

# QUALITY MEASUREMENT STUDY IN A FRACTURED AND COMPETITIVE MARKET. PERCEIVED QUALITY AND OBJECTIVE QUALITY IN THE CANARY ISLAND ELECTRICITY SECTOR

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## ABSTRACT:

The aim of this research is to present and analyse the results obtained as a result of the studies carried out on Perceived Quality and Objective Quality in relation to the electricity industry with the collaboration of consumers in the residential and business segments.

Telephone surveys were conducted to obtain the data for the measurement of Perceived Quality and face-to-face interviews for Objective Quality. Using these data, a detailed study was undertaken of their quantitative importance and trends over the course of two consecutive years, as well as of the decision-taking designed to improve the lowest scoring indicators.

**Keywords:** Perceived Quality, Objective Quality, consumer satisfaction, regression analysis.

## RESUMEN:

El objetivo de esta investigación es exponer los resultados obtenidos como conclusión de los estudios realizados con la Calidad Percibida y la Calidad Objetiva de los consumidores en los segmentos residencial y empresas en relación con la actividad energética.

Los datos se han obtenido realizando encuestas telefónicas para la medición de la calidad percibida y presencialmente los referentes a la objetiva. Con estos datos se ha realizado un estudio detallado de la importancia cuantitativa y su comportamiento durante dos años consecutivos, así como la toma de decisiones orientada a mejorar aquellos indicadores de peor valoración.

**Palabras claves:** Calidad Percibida, Calidad Objetiva, Satisfacción al consumidor, análisis de regresión.

## 1. INTRODUCTION

Since the deregulation of the energy market (in generation and marketing activities) a profound change has been taking place in the commercial strategies employed by the electricity sector providers in their quest for greater consumer satisfaction and service quality. Traditionally, analysis models of these concepts have been based on three dimensions: processes, personnel and systems. In view of the current situation of the sector, we believe that another dimension needs to be included, namely that of the consumers and the treatment they receive in the face-to-face customer help centres run by the service providers. For the purpose and aim of this study, we will therefore base our analysis on the following three dimensions:

### 1. Operational efficiency in Processes.

This includes aspects such as cost efficiency, based fundamentally on the standardisation of interaction processes in all face-to-face help centres, the quest for greater efficiency through an appropriate mix of channels and enhancement of market position and of the service provider brand.

### 2. Consumers and their relationship with the face-to-face Help Centres.

It is vital to develop schemes based on the advice and dynamics of focus-groups so that communication and feed-back can be improved on a long-term basis with the market agents. The perspective of the consumer should be present in all decisions taken by the service providers that could have a bearing on the relationship between the two parties.

### 3. Personnel improving and monitoring customer care continuously.

An analysis is made of the causal relationship between the concepts of customer loyalty and brand positioning. More specifically, the differentiated effect is studied of the perceived positioning of energy companies with customer loyalty, with empirical verification of this relationship.

A schematic representation of the above is shown in Figure 1.



Fig. 1: Scope of the study

As this study is focussed on the market and the consumer, we therefore need to establish objective means to measure evolution and performance.

These measurements will allow us to better understand exactly where we find ourselves in relation to a specific market-based reference (previous measurements, competition, etc...).

The process that is undertaken consists of the following:

1. Verification of the standardisation of the measurements.
2. Identification, via the measurements themselves, of strong and weak points.
3. Awareness, via the measurements themselves, of advantages and threats.
4. Prioritization of improvement efforts and recognition of achievements and successes.

What cannot be measured cannot be known and, therefore, cannot be improved. Continuous improvement cannot be integrated into any service unless there is full knowledge of the areas where it is needed and where it can be applied. It is therefore necessary to measure and thereby know the present position and situation and whether any progress is being made in relation to the goals that have been set or in comparison with previous measurements.

Performance measurements should be separated into two categories:

1. **Internal measurements:** in relation to the performance of personnel and processes and including, for example, indices of errors, productivity, attitude and commitment.
2. **External measurements:** of service components as they are perceived by the consumer, for example, safety and response time.

Defining quality with words alone can be quite confusing, especially when dealing with an area as abstract as service. There is a need for something more, for the establishment of specific parameters that will allow us to know with precision the situation we find ourselves in and the areas we should be working on to reinforce and strengthen the identity of the provider. Only in this way will we be able to draw up the outline of a route map to lead us to the goal of continuous improvement. Applying the principles and complying with the requirements contained in ISO standard 9001, the desired benefits are essentially as follows [1]:

1. **Focus on the consumer:** Understanding the needs of present and future consumers, satisfying their requirements and endeavouring to exceed their expectations.
2. **Leadership:** Establishing the unity of purpose and orientation of the organisation. Creating and maintaining an internal environment in which the staff feel personally and emotionally involved in attaining the goals of the organisation.
3. **Staff participation:** At all levels the workers are the essence of the service and their full commitment to the organisation enables their skills and abilities to be used to its benefit.
4. **Process-based approach:** Process-efficient management.
5. **Processes as an interrelated system:** Identifying, understanding and managing the processes as an interrelated system that contributes to the efficacy and efficiency of the organisation in the attainment of its objectives.
6. **Continuous improvement:** This must be a permanent goal.
7. **Fact-based approach for decision-taking:** Effective decisions are based on the analysis of data and previously obtained information.
8. **Mutually beneficial relations with the provider:** The organisations and providers are independent and a mutually beneficial relationship increases the capacity of both to create value. Benchmarking.

The basic principle lies in a management of the organisation that is aimed at attaining sustained success. A quality management approach fosters self-evaluation as an important tool which serves to examine and review the extent to which the organisation has matured and grown, covering its leadership, strategy, management system, resources and processes. It is designed to identify the strengths and weaknesses of the organisation so that it can both improve and innovate.

Royal Decree 1955/2000 regulates the activities of transport, distribution, commercialisation and supply of electrical energy in Spain. Articles 102, 103 and 106 of this Decree deal essentially with the question of Quality [3]:

- Article 102. Product quality
- Article 103. Customer care quality.
- Article 106. Regional quality.

In this respect, we will consider in greater detail the dimensions associated with the concept of Quality of Service in the electricity sector. Broadly speaking, quality of service can be grouped under three main headings [2,8]:

- 1) **Quality of the supply:** Energy supply is defined for the consumer in kWh. These units are transformed into a service that provides heat, cold, lighting, motion, power, etc. The consumer will therefore evaluate the following aspects: continuity (security) of the system, number and length of power cuts or failures, variations in the physical parameters of the supply, etc.
- 2) **Complementary technical quality:** All the products and services, apart from the actual supply of energy, that the consumer receives from his or her energy provider: advice when contracting services, guidance on how to save energy and thereby reduce the energy bill, help in understanding the bill, advice on payment terms and the general provision of information (services which contribute to reducing errors and increasing transparency).

- 3) **Functional quality:** This refers to the way in which the consumer receives the service (speed, friendliness, behaviour, punctuality, clarity, etc...).

A schematic representation of the above is shown in Figure 2.

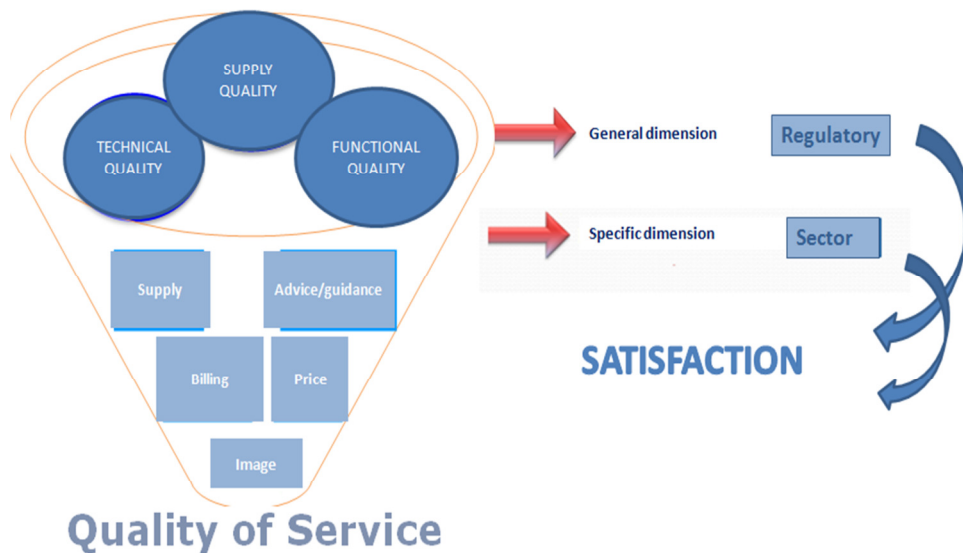


Fig. 2: Dimensions associated with Quality of Service

The first two (supply and complementary technical quality) allow us to glimpse Perceived Quality on the part of the consumer, while the third component is more closely related to Objective Quality. Before continuing, it is important to have a clear definition of these two concepts [7]:

**Objective Quality** is here defined as a physical, tangible quality of a product/service, inherently associated with its production/rendering. It concerns technical attributes and is managed to a large extent by the producer/provider.

**Perceived Quality** refers to how a consumer values the quality of that service. As it coincides with the quality that the consumer needs or requires and which, therefore, he or she most values, it is Perceived Quality, rather than Objective Quality, which makes a consumer decide to buy or not. So, it is also Perceived Quality which will enable results to be improved and the reputation of the brand to rise.

## 2. RESEARCH METHODOLOGY

The methodology applied in this study involved the use of representative surveys of consumers concerning their perceptions of the Quality of Service of an electricity provider. The surveys were used to analyse the degree of trust, satisfaction and loyalty of the consumer to the provider and to compare the quality of service offered with that of other operators in the same market.

A quantitative approach was used in the research based on telephone surveys for the measurement of Perceived Quality. Audits were also performed in order to measure the following: the attention offered to the client, protocols, friendliness, professionalism, customer handling, customer guidance, staff know-how and clarity in explications, empathy, physical aspects (internal and external) of the branch/offices, average waiting time, average time spent with client, etc.

Using the data obtained from the surveys, an analysis was made of the importance of the aspects or attributes that were evaluated in order to establish which had the most impact on the level of commitment of the consumers. Quality of supply, technical quality of the service and functional quality were measured using a 10-point Likert scale. More specifically, the components used for the measurement of these variables (all of which are integral dimensions of the quality of service as perceived by the client) are based on the 22-item SERVQUAL scale developed by Parasuraman, Zeithaml and Berry in 1988, and required an adaptation of their content to the specific context of energy providers [4,5,9].

The applied model was based on structural equations which combined factorial and multiple regression analyses, enabling us to determine the impact of the different dimensions of the service (indirect impacts) and to know the levels of Overall Satisfaction and commitment of the consumers (direct impacts). By adding together direct and indirect impacts we obtained the total impact of each dimension.

The fundamental hypothesis of the analysis is as follows:

The interviewed consumer will give an Overall Satisfaction score that must be more closely related to those aspects of the service that are most important for that interviewee.

Once the coefficients of each aspect had been obtained, they were relativised on a scale from 0-100% to facilitate their interpretation (Fig. 3).

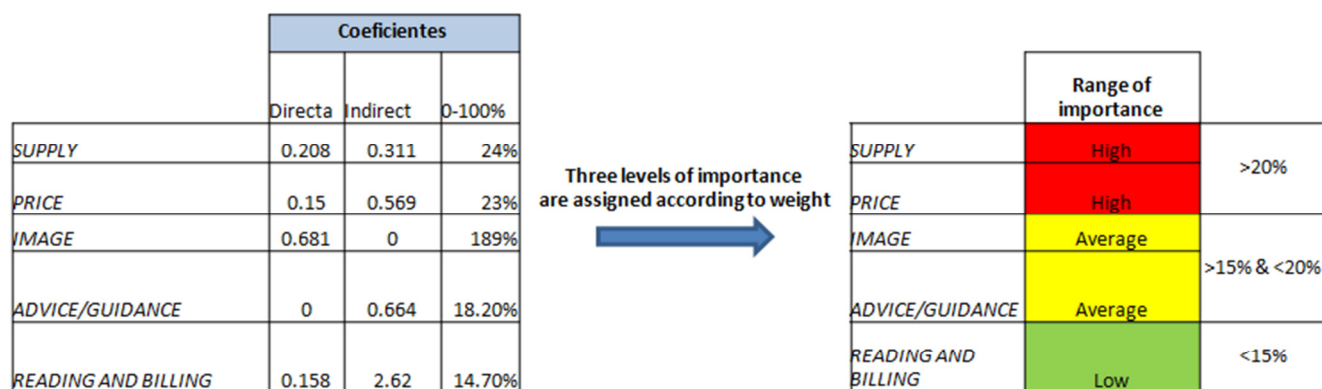


Figure 3: Coefficients of each attribute

For this purpose, the data were analysed individually, following the model described below:

- 1) **Analysis of the response rate:** The model can only be calculated with consumers who have evaluated all the attributes. A non-response was replaced with the average response, with a consequent reduction of the final weight of the attribute.
- 2) **Analysis of the correlation:** Analysis of the relationships between attributes. Two highly intercorrelated attributes give anomalous results in the model.
- 3) **Factorial analysis:** In the event of high correlations, a factorial analysis is performed to group together the attributes in new variables created as a combination of attributes, but which are mutually independent.
- 4) **Regression model:** final step, straight-line fitting, determination of weights.

The formula used to determine sample size depends on various aspects:

- On the population, whether this is finite or infinite (with 100,000 elements or more, it is considered infinite).



- On the confidence level that is established and on the nature of the variables that are being analysed.

Variables that intervene in the determination of the sample size (n):

- Population size (N).** It is clear that the larger the target population size of the study the larger the sample size will need to be to obtain a reliable result. Nonetheless, the relationship is not proportional. That is, the sample size varies in a far less significant way than population size.
- Population variance ( $\delta^2$ ;pq).** This is a measure of the scattering of the results or, in other words, the variability of the opinions. The more heterogeneous the responses are (more variance), the larger will be the sample size required.
- Variance is usually represented: by ( $\delta^2$ )** when the results correspond to a continuous variable, but **by (pq)** when they correspond to a discrete and dichotomous variable (0 or 1, good/bad, etc.). In the latter case, (**p**) represents the percentage of the population which responds positively to the question and (**q**) the remaining population (which respond negatively), making **p=1-q**. So, for example, if 15 out of 20 interviewees respond affirmatively, the corresponding values would be: **p=0.75** and **q=1-p=0.25**.

When no prior information is available, it is advisable to presuppose maximum scattering. For example, given the anticipated ignorance of the variance in a question whose response has a scale from 1 to 10, there would be maximum deviation when half the interviewees responded with a 0 and the other half with a 10. So, the maximum deviation, calculated through the expression:

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n^2}}$$

would have a value of 5 and, therefore, the variance would be taken as:

$$\sigma^2 = 5^2 = 25$$

- Confidence level (1-  $\delta$ ).** The probability that the estimation that is obtained, in the absence of bias, matches reality. It is usual to work with a confidence level of 95%. A higher confidence level implies a higher sample size. Associated with the confidence level, and tabulated as a function of it, we have the expression (**Z $\delta$ /2**), corresponding to a confidence level (**1- $\delta$** ). The most common values of this coefficient, based on a normal distribution, **N(0,1)**, are shown below:

#### Confidence level

$Z_{\alpha/2}$	$1 - \sigma$
1	68 %
1,96	95 %
2,47	99 %

- Sampling error (E).** This refers to the degree of precision of the estimates or, in other words, the magnitude of the deviations from the true value in the population. The greater the sample size, the higher the precision (the lower the sampling error). The most typical sampling error values that are worked with range from 5% to 8%, but it is always advisable for the values to be below 10%. For example, on a scale from 1 to 10 for an item, an error of 10% would mean an error of +1 point).

#### Calculation of sample size

$$n = \frac{N z_{\alpha/2}^2 \sigma^2}{E^2 (N - 1) + z_{\alpha/2}^2 \sigma^2}$$

As a result of the application of the above concepts, the following sample sizes were determined for the study into Regional Perceived Quality and Regional Objective Quality, described by segment, incumbent service provider (related to the Distributor) and competition:

- 1) **Residential segment** (consumption  $\leq 50,000$  kWh/year): for recent and generic contacts, 2,100 samples
- 2) **Business segment** (consumption between 50,000 and 200,000 kWh/year): for recent and generic contacts, 490 samples

The results from the eight (8) face-to-face help centres in the Canary Island Archipelago were used to measure Objective Quality.

### 3. MEASURING PROCESS USED IN THE PRESENT RESEARCH

The process by which quality was measured in this study was based on the scheme as shown in Figures 4 and 5.

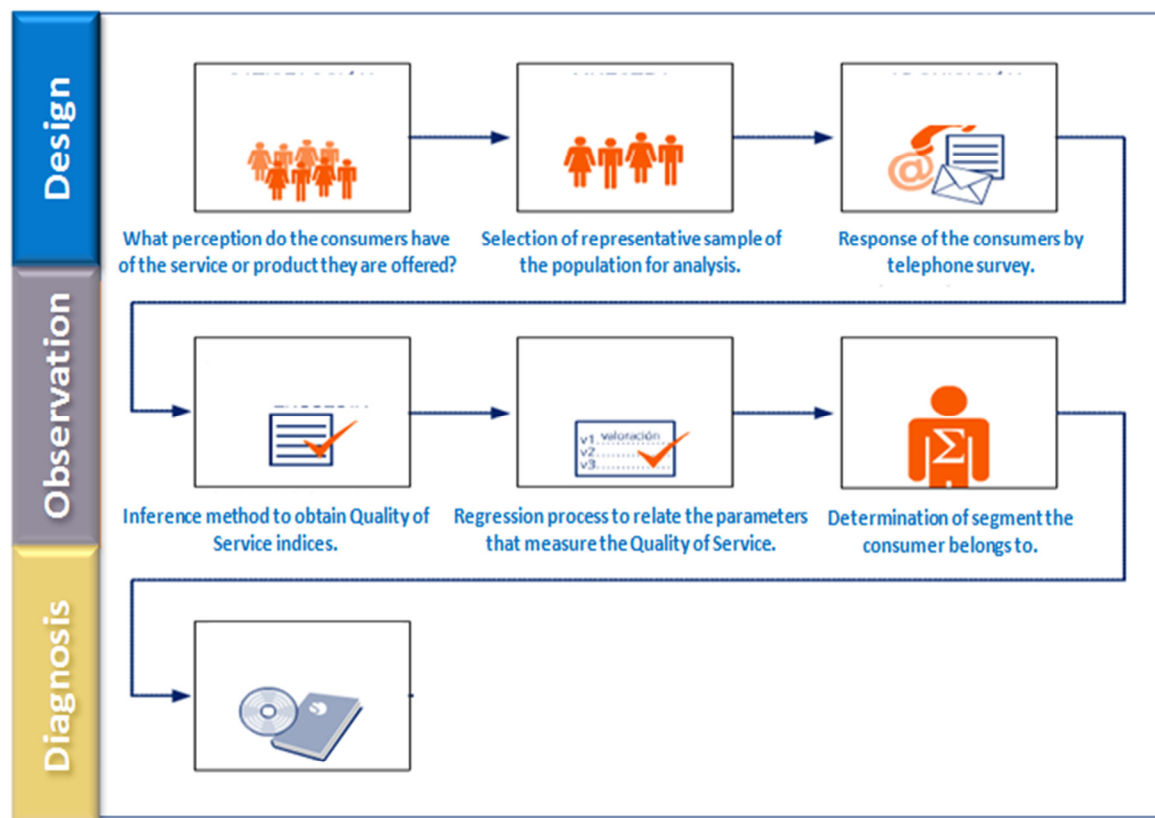


Fig. 4: Measuring process for Perceived Quality

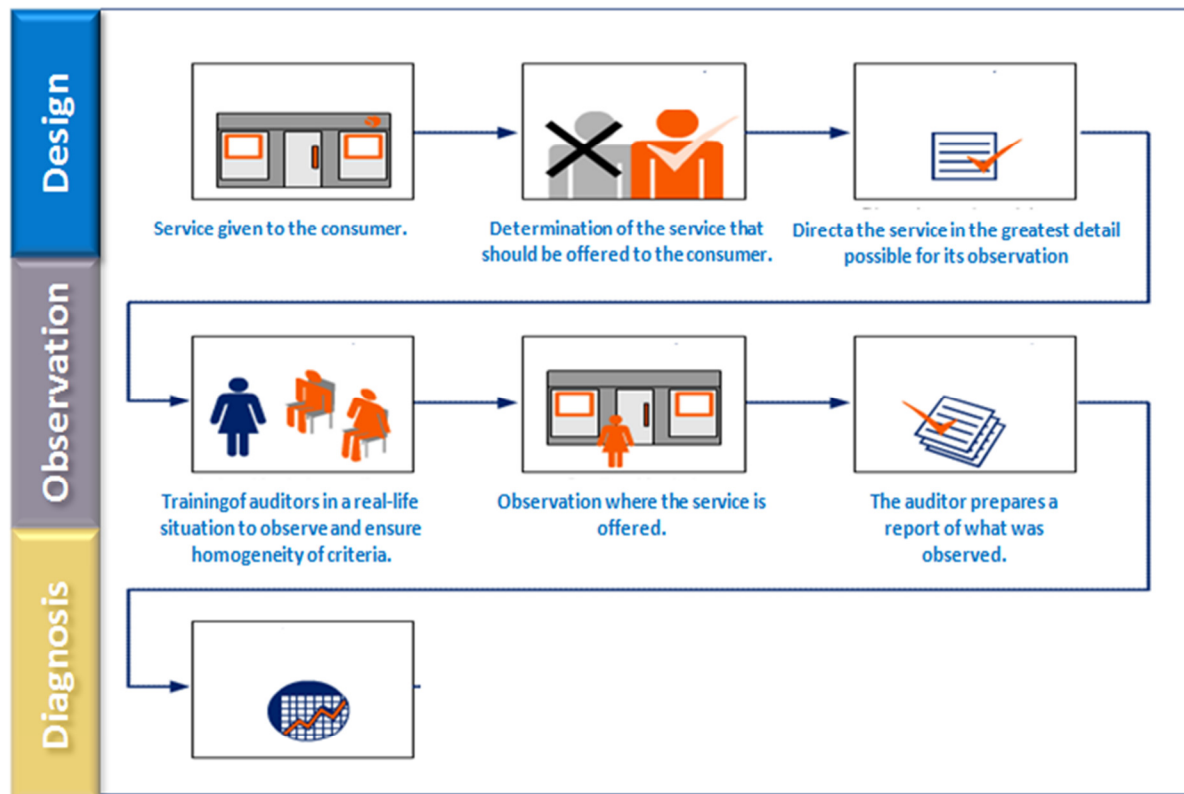


Fig. 5: Measuring process for Objective Quality

**Benefits of the model employed:**

1. **Knowledge about the consumers:** Determination of strategic consumers and opportunities for the business in question. Definition of variables and levers that enable the appropriate orientation of conversion routes to increase customer loyalty.
2. **Suitable strategies:** Adaptation of prices and services to each consumer. Benchmarking studies with other services. Enhancement of CRM (Customer Relationship Management) functionalities.
3. **Relationships:** Proximity to the consumer and strengthening of the value that the consumer gives to the service.

Indicators used to measure the model's latent variables:

- 1) **Supply of energy (Dependability) (Security)**
  - Reconnection time.
  - Uninterrupted supply.
- 2) **Billing and payments (Security) (Dependability)**
  - Billing errors.
  - Billing based on estimated consumption.
  - Billing regularity.
- 3) **Price and guidance/advice (Response capacity)**
  - Application of tariffs for use of service.
  - Application of adjustment factors.
- 4) **Information and communication (Empathy)**



- Prior notification in the event of a scheduled service interruption.
- Guidance for efficient energy use.

5) **Image (Tangibility)**

- Clarification of consumer rights and obligations.
- Correct, fair and flexible.
- Safe installations.
- Respectful of the environment, nature conservation.

## 4. IMPROVEMENTS IMPLEMENTED

The improvements implemented, after the measurements, respond to three criteria:

### 1. STRATEGIC IMPROVEMENT ACTIONS:

- **Data quality.** A need to intervene in the modelling of variables which impact on Overall Satisfaction. This entails an improvement in the contact information with the consumer.
- **Planning and execution of training reinforcement.** A continuous and detailed analysis of the aptitudes of the agents who have contact with the consumers is an absolute necessity, with the obligatory aim of developing specific training in technical-commercial, marketing, regulatory and technological know-how. This can be considered the evolution of an operational and management culture.
- **Adaptation of value propositions of the service to consumer preferences.** The value offers and propositions that the providers make should be directly related to the preferences of the consumers. In this way, a positive effect can be achieved in each interaction with the consumer.
- **Monitoring project.** The providers should incorporate a monitoring project in their processes and sales campaigns to enable experienced agents to detect improvement opportunities as well as any inconsistencies that might be arising in relation to the market.
- **Service optimisation.** Providers need to optimise the service offered and this can be achieved by simplifying the administrative process, improving the scheduling of activities and coordinating the actions of the agents that participate in the customer service process. Valued very positively by the consumers, this aspect requires a major effort on the part of the providers.

### 2. ACTIVITY IMPROVEMENT ACTIONS

- **On-line communication:** It is necessary to increase this type of contact with the consumer. Telematic tools are available for this purpose that enable more frequent (quarterly) knowledge of the needs and demands of the consumer, according to criteria of market digitalisation, processes and sectors of activity.
- **Personalised treatment in claims and complaints:** As far as claims and complaints are concerned, it is clear from the results obtained that improvement in terms of communication with the consumer is an absolute necessity, both while the process to resolve the problem is underway and at the moment when it is resolved. There is a need for quality to be incorporated into the answers given to the consumer, as well as personalised management of the claim/complaint depending on the nature of the consumer.
- **Improvement of functionalities and controls of processes for contracting an electricity provider and the reduction of the time period required.** The major reason for consumer discontent with energy providers at the present time is the complexity of new supply arrangements due to requirements concerning separation of activities as a result of the Electricity Sector Law.

### 3. OBJECTIVE IMPROVEMENT ACTIONS

The periodic realization of ‘mystery shopping’ to assess the know-how of the help-centre staff and the attention they give to the consumer. Corrective actions can be taken based on this information:

- Improvements in the image of the centre.
- Improvement in the attention given.
- Detection of points for improvement in procedures.
- Marketing campaigns.
- Implementation of self-service terminals to handle specific procedures in the centres and reduce waiting times.

### 5. RESULTS OBTAINED

#### ❖ Reasons for the initiation of measurements in 2009

As of 2003 a progressive deregulation of the electricity market took place in Spain. This meant two important changes for consumers:

1. They could enter into a contract with power marketers other than those that directly correspond to their region.
2. They could accept an offer from a power marketer under conditions different from those established by law.

As there was no obligation to change, many consumers remained in the Regulated Market.

After full deregulation of the energy market in 2009, competitive activity began to emerge and regulatory changes came into effect. Consideration was given to the transformation taking place and the search for greater efficiency and differentiation in the development of new services. New types of contract were envisaged that would better adapt to the preferences of the consumer. These new contracts and services were offered to consumers and advice offered about the various options for an efficient management of the market risks (price risk, charges, quality of service, confidence in the provider and costs of change, as antecedents to household energy customer loyalty).

During 2008, a regulatory change took place which made monthly billing obligatory (after November 1st of that year) of all electricity supplies with a power rating of up to 10 kW (Royal Decree 1578/2008). The subsequent delays in billing that resulted were a significant factor affecting the quality of the attention given to the consumer [6].

An increase in consumer requests for information and guidance/advice was noted when the so-called TUR (Tarifa de Último Recurso – Tariff of Last Resort) and income-based subsidies (the Bono Social) came into effect.

Before discussing the results, it is important to analyse certain factors which had a decisive impact on the year 2009 and, consequently, the levels of Perceived Quality for consumers (Fig. 6).

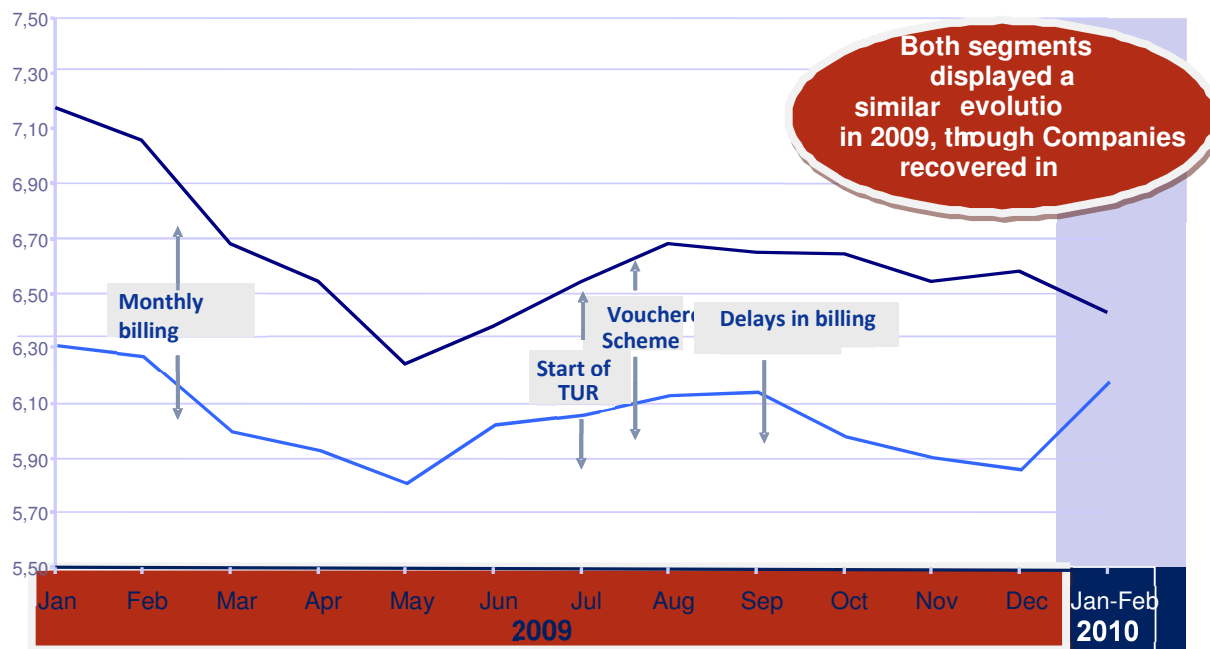


Figure 6: Factors during 2009 which affected Overall Satisfaction.

Figure 7 shows the results for 2010 obtained from the surveys taken of the different segments analysed (household/business) and their evolution with respect to 2009 after the instigation of an action plan for continuous improvement based on the lowest valued concepts.

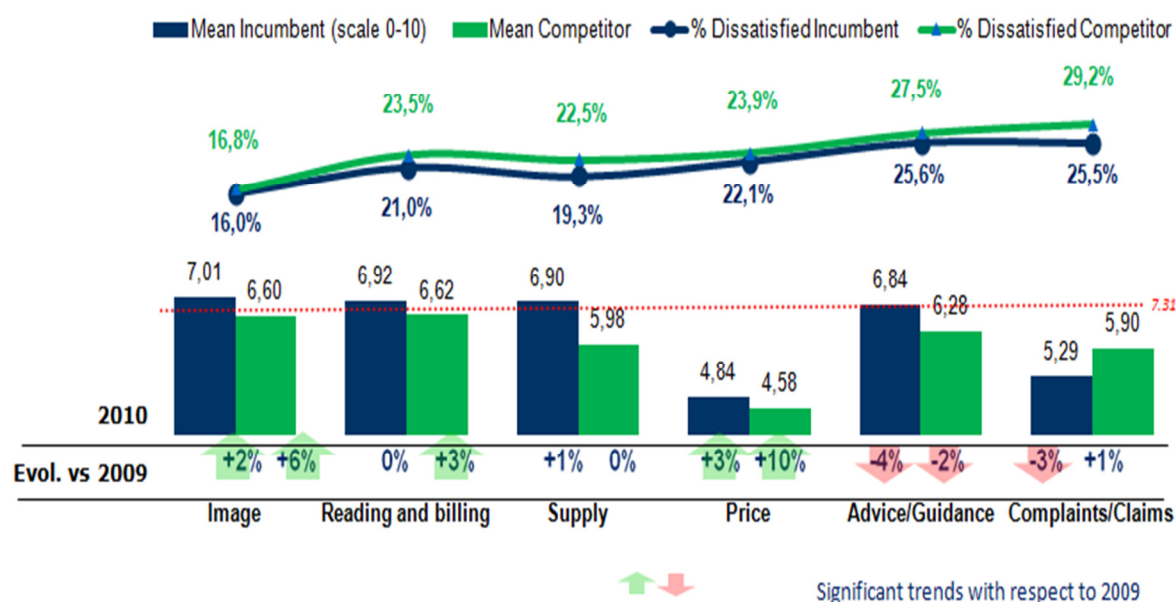


Figure 7: Results of the surveys for 2010 and the evolution of the 5 concepts with respect to 2009.

The results are given for both the business and household segments, showing the percentage levels of dissatisfaction and the corresponding rise or fall with respect to 2009 for each concept. The lowest scoring indicator is Price, with a 14% decrease with respect to 2009 in the household segment and a 10% decrease in the business segment.

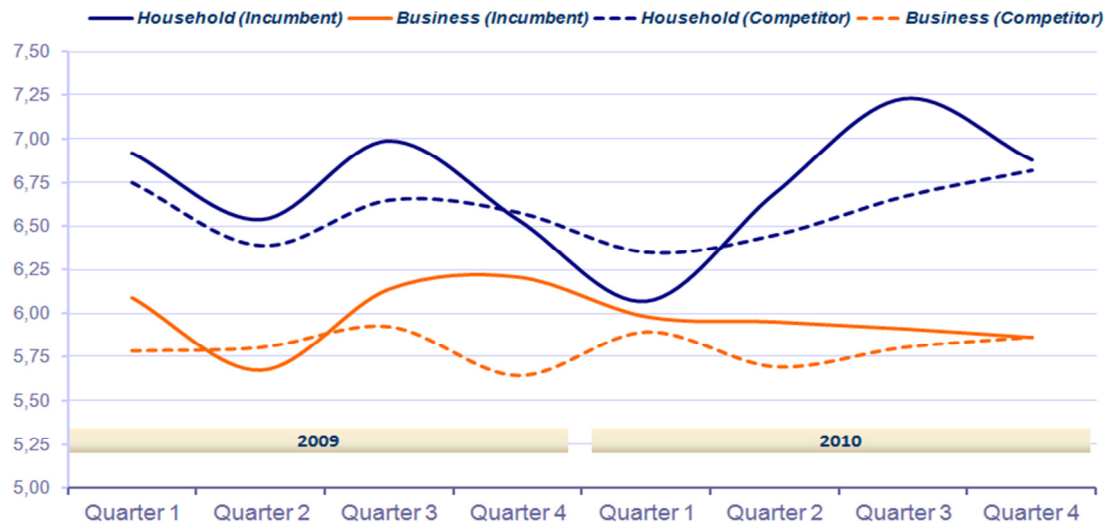


Figure 8: Positioning of Incumbent and Competitors over two consecutive years (2009 and 2010).

## 6. CONCLUSIONS

The most notable conclusions of a qualitative and quantitative nature are as follows:

### ❖ From a qualitative point of view

- **Tangibility:** By applying the SERVQUAL model to the electricity sector, the SERVELECTRIC model which was developed enabled the measurement of Perceived and Objective Quality. The results have allowed us to observe those aspects related to the electricity sector which over the course of a five year period (2009-2014) generated the highest levels of dissatisfaction.
- **Flexibility:** The indicators that were selected allowed us to be sufficiently flexible through the results of the surveys to focus on and follow in greater detail the lowest scoring indicators.
- **Vision of the Consumer:** Given the importance of the generic consumer and consumer-related values, this study has concentrated on the Voice of the Consumer and more specifically on those consumers who have had recent experiences with the provider. Consumer satisfaction measurements were taken on a frequent and regular basis. In other words, a continuous evaluation was conducted in order to reflect the continuous changes taking place and to satisfy market demands.

### ❖ From a quantitative point of view

From this perspective we consider the evolution the evolution of Overall Satisfaction of the household and business segment.

Figure 9 represents the results from a quantitative perspective, showing the evolution of Overall Satisfaction for the household and business segments and the positioning by the consumer of the electricity providers from 2009-2014.

After the major regulatory changes that took place, consumer satisfaction in 2009 was affected in particular as a result of delays in billing which also affected the results of 2010. Nonetheless, at the start of 2010 it should also be noted that the business segment satisfaction level received a higher score than the household segment.

A sharp rise in both household and business segment level of satisfaction was noted in 2011. However, in 2012 regulatory changes again had a negative impact on consumers. These changes included, as can be seen in Figure 9, a rise in prices in the market due to the tariff deficit and further changes in billing frequency. In view of the greater fluctuations seen in the household segment, it would appear that this segment was more sensitive to these changes than the business consumer.

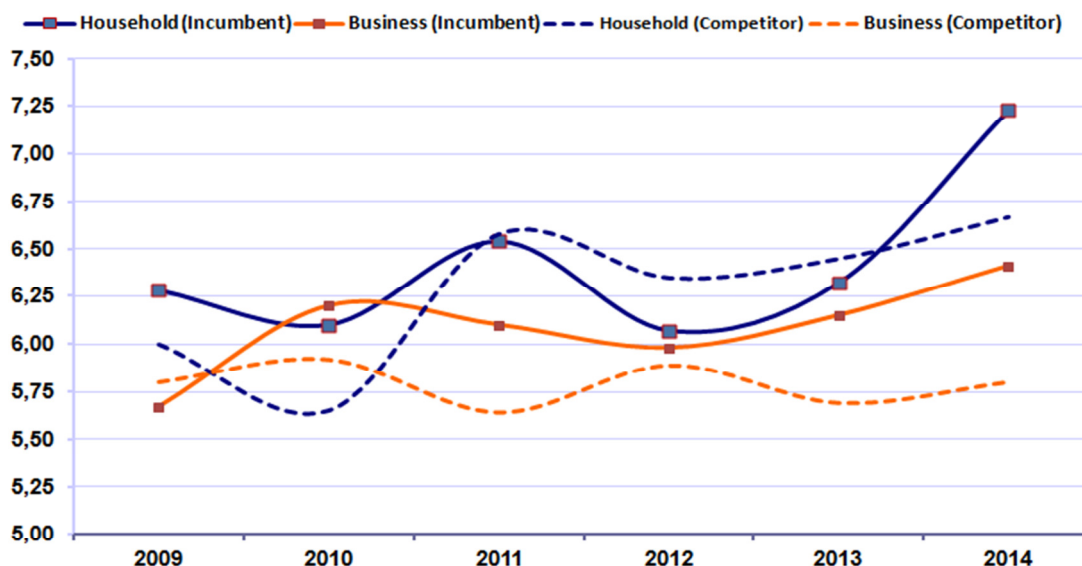


Figure 9: Positioning of Incumbent and Competitors. Continuous Evaluation.

In view of all the above, and making an aggregate interpretation of the results obtained in the measurements taken over the 6 year period, we can conclude with the following aspects of improvement:

- To define a general framework of dissatisfaction management.
- To undertake a detailed analysis of the operational causes of dissatisfaction in order to identify problems within each process.
- To work on a model to deal with critical experiences.
- Process modification at sub-process level to eliminate unnecessary obstacles as experienced by the consumer
- Development of an operating model with consumers after identification of specific manageable cases of dissatisfaction.
- Proactive contact with dissatisfied consumers to resolve the issue at hand with follow-up measurement of satisfaction.

Finally, the most relevant conclusions are shown below in line with the same structure used for the indicators:

## 1. ENERGY SUPPLY

- The security (continuity) and quality of the electricity supply are decisive factors in consumer evaluation.
- There is a generalised demand from all customers who require a new electricity supply to resolve the problems generated by the complexity, difficulty and long response times of the process involved.

## 2. PRICE

- Difficulty of the market in general to understand the price structure and the breakdown of the amount that needs to be paid.
- The surveys reveal a need for greater clarification and clarity for a good that is a primary necessity. In this respect, the consumers request more advice and guidance and useful energy saving recommendations to ensure they are better able to manage the energy equation of  $\text{Cost} = \text{Price} \times \text{Amount}$ .

### 3. **IMAGE**

- All those surveyed concurred in considering the electricity providers to be financially solvent with highly secure and safe infrastructures, but they also concurred in seeing the providers as being cut off from the reality of the market.

### 4. **ADVICE AND GUIDANCE**

- There is a need to increase the level and frequency of contact with the providers so that the consumer is more and better informed. Proper communication and greater transparency with respect to the regulatory changes.
- The incorporation of advice and guidance teams on the part of the providers was valued very positively by the interviewees.

### 5. **BILLING**

- Greater clarity in the bill, both in terms of the content and the breakdown of the amount to be paid.
- Recommendations about the use of appliances.
- Clear billing frequency to facilitate household or company budgeting.

In response to the results as a whole obtained from the consumer the indicators and from the perspective of the sector, we will incorporate management variables on which we will base future measurements. These management variables are as follows:

#### 1. **GROWTH**

- Development of new products and services.
- New business model.
- Increased awareness of Customer Experience through focus groups.

#### 2. **OPERATIONAL EXCELLENCE**

- Digitalization of processes.
- Redefinition of processes.

#### 3. **QUALITY RELATIONSHIP WITH THE CONSUMER**

- Development of channels of Customer Attention, Advice/Guidance and Sales.
- Liaising. Improvement of attitude and operational synergies.
- Development of continuous benchmarking.
- Co-creation workshop to identify the values that it is desirable to transmit to the consumer and to generate lines of work to be undertaken.

The priority strategic target should be to ensure **customer retention** and **customer loyalty**. For this purpose we have worked on two basic pillars: relationship marketing with the consumer and the management of a perceived value, with the commitment to offer the consumer a value that is higher than that offered by the competitors.



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