

# **INTELLIGENT ENERGY EUROPE**

Agreement n° IEE/07/803/SI2.499429

## **PROMOTION 3E**

### **PROMOTION OF ENERGY-EFFICIENT APPLIANCES IN EUROPE**

Workpackage 3 - Deliverable D12

#### **REPORT ON THE MAJOR FACTORS INFLUENCING APPLIANCES' CHOICE**

September 2009

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# 1. Introduction

This document presents the results regarding the major factors influencing appliances choice, resulting from the analysis and interpretation of data obtained through interviews, corresponding to the deliverable D12 of Work Package 3 – Training Need Assessment, developed by Factor Social (FS).

Training Needs Assessment is the first stage of a training cycle. For this project, we aimed to analyse the customer choice process - identifying motives for buying or not buying class A appliances - in order to help sellers to influence customers' choice in such a way as to improve preference of class A appliances over other classes.

For this, consumer interviewing and surveying identified key factors that influence choice when buying appliances, based on open interviews. This information will be used in training to guide retail staff to promote class A appliances in their daily jobs and to influence many customers in preferring class A appliances.

This Deliverable has the following structure:

- Predisposition of customers for the acquisition of energy-efficient appliances (Section 2):  
Describes the methodologies used to gather data and to do its statistical analysis (section 2.1).  
Presents the data analysis for the store customers regarding the major factors influencing appliances' choice (section 2.2), corresponding to the deliverable D12.
- Annexes: Contains the forms used in the questionnaires for the customers.

## **2. Predisposition of customers for the acquisition of energy-efficient appliances**

### **2.1. Methodology**

#### **2.1.1 Data collection**

A survey was performed aimed at data collection for a Training Needs Assessment, in order to understand the factors that can influence the choice of electrical appliances. This information will be used in training, to guide retail staff to promote class A appliances in their daily jobs and to influence many customers in preferring class A appliances. For this, two phases were implemented: 1) qualitative data gathering by means of consumer interviewing; followed by 2) quantitative data gathering by means of consumer surveying.

At first, open interviews were performed in each participating country - Ireland, Germany, Portugal, Greece, Poland, Spain and Italy. Twelve customers were interviewed when buying appliances, by asking them to think about the choice process when deciding which appliance to buy. Following this, the interviews were analyzed and the major key concerns/factors that guide choice process were identified. This allowed the development of a questionnaire based on those concerns and other aspects related to them.

Then, a survey based on that questionnaire was performed in a set of electrical appliance stores in seven participating countries, covering in each country at least three geographical areas and three different stores. This mainly included open-ended questions developed based on the prior open interviews mentioned and was performed inside the stores. It included items referring to the electrical appliance the costumers were considering to buy when inquired or to the last electrical appliance they had bought; to the choice factors that costumers in general consider in their choice and that search information for; main sources of information search and frequency of search; frequency of including certain worries in their choices (e.g. environmental issues); environmental attitudes and behaviors; attitudes towards the employees, their help importance and other related variables; aspects related with energy efficiency assessment; socio-demographic items; and other variables (see questionnaire annexed). This was done in order to understand how many people share the same concerns and which are more common.

#### **2.1.2 Statistical analysis**

The results presented in this report were analyzed with the SPSS (Statistical Package for the Social Sciences) software. This involved both a descriptive and inferential data analysis, based mainly on dichotomous variables (choice; motives; factors) and scales statistically validated (attitudes, behaviors, worries, ...), constructed through the aggregation of questionnaire items and inversion of some, in order

for all of them to have the same measurement scale (1 to 5 Likert type scale, with 5 representing the highest value). These results refer to the aggregated sample of customers (all countries together) and identify the 1) type of electrical appliances most recently bought or to be bought shortly after the time the survey was performed, 2) a list of major factors influencing choice process and 3) variables/factors associated with choice.

## 2.2. Data analysis

### 2.2.1 *Sample characteristics*

The survey sample comprises 211 store costumers from Ireland, 210 from Germany, 207 from Portugal, 246 from Greece, 210 from Poland, 138 from Spain and 210 from Italy, in a total of 1432 stores inquiries performed. The mean age of the sample is 39.90 years old (SD=.48); 47.50% are male and 52.50% are female; 15.20% have an education level equivalent to grammar school (primary), 45.40% a high school degree (secondary), 38.40% a college/university degree and only 1% are illiterate.

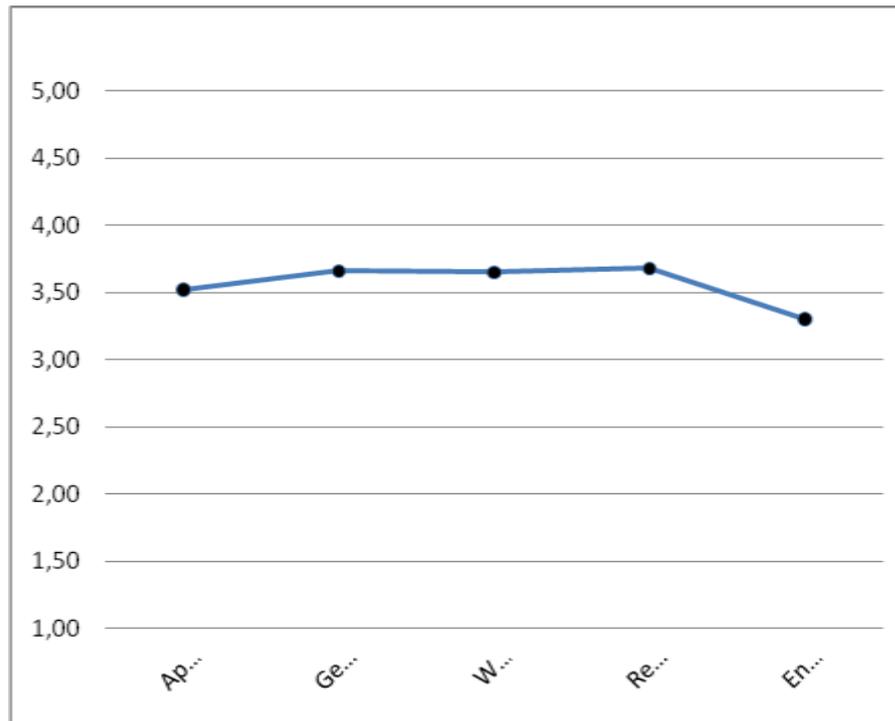
Regarding the families of the costumers inquired, these consist of 3 members on average (SD=.05), with the family's average monthly income being Euros 9780.90 (SD=487.94)<sup>1</sup>. Of this sample, 61.10% have children of which 28.14% are younger than 6 years old, 34.71% are between 6 and 18 years old and 37.15% are above 18 years old. 63.70% own the house where they live, with 15.80% having the house totally equipped with electric appliances at the time they rented/bought it, while for 23.30% the house was partially equipped and for 60.90% it was not equipped. Considering these electric appliances, 55.70% affirm that would replace them if they could.

Overall, they have a positive general attitude towards the environment and its protection (M = 3.60; SD = 1.09), towards saving resources in general (M = 3.60; SD = 1.14), and a positive specific attitude towards energy and water saving (M = 3.58; SD = 1.12), considering as important the reduction in their consumption<sup>2</sup>. No significant differences are found between the latter means. Moreover, they acknowledge both a moderate to high importance regarding the energy efficiency aspect of electrical appliances and consider that knowing the energy consumption of the appliance allows them to save in the long term (M = 3.52; SD = 1.07), with this mean being significantly lower than the means for the other attitudes. These aspects can be observed in the following figure.

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<sup>1</sup> It should be noted that the family's average monthly income in the various countries that comprise the sample is highly heterogeneous and thus, this average value is not equivalent to the average for each country.

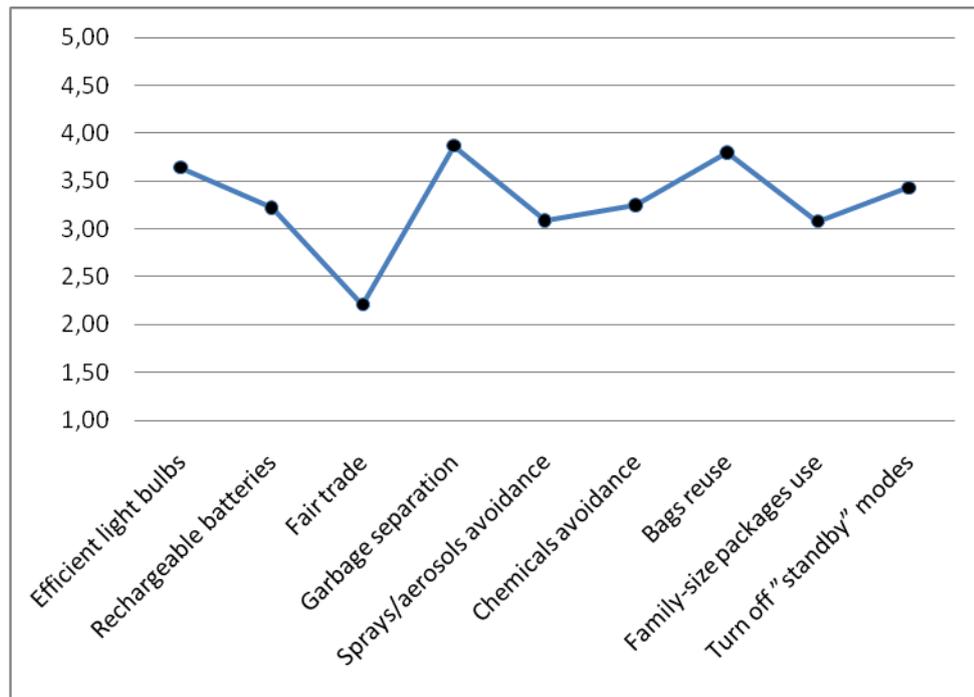
<sup>2</sup> The general attitude scale was constructed by aggregating a set of items (Q36, Q37, Q38, Q39, Q40, Q41 and Q42; see questionnaire attached), having a very high level of reliability ( $\alpha = .94$ ). The resources saving attitude scale was constructed by aggregating a set of items (Q38, Q40, Q41), having a very high level of reliability ( $\alpha = .87$ ). The specific attitude (energy & water) scale was constructed by aggregating a set of items (Q36, Q37 and Q42), having a very high level of reliability ( $\alpha = .90$ ). The specific appliance (efficiency & energy savings) attitude scale was constructed by aggregating a set of items (Q30 and Q31), having a high level of reliability ( $\alpha = .73$ ).



**Figure 1 - Results concerning customer's environmental attitudes and behaviors (1-very negative attitude, 5 – very positive attitude)**

In what concerns their overall environmental behaviour, a scale that aggregates a set of specific environmental behaviours<sup>3</sup> (see the figure below) referred in the literature as related to energy saving was constructed. Results show that they acknowledge performing environmental behaviours “sometimes” (M=3.30; SD=.70), based on the average in a scale from “never” (level 1) to “always” (level 5). In spite of this general value, there are some differences regarding the frequency with which the specific behaviours are performed regarding this scale: both garbage separation (M = 3.88; SD = 1.24) and reuse of bags (M = 3.79; SD = 1.20) are significantly more often performed than the other behaviours. These are followed by efficient light bulbs buying (M = 3.64; SD = 1.15), and in a significantly lower degree by turning “off” standby modes (M = 3.42; SD = 1.35). This latter behaviour is performed significantly more than chemicals avoidance (M = 3.22; SD = 1.27), rechargeable batteries use (M = 3.20; SD = 1.30), family-size packages use (M = 3.07; SD = 1.20) and sprays/aerosols avoidance (M = 3.05; SD = 1.29). Fair trade seems to be a non frequent practice (M = 2.18; SD = 1.16). All these results can be seen in the next figure.

<sup>3</sup> The environmental behavior scale was constructed by aggregating a set of items (Q43, Q44, Q45, Q46, Q47, Q48, Q49, Q50 and Q51; see questionnaire attached), having a moderate to high level of reliability ( $\alpha = .73$ ).



**Figure 2 - Results concerning customer's environmental behavior frequency (1-never performed; 5-always perform it)**

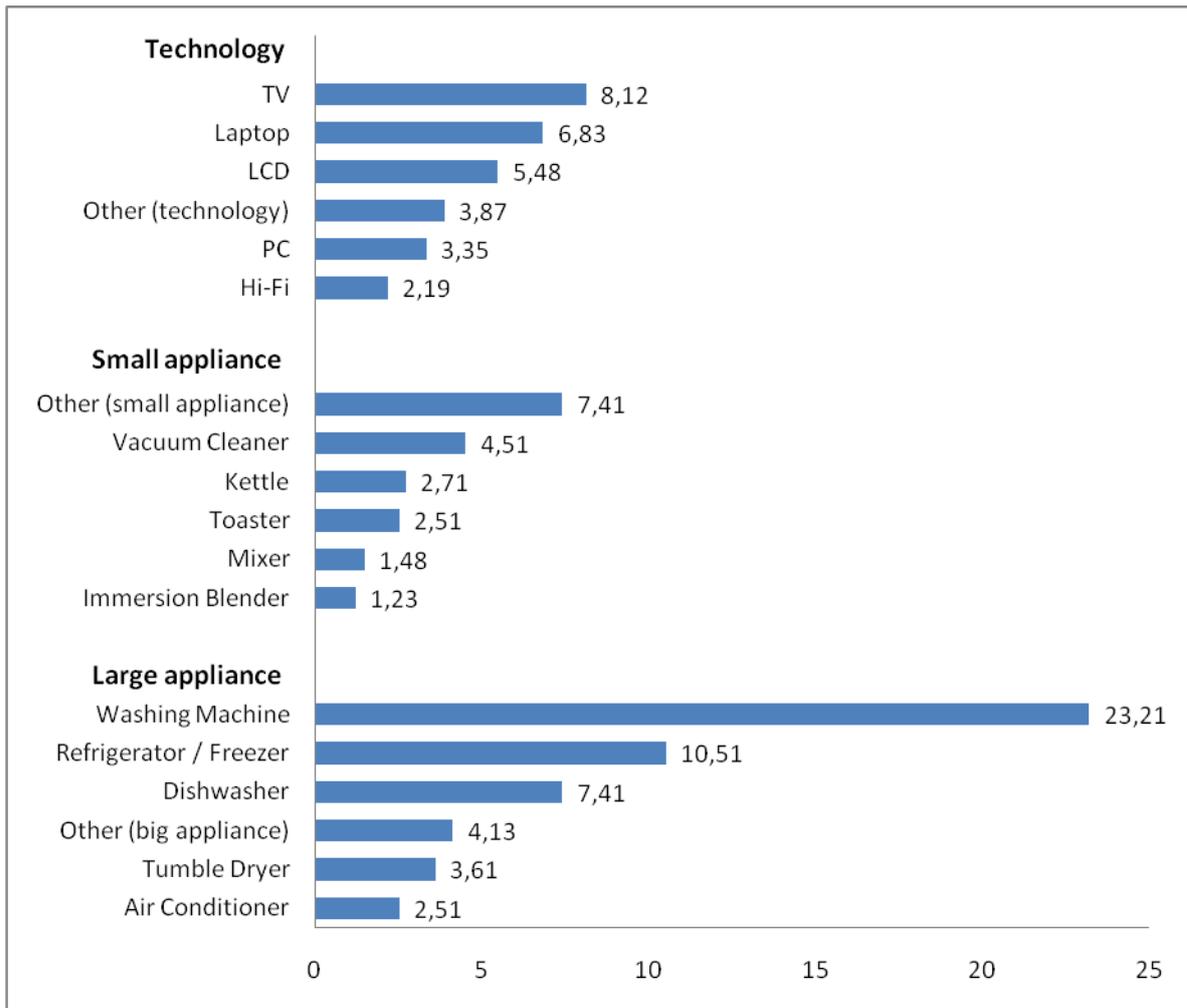
**2.2.3 Type of electrical appliances**

With regard to the electrical appliances considered - either the last electrical appliance bought or the appliance that was about to be bought when consumers were inquired - 49.20% customers considered large appliances, 28.3% technology and 18.80% small appliances. Although most of these results referred to a single choice, there was also a small percentage of costumers that reported a choice of two or more types of appliances at the same time, with 1.50% choosing a large appliance and technology, 0.70% small appliance and technology, 0.60% small and large appliances and 0.80% all three types chosen at the same time (in the last choice they made or the choice they were about to make when inquired).

Considering all the choices made by the consumers (N=1551)<sup>4</sup>, the following figure shows that most refer to large appliances and specifically to washing machines (23.12%) and refrigerators/freezers (10.51%). These are followed by the choice of TV (8.12%), dishwasher (7.41%) and other types of small appliances<sup>5</sup> (7.41%).

<sup>4</sup> This value is larger than the total number of consumers inquired (N=1432) as some consumers chose two or more types of appliances.

<sup>5</sup> Other types of *small appliances* include: coffee machines; iron; fryer; hair clipper/drier/straightener; microwave; steam press; ventilation hood. Other types of *large appliances* include: oven; cooking hobs. Other types of *technology* include: Divx player; digital camera; CD/mp3 player; digital receiver; DVD player; GPS; hard disk; home cinema; mobile phone; modem.



**Figure 3 - Results concerning customer's electrical appliances choices**

With regard to the choice of electrical appliance for each country, costumers from Spain, Poland and Greece chose more than 50% of large appliances, followed by close to 30% of technology; costumers from Portugal chose almost the same percentage of large (42.72%) and small appliances (40.78%); costumers from Ireland chose almost the same percentage of large appliances (35.55%), small appliances (29.86%) and technology (34.60%), with the same happening to a lesser degree in Germany for large appliances (32.38%), small appliances (19.52%) and technology (31.43%). Italy is the only country in which the percentage of technology purchases (53.85%) is greater than the cumulative purchases of large appliances (32.21%) together with small appliances (10.58%). The percentages regarding the choice of electrical appliance(s) for each country can be seen in the next figure.

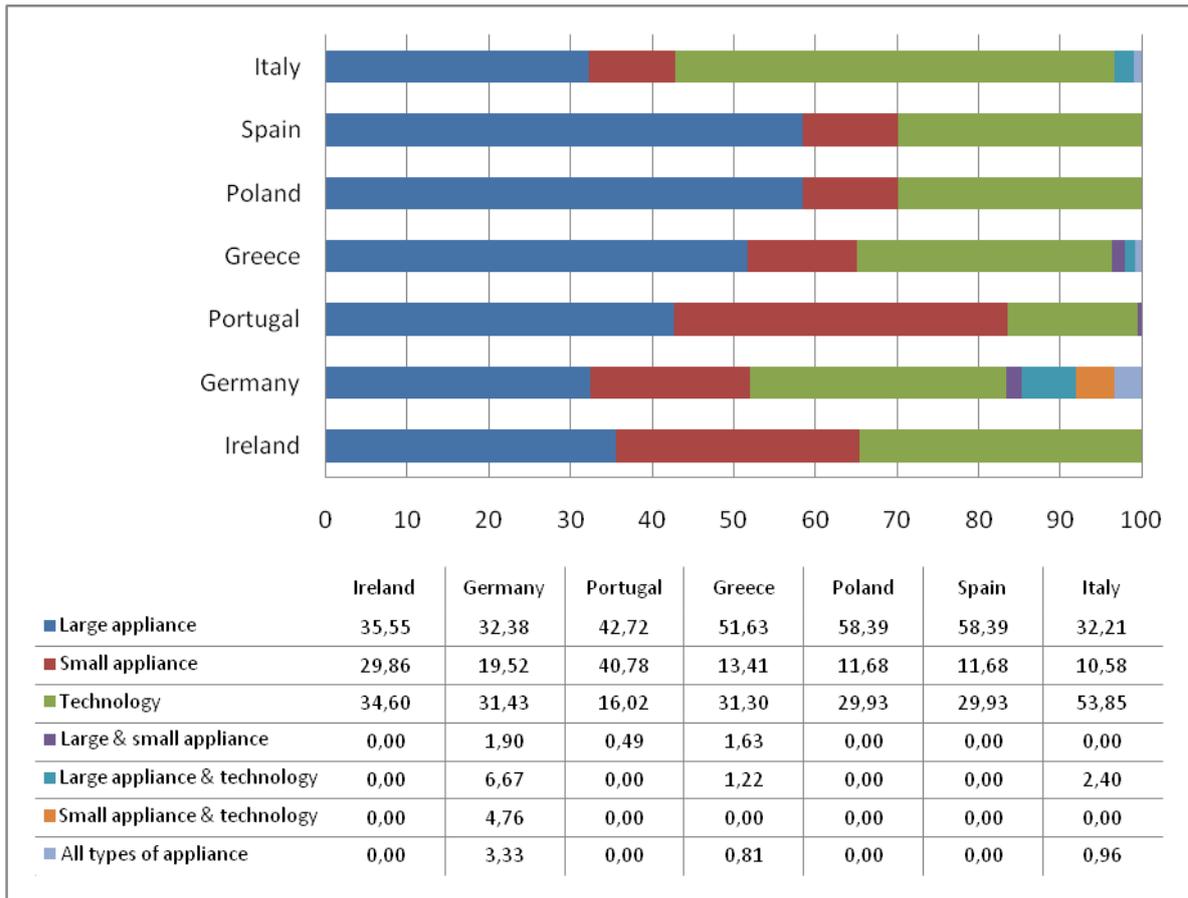
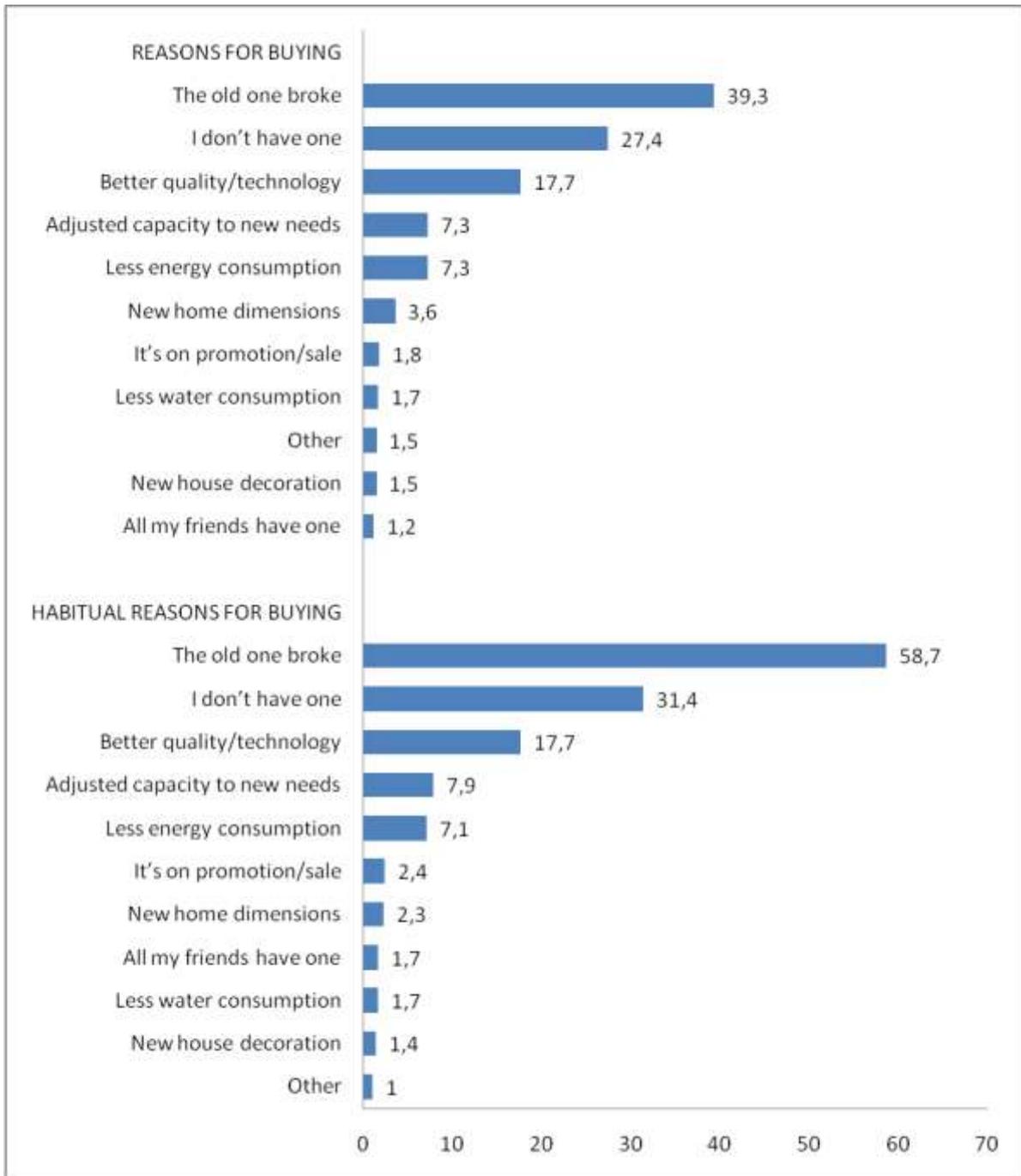


Figure 4 – Types of electrical appliances chosen by country

**2.2.4 Motives for buying electrical appliances**

People usually buy appliances when they need to replace one which is no longer working (39.30%), buying one for the first time to equip their home (27.40%) or buying a better quality/more innovative technology to replace the old one (17.70%). With regard to the usual reasons to choose an appliance the pattern is the same, although in this case a higher percentage of costumers refer replacing an appliance that is broken as the main reason for buying a new one. Results concerning the reasons that support the choice of the appliance (the last one bought or one they were about to buy when requested for the inquiry) and the reasons that habitually supported the choices made when they had to buy appliances in the past, are shown in the next figure.



**Figure 5 – Reasons for buying electrical appliances**

The results shown before refer to the electrical appliances in general. When we consider specifically the **reasons for buying each type of appliance** some differences arise. The main difference is that of the most frequently given reasons, large and small appliances have both more similar percentages than technology. This latter type of appliance differs from the other two mainly in relation to the reason “the old one broke”, having a lower percentage of costumers selecting it; and in regard to the reasons “better quality/technology” and “adjusted capacity to new needs” having more than twice the value of the other two. For the other reasons, the values do not differ significantly, as shown in the next table.

Reasons for choice	Large appliances	Small appliances	Technology
I don't have one	27%	30%	27%
The old one broke	<b>43%</b>	<b>46%</b>	<b>28%</b>
It's on promotion/sale	2%	2%	2%
Less water consumption	3%	1%	1%
Less energy consumption	9%	6%	7%
Better quality/technology	<b>14%</b>	<b>11%</b>	<b>28%</b>
All my friends have one	1%	2%	2%
Adjusted capacity to new needs	<b>6%</b>	<b>5%</b>	<b>13%</b>
New home dimensions	6%	1%	2%
New house decoration	2%	1%	2%
Other	1%	3%	2%

**Table 1 - Percentages for the buying reasons by type of appliance**

With regard to the **habitual reasons for buying each type of appliance**, the percentage of costumers that selected them for each reason is shown in the next table. It can be noted that the reasons given follow the same pattern as the choice of the most recent appliance (last one bought or the one they were about to buy when inquired). The exception is for the reasons “the old one broke”, in which costumers select it frequently for small appliances, while for the other two types of appliances this percentage is similar. Moreover, the reasons “better quality/technology” and “adjusted capacity to new needs” are in this case closer. Apart from this, the factors are given the same order of importance, although for the habitual reasons there is a higher percentage of selection (which can be attributed to the fact that in the past there was high variability in the reasons to choose an appliance, i.e. the reasons in the past weren't always the same as the one for the last choice made).

Reasons for habitual choice	Large appliances	Small appliances	Technology
I don't have one	28%	41%	31%
The old one broke	<b>59%</b>	<b>72%</b>	<b>52%</b>
It's on promotion/sale	3%	1%	3%
Less water consumption	2%	2%	3%
Less energy consumption	8%	5%	9%
Better quality/technology	<b>17%</b>	<b>15%</b>	<b>21%</b>
All my friends have one	3%	1%	1%
Adjusted capacity to new needs	<b>8%</b>	<b>6%</b>	<b>10%</b>
New home dimensions	4%	2%	2%
New house decoration	2%	1%	1%
Other	1%	1%	2%

**Table 2 - Percentages for the habitual buying reasons by type of appliance**

With respect to the reasons given for buying appliances in each country, these are more consistent between some than others. Overall, the most frequently given reason for buying an electrical appliance is substituting an old one that broke, except for Polish costumers in which this is the second reason, with the first reason being that they don't have one (30.33%). This latter reason is second for all the other countries. The third most frequently given reason for all the countries is to acquire a better quality/technology appliance. The reasons related with less energy consumption are in the fourth place for Ireland (5.21%), Germany (11.61%) and Poland (9.95%), in fifth place for Greece (5.83%), Spain (3.68%) and Italy (4.96%), and in eighth place for Portugal (1.36%). The percentages regarding the reasons for the choice of electrical appliance(s) for each country can be seen in the next figure.

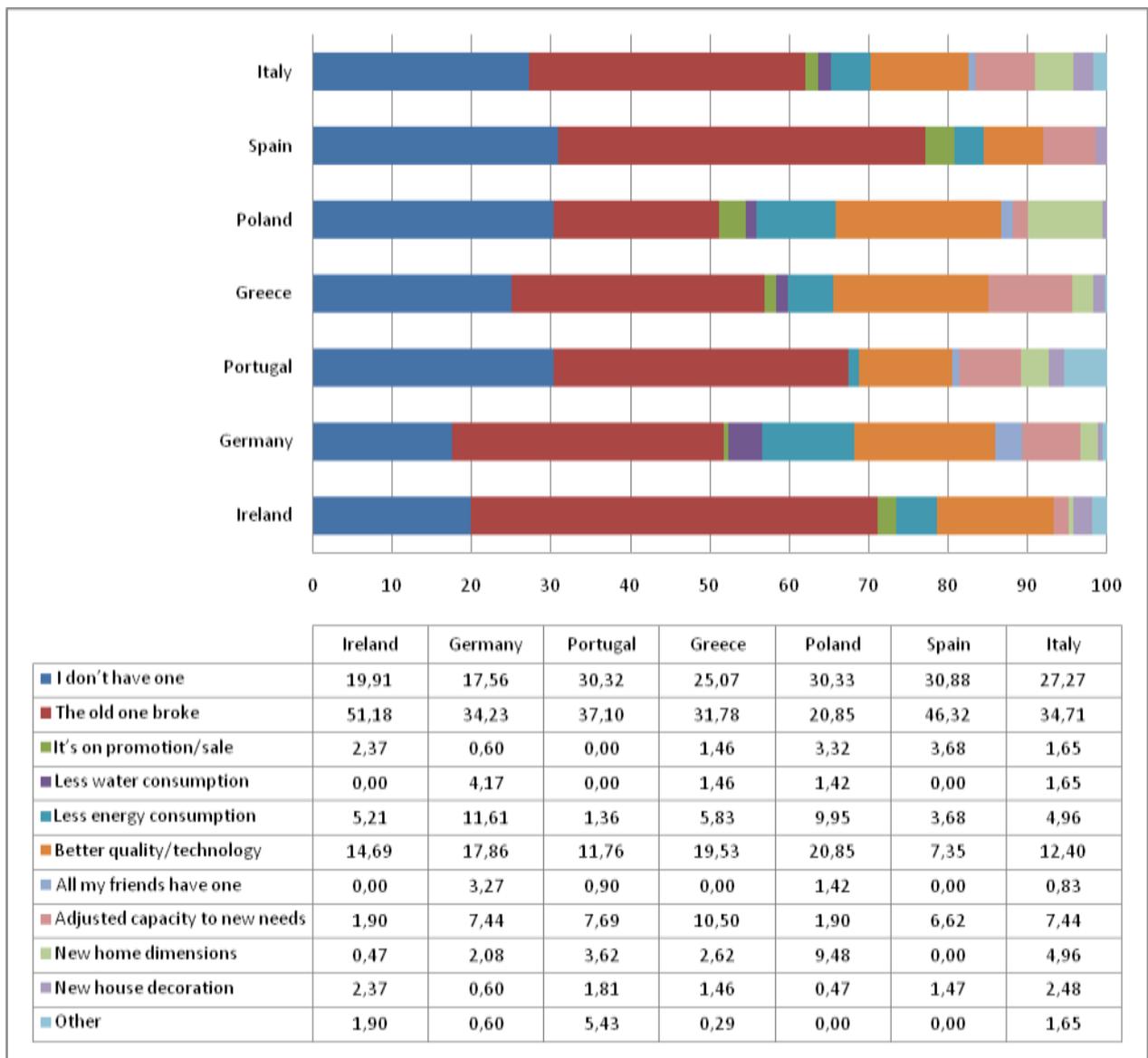
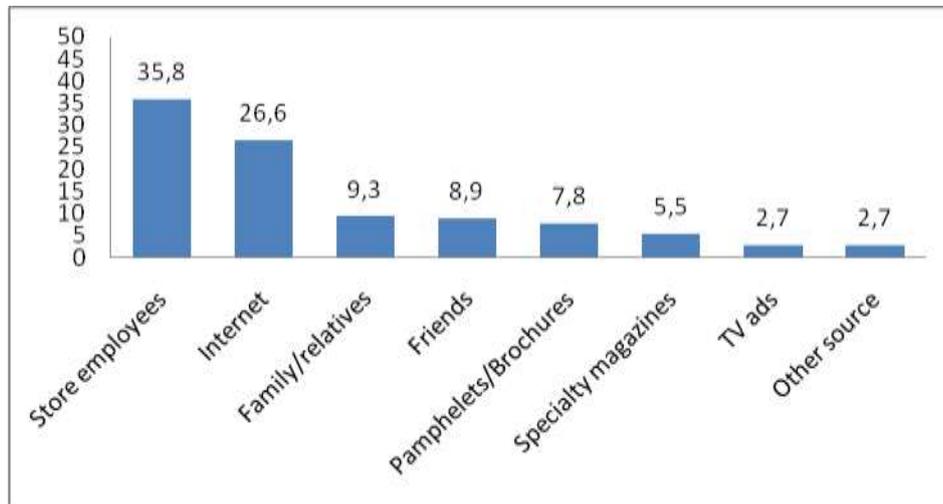


Figure 6 – Reasons for choosing electrical appliances, by country

### 2.2.5 Information on electrical appliances

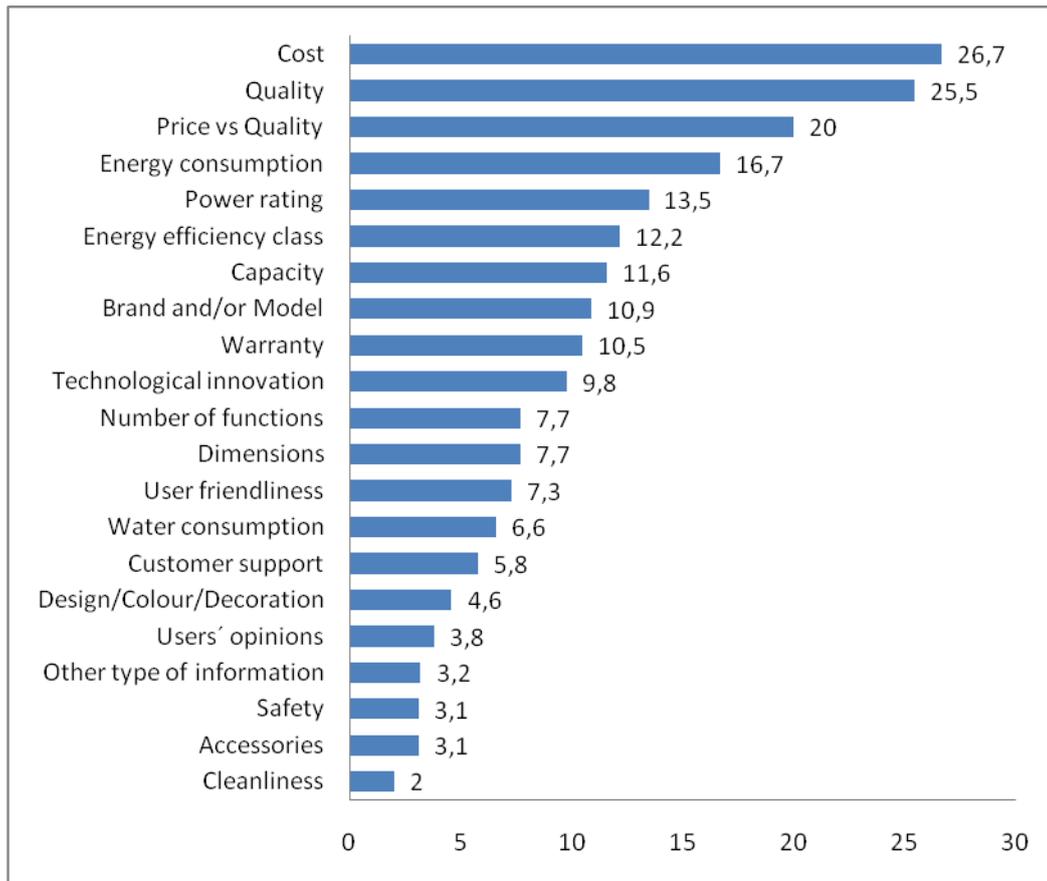
In order to make their choices, 67% costumers have searched information, the primary source being the store's employees (35.80%) and the internet (26.60%). The percentages for the other sources of information can be seen in the next figure.



**Figure 7 – Sources of information to buy electrical appliances**

The type of information that costumers valued the most when making the choices shown above regards cost (26.70%) – it should be noted that 46.69% of costumers report having had determined a price limit, 15.51% “kind of set” a price limit and 37.80% didn't set a price limit -, followed by information regarding quality (25.5%), information that considers a balance of both quality and price (20%) and information regarding energy aspects such as consumption (16.7%), power rating (13.5%) and efficiency class (12.2%). From the list, the information least searched was the appliance's cleanliness (2%), its accessories (3.10%) and safety (3.10%). The percentages regarding the other types of information can be seen in the next figure<sup>6</sup>.

<sup>6</sup> It should be noted that these percentages refer to characteristics that could be selected more than once.



**Figure 8 – Type of information to buy electrical appliances searched**

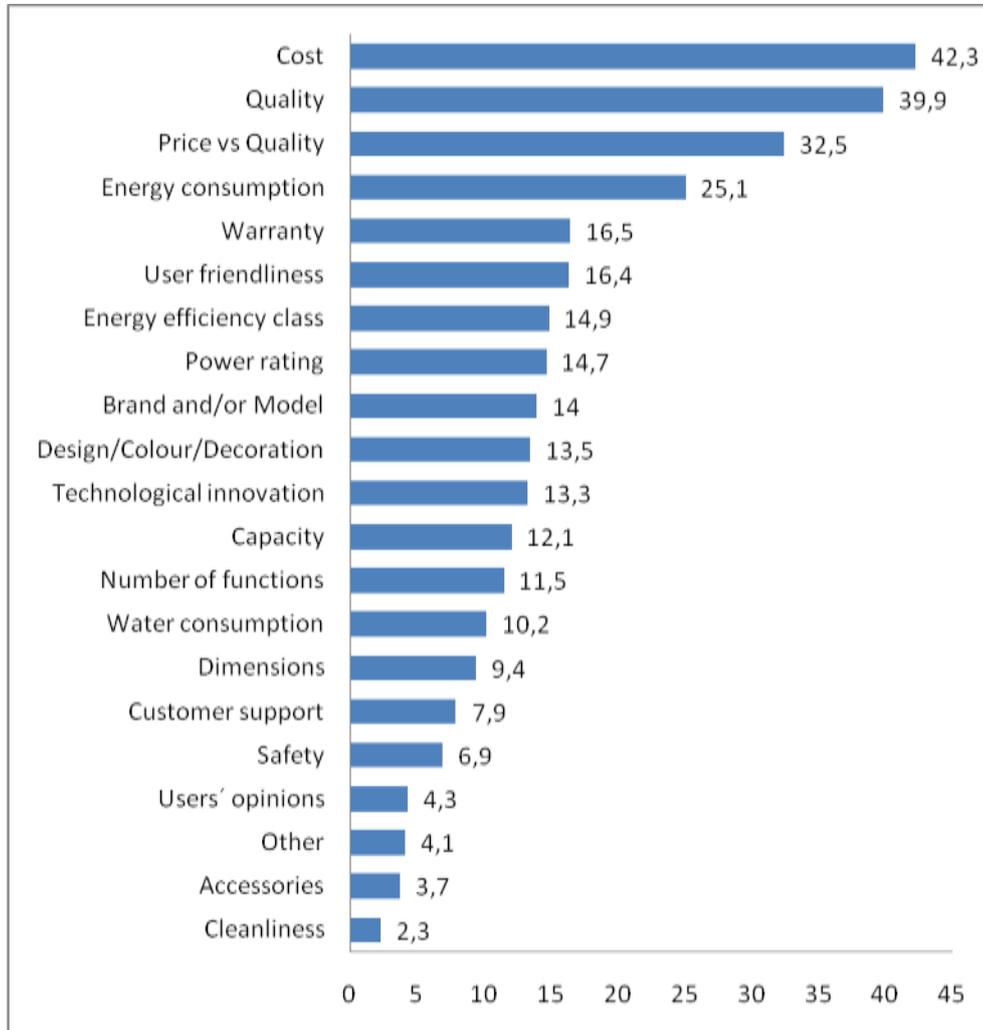
Despite having searched information regarding the choice of appliances referred above, costumers affirm that, in general, they search for this information between “sometimes” and “frequently” ( $M=3.67$ ;  $SD=.05$ ), in a scale from 1 – Never to 5 – Always.

It is also important to acknowledge that decisions are also influenced by people important to costumers, as the choices of electrical appliances were often made/discussed with their spouse/boy(girl)friend for 51.30% of the costumers, with their parents for 7.20% and with their children for 4.90%. Choices were taken alone for 36.70% of the cases,

### **2.2.6 Factors influencing choice**

The **appliance characteristic** that costumers value most when choosing is its cost (42.3%), followed by quality (39.9%), a balance of quality and price together (32.5%) and energy consumption (25.1%). This is consistent with the type of information they reported to have searched for the last appliance chosen (see section presented before), although warranty (16.5%) and user friendliness (16.4%) are as important as energy efficiency class (14.9%) and power rating (14.7%).

The least important characteristics in the costumers' view are the appliance's cleanliness (2.3%) and its accessories (3.7%), which is also consistent with information they reported to have searched for the last appliance chosen. The percentages regarding other characteristics considered to be important can be seen in the next figure<sup>7</sup>.

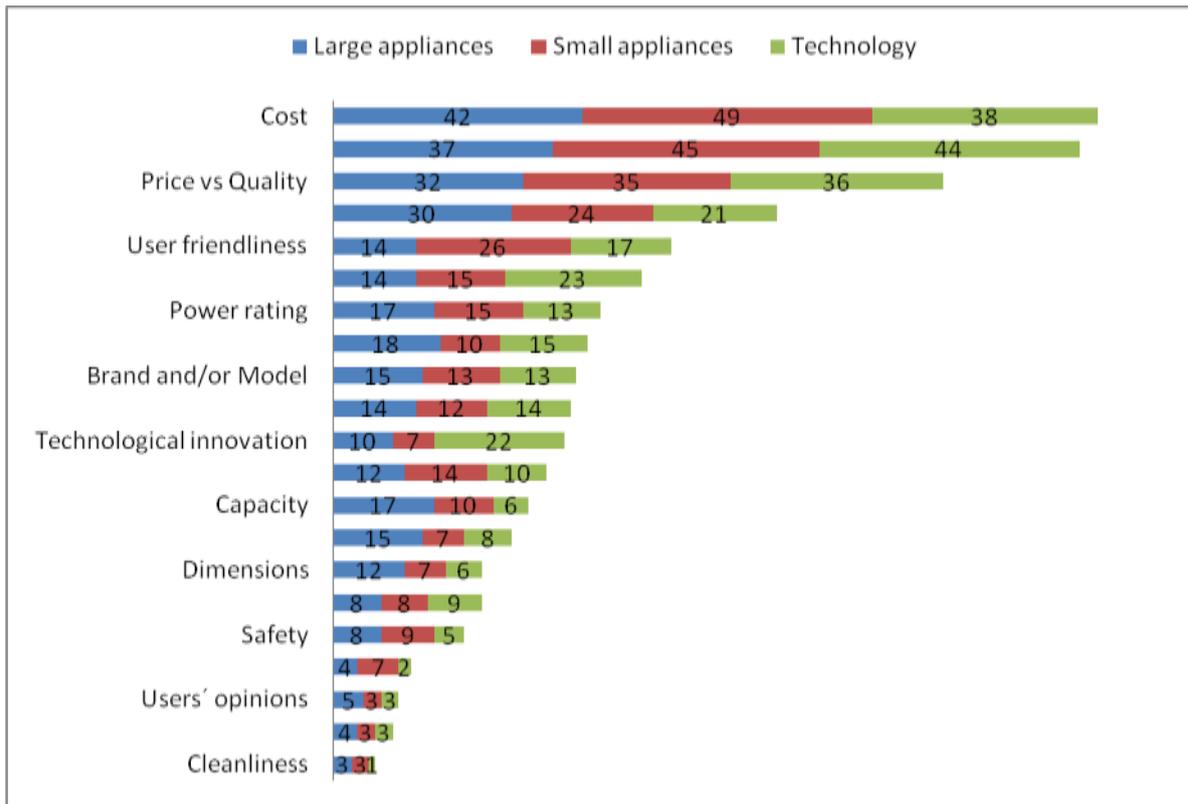


**Figure 9 – Most important characteristics for choosing electrical appliances**

Considering **characteristics for each type of appliance**, cost is the most relevant issue when choosing large (42%) and small appliances (49%); while quality (44%) is the most valuable characteristic when choosing technology appliances. In spite of this, there are no significant differences in the most frequently reported characteristics, which are cost, quality, a balance of quality and price together and energy consumption.

This consistency also exists for the other characteristics, with all having similar percentages for the three types of appliances, as shown in the percentages in the next figure.

<sup>7</sup> It should be noted that these percentages refer to characteristics that could be selected more than once.



**Figure 10 – Most important characteristics for choosing electrical appliances by type of appliance**

These findings are confirmed by the results relating to the **three most important characteristics for choice, for each type of appliance**. Considering all appliances together, the characteristics most identified were again cost, quality, a balance of quality and price together and energy consumption. Thus, not only were these characteristics selected more frequently by the costumers (as shown above), but they were also reported as being the most important in comparison to the other characteristics, as shown in the next figure.

Given the size of the figure, percentages were included in a table that is also presented (the highest percentages - above 10% - are signalled in yellow). Although there is an overall consistency, mainly in regard to the selection of cost and quality in the top three characteristics, there is also some variability in other characteristics. One example refers to energy consumption, which is more frequently referred as important for large appliances in second (11.58%) and third places (11.58%), than for the other types of appliances. The same holds true with power rating (10.50%) and user friendliness (15.98%), being considered slightly more important (in third place) for small appliances than for the other types of appliances.

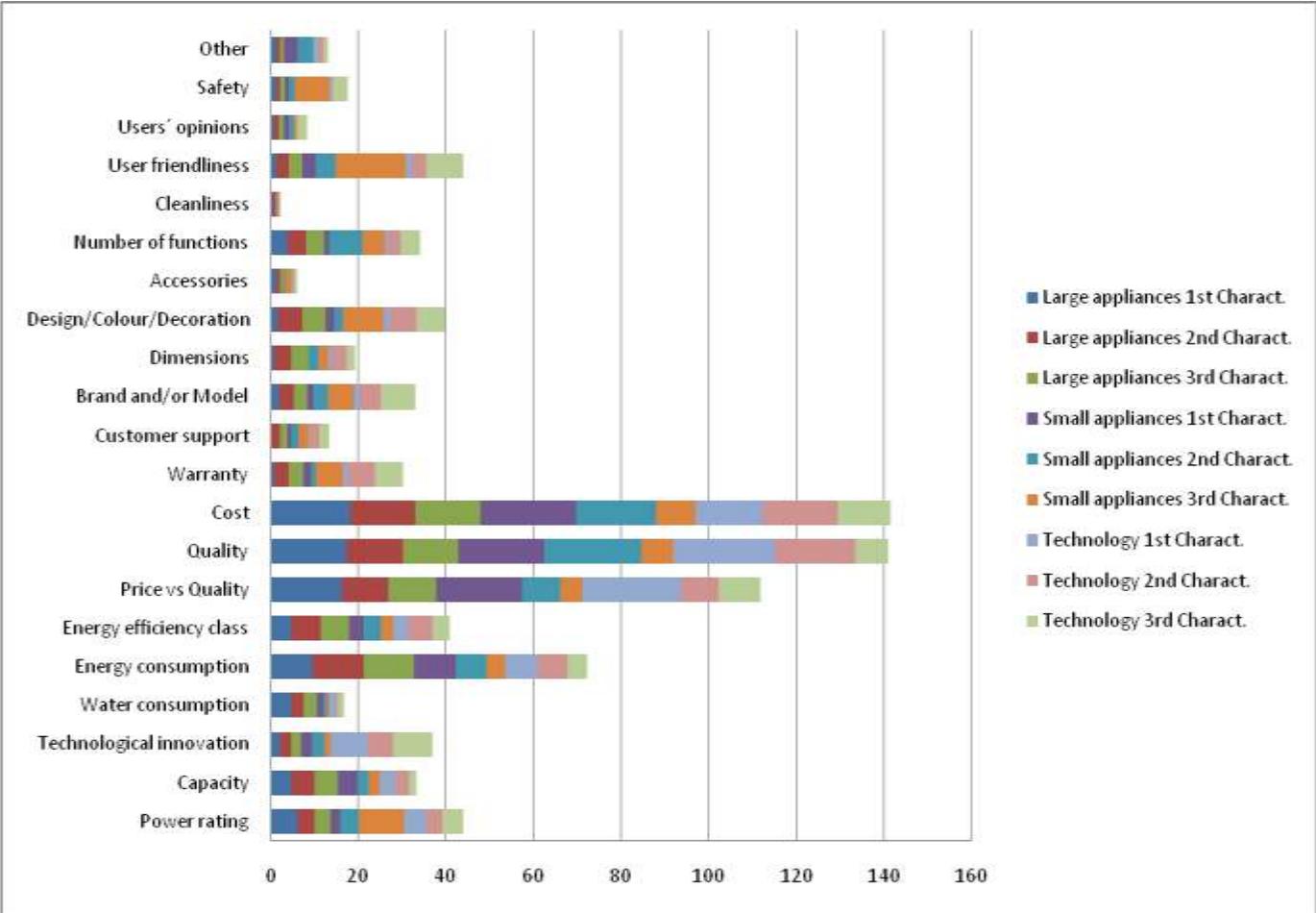


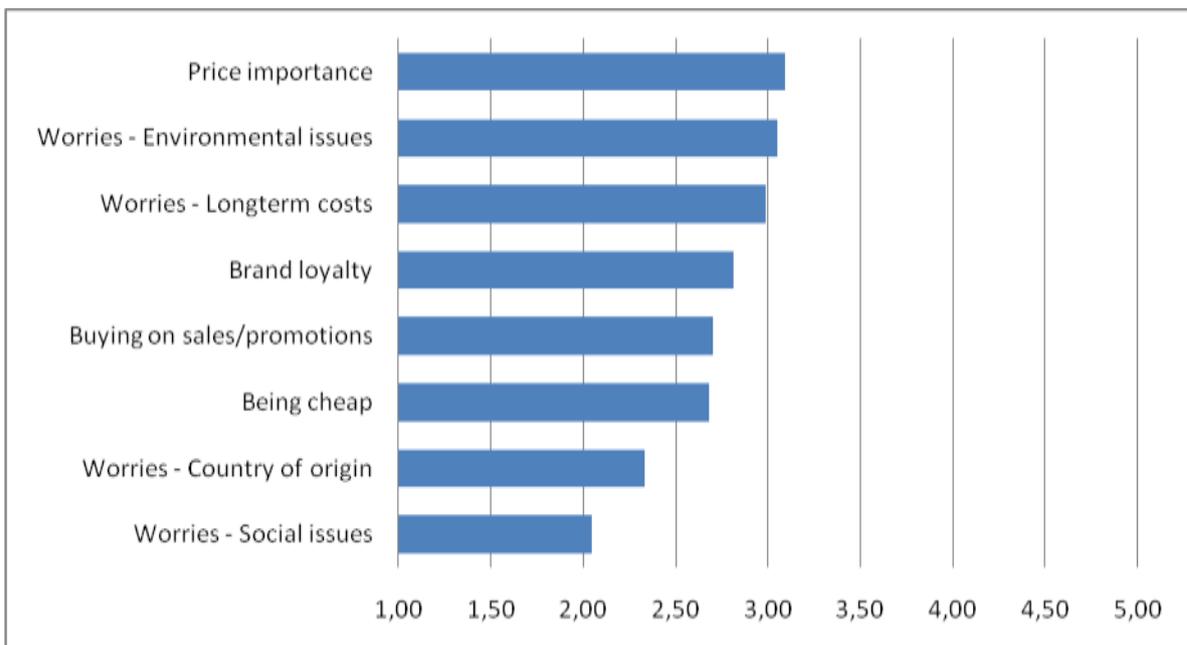
Figure 11 – Three most important characteristics for choosing electrical appliances by type of appliance

	Large appliances			Small appliances			Technology		
	1st Charact.	2nd Charact.	3rd Charact.	1st Charact.	2nd Charact.	3rd Charact.	1st Charact.	2nd Charact.	3rd Charact.
<b>Power rating</b>	6,10	3,86	3,86	2,18	4,02	<b>10,50</b>	4,92	3,81	4,68
<b>Capacity</b>	4,80	5,37	5,37	4,36	2,41	2,74	3,55	3,17	1,67
<b>Technological innovation</b>	2,33	2,35	2,35	2,55	2,81	1,37	8,47	5,71	9,03
<b>Water consumption</b>	4,65	3,02	3,02	1,45	0,80	0,46	1,37	0,63	1,34
<b>Energy consumption</b>	9,59	<b>11,58</b>	<b>11,58</b>	9,45	7,23	4,11	7,65	6,67	4,35
<b>Energy efficiency class</b>	4,80	6,54	6,54	3,27	4,02	2,74	3,55	5,40	4,01
<b>Price vs Quality</b>	<b>16,28</b>	<b>10,74</b>	<b>10,74</b>	<b>19,64</b>	8,84	5,02	<b>22,40</b>	8,57	9,70
<b>Quality</b>	<b>17,44</b>	<b>12,75</b>	<b>12,75</b>	<b>19,64</b>	<b>22,09</b>	7,31	<b>23,22</b>	<b>18,10</b>	7,69
<b>Cost</b>	<b>18,17</b>	<b>14,93</b>	<b>14,93</b>	<b>21,82</b>	<b>18,07</b>	9,13	<b>15,30</b>	<b>17,14</b>	<b>12,04</b>
<b>Warranty</b>	0,73	3,36	3,36	1,82	1,20	5,94	1,37	6,03	6,35
<b>Customer support</b>	0,29	1,85	1,85	0,73	1,61	2,28	0,27	2,22	2,34
<b>Brand and/or Model</b>	2,03	3,19	3,19	1,45	3,21	5,94	1,37	4,76	8,03
<b>Dimensions</b>	0,87	3,86	3,86	0,00	2,41	2,28	0,82	3,17	2,01
<b>Design/Colour/Decoration</b>	1,60	5,54	5,54	1,82	2,01	9,13	1,64	6,03	6,35
<b>Accessories</b>	1,31	0,84	0,84	0,00	0,40	1,37	0,27	0,32	0,67
<b>Number of functions</b>	3,92	4,19	4,19	1,09	7,63	5,02	0,82	2,86	4,35
<b>Cleanliness</b>	0,29	0,17	0,17	0,36	0,40	0,46	0,00	0,32	0,00
<b>User friendliness</b>	1,45	2,85	2,85	3,27	4,42	<b>15,98</b>	1,37	3,49	8,36
<b>Users' opinions</b>	0,73	1,17	1,17	1,09	1,20	0,46	0,00	0,32	2,34
<b>Safety</b>	1,31	1,01	1,01	0,73	1,61	7,76	0,55	0,32	3,34
<b>Other</b>	1,31	0,84	0,84	3,27	3,61	0,00	1,09	0,95	1,34

Table 3 - Percentages for the three most important characteristics for choosing electrical appliances by type of appliance

Additionally to the choice factors presented above associated with the habit of buying various types of electrical appliances, the survey results indicate that costumers also consider other aspects (see also the figure below):

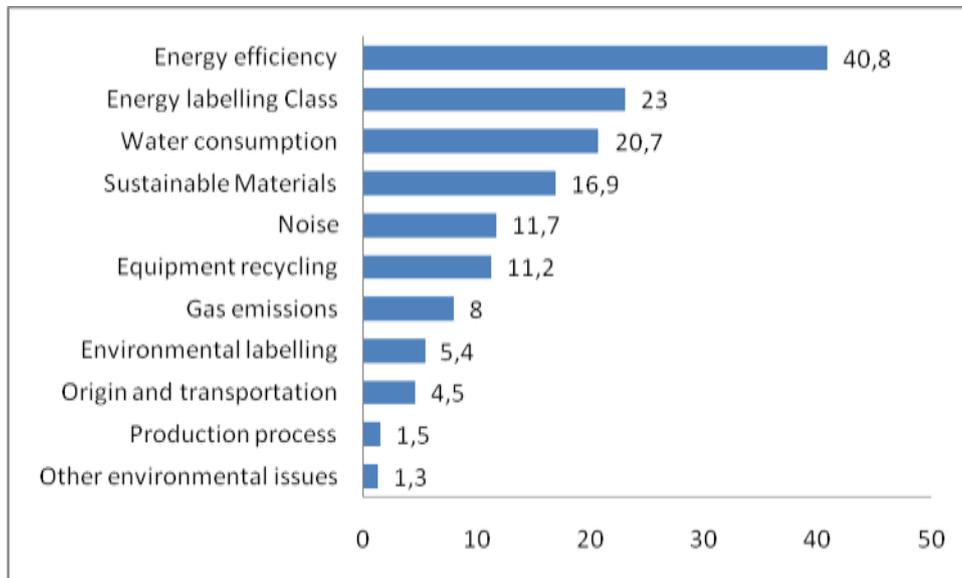
- The highest importance (above the mid point of the scale) is given to aspects like establishing a price limit when buying an appliance and adjusting their behaviour to the type of appliance they own.
- Long-term costs associated with the appliance and the environmental issues associated with its use are considered only to a moderate degree, giving a medium importance to these issues (in a scale from 1 to 5, in which 5 represents very high importance, 1 very low importance and 3 a medium importance).
- The lowest importance (below the mid point of the scale) is given to consideration of aspects like the country where the appliance was produced and social issues when buying it; or aspects like the appliance being at a cheap price or on sale/promotion at the time of purchase. Additionally, loyalty to a particular electrical appliance brand (buying it every time or at least most of the times) is considered to be an aspect of low to medium importance.



**Figure 12 - Costumer’s perceptions about appliances choice**

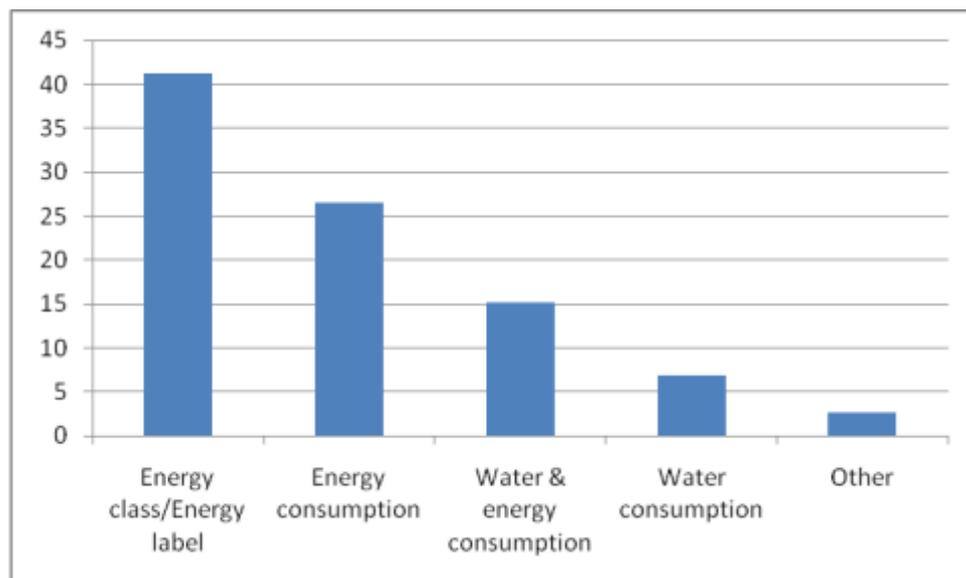
With regard to their worries about social issues, these refer mainly to social responsibility (17%), fair trade (15.8%) and other social issues (3.9%); worries about the country of origin of the electrical appliances refer mainly to economy (13.1%), employment (14.4%), warranty (12.1%), technical assistance (11.2%) and other issues (6.6%); worries about the electrical appliances’ long-term costs refer mainly to maintenance costs (32.6%), energy consumption (46.6%), water consumption (14%) and other costs (2.8%).

In relation to customers’ concerns about environmental issues, these refer mainly to energy efficiency (40.8%), energy labelling class (23%) and water consumption (20.7%). This can be seen in the following figure.



**Figure 13 – Environmental issues considered in costumer’s choices**

Specifically with regard to energy efficiency, 82.7% of the costumers reported having heard before about “energy efficiency”. When asked about how they assess the energy efficiency of an appliance, the majority (41.3%) consider that their assessment is based on the energy class/energy label, with the remaining basing their assessment on energy and water consumption levels, as shown in the next figure.



**Figure 14 - Factors considered in costumer’s assessment of energy efficiency**

### **2.2.7 Employees/technicians importance for choice**

Customers consider hearing the technical opinion of an employee when buying the appliance between “sometimes” and “frequently” ( $M=3.49$ ;  $SD=.04$ ), on a scale in which 1 represents never and 5 represents always. Also, they have a moderate to high general positive attitude<sup>8</sup> towards the store employees ( $M=3.46$ ;  $SD=.63$ ). Specifically in regard to the items included in the measure of general attitude, costumers consider as the most important aspect the fact that the employees give useful information ( $M=3.64$ ;  $SD=.86$ ). Customers also consider employees’ technical opinion important ( $M=3.45$ ;  $SD=1.03$ ) and that the information they provide is trustful ( $M=3.49$ ;  $SD=.87$ ). Whether they were trained to give advice to costumers is the least important of these four specific aspects mentioned ( $M=3.27$ ;  $SD=.87$ ).

### **2.2.8 Determinants of energy related choice factors**

Regarding specifically the energy related choice factors – Power rating; Energy consumption; Energy efficiency class – an analysis of the statistical relationship between these factors and the other choice factors was performed. Results show that from the choice factors associated with all three energy related factors, the one with the stronger positive relationship<sup>9</sup> is water consumption, i.e. a choice based on one factor is probably accompanied by choice based on the other. This might mean that when people are considering the choice of an appliance as for example, a washing machine, both these factors (water and energy) might be considered together, especially to what concerns the consumption levels (given that the highest correlation was found between water and energy consumption choice factors;  $\phi = .343$ ).

Considering each energy related factor isolated, the factor with the highest positive relationship with power rating is quality ( $\phi = .217$ ), followed by capacity ( $\phi = .209$ ), technological innovation ( $\phi = .186$ ), cost ( $\phi = .178$ ) and warranty ( $\phi = .166$ ). This means that the consideration of power rating as a choice factor is probably related with the consideration of the other choice factors, when costumers make their choices. With regard to energy consumption, the factor with the highest positive relationship with it is water consumption ( $\phi = .343$ ), followed by costumer support ( $\phi = .165$ ). Finally, the energy efficiency class, relates stronger and positively with water consumption ( $\phi = .202$ ), followed by costumer support ( $\phi = .197$ ) and technological innovation ( $\phi = .171$ ). This might imply that in order to increase the probability that the energy efficiency class is included as a choice factor, it should be associated with technological innovation (“choosing

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<sup>8</sup> The general attitude towards the employees scale was constructed by aggregating a set of items (Q8, Q9, Q10, and Q11; see questionnaire attached), having a moderate to high level of reliability ( $\alpha = .70$ ).

<sup>9</sup> I.e. the highest positive correlation level is when the value = 1; the highest negative correlation level is when the value = - 1; The value 0 represents no relationship between the factors.

the highest energy efficiency class means that I am also choosing the most innovative technology”) and technical support regarding specifically the energy efficiency aspect.

All these aspects can be seen in the next table.

	Power rating	Energy consumption	Energy efficiency class
Capacity	.209**	<i>n.s.</i>	.109**
Technological innovation	.186**	<i>n.s.</i>	.171**
Water consumption	.101**	.343**	.202**
Price vs Quality	<i>n.s.</i>	<i>n.s.</i>	.127**
Quality	.217**	.078*	.071*
Cost	.178**	<i>n.s.</i>	<i>n.s.</i>
Warranty	.166**	.077*	.141**
Customer support	.112**	.165**	.197**
Brand and/or Model	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>
Dimensions	.130**	<i>n.s.</i>	.060*
Design/ Colour/ Decoration	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>
Accessories	<i>n.s.</i>	<i>n.s.</i>	.053*
Number of functions	.079*	-.061*	<i>n.s.</i>
Cleanliness	.120**	.061*	.079*
User friendliness	.082*	.096**	.079*
Users´ opinions	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>
Safety	.058*	<i>n.s.</i>	.102**
Other type of info	-.066*	<i>n.s.</i>	-.067*

\*\* Highly significant ( $p < .001$ )

\* Significant ( $p < .05$ )

*n.s.* = non-significant correlation

**Table 4 – Phi/Cramers’ V correlation between the energy related choice factors and all the other choice factors**

In order to better understand the factors that can influence the energy related choice factors, i.e. factors that can influence positively or negatively their consideration in choice, other than the one’s presented above, an analysis was performed to assess the role of environmental attitudes and behaviors as predictors.

Overall, more positive levels of general environmental attitude can decrease the probability that power rating ( $B = -.194$ ) and energy consumption ( $B = -.223$ ) are considered in choice, given the negative relationship between them, although this is more probable for the latter (given the higher statistical significance) than for the former. The second is also influenced negatively by resources saving ( $B = -.260$ ). This might represent that people’s attitudes are not truly associated with their behaviors and choice or are somewhat inconsistent/incongruent with these. Moreover the consideration of energy efficiency class is not affected by attitudes. However general environmental behavior has a strong positive influence in energy consumption ( $B = .629$ ) and energy efficiency class ( $B = .595$ ) consideration in choice.

To what concerns the specific environmental behaviors, they mostly have a positive influence in the energy related factors consideration (although with a lower significance), except for fair trade, which influences negatively the power rating consideration ( $B = -.240$ ). The efficient light bulbs use has the highest positive influence either over energy consumption ( $B =$

.189) or energy efficiency class ( $B = .207$ ), With regard to other energy related environmental behaviors, the use of rechargeable batteries ( $B = .192$ ) has a positive influence over the consideration of the energy efficiency class in choice, while turning “off” standby modes ( $B = .115$ ) shows a positive influence over energy consumption consideration in choice. To what concerns the non-energy related environmental behaviors, garbage separation has a positive influence both in energy consumption ( $B = .181$ ) and energy efficiency class ( $B = .191$ ), while bags reuse has a positive influence over power rating consideration in choice ( $B = .161$ ). Finally, chemicals avoidance behavior has a positive influence on energy efficiency class ( $B = .150$ ).

All these aspects can be seen in the next table.

<i>Predictors</i>	Power rating	Energy consumption	Energy efficiency class
General environmental attitude	$B = -.194^*$	$B = -.223^{**}$	<i>n.s.</i>
General environmental behavior	<i>n.s.</i>	$B = .629^*$	$B = .595^*$
Resources saving	<i>n.s.</i>	$B = -.260^*$	<i>n.s.</i>
Water & energy	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>
Appliance energy savings & efficiency	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>
Efficient light bulbs	<i>n.s.</i>	$B = .189^*$	$B = .207^*$
Rechargeable batteries	<i>n.s.</i>	<i>n.s.</i>	$B = .192^*$
Fair trade	$B = -.240^{**}$	<i>n.s.</i>	<i>n.s.</i>
Garbage separation	<i>n.s.</i>	$B = .181^*$	$B = .191^*$
Sprays/aerosols avoidance	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>
Chemicals avoidance	<i>n.s.</i>	<i>n.s.</i>	$B = .150^*$
Bags reuse	$B = .161^*$	<i>n.s.</i>	<i>n.s.</i>
Family-size packages use	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>
Turn off “standby” modes	<i>n.s.</i>	$B = .115^*$	<i>n.s.</i>

\*\* Highly significant ( $p < .001$ )

\* Significant ( $p < .05$ )

*n.s.* = non-significant correlation

B = Regression coefficient value

**Table 5 – Significant predictors of energy related choice factors consideration**

## Annexes

### A.1. Customers' survey

#### a) Form

#### IEE QUESTIONNAIRE

We are conducting a study to find out how people choose their electric appliances. There are no correct or incorrect answers. We are only interested in knowing how you make decisions when you buying an electric appliance. Please answer honestly.

We guarantee all your answers are anonymous.

In answering the following questions, think of the electric appliance you are about to buy.

#### 1. Which appliance are you about to buy?

1	Dishwasher	7	Immersion Blender	13	LCD
2	Washing Machine	8	Mixer	14	TV
3	Air Conditioner	9	Toaster	15	PC
4	Refrigerator / Freezer	10	Kettle	16	Laptop
5	Tumble Dryer	11	Vacuum Cleaner	17	Hi-Fi
6	Other (big appliance): _____	12	Other (small appliance): _____	18	Other (technology): _____

#### 2. Did you search for any type of information before coming to buy the appliance?

1 Yes	2 No	If yes, proceed to question 3, If no, proceed to question 5.
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#### 3. What kind of information did you research, what was it about?

1	Power rating	8	Quality	15	Accessories
2	Capacity	9	Cost	16	Number of functions
3	Technological innovation	10	Warranty	17	Cleanliness
4	Water consumption	11	Customer support	18	User friendliness
5	Energy consumption	12	Brand and/or Model	19	Users' opinions
6	Energy efficiency class	13	Dimensions	20	Safety
7	Price vs Quality	14	Design/Colour/ Decoration	21	Other: _____

#### 4. Where did you search for that information.

1	Shop employees	4	Internet	7	Pamphlets / brochures
2	Family / relatives	5	TV advertisements	8	Other: _____
3	Friends	6	Specialty magazines		

5. How often do you search for information before buying an electrical appliance?

1 Never	2 Rarely	3 Sometimes	4 Frequently	5 Always
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6. Was the choice of buying the electric appliance yours alone or did you discuss it with someone else before buying it?

1 Alone	2 Spouse/boy(girl)friend	3 Parents	4 Children
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7. Do you consider it important to hear the technical opinion of an employee when buying an electrical appliance?

1 Never	2 Rarely	3 Sometimes	4 Frequently	5 Always
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Tell us if you totally agree, agree, don't agree nor disagree, disagree, or totally disagree with the following:

	Totally disagree	Disagree	Don't agree nor disagree	Agree	Totally agree
8. The technical opinion of the shop employees is very important to me.	1	2	3	4	5
9. The shop employees never give useful information.	1	2	3	4	5
10. The employees have been trained in order to give advice to customers.	1	2	3	4	5
11. I don't trust the information given by the shop employees.	1	2	3	4	5

12. Why are you buying this particular appliance (advantage of replacing the old one)?

1	I don't have one	5	Less energy consumption	9	New home dimensions
2	The old one broke	6	Better quality/technology	10	New house decoration
3	It's on promotion/sale	7	All my friends have one	11	Other: _____
4	Less water consumption	8	Adjusted capacity to new needs		

13. For which reason do you usually buy an electric appliance?

1	I don't have one	5	Less energy consumption	9	New home dimensions
2	The old one broke	6	Better quality/technology	10	New house decoration
3	It's on promotion	7	All my friends have one	11	Other: _____
4	Less water consumption	8	Adjusted capacity to new needs		

14. When buying an appliance, what are the most important characteristics?

1	Power rating	8	Quality	15	Accessories
2	Capacity	9	Cost	16	Number of functions
3	Technological innovation	10	Warranty	17	Cleanliness
4	Water consumption	11	Customer support	18	User friendliness
5	Energy consumption	12	Brand and/or Model	19	Users' opinions
6	Energy efficiency class	13	Dimensions	20	Safety
7	Price vs Quality	14	Design/Colour/ Decoration	21	Other: _____

15. Of the characteristics mentioned above, which are the 3 most important?

1 <sup>a</sup>		2 <sup>a</sup>		3 <sup>a</sup>	
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16. Did you set a price-limit up to which you were willing to spend on this appliance?

1 Yes	2 A kind of	3 No
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17. And do you usually set a price-limit up to which you are willing to spend on an appliance?

1 Never	2 Rarely	3 Sometimes	4 Frequently	5 Always
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18. Do you have normally buy appliances of the same brand?

1 Never	2 Rarely	3 Sometimes	4 Frequently	5 Always
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19. How frequently do you buy your appliances on promotion/sale?

1 Never	2 Rarely	3 Sometimes	4 Frequently	5 Always
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20. When buying electric appliances do you consider environmental issues?

1 Never Proceed to question 22	2 Rarely	3 Sometimes	4 Frequently	5 Always
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21. Which environmental issues?

1	Energy Efficiency	5	Gas emissions	9	Environmental Certification
2	Energy Certification Class	6	Sustainable Materials	10	Production process
3	Water consumption	7	Equipment recycling	11	Other: _____
4	Noise	8	Where it's made and transportation		

22. When buying electric appliances do you worry about social issues?

1 Never Proceed to question 24	2 Rarely	3 Sometimes	4 Frequently	5 Always	6 I don't understand the question
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23. Which?

1 Social Responsibility	2 Fair trade	3 Other: _____
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24. When buying electric appliances do you consider if it is made on your country?

1 Never Proceed to question 26	2 Rarely	3 Sometimes	4 Frequently	5 Always
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25. Why?

1 Economy	2 Employment	3 Warranty	4 Technical Assistance	5 Other: _____
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26. Have you ever heard of Energy Efficiency?

1 Yes	2 No	If yes, proceed to the next question, If no, skip the next question.
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27. How do you assess the energy efficiency of an appliance?

1	Energy class / Energy certificate	2	Energy consumption	3	Water consumption
4	Water and energy consumption	5	Other: _____		

28. Do you consider long term economic costs of the usage of the appliance?

1 Never Skip the next question	2 Rarely	3 Sometimes	4 Frequently	5 Always
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29. Which long term economic costs do you consider?

1	Maintenance costs	2	Energy consumption	3	Water consumption
4	Other: _____				

Next, we present you with some statements. For each of these, tell us if you totally agree, agree, don't agree nor disagree, disagree, or totally disagree.

	Totally disagree	Disagree	Don't agree nor disagree	Agree	Totally agree
30. The energy efficiency of the appliance is not relevant.	1	2	3	4	5
31. Knowing the energy consumption allows us to save in the long term.	1	2	3	4	5
32. I adjust my behaviour according to the electric appliance I own.	1	2	3	4	5

	Totally disagree	Disagree	Don't agree nor disagree	Agree	Totally agree
33. I always choose the appliance with the largest capacity regardless of the capacity I need actually because I don't know what tomorrow will bring me.	1	2	3	4	5
34. To me, the most important factor is that the appliance is cheap.	1	2	3	4	5
35. When I buy an appliance, the price is a secondary aspect.	1	2	3	4	5
36. Reducing energy consumption is very important.	1	2	3	4	5
37. Reducing water consumption is very important.	1	2	3	4	5
38. It's important to preserve resources for future generations.	1	2	3	4	5
39. Environmental issues are not relevant.	1	2	3	4	5
40. Consumption doesn't concern me.	1	2	3	4	5
41. The depletion of resources doesn't concern me.	1	2	3	4	5
42. There are no environmental risks associated with water and energy consumption.	1	2	3	4	5

Tell us how often you take the following measures:

	Never	Rarely	Sometimes	Frequently	Always
43. Use of energy efficient bulbs.	1	2	3	4	5
44. Use of rechargeable batteries.	1	2	3	4	5
45. Shopping in fair trade shops.	1	2	3	4	5
46. Recycle (separate) garbage.	1	2	3	4	5
47. Avoid sprays/aerosols.	1	2	3	4	5
48. Avoid buying detergents with harsh or toxic chemicals.	1	2	3	4	5
49. Re-use of bags.	1	2	3	4	5
50. Buy family-size (large) packages.	1	2	3	4	5
51. Turn off "standby" modes on TV or other appliances.	1	2	3	4	5

Finally, we would appreciate asking just a few generic questions for the sole purpose of statistical analysis.

52. Age: \_\_\_\_\_

53. Sex: 1 - Male 2 – Female

54. Level of Education

1 None	2 Grammar school (primary)	3 High school (secondary)	4 College / University
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55. Do you have children? 1 – Yes; 2 – No (skip to question 55)

56. How old are they? 1- < age 6; 2 - 6>x<18; 3 - > age 18

57. Family size (number of family members)? \_\_\_\_\_

58. Family's average monthly income? \_\_\_\_\_ (euros)

59. Do you own the house you live in? 1 – Yes; 2 - No

60. When you bought/rented your house, was it already equipped with electric appliances?

1 Totally equipped	2 Partially equipped	3 Didn't have any Skip to question 60
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61. If you could, would you replace the existing appliances in your house? 1 – Yes; 2 - No

62. Inquirer who conducted the questionnaire: \_\_\_\_\_

63. Place of questionnaire: \_\_\_\_\_