

# Energy saving and the contribution of green marketing to behavioural change

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*Abstract:* The consumption of energy resources has significantly increased in over the years. One of the sectors where this increase has been most notorious is in the domestic sector. Given the environmental and economic costs that this tendency brings with it, it has become necessary to reduce energy consumption. The aim of this study is to find which factors most influence the behaviour of individuals in relation to energy saving. At the same time, an attempt is also made to understand whether advertising campaigns seeking to raise awareness about the need to save energy resources exert any influence over behaviour. The results show that advertising campaigns are highlighted by individuals in general as a good way of raising awareness about the need to save energy resources, even though they do not point to this as the factor that most influences their energy saving behaviour.

*Key-Words:* environment, energy saving, green marketing, consumer behavior, communication

## 1 Introduction

According to the American Chamber of Commerce to the European Union [1], the question of energy supply, the diversification of energy sources and the development of renewable energy sources will be one of the most fundamental issues for guaranteeing the future of Europe, ensuring the equilibrium of the environment and attempting to overcome adverse climate changes.

Insofar as they are responsible for a large percentage of energy consumption, consumers have been encouraged to take part in the saving of energy resources. Companies are equally beginning to adopt “environmentally friendly” practices with regard to the saving and rational use of energy resources, once they are seeing their energy/electricity bill increase.

As far as the energy consumption market is concerned, this may be divided into several sectors: the domestic or residential sector, the services sector, the industrial sector and the transport sector. This paper focuses essentially on the domestic sector, more precisely on the use of electric power. This

option is due to the fact that this sector has shown an increase in energy consumption, with all the costs and implications arising from this.

Research into the efficient management of energy resources (in this case electricity) through the use of marketing strategies, is still in its early stages. At the same time, the influence of advertising on the saving of resources has tended to be somewhat overlooked by researchers, so that it makes sense to make an approach to the study of this problematic.

This paper begins by outlining the question of energy resources and its relationship with the preservation of the environment. This is followed by the presentation of an approach to green marketing and green communication. In this case, stress will be laid on the important role played by the consumer market in the adoption of environmentally friendly behaviour at the level of energy resource saving. After this contextualisation has been made, the most important methodological aspects of the research will be presented, together with the empirical results and respective conclusions. The empirical study will focus the Portuguese consumer market.

## 2 The Environment and the Energy Saving Resources

The results of a Eurobarometer survey undertaken in January 2007, 55% of European citizens consider the use of renewable energies to be very promising and 60% think that further research in the field of energy should be made a priority. 40% of consumers are willing to pay for renewable energy sources, considering it necessary to increase the consumption of these to ensure that we live in a clean, sustainable and safer environment. However, the remainder believe that it is the duty of national governments to guarantee low energy prices, as well as its continuing supply [2].

According to another Eurobarometer survey undertaken between March and May 2008, which asked the citizens of the European Union (UE) about climate change, show that “three out of four Europeans (75%) are seriously concerned about the problem of climate change, and almost two thirds are helping to minimise it. However, most of those questioned believe that neither industry nor citizens nor national governments are doing enough” [3].

For the Commission of the European Communities [4], the renewable energy sector is the one that has recorded the fastest growth in the context of the energy industry in Europe and even worldwide, displaying a growth rate of more than 20% per year in wind power and photovoltaic solar energy. This communication adds that this sector is the one that most stands out in terms of its capacity for reducing toxic gas emissions and exploiting local and decentralised energy sources, as well as the incentives that it provides for international high tech industries.

From the national viewpoint, Portugal is one of the European countries best placed to make a large-scale use of renewable energies. “The reasons are obvious: a high level of solar exposure, a relatively dense hydrographic network and a coastline that benefits from the Atlantic winds are factors that can cut the country’s energy spending by half, with the bill currently being calculated at 2.5 billion Euros per year and directly or indirectly responsible for roughly 70% of national imports” [5]. Besides its advantages for the environment and associated low costs, the renewable energy sector can help to stimulate the economy and lead to the creation of more jobs.

According to the study carried out by *Ernst & Young* in the third quarter of 2007, *Renewable Energy Country Attractiveness Indices* [6], Portugal ranks in tenth place amongst the most attractive countries for international investment in renewable energies.

Research places Portugal ahead of countries that are more traditionally associated with the active defence of the environment, such as Sweden (13<sup>th</sup>), Denmark (14<sup>th</sup>) or the Netherlands (17<sup>th</sup>).

There are still currently a number of obstacles preventing the full application of policies relating to the use of renewable energy resources. As such, other solutions have been sought to safeguard the environment. Saving energy resources is one of these.

In 1973, the first oil shock took place, leading to a rise in oil prices in the international market. This was the first warning for the world economy, whose development was based on this source of energy. Being a country that is highly dependent on energy, Portugal became extremely vulnerable to the crisis situations occurring in the oil market. It was after this date that the first concerns began to be shown about the levels of energy consumption, and the first measures were taken to encourage energy saving.

The need to reduce energy consumption became evident and, in order to achieve this aim, consumption had to be rationalised and superfluous consumption banned. It became necessary to use technologies requiring lower levels of energy consumption, which had not been used before then because they were more expensive.

In order to promote a rationalisation of consumption, the energy labelling of electrical household appliances (fridges, deep freezers, washing machines, dish washers, spin dryers, etc.) was approved and implemented. A public initiative, “Energy Efficiency in Buildings”, was also promoted with the aim of introducing an energy certification system, resulting in a new legislative package for buildings, which came into force in 2006. As is the case with household appliances, this system makes it possible to inform users about the energy consumption of their building and thus provides for a more rational choice [7].

Besides helping to protect the environment, an efficient management of energy resources makes it possible to reduce the related costs, namely electricity. A more rational energy consumption is also essential for creating a model of sustainable and socially responsible development [8].

The environmentalist association Quercus and Portugal’s main electricity supply company, EDP, joined forces in the organisation of a project entitled “Ecofamilies”, in which they studied the habits of 225 Portuguese families. The conclusion of this study was that, in energy terms, each household presented a saving potential of roughly 10%. The analysis took into account the habits, composition and “contents” of each household and noted that a household with a

child or with several computer and entertainment appliances potentially consumes more than the rest.

According to the Yale Center for Environmental Law and Policy [8], other studies that have been undertaken show that an average European household could save between 200 and 1000 Euros per year, if they chose a more efficient form of energy consumption. As a whole, the European Union could reduce its current energy consumption by roughly 20%, which is equivalent to a saving of approximately 60 billion Euros per year. Strengthening the implementation of energy saving policies and energy efficient practices would further create another million jobs in Europe.

Obtaining significant and lasting energy saving involves, on the one hand, the development of energy efficient techniques, products and services, and, on the other hand, a change in behaviour patterns, with the aim of reducing energy consumption without losing any quality of life<sup>1</sup>.

The main aspects to be taken into account when seeking to save energy resources in the home are lighting, insulation, air conditioning, the use of energy efficient appliances, the habit of turning off appliances when they are not being used and maximising the potential of electrical household appliances (e.g. fully loading washing machines and dish washers). These aspects will be explored in the empirical research.

### 3 Green Marketing and Green Communication

From an ecological viewpoint, sustainability requires societies to satisfy human needs, not only by increasing productive potential, but also by ensuring equal opportunity. Furthermore, consumption patterns have to be re-assessed in order to take sustainability into account [9, 10].

The role played by marketing in the process of sustainable development is highly important, since most economic activity is encouraged through marketing strategies, which offer and stimulate consumption opportunities that will satisfy the needs and wishes of individuals. However, a marketing approach that seeks to serve the natural desires of consumers by increasing the volume of goods without any attempt to maximise the quality of life is akin to “mortgaging the future” of the new generations to come.

The concept that combines environmental concerns and marketing may seem paradoxical [11]. But, if one considers that sustainability is the cornerstone of the philosophy of green marketing, then the contradiction that is involved in the logic of productivism/consumerism is apparently resolved. A sustainable approach to consumption and production means that our current standard of living cannot be allowed to endanger the survival of future generations. Thus, the task of green marketing must be centred upon re-directing consumers’ needs and wishes towards a more conscious and sustainable form of consumption [12].

Marketing thus needs to be concerned with the resources used to satisfy the needs and wishes of consumers, as well as the effects of consumption on human life and the environment. Sustainable development requires “sustainable marketing”, i.e. marketing efforts must not only be sustainable in terms of competitiveness, but they must also be ecologically sustainable [12]. In this way, green marketing can also be described as a group of activities that consider environmental stewardship as an opportunity for business development [13]. For Sheth and Parvatiyar [12], green marketing involves proactive strategies that benefit both companies and society and that redirect consumer demand towards products/services that are not harmful to the environment.

Polonsky and Mintu-Wimsatt [14] define green marketing as the application of marketing tools to facilitate exchanges that satisfy organisational and individual goals, so that the preservation, protection and conservation of the environment are sustained. According to these authors green marketing is related to the way in which a company’s activities can affect the environment. This definition includes the promotion of products and practices, as the energy saving, whose characteristics are not harmful to the environment.

When the organizations are implementing communication campaigns, if a promotional strategy is being developed based around environmental and social issues, a number of aspects should be analysed: the dimension and characteristics of target markets; the level of emphasis required in corporate communication and product communication; the promotional mechanism containing the correct information; the communication tools used; the level of consumers’ understanding of energy labelling programmes; and the use of comprehensible terms and claims. For example the terms “recyclable”, “environmentally friendly”, “harmless to the ozone layer” and “biodegradable” have become commonplace in advertising. Sometimes the

<sup>1</sup> <http://europa.eu/scadplus/leg/pt/lvb/127064.htm>. Accessed 12 November 2008.

consumers who are exposed to these appeals tend to show some resistance and scepticism [15].

The strategies and claims made by the firms must be based on relevant research and information. Information must be communicated constantly to customers and other stakeholders. If claims are erroneous and unproven, then negative publicity will be attracted. In this sense it is crucial that the needs of the target audience be sufficiently researched and defined and the organization have a clear vision of the audience's understanding of the issues [16].

When developing an advertising campaign, it is necessary to take into account the fact that consumers tend to pay attention to messages that are useful for either solving a situation or satisfying a personal need [17]. Hassan *et al.* [18] reinforce this idea, claiming that consumers who are deeply involved with the message are more likely to act in accordance with what is suggested by the advertisement.

### 3.1 The green consumer and the energy saving behaviour

Being a green consumer involves adopting attitudes and behaviours that are designed to minimise adverse effects on the environment. The consumer is faced with a variety of choices that represent different degrees of greenness, but which call for an assessment of the environmental impact of the choice that is made of either a product or service and a change in behaviour in the purchase, consumption and post-consumption use of the product [19].

The green consumer thus practises sustainable consumption, expressed by his use of goods and services that fulfil his basic needs and bring him a better quality of life, while minimising the use of natural resources, toxic materials, emissions of waste and pollution, so as not to harm the needs of future generations [20].

To Pickett *et al.* [21], it was in the 1970s that the first studies appeared with the aim of defining the green consumer market. Demographic aspects (age, gender, social class and education) were the ones given greatest consideration [22]. After many years and much research, it proved impossible to arrive at a generally accepted conclusion regarding the characteristics of this market. Many of the studies reached contradictory results, namely with regard to the profile of the green consumer. An example of this is the fact that, in some of the research undertaken, the demographic variables were found to be related with a concern for the environment whereas, in other studies, there was no direct or significant relation established with some variables.

As far as psychographic variables are concerned, personality may strongly influence energy saving behaviour. However, according to Black and Stern [23], it does not appear to have such a strong influence on the activities that involve making investments in energy efficiency. In the case of values, despite their recognised importance for analysing consumer behaviour, Neuman [24] notes that they have been largely ignored as a factor affecting energy saving.

Within the area of behavioural segmentation, people's attitudes towards the environment are of particular importance. According to Kinnear and Taylor [25], the environmental concern that is displayed by an individual is related to his or her attitude and behaviour. It is influenced by personal experiences, the experiences of other individuals and the media. It results in an environmentally friendly behaviour that is conditioned by a number of factors, such as price, product performance, social standards and knowledge about the environment.

However, consumers do not always translate their concerns into effective purchasing behaviour. For example, in the studies by Yam-Tang and Chan [26], the levels of concern displayed by individuals are not reflected in their environmental purchasing habits, nor even in other environmental behaviours. The same may also happen in the case of energy saving. Sometimes, the economic factor and the need to lower costs outweigh the importance of affect and environmental concern [27].

## 4 Methodology

The aim of this study is to find which factors most influence the behaviour of individuals in relation to energy saving. At the same time, an attempt is also made to understand whether advertising campaigns seeking to raise awareness about the need to save energy resources exert any influence over behaviour, and whether or not they are favourably received and perceived.

Thus, the following research questions were formulated:

- Are consumers sufficiently concerned about the environment to the extent of their rationally using energy resources?
- Which factors most contribute to energy saving?
- What importance is given to advertising campaigns seeking to change attitudes and behaviours towards the saving of energy resources?

The data were collected through a survey of Portuguese consumers. The model of data collection was a survey conducted by self-administered

questionnaire. A convenience sample was used and the final sample was composed by 300 individuals aged over 18.

The questionnaire is composed of two main sections. The first part examines the environmental dimension: concern, use of renewable energy, energy saving behaviour, factors that could influence that behaviour and questions about green advertising perceptions. The scales used to measure these dimension were Likert scales (min 1, max 5), where 3 is the indifference value and other five-point scales (1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Frequently; 5 = Always). In the second part, data are collected about the demographic characteristics of respondents.

After collection, the data were statistically analysed and interpreted using the statistical software SPSS 17.0 (Statistical Package for Social Sciences). A descriptive analysis was undertaken (frequencies, cross tabulations and central tendency statistics), together with nonparametric tests.

## 5 Results and Discussion

The sample used in this study consisted of 300 individuals, of whom 49.0% were women and 51.0% were men. Ages ranged from 18 to 87 years of age, with a predominance of relatively young individuals, and with an overall average age of 33. 32.0% of the respondents' households had an average monthly income of between 1000€ and 1999€. As far as educational levels were concerned, most respondents had fully completed their secondary school education (37%) or held university degrees (39.7%).

Besides this socio-demographic description of the sample, it was also considered pertinent to characterise individuals according to their levels of energy saving, with the process described below being used for this purpose.

Variables were selected that related to energy saving behaviour, or, in other words, which focused on the use of electrical household appliances and other electrical equipment, air conditioning and lighting. Next, the values of the answers relating to 14 selected questions were added together and the scores were then analysed.

It was decided to consider as "environmentally friendly" ("Savers") those individuals who scored more than 50 points, and as less "environmentally friendly" ("Non-carers") those who scored lower than this. The first group comprised 208 individuals (69.3%) and the second group 92 (30.7%).

In order to measure the reliability of the group of variables related with energy saving, Cronbach's Alpha coefficient was estimated. The value that was

obtained (0.729) shows that the scale presents satisfactory levels of internal coherence.

### 5.1 Influence of environmental concern on energy saving behaviour

In order to analyse the influence of environmental concern on energy saving behaviour, data cross tabulation was carried out, as well as the Mann-Whitney U test (Table 1).

**Table 1.** Environmental concern versus energy saving behaviour

	Level of concern with the environmental problems				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Savers	1	2	1	72	<b>132</b> (44,0%)
Non-carers	1	2	1	42	<b>46</b> (15,3%)
Total	2	4	2	114	178 (59,3%)
U de Mann-Whitney .....	8220,000				
Sig.....	0,023				

As can be seen, the "Savers" group has a higher percentage (44.0%) of individuals who are concerned, or greatly concerned, about environmental problems than the "Non-carers" group (15.3%). The statistical significance obtained through the use of the Mann-Whitney U test (0.023) indicates that the type of behaviour that individuals adopt in relation to the saving of energy resources is influenced by their level of concern about environmental problems. Or, in other words, this variable is significant for differentiating between the two groups, taking into account the fact that the test was undertaken for a significance level of 0.05.

In 1973, Kinnear and Taylor [25] had already stated that there was a relationship between environmental concern and individual behaviour. In turn, Kinnear *et al.* [28] reinforced the claim that the attitudes of green consumers must express their environmental concern.

However, such concerns are not always translated into environmentally friendly behaviour. And, while there are, for example, inconsistencies in relation to the behaviour of buying green products, the situation of saving energy resources is even less clear due to the shortage of studies on this theme.

## 5.2 Factors that influence the energy saving

As far as the factors influencing the saving of energy resources are concerned, the following variables were considered: cost of electricity bill; advertising campaigns; other communication activities; available information; environmental concern; social responsibility; and influence of others.

Analysing the averages of the scores obtained from the answers (Table 2), which were measured using a 5-point scale, it can be seen that they all present values close to or higher than 4 points, which means that individuals consider that all the factors are important and influence their energy saving behaviour.

**Table 2.** Descriptive statistics

	Mean	Standard deviation
Cost of electricity bill	<b>4,50</b>	0,803
Advertising campaigns	3,68	0,959
Other communication activities	3,66	0,864
Available information	3,97	0,760
Environmental concern	<b>4,55</b>	0,623
Social responsibility	4,38	0,759
Influence of others	<b>3,51</b>	0,969

The factor that presents the highest average score is “environmental concern” followed by the “cost of the electricity bill”. The lowest average score is represented by the variable “influence of others”. Bearing in mind the value of the standard deviation, the variable “environmental concern” is the one that shows least variability. The one showing the greatest range of answers is the “influence of others”.

It can be seen that “environmental concern” presents scores that are very close to those of the variable “cost of the electricity bill”. The choice of the cost of the electricity bill as the most important factor may also be justified by the current economic situation and by the successive increases that have occurred in the prices of energy resources.

In an attempt to understand whether the listed factors exert different influences on energy saving behaviour, it was decided to analyse the significance of the relationships between these variables by performing the Pearson Chi-Square test. The statistical significances of all these factors correspond to 0.000, so that all the factors influence the energy saving behaviour of individuals to some extent.

## 5.3 Communication and advertising

The importance of advertising campaigns for encouraging energy saving will now be examined. In an attempt to understand whether there was any difference between “Savers” and “Non-carers” with regard to the influence of advertising campaigns, data cross tabulation was carried out, as well as the nonparametric Mann-Whitney U test (Table 3).

**Table 3.** Advertising campaigns and energy saving behaviour

	Savers	Non-carers	Total	
Importance of the advertising campaigns	Completely unimportant	11	5	16
	Unimportant	10	8	18
	Neutral	38	12	50
	Important	<b>123</b>	54	177
	Completely important	26	13	39
Total	208	92	300	
Mann-Whitney U.....	10541,000			
Sig.....	0,552			

As can be seen, “Savers” consider the influence of advertising campaigns on their energy saving behaviour to be more important than do “Non-carers”. From the statistical significance of the Mann-Whitney U test, it can be seen that advertising campaigns are not a significant factor for distinguishing those consumers with a greater tendency for energy saving from other consumers.

The influence of advertising campaigns is not very important in determining the behaviour of individuals with regard to the saving of energy resources. According to Zinkhan and Carlson [29], this situation may be due to various factors, such as, for example, a certain saturation and scepticism in relation to advertisements.

When asked about the capacity of advertising campaigns for making individuals more aware of the need for energy saving, most respondents (91.3%) were of the opinion that this is an effective medium. As regards its capacity for changing energy saving behaviour, again most respondents (71.7%) were of the opinion that advertising does in fact succeed in changing behaviour (Table 4).

**Table 4.** Perceptions about advertising

	Yes	No	Don't know
Advertising is a good way of raising awareness about the need for energy saving	274	18	8
Advertising succeeds in changing individual behaviour towards energy saving	215	39	46

Advertising campaigns are highlighted by individuals as a good way of raising awareness about the need for saving energy resources, although they do not tend to indicate them as the factors that most influence their energy saving behaviour. This situation is perhaps due to the fact that, despite the various contingencies (e.g. its rejection by some consumers and the decrease in investments), advertising continues to be a commonly used medium for the dissemination of information, which, because of its general nature, reaches a wide range of different audiences.

As a result of this analysis, it was considered interesting to discover the reasons why advertising may contribute towards changing individual behaviour (it is informative; it is persuasive; it clarifies doubts; it appeals to the emotions; it exemplifies real situations; it shows a reduction in the electricity bill). The information that is transmitted by advertising was highlighted by respondents as the most important factor (80.6%), which leads us to think that this may be the most effective factor in persuading individuals to save energy resources.

This situation may be due to the need that individuals feel for knowing more about the theme of energy saving. Furthermore, they may consider that advertising campaigns of an informative nature are more believable than those of another type.

## 6 Conclusions

In this research we decided to classify the individuals into two groups: the more “environmentally friendly” (“Savers”) and the less “environmentally friendly” (“Non-carers”), according to their energy saving behaviour, with the first group consisting of roughly 70% of the individuals in the sample. This finding ends up being somewhat surprising in a country that is highly deficient in terms of education and environmental information. Yet, on the other hand, it seems less strange if one considers that the act of saving energy brings with it an underlying factor that is extremely enticing: a reduction in economic costs.

According to the results that were obtained, 97.3% of individuals claim to be concerned about environmental problems, with 68% of these belonging to the “Savers” group, or, in other words, the group of consumers who display a more “environmentally friendly” behaviour with regard to the saving of energy resources. However, even though they may be concerned with environmental problems, the vast majority of individuals do not have any system of renewable energy at their homes, despite their claiming that renewable energies are a viable option for protecting the environment.

The factors that most influence behaviour with regard to the saving of energy resources are the “cost of the electricity bill” and “environmental concern”. However, “advertising campaigns” are also seen to have some importance in terms of the influence on individual behaviour. The results show that “Savers” attach more importance to advertising campaigns than do “Non-carers”. However, the factor that most influences energy saving behaviour is not advertising campaigns, but instead the cost of the electricity bill.

Or, in other words, advertising campaigns are highlighted by individuals in general as a good way of raising awareness about the need to save energy resources, even though they do not point to this as the factor that most influences their energy saving behaviour. Although advertising is a good way of raising the awareness of individuals, it is not considered sufficiently motivating to change their behaviour with regard to saving energy resources.

One of the methodological limitations of this study has to do with the fact that the sample that was put together was a sample of convenience. However, the greatest constraint on the research is the limited number of studies available related to the saving of energy resources, especially in the area of marketing, which may have imposed limitations on the theoretical framework, as well as on the comparison of results.

It should also be added that it is likely that the use of a non-validated scale for measuring the level of individuals’ energy saving, and the methodology used for the classification of the groups may raise some doubts. Thus, one of the targets of future research studies must be to work on the validation of a scale for measuring the behaviour that is related to the saving of energy resources. To this end, it is proposed that specific models for the study of energy saving behaviour should be constructed and/or replicated, in which the relationships of interdependence between the variables are tested, using for this purpose other statistical procedures such as structural equation systems.

Another form of research that may usefully be

carried out is one that has a more multidimensional aspect and includes the analysis of other variables, such as lifestyles, values, environmental knowledge, environmental activism and the type of housing in which individuals live, amongst other aspects.

In the future, the theme of renewable energies will certainly have enormous research potential, where a greater focus could be placed in the concern about environmental issues and economic development [30, 31].

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