

# PROCESS RE-ENGINEERING AND TOTAL QUALITY MANAGEMENT AT ELECTRIC UTILITY COMPANIES - TWO PORTUGUESE EXPERIENCES

Carlos Loureiro

Electricidade de Portugal, SA

Rua Camilo Castelo Branco, 43-6° 1050 Lisboa PORTUGAL

Tel. 351 1 3171591 Fax 351 1 3171730 e-mail caloureiro@edinfor.pt

*Summary: This paper gives a succinct account of the experiences at two distribution companies in the southern part of the country.*

*At LTE, which operates in the Lisbon and Tagus Valley areas, priority was given to approach by processes, the realisation of benchmarking exercises and the implementation of redesigned solutions.*

*At SLE, which conducts its business activities in the Alentejo and Algarve regions, an approach was adopted which is more directly founded on TQM principles and methodologies.*

## 1. INTRODUCTION.

The author was privileged to have been associated (albeit in different ways) with the two projects referred to in this paper.

In my capacity as a consultant to the Board of Directors of LTE, I have been responsible for the "LTE em Movimento" (translation of "LTE on the move") project since the beginning of 1996. Later (in 1997), entrusted with the mission of unifying the quality management of the two companies (LTE and SLE), I was placed in charge of the two projects (SLE was running the project "Gestão pela Qualidade Total", translated "Total Quality Management"). My brief was to render them more co-ordinated whilst simultaneously bringing them closer together within the context of a broader spectrum, drawing on the experience gained in the interim.

The closure of the two projects was announced publicly in November 1997 at the same time as the unveiling of a third project took place - entitled "Qualidade em Movimento" (translation of "Quality on the Move")- the launching of which had in fact been scheduled for May of that year. As it turned out, this new initiative never materialised owing to the profound restructuring which, in the meantime, was being implemented at the Group's four distribution companies, involving a more ambitious project designated "Distribuição 21" (translation of "Distribution 21").

Accordingly, this paper deals with two projects covering business change and which, although no longer in existence, produced fruitful results in terms of improvement and experience, thereby contributing positively to the restructuring currently under way.

In addition to the text dealing with the two projects, I have added another chapter summarising the improved performance achieved via the "LTE em Movimento" project which, as pointed out earlier, I have been intimately involved with since it was first embarked upon.

## 2. ELECTRIC POWER DISTRIBUTION IN PORTUGAL.

With the exception of the island territories of the Autonomous Regions of the Azores and Madeira, electricity distribution in mainland Portugal is carried out under concession by EDP Group companies, that is, companies whose equity capital is fully controlled by the holding company, Electricidade de Portugal, S.A.(EDP). Organisational structures and in-house information systems are common to the four EDP Group distribution companies, thereby permitting an easier perception of their implantation throughout the country, as borne out by the following indicators relating to 1997 (Table 1).

Table 1 - Features

Item	LTE	SLE	Total
Distribution centres	7	5	30
Technical units	12	17	76
Commercial units	21	24	123
VHV, HV and MV customers	4 923	2 535	16 930
LV customers	1 401 891	876 465	4 995 197

## 3. EXOGENOUS FACTORS.

The backdrop against which the business of electric-energy distribution is conducted in this second half of the decade is characterised by the existence of strong pressures being exerted upon the principal sector players. In particular, these pressures manifest themselves in the following areas:

- *price levels;*
- *quality of service offered;*
- *market shares;*
- *business profitability.*

### 3.1 Pressure on prices.

Electricity distribution companies are from the very outset limited to the fixing of prices falling within a narrow band, the lower and upper limits of which are defined respectively by the purchase (cost) price and by the demands of a sales market subjected to pressure from economic agents, public opinion and the public authorities. Moreover, in recent years this pressure has clearly intensified as a result of macroeconomic policies directed at curbing inflation, the progressive liberalisation of sector access, and the manner in which regulations have been processed, thus leading to the virtual eradication of business profit margins.

### 3.2 Pressures on service quality.

The social and cultural evolution of the populations served by the Group and the increasingly demanding economic environment in which we operate have likewise intensified the pressures exerted by customers from the viewpoint of service quality.

These pressures are being felt simultaneously at the level of both technical and commercial service quality. They also have an influence on the regulatory mechanisms which the markets are being progressively subjected to.

### 3.3 Pressures on market share.

On the other hand, companies are being exposed to competition in areas not contemplated by the sector's liberalisation.

Indeed, the increasing availability of self-generation, the escalating appearance of new independent producers and the arrival of new energy suppliers (a case in point being natural gas) constitute additional factors of increased competition.

### 3.4 Pressures on business profitability.

The partial or total transfer of State-controlled companies' share capitals to the private sector by way of privatisation operations has introduced a new pressure factor.

Participation in the capital market requires the creation of value that permits an adequate return on shareholders' investments, as well as the maintenance of good competitiveness levels in order to attract new investors.

## 4. THE INTERNAL REALITY.

Against such a scenario, the distribution companies were obliged not only to be attentive to the opportunities and obstacles presented by the new reality, but also to take the appropriate measures to orient their activities.

On the opportunities front we can cite:

- *The potential for cost reductions;*
- *The increased demand for electricity;*
- *Business internationalisation;*
- *Business diversification;*
- *Multiutility business.*

On the other hand, obstacles are represented by:

- *A business culture adapted to a reality that no longer exists;*
- *In-house information systems lacking flexibility;*
- *Inadequate focus on the customer.*

The above eight points form the operational framework within which the projects described in this paper were evolved.

## 5. "LTE EM MOVIMENTO" PROJECT.

The "LTE em Movimento" project was initiated in April 1995 following the decision taken by LTE's Board of

Directors to launch a programme aimed at identifying areas for improvement and the necessary corrective action to be taken. This task was entrusted to a team composed of certain company technical staff, assisted by an external consultant.

In the wake of the preliminary review, the project proper got under way in March 1996 with the following three major goals:

- *Improvement in the quality of service supplied to the customer;*
- *Enhanced project efficiency and the optimisation of resources;*
- *Adjusting the organisational model and adapting information systems to new management requirements.*

It was important to bear in mind that the steps to be taken had to produce the following simultaneous effects:

- *Cost reduction;*
- *Decrease in response times;*
- *Improved service quality.*

The project's activities were structured along 3 principal lines:

- *13 implementation teams;*
- *Communication initiatives;*
- *Business performance indicators.*

With the exception of the teams charged with reviewing processes in the procurement (supplies) area, the remaining teams' work was conducted at two selected distribution centres (Lisbon DC and West DC), with the results obtained therefrom being exportable to the company's other centres.

At these two centres (the largest in the country), besides accomplishing the project's general aims, we sought to pursue additional objectives with a view to overcoming environments marked by the stifling workloads that constitute a hindrance to good commercial performance, at the same time testing the appropriateness of existing systems.

## 6. "GESTÃO PELA QUALIDADE TOTAL" PROJECT.

The "Gestão pela Qualidade Total" project was based on the implementation in January 1995 at SLE of a quality-oriented structure, in which the following units played prominent roles:

- *Quality circles;*
- *Continuous improvement teams.*

Advocating a meaningful measure of participative management, the project sought to encourage the widespread active involvement of all employees in the company's affairs.

The quality circles were spontaneously formed by employees belonging to the same work group, holding

weekly meetings to analyse problems impacting on their performance. These groups then submitted recommendations to the company's managers for the resolution of these problems: the latter, in turn, would formulate replies and, where necessary, constitute a team entrusted with the job of implementing improvement. The continuous improvement teams were composed of personnel chosen on the basis of their capabilities, with one of their number acting as co-ordinator. The teams' mission was the analysis of problems, identifying solutions and monitoring their implementation (once approved).

## 7. MOST IMPORTANT ACTIVITIES.

Amongst the various initiatives realised under the two projects, the following merit special reference:

- Insofar as the "LTE em Movimento" project is concerned. team activity centred on:
  1. *New connections;*
  2. *Contracting procedures;*
  3. *Network construction;*
  4. *Works management;*
  5. *Customers attendance;*
  6. *MV network project;*
  7. *Meter readings;*
  8. *Inspection;*
  9. *MV customers managers;*
  10. *Large volume and risk-attached articles;*
  11. *Standardisation and harmonisation;*
  12. *Contractors;*
  13. *Warehouse management;*
- Turning to the "Gestão pela Qualidade Total" project, the activities of the 119 quality circles and 20 continuous improvement teams were focused on the following areas:
  1. *Technical area -11*
  2. *Commercial area - 6*
  3. *Management information - 1*
  4. *Human resources - 2*

## 8. RESULTS ACHIEVED.

The results achieved present facets that are common to the qualitative descriptions of the two projects concerned and which correspond to the various approaches to the business changes being promoted.

Briefly put, it can be said that in both cases benefits were derived from the intensification of internal communication:

- Information bulletins were published under both projects;
- In both instances, communication channels were opened, via which company employees were able to formulate improvement proposals;
- Another feature of both projects was the convening of regular meetings for the presentation and discussion of solutions, thus affording personnel the opportunity to significantly improve their communication skills.

With the exception of improvements to information systems (which only occurred in the first project), a similar conclusion can be reached in relation to the following initiatives:

- Regarding the "LTE em Movimento" project, mention is made of the work of the thirteen processes corresponding to the teams enumerated previously and, on the other hand, the introduction of changes to the following systems:
  1. *Contracting:* Back-up information, customer agenda, contract model, drafting of the contract with the principal contractor;
  2. *Connection requests (applications):* Monitoring new connections
  3. *Works management:* Connection to the contractor, identification of contractual tasks, control over invoicing, quality surveys and control;
  4. *Networks construction:* Refinements to the works management system;
  5. *Large-volume and risk-attached articles:* back-up for materials management;
  6. *Warehouses :* Adapting the management system to the new centralised configuration.
- Turning to the "Gestão pela Qualidade Total" project, the continuous-improvement teams registered success in the following fields:
  1. *Commercial:* Dynamic pre-attendance, customer opinion polls, customer guide, installer's manual, technical information leaflets and billing procedures;
  2. *Technical:* Interface between information systems, control and imputation of costs of damages to underground networks, procedures covering materials returned to warehouses, technical design and emergency lighting procedures;
  3. *Management:* Standardisation of management information supports, work-and road-safety tenders.

## 9. QUANTITATIVE RESULTS.

Quite substantial differences are already discernible with respect to the successes achieved by the two projects.

Success noted under the "LTE em Movimento" project centres primarily around the gains attained in the performance indicators associated with each one of the processes concerned.

We propose to analyse these in greater detail in the attached document.

As for the "Gestão pela Qualidade Total" project, success was recorded mostly in terms of the results obtained in the degree of participation, motivation and cultural change observed at the company.

Three chief aspects can be highlighted in a brief summary of the gains obtained:

**Motivation and commitment:** The opportunity afforded by active participation in the company's affairs and the possibility to share in the successes achieved constituted a determining factor in instilling in each employee a real and conscious interest in the processes and methods attaching to job positions;

**Corporate culture:** Increased participation was conducive to greater flexibility and dynamism that spread throughout the company. This phenomenon led to a situation whereby employees felt they were the protagonists of change, altering and influencing attitudes, habits and behaviour.

**Costs of no quality:** Resorting to management tools which make use of an employee's creative and innovative potential for identifying and solving problems, the project was, right from the beginning and for this reason alone, responsible for a reduction in the (added) costs incurred in a quality-lacking culture.

## 10. IMPROVEMENTS EMANATING FROM "LTE EM MOVIMENTO" PROJECT

### 10.1 New connections.

This team's primary mission was twofold: reducing the bureaucratic time span elapsing prior to the construction of power connections and securing gains in customer satisfaction.

In addition to the success obtained in this area (as illustrated in Figure 1), information brochures were prepared for draughtsmen and installers. Furthermore, a software application was developed for supporting process management.

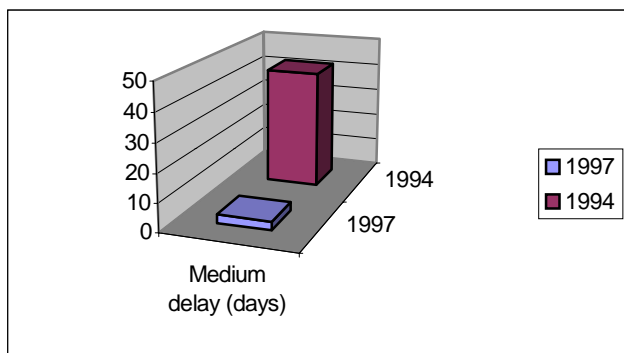


Fig. 1 – Quotations for connection lines

Furthermore, a software application was developed for supporting process management, while assistance was given in the start-up of a New Connections department at the Lisbon Distribution Centre.

### 10.2 Contracting procedures.

With regard to the contracting process, this team was attributed the task of simplifying procedures, improving the quality of information given to customers and cutting delays in matters involving other entities.

Fruit of the team's work was the introduction of a simplified electricity-contracting procedure and the preparation of others, the implementation of which will make possible the attainment of highly ambitious targets.

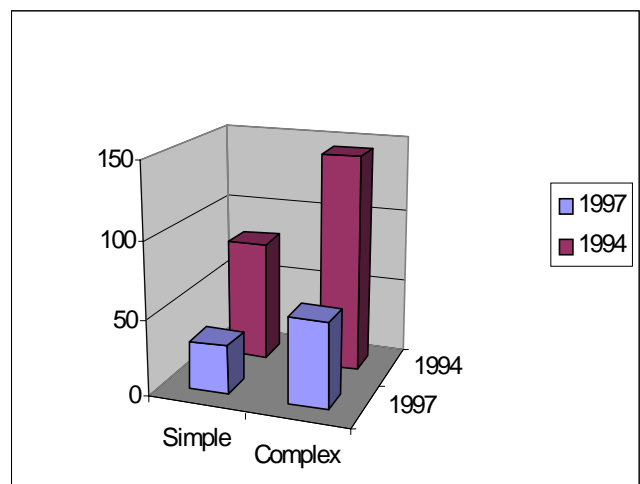
### 10.3 Network construction.

The issue of network construction covered not only the area of technical solutions and works management, but also certain aspects of procurement, in particular, the management of materials classified as accessories.

This team was responsible for a broad range of tasks, amongst which the harmonisation of construction and materials-related solutions in the building of the network, on the one hand, and the conception of a new regime governing the engagement of contractors/subcontractors, on the other. This new system features innovation in the requisitioning of materials from stores, in the monitoring of capital works and in the final settlement of accounts.

In liaison with the activity of certain other teams, this team was also involved in the drafting of documents setting out the harmonisation of technical solutions and procedures with the aim of overcoming the existent diversity.

In addition to the production of this invaluable set of technical documents, meaningful progress has been made in reducing construction periods, as Figure 2 amply demonstrates, whereby branch lines are segmented according to whether or not upstream network construction



or remodelling is involved.

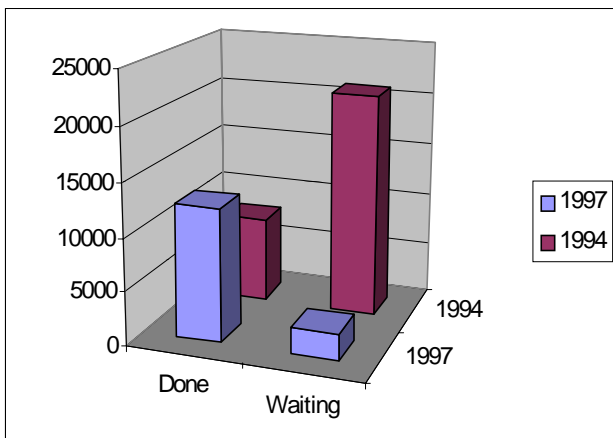
Fig.2 – Construction periods (days)

### 10.4 Works management.

The chief objectives entrusted to this team relate to the drastic reduction in execution periods and an improvement in the functional aspects covering the booking of service orders.

Besides the results shown in Figure 3, the team achieved positive results in several other important fields, including:

- Centralisation at one location of the handling of all service orders;
- Decrease in customer waiting period;
- Improved co-ordination with customer attendance centres;
- Automatic link-up to the contractor;
- Improved control over contracted works.



**Fig.3 – Working management**

### 10.5 Customers attendance.

The principal objective attributed to this team was to raise attendance efficiency. In order to fulfil this mission, the team opted to concentrate its efforts on boosting information regarding existing products and services with the aid of television, leaflets and posters, complemented by the creation of alternative solutions to face-to-face attendance.

The company's products are clearly visible at customer-attendance centres in the form of merchandising materials, posters, cheque deposit boxes and fixed telephone booths linked to the call centre.

In addition to these products, the team developed solutions for attendance management, a key example of which is the «customer contact agenda» application.

### 10.6 MV network project.

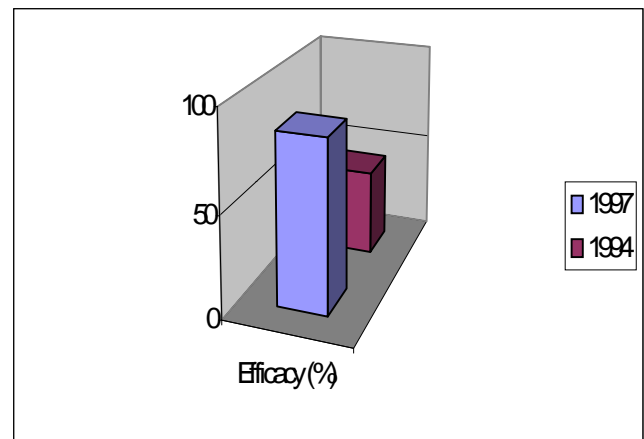
This team was given the task of harmonising technical solutions and the procedural red tape associated with the process of power connections to customers' installations and which involve the establishment of sections of the medium-voltage network.

Work carried out entailed the production of documents promoting procedural harmonisation, including those concerning the rules applicable to quotations, new townships and public-service transforming stations.

### 10.7 Meter readings.

In order to address the problem stemming from the diminished efficiency of meter readings, notably in those zones where second housing predominates, the team undertook meter readings during after-work hours. The data gathered from this experiment were analysed and the results thereof led to the conception of new solutions.

The implementation of the new solutions adopted, which basically have a bearing on the definition of special itineraries in critical zones, produced the change shown in Figure 4.



**Fig. 4 – Efficacy of meter reading, in critical zones**

### 10.8 Inspection.

Electricity distribution companies in Portugal used to play a prime role in the licensing of electric-energy installations, appraising projects and carrying out site inspections.

This team's mission was directed at the last-mentioned activity which, in the meantime, was statutorily attributed to a new institution called CERTIEL.

For this reason, its work was interrupted, at which point in time a number of specifications for procedures and IT applications had already been drawn up.

### 10.9 MV customers management.

The work performed by this team centred on the organisation of the work of customer managers for the supply of special low-voltage (above all to the business market) and medium-voltage electric power.

The results achieved entailed the drawing up of specifications in terms of which the following facets were defined: the area of intervention and the function's profile, the activities to be developed, the segmentation criteria for establishing customer portfolios, and the training programme.

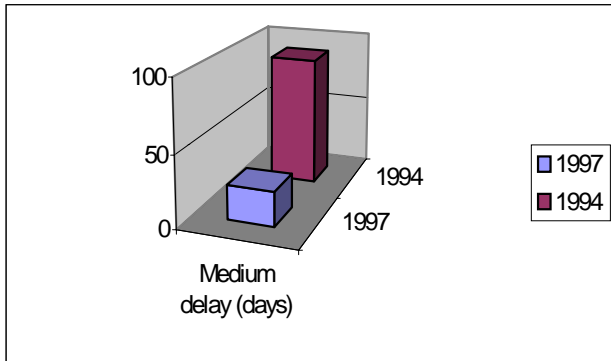
### 10.10 Standardisation e harmonisation.

This team's function was to lend support to the other project teams, focusing its attention primarily on the identification of materials indicated as needed for the various capital projects. This process entailed the dissemination of the respective specifications, the drafting of documents for supporting the acquisition or supply by the owners and, finally, producing documents prescribing the harmonisation of constructive solutions.

The outcome of its work is incorporated in dozens of DNI's (Internal Harmonisation Documents) which were drafted, consulted, approved and disseminated.

### 10.11 Large volume and risky articles.

Figure 5 portrays the results flowing from the modifications introduced in the procurement-processing area, in which this team played a major part in the general reformulation and clean-up of materials files, particularly those relating to large volume and potentially critical articles.



**Fig. 5 – Issues of orders**

More specifically with regard to the above-mentioned articles, the objectives were to reduce shortages while simultaneously securing gains through the decrease in stock-management costs.

During the project's duration it was possible to redesign processes and conclude 18 contracts in accordance with the new procedures.

### 10.12 Contractors.

This team was assigned the task of redefining the relationship with contractors.

Having made a start to its work, it was then instructed to participate in an identical assignment being carried out at EDP Group level. It thus ceased to form part of the project's activities.

### 10.13 Warehouse centralisation.

The goals assigned to this team embraced on the one hand redefining the configuration of LTE's warehouse structure, and, on the other, providing back-up for the realisation of steps taken to introduce centralisation.

The work performed culminated in the co-ordinated centralisation of the four warehouses in the Lisbon area. This measure resulted in the establishment of a new warehouse in Sacavém, a process which involved diversified areas in the definition of space, equipment, the adjustments to information systems, staff movement and training.

## 11. TOPICS FOR REFLECTION.

More than inducing paths for reflection, we are of the opinion that the essence of a paper such as this is to record and transmit succinct information concerning the facts pertaining to the two projects of change, and which we set out to do in the preceding ten chapters.

In the meantime, we would like to highlight the following four topics which we consider of paramount importance:

1. The idea of what is essential for motivating and fostering the participation of all the company's employees and, therefore, the importance of internal communication;
2. The conviction that the depth of transformations must be accompanied by the redesign of processes;
3. The idea that it is necessary to incorporate into future projects the above two realities, whilst benefiting from the experience gained thus far;
4. The idea that it is inevitable, in view of the extent of the problems to be faced by the sector, that future efforts falling within this scope must be assumed with much broader objectives.