

ELECTRICITY CONSUMERS QUALITY OF SERVICES SYSTEM (QSS)

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ABSTRACT

Egyptian Electric Utility and Consumer Protection Regulatory Agency (EgyptEra) is responsible for the protection of consumer's interests as one of its roles. In order to investigate consumer's complaints and ensure protection of their interests, a unified web based consumer's quality of service system (EgyptEra-QSS) is developed which is composed of several modules to offer supreme services to the electricity consumers.

The first phase of this system is a complaint module which is already implemented in Cairo South Electricity Distribution Company (EDC1). This company provides electricity to more than 4 million consumers. The system enables any consumer to file a complaint at any time from any place through a hot phone line number or by any other method including; Internet, email, fax, post or by hand. The system ensures immediate reception of this complaint as well as it directs it to the relevant department within the EDC and generates a unique identifier for each complaint. Also it sets a predefined policy for escalation of delayed complaints using a reasonable time for resolution of each complaint. The system communicates with the consumers by email/SMS to notify them of reception/ resolution of their complaints. The system records complete data and status of all the consumers supply elements. The system develops several reports to define some technical indicators and statistics which are used in the evaluation and benchmarking of the different departments within the company. This helps the decision maker in data analysis and needed actions.

The developed system proved to be effective in monitoring and evaluating the quality of service, and the system has an impact on reducing the complaint resolution time which has an impact on improving the quality of service, also it offers a good infrastructure to be used in future to enhance and expand services offered to consumers.

This paper discusses the design concepts, specifications, future developments and the benefits of this QSS system which can be gained by consumers, Electricity Company and the Regulatory Agency.

INTRODUCTION

A. Background

EgyptEra was established as a legal entity affiliated to the Minister of Electricity and Energy (MOEE) by the presidential decree number 339 for the year 2000 [1] to

reorganize EgyptEra and define its functions and Board of Directors.

EgyptEra objectives are to regulate, supervise and control all matters related to the electric power activities, whether in generation, transmission, distribution or consumption, in a way that ensures availability and continuity of supply so as to satisfy environmental protection considerations, interests of the electric power consumers as well as the interests of the producers, transmitters and distributors. The Electric Utility comprises nine Electricity Distribution Company (EDCs). The total number of consumers in all the EDCs is 25656884, and the percentage consumers in each EDC relative to the total is illustrated in table 1[2].

TABLE 1
Percentage number of consumers in each EDC [2]

Company Name	Percentage of Consumers
EDC 1	17.08
EDC 2	13.41
EDC 3	12.79
EDC 4	11.57
EDC 5	11.46
EDC 6	10.89
EDC 7	8.50
EDC 8	7.94
EDC 9	6.37
Total	100.00

B. Consumer issues

Investigation of consumer's complaints is one of EgyptEra functions specified by the presidential decree to ensure protection of their interests and settlements of any disputes that may arise among the parties involved in the activity.

The consumers must complain first to the concerned company [3], and if they could not find a solution, then they may raise their complaints to EgyptEra to start looking at these complaints to resolve the complaints in a constructive way that guarantees a stable relationship between EDCs and consumers.

EGYPTERA-QSS

In order to investigate consumer's complaints to ensure protection of their interests, a Unified Web Based Consumers Quality of Services System EgyptEra-QSS was designed totally by EgyptEra, developed and established to offer complete supreme services to all the electricity consumers connected to the electricity network. "Complaints" is the first module that have been already developed of this system to ensure complete recording of all the complaints details and instruction processes done till

resolving. The system can be accessed either by consumers, utility operators or EgyptEra through the internet.

A. EgyptEra-QSS goals:

To satisfy the consumer's satisfaction and to meet EgyptEra supervision of all EDCs, the system objectives in the first phase are:

- 1-Instantaneous direction of the complaint to the responsible technical or commercial department to solve.
- 2-Complete recording for all the resolving processes and steps of all complains received in all electricity companies through phone/internet or other paths: e-mail, mail, and fax or by hand as in Fig.1.
- 3-Generation of a non-repeatable complaint identification number (ID) expressing the company, department and date of complaint, to be given to the consumer for future follow up.
- 4-Estimation of the complaint resolving time starts from receiving time, and defining the responsible level of solving.

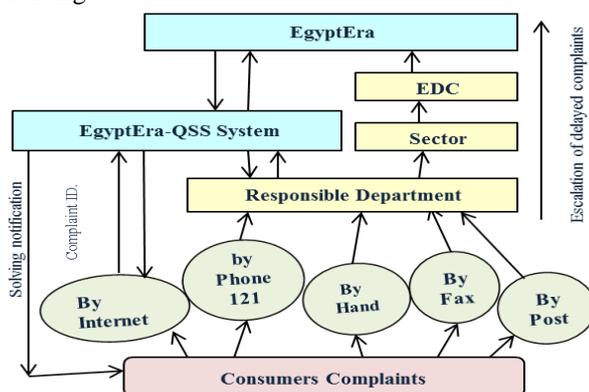


Fig.1. Complaints flow

- 5-Escalation of the complaint to the higher level of responsibility after a certain defined time for each type if it is not resolved.
- 6-Interaction with consumer by e-mail or SMS to notify him of reception and resolving of his complaint and to ask him any data/document needed for resolution of his complaint.
- 7-Measurement of the consumer opinion regarding the services offered.
- 8-Use of the accumulated data in auditing and benchmarking EDCs by EgyptEra.

B. EgyptEra-QSS general specifications

The general specifications of the system are:

- 1-Has unified short phone number 121 for consumers.
- 2-Operators can access the system through Internet by Leased or ADSL lines.
- 3-Operators can work off-line to receive calls during internet failure, and then data exchange will be done with the system data base (DB) after restoring internet connection.
- 4-Ability to attach documents either by operators or complainer.

- 5-Auto recognition of the responsible department to solve the complaint.
- 6-Sending email or SMS to consumers to notify them by:
 - a. Reception of their complaints.
 - b. Asking to send or complete data or documents.
 - c. Resolving of their complaints.
- 7-Enabling different reports for some technical indicators [4] & [5] and statistics of complaints, and other reports for the network devices of consumer and the EDC.

C. Design basics, Data Bases and software used

- 1-The system makes use of the rigid relation between the departments of EDCs and the regional Private Branch Exchange centrals (PBX) of the national telephone company to ensure right routing of the call/complaint to the right department of the right EDC.
- 2- The system depends in its operation on some auxiliary predefined data bases:
 - a. Hierarchy of EDCs and its divisions and departments.
 - b. Hierarchy of governorates and its cities and districts.
 - c. Relation between the departments of the EDCs and governorates and its cities and districts.
 - d. Complaints types and classifications issued by EgyptEra.
- 3-The system developed making use of the following software programs: M.S CRM4, M.S SQL, M.S Exchange and M.S Windows Server.

D. Reports

The system will enable a lot of reports to give some information, statistics, comparisons and technical indicators to give support in decision, for example:

- 1-No. of complaints of each type sent to different departments in each company during certain period.
- 2-No. of complaints per 1000 consumers sent to different departments in each company during certain period.
- 3-Average resolving time of each type of complaints sent to different departments in each company during certain period.
- 4-No. of escalated complaints from different departments in each company during certain period.
- 5-System Average Interruptions Frequency Index (SAIFI) = (total number of customer interruptions)/(total number of customers served).
- 6-System Average Interruptions Duration Index (SAIDI) = (total customer interruption durations)/(total number of customers served)
- 7-Customer Average Interruptions Duration Index (CAIDI) = (total customer interruption durations)/(total number of customer interruptions)
- 8-No. of complaints have interruptions of continuous duration classified as: (blocks of X hours with total of Y hours) for specific department during specific period.

- 9-No. of subscribers have interruptions of continuous duration classified as: (blocks of X hours with total of Y hours) for specific department during specific period.
- 10-No. of subscribers has interruptions of continuous duration equal or more than Y hours for specific department during specific period.
- 11-Detailed list of complaints have interruptions of continuous duration equal or more than Y hours for specific department during specific period.
- 12-No. of subscribers have interruptions of cumulative duration classified as: (blocks of X hours with total of Y hours) for specific department during specific period.
- 13-Detailed list of subscribers have interruptions of cumulative duration equal or more than Y hours for specific department during specific period.
- 14-No. of subscribers have interruption complaints of repetition classified as: (blocks of X times with total of Y times) per year for specific department during specific period.
- 15-Detailed list of subscribers have interruption complaints of repetition equal to or more than Y times per year for specific department during specific period.

IMPLEMENTATION

EDC1 was selected and a cooperation protocol was signed with it to be the pilot of implementation of the system based on that company has the largest number and the most diversity of consumers connected to it, also it has a call center and good infrastructure ingredients. The complaints module of the EgyptEra-QSS system is implemented in all technical and commercial departments of the selected EDC. The rest of the companies are well prepared, trained and ready to deploy the system. Also the system can be monitored in the MOEE, the Egyptian Electricity Holding Company (EEHC) and the Egyptian Electricity Transmission Company (EETC) as in Fig.2.

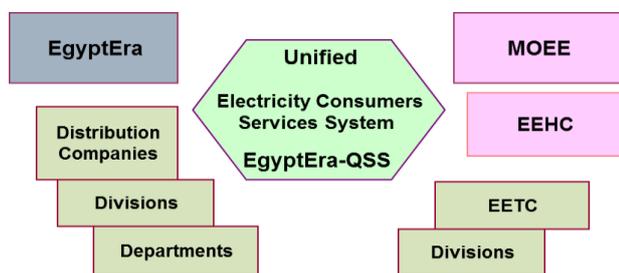


Fig.2. Consumers services centers

A. Enhancements

On the other hand, other enhancements are currently done to this complaints module of the EgyptEra-QSS system including all the following:

- 1-Creation of a new feature for automatic case grouping for the interruption complaints based on: complaint address, complaint time and interruption type.

- 2-Creation of a new relation between the EgyptEra-QSS system and all the events of supply cutoff either programmed or emergency events done by the company control center.
- 3- Sending SMS to subscribers when they are applied under any programmed event for supply cutoff by any company control center, and sending a prerecorded message for those consumers when they contact the unified no. 121 to tell them the current status of their supply and the expected time of return, Fig.3.

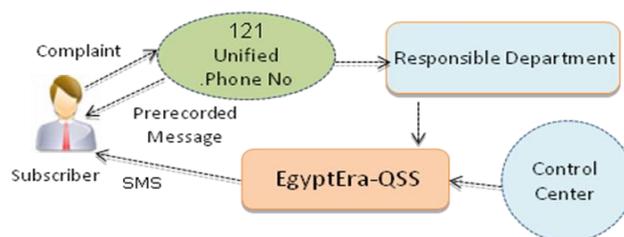


Fig.3. Rout the call to the right department

- 4-Ensuring the high availability of the system by leverage the specifications of the system communication links and servers used and adding redundant for these machines to secure its operation.

B. Story of success

The following are the most important data recorded during the period starting from the date of its rollout in all the company's departments on 01/07/2009 till the end of 2010:

- 1-The total number of complaints is 208385 complaints of different types.
- 2-The average ratio of the number of complaints received to the total number of subscribers during this period is about 47 complaints per 1000 subscribers.
- 3-An increase of the average time to resolve the complaint is noticed in the third quarter of year 2009 which reach 2513 minutes for the interruptions complaints and 2199 minutes for other complaints, this was a result of the poor experience of the company operators in recording the complaints resolution time, and this time began to decline to become the border logical level when it reached in the third quarter of year 2010 to be 173 minutes for the interruptions complaints and 228 minutes for the rest of the complaints as in Fig.4a and Fig.4b respectively.

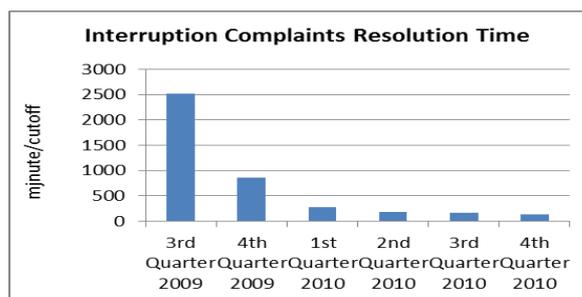


Fig.4a. Interruption Complains Average Resolving Time

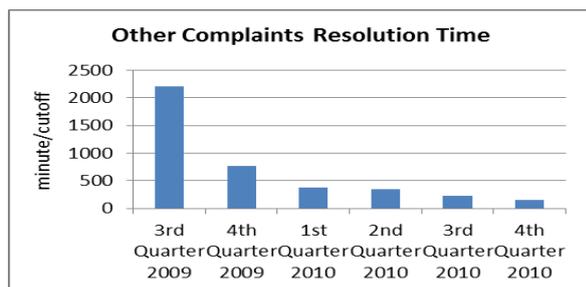


Fig.4b. Other Complains Average Resolving Time

This is as well as the improvement and acceptable decrease in the System Average Interruption Frequency Index (SAIFI) Fig.5a, the System Average Interruption Duration Index (SAIDI) Fig.5b and the average periods of the Customer Average Interruption Duration Index (CAIDI) Fig.5c, then continued to improve the complaints situation at the same level during the fourth quarter of the year 2010, and also a significant improvement in the ratio of the number of SMS sent by the system to subscribers in the fourth quarter of year 2010.

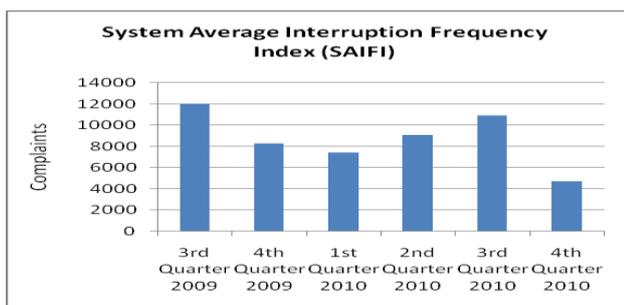


Fig.5a. System Average Interruption Frequency Index (SAIFI)

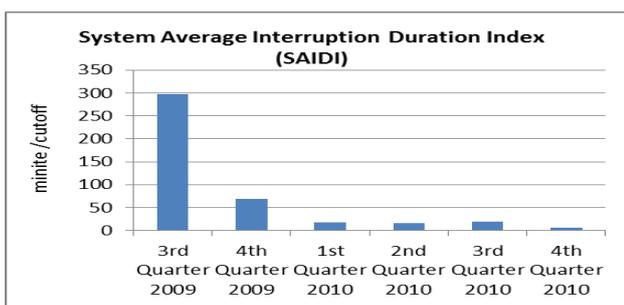


Fig.5b. System Average Interruption Duration Index (SAIDI)

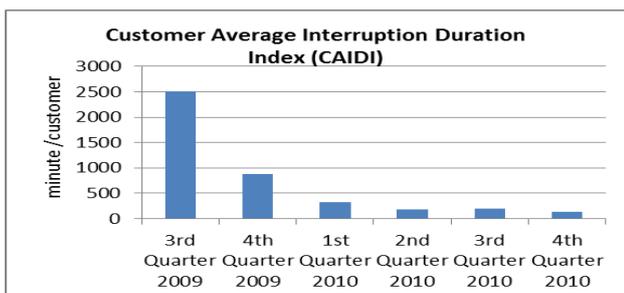


Fig.5c. Customer Average Interruption Duration Index (CAIDI)

C. Benefits achieved:

The utilities use the customer oriented indices to evaluate their service reliability with the most commonly used indices: System Average Interruption Frequency Index (SAIFI), System Average Interruption Duration Index (SAIDI), and Customer Average Interruption Duration Index (CAIDI). Deploying EgyptEra-QSS system assist the EDC to reduce the complaint average resolving time specially the interruption complaints. On the other hand the system assists Egyptera to monitor - online - the complaint status of the EDC, and benchmark its different departments regarding their percentage of complaints to total consumers and the average resolving time.

FUTURE PLAN

- Important features will be added to the QSS system:
- 1-Enable customer to enter his meter reading and verifying this reading with his last and average readings.
 - 2-Enable customer to examine his bill and to pay his invoice electronically, and guarantee non duplication of payment by the system and the company collector.
 - 3-Enable customer to apply for new contract, for upgrading his meter/contract power and for removing his meter.
 - 4-Interact with smart meters in a future smart grid.
 - 5-Plotting all the supply elements positions on an electronic earth map, and make the name and status of each element appear when the cursor point to it.

CONCLUSION

The benefit of using the communication and information technologies in the power sector [6] is very clear in this case. The application of the unified automated consumers quality of services system EgyptEra-QSS helped fast handling of consumer complaints and helped improve the efficiency of work in the electricity distribution company, which in turn helps to increase the amount of electricity sold by improving power failures and reduce the extended connection of power to citizens. It will also help after the implementation of the next phases to improve the level of collecting the dues of all electricity companies (Production - transmission - distribution) in order to improve the efficiency of the electricity utility in general.

REFERENCES

[1] Presidential Decree number 339 for the year 2000.
 [2] Egyptian Electricity Holding Company Annual Report 2008/2009.
 [3] Egyptian Electricity Distribution Code, 3-2010
 [4] IEEE Working Group on System Design, "Trial Use Guide for Electric Power Distribution Reliability Indices", Report p1366, Draft #14
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