. The quality of the washing cycle was discussed by 40%.

In-depth interviewees showed very low comprehension of this icon, with only 17% making correct deductions by saying that the icon represents the drying efficiency of the appliance. A drying attribute such as energy consumption or drying temperature was discussed by 27%.

Of those who did not have correct answers, the majority (30%) thought that the icon relates to the temperature of the water and 20% thought it represents the quality of the washing cycle, i.e. how well it washes (with G being the worst). Other interpretations included escaping heat, efficiency of the wash cycle, and pre-wash/cycle type; 17% said they did not know what the icon meant.

Examples of comments made include:

- “Well, probably what the drying ability of the dishwasher is like. So how dry it will be once you take it out of the dishwasher because this is a symbol for water evaporation.”
- “It’s not clear. It’s not clear whether it heats a lot or not and it looks like it’s high up in its category, but I don’t know what that category corresponds to.”
- “Well, ... you see a round circle which, for me, is a plate that’s standing vertically. Those three little curves symbolise, for me, the heat, so that’s the drying of a hot plate.”
- “That goes from A to G, and I don’t know what that is. It’s a plate with wires.”
- “Well the picture looks like a plate, but I’m not sure about the lines, unless they signify steam or water or something. I’m not too sure. I don’t know what the letters stand for.”
- “I don’t understand the picture on the letter. The picture I don’t understand now because, who knows? That could be the water temperature or how it contaminates the water or not. It can be dirt as well.”
- “That icon is not clear.”
- “It’s not clear at all. Not in the slightest.”
- “It seems the worse it smells, or it looks like a picture of smells, showing matters there that have nothing to do with these red letters.”

### **Synopsis**

This icon was not well received or easily understood; many participants spoke of their confusion and often associated the icon with temperature. Drying was mentioned in six of the ten group discussions and in about eight of the 30 in-depth interviews.

Many participants understood that the icon symbolises something to do with drying and that it ranks this from A to G, but most did not know it is a ranking of drying efficiency and many thought it expresses the energy efficiency of drying.

Q64;  
SC5e

### **Icon Q: number of place settings (dishwashers)**



### **Results**

Icon Q was correctly understood by all focus groups to denote the capacity of the dishwasher in terms of place settings.

Among in-depth interviewees, 70% correctly understood the icon. Of those who did not, 63% did not know and did not attempt to guess the meaning of the icon, while the remaining 37% thought that it refers to a particular washing cycle for delicate objects such as china and glassware.

Comments included:

- “I would say that’s the maximum number of place settings that you can put in the machine. Just the icon there is rather meaningful. I don’t think you could make a mistake there. It’s pretty obvious.”
- “I don’t think you could accommodate the complete sets for thirteen people – I don’t think it could fit thirteen glasses, thirteen plates. I thought that’s what it could be, thirteen of each, but I think that’s not possible.”
- “I think it keeps saying that you can put in your very, very fine glasses, wine glasses, crystal glasses – it’s safe for them.”
- “I would imagine that’s the number of place settings – you know, plates, glasses and silverware – that you can put in the device.”

### **Synopsis**

This icon was well understood, with 100% accuracy among focus groups and 70% among in-depth interviewees.

## Icon D: presence of on/off switch (televisions)



### Results

Three of the focus groups reached agreement that Icon D means that the television set has a hard 'off' switch. Six of the groups discussed the 'on/off' switch but the majority concluded that the icon means the device can be left on standby. Two groups thought the icon is connected to having a remote control or that the device can be turned off using the remote control.

In-depth interviewees also expressed confusion over the symbol, with only 30% producing the correct answer. Thirteen percent were undecided as to whether it means the appliance has an 'on/off' switch or whether it can be put on standby. Over 50% of interviewees discussed the 'on/off' function, but some dismissed it because they assumed all sets have an 'off' switch. The most common incorrect interpretation was that it relates to the standby function; others guessed it is related to switching the set on, the remote control, connectivity and locking channels.

Some confusion was apparent over whether Icons D and E (see next section) are related. Some offered the notion that together they meant that the set used 41 watts while in standby mode. Interviewees said:

- "I am convinced that they are associated. They mean something if they are one next to each other. Otherwise if they're separate I don't think that they mean anything."
- "I would probably ignore this icon or I would have to ask someone. It's something that has to do with switching it on. Then it's probably related to other boxes, to other information. When I see it standing on its own, it doesn't tell me much."

Other comments included:

- "When you want to switch your fridge on, you just plug it in. With a television, plugging it, unplugging it, that would be too much, so you have to have a hard switch-off and a soft switch-off so you go into standby or you go into totally switched off."
- "The tick perhaps means it's on."
- "For me, this symbol is strange because this symbol on a television reminds me of the switch-off button."
- "This symbol is used for a switch-off button, and this tick in the box probably means it can be switched off."
- "I can understand that this can go into standby mode automatically to help save energy, I would imagine, because you have that icon with the on/off."
- "Well that normally means like an on and off switch, I think, but I'm not too sure about that. But it's got a tick underneath it saying... I don't know if that's saying standby or not. I don't know."

## **Synopsis**

Overall, this icon was not well understood by the majority of participants. Although over half of the groups and in-depth interviewees understood it to mean 'on/off', many dismissed this idea because they assumed all sets have such a switch. Many confused 'on/off' with 'standby' and linked Icon D with Icon E, and assumed Icon D combined with Icon E indicates standby power in watts.

Criticism of Icon D included:

- "It's not a very effective icon at all. I don't understand it. I look at it and I don't know what it is."
- "It's not that I can draw any conclusions from that. There is a piece of information that is not of relevance because we don't know what it is."
- "The extra symbol there I think has something to do with how much energy it consumes on standby. If that doesn't mean standby and it means something completely different, then it's the wrong symbol to use."

Although most participants understood that a television consumes energy in standby mode, only a minority understood that some modern televisions do not have a hard 'off' switch.

Q71;  
SC6d

## **Icon E: 'on' mode power consumption (televisions)**



## **Results**

Icon E was correctly identified in two of the focus groups; another two discussed energy consumption in the 'on' mode but could not reach agreement on the icon's exact meaning. Other explanations discussed were energy consumption in standby mode and the strength of the television's speakers. The groups also discussed the time period over which the 41 watts were measured as they were familiar with the 'kW per annum' figure on the label: two groups thought 'watts per hour' was being denoted. All groups related the icon to power and energy consumption.

The meaning of the icon was correctly identified by 30% of in-depth interviewees. The most common incorrect interpretation was that the figure represents energy consumption in standby mode. Other incorrect answers linked the figure to energy and power consumption but did not categorically say to what the figure referred.

Examples of comments made are:

- "This is the actual consumption of the television when it's turned on, which is pretty low for a television."
- "Here, I would say it's the consumption in the standby mode when the television is switched off."
- "I've never been very good at physics. It's something about consumption again. That's related to power."

- The actual consumption of the set, maximum consumption, 41 watts ... is it when it's on or when it's standing by? I don't know."

### Synopsis

Comprehension of this icon was low among both focus groups and in-depth interviewees, with most linking it to Icon D (see the previous section) and thinking that it relates to television energy consumption during standby. Most participants understood that the icon relates to energy consumption, but some expressed confusion about the time period over which the wattage is measured, and there was a lack of sureness about whether the power consumption figure refers to the 'on' mode or standby mode.

Comments demonstrating the confusion and misinterpretation include:

- "Perhaps something per annum something, could be... a 40 watt bulb is per annum and standby per annum will consume 41 watts. That's how I understand it. This icon appears to be unclear, 41 is absolutely unclear."
- "Normally, you know, these show that they're connected between each other with the fact it's been on standby. It's when it's on standby. So, they have a single block instead of two blocks."
- "Maybe it's per month, I don't know. It's not very clear, actually. You know – if you think about consumption versus watt per day, per month. You know, if you don't know how much energy it uses you can't really understand it, I don't think."
- "Well, I think it's confusing because it gives that as wattage and it gives this as kilowatts. No, I don't know – it's confusing, the two of them."
- "In isolation, that doesn't mean anything to me."
- "That doesn't mean anything to me whatsoever."
- "It's just 41 watts, that's like saying, '22 elephants.' So what?"

Q72;  
SC6e

### Icon F: screen size (televisions)



### Results

All participants understood Icon F to communicate television screen size. However, a minority of participants, e.g. those in the Czech Republic and France, were not familiar with the inch measurement, which was generally described as an 'English measurement'.

Participants made comments such as:

- Participant (P): "That's the diagonal of the appliance in both centimetres and inches." Moderator: "That's obvious enough to you?" P: "Yes, because you have a pictogram with an arrow going in both directions. That's just intuitive."
- "That's absolutely clear. It's the diameter of 80 centimetres (or 32 inches in English)."

- “That’s easy, that’s just diagonal of the screen. It’s the size of the screen, the screen diagonal.”
- “That’s fairly self-explanatory because at least it’s showing you the arrows, the diagram, on the screen. So, that’s quite good and it’s got old money and new money, so that’s okay.” [UK participant talking about centimetres versus inches.]

### **Synopsis**

Icon F was described in the majority of cases as being ‘obvious’ and ‘clear’. The diagram helped to reinforce the message. Very few participants discussed the icon’s relevance on the label as a tool for comparison, and some did not see the relevance at all because this information would be available in the specification or would be obvious to the consumer:

- “Well that’s just the size of the television, the French size and then in inches. Absolutely no point having that there, because you have the data sheet for the television, and so the screen size doesn’t necessarily mean that the television is going to consume more. There are some brands that consume more energy, even though they have a slightly smaller screen. So you don’t need to have that.”
- “It tells you the size dimension of the screen, but you kind of know that anyway when you’re buying the telly... That’s what people look at first.”

### **3.10 Comprehension of elements of the energy efficiency scale**

Q29–34;  
4e–4j

With regard to the energy labels for refrigerator-freezers (Show Card 1a; Rotation 1) and televisions (Show Card 1b; Rotation 2) (see Figure 3.1), participants were asked:

- What they thought the coloured arrows indicate;
- What significance the colours of the arrows have;
- Whether the length of the coloured arrows signify anything;
- What they thought the letters in the coloured arrows signify;
- What they thought the letter in the black arrow signifies; and
- What they thought the ++ sign (for an A++ refrigerator-freezer) in the black arrow indicates.

They were asked to explain why they thought what they did when answering each of these questions. Focus groups were then probed as to how much difference in energy efficiency they felt there was between the highest efficiency class (A+++ for refrigerator-freezers; A for televisions) compared to the lowest class (D and G, respectively). This probing was repeated after participants were shown the energy labels for the alternative appliances.

### **Results**

The arrows were described as being related to ‘energy efficiency’ and ‘energy consumption’ and as being ‘friendly to the environment’. Focus groups and in-depth interviewees also understood that A was the highest efficiency class and D/G the worst.

The colours were well understood by the majority of participants and were often associated with traffic lights: green was described as ‘environmentally friendly’, ‘ecological’, ‘safe’ and ‘cool’ and was associated with nature and the word ‘go’; red was described as ‘fire’, ‘danger’, ‘alert’, ‘stop’, ‘caution’ and ‘hot’. The yellow arrow was described as ‘intermediate’ or ‘neutral’.

The lengths of the arrows were often described as looking like a pyramid. Most participants said that the longer the arrow was the more energy they expected the product to consume. There was slightly more confusion about this element than the others: some thought there was no meaning; some were confused; and some stated that they did not know what the meaning was. Most, however, thought the

length was related to the energy consumed, with many saying they either thought the length was proportional to the energy efficiency or that they would like the length to be proportional to the energy efficiency so that it would be possible to see how much could be saved depending on the efficiency of the product chosen.

### ***Comprehension of elements of the energy efficiency scale***

#### *What the coloured arrows were thought to indicate*

- “The amount that it consumes, the ratio between each other. They make a scale of efficiency.”
- “I don’t know. I guess it’s some kind of classification scheme, but I don’t know. It doesn’t mean anything to me.”
- “Energy consumption, the class. I mean, first, second, third, etc., and on down the line. They’re just different categories, I mean, where A is the best.”

#### *What significance the colours of the arrows were thought to have*

- “It’s like a coloured scale of energy efficiency. It’s like streetlights – green, orange, red.”
- “It’s like, maybe, fire. Red, full of energy. Green is cold, no energy. That’s maybe how they meant it.”
- “It’s more ‘green, go for it. Red, don’t go for it’.”
- “It’s like the traffic lights, yellow, green and red. As a consumer who only knows little, I would look at the colours and think that green is the best.”
- “Green is better and more green, in fact. Red is poor, or less energy efficient, I suppose. Being red, I suppose, there’s more heat generated, or more heat waste. Energy converted to heat, rather than mechanical energy for the machine itself.”
- “The green is close to the environment so I think it’s lower consumption, it’s not as polluting. So in a traffic light of course green is positive, and red you have to stop.”
- “Well, for me, I can understand it. It’s enough for me to understand it. With this type of label, it’s becoming more and more generalised on all sorts of goods where you have an expected performance. So the colour of choice is intuitive.”

#### *What the length of the coloured arrows was thought to signify*

- “The shorter it is, the least energy required to function – you know, the energy required to function.”
- “If you look at it like this, the arrows at the top as they go down, the arrows get longer and longer, so you would assume that the longer the arrow, the more the product consumes in terms of energy.”
- “Well, you talk about energy waste, which means you’re standing next to the fridge and you can feel the cold leaving the fridge. The shorter the arrow, the less cold comes out, the longer the arrow, the more cold air comes out.”
- “Well the bottom one’s the longest arrow, but now that makes me think it’s the most energy efficient, but then the colour is making me think it’s not. So I’m just sort of torn between both now, the length and the colour are completely different things.”
- “That’s energy consumption. ‘A’ is two thirds of ‘G’, but I think ‘A’ will be, say, four times less energy than ‘G’, so it’s not real. I think it’s to accentuate the colours.”
- “I don’t think there is a match between the length of the arrows on this scale. If it’s 30% longer, I

don't think you can deduct that or deduce that it's then 30% higher consumption. I think it is misleading that it's linear but it would probably not look good and then it's better to use some power."

- "If they hadn't had different lengths, I don't think it would have made a difference. It's made a little bit more striking with longer arrows, but I don't think it really makes a big difference."
- "I suppose if the labels were printed in black and white, it might have relevance."
- "No, first of all I would have thought so, but then I thought, 'What if they'd done that the other way round?' I'd still look at the A+++ to say that's the highest energy saving."

*What the letters in the coloured arrows were thought to signify*

- "This is an alphabetical ranking. Even if the printers do not have the same colour, and it would be a different shade or green or lighter shade or orange, it will be the letter. This is the utmost significance of class."
- "I think it's a kind of visual distinguisher so that we can see the difference in the length of the arrow and they are also marked by the letters to clearly identify that this is A, this is B, this is C."

*What the letter in the black arrow was thought to signify*

- "Well, that represents where the actual appliance that you're looking at is situated in terms of the value scale. You know, so it's black and white like that. It's extremely clear, it's obvious."
- "It gives you the information about the class. To the left, you have the scale, and to the right you have the actual energy consumption, or efficiency. The black arrow tells me that this fridge is A two stars [A++] energy efficiency."

*What the ++ sign in the black arrow was thought to indicate*

- "The second best grade there is. That's what it means."
- "The Liebherr appliance has got 'plus plus', meaning that there is only one that is better. There is no letter that precedes 'A', and therefore they took 'zero' because in the past there were no appliances that were ever better than 'A'."
- "There's nothing more than A, of course, so they're now adding these pluses. That's a trick, they perhaps started with a letter and they were improving, they were even more improving, they were further improving after A and they just couldn't use any further letter."
- "To me, there is a higher difference between A and B as opposed to A+ and A+++; that's the perception. There's no A-, there's only A+."
- "Well, that shows you that it's twice as good as A by itself and one times less good than A+++."
- "There will be a brand soon that will be A+++++. Then the A will down within the red arrow."

Nearly all participants recognised that the letters in the coloured arrows represent the coding of the energy class. They were often described as 'differentiators'. It was understood that A stood at the top of the group and was the best class. Many were able to link the A-to-G scale to school grades and other pre-existing/familiar ratings.

Around 90% of in-depth interviewees and all of the focus groups were able to link the letter in the black arrow to the product itself, showing very clear comprehension.



As with comprehension of the letters, in general most participants understood that the more plus signs there were the better the grade of the product. Many thought that the labels had started with A, with plus signs being added as technology improved.

### **Synopsis**

Focus groups and in-depth interviewees showed high levels of comprehension with respect to the arrows, colours and letters on the labels. Most understood that the label provides information on the energy consumption and major characteristics of a product; they also understood that, depending on the label format, A or A+++ is the highest energy efficiency class and D/G the lowest.

Consumption was considered to be a more important consideration for refrigerator-freezers because they are constantly on. Televisions were assumed not to consume as much energy, so energy consumption was not such an important factor for this appliance type. Some participants said they preferred the refrigerator label to the television label as it was less technical and they understood the icons better. It was also queried why the grades for televisions and refrigerator-freezers differ.

The issue of the lengths of the arrows being proportional to the product's efficiency is complex as it relates efficiency to consumption (sometimes participants mixed these two concepts), but the comments made do suggest that the slope of the scale (i.e. the change in arrow length from one class to another) may have an impact on perceptions of the savings potential through purchasing a higher efficiency product and may hence impact the motivational impact of the label. Similarly, many participants seemed to believe there is a linear step change in efficiency from one label class to another because there is a linear change in arrow length. In fact this has not always been the case, although in recent times the new or revised label scales are tending to move towards linear (equal) efficiency steps from one class to the next.

Most participants appreciated that there would be a large difference in efficiency between the highest and lowest grades on the scale, but there was some confusion over the rates of efficiency improvement between A and A+++ . While comprehension of the significance of the plus signs with respect to the efficiency ranking was high, many participants expressed a degree of irritation with them and felt that the difference in efficiency between the various A+ to A+++ rankings was less important than between other proximal efficiency classes. However, many felt that the difference between the highest and lowest efficiency classes was very substantial, while others were unsure and others speculated that there would be a difference of 20-55% (based on the relative lengths of the arrows).

## **3.11 Comprehension of other elements of the energy labels**

### **3.11.1 Additional white space**

Q42, 43;  
5h, 5i

Participants were shown a set of three energy labels for refrigerator-freezers (Show Card 2a; Rotation 1) or televisions (Show Card 2b; Rotation 2) and asked what, if anything, they thought the white space below the A+++ -to-D scale (refrigerator-freezer label) or above the A-to-G scale (television label) might signify (see Figure 3.3).

### **Results**

In the case of the television label, focus groups and in-depth interviewees discussed the possibility that the extra space was to allow the addition of further efficiency grades at a later date (a correct interpretation). They agreed that it was highly likely that technology would improve, which would mean that efficiency classes would shift beyond the current 'A' grade.

Other explanations included:

- The addition of price information;
- Design/aesthetic reasons;
- Certification or other types of labelling;
- Model name or barcode;
- Warranty information;
- Product characteristics; and
- The space has no meaning.

Examples of suggestions about the white space were:

- “Perhaps even more environmentally friendly or efficient appliances could be made one day and they would be put in there.”
- “There might be more arrows added to an even higher energy efficient level.”
- “Maybe, it’s to put the price in there. I have no idea. I would assume that someone has got to put something in there somewhere at some point in time.”
- “Maybe it just ... gives it a little bit more space, makes it a little bit clearer.”
- “I just thought it was a sizing problem or something.”

With regard to the refrigerator-freezer label, more participants were inclined to answer that the white space has no meaning at all. Some dismissed the possibility that a refrigerator could achieve or would be manufactured to achieve less than a ‘D’ grade and doubted that anyone would buy such an appliance.

Comments about the white space included:

- “Maybe there are also classes going down to the letter ‘Z’.”
- “I don’t know. Nothing comes to mind. It can’t be worse than D. D is the worst you can get and people want something better than D. I don’t think anything worse than D would ever sell.”
- “I think that the manufacturer keeps the space here to be able to add some information here like E or F, perhaps that the development is going further and further, everything’s improving, perfecting. Perhaps soon there’ll be another colour, perhaps purple or blue.”
- “Well, it’s the graphic layout. There’s no meaning, it’s just for graphic purposes. I wouldn’t think there’s any deeper meaning to that.”
- “I don’t think there will be someone trying to manufacture a refrigerator worse than D. I think it’s there just for the sake of graphics.”

### **Synopsis**

Most participants considered that the white space is being reserved for further energy classes or the shifting of the scales. This appeared easier to deduce from looking at the television label than the refrigerator-freezer label because participants were now familiar with the A+ to A+++ classes. Participants were more likely to say that the white space is there for no reason or that they did not know why it is there in the case of the refrigerator-freezer label. Other popular explanations for the space were design/aesthetics and pricing information.

### 3.11.2 The 'kWh/annum' text

Q45, 52, 61, 69; SC3b, SC4b, SC5b, SC6b

Participants were presented with the energy labels for refrigerator-freezers, washing machines, dishwashers and televisions (Show Cards 3, 4, 5 and 6, respectively; see Figure 3.2) by rotation. The moderator pointed to the text reading 'kWh/annum' on the label being shown and asked participants what they thought it meant and why.

#### **Results**

All the focus groups identified that the text denotes a measurement of energy over a year. They all understood or were able to deduce what 'annum' stood for, although throughout the group discussions the French focus group appeared to struggle with the term, as did the German, Czech, Polish and Spanish groups. However, when one person in the group knew its meaning, the rest of the group tended to agree with them, making overall comprehension challenging to decipher.

All focus groups understood 'kW' to mean 'kilowatts', but two groups did not mention the 'h' (hours) in 'kWh' and referred only to the 'kilowatts'.

Among in-depth interviewees, 46% were able to correctly identify all the elements of the text. Of those who gave incorrect answers, some did not understand the 'h' in 'kWh' (kilowatt-hours) and some did not know the meaning of the word 'annum' (especially in the Czech Republic and France).

Examples of remarks made by those who were not aware of its meaning were:

- "Maybe 'annum' represents a certain amount of time."
- "Maybe kilowatt-hours – energy in French and English, etcetera, so maybe the 'annum' is a unit in another country."
- "It's kilowatts per annum. I don't know what 'annum' stands for, but again, we were talking about some kind of energy consumption so I would think it's the consumption."
- "It means that the energy consumption is 197 kilowatts per hour in the operating mode of the refrigerator."
- "Well, I'm thinking price or money, because, in terms of jobs you'd be paid a certain amount per annum, and I think that's where it links to me and all the boxes on all the labels have a different number in them, so I'm thinking different prices, but I'm not too sure what the 'kWh' means."

#### **Synopsis**

The focus groups showed higher comprehension of this text than did the in-depth interviewees; however, the majority of participants understood that the text represented energy consumption over a given period.

There was low comprehension of the Latin word 'annum' among the Czech Republic and French in-depth interviewees: in the Czech Republic, two interviewees were able to correctly guess its meaning, six did not know the meaning and two were not asked; eight of the French participants knew or deduced the meaning of 'annum' and two did not, although one of the latter guessed correctly.

The UK interviewees showed a lower comprehension of the complete meaning of 'kWh', with three referring to it only as 'kilowatts' and two not understanding the meaning at all. All UK interviewees were able to correctly identify that 'annum' means 'year', as it is a term in common usage when describing payments, salaries, etc.

### 3.11.3 The 'L/annum' text

Q53, 62;  
SC4c,  
SC5c

Participants viewed the energy labels for washing machines and dishwashers (Show Cards 4 and 5, respectively; see Figure 3.2) by rotation. The moderator pointed to the text reading 'L/annum' on the label being shown and asked participants what they thought it meant and why.

#### **Results**

The 'L' was understood in all countries and in the majority of the in-depth interviews to mean 'litres'; only one participant thought 'L' stood for anything other than litres, thinking it meant 'liquid'.

Overall, 50% of the focus groups recognised and were able to interpret the term 'annum' and 50% showed mixed comprehension. The Czech in-depth interviewees showed very low comprehension of the word 'annum' and the French also struggled with the term. The UK interviewees had no problem with interpreting the whole term as 'litres per year'.

A summary of comments regarding understanding of the word annum is given for the kWh case in section 3.11.2.

#### **Synopsis**

Across the board, there was mixed comprehension of the word 'annum' and high comprehension of the abbreviation 'L' for 'litres'. Comprehension of 'annum' was highest among the UK and lowest among the Czech Republic in-depth interviews. The majority of participants understood that volume is measured in litres and the depiction of the tap in Icon G helped in the association with water.

### 3.11.4 Directive number and version

Q49, 58,  
66, 73;  
SC3f,  
SC4h,  
SC5g,  
SC6f

Participants were shown the energy labels for refrigerator-freezers, washing machines, dishwashers and televisions (Show Cards 3, 4, 5 and 6, respectively; see Figure 3.2) by rotation. The moderator pointed to the text reading '2010/XYZ' at the bottom left corner of the label being shown and asked participants what they thought it meant and why.

#### **Results**

Seven of the ten focus groups discussed whether the code was a regulation/directive number. Other explanations were that the code represents the production date of the device. The model number, year of the label, warranty number and production line number were also discussed.

Among in-depth interviewees, only 20% thought that the number was a regulation/directive number. The most common suggestion was that the text denotes the production date and production number; 46% of interviewees said that they did not know what the text could mean.

Examples of the answers to this question are:

- "It was a 2011 device that was evaluated using specifications dated or drafted in 2010."
- "I have an idea of what this code here, lower left – 2010. I don't know. Maybe 2010 was when it was manufactured. This model came out in 2010 maybe."
- "That's probably the standards of the machine that were written in 2010, but I don't know what the 1059 actually corresponds to."
- "I suppose it's because I've got a very, very sparse amount of legal knowledge, that means if I want to go on the internet and look up the European Directive 2010/1060 then I can see what governs this sticker. I would assume it could be wrong but I think that's what it is."

- “Well, that looks like... these have been regulated from 2010 to 1060. Is it going back? I really don’t know.”
- Participant (P) 1: “To me, it’s the directive number, it’s not the production year. It’s the number during which the directive was issued.” P2: “Well, 2010 is the one thing that we’re all agreed with, it refers to a year. Anything else is kind of a question mark. We can just make any guesstimate. We don’t know what it is.”

### **Synopsis**

Comprehension of the text was low among the in-depth interviewees (who did not have the benefit of group discussion) and even though the correct meaning was discussed in all the focus groups, only two groups appeared to mutually agree that it was the correct interpretation. Most participants thought the code related to the year of production or simply did not know what the text could mean.

### **3.12 Appeal of the top energy label class compared to the middle class**

Q82, 83 The energy labels for refrigerator-freezers and televisions (Show Cards 1a and 1b, respectively; see Figure 3.1) were presented side by side to focus group participants, who were asked to discuss how motivating they found (i) the A+++ class compared to the A for refrigerator-freezers, and (ii) the A class compared to the D for televisions.

### **Results**

The reaction to this question was quite mixed, but in the case of refrigerator-freezers most participants considered A+++ to be more motivating than A; others expressed confusion about the increments between A, A+, A++ and A+++. Some thought A was as good as A+++. A+++ was described as being ‘more meaningful’, ‘powerful’, ‘positive’, ‘appealing’, ‘better quality’ and ‘superior’.

For televisions, class D was described as being a ‘no-go’, or unacceptable, purchase. The difference between A and D was considered to be large; other participants thought that D was ‘average’ as it was situated in the middle of the energy efficiency scale.

Comparisons were drawn between the television and refrigerator-freezer labels and were sometimes described as being the same; others considered the mid-point better for refrigerator-freezers (A class) than for televisions (D class).

The point raised earlier in the sessions about the amount of time an appliance is switched on was repeated as being a motivator for more energy efficient appliances. A sample of comments about the motivational aspects of the different classes is presented in the box below.

### ***How appealing did participants find the top versus the middle energy label classes?***

- “Well, the A+++ is the most modern, is the newest, the most starred, the most plusses, it has the best technology and I know that I would appreciate the price that I will have paid extra in a couple of years’ time, and above that threshold I will have saved a lot of money.”
- “I see absolutely no difference, really – because there’s nothing else besides the plusses. This label is missing a point of reference, a benchmark, because what am I supposed to be driven by? The colour? I mean, I have no idea about the colours. I also like the colour yellow, to be honest. So, I could also make that statement.”
- “I’m generally not a suspicious person, I never look for conspiracies, and I don’t think that a higher number of plusses that somebody wants to reach into my pocket. I think it’s simply a better product, and I would buy it.”
- “[The] thing with the plusses and stuff is that it can go up to infinity, that’s the case, whereas with the A, that’s it.”
- “You can’t really tell what just that one plus could be. It could be that it saves you one kilowatt more than the one below it, for instance. There’s nothing to really compare it to. The margin can be very tiny in comparison. It doesn’t really give me any added comfort, to be honest.”
- “I think ‘A’, if you use the ‘plus’ ones. ‘A’ shows you’re still getting a good product but the others are superior. Whereas this, ‘A’ there, doesn’t look like a superior product, it just looks like the best product. With that it’s like the best but superior.”
- “I would just say A, B, C, but no D. With the refrigerators, I would not go for anything less than A. Why make it so complicated? Why Bs and Cs? People won’t buy it anyway. People look at the entry price as well. I think producers and retailers abuse this system. I don’t think anybody sells B class fridges anymore. It’s psychological as well. Maybe there is a European directive which says that you have to have A, B, C, D, whatever. I don’t know.”
- “By all means ‘A’. ‘B’ would also be fine, but ‘D’, no go.”
- “It’s the newest, I wouldn’t even look at the D. I wouldn’t even look at it, and I would expect D to be the very old television, right before plasma and LCD and so on.”

### ***Synopsis***

Most participants appreciated that appliances at the top of the scale, whether A or A+++, were the most efficient. Participants were more expressive when discussing the merits of an A+++ appliance, calling it ‘superior’ and ‘positive’. However, the difference between A+++ and A caused some confusion, with reference being made to the colour rather than the letters to make sense of the scale. One or two participants expressed a preference for the A-to-G scale, describing it as ‘nice and easy’.

Across both labels participants tended to agree that the plus signs made the appliance more appealing.

The distinction between the top and middle energy classes for television classes was generally more marked than for refrigerator-freezers. Participants were more likely to describe the difference as being ‘big’ or ‘great’. With regard to the A-to-A+++ scale they were more likely to say there was no difference or that there was a difference but they did not know what it was.

### 3.13 What is the minimum efficiency class consumers say they would choose?

Q14, 16, 24, 41; 3c, 5g Participants were presented with a set of three energy labels for either refrigerator-freezers (Show Card 2a; Rotation 1) or televisions (Show Card 2b; Rotation 2) (see Figure 3.3) and asked what energy efficiency class they would consider good enough if they were buying either a new refrigerator-freezer or television. Among focus groups, this question was asked twice for each appliance type: once with no discussion, before they had become accustomed to the energy labels; and after later re-presentation, with answers being given after discussion. In-depth interviewees were also asked to explain the reasons for their answers.

#### **Results**

The frequency of responses among focus groups is shown for both refrigerator-freezers and televisions in Table 3.10 and Figures 3.7 and 3.8. The data are normalised in terms of the highest (Top) labelling class, such that for refrigerator-freezers the top class is A+++, the Top –1 class is A++, the Top –2 class is A+, etc., while for televisions the top class is A (or A+ in the rare case when anyone gave this answer for televisions), the Top –1 class is B, the Top –2 class is C, etc. Figures 3.7 and 3.8 clearly show that on average the minimum acceptable energy efficiency class is closer to the Top energy efficiency class for televisions than for refrigerator-freezers. The weighted mean response for televisions was the Top class minus 0.9 classes, whereas the weighted mean response for refrigerator-freezers was the Top class minus 1.8 classes, i.e. the latter was an average of 0.9 classes lower than for the television label. There was no change in the weighted mean values between when the questions were first asked and no discussion was allowed versus when they were reposed and answers given after group discussion).

With regard to televisions, with no discussion 43% of focus group participants considered class A to be good enough, 27% class B and 22% class C (see Figure 3.7). When asked the question at a later stage and after being able to discuss their choices with the rest of the group, 34% chose class A, 42% class B and 22% class C (see Figure 3.8); this showed a clear shift down to energy efficiency class B. The lowest efficiency class selected when no discussion was allowed was E and 7% of participants selected D; when discussion was allowed, the lowest class was G, although this time no one opted for E or F and only 1% for D.

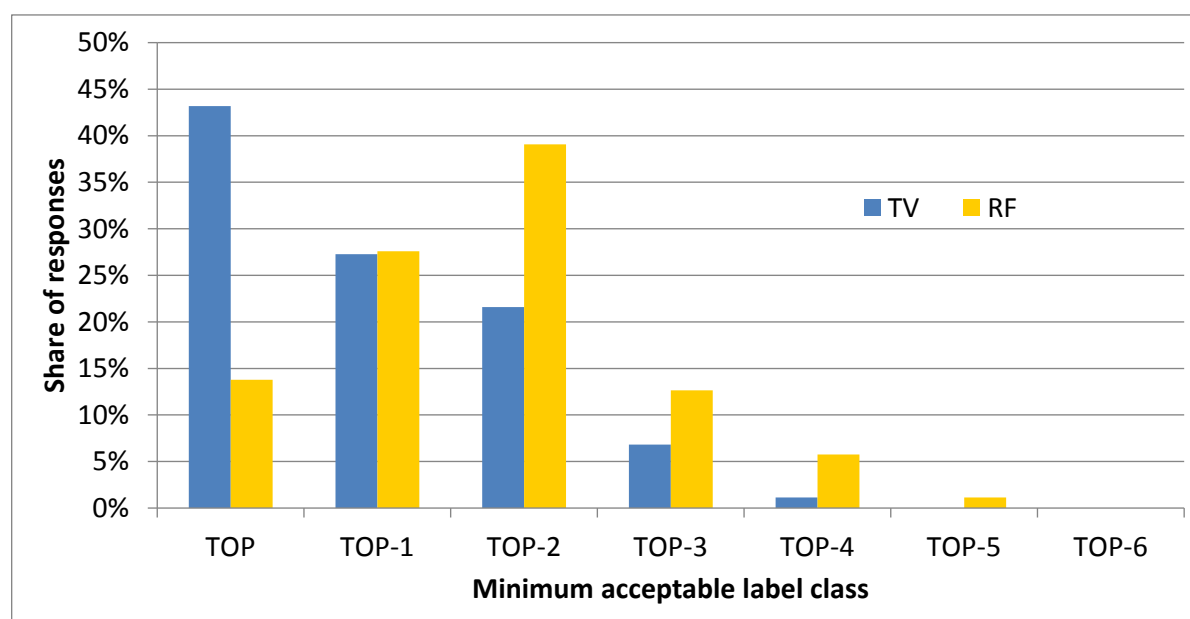
For refrigerator-freezers, when the question was asked the first time and no discussion was allowed, 14% answered A+++, 28% A++, 39% A+ and 15% A. When the question was asked again later and discussion was allowed, the proportions were 11% for A+++, 23% for A++, 45% for A+ and 16% for A, showing a slight movement away from the top class to the next two lower classes. The lowest class selected was C without any conferring, and D when discussion was allowed.

During the in-depth interviews, upon first exposure to the labels the majority of participants selected the upper half of the energy efficiency classes: B to C for televisions and A+ to A++ for refrigerator-freezers. When they were later presented with the energy labels for the alternative appliance to the one that they were first shown, the majority selected B followed by C for televisions and A++ followed equally by A+ and A for refrigerator-freezers.

**Table 3.10. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer or television. The number of participants and share of responses are given in relation to the top energy efficiency class (A+++ for refrigerator freezers; A for televisions)**

	Responses in relation to the highest efficiency (Top) labelling class							Total no. of responses
	Top	Top -1	Top -2	Top -3	Top -4	Top -5	Top -6	
No discussion (share of total)	50 (29%)	48 (27%)	53 (30%)	17 (10%)	6 (3%)	1 (1%)	0 (0%)	175
With discussion (share of total)	41 (23%)	59 (33%)	59 (33%)	15 (8%)	1 (1%)	1 (1%)	3 (2%)	179

**Figure 3.7. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer (RF; Top class = A+++ or television (TV; Top class = A); responses given with no group discussion.**

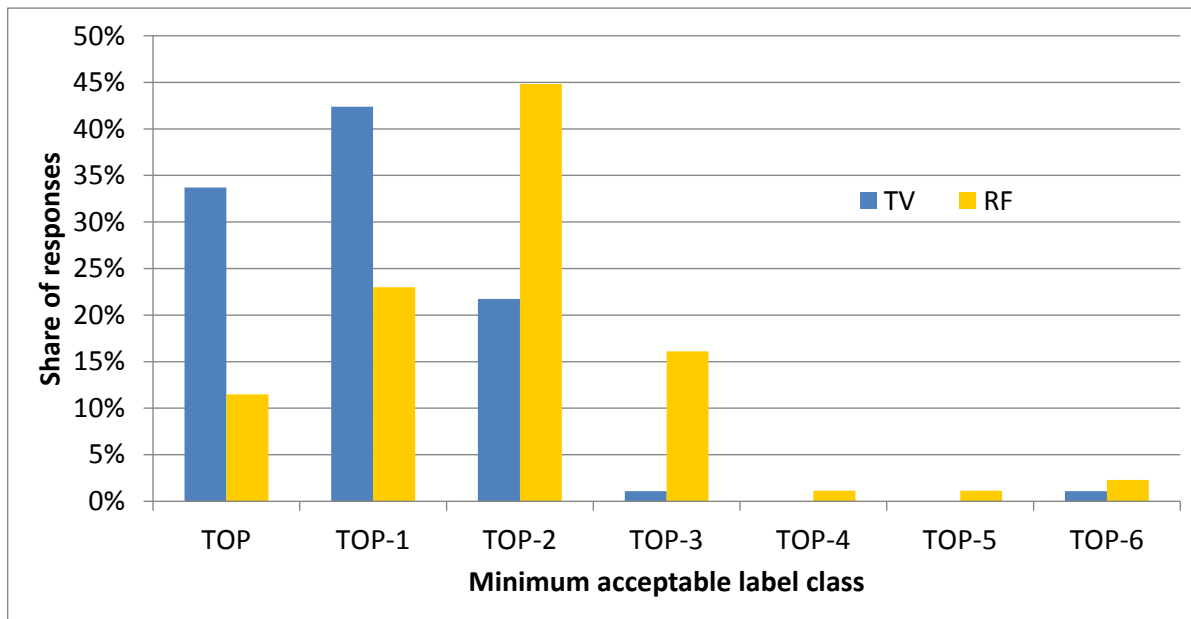


### Synopsis

In general, it appears that participants found the energy efficiency class information quite compelling: although the majority of participants did not select the top efficiency class category, they generally selected options from the upper half of the class range. The minimum acceptable class was somewhat closer to the top class for the television label, however, than it was for the refrigerator-freezer label.



**Figure 3.8. Minimum acceptable labelling class within focus groups in the event of buying a new refrigerator-freezer (RF; Top class = A+++)** or television (TV; Top class = A); responses given after group discussion.



On the second round of the questions, when discussion was allowed, focus group participants relaxed their preferences slightly, tending to opt for a class lower than they had done previously.

Selections were also made using the colour range, with many saying they would stick within the ‘green range’; this is a good indicator that the coloured bars are useful in purchasing decisions, particularly when consumers do not entirely understand the letter system of the classes. These responses reveal that a choice from the green to yellow threshold is a very important one from a market transformation perspective as a large proportion of consumers are of the mind to choose products within the top, green classes.

There is a negligible difference in the mean value of the answers given when participants made their choices without conferring versus with the benefit of discussion, although there was a slight tendency for responses to move closer to the group mean after discussion, i.e. to have less spread.

Overall, the label energy efficiency class appears to have an important impact on participants’ views of the acceptability of a product and thus is a powerful motivational tool to promote higher efficiency purchases; however, it is equally clear that participants were more inclined to reject products with a relatively low energy efficiency when viewing the television energy label compared to the refrigerator-freezer label. The explanation seems to lie in the notion expressed by many that A is good enough and that having fewer plus signs is not as demotivating as a lower letter. Thus, while comprehension of the label rankings for the A+++to-D labels (refrigerator-freezers) was almost as high as it was for the A-to-G labels (televisions), an A+++ on the former scale was not seen to be as desirable as an A on the latter scale.

### 3.14 How much extra are consumers prepared to pay to have the energy efficiency class they want?

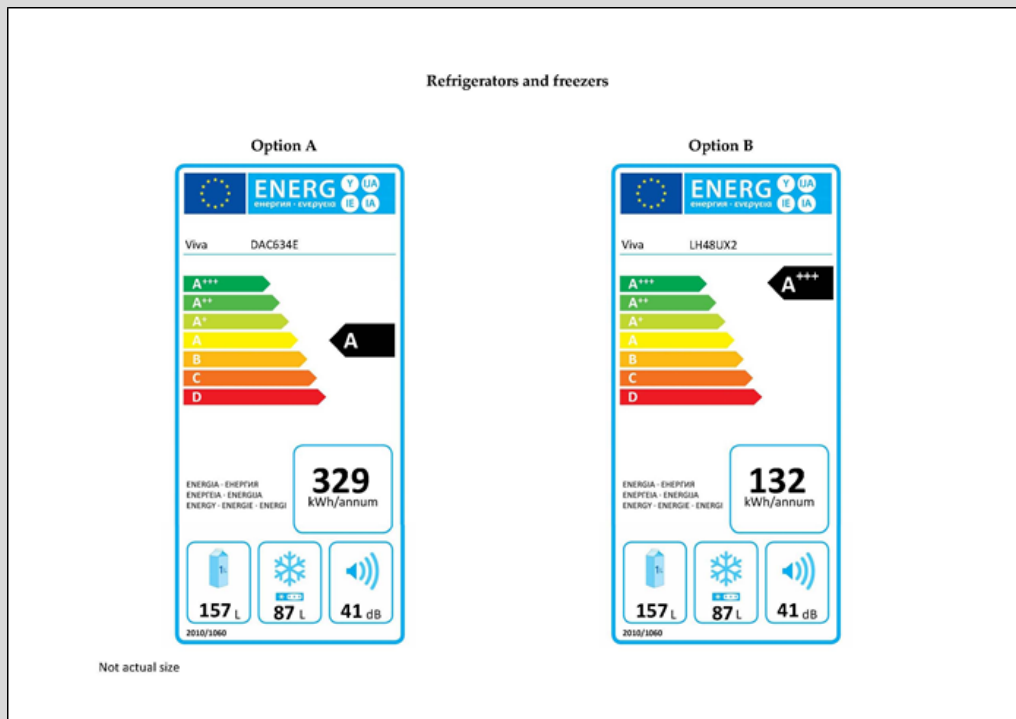
Q75–78; 7a, 7b, 8a, 8b

Participants were presented with two energy labels for either refrigerator-freezers (Show Card 7) or televisions (Show Card 8) by rotation and asked which of the two models depicted they would most like to have; the two models were identical except in terms of energy efficiency, with the more efficient model being three classes higher than the base case for both refrigerator-freezers and televisions (Figure 3.9). They were then asked how much more they would be willing to pay for the option of their choice compared to the other option, if the other option cost the equivalent of €300 in rounded local currency units.

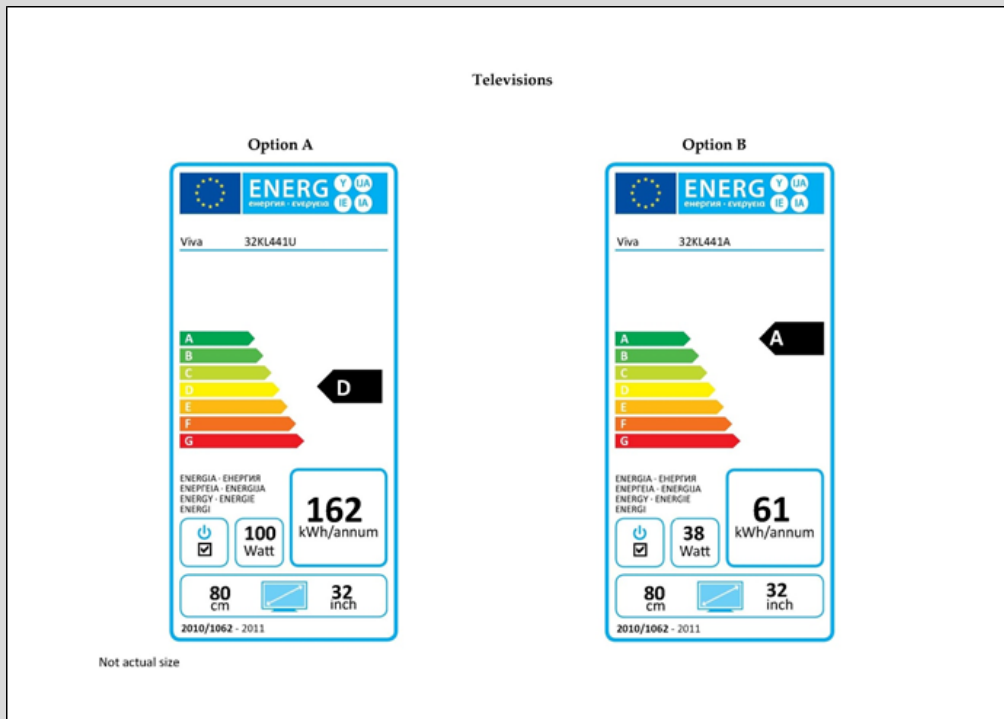
The alternative energy labels (for televisions or refrigerator-freezers) were then presented to the participants and the same questions were asked.

**Figure 3.9. Show Cards 7 (refrigerator-freezers) and 8 (televisions), showing two same-brand models with identical storage volume or screen size but differing energy efficiency classes and levels of energy consumption**

*Show Card 7*



## Show card 8



## Results

All but one focus group participant and one in-depth interviewee chose the most efficient (Option B) of the two refrigerator-freezers offered. Comments from those who selected the less efficient Option A are presented in the box below. When asked how much more they would pay for their first choice of refrigerator-freezer, 27% of participants would pay 31–40% more, 18% would pay 41–50% more and 16% would pay 11–20% more (Figure 3.10). Only 3% would pay in excess of 100% more.

With regard to televisions, 95% of focus group participants and all but one in-depth interviewee selected the more efficient option (B). Twenty-three percent of participants were willing to pay 11–20% more, 23% would pay 31–40% more, and 14% would pay 41–50% more. Some 12% said they would pay in excess of 100% more. Some participants considered the energy savings for televisions to be less significant than those for refrigerator-freezers on account of the reduced operating times.

**Rationale for choosing between two refrigerator-freezers or televisions, respectively, offered (depicted on Show Cards 7 and 8) and for the extra price participants were willing to pay**

*Refrigerator-freezers*

Comments by the two participants who selected the less efficient option (A):

- “I would probably go for A. Because Option B, at first sight it’s kind of tempting because this number is lower, this A with triple plus. Somehow, I don’t trust the first impression that it should be good, so I would go for Option A... I still don’t know which of the letters is good on the scale. Again, I stick to the average [middle value].”
- “[T]riple A’ is still very good but it costs three times as much [as A]. Option A would be absolutely okay for me because I am a person concerned with cost. A is definitely not as expensive.”

Comments regarding willingness to pay more for their choice:

- *Moderator (M): “[Would you] be interested in paying more for a refrigerator than for a television?” Participant (P): “Obviously a refrigerator will last you longer. You probably renew or upgrade your television set more frequently.” M: “You would perhaps be willing to invest more in a fridge?” P: “Yes, because I buy it for a longer period of time.”*
- “In case they are the same but the other one is labelled A+++ . Well, if I look at it and consider that the lifecycle of a refrigerator is 5 to 10 years, then I would think about the energy efficiency and about how much I could save. So let’s say I would probably pay 4000 more, so let’s say that one is for 8000, the other one is for 12 000, so then I would pay 4000 more for it.”
- “Because if it were 10 000 crowns more expensive, then when I consider the life cycle of a fridge that is 10 years, then the price would be the same taking consumption into consideration. With the current price, that’s how much more expensive this one is.”
- “My argument is that it’s turned on all the time. It’s not on standby so therefore you would be willing to pay some extra. I wrote up to 25 000 kroner extra.”
- “Go £500 for it, so £200 [more]. I know that, having had a fridge freezer that I broke once, it's not something you should skimp on... I'd just feel this rating would give me the security to know that it'd be safe for longer. I think the less energy you use, the longer it would live.”

*Televisions*

Comments by participants who selected the less efficient option (A):

- P: “I chose option A. It’s 38 watts and this [on mode power consumption] is 100 watts. Maybe the luminosity and the quality of how well it’s going to light up the screen – I would imagine the 38’s not going to be enough.” M: “So for you, it’s the luminosity? So you put option A.” P: “Yes.”
- “It’s option A. It’s the golden average again.”

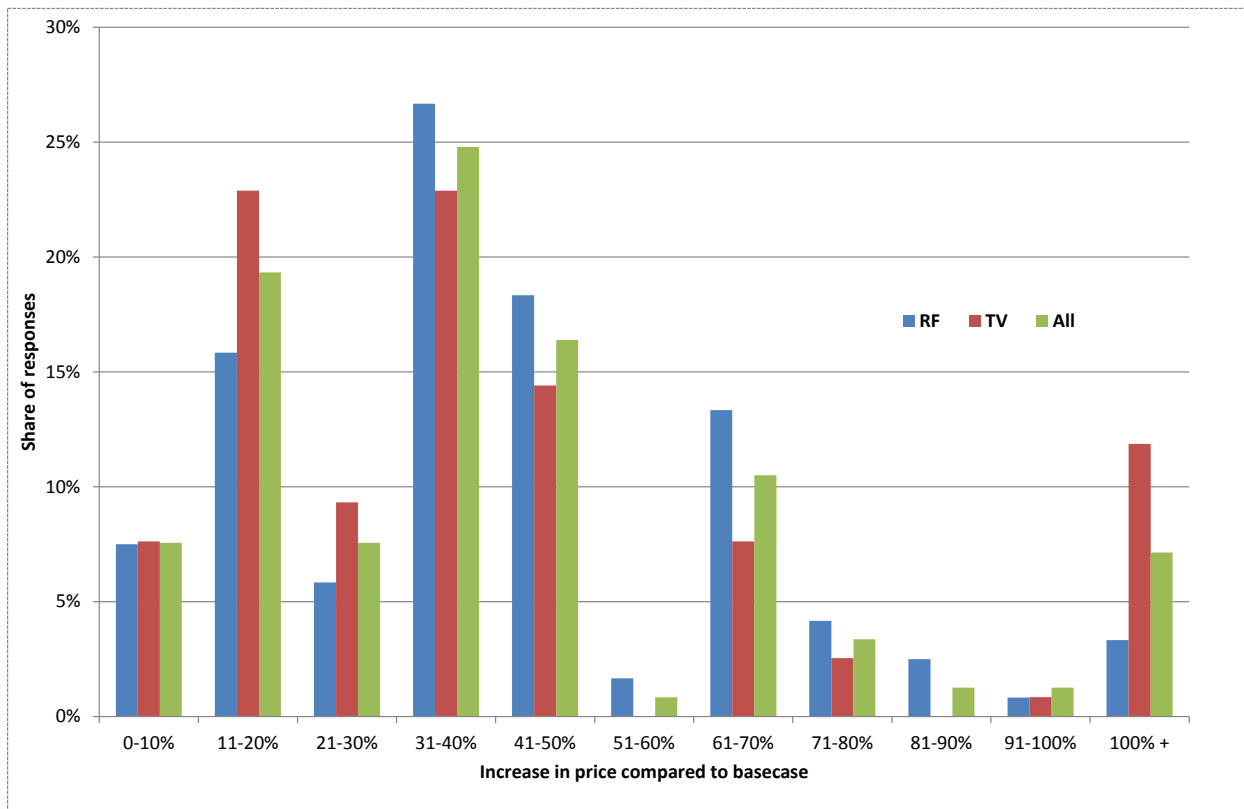
Comments regarding willingness to pay more for their choice:

- “I wouldn’t pay more than 1500 [local currency units] in difference. I’ve got a television set, but I don’t use it, so consumption/energy efficiency doesn’t make any sense for me. Of course, I like A, but if A was really much more expensive, I’m fine with D.”
- “It’s ecologically friendly and also I’m thinking of the actual energy consumption and my

electricity bill that you'd have to pay. The less energy it uses, you'll pay more in the beginning, but you'll pay less later. In the meantime you're being ecologically friendly.”

- “I would think that you should pay less. Less incentive to buy it. Why should you have to pay more for something that just uses a bit less juice? Because it's incentivised, yes. You should be charging more for using high carbon stuff, that's the way it should be, if that makes sense.”

**Figure 3.10. Share of participants willing to pay incremental increases in price for a highest energy efficiency class product compared to a mid-range energy efficiency class product costing €300 in rounded local currency units (RF = refrigerator-freezers, n = 120; TV = televisions, n = 118).**



On average, participants were willing to pay 44% (standard deviation 30%) more for the refrigerator-freezer in the highest energy efficiency class (A+++), compared to a mid-range product (class A), and 50% (standard deviation 59%) more for the television in the highest energy efficiency class (A) compared to the base-case television model (class D).

In the case of televisions, the average increase in price consumers were prepared to pay was equivalent to €50 per additional label class, whereas for refrigerator-freezers the value was €44 per label class. These increases are not as high as those reported in the St. Gallen study (Table 3.11), in which participants expressed a willingness to pay between €49 and €194 per increase in label class when purchasing a hypothetical television using either an A-to-G closed labelling scale or

an A+++ to-D labelling scale (Heinzle & Wüstenhagen, 2010). However, the higher amounts found in the St. Gallen study may be partially or wholly due to the differences in experimental design.<sup>18</sup>

**Table 3.11. Willingness to pay for an appliance in a higher energy efficiency class in the St. Gallen consumer study (Heinzle & Wüstenhagen, 2010)**

	Extra amount study participants were willing to pay for energy efficiency class upgrade		
	From second highest to highest class	From second lowest to second highest class	From lowest to second lowest class
Closed scale, A to G	B to A: €133	C to B: €194	D to C: €141
A+++ to-A scale	A++ to A+++: €49	A+ to A++: €79	A to A+: €109

### 3.15 What do the public like and dislike about the label?

#### 3.15.1 What participants liked

Q20, 36;  
2d, 5b

Participants were presented with a set of three energy labels for either refrigerator-freezers (Show Card 2a; Rotation 1) or televisions (Show Card 2b; Rotation 2) and asked what they liked about the labels and why (see Figure 3.3). They were later asked the same question about the labels for the alternative label. In the case of focus groups, discussion was allowed before answers were given.

#### Results

Participants in all countries stated that they found the label informative, clear and often easy to use. The most common reason stated for this was the use of the graded colours, which seemed to be appreciated in all markets. The fonts and layout were considered clear and it was sometimes remarked that the label was easy to interpret at a glance and that this was useful in a real shopping environment when comparing goods. Some participants also liked the presence of the EU flag, which in some cases was believed to indicate that the label was valid across Europe and that it was official. Some also expressed their appreciation of the letter scale, the icons and the energy consumption data.

<sup>18</sup> In the current study participants stated how much more they would pay for a higher efficiency product that was otherwise identical to the lower efficiency product (same brand, features, etc.). By contrast, in the St Gallen study participants selected products from an array of models with different prices, features, brand, efficiency, etc., and used a discrete choices methodological design within the broad framework of conjoint analysis to determine willingness to pay. Both studies used products spanning highest to mid-scale energy efficiency, but the St Gallen study used a higher-priced base case product, the higher efficiency products were twice as expensive as the base case, and more prestigious brands with higher-end features were used. The St Gallen research used a sample of German consumers whereas the current research drew from consumers across the EU.

### ***What participants liked about the energy label***

- “It is quite informative.”
- “It’s clear.”
- “It has all the important data.”
- “I like the graphics of it.”
- “You can tell from afar which energy class it is.”
- “It’s easy to get an overview of it.”
- “What I notice is the colour scale and they are green. For me when it’s green it’s more environmentally friendly. I think that’s good.”
- “I think the letters are very educational.”
- “The font size is good. The layout is good; it’s clear.”
- “The colour scheme that’s used – it helps you situate yourself.”
- “It’s very straightforward, intuitive.”
- “[Y]ou can, in the shortest amount of time, figure out the energy consumption of a television, thanks to these colours. Not everybody wants to read those numbers and stuff. So, I mean, if you’re standing in front of a huge shelf of televisions, and if you have, like, 500 televisions, then reading every label, reading all the numbers on each label, would be a horror.”
- “It’s clear and it’s got symbols and numbers.”
- “I think at a glance I could see exactly what I’m looking for quite quickly.”

The most common statement pertaining to both appliance types among focus groups was that the labels were clear, easy to understand and simple (70% of focus groups). The second most common comment was that the label was informative (60%) and held a good level of information. The colours were the third most liked element (40%).

Among in-depth interviewees, both labels were described as informative (40% of interviewees) and clear (33%); the third most liked element was the colours (30%).

### ***Synopsis***

Participants appreciated the colour coding, fonts and layout of the energy labels, often stating that it was easy to find the key information they were looking for. Many participants also remarked that they appreciated the selection of information presented. The colour coding appears to aid comparisons across products and to help consumers situate the relative performance of the product quickly.

### **3.15.2 What participants disliked**

Following immediately on from being asked about what they liked (see section 3.15.1), participants were asked what they disliked about the label and why.

### ***Results***

The most frequently disliked element of the label across the focus groups was the rating scale and energy classes (an average of 30% of the groups across both appliance types), which were not understood; the second element was the plus signs on the refrigerator-freezer labels (25%). The third most commented upon element was the differing scales between the television and refrigerator-freezer labels; compared to the television energy label, the refrigerator-freezer label was considered overly complicated.

In-depth interviewees most regularly commented that they did not understand the icons, the energy data or the 'Energ[y]' text in the foreign languages (an average of 12% of interviewees for each of these elements across both appliance types).

In general, participants did not understand some of the elements, most commonly the icons and the foreign languages at the top of the label. Participants requested that more explanation is included on the label or that guidance is offered to consumers about how to read the label. Some observed that the scales were different between televisions and refrigerator-freezers and questioned why this was so.

#### ***What participants disliked about the energy label***

- "The price is missing."
- "The label is too long."
- "There are too many characteristics."
- "There's not enough technical data."
- "The brand information should be more visible."
- "There are too many classes."
- "The black arrow should be another colour (black denotes negative things)."
- "General confusion over the foreign languages."
- "The label should be in my country's national language."
- "The information is not relevant to me [televisions]."
- "The plusses are confusing and ambiguous."
- "There's too much white space [televisions and refrigerator-freezers]."
- "I don't understand the 2010/1062 code, language circles, icons, terms used."

#### ***Synopsis***

Participants tended not to like elements that they found difficult to understand or unnecessary. This applied to some of the icons (particularly for the television label) and in some cases to the meaning of plus ratings on all labels (except the television label). There were very few negative comments on the design and layout, although it was sometimes remarked that the television label has too much white space at the top.

In terms of overall confusion and comprehension of the label, dislikes and complaints were fairly equal for both televisions and refrigerator-freezers, although a small percentage of participants showed a preference for the refrigerator-freezer label because the meaning of the icons was clearer to them.

#### **3.16 Perception of the relative strengths of the old and new energy labels**

Q84 Focus group participants were presented with the old and new refrigerator-freezer energy labels side by side (Show Card 12; Figure 3.11) and asked what they liked and disliked about each and why.

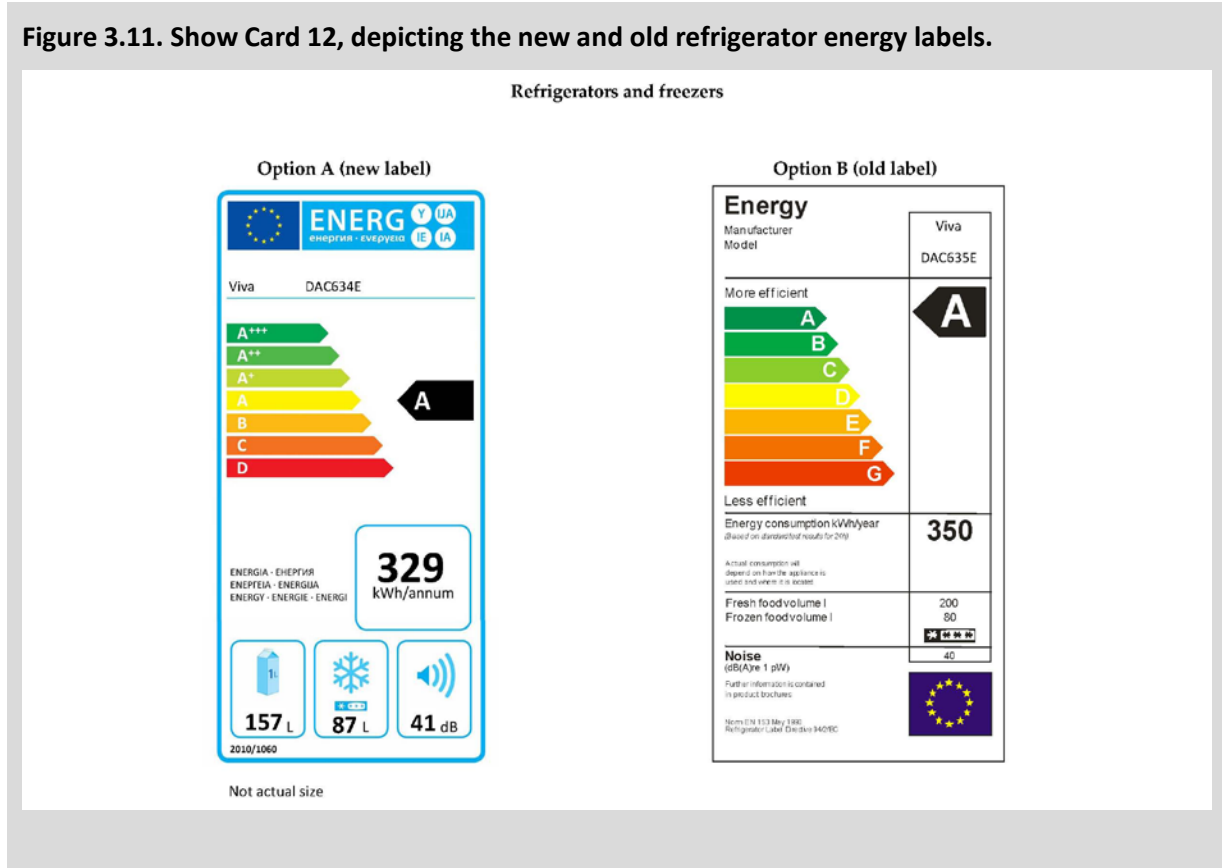
#### ***Results***

Responses varied as to the likes and dislikes for each style. The new label was considered 'clearer' by 50% of focus groups, and 'less cluttered' and 'better designed' by 60%. By contrast, 50% felt that the old label explained all the information so was simpler and easier to understand. The explanatory text on the



old label was referenced by 70% of focus group participants as making the label easier, but was disliked by the remaining 30%, with some stating that the label had too much text which they would not read.

Figure 3.11. Show Card 12, depicting the new and old refrigerator energy labels.



### ***What participants like and disliked about the new versus old energy label***

- “I think [the explanatory text] on the new label gives a better overview. It’s more clear. We soon guessed what these icons meant. It’s correct that it gives a better overview but the old one is easier to understand. The message is clearer in the old label.”
- “[The old label is] simpler and it’s easier to understand much more quickly than these new standards. With icons, you need to know what they are.”
- “Well, [the new label is] a better summary, briefer summary. You just have to look at it very briefly, glance at it to get all the information you need.”
- “I think the old one is for older people, where the new one is for more knowledgeable people, better informed.”
- “[The new label is] simpler. It’s less divided – less compartments. I like it because it’s clear and the design is clear. It’s horizontal, cross, and verticals where there [were] lots of boxes [on the old label].”
- “[The new label is] easy to understand and it’s universal across the whole of Europe. There are fundamental things that can go anywhere, and part of you have the same language. That’s what it’s all about, or what the energy commission does.”

It was thought that the new label may suit those with a better understanding of energy-related matters and technology in general and that the old label would be better for the older generation and those with no technological understanding.

Participants discussed the languages used on the old label; 30% expressed a preference for the label information to be in their national language.

### ***Synopsis***

The groups did not often agree as to their preferred label, although it was generally acknowledged that while the design of the new label was better in terms of the organisation of information, the fonts and the clarity of the icons, the information was less easy to understand. With regard to the old label, the design was described as more cluttered and containing too much text, but the information was much simpler to understand, particularly for those who are not ‘technical’. On balance, more people preferred the old label to the new one for these reasons.

### **3.17 Preference for energy and water usage values: per annum versus per cycle**

Q85

The energy labels for washing machines and dishwashers (Show Cards 4 and 5, respectively; see Figure 3.2) were presented side by side to focus group participants, who were asked whether they preferred energy consumption to be expressed per year (kWh/annum), as on the new labels shown, or per cycle (kWh/cycle), as on the old labels.

### ***Results***

Among the nine focus groups asked, four agreed that a per cycle approach would be more useful, one agreed that a per annum approach would be preferential and four were undecided as to which they preferred, discussing both options within the group. The group that opted for the ‘per annum’ expression was the Greek one: the term ‘per cycle’ was confusing because the word ‘cycle’ also means ‘revolution’ in Greek.

### ***Participant preference for presentation of energy and water usage values***

#### *'Per cycle' approach*

- “For me, to compare, it’s much better to have it per cycle. There’s a lot of difference. People do a wash once a week and people do three washes a day. On average, it’s hard to tell. I think it’s easier to put up consumption per cycle.”
- “The washing machine and dishwasher labels, you had consumption per year and kilowatt per year. The old label was kilowatt-hours per cycle. I think that’s better information.”
- “Yes, [kWh per cycle is] more precise.” Participant 2: Yes. Participant 3: That’s more meaningful
- Participant (P) 1: “To me, it works better to speak by cycle as opposed to a yearly basis, also because what does ‘annum’ mean? What does ‘year’ mean? Does it mean how many cycles per day, how many days per year? So we should also know what are the references, what are the criteria, on how many loads? So is it one wash per day, 24 hours a day? What are you saying, I’m not running my washing machine 24 hours a day?” P2: “Yes, but that is what it would mean if they say per annum... So they should perhaps enter both, both the cycle and the annum, the year.”

#### *'Per annum' approach*

- “I think it’s easier to know per annum as opposed to per cycle, and perhaps there will be a year when I’m running more cycles and a year when I’m running less. I think annum is a standard parameter. Of course, a three-people household does not consume as much as a five-people household, but per annum I think is just a general parameter, it’s just a reference parameter, a generic one, and I think it’s better compared to per cycle.”
- “This per cycle is very confusing. They confuse ‘cycle’ because it’s the same word in Greek as ‘revolution’.”

Most groups raised the point that it is unclear how the current per annum figure is calculated and how many cycles of washing or drying the average household is estimated to use each week.

### ***Synopsis***

Although four of the focus groups remained undecided over how best to display the consumption information, four groups voted for a per cycle display and one group opted for a per annum display.

Among the undecided groups, both approaches were discussed and arguments presented for both. The main reason people opted for the per cycle approach was because the calculation of the per annum figure was unclear. A per cycle figure was deemed to be more transparent. By contrast, the per annum figure was said to be a more standard parameter and therefore a better comparison tool than a per cycle figure.

When asked about what information the groups felt was missing from the dishwasher and washing machine labels (see section 3.18) the top three answers pertaining to both appliances included the addition of energy and water consumption per cycle figures. When asked what they would change about the label (see section 3.19), the second most common answer was to add per cycle figures.

Although the per annum calculation was criticised as being ambiguous, very few discussed the fact that the criteria would be standard across a whole range of appliances.

### 3.18 Is the label missing anything?

Each focus group and in-depth interviewee was shown the energy label for an appliance type (refrigerator-freezer, washing machine, dishwasher or television; see Figure 3.2) that differed by rotation and asked if they thought any information was missing.

#### **Results**

##### *Refrigerator-freezers*

Q50;  
SC3g

This label was most commonly considered to be complete and to carry sufficient information. A small proportion of participants suggested that the dimensions of the unit should be included, and a smaller proportion thought that the cooling temperature and price should be added. Other suggestions for other information, grouped by type, to be included were:

- Cost: per kilowatt-hour (kWh) or year;
- Energy use: overall unit efficiency as a percentage and energy consumption per litre storage;
- Label language: explanation or comparator for the number of decibels, explanation of the icons, explanation for all the elements, and a legend/key for the energy class;
- Manufacturing: place of product manufacture; and
- Physical unit: number of compressors, number of drawers and aggregates, and recyclable parts.

##### *Washing machines*

Q59;  
SC4i

As with the refrigerator label, most participants felt that the energy label contains the appropriate information. Among those who wanted more information, the item most commonly thought to be missing was energy consumption per cycle; this was followed by water consumption per cycle and the appliance dimensions (height × width × depth).

Other suggestions, grouped by type, were:

- Costs: price of unit, cost per cycle, and cost per year;
- Label language: an explanation of the terms 'annum,' 'per litre,' and 'per annum,' and an explanation of the icons;
- Machine function: washing efficiency/how clean the clothes get, and water temperature;
- Machine programmes: the fastest programme/how long it takes, most ecological programme/whether there is an 'eco' programme, cheapest and most expensive programme (energy used and cost of electricity), and more information about the functions and programmes;
- Machine type: type of machine (automatic etc.), type of engine, and whether the model is a top loader or front loader; and
- Physical unit: weight.

It also emerged from the discussion that consumers were unsure what was the most ecological or energy efficient wash programme, nor did they know which wash cycle the machine had been tested under to produce the energy efficiency classification.

##### *Dishwashers*

Q67;  
SC5h

Most participants considered that no elements were missing from the dishwasher label, but in this case a greater number asked for additional information. Among the latter, the most common request was for an explanation of the icons, particularly Icon P (drying efficiency). A smaller group asked for an

explanation of how the per annum figures were calculated, and the joint third most common suggestions were for water consumption per cycle and the unit dimensions. Other suggestions were:

- Cost: price of unit and cost per cycle;
- Energy use: energy consumption per cycle and electric capacity;
- Label language: explanation of all elements, explanation of decibels figure, labels should be in local languages, legend to explain efficiency grades, and explanation of 'Energ[y]' text;
- Machine functions: temperature variation, length of cycle, washing efficiency, and presence of an eco-cycle or half-load wash option;
- Manufacturing: place of product manufacture.

### *Televisions*

Q74;  
SC6g

Most participants thought that the information on the television label was 'sufficient'. In descending order of frequency, it was suggested that price, explanation of the icons and presence of features such as HD, digital and in-built free-view could be added. Other suggestions were:

- machine function: image quality (colours); resolution; pixels; screen technology (LCD, plasma, LED, etc.); connectivity; lifetime of product; sound (power, maximum decibels, integrated speakers)
- screen refreshment rate: Hertz
- label language: explanation of '2010/1060' text; how kWh/annum and watts are calculated; how to determine whether the kWh/annum value is 'good'
- other: certifications.

## ***Is the label missing anything?***

### *Refrigerator-freezers*

- “Well, you can’t put everything on a label... I mean, in general there’s another label where you have all of the characteristics of the actual product. This one, in terms of energy efficiency, looks to be pretty good.”
- “I think the size is missing. Size is important. Energy consumption is important, but I want to know the size. If you’re asking me what I’m missing, I’m missing the size. The television label showed the size. Why doesn’t this show the size?”
- “Well, yes, because I’d want to maybe know how much in pounds is 197 kilowatts, how much would it be costing?”
- “I would like to hear about the temperature in the fridge, and the temperature of the freezer, I would [like] to know that.”
- “I don’t think so. I think it covers everything.”

### *Washing machines*

- “Yet again they’re putting the dimensions on the television – why can’t they put the washing machine dimensions on? Because everyone’s got a very specific space to put their washing machine. If it’s 1 mm over it won’t fit. It has a space and it has to slot in. So dimensions of a washing machine are intricately important. So a little symbol with the depth, width, height would be good.”
- “They should indicate the consumption for the environmentally friendly programme, the most standard one.”
- “No, but I would wonder if it’s, like, a top-filled or side-filled washing machine – but then you can see it when you’re buying it.”
- “...per load instead of per year, because you have families where the consumption of water really just depends on the number of people in their family and the number of, therefore, loads of wash.”
- “I would want to know consumption per one wash. Also, I would like to know how long it takes to do one wash, the fastest programme, say...”

### *Dishwashers*

- “Well, the same thing – size. If you’ve got to fit it into your kitchen, if I don’t have a notion of how big it is, then I don’t know if it’s going to be able to enter into the space that I have provided for it, even though it’s going to be the same thing for all the different devices we’ve talked about here. It’s more important, maybe even very important, because you have a device that doesn’t consume a lot of energy, but if it doesn’t fit into the space, I would have to choose the one that consumes a little bit then if it does fit. I don’t want to break up my entire kitchen just to fit in low-consumption device.”
- “They could put the cost of a wash in one cycle even on the lowest wash, the quickest, fastest wash. They’d have to keep changing that, wouldn’t they, because the prices go up and down and up and down, so that might be difficult, and then you might be looking and thinking, ‘When did they put that up?’.”
- “Well, I would specify the meaning of this one, this multiplied by thirteen [Icon Q], this symbol, what they think. I think this one should be specified... Yes. It looks a bit strange.”
- “Well, what bothers me is not knowing how they calculated the water consumption there, Icon G. Then Icon P, with the letter ‘A’ – I don’t know what that really corresponds to.”

### *Televisions*

- “They should specify whether this consumption of 41 Watts... is it a consumption that you see when the television is on or off, or is it per one minute, or per year?”
- “I'd probably want to know if it was an HDTV. If they've got the space. I think probably the television itself would say that, the manufacturer would have something saying ‘HDTV, built-in Freeview box’.”
- “There’s maybe a little bit too much information, as they say. I would want to have an explanation of the on/off button, Icon D. You know, it’s whether or not the television has an on/off button or... that’s the only technical characteristic that’s important or interesting to have on this page, and you’d want to have a reminder of that on the actual television data sheet. Otherwise nothing’s missing for me here.”
- “The price, still. If it’s HD or... I know there’s different types of options in terms of televisions, but price in particular...”
- “The price still and the screen resolution. Also the connection possibilities.”

### **Synopsis**

In general, many participants felt that sufficient information is carried on the energy labels. There was more satisfaction with the existing label information for refrigerator-freezers and washing machines (36%) than for dishwashers (29%) or televisions (24%), which could mean that there was a greater understanding of more of the elements on the first two labels and of why those elements appear on the labels.

It is instructive to consider what information was thought to be missing. Most commonly for each energy label, the ‘missing’ items for each appliance type comprised:

- i) Refrigerator-freezers: size, cooling temperatures, price;
- ii) Washing machines: energy and water consumption per cycle, size;
- iii) Dishwashers: calculation of per annum figure, water consumption per cycle, size; and
- iv) Televisions: price, explanation of the icons, and product features.

Across all suggestions for additions to the labels, size was mentioned most frequently, except for television labels, which already carry this information. Price was often mentioned for refrigerator-freezers and televisions, and per cycle energy and water consumption was mentioned in products with ‘cycles’.

Some of the suggestions, such as dimensions and price, are unnecessary as they would always be present on additional labels or would be provided in product documentation. Others, however, reflect real omissions. These include:

- Information on how much energy each wash programmes uses for washing machines and dishwashers;
- A desire for water consumption information to be expressed per cycle rather than per year;
- Information on operating costs, e.g. cost per kWh; and
- A legend to explain the icons in the local language.

Even if it is not practical to add this information to the label itself, it may be possible to devise mechanisms to communicate it, e.g. information on the wash cycle energy use and water consumption per cycle could perhaps be a mandatory requirement in the product documentation. Alternatively,

efforts could be made to provide the operating cost information and explanatory legend at the point of sale by in-store retailers or on the web.

### 3.19 Is there anything on the label that is confusing or should be changed?

Q86, 87;  
C2a, C2b

Near the end of the sessions, the energy labels for refrigerator-freezers, washing machines, dishwashers and televisions (Show Cards 3, 4, 5 and 6, respectively; see Figure 3.2) were presented together and participants were asked whether there was anything about the labels that (i) they found confusing or (ii) they would like changed or added.

#### **Results**

Most participants found at least one thing about the labels confusing, most commonly the icons – particularly those for dishwashers (Icons P and Q) and televisions (Icons D and E) (see section 3.9). Confusion also surrounded some of the text ('kWh', 'Energy[y]', 'annum' and 'inch'), but most especially the reference to the Directive ('2010/1062'). Other items raised were:

- Languages used;
- Difference in the units of measurement for televisions (kWh and watts);
- White space (thought to be excessive above the television efficiency scale);
- Calculation of the per annum figures;
- Coloured scale and grades;
- Arrows and their opposing directions;
- Televisions having a different grading scale compared to other appliances;
- Subclasses of the A grade; and
- Consistency of the labels – the energy consumption boxes vary in size.

The changes that participants would have liked varied, but the most popular suggestion was to add more explanation for the icons or to change them to make them more comprehensible. The second most popular suggestion was to add per cycle data. The second most popular suggestion was to replace per annum data with per cycle water consumption and energy consumption data on the dishwasher and washing machine labels. Other recommendations included:

- Add an energy-saving figure in terms of cost information;
- Highlight the brand;
- Include a price ratio;
- Include price of product;
- Improve placement of objects on the label and reduce white space;
- Include limits/range for the coloured arrows;
- Use a real-world example for the decibel figure;
- Make the length of the arrows proportional to efficiency values; and
- Add a symbol proving the authenticity of the information on the label.



### ***Is there anything on the label that is confusing?***

- “I’m not familiar with this word here. Young people can understand English, but, like, middle-aged and older people would need it to be written in Czech to know what it means, really. Colours, they are there. It’s distinguished in colours. The symbols are quite logical. I only don’t know what this trumpet [the noise icon] means, but I think it’s well arranged, and if someone’s quite smart, or is not quite stupid, they can understand that.”
- “I’m confused by the ‘kWh’, the arrow with the letter – I’m still not entirely sure about the black arrows, the letters underneath pictures at the bottom of the label, the A B C D E F G.”
- “[T]he layout of televisions is different. I would like to see the label be absolutely standard, so that your annual energy consumption is in the same shaped box, the rating is in the same place on the label. Yes, and given the same emphasis, because some are slightly larger.”
- “Well, for me, the most ambiguous label was the television label. You know, the other ones are pretty obvious. The only reason why is because the pictograms... I understand the pictograms on the other show cards. I also understand the colour scale, so all of that’s relatively clear. The ambiguity on the television one comes first from the white space that’s left over the energy class A, and also, it’s the only one that doesn’t have the same value scale as everything else.”
- “I got stuck on that text in the lower left, there, where it says ten, slash, etcetera. I don’t know what that text is.”
- “...the dishwasher, ‘×13’. No clue what that is, that tells me nothing.”

### ***Is there anything on the label that should be changed?***

- “If they keep them that way without changing them, I shall be able to memorise what they mean. What most matters to me is not to have these constant changes, because we have a standard and we finally get used it.”
- “If there were a European certification organisation that were independent from manufacturers – because we know that they can be biased if they’re done by the different manufacturers. For the authenticity of the label – there would be a cost associated with this, but I would say you’d want to have almost a hologram that really proves that it’s something that’s official, like a banknote – that it’s not something that’s been altered or falsified.”
- “Well, maybe have more of an explanation on those icons that we don’t really understand. You know, that would have to be more explicit.”
- Participant (P): “Yes, the only thing is that this text here, ‘Energy’ – they’re written in different languages, that’s next to the annual consumption. Moderator: “What does that mean for you to have it there?” P: “It just clutters it unnecessarily.”
- “Little details like a ratio in Euros or relationship to Euro values for the big consumption. So for the fridge, for instance, x number of Euros per year on average based on a kilowatt hour that costs X amount. Because these numbers you can make them say whatever you want them to say, you know?”
- “Well, I’m not sure if they’re meant to be a different language, but if they weren’t then I’d prefer to know what everything means, because there’s not really any real information. It’s just pictures and I’m not really sure what the pictures mean. I think I just need a bit more information about what everything did mean.”
- “Perhaps an understanding of what that range is. I suppose they deemed that they don’t need to provide that level of information, because as a consumer, all you need to know is, is it good, or is it poor?”

## **Synopsis**

The most troublesome aspect of the energy labels was comprehension of the icons, which were the most likely element that participants wanted to change or have explained more. The text on the label was also the subject of confusion. Some participants wanted all the language to be country-specific, and one UK participant thought the text should be in English throughout Europe. The items that were most commonly cited as missing from the current label design were pricing information, price ratio and cost per cycle data.

### **3.20 Overall usefulness of the labels**

Q88; C3 Participants were asked how useful they found the energy labels for refrigerator-freezers, washing machines, dishwashers and televisions (Show Cards 3, 4, 5 and 6, respectively; see Figure 3.2) in terms of providing information on the energy efficiency of each of the appliance types.

## **Results**

The majority of participants described the energy labels as 'informative', 'highly useful', 'simple', 'important' and 'clear'. Some participants said they found the labels a little confusing as they did not understand all of the elements and that if they understood them fully they would find the labels more useful. Most recognised the importance of using the labels as a comparison tool, saying that they were less useful alone but were very useful when compared to other labels. Some also said they would prefer a price comparator linked to the energy consumption of the product as they would be more concerned with energy savings in terms of monetary cost.

## **Synopsis**

Most participants thought the energy labels were useful. They found the energy grades and coloured scale the most useful element to use as a comparator with other labels, even if they did not understand the entire contents of the label. The comments regarding the labels being more useful when compared with other labels rather than used alone reflect that most participants do not have a sense of the overall magnitude of performance units such as kWh or decibels but are able to give them relative meaning by comparing them across similar appliances.

Some participants expressed confusion over some elements of the label, most especially the icons, and said that if they fully understood those elements they would find the labels more useful. They thought they would need to ask for more information in a shop from a sales assistant.

Many participants were aware of the importance of saving energy that more emphasis is being placed upon on it in the public domain/media. They were also aware of how energy consumption translates to electricity costs in the home (and the rising cost of energy), making it an important consideration in appliance purchases.

### ***Are the energy labels useful?***

- “Yes, to help make a choice between two products that are similarly priced. It’s sort of a modern indicator. I think it needs to be there.”
- “You can read the information on the label before you talk to the shop assistant.”
- “I think they tell me quite a lot, and energy efficiency is important. When you shop for kitchen appliances of this size, you really have to watch energy consumption. It’s not misleading by any means. It’s clear what A, B, C and D mean.”
- “Well, after I realised what those symbols or the information stands for, I think it’s okay, because next time when I go shopping, I will know what they stand for, so this information is probably important and it’s useful, but first you have to find out what it is about. Without being informed about it for the first time, then I wouldn’t know what half of the card means.”
- “I think it’s very important because, as I say, for me, if I were to buy an appliance, I look at consumption. Maybe not immediately. It’s maybe not the first thing I look at, but once, you know, I’ve narrowed it down to three or four devices, that’s really going to influence my purchase decision.”
- “[B]y itself, it doesn’t mean anything. You could see it in terms of the letter, but then it’s good to be able to compare it in that way. You’d be able to compare it very easily, very quickly.”
- “To be honest, not useful, because I don’t really know what they mean, that’s the main thing. If I was really interested and did know what certain things meant before going to the shop to buy one, then they would probably be more useful, but I don’t really have a clue.”
- “Yes, so you would look at that [the efficiency grades diagram], but when you get all these figures, and – as I say – if you’re trying to choose a fridge freezer and you’re running from here to there and you’ve got these figures butting around in your head, it’s too much. Cost would be easier to retain.”

## 4 CONCLUSIONS AND POLICY RECOMMENDATIONS

### 4.1 Key findings

It is clear that the new labels are generally appreciated and have a reasonably high level of comprehension thanks to the overall effectiveness of the label efficiency scale, use of colour, efficiency classification, and energy consumption information. Most consumers were able to use them to correctly rank the efficiency of products, but a significant minority had difficulty in doing this. However, there was evidence that this could be overcome through explanation, which implies that public education programmes would be useful to better explain how to use the energy labels.

Efficiency was a reasonably important parameter for participants, with the majority being strongly motivated by the information on the label such that they would not consider buying products in lower efficiency classes and were prepared to pay an average of roughly half as much again for higher efficiency products compared to those with mid-range efficiency.

The choice of colours, especially green, in the efficiency scale had a large impact on consumer preference, such that the single most important division in motivating consumers was the division in the efficiency classification scale between the three green classes and the rest. This implies that the demarcation of the efficiency threshold between the green grades and the rest will have a larger market transformation impact than any other efficiency threshold demarcations on the label and should therefore merit very careful consideration when devising efficiency thresholds.

There is no significant difference in comprehension between the A-to-G label formats and the A+++to-D formats, but there is evidence to suggest that the higher efficiency classes in the A-to-G label formats are more motivating than their corollaries in the A+++to-D label formats. The labels were generally well liked and appreciated, and participants preferred the look of the new labels compared to the old. However, participants expressed the most dissatisfaction with the elements of the new labels that they had difficulty in understanding. These were often easier to understand in the old label because nationally specific language was used in each country to explain the parameters.

The decision to move toward a universal language-independent energy label was taken to address different issues, and policy-makers must have always thought it likely this would result in some loss of comprehension. The results from this survey support this but demonstrate that in many cases the icons used to convey what was previously conveyed in words are successfully understood and that it is only certain icons that present significant difficulties. In principle, these deficiencies could be addressed in part through targeted educational efforts such as in-store leaflets and sales staff training.

Difficulty in comprehension was also found with regard to the word 'annum,' which was understood in many markets but barely at all in others.

Somewhat surprisingly, most participants were unaware that the energy labelling scheme was an EU-wide initiative initiated by the European Commission, and many thought the labels were issued or managed by other entities such as manufacturers. This suggests there may be benefit in promoting the role of government in authoring and managing the labelling scheme to increase its credibility among consumers. Many participants were also unclear that the label is principally about energy and efficiency, although most made this connection; however, this did not seem to greatly hinder how participants used or understood the label.

## 4.2 Principal policy conclusions

In general, this research demonstrates that the new label works quite well and that most consumers are able to understand the more important elements and use this information to inform their purchasing decisions. The use of icons and language-neutral imagery works for the majority of users in most instances, but creates a problem for an important minority. Furthermore, some icons are appreciably less self-explanatory than others. Overall, the evidence from the research process shows that comprehension rates measurably increased with explanation by peers. It is likely that if Member States strengthened their education and outreach efforts, labelling comprehension rates – and therefore label market transformation impacts – would be raised. Outreach and educational efforts are also likely to increase confidence in the label, as most consumers are unsure who operates the scheme, and this causes its independence and credibility to be questioned.

Most consumers find the information on the label helpful and informative and generally appreciate the aesthetics of the design. The colour scale is particularly appreciated and important to consumers, and it is clear that the single most important threshold on the energy label, from a motivational perspective, is not the lowest or highest efficiency class, but the point at which the label turns from yellow to green. Most consumers said they would only consider purchasing a product in one of the green efficiency classes. Thus, if market transformation impacts are to be maximised, much more attention needs to be focused on the choice of efficiency threshold that delineates this boundary in future label design exercises.

It is clear that consumers generally thought that if a label class was shown on the label, products in that class were still available on the market. The fact that in some cases lower efficiency classes indicated on the label are prohibited from sale by Ecodesign regulations was not understood by any of the participants. It would therefore be appropriate for efforts to be made to either discard redundant classes or use some other means to indicate when efficiency levels are no longer permissible, in order to avoid misleading consumers and to maximise market transformation effects.

While there was no significant difference in the ability of consumers to comprehend the label efficiency rank order if either an A-to-G scale or an A+++to-D scale is used, there is a significant difference in the motivational effect that this scale has. When A is the top of the label scale, it is much more motivating to consumers than when A+++ is at the top. This conclusion may be unwelcome, but the research findings are definitive that this change has weakened the market transformation impact of the label. It is therefore proposed that the Commission's recently commissioned study to evaluate the revised energy label should explicitly examine this effect, and if its findings confirm those in the current study, reconsideration should be given to moving to a regular re-grading of the A-to-G scale in preference to adding new, higher efficiency classes. The current research indicates that the majority of consumers are willing to purchase higher efficiency products that are two label classes lower when A+++ is the highest efficiency class on the label, compared to when A is the highest class.

## 4.3 Recommendations

***For future label revisions, consider re-grading the A-to-G efficiency scale in preference to adding more plus signs***

With future revisions of the energy label, it is recommended that the Commission consider switching to a re-grading of the A-to-G scale such that A is the top efficiency class and G the bottom, dispensing with the A+, A++, and A+++ approach. While there is no apparent difference in comprehension of the efficiency scale between the two approaches, there is a very marked difference in the motivational effect of the A as the top efficiency class compared to the A+++. Consumers clearly perceive that A is

already very good and are therefore less willing to make additional investments in order to attain what they perceive to be marginal improvements. By contrast, they perceive a substantial difference between an A and a B or other lettered classes and show considerable willingness to invest in moving from a lower class to an A.

### ***Maximise the impact of the demarcation between the green and yellow parts of the scale***

As there was a very strong preference for products rated in the green part of the scale, the selection of the efficiency level that demarcates when the switch on the label from yellow to green is of considerable importance to the market transformation impact. This information should be used constructively to maintain the pace of market transformation, and the selection of the yellow to green efficiency threshold should be a focus of policy attention. For example, this threshold could be used if an analysis of technology learning curves indicated that it would be a future least-life-cycle-cost threshold in a number of years' time, and hence the market could be softly primed to meet that threshold ahead of a revised regulation.

### ***Ensure all efficiency classes indicated on the label are still permitted for sale***

Not unreasonably, consumers believe that if an efficiency class is indicated as an option on the label, it is possible to find such products on the market. The fact that in many cases the adoption of Ecodesign regulations has precluded one or more (up to four) classes from sale is highly misleading. Thus, when such regulations are being adopted, the label should either be re-graded or its display should be altered to indicate that certain lower classes are no longer permitted for sale. This could be done by blanking out those classes or striking a line through them, etc. In general, preference should be given to re-grading the label to ensure that all classes indicated are legally viable and thereby strengthen product differentiation. However, if this is not practical as a result of the rapid adoption of a series of phased Ecodesign regulations (i.e. in tiers), or for some other reason, then adjustment of the label to indicate which classes are no longer permitted is the next best option.

### ***Review problematic icons***

Certain icons were much less well understood than others. These include:

- Icon D on the television label, indicating the presence of an on/off button – this was often confused with standby functionality and was routinely misunderstood.
- Icon E on the television label, indicating on-mode power demand of televisions – this was only understood by roughly a quarter of respondents.
- Icon P on the dishwasher label, indicating the dish-drying efficiency – this was only understood by 8 out of 30 in-depth interviewees (but a higher proportion of the focus groups).

It is suggested that alternative designs be developed and trial tested to see if there are means of improving the comprehension of these icons. In the case of the TV on-mode power demand icon, if no better icons can be produced, it might be better to dispense with this information as many consumers confused it with overall energy consumption or standby power demand. In the former case, there is the risk of diluting the impact of the annual energy consumption information, and in the latter case it is simply misleading.

### ***Revisit the Energ[y] text***

Most participants did not seem to see the connection between the text 'Energ[y]' and the language-specific suffixes that follow it at the top of the label. This could be because of graphical design issues and

other associations, so it is suggested that the design of this aspect of the label be reviewed and alternative options developed and tested.

***Raise awareness that labelling is an EU scheme operated by the European Commission with support from Member States***

The majority of participants did not associate the energy label as being an EU-wide scheme operated by the Commission; many believed it is operated by the private sector. This may affect the credibility of the information in consumer opinion and potentially dilute its impact. Thus, it might be appropriate to initiate awareness-raising efforts to explain who is responsible for designing and administering the scheme.

***Strengthen label comprehension through educational communication campaigns***

In the research reported here, group discussion of the labels raised overall comprehension by a statistically significant degree and increased the ability to correctly rank the efficiency of more complex sets of products (from 55% to 80% in the case of refrigerator-freezers, for example). This suggests that educational efforts would be likely to be effective in explaining how the labels work, the meaning of important icons, the provenance (and hence credibility) of the labels, the meaning of the word 'annum,' and other important factors. It would therefore be beneficial to organise communication campaigns aimed at educating the public on these issues. These could either target the public directly or be aimed at educating those who influence the public at the point of sale, such as retail staff.

Of particular note, in some countries the word 'annum' was poorly understood; hence, in those countries awareness-raising efforts could also focus on educating consumers on this issue.

***Test icon and other label element comprehension to ensure optimal understanding before deployment***

In general, all potential new label design elements should be thoroughly trial tested with groups of consumers before deployment to ensure they are effective and do not have unintended consequences. It is strongly recommended that no label design modification proposals be adopted in future without proper testing for efficacy with consumers. The basis of this recommendation is that around the world there has been an extensive history of energy label designs being decided by technical or regulatory committees without first testing their effectiveness with consumers. This has often resulted in suboptimal outcomes where the market transformation impact of the label is weakened as a result of deficiencies in design.

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