Study assessing consumer understanding of a draft energy label for electronic displays

Final report

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1. Introduction

The EU energy label, as provided for by Regulation (EU) 2017/1369, repealing Directive 2010/30/EU, aims at promoting the uptake of more efficient energy-related products. It aims to help consumers make informed choices by facilitating product comparisons among different models with different characteristics that influence energy consumption during product use. The label focuses on the energy efficiency of the product, but also allows the inclusion of other environmental aspects (such as water consumption or noise level) relevant to consumers to make an informed choice.

Previous studies, conducted to support the review of Directive 2010/30/EU[1], resulted amongst others, in recognition that consumer understanding studies should, where appropriate, be conducted before a new or revised energy label is proposed by the Commission. Regulation (EU) 2017/1369 is even more detailed and states that where appropriate, when preparing delegated acts, the Commission shall test the design and content of the labels for specific product groups with representative groups of Union customers to ensure their clear understanding of the labels.

The purpose of the present study is to inform the design of a new energy label for electronic displays. To remain in step with developments in the field of electronic displays and continue to provide information that consumers find useful, the new energy label shall replace the current energy label for televisions, but also cover other types of electronic displays (computer displays) for which energy labels are not yet compulsory.

1.1. Research questions

The present study examines perceived relevance of energy (and other environmental) aspects of electronic displays for consumers, as well as consumer understanding of a specific draft label, as proposed by the Commission and further optimised by graphic designer Right Brained. The study aims to answer the following key research questions:

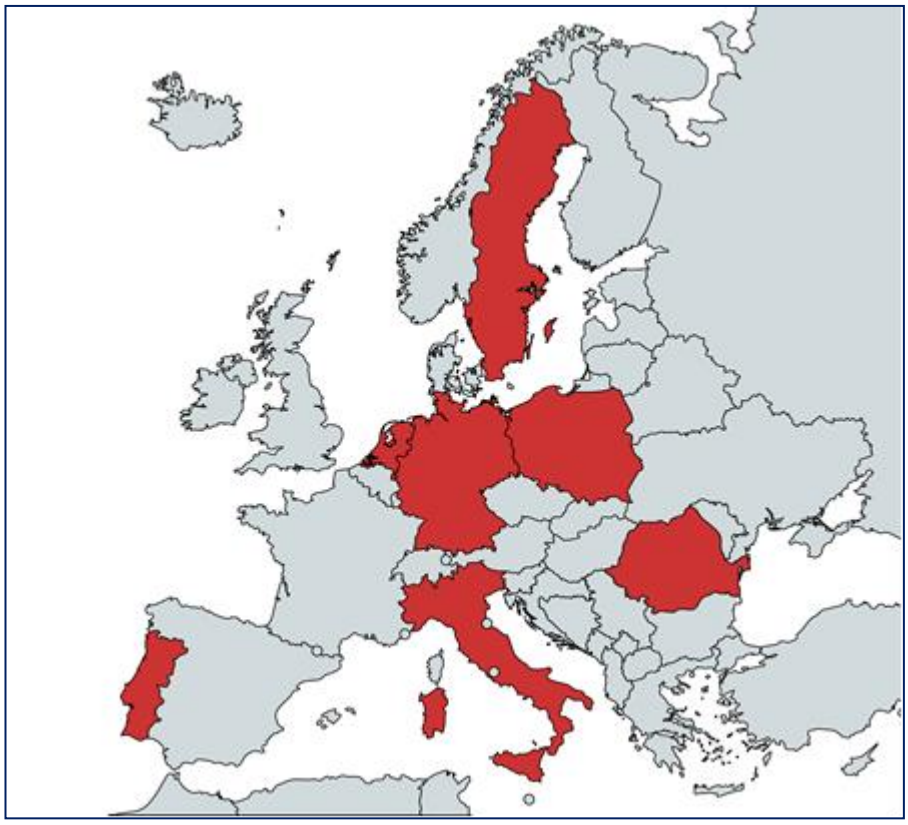
1. *Which feature(s) do consumers find most important when buying an electronic display (television or computer monitor)? Which energy-related (or other environmental) information would they prefer to see on the new energy label?*

2. *How well understood and effective is the proposed new label? Are consumers missing certain information in this new label?*

To answer these questions, an online survey was administered to approximately 600 panel members of GfK's online panels in each of 7 countries (4081 respondents in total): Germany, Italy, the Netherlands, Poland, Portugal, Romania, and Sweden (see Figure 1.1).

[1] Ecofys (2014). Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive and related technical assistance; London Economics/Ipsos (2012). Study on the impact of the energy label – and of potential changes to it – on consumer understanding and on purchase decisions.

Figure 1.1 Countries in which data collection took place



Half of the respondents in each country recently bought or were planning to buy a display and gathering information on the products available in the market at the time of data collection (referred to as "interested buyers" in the remainder of this report). The other half of the respondents constituted a nationally representative sample in terms of age, gender, educational level, and region (referred to as "general consumers"). The interested buyers are likely to be better informed about the products and features currently available on the market and hence may have a better understanding of relevant information, present on the proposed label or not, than the non-experienced public.

1.2. Draft label for electronic displays

A draft energy label proposed by the Commission was taken as a starting point for this study. The label contained the following elements:

- Energy efficiency on an A-G scale, including indication of the different levels of energy efficiency in standard versus HDR mode (for displays that support this mode);
- Indication of the energy consumption (on-mode power consumption in Watts or annual energy consumption in kWh/annum) in standard versus HDR mode (for displays that support this mode);
- Indication of parameters that provide a coherent, concise and clear indication of comparable models, e.g. resolution levels, size ratio (horizontal/vertical) and diagonal size (in cm and inches).
- Indication of additional optional features:
  - Autobrightness control (ABC) capability to adjust backlight to ambient light: on top of improving visual comfort, this feature helps decrease energy use particularly when watching television (for example) in a dark room;

- Movement sensor: normally offered in high-end televisions, presence of a movement sensor comes with a shortened interval for turning a display into standby mode (e.g. after 1 hour instead of 4 hours in a display without a movement sensor);
- Standardised external power supply (EPS): power supplies are components needing more frequent repair than other components (e.g. because of current peaks during a storm). An external and standardised power supply should avoid the cost of a repair with an expectedly cheap (because standardised) part that could easily be replaced by the consumer.

In the first phase of this study, the pictograms and layout of the draft energy label were further optimised. Draft pictograms were developed and fine-tuned in consultation with the Commission. The design process included the (re-)design of the individual elements, that is, the pictograms representing the display features listed above and, when relevant, the selection of an appropriate indicator of the presence or absence of a certain feature (currently, a ticked box), as well as the optimisation of the full label (e.g. the positioning of information elements on the label). In designing the "double" energy efficiency scale, special attention was devoted to finding a solution for the situation in which the black arrows indicating the energy efficiency in standard mode versus in HDR mode overlap.

To allow for flexibility in finding the "optimal" label layout, that is, the optimal combination of pictograms, we developed and tested three different variants of each individual element, and two different ways of indicating whether a certain display feature (e.g. autobrightness control, movement sensor) is present or absent. If a certain feature was absent, the icon was either crossed or completely absent (i.e. there was an empty space on the label).

Finally, the label received a new look, making it distinguishable from the currently used label. To ensure that the new label design does not compromise the "brand" image of the label, the survey also assessed the extent to which consumers recognised and trusted this new label as the EU energy label.

The individual label elements were pretested among a small convenience sample to gain initial insight into how well they communicated their intended meaning. In addition, understanding of individual label elements was assessed via multiple choice questions[2] in the main study, and incorrect answers in the pretest inspired the false response alternatives used for these questions.

Appendix A provides all pictograms and labels used in this study.

1.3. Structure of the report

The remainder of this report is structured as follows. Chapter 2 describes the set-up of the survey and the fieldwork methodology. Chapter 3 provides the results of the survey and the policy recommendations.

[2] See e.g. Verbraucherzentrale Rheinland-Pfalz (2014). Comprehensibility of the EU Energy Label–Results of two focus groups and a representative consumer survey; London Economics/Ipsos (2012). Study on the impact of the energy label – and of potential changes to it – on consumer understanding and on purchase decisions.

2. Methodology

This chapter presents the methodology of the study. It describes the general set-up of the survey and the fieldwork methodology.

2.1. Survey set-up

The survey consisted of a short screening questionnaire and three parts which contained the outcome measures of interest.

Screening questionnaire

Screening questions were asked to determine whether the respondent was an interested buyer or not. In this study, interested buyers are consumers who had bought an electronic display (television and/or computer monitor) in the past 12 months or who had the intention to buy one and were actively looking for information at the time of the study.

Part A: Perceived relevance of display features

The first part of the survey aimed to provide insight into consumers' decision-making process: which features do they find important when buying an electronic display and which specific information do they prefer to see on the new label?

First, we assessed the perceived importance of energy consumption/energy efficiency relative to other (general) product features in comparing different types of models, such as the brand, purchase price, display size, image quality, etc. Respondents answered the question either for television or for computer displays. Each feature was evaluated on a 5-point scale from (1) *not at all important* to (5) *extremely important*.

Next, participants completed a label design task, in which they were asked to indicate which information they would put on the label if it were up to them to design it. The key challenge in developing this task was to sufficiently inform consumers on the information elements they could choose among, which mostly involved features that were not widely diffused yet at the time of the study (High Dynamic Range, standardised EPS, automatic brightness control, etc.) and hence relatively unfamiliar even to consumers who had recently bought an electronic display, yet at the same time avoid information overload.

In the label design task, respondents first read about the existence and purpose of EU energy labels, and were presented with a few examples of energy labels in other product categories (washing machines and vacuum cleaners). Then, they were informed that the current study was about a potential new energy label for electronic displays, which included televisions and computer displays. They read that "to ensure that the new label does not become obsolete too quickly, label developers must predict which features, which may be relatively unknown now, will be relevant in a few years' time". As an example of a new technology, respondents then read about HDR and its impact on energy consumption. Next, respondents were asked to imagine that they were to design this new energy label for electronic displays. It was explained to them that certain information was required by law (such as the energy efficiency class, energy consumption in on-mode and the size of the display), but that other information could be added to the label as well, to help consumers makes swift but informed choices. To make an informed choice with regard to which information to include on the new label, it was then explained to them which other information *could* be on the new label. Table 2.1 lists the features that were included. Respondents read

a text which explained each feature and how it affected energy consumption/efficiency or other environmental aspects (such as waste and product reparability). To avoid information overload, the text was divided into four short sections addressing (1) power consumption (in on, off, standby and network standby, and annual power consumption), (2) power-saving features (automatic brightness control, motion sensors) and information that may help consumers to identify comparable models (resolution and aspect ratio), (3) standardised EPS, and (4) other features (type of display, presence of an on-off button, Internet connectivity) each presented on a single screen. After each section, respondents were asked to indicate to what extent they understood the information, on a 5-point scale from (1) *not at all* to (5) *completely*. After reading all information, respondents indicated the extent to which the information was new to them (on a scale from (1) *I learned nothing new* to (4) *all information was new to me*), as a measure of expertise in the product category. The actual texts used can be found in Appendix B, which provides the full questionnaire.

Table 2.1 List of features included in Part A

1. Energy efficiency class on a scale from green (class A) to red (class G) - *mandatory*
2. Power consumption (in Watts) when the display is on - *mandatory*
3. Diagonal size in centimeters and inches - *mandatory*
4. Power consumption and efficiency when displaying images in HDR mode (for HDR capable displays) - *mandatory*
5. Power consumption *(in Watts)* when the display is turned off
6. Power consumption *(in Watts)* when the display is in standby mode
7. Power consumption *(in Watts)* when the display is in network standby mode
8. Annual power consumption *(in kWh/annum)*
9. Whether or not the display has automatic brightness control *(yes/no)*
10. Whether or not the display has motion sensors *(yes/no)*
11. Resolution in pixels (*e.g. 3840x2160px, 2560x1440px, 1920x1080px)*
12. Resolution name *(e.g. FHD, UHD-4K, WQHD)*
13. Aspect ratio *(e.g. 16:9, 21:9)*
14. Type of display: television or computer monitor
15. Whether or not the display has an on-off button *(yes/no)*
16. Whether or not the display has Internet connection *(yes/no)*
17. Whether or not the display has a universal external power supply *(yes/no)*

Next, respondents were presented with an overview of the display features, which distinguished between mandatory and optional information (the order of the features was randomised). Respondents were asked to indicate which optional information they would put on the label. To not overcrowd the label, they could choose maximum six features.

Part B: Understanding of the draft label

The second part (part B) assessed consumer understanding of the draft energy label especially designed for this study, as well as specific elements thereof. This part of the survey employed a 3 (variant) x 2 (type of feature absence indicator) experimental design. Respondents were randomly assigned to one of three variants of each label or

label element, and one of two variants of the absence indicator (crossed versus absent). Appendix A shows all variants of the label (elements) and examples of a label in which the absence of a certain feature is represented by a crossed icon versus an empty space.

In this part, respondents were asked to imagine being in a store to buy a television or computer display and seeing the energy label on the displays that the store sells. Respondents were then exposed to one of the three full energy label variants (see Appendix A.1) and asked to indicate to which extent they would trust this label. To establish a meaningful benchmark against which to compare the 'trust score' of the draft label, the exact same questions were asked for the current energy label for televisions, at the very end of the questionnaire.

The remainder of this part of the questionnaire aimed to assess consumers' level of understanding of the various elements of the label. Respondents always saw only one of the three variants of the label or label element. First, respondents were exposed to (one variant of the) full label and answered four multiple choice questions that assessed their understanding of the label information directly relating to *energy efficiency* (class) and *energy consumption* (in Watts) as well as their understanding of the difference between efficiency and consumption. Next, individual icons for (a) diagonal size and resolution, (b) automatic brightness control, (c) motion sensors, and (d) standardised EPS, were shown one by one. For each icon, we first assessed icon comprehension via a multiple choice question with plausible distractors (partly inspired by the wrong answers given by respondents in the pretest). Second, respondents were informed on the intended meaning of the icon (the correct answer) and indicated how well they thought the icon communicated this meaning. Third, to assess consumer understanding of the feature presence/absence indicator (either a red cross or empty space), respondents were exposed to two displays with energy labels and indicated which display had the specific feature of interest (e.g. "Which display do you think has automatic brightness control?").

Finally, respondents saw the full label once more in its entirety, and rated its visual attractiveness ("This energy label looks…" on 5-point scales with end point labels: ugly-attractive, amateurish-professional, fake-real, sloppy-orderly).

Part C: Background information

In the third and final part (part C), we collected background information on the respondents, namely (1) socio-demographic information (age, gender, educational level, and financial situation), (2) product category expertise ("I know a great deal about televisions and/or computer displays" and "I know more about televisions and/or computer displays than most other people", Cronbach's alpha[3] = .89, and environmental concern ("In my daily activities, I am conscious about saving energy" and "I am worried about the environment", Cronbach's alpha = .81). Finally, we measured consumers' trust in the current EU energy label for televisions, as explained above.

2.2. Fieldwork methodology

The survey was administered to members of GfK's online panels in seven countries. In this section, we describe the country selection, the fieldwork and respondent samples.

[3] Cronbach's alpha is a measure used to asses the reliability, or internal consistency, of a set of scale items. A high value (>.8) indicates that the scale has good internal consistency (i.e., the items are closely related).

Country selection

The countries were selected such that they together provide a coverage of the 28 EU Member States and EEA countries on relevant factors. Table 2.2 shows the details per country for relevant country characteristics. The seven countries are: Germany, Italy, The Netherlands, Poland, Portugal, Romania, and Sweden. This includes:

- one country with a relatively low level of consumer concern for the environment, four with an average level of concern and two with a relatively high level of concern. The selection also includes two countries where there has been a big (positive) change in this figure since 2011, three where the change has been around average and two where there has been little or no change since 2011;
- two countries with a high percentage of households with broadband Internet, three with a low broadband rate and two with an average rate;
- four countries with low consumer empowerment and three countries with a high level of consumer empowerment;
- three countries with a low GDP/capita, one country with an average GDP/capita and three countries with a high GDP/capita;
- a coverage of 46,6% of the EU-28 population with adequate geographical spread. The sample includes countries from all European regions, with one Nordic-European country, two Western-European countries, two Southern-European countries, and two Eastern-European countries.

Table 2.2 Country sample

Country	Population	Region	Concern for the environment 2014	Change in concern for the environment (2011-2014)	Broadband Internet at home (2015)	Consumer empowerment	GDP per capita
	%		Percentage	Percentage	Percentage	Level	Level
Germany	15,9%	West	54%	25%	88%	17.3	124
Italy	11,8%	South	59%	31%	74%	13.5	96
Netherlands	3,3%	West	58%	18%	94%	17.3	131
Poland	7,6%	East	55%	27%	71%	12.5	68
Portugal	2,1%	South	42%	0%	69%	13.7	78
Romania	4,0%	East	65%	34%	65%	11.1	55
Sweden	1,9%	North	56%	16%	83%	17.0	123
EU-28	100%		55%	26%	80%	15.0	100

The questionnaire was made available to respondents in the national language of all countries surveyed in order to maximize respondent engagement and understanding.

Fieldwork and respondent samples

After a successful soft launch, the actual fieldwork was conducted at the beginning of August 2017. In each country, approximately 600 respondents completed the questionnaire. Respondent samples consisted of two subsamples, similar in size:

- Members of the general consumers aged 18-65, nationally representative in each country with soft quotas on age, gender, region and education;
- Consumers (aged 18-65) who had bought an electronic display (i.e. TV/computer monitor) in the past 12 months.

Table 2.3 shows the sizes of the respondent samples per country. Table 2.4 provides the sample characteristics per country.

Respondents were incentivised as part of their membership of the GfK online panel, where they receive 'points', which can then be converted into shopping vouchers, as reward for taking part in surveys. Through the use of managed panels and incentives, we are able to achieve high levels of response and respondents who engage with the survey.

Table 2.3 Sample sizes per country

Country	Interested buyers television	Interested buyers computer display	Subtotal interested buyers	Subtotal general consumers television	Subtotal general consumers computer display	Subtotal general consumers	Total sample
Germany	210	81	291	165	144	309	600
Italy	205	113	318	147	142	289	607
Netherlands	156	74	230	144	164	308	538
Poland	198	105	303	145	156	301	604
Portugal	193	107	300	153	147	300	600
Romania	217	84	301	151	149	300	601
Sweden	147	68	215	150	166	316	531
Total	**1326**	**632**	**1985**	**1055**	**1068**	**2123**	**4081**

Table 2.4 Sample characteristics per country

	TOTAL	DE	IT	NL	PL	PT	RO	SE
Interested buyers (N)	1958	153	165	140	151	148	151	121
Male	53%	53%	52%	61%	50%	49%	50%	56%
Female	47%	47%	48%	40%	50%	51%	50%	44%
Age: 18-24	8%	10%	5%	10%	13%	9%	8%	4%
Age: 25-34	26%	23%	27%	30%	26%	26%	29%	21%
Age: 35-44	24%	24%	30%	24%	20%	28%	22%	20%
Age: 45-54	22%	23%	23%	17%	17%	22%	23%	32%
Age: 55-65	18%	21%	15%	24%	24%	16%	19%	24%
Education: low[4]	2%	<1%	4%	2%	1%	2%	0%	2%
Education: medium	50%	59%	54%	51%	65%	43%	26%	56%
Education: high	48%	41%	42%	47%	34%	55%	74%	41%
Household financial situation[5]	3.3	3.3	3.0	3.6	3.7	2.9	3.1	3.9
Trust in current energy label (TV)[6]	3.9	3.9	4.0	4.0	3.7	3.6	4.1	3.9
Product category expertise[7]	4.4	4.3	4.7	4.3	4.2	4.3	4.8	3.9
Concern for the environment[8]	5.2	5.1	5.4	4.8	5.0	5.6	5.8	4.5
General consumers (N)	2123	309	289	308	301	300	300	315
Male	49%	49%	49%	50%	48%	48%	49%	48%
Female	51%	51%	51%	50%	52%	52%	51%	52%
Age: 18-24	9%	7%	7%	8%	15%	10%	8%	5%
Age: 25-34	22%	24%	17%	23%	23%	22%	26%	22%
Age: 35-44	22%	21%	26%	19%	21%	29%	20%	20%
Age: 45-54	25%	28%	27%	26%	19%	23%	27%	24%
Age: 55-65	22%	20%	23%	24%	22%	16%	20%	29%

[4] Note: the percentage of respondents in the low education category is low. GfK noticed during the data collection process that there were many dropouts in the questionnaire. It might be that lower educated respondents found it difficult to read all background information regarding the features that could be included on the energy label.

[5] Financial situation ("Would you say that making ends meet every month is…") measured on a 5-point scale from 1 = *very difficult* to 5 = *very easy*.

[6] Trust ("Would you trust the information in this label to be correct" and "Would you trust this label as the official EU energy label?") measured on 5-point scales ranging from 1 = *definitely not* to 5 = *definitely*.

[7] Product category expertise ("I know a great deal about televisions and/or computer displays" and "I know more about televisions and/or computer displays than most other people") measured on 7-point scales from 1 = *strongly disagree* to 7 = *strongly agree*.

[8] Environmental concern ("In my daily activities, I am conscious about saving energy" and "I am worried about the environment") measured on 7-point scales from 1 = *strongly disagree* to 7 = *strongly agree*.

	TOTAL	DE	IT	NL	PL	PT	RO	SE
Education: low	3%	1%	8%	2%	4%	< 1%	< 1%	4%
Education: medium	56%	68%	62%	53%	70%	43%	30%	63%
Education: high	42%	31%	30%	45%	26%	57%	70%	33%
Household financial situation	3.1	3.1	2.6	3.5	3.5	2.9	3.6	3.1
Trust in current energy label (TV)	3.8	3.7	3.9	4.1	3.7	3.6	4.0	3.9
Product category expertise	3.8	3.4	4.1	3.6	3.7	3.9	4.4	3.4
Concern for the environment	5.0	4.9	5.4	4.7	4.7	5.5	5.6	4.6

3. Results and recommendations

This chapter provides the results of the study as well as policy recommendations for the design of the new label for electronic displays.

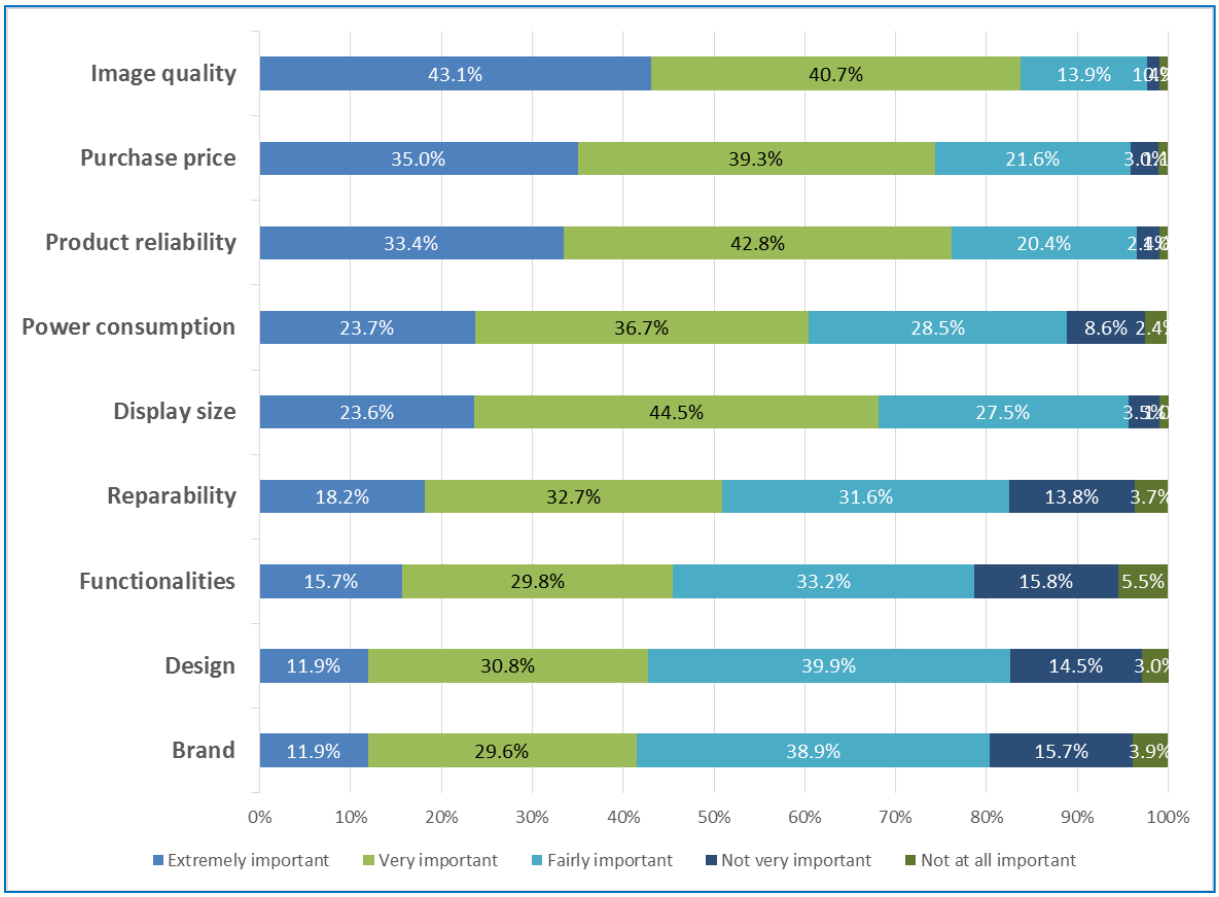
3.1. Results

3.1.1. Perceived (relative) importance of energy efficiency

First, it was investigated which features consumers find most important when buying a TV or computer display. Interested buyers were asked how important they considered each of the following features in comparing different types and models of displays: brand/manufacturer, purchase price, size of the display, image quality, additional functionalities (e.g. integrated speakers, 3D technology), power consumption/energy efficiency, product reliability/warranty, reparability (i.e. the possibilities of repair if a component breaks), and the product's design/look. General consumers were asked to imagine that they intended to buy an electronic display (either a television or a computer monitor) and to indicate which of these features they would consider most important when comparing display models. Figure 3.1 shows which features respondents find most important when buying a TV or computer.

Consumers consider image quality, purchase price, and product reliability/warranty the three most important features when buying a TV or computer display. Respectively 43.1%, 35.0% and 33.4% of the respondents consider these aspects extremely important (see Figure 3.1). About a quarter of the respondents find power consumption and energy efficiency extremely important when comparing different display models (23.7%), and about a third considers it very important (36.7%). Power consumption/energy efficiency and reparability (i.e. the possibilities to repair if a component breaks) are considered more important when buying a TV or computer than additional functionalities (e.g. smart TV functions, 3D technology), design and brand. For durability and reparability aspects, the universal external standardised power supply pictogram is a first example of an indicator of easy/cheap reparability. Whether consumers find it important to find this information on the energy label is tested in paragraph 3.1.2.

Figure 3.1. Features that consumers find most important when buying a TV or computer display (N = 4081)



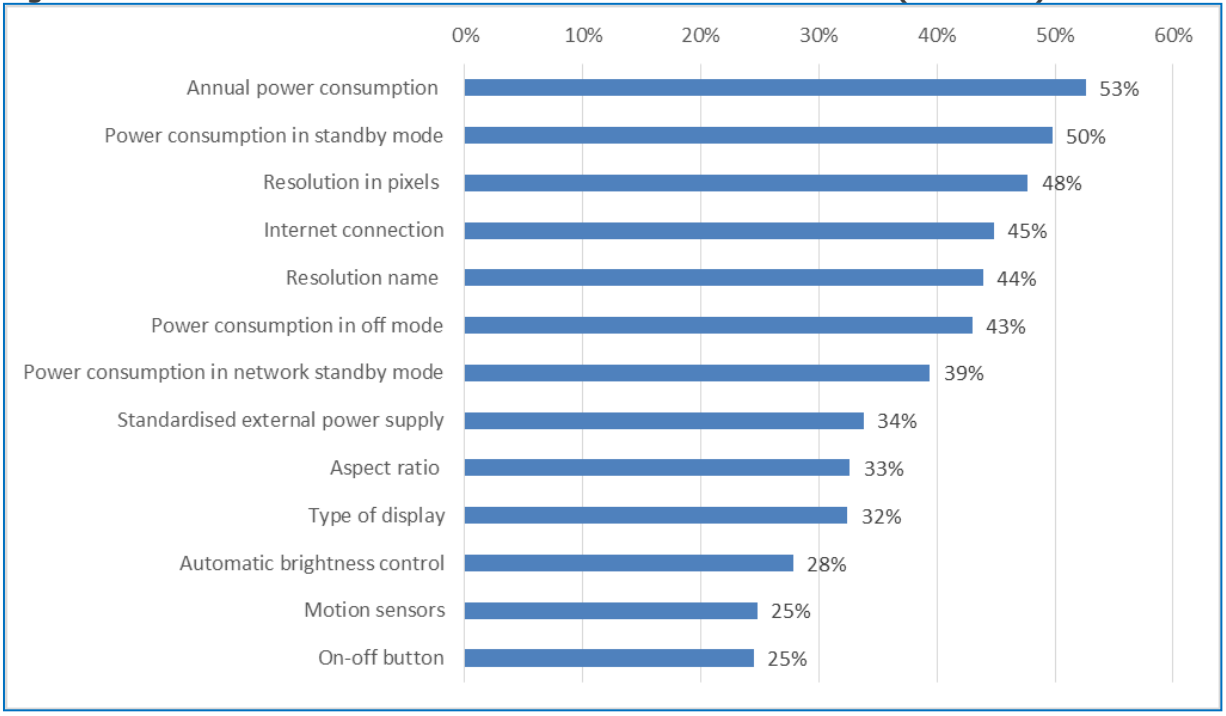
For both the interested buyers and the general consumers and for both TVs and computer displays the image quality, product reliability and purchase price were always the three most important features (see appendix C).

3.1.2. A new label for electronic displays: consumer preferences

Before the new (proposed) energy label was shown, respondents were asked what information they would put on the energy label if it was up to them to design it. It was explained that some information was mandatory, namely the energy efficiency class on the A-G scale, the power consumption when the display is turned on and the diagonal size, but that the label also provided room for other information that they considered important. They could indicate a maximum of 6 additional features that they would like to see on the new energy label. Each feature was explained to the respondent. This background information was well understood (M = 4.0[9] on a 5-point scale), though interested buyers understood the information slightly better (M = 4.0) than general consumers (M = 3.9).[10] Figure 3.2 shows for each feature, the percentage of respondents who would like to see that specific feature on the new energy label.

[9] Abbreviation for mean score, used throughout the report.
[10] p = .019

Figure 3.2 Features that consumers would like to see on the label (N = 4081)



Annual power consumption

Overall, the annual power consumption (indicated in kWh/annum) is the piece of information that the largest group of respondents selected to be displayed on the new label (52.6%). The Commission, however, proposed not to include this figure anymore in the new energy label, due to the large variability in usage patterns of electronic displays. This figure relies on assumptions regarding "normal" use, which are difficult to establish (perhaps even more so for computer monitors which are now also included) and may even mislead consumers who are not sufficiently aware of the fact that the actual power consumption depends on actual use. Nonetheless, the survey results suggest that consumers have a relatively strong need for concrete information regarding power consumption that they use to compare display types and models, and the annual use cost may be the information that they look for in reality. Future research could try to find and test alternative ways to provide this information (e.g. by having the figure accompanied by an indication of the assumptions) in a simple manner, to not overcrowd the label.

Power consumption in different modes

The power consumption in Watts in on-mode is included in the proposed new label. Power consumption in standby mode, off mode and network standby mode were not included, as after the Ecodesign Regulation (642/2009) came in force the energy consumption in off mode and standby mode was significantly reduced and is now low or close to zero. Still, relatively many consumers would like to find on the label information on the power consumption when the display is in standby mode (49.8%), off mode (43.0%) and network standby mode (39.4%), even though they were informed that actual energy used in these modes is relatively low or close to zero. It could be that respondents selected these power consumption features because they consider it the purpose of the energy label to provide energy information in a comprehensive manner. In other words, they might have simply selected the features that were most closely related to energy consumption, irrespective of their relevance in product comparisons, to obtain the most "complete" overview. It could also be that it surprised respondents that some displays use energy even when they are turned off,

which – despite the fact that the amount is actually negligible – might have increased their interest in this type of information. It could also be that even though consumers were informed about the low energy use in off and standby mode, they had their current – older television, with higher power consumption in these modes - in mind when asked what information they want to put on the label. Finally, the fact that power consumption information was provided in an overview directly showing its impact on electricity costs might have increased its perceived relevance.

Resolution
The third important aspect for consumers to have on the energy label is the resolution in pixels (47.7%). Also, the resolution name is considered relatively important by consumers (43.9%). This is not surprising as image quality was the most important criterion in purchasing electronic displays. Resolution is included in the middle part of the proposed new energy label.

Internet connection and type of display
Also, relatively many consumers would like to find on the label whether the display has an Internet connection (44.8%), which helps to identify smart TVs but is not applicable to simple computer monitors. This aspect was not included in the new proposed energy label. Icons representing Internet connectivity, such as the familiar hemisphere icon, already exist.[11] It is relevant to about a third of the respondents to know the type of display via the energy label (32.4%). Both aspects were not included in the new proposed energy label.

Standardised external power supply
For the new energy label it was proposed to include an icon to indicate that the display has a standardised external power supply. 33.8% would like to see on the label whether the display has a universal external standardised power supply. This feature is however considered less relevant than information on power consumption, resolution and whether the display has an Internet connection.

Aspect ratio
The current energy label does not display the aspect ratio. Consumers consider it less relevant than many other features to have the aspect ratio on the new energy label (32.6%).

Automatic brightness control and motion sensors
For the new energy label it was proposed to include an icon for automatic brightness control and an icon for motion sensors. Relatively few consumers indicated that they would like to see information on these features on the new label (27.8% and 24.8%, respectively).

On-off switch
On the current energy label for TVs, the presence of a visible (frontal) on-off switch is indicated with a pictogram. On the new proposed energy label the on-off button will not be indicated as the difference in power consumption between off and standby mode is considered negligible in terms of electricity costs. The survey results confirm that information on the presence of an on-off button is the information considered least relevant to consumers to have on the energy label (24.5%).

Interested buyers and general consumers
Table 3.1 shows the total percentage of respondents, the percentage of interested buyers, and the percentage of the general consumers who would like to see certain

[11] Future research could test consumer understanding of these (and alternative) icons.

information on the label. The percentages in bold indicate where interested buyers or general consumers deviate from the total sample. Interested buyers consider the resolution name slightly more important than whether or not the display has Internet connection. Also, they consider the aspect ratio slightly more important than whether or not the display has a universal external standardised power supply. General consumers consider the power consumption when the display is turned off slightly more important than the resolution name, and consider it more important to know whether the display is a television or computer monitor than to know the aspect ratio.

Table 3.1 Features that interested buyers and general consumers would like to see on the label

	Interested buyers (N= 1958)	General consumers (N= 2123)	Total (N = 4081)
Annual power consumption *(in kWh/annum)*	52.2%	52.8%	52.6%
Power consumption in standby mode *(in Watts)*	49.7%	49.8%	49.8%
Resolution in pixels (*e.g. 3840x2160px, 2560x1440px, 1920x1080px)*	47.4%	47.9%	47.7%
Internet connection *(yes/no)*	**44.9%**	44.7%	44.8%
Resolution name *(e.g. FHD, UHD-4K, WQHD)*	**45.9%**	**42.1%**	43.9%
Power consumption when turned off *(in Watts)*	43.7%	**42.4%**	43.0%
Power consumption in network standby mode *(in Watts)*	41.0%	38.0%	39.4%
Universal external power supply *(yes/no)*	**33.4%**	34.2%	33.8%
Aspect ratio *(e.g. 16:9, 21:9)*	**34.1%**	**31.2%**	32.6%
Type of display: television or computer monitor	32.4%	**32.5%**	32.4%
Automatic brightness control *(yes/no)*	28.3%	27.4%	27.8%
Motion sensors *(yes/no)*	**25.2%**	24.5%	24.8%
On-off button *(yes/no)*[12]	**25.5%**	23.5%	24.5%

Consumers with high versus low energy concern

We also investigated whether consumers for whom energy efficiency is a key choice criterion, prefer any different elements to be indicated on the label. Two consumer segments were defined based on the relative importance of energy efficiency compared to other features (image quality, price, functionalities, design, etc.). Table 3.2 shows for a low energy concern segment and high energy concern segment the percentage of respondents that would like to see certain information on the label. Consumers with high energy concern seem to focus slightly more on power consumption features than consumers with low energy concern (such as power consumption in standby mode). Consumers with low energy concern seem to focus more on technical features (such as resolution).

[12] For TVs: 25.2% of the total sample would like to see this on the label. This percentage is 25.6% for interested buyers and 24.8% for general consumers. For computer monitors: 23.4% of the total sample would like to see this on the label. This percentage is 25.5% for interested buyers and 22.2% for general consumers.

Table 3.2 Features that consumers would like to see on the label for two consumer segments: high and low energy efficiency concern

Relative importance of energy efficiency	Low concern (N= 1583)	High concern (N= 2498)	Total (N = 4081)
Annual power consumption *(in kWh/annum)*	52.2%	52.8%	52.6%
Power consumption in standby mode *(in Watts)*	47.1%	**51.4%**	49.8%
Resolution in pixels (*e.g. 3840x2160px, 2560x1440px, 1920x1080px)*	**52.7%**	44.5%	47.7%
Internet connection *(yes/no)*	**49.2%**	42.0%	44.8%
Resolution name *(e.g. FHD, UHD-4K, WQHD)*	**48.8%**	40.8%	43.9%
Power consumption when turned off *(in Watts)*	40.9%	**44.4%**	43.0%
Power consumption in network standby mode *(in Watts)*	35.5%	**41.9%**	39.4%
Universal external power supply *(yes/no)*	34.0%	33.7%	33.8%
Aspect ratio *(e.g. 16:9, 21:9)*	35.7%	30.6%	32.6%
Type of display: television or computer monitor	33.2%	31.9%	32.4%
Automatic brightness control *(yes/no)*	30.6%	26.1%	27.8%
Motion sensors *(yes/no)*	25.1%	24.7%	24.8%
On-off button *(yes/no)*	23.7%	25.0%	24.5%

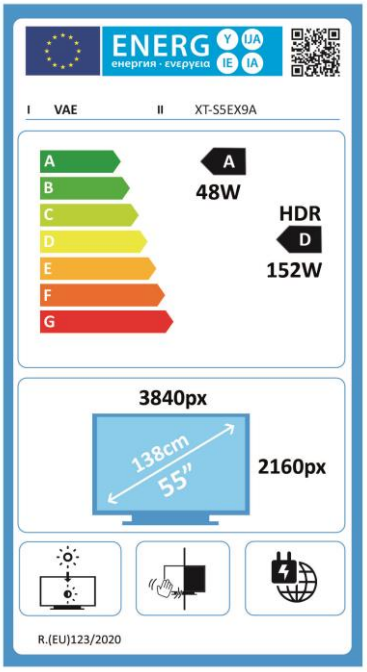
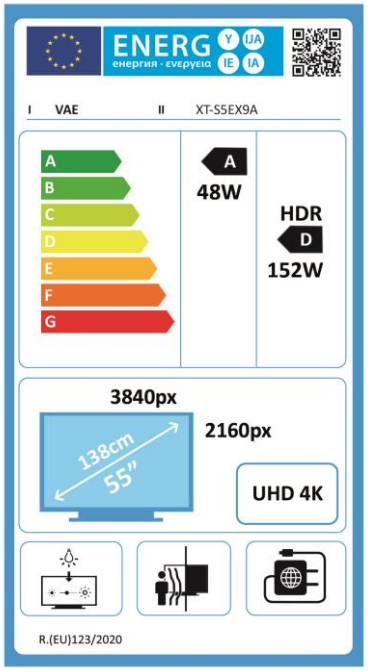
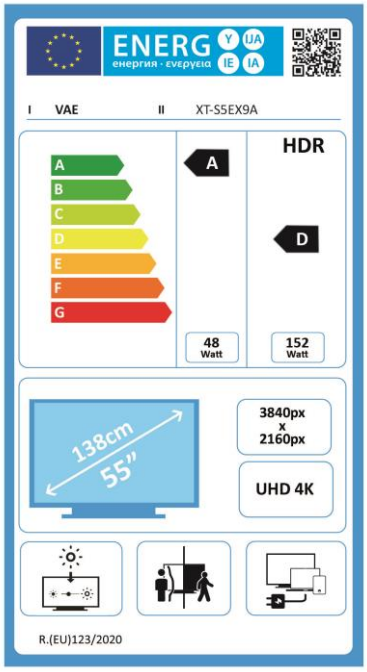
3.1.3. Consumer understanding of the draft label

In the second part of the survey, consumer understanding of the draft label was tested.

Energy efficiency and energy consumption

Comprehension of energy efficiency and energy consumption was measured with four items. Respondents saw one of the three energy label variants as displayed in Table 3.3.

Table 3.3 Full label variants tested

Variant 1	Variant 2	Variant 1
		

Three variants of the energy efficiency class and energy consumption information were tested (top part of the label). The energy efficiency class and power consumption in standard and HDR mode were provided on the new energy label. On average, 57.4% of the respondents were able to derive the energy efficiency class when both the standard mode and HDR mode were displayed, and 52.6% understood the displays' power consumption when both modes were displayed. 10% of respondents falsely interpreted the energy efficiency class in HDR *mode* as reflecting energy efficiency when the display is *capable* of displaying images in HDR (see appendix D), which demonstrates that not all consumers fully understand the meaning of HDR in the first place. The *p*-value shown in the last column of Table 3.4 (and other tables) indicates whether the differences between the icon variants are statistically significant, which means that they are very unlikely to have occurred by chance. A small *p*-value (<.05) indicates that there are significant differences in mean comprehension scores across the different icon variants. Table 3.4 reveals that there were no significant differences in understanding of the information related to the energy efficiency class and power consumption between the three label variants (all *p*-values > .05).

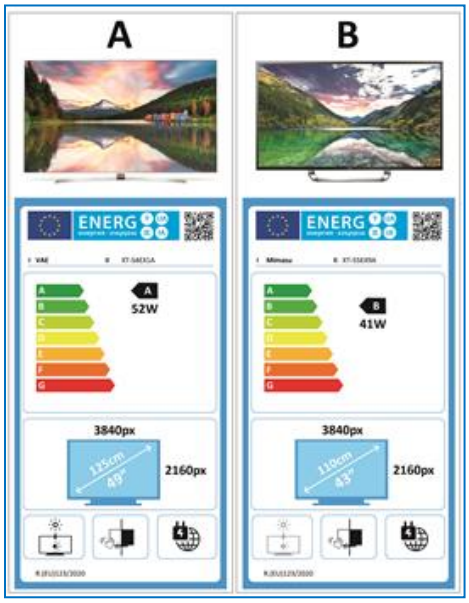
Table 3.4 Comprehension of information (top part)

Comprehension question	% correct Variant 1 (N = 1361)	Variant 2 (N = 1360)	Variant 3 (N = 1360)	*p*
Q10. What do you think the energy efficiency class of a display with this label is?	57.6%[a]	57.0%[a]	57.7%[a]	.82
Q11. When this display is turned on, how much power do you think it uses?	52.8%[a]	52.7%[a]	52.5%[a]	.99

Comprehension question	% correct			
	Variant 1 (N = 1361)	Variant 2 (N = 1360)	Variant 3 (N = 1360)	*p*
Q13. Which of these two displays do you think consumes less energy?	57.6%[a]	58.4%[a]	57.4%[a]	.76
Average comprehension score	2.4[a]	2.4[a]	2.4[a]	.92

Note – Different row-wise superscripts indicate significant differences at $p < .05$.

Figure 3.3 Energy labels product comparison



Next, to assess whether they understood the difference between energy consumption and energy efficiency, respondents were exposed to energy labels of two different (non-HDR capable) displays, as shown in Figure 3.3. One display had a larger screen than the other, and fell into a higher efficiency class despite having a higher energy consumption. On average, 57.9% of the respondents were able to correctly identify which display was most energy efficient (see Table 3.4). Also, 57.8% of respondents, on average, were able to identify the display with the lowest power consumption. There were no significant differences in understanding between the different variants.

In sum, there were no differences in understanding of the top part of the label showing the coloured A-G scale across the three variants. Thus, all variants could be used in the new energy label design. In general, however, the results show substantial room for improvement in understanding of energy efficiency and power consumption information, for both standard mode and dual mode labels. The results demonstrate, for example, that about half of the respondents (51.5%) did not understand the difference between energy efficiency and power consumption information: They inaccurately believed that the same display was more energy efficient *and* consumed less energy relative to the other, while in fact one was more energy efficient and the other had lower consumption (see Figure 3.3, and Appendix D for more detail).

Diagonal size and resolution

It was investigated whether consumers could correctly interpret the diagonal size and the resolution. Next, it was explained what the correct interpretation of the diagonal size and resolution was, and consumers could indicate to what extent this specific part of the energy label was clear to them. On average 69.8% of respondents were able to derive the meaning of the diagonal size information. There was no significant difference in comprehension of the diagonal size across icon variants (see Table 3.5). After explaining the meaning of the information, more than 87% found this specific part of the label clear. There were no significant differences across icon variants.

On average 76.4% of the respondents were able to derive the meaning of the resolution information. Comprehension (percentage correct) was significantly lower for the first icon variant compared to the third icon variant. After explaining the resolution information to the respondent on average 83% perceived the information to be clear. This did not significantly differ across icon variants (see Table 3.5).

Furthermore, 50.2% of the respondents have a preference for receiving information on the display resolution in pixels, 17.9% prefer to see the resolution's name, 27.7% of the respondents find these information equally useful and only 4.1% of the respondents find this information useless.

Since comprehension of resolution information was lowest for the first icon variant, it might be the case that consumers have better understanding when double information is provided, i.e. resolution in pixels and resolution name. Therefore, it is recommended to either use icon variant 2 or 3, which provide resolution information in pixels as well as the resolution name.

Table 3.5 Comprehension of information (middle part)

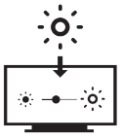
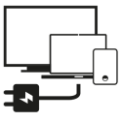
Comprehension question		% correct			
		Variant 1 (N = 1361)	Variant 2 (N = 1360)	Variant 3 (N = 1360)	*p*
Diagonal size	Q14. What do you think the information 55'' and 138 cm indicates?	68.9%[a]	69.9%[a]	70.6%[a]	.63
	Q15. How clear or unclear do you find this specific part of the label?				
	% (very) clear	87.5%[a]	88.3%[a]	88.2%[a]	.94
	% (very) unclear	3.1%[a]	2.7%[a]	2.4%[a]	.46
	Average clarity score	4.4[a]	4.5[a]	4.5[a]	.40
Resolution	Q16. What do you think the information 3840px x 2160px indicates?	73.5%[a]	77.2%[ab]	**78.4%[b]**	.018
	Q17. How clear or unclear do you find this specific part of the label				
	% (very) clear	81.9%[a]	84.3%[a]	82.9%[a]	.79
	% (very) unclear	5.1%[a]	4.6%[a]	4.9%[a]	.82
	Average clarity score	4.3[a]	4.3[a]	4.3[a]	.65

Note – Different row-wise superscripts indicate significant differences at $p < .05$.

Automatic brightness control

It was investigated whether consumers could correctly interpret the icons for automatic brightness control, the motion sensor and standardised EPS. Next, the correct meaning of the icon was explained to the consumer, and consumers could indicate to what extent this specific part of the energy label was clear to them.

Table 3.6 Comprehension of information (bottom part)

	Comprehension question	% correct Variant 1 (N = 1361)	Variant 2 (N = 1360)	Variant 3 (N = 1360)	*p*
Automatic brightness control					
	Q19. What do you think this symbol means?	**54.0%[a]**	52.4%[a]	42.7%[b]	<.001
	Q20. How clear or unclear do you find this symbol?				
	% (very) clear	67.9%[a]	**74.0%[a]**	68.1%[a]	.18
	% (very) unclear	11.5%[a]	9.9%[a]	11.3%[a]	.10
	Average clarity score	3.8[a]	**4.0[b]**	3.9[ab]	.002
Motion sensors					
	Q22. What do you think this symbol means?	52.2%[a]	68.6%[b]	**71.5%[c]**	<.001
	Q23. How clear or unclear do you find this symbol?				
	% (very) clear	61.0%[a]	63.3%[a]	**66.3%[a]**	.51
	% (very) unclear	18.3%[a]	16.5%[a]	13.7%[a]	.17
	Average clarity score	3.7[a]	3.7[a]	**3.8[b]**	.003
Standardised EPS					
	Q25. What do you think this symbol means?	24.5%[a]	30.2%[b]	**41.1%[c]**	<.001
	Q26. How clear or unclear do you find this symbol?				
	% (very) clear	39.2%[a]	49.1%[ab]	**52.6%[b]**	.015
	% (very) unclear	33.7%[a]	29.3%[a]	23.8%[a]	.34
	Average clarity score	3.1[a]	3.3[b]	**3.5[c]**	<.001

Note – Different row-wise superscripts indicate significant differences at $p < .05$.

On average 49.7% of the respondents understood the automatic brightness control icon. Comprehension (percentage correct) was significantly lower for the third icon variant and did not significantly differ between the first and second icon variant (see Table 3.6). After explaining the automatic brightness icon, on average 70% perceived the icon to be clear. The automatic brightness icon variant 2 was perceived significantly clearer than the first icon variant. Together, these results show that the second variant is perceived as most clear to consumers and is therefore recommended.

Motion sensors

On average, 64.1% of the respondents understood the motion sensor icon. Comprehension (percentage correct) differed significantly across all icon variants and was highest for the third variant (see Table 3.6), followed by the second and first variant. After explaining the automatic brightness icon, on average 63.5% perceived the icon to be clear. The third motion sensor icon was perceived significantly clearer than the other variants.

The motion sensor icon with the waving hand is thus least self-explanatory. Comprehension is higher for the third variant and the clarity score is also higher, so the third icon variant might be the most clear to consumers.

Standardised EPS

In general, comprehension (percentage correct) was lowest for the standardised EPS icon. On average, 31.9% of the respondents understood the meaning of the EPS icon. 22.5% of the respondents thought that the second icon indicated that the display can be connected to the Internet (see Table 3.7). Comprehension was significantly lower for the first icon variant (39.2%, *M* = 3.1) compared to the other icon variants, but especially compared to the third icon variant (52.6%, *M* = 3.5).

Table 3.7 Comprehension of EPS

EPS: what do you think this symbol means? (N =4081)	Total	Variant 1	Variant 2	Variant 3
The display can be connected to the Internet	22.5%	20.3%	**38.7%**	8.5%
The display has a battery that can be charged	5.1%	5.4%	3.9%	6.1%
The display has surge and lightning protection	8.1%	15.3%	2.0%	6.9%
The display can mirror the display of a laptop or a tablet	6.0%	1.2%	1.5%	15.3%
The display has a universal external (i.e. separate) power supply	**32.0%**	**24.5%**	30.2%	**41.1%**
The display has a universal power plug that fits sockets all around the world	12.3%	15.4%	12.9%	8.7%
None of the answers is correct	1.1%	1.0%	0.6%	1.6%
I really don't know	13.0%	18.2%	10.3%	12.3%

Note – Consumers had to choose one response option

Although the three proposed icons for standardised EPS are in general less well understood than the icons for motion sensor and automatic brightness control, consumers consider information on the presence of a standardised EPS on the energy label more relevant than information on the presence of automatic brightness control or motion sensors (see Figure 3.2). It could be that the effectiveness of the icons increases after multiple exposures (learning effect), but it may also be the case that the information that the standardised EPS icon needs to communicate is simply too complex to be grasped by a simple icon. Future research could design and test new

icons to try find an icon that (instantly) succeeds at communicating its intended meaning, or to test the effectiveness of the current best performing icon after multiple exposures.

Feature presence/absence indicator

Two variants were tested to indicate the presence/absence of features: a crossed icon, or an empty space, see Figure 3.4.[13] More than 80% of the respondents understood that a crossed icon or empty space indicates that the feature is absent. There are no significant differences in comprehension between crossing the icon and providing an empty space to indicate that the feature is absent (see Table 3.8).

Figure 3.4 Crossed and absent icon variants

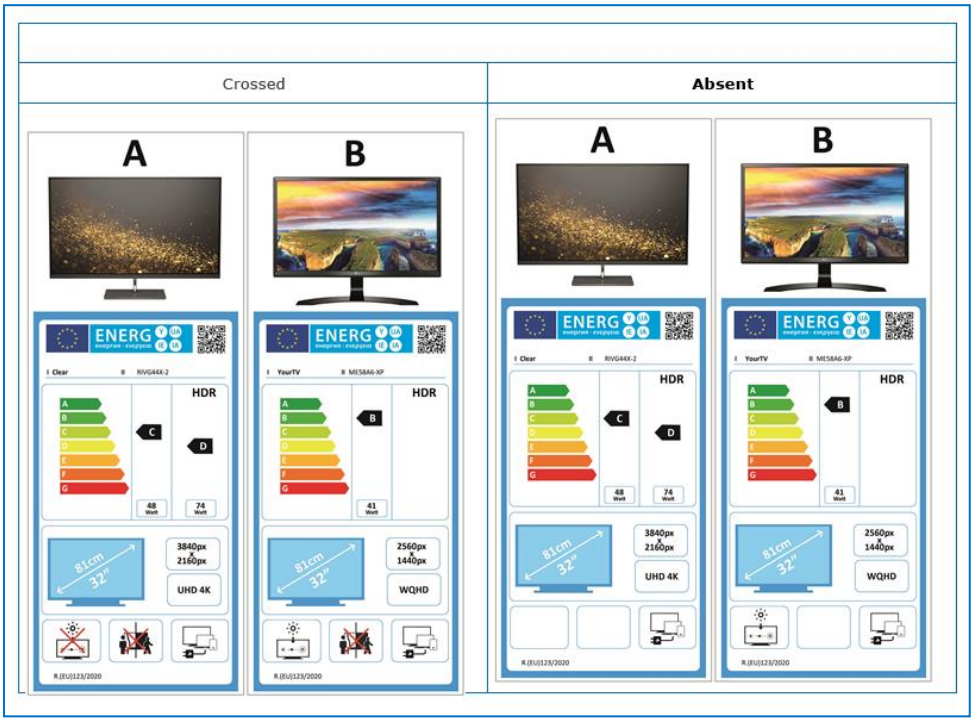


Table 3.8 Comprehension presence/absence indicator

Comprehension presence / absence indicator	% correct Crossed (N = 2041)	% correct Absent (N = 2040)	*p*
Q21. Below are two energy labels belonging to two different displays. Which display do you think has automatic brightness?	82.3%[a]	81.5%[a]	.40
Q24. Below are two energy labels belonging to two different displays. Which display do you think has a motion sensor?	81.3%[a]	81.4%[a]	.86
Q27. Below are two energy labels belonging to two different displays. Which display do you think has a universal external power supply?	84.5%[a]	84.4%[a]	.96

[13] Note that respondents saw multiple product comparison pictures and it was systematically varied which feature was absent or present. Note that in Figure 3.4 the motion sensor for both displays is absent in the absent version.

Comprehension presence / absence indicator	Crossed (N = 2041)	Absent (N = 2040)	*p*
Average comprehension score	2.7 [a]	2.7 [a]	.47

Note – Different row-wise superscripts indicate significant differences at $p < .05$.

3.1.4. Visual attractiveness and trust

The new energy label (see Table 3.3 for the energy labels that were shown) was considered relatively attractive (*M* = 3.7), professional (*M* = 3.9), realistic (*M* = 3.9), and structured (*M* = 4.0) (all items measured on 5-point scales). Moreover, trust in the new energy label was high (with means around 3.9 on 5-point scales) and certainly not lower than the old energy label, see Table 3.9.

Table 3.9 Trust in the label

	Interested buyers (N=1958)		General consumers (N=2123)		Total (N=4081)	
Label:	Old	New	Old	New	Old	New
Q8 & Q32. Would you trust the information in this label to be correct? (1 = definitely not, 5 = definitely)						
% definitely	18.6%	20.5%	14.3%	17.2%	16.3%	18.5%
Average trust score	3.7	3.9	3.7	3.8	3.7	3.9
Q9 & Q33. Would you trust this label as the official EU energy label? (1 = definitely not, 5 = definitely)						
% definitely	20.9%	23.0%	16.2%	20.1%	18.4%	21.5%
Average trust score	3.7	3.9	3.6	3.8	3.7	3.9

3.1.5. Differences in understanding across countries

There were no differences in understanding of the different label parts across countries. It is thus not the case that one icon variant is better understood in one country and another icon variant is better understood in another country. Only for the clarity score of motion sensors there was a significant interaction effect between icon variant and country (i.e. the relative effectiveness of the different variants depended on the specific country). The overall finding that variant 3 was perceived as more clear than the other variants appeared to be driven by the results of the Netherlands and Portugal. In the other countries there were no differences in clarity across the different variants of the motion sensor icon.

3.2. Conclusions and recommendations

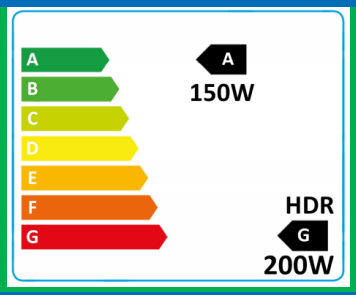
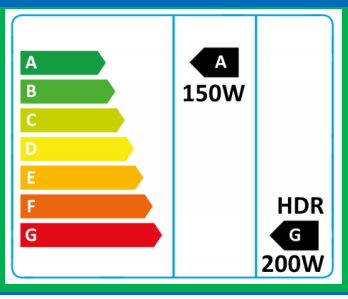
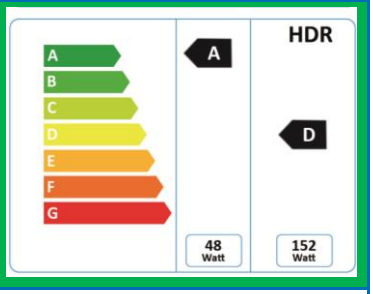
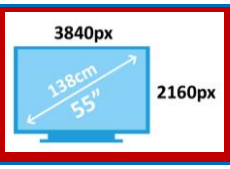
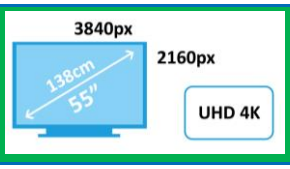
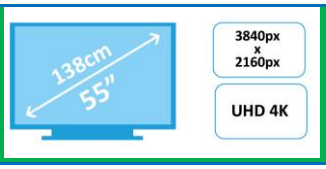
We investigated which features consumers find most important when buying electronic displays and which energy-related information consumers would prefer to see on the new energy label. Consumers report to find image quality, purchase price, and product reliability (warranty) the three most important factors when buying electronic displays.

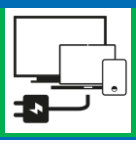
If consumers could design the label, the largest group of consumers (about half of the sample) indicate that they would like to have information on the annual power consumption on the energy label, the power consumption in standby mode and the resolution in pixels (note that the power consumption in Watts in on-mode is

mandatory information). The survey results seem to suggest that an indication of the annual power consumption may be important information to the consumer. Alternative ways to provide this information, and – importantly – to find a 'solution' for the fact that this measure depends on the households' usage pattern which strongly varies across households, may need to be investigated. Resolution is included in the middle part of the label. Regarding the new features, more consumers find it important to have information on the presence of standardised EPS on the label, as compared to information on the presence of automatic brightness control or motion sensors.

We also investigated how well understood and effective the proposed new energy label is. Consumers consider the new energy label visually attractive. Moreover, trust in the new energy label was high and certainly not lower than trust in the old energy label.
For each icon in the draft label, three variants were developed and tested. Table 3.10 summarizes the recommendations for the icon variants. Red colours show that the icon variant is not recommended, green colours indicate that the icon variant is recommended, orange colours indicate that it is a good, but not the best alternative.

Table 3.10 Icon recommendations

	Variant 1	Variant 2	Variant 3
Energy efficiency			
	V	V	V
Display size and resolution			
	X	V	V
Automatic brightness control			
	V	V	X
Motion sensor			
	X	V	V

	Variant 1	Variant 2	Variant 3
Standardised EPS			
	X	X	V

The energy efficiency class and power consumption in standard and HDR mode were displayed on the draft energy label. About 57% of the respondents were able to correctly identify the energy efficiency class in standard and HDR mode and understood the displays' power consumption. There were no significant differences in understanding of the energy efficiency class and power consumption variants. All icon variants could be used in the new energy label design. However, in general, consumer understanding of the energy efficiency class and power consumption information show substantial room for improvement, for both standard mode and dual mode labels.

There is no difference in understanding of the different icon variants for the diagonal size. About 69% of the consumers understood the diagonal size information. About 76% of the consumers understood the resolution information. Comprehension of resolution was lowest for the first icon variant. This makes sense as the resolution name was not displayed in variant 1. Both resolution in pixels and the resolution nick name were shown in variants 2 and 3, and relatively many consumers indicated to find both types of information useful (see Table 3.1). Therefore, we recommend using icon variant 2 or 3 which provide both the resolution in pixels and the resolution name.

The second automatic brightness variant is best understood. The first icon variant is a good alternative. Comprehension is higher for the first and second variant compared to the third variant. Moreover, the clarity score is higher for the second and third variant. Together, these results show that the second variant might be the most clear to consumers and is therefore recommended.

The motion sensor with the waving hand (variant 1) is least self-explanatory. Icon variant 2 and 3 for the motion sensor are best understood. Comprehension is higher for the third variant and the clarity score is also higher, so the third option might be the most clear to consumers and is therefore recommended.

The icon for standardised EPS is in general less well understood than the icons for motion sensor and automatic brightness control. Consumers find it relatively difficult to derive the meaning from the symbol itself. However, after consumers received an explanation of the symbol understanding increased. Icon variant 3 is significantly better understood and most clear to consumers. It could be that the information that the standardised EPS icon needs to communicate is too complex to be grasped by a single, simple icon. Future research could design and test new alternatives that better communicate the intended meaning, and/or test whether comprehension further improves after learning (e.g. after multiple exposures).

There are no significant differences in comprehension between crossing an icon and providing an empty space to indicate that the feature is absent. Both indicators could be used for showing absence of a specific feature.

3.3. Energy label design

Based on the findings of the study, the draft label for electronic displays was further refined. Two variants were designed, one variant including all icons and one variant including only the icon for EPS as information on the presence of motion sensors and automatic brightness control was considered less relevant by consumers.

Moreover, the following improvements were implemented:

- The upper part of the energy label, which contained the key information, was made more visually prominent.
- The middle part was made less prominent and space was used more efficiently, decreasing the size of the display icon and increasing font size. Also the colour scheme of the middle part was adjusted to increase the visual contrast between text and background.

Figure 3.5 shows the first proposed variant, the second proposed variant is displayed in Figure 3.6. Figures 3.7 and 3.8 show the same labels without standardised EPS.

Figure 3.5 Final proposed energy label variant 1

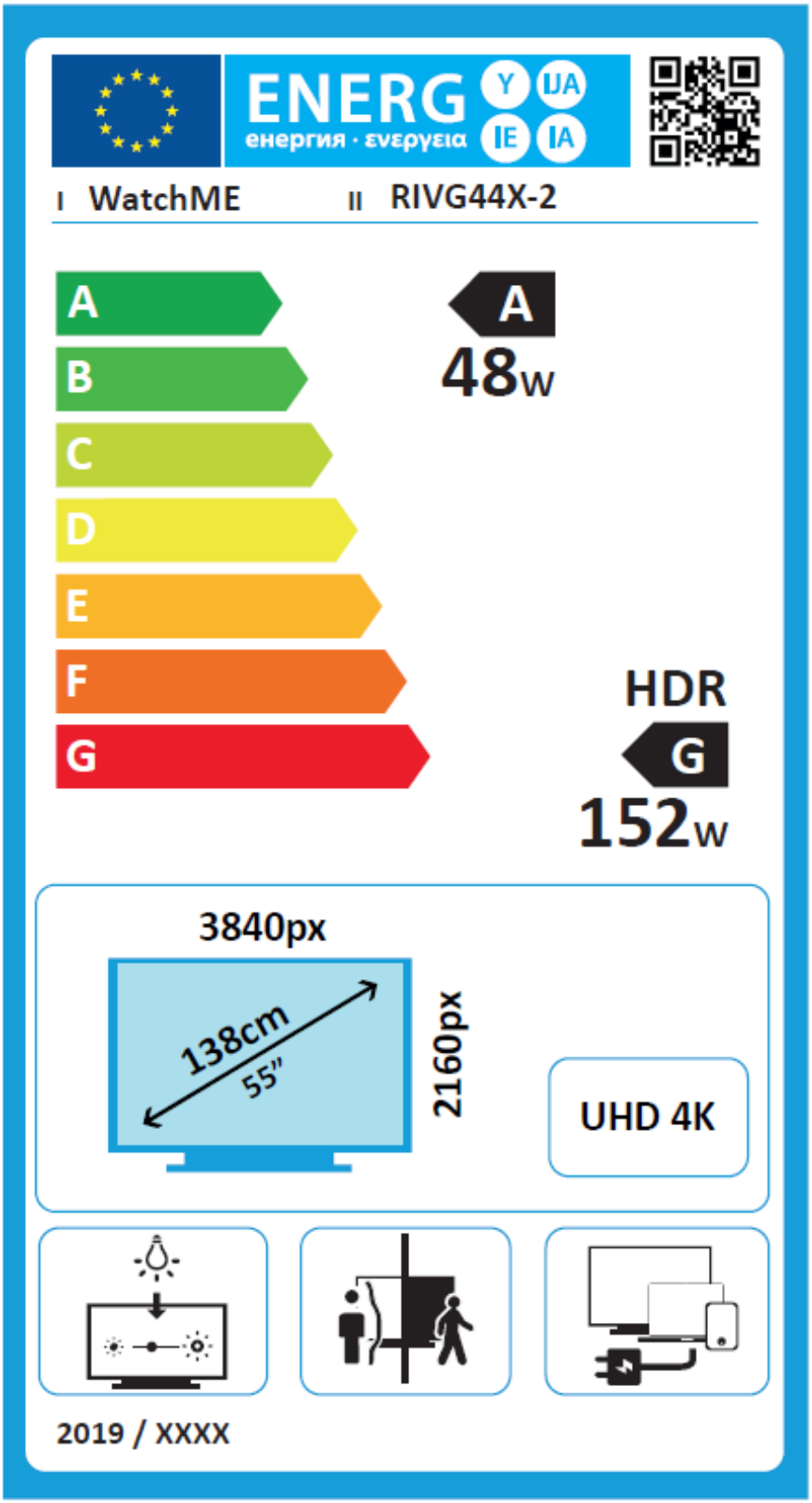


Figure 3.6 Final proposed energy label variant 2

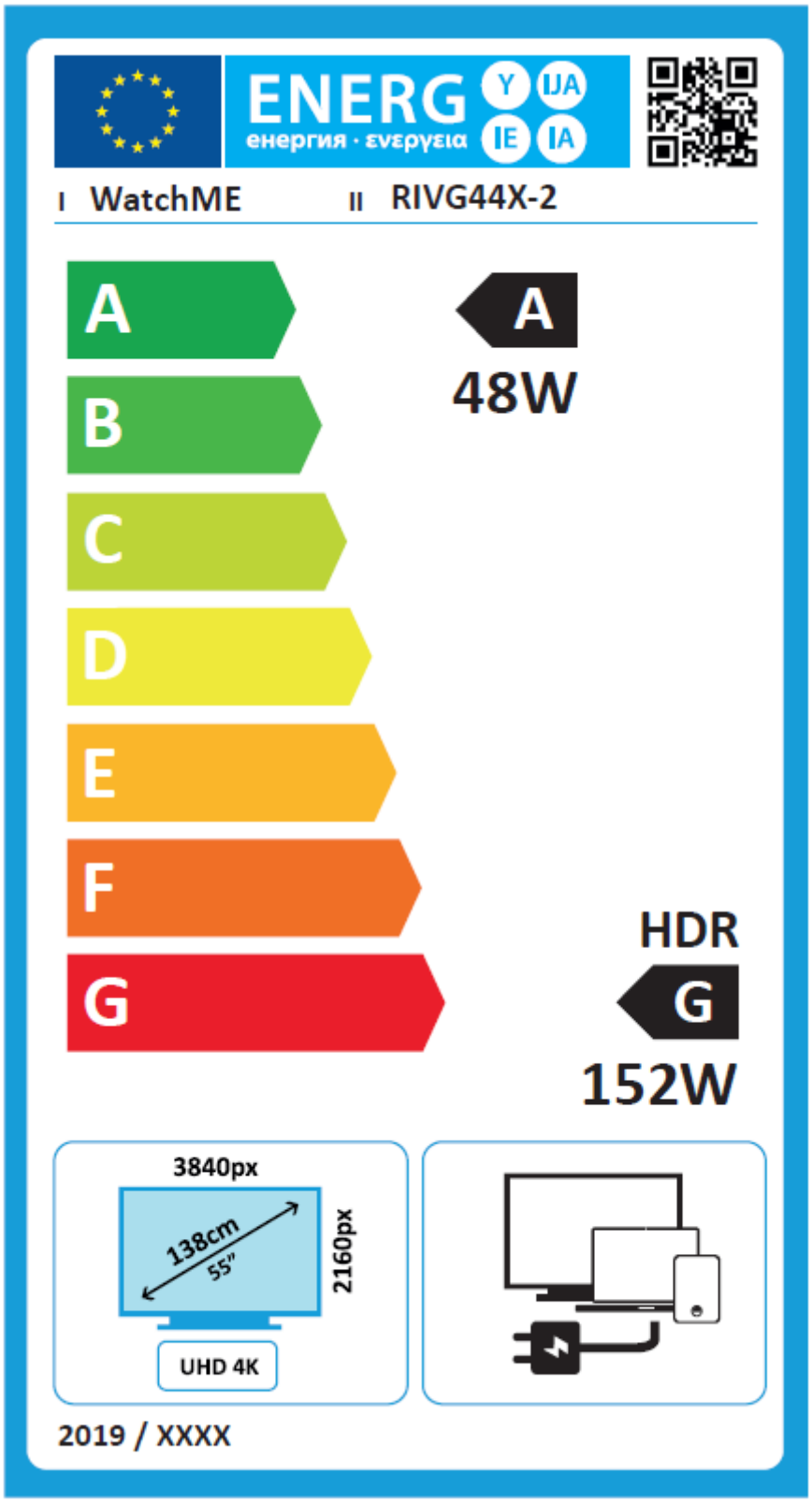


Figure 3.7 Final proposed energy label variant 1, without standardised EPS

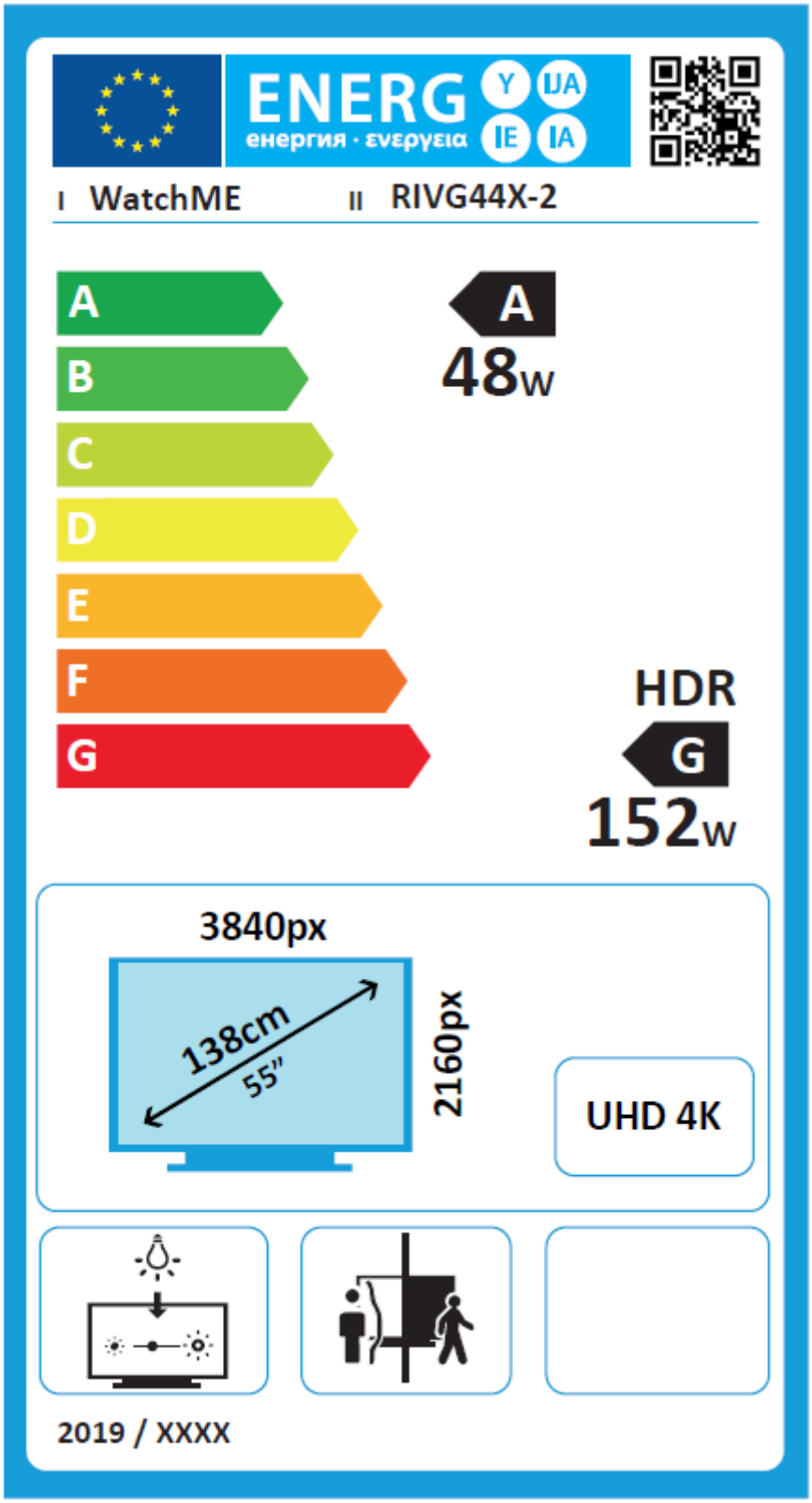
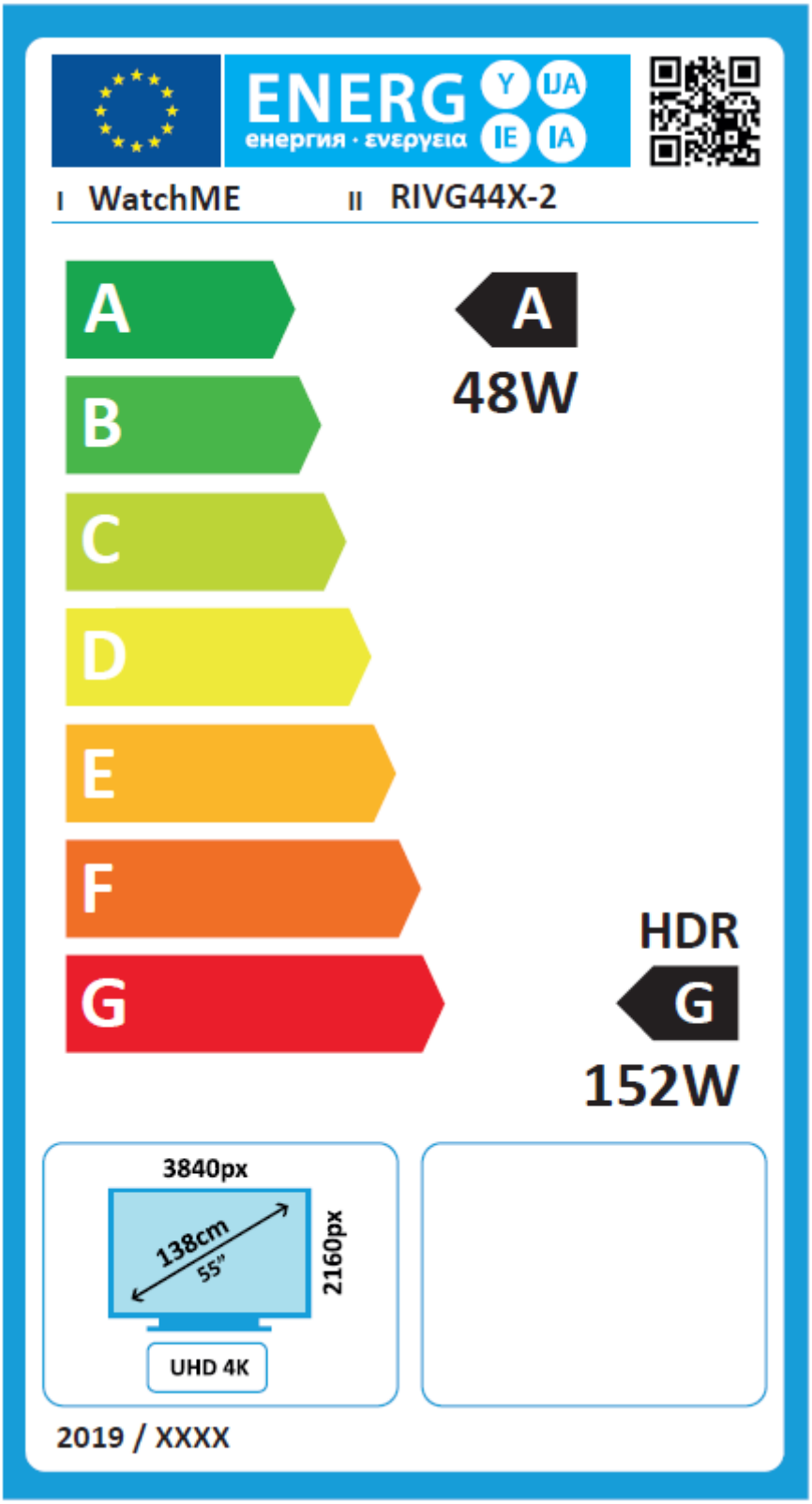
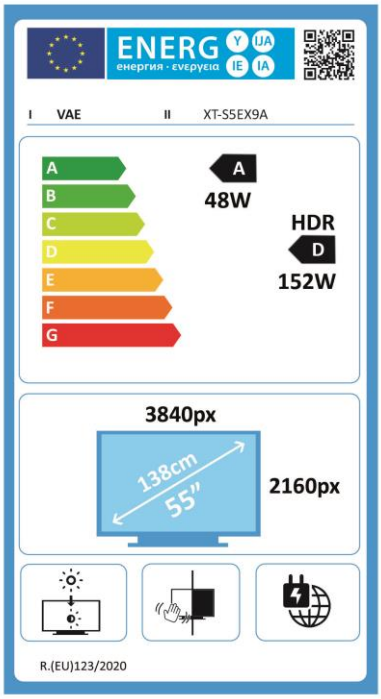
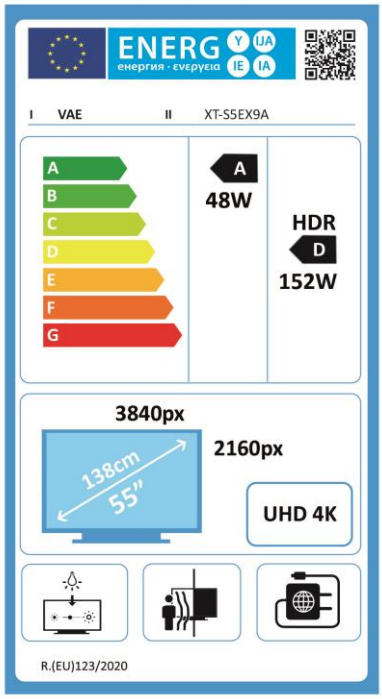
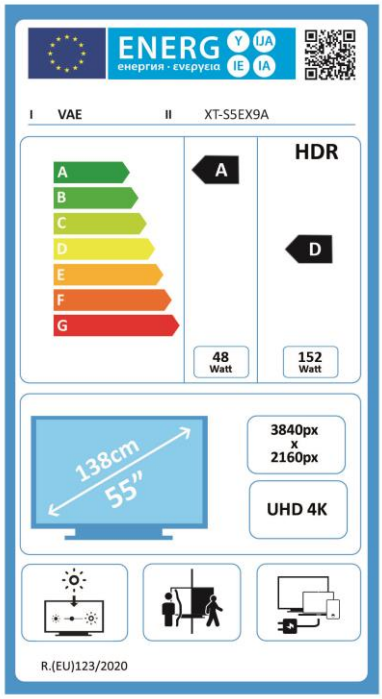


Figure 3.8 Final proposed energy label variant 2, without standardised EPS

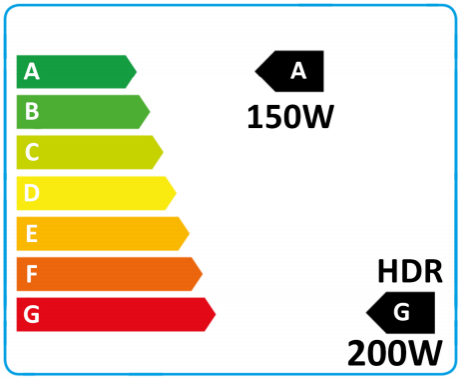
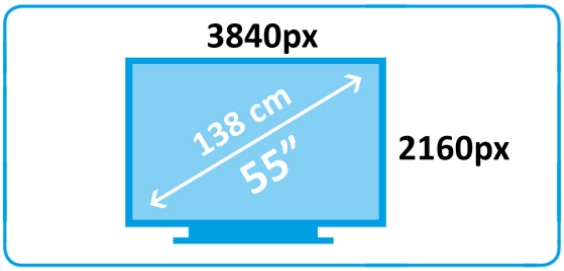
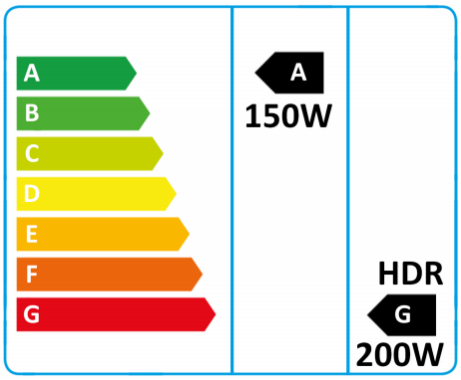
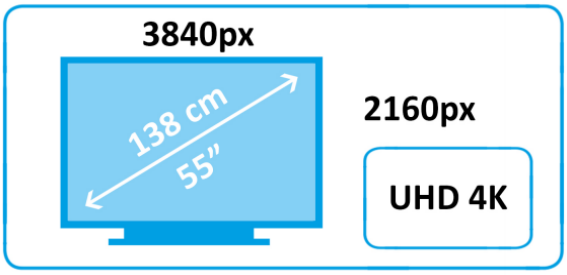
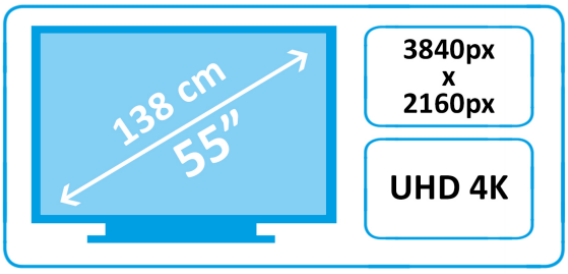


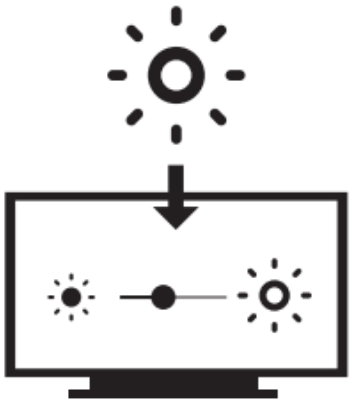
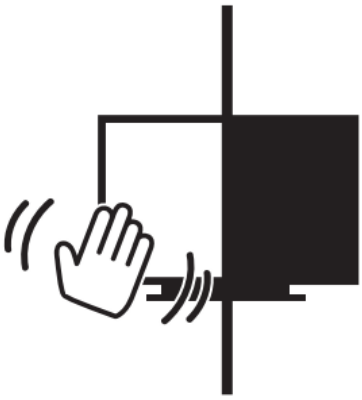
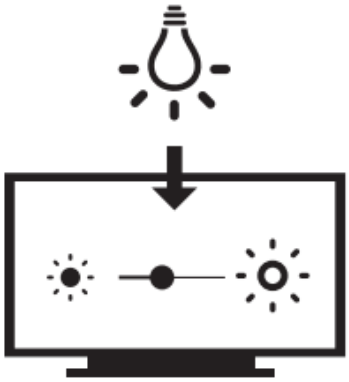
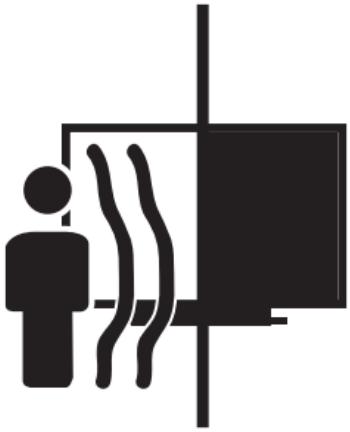
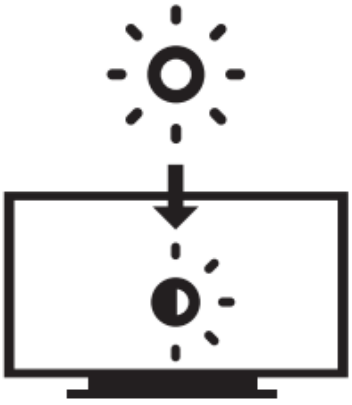
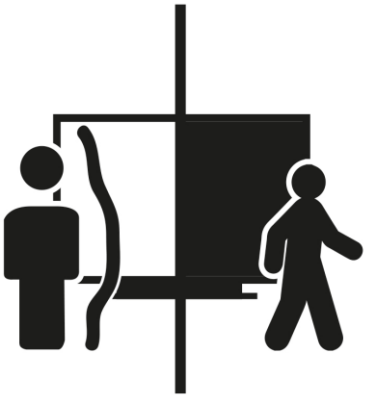
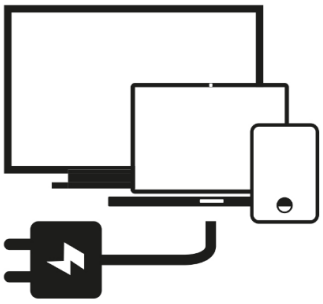
Appendix A: Icons and labels tested

A.1. Full labels

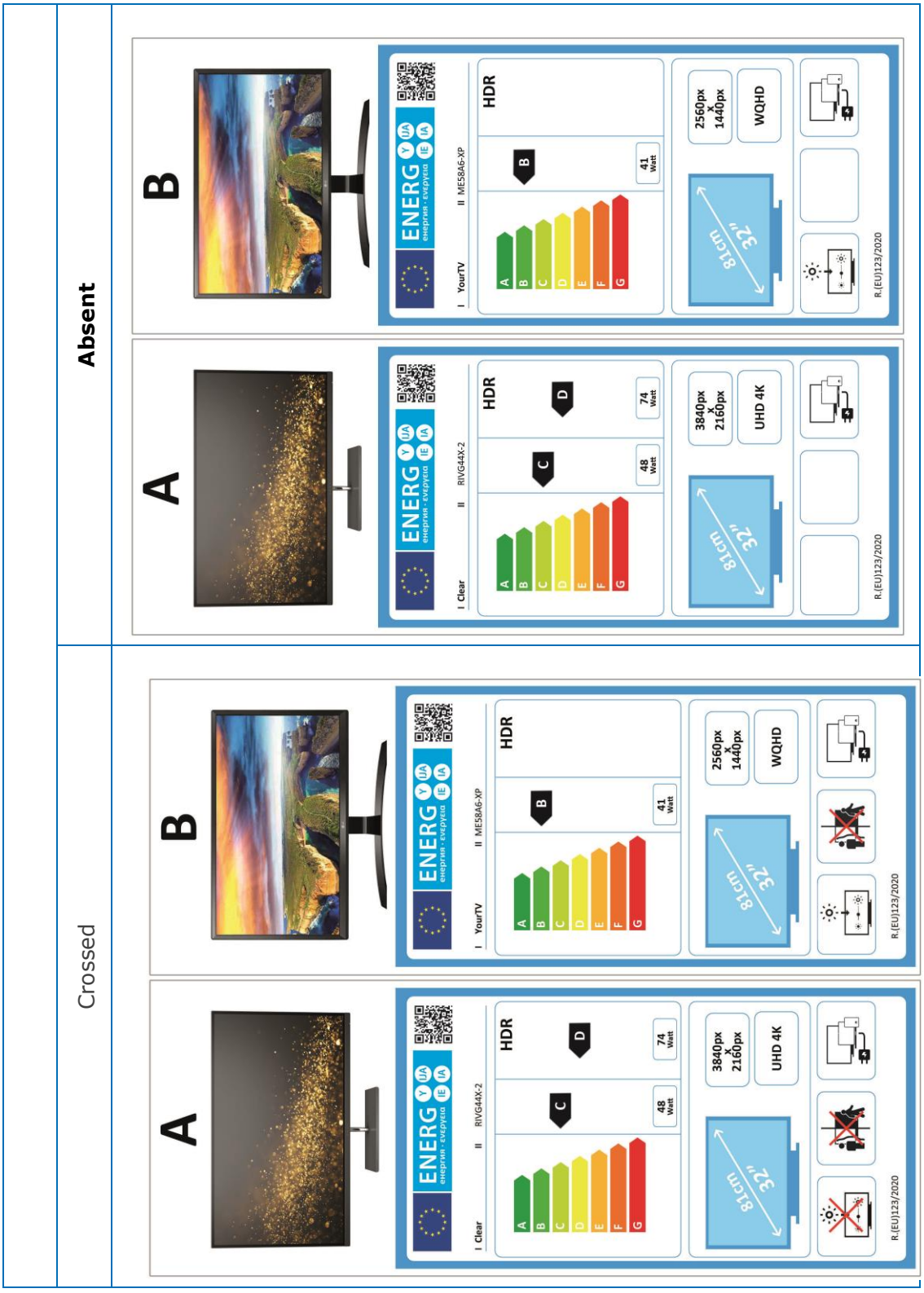
Variant 1	Variant 2	Variant 1
		

A.2. Label elements

Energy efficiency	Diagonal size and resolution
Variant 1	Variant 1
	
Variant 2	Variant 2
	
Variant 3	Variant 3
	

Automatic brightness control	Motion sensors	Standardised external power supply
Variant 1	Variant 1	Variant 1
		
Variant 2	Variant 2	Variant 2
		
Variant 3	Variant 3	Variant 3
		

A.3. Labels in product comparison task (example)



Appendix B: Questionnaire

Survey length: 15 minutes
Methodology: CAWI

Value of X1	Subsample	Number of respondents per country
1	General consumers	300
2	Interested buyers	300

Interested buyers are selected based on screening questions. Interested buyers are consumers who have bought an electronic display (television/computer monitor) in the past 12 months or who have the intention to buy one and are actively looking for information.

Value of X2	Product type	Number of respondents per country
1	Televisions	300
2	Computer displays	300

Value of X3	Label configuration	Number of respondents per country
1	Variant 1	200
2	Variant 2	200
3	Variant 3	200

Value of X4	Feature absence indicator	Number of respondents per country
1	Crossed	300
2	Absent	300

SCREENING QUESTIONS
Screen 1
SEL1. Have you purchased a television in the past 12 months?
1 Yes
2 No

SEL2. Have you purchased a computer display (computer monitor) in the past 12 months? *This means a separate display (not a laptop or tablet).*
1 Yes
2 No

Screen 2
SEL3. Are you currently planning to purchase a new television?
1 Yes
2 Maybe
3 No

SEL4. Are you currently planning to purchase a new computer display?
1 Yes
2 Maybe
3 No

Screen 3
SEL5. Have you looked up information about televisions in the past month?
1 Yes, extensively
2 Yes, a little
3 No, none

SEL6. Have you looked up information about computer displays in the past month?
1 Yes, extensively
2 Yes, a little
3 No, none

Assignment to groups of X1 (subsample) and X2 (product type) based on displaying questions.

If SEL1 = 1, then X1 = 2 (interested buyers) and X2 = 1 (television).
If SEL2 = 1, then X1 = 2 (interested buyers) and X2 = 2 (computer display).
If SEL1 = 1 & SEL2 = 1, then X2 = random (television or computer display).

If (SEL3 = 1 & SEL5 = 1), then X1 = 2 (interested buyers) and X2 = 1 (television).
If (SEL4 = 1 & SEL6 = 1), then X1 = 2 (interested buyers) and X2 = 2 (computer display).
If (SEL3 = 1 & SEL5 = 1) & (SEL4 = 1 & SEL6 = 1), then X2 = random (television or computer display).

Else, X1 =1 (general consumers) and X2 = random (television or computer display).

Screen 4 [Introduction]
This questionnaire is about the purchase of a display, such as a television or computer display. The questionnaire consists of three parts.

The first part of the questionnaire is about the information you consider important when comparing different displays. In the second part, we show you a possible new information label and ask several questions about it. Finally, the third part contains a number of general questions.

PART A. FEATURE RELEVANCE
Screen 5 [importance of energy consumption/efficiency relative to other features]
If X1 = 1 (general consumers);
Imagine that you currently intend to purchase a [*X2 = 1, then* new television, *X2 = 2, then* new computer display].

Q1_gp. For each of the following features, please indicate how important you would consider that feature when comparing different types and models of [*X2 = 1, then* televisions, *X2 = 2,* then computer displays].

A. brand / manufacturer
B. purchase price
C. size of the display
D. image quality
E. additional functionalities (e.g. [X2 = 1, then smart TV functions, X2 = 2, then integrated speakers], 3D technology)
F. power consumption / energy efficiency
G. product reliability / warranty
H. reparability (i.e. the possibilities of cheap/easy repair)
I. product's design / look

[order of features is randomised]
1 Not at all important
2 Not very important
3 Fairly important
4 Very important
5 Extremely important

If X1 = 2 (interested buyers);
In the past 12 months, you purchased a [*X2 = 1, then* television, *X2 = 2, then* computer display]. Or you currently intend to buy one, and have recently looked up information about televisions.

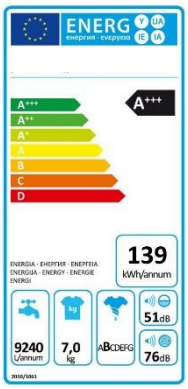
Q1_eb. For each of the following features, indicate how important you considered that feature in comparing different types and models of [*X2 = 1, then* televisions, *X2 = 2, then* computer displays].

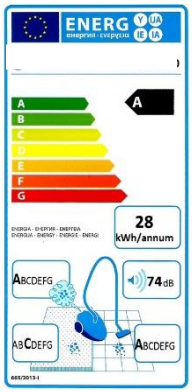
A. brand / manufacturer
B. purchase price
C. size of the display
D. image quality
E. additional functionalities (e.g. [X2 = 1, then smart TV functions, X2 = 2, then integrated speakers], 3D technology)
F. power consumption / energy efficiency
G. product reliability / warranty
H. reparability (i.e. the possibilities of cheap/easy repair)
I. the product's design / look

[order of features is randomised]
1 Not at all important
2 Not very important
3 Fairly important
4 Very important
5 Extremely important

Screen 6
When you purchase a domestic appliance, like a washing machine, dishwasher, refrigerator, vacuum cleaner or television, you have a wide choice and an enormous amount of information to compare. To facilitate a quick and easy comparison of models in terms of energy efficiency and durability, many domestic appliances carry an energy label.

Below are two examples of the energy label, which is compulsory in all EU countries, one for a washing machine (left) and one for a vacuum cleaner (right). You can click on the image for an enlarged version.





Screen 7
This questionnaire is about the energy label for electronic displays, that is, televisions and computer displays. To remain in step with developments and continue to provide information that people find useful, this label will soon be updated. To ensure that the new label does not become obsolete too quickly, label developers must predict which features, which may be relatively unknown now, will be relevant in a few years' time.

One example of a new technology that is expected to break through in the coming years is high dynamic range (HDR). Simply put, HDR makes whites brighter and blacks darker, which makes images appear more "real", thus improving image quality. To be able to view films or documentaries in HDR, the images must be broadcast in HDR format *and* you need to have a display that is HDR capable. Displays use up to twice as much energy when they display images in HDR (as compared to normal) format.

Screen 7
Now, imagine that you are to design this new energy label for televisions and computer displays.

Certain information must be provided on the new label by law. The key element of the label, for example, is the energy efficiency class, shown on a scale from class A (green) to class G (red). It tells you how efficient the display is in its use of electricity compared to other displays with the same screen size. In addition, the label must show how much power the display uses when it is turned on, which can help consumers estimate the impact of the display on their electricity bill. For HDR capable displays, the label must also show the display's energy consumption and efficiency when it is displaying images in HDR. Finally, to allow for quick identification of comparable models, the energy label must indicate the size of the display (diagonal, in inches or centimeters).

In addition to this mandatory information, the label may provide other information to help consumers make swift but informed choices. If it were up to you to design the new label, what additional information would you put on it?

To make an informed choice, on the next four screens, we first explain to you which other information *could* be on the new label. It is important that you carefully read and try to understand the information.

Screen 8

The new label must indicate how much power a display uses when it is turned on. But since displays also use power when they are in standby* or in network standby**, and sometimes even when they are turned off (e.g. because they have a touch-sensitive and illuminated on-switch), the label could also show that information. The table below shows the power consumption in each mode.

* A TV in standby can be switched on using the remote control. A computer monitor in standby can be switched on by turning on a computer that is attached to it.
** A display in network standby maintains a connection with the network. In this mode, a movie can be recorded from the Internet, for example. The power needed in this mode is higher than in normal standby.

Mode	Power consumption	Example	
		Usage	Power consumption / costs per year*
On	20 - 300 Watts depending on the specific model, (e.g. size, display technology, functions)	E.g. 100 Watts - 4 hours per day	About 146 kWh/year or €32
Off	Max. 0,3 Watts	20 hours per day	Max. 2 kWh/year or €0,50
Standby	Max. 0,5 Watts	20 hours per day	Max. 3,5 kWh/year or €0,80

Network standby	Max. 2 Watts	20 hours per day	Max. 15 kWh/year or €3,50

* Estimated based on an average price of €0,22 per kWh (in the Euro area).

Sometimes, the label also provides an estimate of the annual energy consumption, that is, how much energy in kilowatt-hours the appliance will use over a year (kWh/annum). This estimate is based on assumptions about "average usage". When calculating the annual energy consumption of a television, it is assumed, for instance, that the television is on for 4 hours per day and in standby for the remaining 20 hours. Of course, the actual annual power consumption – and hence your electricity bill – depends on how and how long the display is used.

Q2. To what extent do you understand this information?
1 Not at all
2
3
4
5 Completely

Screen 9

Today's newest electronic displays feature new power-saving features, and the new label could inform consumers on the presence of these features. Automatic brightness control, for example, uses a sensor to measure the light in the room and automatically adjust the display's brightness level (which is more comfortable for your eyes). So in a dark environment, the image will be less bright than in sunny daylight, also saving energy. Another example are motion sensors that register whether anybody is present in the room. If nobody is in the room (or you fell asleep in front of your display), the sensor will tell the display to go into standby, thus saving energy.

In addition to the display's diagonal size, the label could also provide other information that may help consumers to identify comparable models, namely the resolution and/or aspect ratio. The resolution is the number of pixels – the tiny dots that make up images – on a display. It is expressed as the number of pixels in horizontal by the number of pixels in vertical (e.g. 1920 x 1080 pixels), but each resolution has a nick name as well (e.g. Full HD). The higher the resolution, the sharper and more detailed the image becomes. Most computer monitors and the cheaper televisions currently have a resolution of 1920 x 1080 pixels (that's Full HD, or FHD). Displays with four times that resolution – 3840 x 2160 pixels, called Ultra High Definition, or UHD-4K – are now common, and manufacturers are already working on the development of UHD-8K. The aspect ratio is the ratio between the width and height of the screen. The standard ratio for televisions is now 16:9. Computer displays typically have aspect ratios of 16:9, 16:10 or 21:9 (very wide screens for gaming or other specific activities).

Q3. To what extent do you understand this information?
1 Not at all
2
3
4
5 Completely

Screen 10

The label could also provide information on the display's power supply.

Power supplies can be external (i.e. separate), like the charger for your laptop, or built-in. Today, almost every type of device that uses an external power supply needs a different one, leading to an awkward collection of chargers and cables with differently shaped connectors. A new, universal standard for external power supplies – USB Type-C (USB-C for short) – may solve this problem. The newest smartphones and some of the newest laptop models already use this new type of charger and cable, but other types of devices, including computer displays and (small and medium-sized) televisions, are expected to use it later. Then, the same charger can be used to power your computer display, computer, or even compact dust buster, portable drill or battery charger. When the power supply is broken, you no longer have to bring your display to a repair shop, you just buy a new universal power supply – from any brand – or use another one that you have at home. And when your display needs replacement, you can keep the still working universal power supply, which reduces waste.

The new energy label could indicate whether or not the display is made to use such a universal external power supply.

Q4. To what extent do you understand this information?
1 Not at all
2
3
4
5 Completely

Screen 11

Finally, the label may contain additional information, such as:

- the type of display: Up to a certain size, flat televisions and computer monitors are similar. The label could indicate whether the display is a television or a computer monitor.
- Whether the display has an on-off button: that is, a button to turn the display on and off, clearly visible on the front.
- whether the television has Internet connection: A television with built-in Internet connectivity is considered a "smart TV". Smart TVs can access a range of online services including video on demand, social networking, instant messaging, or even a web browser (e.g. Internet Explorer), games or other apps.

Q5. To what extent do you understand this information?
1 Not at all
2
3
4
5 Completely

Screen 12 [product category expertise]

Q6. You have just read some information about displays. Which of the following statements most applies to you?

1 I learned nothing new, I already knew everything.
2 I already knew most of the information, but did learn something new.
3 I knew a few things, but most of it was new to me.
4 All the information was new to me.

Screen 13
Below you find an overview of the display features that you just read about. The upper part of the table shows the information that must be provided on the new energy label by law. The remainder of the table shows which other features *could* be displayed on the new label. Please click on the feature if you want to read the information on that feature once more.

Q7. Please indicate which additional information you would put on the new label if it were up to you to design it. To not overcrowd the label, you can choose no more than 6 features. There are no right or wrong answers, just indicate which information you would like to see on the label.

If you would like to see certain information on the label, tick the box in the "On the label" column. If you feel that certain information does not need to be on the label, tick the box in the "Not on the label" column.

If you do not understand at all what the feature means, check the box in the "?" column.

[Blocks and features within a block are randomised]

	On the label	Not on the label	?
The new label must indicate…			
Energy efficiency class on a scale from green (class A) to red (class G)	X		
Power consumption (in Watts) when the display is on	X		
Diagonal size in centimeters and inches	X		
For HDR capable displays: Power consumption and efficiency when displaying images in HDR mode	X		
The new label could indicate…			
BLOCK I:			
Power consumption *(in Watts)* when the display is turned off			
Power consumption *(in Watts)* when the display is in standby mode			
Power consumption *(in Watts)* when the display is in network standby mode			
Annual power consumption *(in kWh/annum)*			
BLOCK II:			
Whether or not the display has automatic brightness control *(yes/no)*			
Whether or not the display has motion sensors *(yes/no)*			
BLOCK III:			
Resolution in pixels (*e.g. 3840x2160px, 2560x1440px, 1920x1080px)*			
Resolution name *(e.g. FHD, UHD-4K, WQHD)*			
Aspect ratio *(e.g. 16:9, 21:9)*			
BLOCK IV:			

Type of display: television or computer monitor			
Whether or not the display has an on-off button *(yes/no)*			
Whether or not the display has Internet connection *(yes/no)*			
Whether or not the display has a universal external power supply *(yes/no)*			

PART B. EVALUATION OF DRAFT ENERGY LABEL
Respondents cannot go back to part A.
In part B, respondents cannot go back to previous questions.

Random assignment of respondents to 1 out of 6 label variants:

		Label configuration (X3)		
		Variant 1	*Variant 2*	*Variant 3*
Feature presence indicator (X4)	*Crossed*	*FULL_V1_P1.jpg*	*FULL_V2_P1.jpg*	*FULL_V3_P1.jpg*
		TWO1_V1_P1.jpg *TWO2_V1_P1.jpg* *TWO3_V1_P1.jpg* *TWO4_V1_P1.jpg*	*TWO1_V2_P1.jpg* *TWO2_V2_P1.jpg* *TWO3_V2_P1.jpg* *TWO4_V2_P1.jpg*	*TWO1_V3_P1.jpg* *TWO2_V3_P1.jpg* *TWO3_V3_P1.jpg* *TWO4_V3_P1.jpg*
		EL1_V1_P1.jpg *EL2_V1_P1.jpg* *EL3_V1_P1.jpg* *EL4_V1_P1.jpg*	*EL1_V2_P1.jpg* *EL2_V2_P1.jpg* *EL3_V2_P1.jpg* *EL4_V2_P1.jpg*	*EL1_V3_P1.jpg* *EL2_V3_P1.jpg* *EL3_V3_P1.jpg* *EL4_V3_P1.jpg*
	Absent	*FULL_V1_P2.jpg*	*FULL_V2_P2.jpg*	*FULL_V3_P2.jpg*
		TWO1_V1_P2.jpg *TWO2_V1_P2.jpg* *TWO3_V1_P2.jpg* *TWO4_V1_P2.jpg*	*TWO1_V2_P2.jpg* *TWO2_V2_P2.jpg* *TWO3_V2_P2.jpg* *TWO4_V2_P2.jpg*	*TWO1_V3_P2.jpg* *TWO2_V3_P2.jpg* *TWO3_V3_P2.jpg* *TWO4_V3_P2.jpg*
		EL1_V1_P2.jpg *EL2_V1_P2.jpg* *EL3_V1_P2.jpg* *EL4_V1_P2.jpg*	*EL1_V2_P2.jpg* *EL2_V2_P2.jpg* *EL3_V2_P2.jpg* *EL4_V2_P2.jpg*	*EL1_V3_P2.jpg* *EL2_V3_P2.jpg* *EL3_V3_P2.jpg* *EL4_V3_P2.jpg*

FULL = full energy label
TWO = two full labels next to each other
EL1 = diagonal size / resolution / size ratio
EL2 = auto brightness control
EL3 = motion sensor
EL4 = external power supply

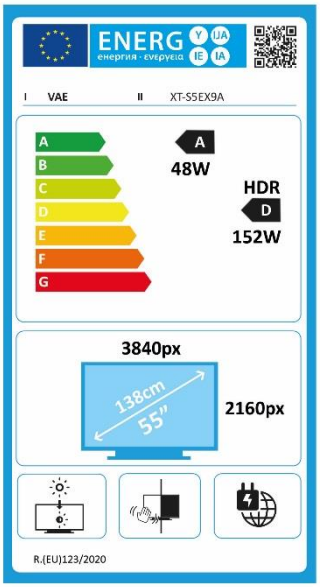
Screen 14
This is the second part of the questionnaire. In this part, you will be shown a possible new energy label for displays.

Please note: in this part of the questionnaire, you cannot go back to the previous question. It is therefore important that you think carefully about each answer before you make it definitive by clicking "Next".

Screen 15
Imagine that you are in a store to buy a television or computer display. You see this energy label on the displays that the store sells.

[show FULL_VX_VX.jpg depending on X3 and X4, see Table above]

Example: FULL_V1_P1.jpg

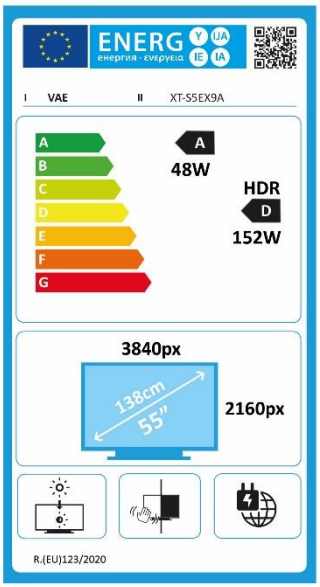


Q8. Would you trust the information on this label to be correct?
1 Definitely
2 I think so
3 I really don't know
4 I don't think so
5 Definitely not

Q9. Would you trust this label as the official EU energy label?
1 Definitely
2 I think so
3 I really don't know
4 I don't think so
5 Definitely not

Screen 16
[show FULL_VX_VX.jpg depending on X3 and X4, see Table above]

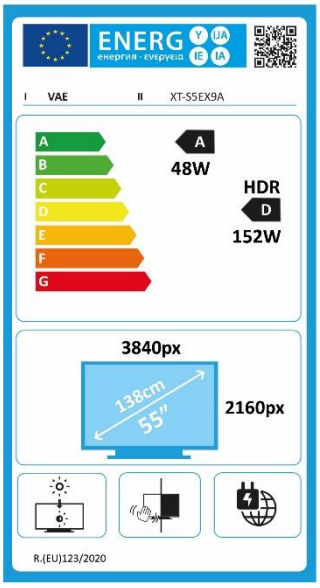
Example: FULL_V1_P1.jpg



Q10. What do you think the energy efficiency class of a display with this label is?
1 A
2 D
3 A, but D when displaying images in HDR format (*correct*)
4 D, but A when displaying images in HDR format
5 A, but D when the display is capable of displaying images in HDR format
6 D, but A when the display is capable of displaying images in HDR format
7 I really don't know

Screen 17
[show FULL_VX_VX.jpg depending on X3 and X4, see Table above]

Example: FULL_V1_P1.jpg



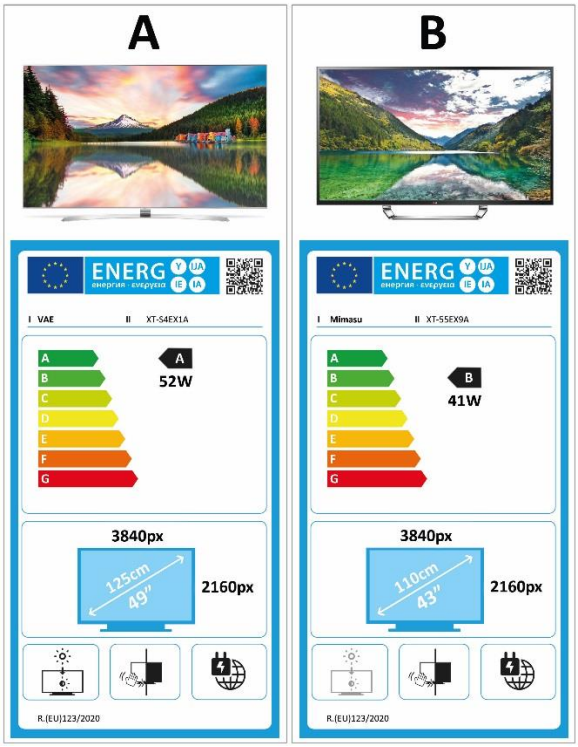
Q11. When this display is turned on, how much power do you think it uses?

1 48 W
2 55 W
3 138 W
4 152 W
5 55 or 138 W, depending on the format in which the images are displayed (normal or HDR)
6 48 or 152 W, depending on the format in which images are displayed (normal or HDR) (*correct*)
7 Impossible to determine with this information
8 I really don't know

Screen 18
Q12. Below are two energy labels belonging to two different displays. Which of these two displays do you think is most energy-efficient (i.e. most efficiently uses power)?

[show TWO1_VX_VX.jpg depending on X3 and X4, see Table above]

Example: TWO1_V1_P1.jpg

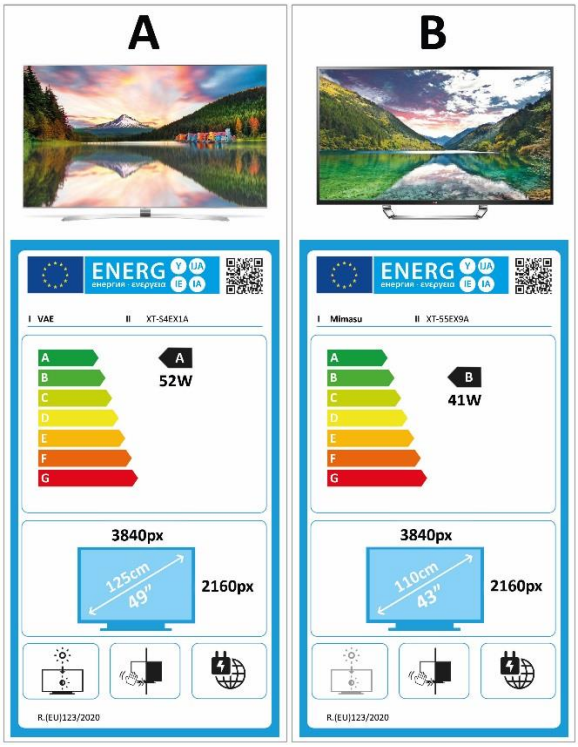


1 Display A (*correct*)
2 Display B
3 Equally efficient
4 I really don't know

Screen 19
Q13. Below are two energy labels belonging to two different displays. Which of these two displays do you think consumes less energy (i.e. has the lowest impact on your electricity bill)?

[show TWO1_VX_VX.jpg depending on X3 and X4, see Table above]

Example: TWO1_V1_P1.jpg



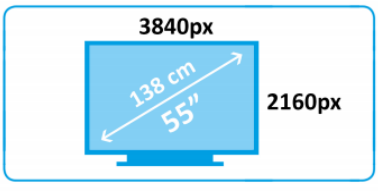
1 Display A
2 Display B (*correct*)
3 They consume an equal amount of energy
4 I really don't know

Screen 20
On the following screens, you will be shown the symbols on the energy label one by one. We are interested to know what you think these symbols mean. Each time, you will be given a choice between several answers. It is possible for the correct answer not to be among them. In such cases, you can indicate that you think that none of the answers are correct.

Screen 21 [Diagonal size]

[show EL1_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL1_V1_P1.jpg



Q14. What do you think the information 55'' and 138 cm indicates?

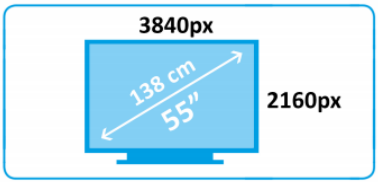
1 The width of the display
2 Refresh rate and brightness
3 The display diagonal (*correct*)

4 The degree to which the image can be enlarged or shrunk (zooming in or out)
5 The display's resolution
6 The display surface
7 Minimum and maximum color intensity
8 The aspect ratio
9 None of the answers is correct
10 I really don't know

Screen 22 [Diagonal size]

[show EL1_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL1_V1_P1.jpg

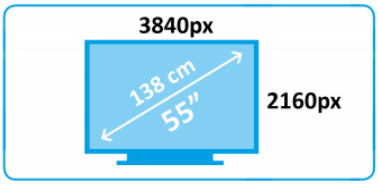


Q15. 55'' and 138 cm refers to the display diagonal, that is, the size of the display measured between opposite corners. How clear or unclear do you find this specific part of the label?
1 Very clear
2 Clear
3 Neither clear, nor unclear
4 Unclear
5 Very unclear

Screen 23 [Resolution]

[show EL1_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL1_V1_P1.jpg



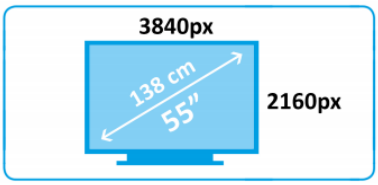
Q16. What do you think the information 3840px x 2160px indicates?

1 The width of the display
2 Refresh rate and brightness
3 The display diagonal
4 The degree to which the image can be enlarged or shrunk (zooming in or out)
5 The display's resolution (*correct*)
6 The display surface
7 Minimum and maximum color intensity
8 The aspect ratio
9 None of the answers is correct
10 I really don't know

Screen 24 [Resolution]

[show EL1_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL1_V1_P1.jpg



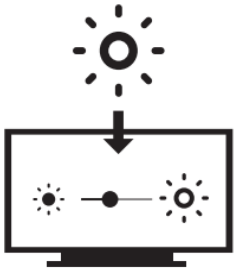
Q17. 3840px x 2160px refers to the display's resolution, that is, the number of pixels that make up the image, in horizontal and vertical direction. How clear or unclear do you find this specific part of the label?
1 Very clear
2 Clear
3 Neither clear, nor unclear
4 Unclear
5 Very unclear

Q18. Which information do you find more useful, the resolution in pixels or the resolution's name?
1 resolution in pixels (e.g. 3840px x 2160px)
2 resolution's name (e.g. UHD-4K)?
3 equally useful
4 both useless

Screen 25 [Automatic brightness control]

[show EL2_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL2_V1_P1.jpg



Q19. What do you think this symbol means?

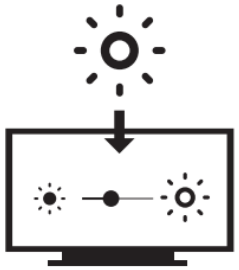
1 It is possible to adjust the display brightness
2 It is possible to adjust the display contrast
3 The display can automatically adjust the brightness of the image (depending on ambient light) (*correct*)
4 The display displays has an anti-reflective surface
5 The display has a direct-sun protection system
6 None of the answers is correct
7 I really don't know

Screen 26

The correct answer is: The display can automatically adjust the brightness of the image (depending on ambient light). This is called automatic brightness control (or ABC).

[show EL2_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL2_V1_P1.jpg

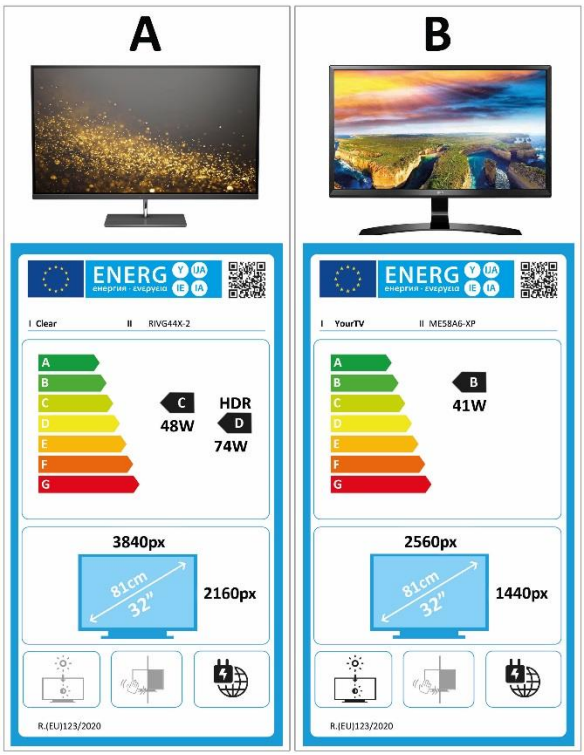


Q20. Now you know its meaning, how clear or unclear do you find this symbol?
1 Very clear
2 Clear
3 Neither clear, nor unclear
4 Unclear
5 Very unclear

Screen 27
Q21. Below are two energy labels belonging to two different displays. Which display do you think has automatic brightness control?

[show TWO2_VX_VX.jpg depending on X3 and X4, see Table above]

Example: TWO2_V1_P1.jpg



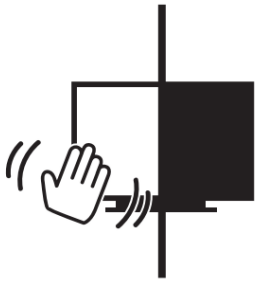
[Display A: no auto brightness control]
[Display B: auto brightness control]

1 Display A
2 Display B (*correct*)
3 Both displays
4 Neither display
5 I really don't know

Screen 28 [Motion sensor]
Q22. What do you think this symbol means?

[show EL3_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL3_V1_P1.jpg



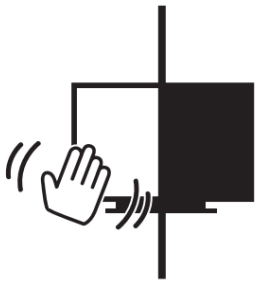
1 The display is a touchscreen
2 The display has a motion sensor, checking if anybody is present in the room (*correct*)
3 You can change channels with hand gestures
4 The display has day and night modes
5 The display has a wake-up function: it will make an alarm noise if you fall asleep
6 None of the answers is correct

7 I really don't know

Screen 29
The correct answer is: The display has a motion sensor, checking if anybody is present in the room. If nobody is in the room, the sensor will tell the display to go into standby.

[show EL3_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL3_V1_P1.jpg

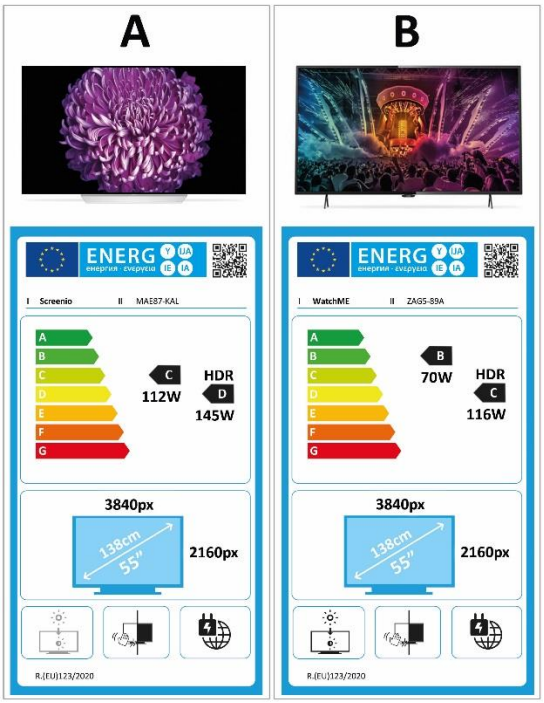


Q23. Now you know its meaning, how clear or unclear do you find the symbol?
1 Very clear
2 Clear
3 Neither clear, nor unclear
4 Unclear
5 Very unclear

Screen 30
Q24. Below are two energy labels belonging to two different displays. Which display do you think has a motion sensor?

[show TWO3_VX_VX.jpg depending on X3 and X4, see Table above]

Example: TWO3_V1_P1.jpg



[Display A: motion sensor]
[Display B: motion sensor]

1 Display A
2 Display B
3 Both displays (*correct*)
4 Neither display
5 I really don't know

Screen 31 [standardised external power supply]
Q25. What do you think this symbol means?

[show EL4_VX_VX.jpg depending on X3 and X4, see Table above]

Example: EL4_V1_P1.jpg

1 The display can be connected to the Internet
2 The display has a battery that can be charged
3 The display has surge and lightning protection
4 The display can mirror the display of a laptop or a tablet
5 The display has a universal external (i.e. separate) power supply (*correct*)
6 The display has a universal power plug that fits sockets all around the world

7 None of the answers is correct
8 I really don't know

Screen 32
The correct answer is: The display has a universal external (i.e. separate) power supply.

[show EL4_VX_VX.jpg depending on X3 and X4, see Table above]

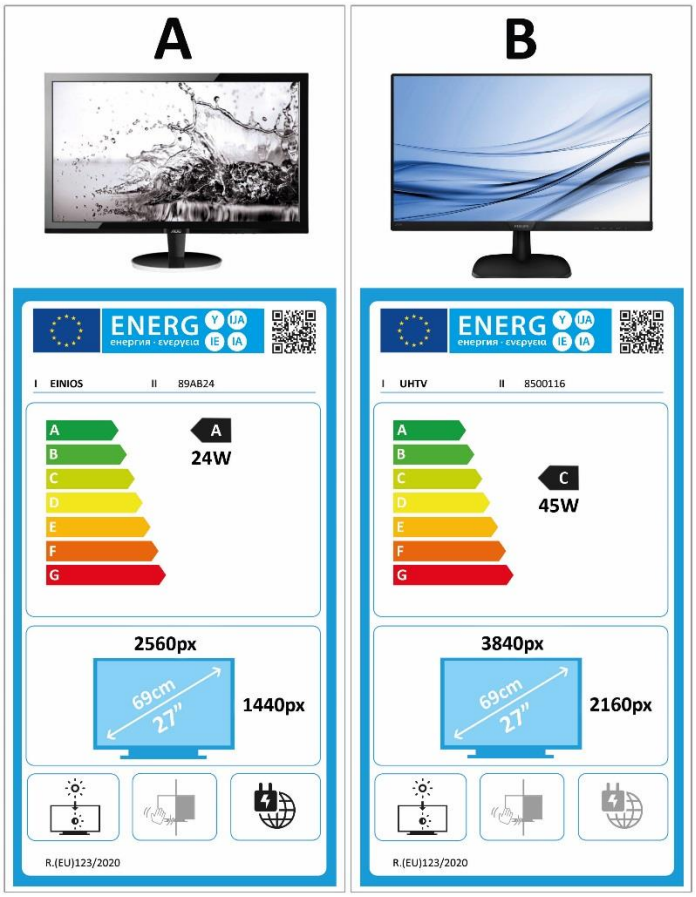
Example: EL4_V1_P1.jpg

Q26. Now you know its meaning, how clear or unclear do you find the symbol?
1 Very clear
2 Clear
3 Neither clear, nor unclear
4 Unclear
5 Very unclear

Screen 33
Q27. Below are two energy labels belonging to two different displays. Which display do you think has a universal external power supply?

[show TWO4_VX_VX.jpg depending on X3 and X4, see Table above]

Example: TWO4_V1_P1.jpg



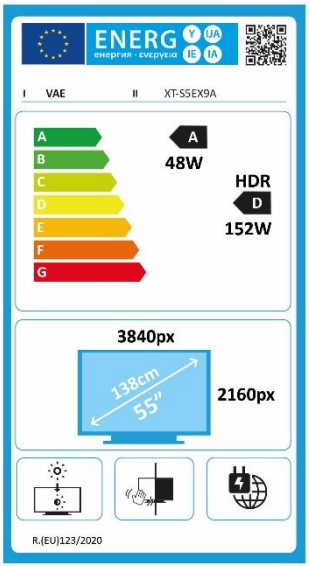
[Display A: standardised external power supply]
[Display B: no standardised external power supply]

1 Display A (*correct*)
2 Display B
3 Both displays
4 Neither display
5 I really don't know

Screen 34
Below, the energy label is shown once more in its entirety.

[show FULL_VX_VX.jpg depending on X3 and X4, see Table above]

Example: FULL_V1_P1.jpg



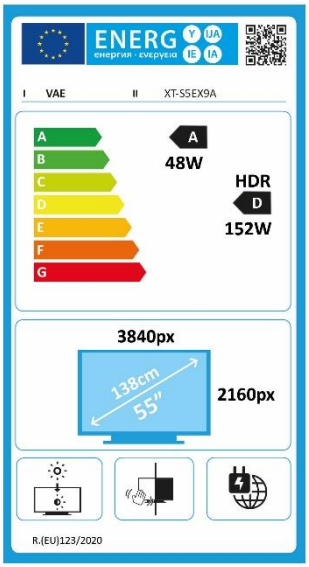
Q28. In your opinion, is there any important information missing from this label?
1 No
2 Yes, namely…

[Textbox]

Screen 35

[show FULL_VX_VX.jpg depending on X3 and X4, see Table above]

Example: FULL4_V1_P1.jpg



Q29. This energy label looks….

ugly	1	2	3	4	5	attractive
amateurish	1	2	3	4	5	professional
fake	1	2	3	4	5	real
sloppy	1	2	3	4	5	orderly

PART C. BACKGROUND INFORMATION

Screen 36
Finally, we have a few general questions.

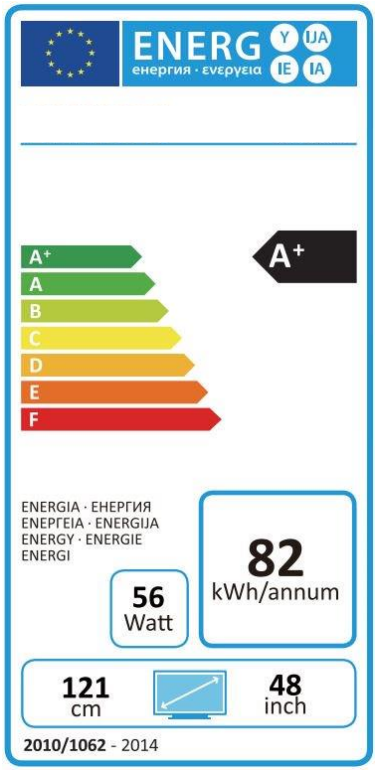
Screen 37 (self-reported product category expertise/ pro-environmental self-identity)
Q30. Please indicate how much you agree or disagree with the following statements.

		Strongly disagree						Strongly agree
1	I know a great deal about televisions and/or computer displays.	1	2	3	4	5	6	7
2	I know more about televisions and/or computer displays than most other people.	1	2	3	4	5	6	7
3	In my daily activities, I am conscious about saving energy.	1	2	3	4	5	6	7
4	I am worried about the environment.	1	2	3	4	5	6	7

Screen 38 (reason for paying attention to energy efficiency/energy consumption)
If Q1_F (energy efficiency/energy consumption) > 2:
Q31. There are various reasons why people pay attention to power usage and/or energy efficiency when buying a new display. What would be the most important reason for you, personally?
1 I want to save money (a lower electricity bill)
2 I want to help protect the environment and combat climate change
3 Other, namely…
4 I really don't know

Screen 39
Now, imagine once more that you are in a store to buy a television. You see this energy label on the televisions that the store sells.

[show OLD.jpg]



Q32. Would you trust the information on this label to be correct?
1 Definitely
2 I think so
3 I really don't know
4 I don't think so
5 Definitely not

Q33. Would you trust this label as the official EU energy label?
1 Definitely
2 I think so
3 I really don't know
4 I don't think so
5 Definitely not

Screen 40 (socio-demographics)

Q34. What is your gender?
1 Man
2 Woman

Q35. What is your age?

Q36. At what stage did you complete your full-time studies?
1 Elementary (primary) school or less

2 Some high (secondary) school
3 Graduation from high (secondary) school
4 Graduation from college, university or other third-level institute
5 Post-graduate degree (Masters, PhD)
6 Still studying full-time
7 Other qualification
8 Prefer not to answer

Q37. Thinking about your household's financial situation, would you say that making ends meet every month is:
1 Very difficult
2 Fairly difficult
3 Neither easy nor difficult
4 Fairly easy
5 Very easy
6 Don't know

Appendix C: Survey results

Which features do consumers find most important when buying an electronic display? Figures C.1-C.4 provide the results split by consumer type (interested buyer versus general public) and product type (TV versus computer display)?

Figure C.1 Interested buyers: televisions

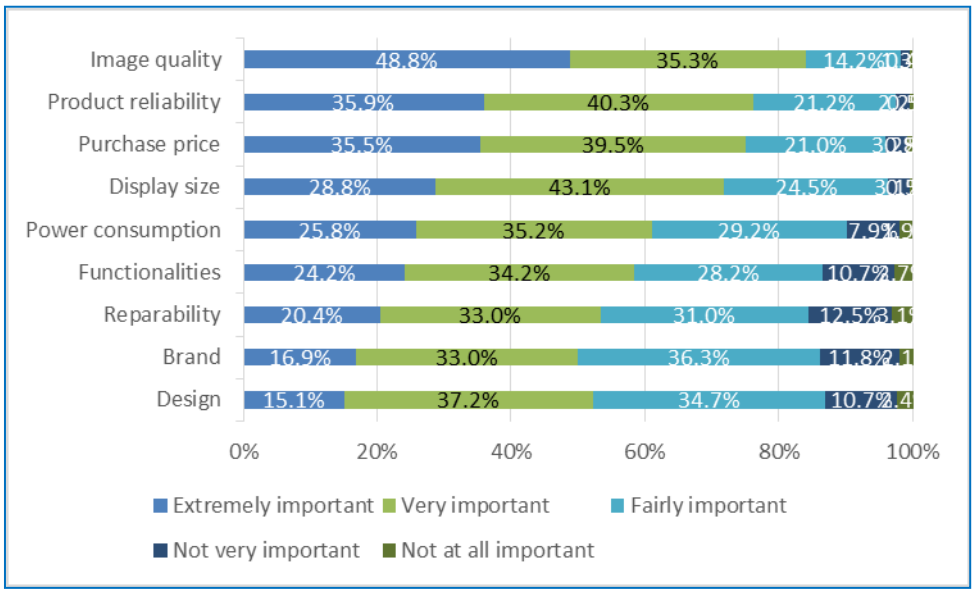


Figure C.2 Interested buyers: computer monitors

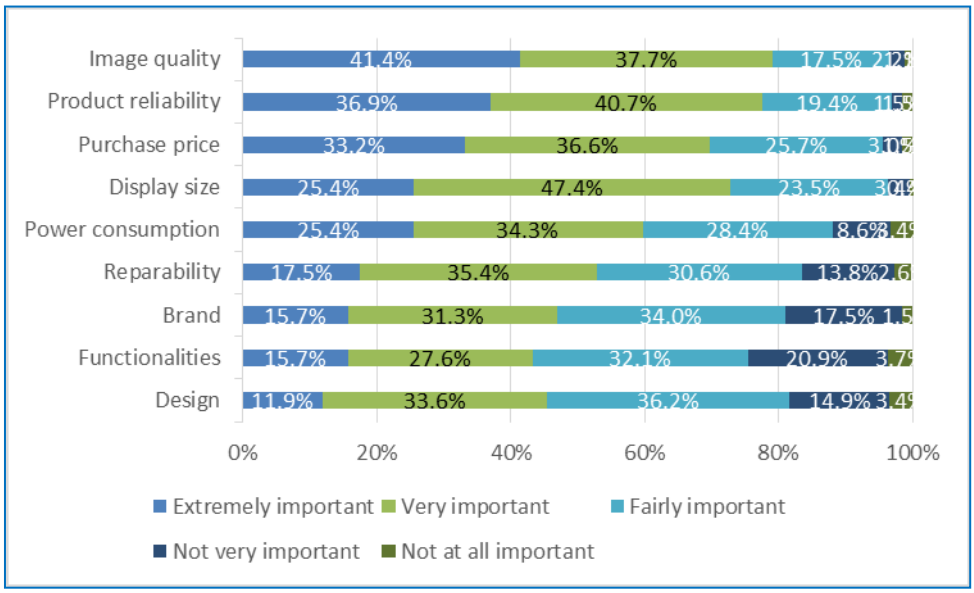


Figure C.3 General consumers: televisions

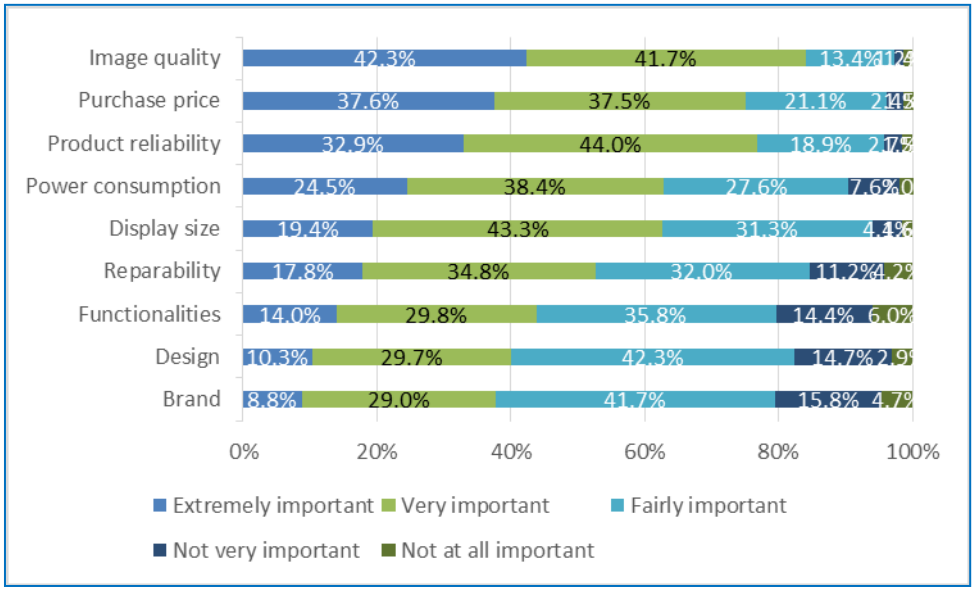
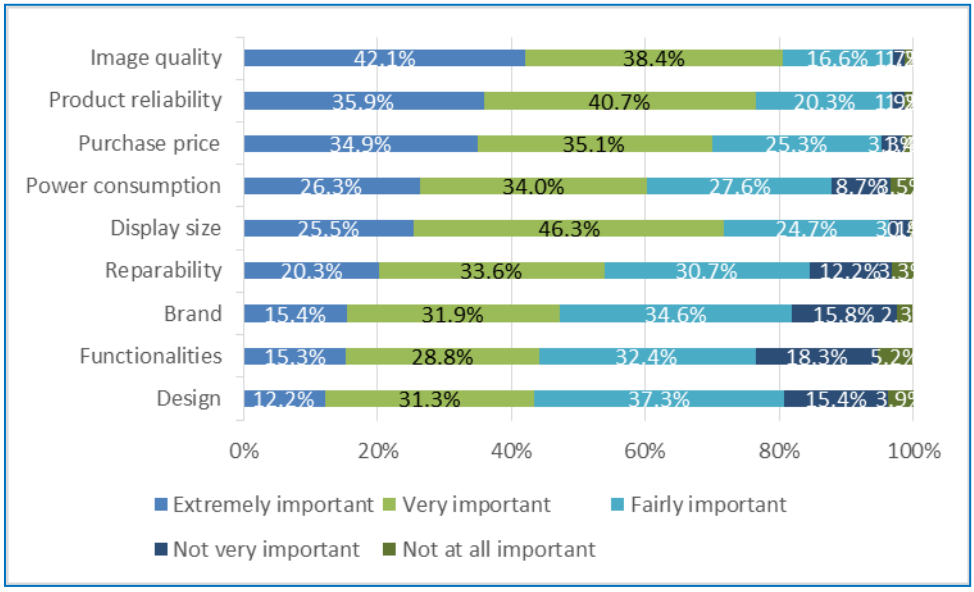


Figure C.1 General consumers: computer monitors



Appendix D: Understanding of energy efficiency class and power consumption

Understanding of the energy efficiency class and power consumption was further investigated. Respondents saw the energy label with dual modes as displayed in Figure D.1 and were asked what the energy efficiency class of the display was and how much power the display used when turned on. The correct answer on the question related to the displays' energy efficiency class was "A, but D *when displaying images* in HDR". Table D.1 shows that, on average, 57.4% of the respondents selected the correct answer. The false response options selected most were simply "A" (18.4%) and the option "A, but D when the display is *capable of displaying images* in HDR format" (10.3%), which demonstrates that not all consumers understood the meaning of HDR in the first place.

Figure D.1 Energy label

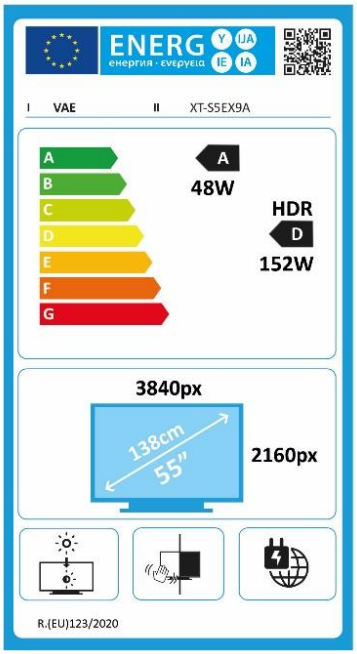


Table D.1 Comprehension of energy efficiency class

What do you think the energy efficiency class of a display with this label is? (N =4081)	Total	Variant 1	Variant 2	Variant 3
A	18.4%	17.3%	18.6%	19.3%
D	2.5%	2.2%	2.2%	3.1%
A, but D when displaying images in HDR format	**57.4%**	**57.6%**	**57.0%**	**57.6%**
D, but A when displaying images in HDR format	3.0%	3.5%	2.6%	2.7%
A, but D when the display is capable of displaying images in HDR format	10.3%	10.3%	10.4%	10.3%
D, but A when the display is capable of displaying images in HDR format	0.6%	0.7%	0.8%	0.4%
I really don't know	7.8%	8.4%	8.4%	6.5%

The correct answer to the question related to the displays' power consumption (see Table D.2) is "48 or 152 W, depending on the format in which images are displayed (normal or HDR)", which was selected by 52.7% of the respondents, on average. The false response options that were selected most were "48 W" (20.2%, on average) and "152 W" (11.9%).

Table D.2 Comprehension of power consumption

When the display is turned on, how much power do you think it uses? (N =4081)	Total	Variant 1	Variant 2	Variant 3
48 W	20.2%	20.0%	21.5%	19.0%
55 W	1.7%	2.0%	1.1%	1.9%
138 W	1.7%	1.2%	1.6%	2.3%
152 W	11.9%	11.8%	12.1%	11.8%
55 or 138 W, depending on the format in which the images are displayed (normal or HDR)	2.2%	2.3%	1.5%	2.9%
48 or 152 W, depending on the format in which images are displayed (normal or HDR)	**52.7%**	**52.8%**	**52.7%**	**52.5%**
Impossible to determine with this information	2.9%	2.5%	3.2%	3.0%
I really don't know	6.7%	7.3%	6.2%	6.6%

Next, to assess whether respondents understand the difference between energy consumption and energy efficiency, respondents were exposed to energy labels of two different (non-HDR capable) displays, as shown in Figure D.2. One display had a larger screen than the other, and fell into a higher efficiency class despite having a higher energy consumption. Table D.3 shows that about a third of the respondents (29.2%) correctly identified A as the most energy efficient display *and* B as the display with the lower power consumption. About half of the respondents (51.5%) did not distinguish between consumption and efficiency: They inaccurately believed that the same display was more energy efficient *and* consumed less energy relative to the other. This demonstrates that quite a large group of consumers do not understand the difference between energy efficiency and power consumption information.

Table D.3 Understanding the difference between efficiency and consumption

	Which of the two displays do you think is most energy-efficient?			
Which of the two displays do you think consumes less energy?	Display A	Display B (correct)	Equally efficient	I really don't know
Display A (correct)	26.6%	29.2%	0.9%	1.3%
Display B	3.4%	24.9%	1.0%	0.5%
They consume an equal amount of energy	0.8%	2.3%	2.4%	0.4%
I really don't know	0.6%	1.5%	0.1%	4.4%

Figure D.2 Energy labels for two different displays