ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
MBA PROGRAM

EVALUATION OF THE DESIGN AND IMPLIMENTATION OF DECENTRALISED BILLING SYSTEM PROJECT AND ITS IMPACT ON CHANGE MANAGEMENT PROCESS. A CASE STUDY OF EEPCO.

A RESEARCH PROJECT SUBMITTED TO ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE IN MASTER OF BUSINESS ADIMINISTRATION.

BY

- SOLOMON TEKLEHAIMANOT

Research Advisor
TILAHUN TEKLU (Dr.)

DEPARTMENT OF MASTER OF BUSINESS ADIMINISTRATION
FACULTY OF BUSINESS AND ECONOMICS
ADDIS ABABA UNIVERSITY
ADDIS ABABA

JULY 2007

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Approved by Board of examiners:

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Advisor	Signature
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Examiner	Signature
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Examiner	Signature
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Examiner	Signature

STATEMENT OF CERTIFICATION

This is to certify that Ato Solomon Teklehaimanot has carried out his research work on the topic entitled, Evaluation of the Design and Implementation of Decentralized Billing System project and its impact on Change Management process. A case study of Ethiopian Electric Power Corporation (EEPCO).

The work is original in nature and is suitable for submission for the award of Master of Business Administration.

_____

Advisor: Tilahun Teklu (Dr.)

Date: ----------

STATEMENT OF DECLARATION

I, Solomon Teklehaimanot declare that this study entitled, Evaluation of the Design and Implementation of Decentralized Billing System project and its impact on Change Management process. A case study of Ethiopian Electric Power Corporation (EEPCO) is my own effort and study. I have carried out the study independently with the guidance and support of the research advisor. This study has not been submitted for award of any degree or diploma program in this or any other institution and that all source of materials are duly acknowledged. It is offered here in partial fulfillment for the requirement for the degree of Master of Business Administration.

_____

Solomon Teklehaimanot

ACKNOWLEDGEMENTS

First, I would like to express my special gratitude to my advisor, Dr. Tilahun Teklu, for his unreserved support and advise from the start to the end of the study.

I would like to thank EEPCO greatly, especially to the General Manager of EEPCO, Ato Meheret Debebe, for his support to realize my dreams from the very beginning of the undergraduate program. I am extremely indebted to my former supervisor W/ro Amarech Yirdaw for her invaluable assistance and encouragement during my study.

I would like to uplift my son, Henok Solomon for his invaluable support and patience during my study.

I would like to express my sincere appreciation and thanks to W/ro Sara Getahun for her support in typing this paper.

Finally, I would like to thank my relatives' and friends for all the help and encouragement that they have been extended to me.

Thank you, all!

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AAR: Addis Ababa Region
AFMIS: Accounting and Financial Management System
BPR: Business Process Re-engineering
CIBS: Customer Information and Billing System
CIPC: Customer Information Processing Center
CMS: Customer Management System
DBMS: Database Management Systems
DDN: Digital Data Network
DFD: Data Flow Diagram
EDI: Electronic data interchanger
EELPA: Ethiopian Electric Light and Power Authority
EEPCO: Ethiopian Electric Power Corporation
E-R: Entity Relationship
ETC: Ethiopian telecommunication corporation
GTAG: Global Technology Audit Guide
GWH: Gigawatt hour
HV: High Voltage
ICS: Inter-connected System
ICT: Information Communication Technology
IIA : Institute of internal auditors
IT: Information Technology
KM: Kilometer
KWH: Kilowatts hour
LCA: Local Collection Application
LRA: Local reading application
LV: Low Voltage
MIS: Management Information System
MW: Mega watt
NIPS: Network Information and Planning System
PIP: Project initiation and planning
SCS: Self-contained System,
SDLC: System Development Life Cycle
TQM: Total Quality Management
TWH: Tera watts hour

Abstract

The intention of any change is to move an organization from its current state to a more desirable state. However, pursuing change and transforming organizations is hard work. Many change initiatives fail because either culture does not ready to accept change or the change process was not administrated properly. Some successful Corporations like EEPCO, may fail in some aspect of their change management process. Change can be emanated due to external environment pressure, Regulatory environment, business objective (goals, strategies, and requirements), result of audit or risk assessment, operational problem or change in performance or capacity requirements. The main issue is the change must be addressed and managed effectively. This paper is to evaluate the effectiveness of the design and implementation of EEPCO's billing system. The study focuses on the effort made to identify the problem and design an effective billing system and the implementation of the designed system to change the old IBM based AS/400 system. The problems associated with this change process and the reaction from responsible bodies was assessed. This study identifies that; there were problems in the change management of the case under consideration. It was suggested that to tackle the identified problems and to purse additional changes management should take corrective action promptly. This may enable change to be understood as a continuous phenomenon. I believe that, the paper will not adequately address all the problems of the change process of the billing project. However, the paper will trigger the sluggish management to reconsider the problems and to put some influences to create sense of urgency to act as energetic leader to overcome the problems.

CHAPTER ONE

The Problem and its Approach

1.1 Introduction

Change is endemic in managing large Corporations that provide service to the public. The pressures for change come from all sides: globalization, government initiatives, doing more with less, improving the quality of service and the learning experience, and the pace of change is ever increasing. Living with change and managing change is an essential skill for all (Pettigrew, 2001).

Change is also difficult. There are many different types of change and different approaches to managing change. It is a topic subject to more than its fair share of management fads, quick fixes and guaranteed win approaches. Finding an approach that suits given situation goes to the heart of being an effective and professional manager in any sector.

Change management is a structured approach to change in individuals, teams, organizations and societies that enable the transition from a current state to a desired future state. The change referred to in this context includes a broad array of topics. From an individual perspective, the change may be a new behavior. From a business perspective, the change may be a new business or new technology. From a societal perspective, the change may be a new public policy or the passing of new legislation. Successful change, however, requires more than a new process, technology or public policy. Successful change requires the engagement and participation of the people involved. Change management provides a framework for managing the people side of these changes. The most resent research points to a combination of organizational change

management tools and individual change management models for effective change to take place (Wikipedia, the free encyclopedia 2007).

According to the definition, whatever the change program, one key area requiring corporate attention is the identification and management of change stakeholders. In addition to this, there are essential activities like setting of clearly defined and measurable objectives. Therefore, evaluating the design and implementation process and its impact on corporate change objectives or desirable future states of Ethiopian Electric Power Corporation Billing system project is valuable. Billing system and Customer Management system (CMS) are used interchangeably throughout the study paper.

As cited by Carnell (1995), in the words of Coffey, Cook and Hunsaker (1994: 638), change is defined as "the process of alteration or transformation of individuals, groups, and organization undergo in response to internal and external factors." They describe four types of change.

Change by Exception: - Change by exception is usually handled by setting up a project to manage its implementation. It has a distinct beginning and end where success can be relatively measured (Lovell, 1994). It will often have little impact on the way the remainder of the organization worked; hence it can be seen as the black sheep at the time.

Incremental change: - By far the most usual type of change is that occurs in an evolutionary way, often without the participants realizing that it has happened. In the picture, for example, people only occasionally notice that the trees have grown.

Pendulum Change: - Pendulum change is often associated with fashion. In other words, the change swings from side to side of a spectrum as moods change. An obvious example is the fashion for centralization or decentralization. Another good example is the swings towards work measurement and performance pay, which was in fashion in the 1960s.

Paradigm shift: - By far the most type of change in the present environment is paradigm shift. A paradigm is a way of viewing the world, or the values, which underpin our viewpoint. Many would argue that a paradigm shift is taking place in public administration at the moment. The new public management tends to emphasize keeping administration lean and purposeful (Hood, 1991, as cited in Lovell, 1994).

The CMS is a product that provides integral support to the business processes that take place in the commercial department of a utility company. In this part, I will present a brief description of the main processes of the system. The CMS (Billing System) consists the following functional sections; Market Management, Customer Management, Readings Management, Billings Management, Collection Management, Credit Action Management, Meter Management, Service Order Management, and Financial Accounting Management and Report Management.

1.2 Statement of the problem

The Government of Federal Democratic Republic Ethiopia is currently undertaking a civil service reform program in order to foster development by enhancing a transformed socio economic activity of the country. To supplement this effort, the government has outlined a national civil service reform program to be implemented on government organizations. Among

the key organizations of the country involved in the infrastructure development which undertaking holistic reform program is the Ethiopian Electric Power Corporation.

The reform program in the Corporation has developed sub-programs in line with the national reform program and customer management reform sub-program is one of the identified processes that demand immediate attention. The continuous change and the civil service reform program of EEPCO is to decentralize its customer management system to regional distribution offices and districts. To maintain this objective at most effective status, the Corporation has introduced a project known as the decentralization of Accounting and Billing system as part of the broad information technology development or Management Information System Project. It is publicly known that, customers of the Corporation are repeatedly claim that "the new billing system is not customer friendly", "they are asked to pay exaggerated amount", "the system doesn't bill their consumption on time" as a result, they claim that, they are forced to pay excess amount due to the progressive tariff structure. In general the new billing system has created many troubles in the customer management of the Corporation. Customers are claiming and employees at the frontline offices or service centers are frustrated due to the indistinguishable information and disability to evidently answer customer's complaints. Therefore, the evaluation of the design and implementation system of the billing system and its impact on the corporate change management program is to be evaluated in this context of change.

The study will try to address the following basic questions: -

- Is the project designed and implemented well to address the main change objective of the management and the Corporation as a whole?
- Is the billing project adds-value to EEPCO customer management system?

- ❖ Are the predetermined objectives of the billing project achieved?
- ❖ To what extent does the program change the CMS/billing system from the old fashion?

1.3. Objective of the study

As it discussed above, the main problem in relation to the research area is the lack of confidence in the new billing system by its direct users and customers. As a result, evaluating the success and failure of the billing project as a change management process is important. Identifying, analyzing and suggesting sound solution to a problem is the primary objective of the study.

The study focuses only to one of the prominent activities of Customers' Management System (CMS) - the implementation of EEPCO's new billing system and its contribution to achieve corporate objective.

Therefore, the objective of this study mainly focuses on customer management system especially activities related to the Billing system of EEPCO. Accordingly, the specific objectives of the research project are: -

- To review the appropriateness of the billing system design
- To show the over all pictures of the efforts exerted to make the project live.
- To identify the basic knowledge practiced in relation to the customer management/ Billing system in the Corporation
- To point out weaknesses and strengths in the design, implementation and operations of the corporate Billing system /CMS/.

1.4 Scope of the Study

The Corporation has many different kinds of activities within the customer management system. It would be complete if it were conducted on all aspects of customer management system activities. However, this research focuses its attention only to one of the prominent activities of customer management system i.e. billing system which is the major determinant factor on corporate public relation. The researcher focuses the study to the evaluation of the success of customer management system or billing system project of the Ethiopian Electric Power Corporation (EEPCO).

1.5. Significance of the Study

It is known that any useful study is conducted to serve a particular purpose. Therefore this study is: -

- To provide a valuable suggestion on change management process.
- Help researchers and owners of the process to look for further study and for solution to the discovered problems.
- The research paper copy will be submitted to the management and post graduate college of Utility management and Electrical Engineering of EEPCo as a valuable input to the current business process reengineering activity and reference material respectively.

One of the significant issues that trigger the study of the case is a continuous customers' claim through public media and other mechanisms. Examples of customer claims are: -

"We are forced to pay exaggerated amount"
Ethiopian News Agency (Customer, Dessie)

"Customers are billed in excess of their KWH meter reading"
Printed Media

"EEPCO has implemented a purse-snatch billing and collection system"
Some Customers

"Is this a real system applicable to EEPCO?" (Employees uncertainty)
EEPCO Employees

These are some important issues that triggered or served as motivating factors for the study. And also, experience as an auditor and education in Information systems has given me a better position to appreciate the problem.

1.6. Research Methodology

The Corporation that is the subject of this research is a large, complex electric utility service provider, which was transformed its traditional billing system to a comprehensive modern billing system. The study is based on primary and secondary data. The primary data is collected through questionnaire. Four type of questionnaire was distributed to end users of the system (finance work units and customer management managers, customers, ICT department system analysts and programmers of the Corporation). The respondents were selected based on judgment or convenience method to fill the questioner. A total number of 168 respondents were selected. These respondents are 8, 32, 23 and 105 for ICT department employees, for finance employees, for service center heads /sales and reception heads and customers of the corporation respectively. Percentage is used to analyze the response /opinion of respondents for each item of the questioner. Comparison will also be made between the objective of the project and the reply

of the respondents. Radio Fana Tele conference on capacity building dated July 01, 08 and 15/2007 focused on EEPCO service delivery was burned to CD and Summarized. The secondary data are collected from corporate prints, reports, journals and books. Both empirical and theoretical information are employed to produce conclusions.

1.7 . Limitation of the study

Evaluating the design, implementation and impact of giant Corporations billing system within a couple of weeks and limited resource is very difficult. From its very nature conducting research on this topic is not an easy task and at least it needs sufficient time or a two semester effort and communication with different end users at different places with different capacity. Major problems that hindered my research works are mainly lack of cooperation by informants to provide valid information and adequate time to reach a considerable number of stakeholders.

1.8. Organization of the study

The report is organized into five chapters: Chapter one contains the problem and its approach dealing with research problem, design and methodology, the next chapter deals with the process of system change in conceptual approach, in chapter three company set up with a brief background is presented, chapter four focuses on the analysis of the subject matter to evaluate the success of the change process. Finally, chapter five comes up with the summaries and conclusions of the findings and forwards recommendations.

CHAPTER TWO

The Process of system Change-Conceptual Approach

As it was discussed in the introductory chapter of the research paper the Corporation has undergoing a decentralization of billing and accounting project. Currently EEPCO is in extensive activities to redesign its core and support process to bring a dynamic redesign and dramatic change in its service delivery. So, the Billing system project or Customer Management System project is its continuous improvement and corporate development process. In light to this, assessing related change management and system development literatures is eminent.

2.1 Introduction

If you ask employees what they think about change, you will normally find that most people have negative attitudes and perceptions towards change. They have fears of losing their job, their status or their social security, or they are afraid of a higher workload.

In many cases, first effects of change on employees, leaders, and on performance levels are negative. These effects include fears, stress, frustration and denial of change. Most employees tend to react with resistance to change rather than seeing change as a chance to initiate improvements. They are afraid of losing something, because they have incomplete information on how the change processes will effect their personal situation in terms of tasks, workload, or responsibilities (William et el., 2007).

If chance processes lead to redundancies, those who "survived job cuts" still have a negative attitude towards change. One reason may be that they now face additional tasks and responsibilities. Some people may feel guilty for still having their job while others became unemployed. Such emotional reactions may cause additional stress in the changing organization.

Managers need to keep in mind those negative side effects of change initiatives in order to achieve the expected positive results. The success of change projects depends on the organization's ability to make all their employees participate in the change process in one way or the other.

Change Management is the process, tools and techniques to manage the people-side of change processes, to achieve the required outcomes, and to realize the change effectively within the individual change agent, the inner team, and the wider system (Carnall, 1995).

There are a multitude of concepts on Change Management and it is very difficult to distil a common denominator from all the sources that are applying the phrase to their mental maps of organizational development. But obviously there is a tight connection with the concept of learning organizations. Only if organizations and individuals within organizations learn, they will able to master a positive change. In other words, change is the result from an organizational learning process that centers around the questions: "In order to sustain and grow as an organization and as individuals within; what are the procedures, what is the know-how we need to maintain and where do we need to change?" and, "How can we manage a change, that is in harmony with the values we hold as individuals and as organizations?"(Williams et el., 2007).

Change Management has also to be seen in the light of the discussion on Knowledge Management, which took several turns during the nineties. When the establishment of an intranet was suddenly feasible to any large organization, IT and management scientists declared the beginning of the "knowledge society". The immature anticipation of knowledge management was that every member of an organization would be highly motivated to share information through a common platform and a quality improvement process would be enabled more or less by itself. It took only a couple of years to realize that this assumption was false. Up to now, there are no examples of a company in which transformational learning is facilitated by an IT system only, because the early protagonists forgot that information does not equal knowledge and that human knowledge is in the muscles of the persons who make the parts of a larger system (*Handy, 1995)*

The Institute of internal auditors **(IIA)** Global Technology Audit Guide **(GTAG)** describes Change management process (source and scope) as follow:-

Sources of Change

Virtually every business decision requires change in IT. The following factors serve as sources of change that must be addressed and managed effectively in the IT environment:

- External environment (competitive market, stakeholders, changing risks)
- Regulatory environment
- Business objectives, goals, strategies, requirements, processes, and shifts in priorities.
- Results of an audit, risk assessment, and other type of evaluation or assessment.
- Operational problems

• Changes in performance or capacity requirements.

Scope of Changes

An effective change management process encompasses within its scope any and all alterations to any and all IT based assets on which business services depend. Assets subject to change management include: Hardware, Software, Information, data, data structures, Security controls, Processes, policies, procedures, and Roles/responsibilities.

2.2 The three phases of change

A model first developed by social psychologist Kurt Lewin in 1958 classifies the change process into three phases: the present state, the transition state, and the desired state. The present state is the status quo-an established equilibrium that continues indefinitely until a force disrupts it. The transition state is the phase during which we disengage from the status quo. During this period, we developed new attitudes or behaviors that lead to the desired state. To attain what we want (the desired state), we must pass through the uncertain, uncomfortable phase of the transition state.

Keeping major change alive is only possible when the pain of the present state exceeds the cost of the transition state. Because of the nebulous and often chaotic nature of this phase, people will often attempt to regain their equilibrium by reverting back to the way things were. Many change projects are never completed because the people involved could not tolerate the sense of ambiguity and lack of control inherent to the transition phase (Lewin, 1958).

People will even chose to stay in familiar situations that they know are not working rather than face the ambiguity of the unknown. Many times, a battered wife will remain for years, even a lifetime, with a physically violent husband. Women have reported that, among other reasons, they have stayed with brutal husbands because breaking out of the relationship was even more freighting than the beatings. Even though the situation may be physically abusive, such women have at least learned what to expect, and there is an odd comfort in being able to anticipate the future-even a negative future. For most us, the unknown is so terrifying that we will remain with what we have long after it is apparent that it is punishing to do so. Therefore, the difficulty of the transition state forces some people to abort the process shortly after initiating it; only by developing the resolve to sustain the transition can you attain the desired state (Pettigrew et el, 2001).

2.3 Change Management

Change management is a systematic approach to dealing with change, both from the perspective of an organization and on the individual level. A somewhat ambiguous term, change management has at least three different aspects, including: adapting to change, controlling change, and effecting change. A proactive approach to dealing with change is at the core of all three aspects. For an organization, change management means defining and implementing procedures and/or technologies to deal with changes in the business environment and to profit from changing opportunities (Slater as cited by Hoffer et el., 2002).

Change management means to plan, initiate, realize, control, and finally stabilize change processes on both, corporate and personal level. Change may cover such diverse problems as for example strategic direction or personal development programs for staff.

Change is the continuous adoption of corporate strategies and structures to changing external conditions. Today, change is not the exception but a steady ongoing process. On contrast 'business as usual' will become the exception from phases of turbulence. Change management comprises both, revolutionary one-off projects and evolutionary transformations (Weiss, 1986).

2.4 ICT Initiatives and Change Management

Most modern ICT-related investments involve some form of change, regardless of whether the change is initially focused on a single individual, work group, or the entire Organization (Pare´ and Jutras, 2004 as cited by Williams). Indeed, change may nowadays be viewed as a normal condition associated with the use of ICT as new products are continuously installed, and are often accompanied by changes in the user-base and location, and/or in the core business or ICT strategic plan. In reality, as organizations evaluate and implement changes to their ICT systems and infrastructures, change has become an increasing part of "business as usual".

Fundamental issues, Pressures to change can emanate from a range of sources, and are part external and part internal. External pressures may be viewed in terms of PEST factors (political, economic, social, technological), while Reddin's (1975) motivating factors may be viewed as internal pressures. We may also differentiate between mandatory and voluntary change, a distinction held by Becher and Kogan (1992), who in referring to planned and unplanned change, combine aspects of the debates on internal/external pressures and voluntary/mandatory change. Unplanned change (which tends to be accepted rather than actively opposed) occurs when external forces impose adjustment upon an organization. Planned change generally originates from higher levels within an organization, is often in response to environmental pressures, is based on coercion, and is more likely to arouse conflict or contention than unplanned change.

People issues, Change has the potential to complicate life for people, regardless of its motivation, desirability, or method of implementation, and understanding the way in which individuals react to change can assist management in the planning and implementation of change initiatives (Hayes, 2002 as cited by Williams). Correspondingly, the impact of change on individuals, and the meaning that individuals give to their involvement in the change process has been given much consideration in the literature. Fullan (1991) argues that real change involves loss, anxiety, struggle, uncertainty, being lost, and confronting more information than can be handled. Harris (1989) describes how change can cause temporary confusion, and that persons respond to change more positively when they have understanding of its purpose and consequences, while Nanus (1992) points out that change may alter long-standing working relationships, and argues that we "fear the unknown", often with very good reason.

Change models, although there are many competing approaches to effecting individual and organizational change (Neal et al., 1999), there is general agreements that the two dominate tactics are the planned and emergent approaches (Burnes, 2004 as cited by Williams). The planned change approach is characterized by Lewin's (1951) theory of change, which comprised three sequential phases: unfreezing (preparing for change by destabilizing the equilibrium), moving (designing and installing the change), and refreezing (institutionalizing in a new state of equilibrium).

Although the planned approach to change was expanded and updated over time by the organization development movement – see for instance Schein (1985) or Cummings and use (1989) – it has attracted much criticism over the years, with authors such as Kantar et al. (1992) describing it as being quaint, linear, and static, arguing that organizations are organic and fluid

entities that cannot be frozen in a particular desirable state. Kanter et al. (1992) form part of the culture-excellence school, which along with postmodernists and processualists, are among the fiercest critics of the planned approach. According to Burnes (1996), these groups collectively promoted the emergent model, which rejected the planned approach, believing change to be a continuous process during which organizations seek to align and realign themselves with volatile operating environments. According to Hayes (2002), the rationale for the emergent approach stems from the belief that key decisions within organizations evolve over time, and are the outcome of intertwined cultural and political processes. In the emergent model (also sometimes referred to as continuous improvement or organizational learning), change is effected via a series of ongoing small adjustments; the cumulative result may sometimes be the introduction of major change without the intention of doing so. However, despite the numerous criticisms leveled at the planned approach, it has been argued that successful change projects tend to conform more closely to the recommendations of the Lewin model than to other methods (Grover et al., 1995 as cited by Williams).

A change-based framework facilitating ICT investment evaluation taken individually, the four themes discussed above do not provide a comprehensive or integrated understanding of the organizational change process that is particularly useful for managers who find themselves in the position of planning and/or implementing change. Correspondingly, our framework draws upon all four themes and incorporates other important issues involved in evaluating overall effectiveness in order to facilitate a more holistic understanding of a given ICT investment and its context. Many early change efforts were unsuccessful due to reasons such as failing to match the innovation/implementation with the environment, lack of follow-through, and lack of

practice and training in the innovation. Change is now viewed differently,

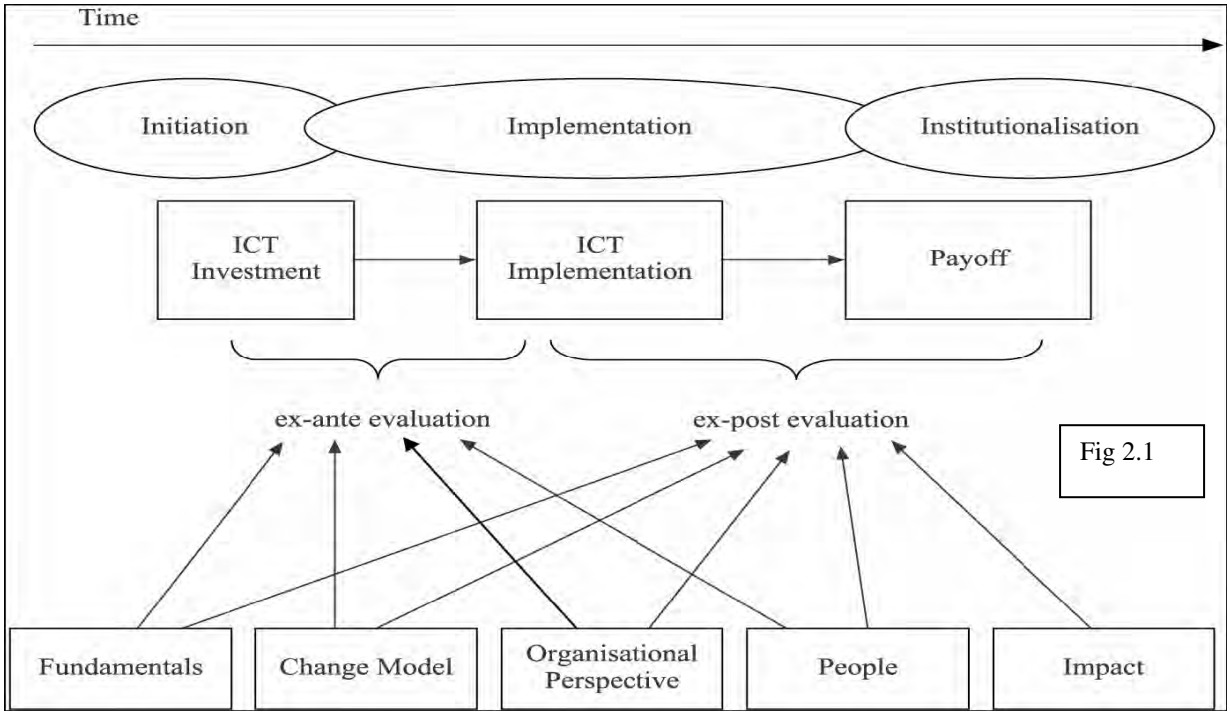


Fig. 2.1 Williams updated version of Lewins model.

the emphasis being both on the process of introducing change, and the context in which the change will be placed. Such changes are sometimes referred to as "second order" – permeating deep into structure and culture. The framework acknowledges this philosophy, recognizing the importance of harmonizing the contextual aspects with the intended change and change process if the desired results are to be achieved. The framework views the change process as a series of overlapping phases – initiation, implementation, and institutionalization – which correspond to the preparation, acceptance, and commitment activities of Connor (1992), and also exhibit close similarities to Lewin's (1951) much cited work involving unfreezing, changing, and refreezing.

- Initiation is concerned with beginning work, and involves developing commitment to investing in the innovation.

- Implementation is concerned with putting the innovation into action, and with a major change this phase often occupies a period of between two and three years.
- The emphasis during institutionalization or continuation is on seeing the innovation integrated into daily life, and no longer considered as something new.

The figure illustrates that ex ante evaluation takes place largely during initiation. Although there is potential for aspects of ex ante evaluation to take place during the early parts of implementation, this is limited as the change is in use for most of this phase, and is thus available for ex post evaluation. Ex post evaluation takes place following implementation and during the so-called payoff period (when the change has become institutionalized or anchored). All components of the framework can be examined during both ex ante and ex post evaluation, apart from impact – which is not assessed until after implementation has taken place. In the following case study we apply the framework during the initiation stage of an ICT investment (hence providing information that could contribute toward ex ante evaluation) in order to appraise its usefulness.

2.5 System Development strategies

According to Jeffery et el. (1996) the process of managing changes especially in information system changes, management shall give enough attention to all stakeholders to deal with the people side problem.

These stakeholders are any person with an interest with the existing or new information system. Stakeholders can be technical or non-technical workers. They broadly classified into six groups:

i.e. System Owners, System users, System Designers, System Builders, System Analysts and IT vendors and Consultants.

The U.S. Department of labor calls these stakeholders them information workers. The name is coined to describe those people whose jobs involve the creation, collection, processing, distribution and use of the information.

2.6 The process of developing and implementing of system

Hoffer et el. (1996) in their Modern system analysis and design book describe the same approach for analyzing and solving problems as Herbert Simon and colleagues (Simon, 1960 as cited by Hoffer) for analyzing and solving a problem approach.

This problem analysis and solving approach should be considered on evaluating the process of designing and implementing of the new customers Management system (CMS) or Billing systems of to EEPCO.

The approach has four phases' intelligence, design, choice and implementation. According to Simon, during the intelligence phase, all information relevant to the problem is collected. During the design phase, alternatives are formulated and, during the choice the best alternative solution is chosen. The Solution is put into practice during the implementation phase.

Simon's Problem solving mode is a useful one that lends insight into how people solve certain kind of problems, but there are other factors in organizations that influence how problems are

solved. Among these are personal interest, political considerations, and limits on time and cognitive ability that affect how much information people can gather and process.

2.6.1. Project Identification and Selection

What is a problem? Pounds (1969) define a problem as the difference between an existing situation and a desired situation. For him, it is the process of identifying an existing situation and a desired situation. For him, the process of identifying problems is the process of defining differences, so problem solving is the process of finding a way to reduce differences. According to pounds, a manager defines and a host of other documents. This documentation is essential to provide a written, not just oral, history for the project, to convey information clearly, to provide details needed by those who will maintain the system after we are off the project team, and to obtain commitments and approvals at key project milestones.

Systems development is a change process, and organization members greet any organizational change with anticipation and uncertainty. Organization members will have certain ideas, perhaps based on their hopes and wishes, about what a new information system will be able to do for them; these expectations about the new system can easily run out of control. Ginzberg (1981 as cited by Hoffer)

found that successfully managing user expectations is related to successful systems implementation.

A prerequisite to making effective project selection decisions is to gain a clear idea of where an organization is, its vision of where it wants to be in the future, and how to make the transition to its desired future state.

2.6. 2. Initiating and planning systems Development Projects

A key consideration when conducting project initiation and planning (PIP) is deciding when PIP ends and when analysis, the next phase of the SDLC, begins. This is a concern since many activities performed during PIP could also be completed during analysis. Pressman (1992 as cited by Jeffery) speaks of three important questions that must be considered when making this decision on the division between PIP and analysis:

1. How much effort should be expended on the project initiation and planning process?
2. Who is responsible for performing the project initiation and planning process?
3. Why is project initiation and planning such a challenging activity?

2.6. 3. Performing Requirements Determination

There are three sub-phases to systems analysis: requirements determination, requirements structuring, and generating alternative system design strategies and selecting the best one.

Once management has granted permission to pursue development of a new system (this was done at the end of the project identification and selection phase of the SDLC) and a project is initiated and planned, we begin determining what the new system should do. During

requirements determination, we gather information on what the system should do from as many sources as possible: from users of the current system, from observing users, and from reports, forms, and procedures. All of the system requirements are carefully documented and made ready for structuring. In many ways, gathering system requirements is like conducting any investigation.

Structuring System Requirement involves Process Modeling, Logic Modeling and Conceptual Data Modeling. Process modeling involves graphically representing the functions, or processes, which capture, manipulate, store, and distribute data between a system and its environment and between components within a system. Over the years, several different tools have been developed for process modeling. We focus solely on data flow diagrams, the traditional process modeling technique of structured analysis and design and the technique most often used today for process modeling.

Logic modeling involves representing the internal structure and functionality of the processes represented on data flow diagrams. These processes appear on DFDs as little more than black boxes, in that we cannot tell from only their names or CASE repository descriptions precisely what they do and how they do it. Yet the structure and functionality of a system's processes are a key element of any information system. Processes must be clearly described before they can be translated into a programming language.

A conceptual data model is a representation of organizational data. The purpose of a conceptual data model is to show as many rules about the meaning and interrelationships among data as are

possible. Do conceptual data modeling in parallel with other requirements analysis and structuring steps during systems analysis. Collect the explanations of the business necessary for conceptual data modeling from information-gathering methods like interviewing, questionnaires, and JAD sessions.

2.6. 4. Selecting the best alternative design Strategies

Selecting the best alternative system involves at least two basic steps: (1) generating a comprehensive set of alternative design strategies and (2) selecting the one that is most likely to result in the desired information system, given all of the organizational, economic, and technical constraints that limit what can be done. In a sense then, the most likely strategy is the best one. A system design strategy is an approach to developing the system. The strategy includes the system's functionality, hardware and system software platform, and method for acquisition.

2.6. 5. Designing Forms and Reports

System inputs and outputs-forms and reports-were identified during requirements structuring. The kinds of forms and reports the system will handle were established as part of the design strategy formed at the end of the analysis phase of the systems development process. During analysis, however, we may not have been concerned with the precise appearance of forms and reports, only with which ones needed to exist and what their contents were. We may have distributed prototypes of forms and reports, which emerged during analysis as a way to confirm requirements with users. Forms and reports are integrally related to various diagrams developed during requirements structuring. For example, every input form will be associated with a data flow entering a process on a DFD, and every output form or report will be a data flow produced

by a process on a DFD. This means that the contents of a form or report correspond to the data elements contained in the associated data flow.

2.6.6. Designing interfaces and Dialogues

The process of designing interfaces and dialogues is a user-focused activity. This means that we follow a prototyping methodology of iteratively collecting information, constructing a prototype, assessing usability, and making refinements. To design usable interfaces and dialogues, we must answer the same who, what, when, where, and how questions used to guide the design of forms and reports. The deliverable and outcome from system interface and dialogue design is the creation of a design specification. This specification is also similar to the specification produced for form and report designs-with one exception.

2.6.7. Designing Database

A logical data model describes data using a notation, which corresponds to a data organization used by a database management system. The most common style for a logical data model is the relational database model. We do logical data modeling in parallel with other systems design steps. Thus, we collect the detailed specifications of data necessary for logical data modeling as we design system inputs and outputs. Logical data modeling is driven not only from the previously developed E-R data model for the application but also from form and report layouts.

Physical file and database design is a natural, succeeding step after logical data modeling. As in logical design, the three steps of the physical design phase-physical file and database design, program and system structure design, and distributed system design-are typically conducted in

parallel because of the overlap of issues addressed. The goal of physical design, in general, and physical file and database design, in particular, is data processing efficiency.

2.6.8. Designing Distributed Systems

Designing distributed systems is much like designing single-location systems. The primary difference is that because a system will be distributed over two or more locations, numerous design issues must be considered due to their influence on the reliability, availability, and survivability of the system when it is implemented. Because distributed systems have more components than a single-location system-that is, more processors, networks, locations, data, and so on-there are more potential places for a failure to occur. Consequently, various strategies can be used when designing and implementing distributed sites will enhance the reliability that a given piece of information will be available at a given time, and enhance the overall system survivability if a single node has a catastrophic failure. Yet, replicating all data elements at all sites may result in not having the latest information at a given site since it may not be possible to simultaneously update changes to all locations.

2.6.9. System Implementation

Coding, testing, and installation (or conversion) are three separate processes in the implementation phase of the systems development life cycle. The purpose of these steps is to convert the final physical system specifications into working and reliable software and hardware. Coding, as mentioned before, is the process whereby the physical design specifications created by the analysis team are turned into working computer code by the programming team. Depending on the size and complexity of the system, coding can be an involved, intensive

activity. Once coding has begun, the testing process can begin and proceed in parallel. As each program module is produced, it can be tested individually, then as part of a larger program, and then as part of a larger system. We should emphasize that although testing is done during implementation, we must begin planning for testing earlier in the project. Planning involves determining what needs to be tested and collecting test data. This is often done during the analysis phase because testing requirements are related to system requirements.

Finally, installation is the process during which the current system is replaced by the new system. This includes conversion of existing data, software, documentation, and work procedures to those consistent with the new system. Users must give up their old ways of doing their jobs, whether manual or automated, and adjust to accomplishing the same tasks with the new system. Users will sometimes resist the change to the new system and we must help users adjust. The most obvious outcome is the code itself, but just as important as the code is documentation of the code.

Each installation process involves getting workers to change the way they work. As such, installation should be looked at not as simply installing a new computer system, but as an organizational change process. More than just a computer system is involved-we are also changing how people do their jobs and how the organization operates.

2.6.9.1. Managing organizational change

As the previous discussion of installation approaches implied, implementation is an organizational change process. As such, implementation should be handled like other

organizational changes. Perhaps the best known prescription for handling permanent social change was offered by Lewin in the 1940s: unfreezing the current situation and circumstances, moving to the new level of operations, and refreezing the situation at the new level (Lewin, 1951 as cited by Hoffer). Unfreezing involves breaking current habits, getting people to stop doing things the way they are used to, essentially persuading workers to unlearn the way they do things. Once old processes and operations have been unfrozen, new processes and operations can be introduced, and once the new ways take effect, they can be frozen into place as the accepted methods for working. Without unfreezing, organizational change becomes a process of pushing new methods to workers while they continue to think and act in the old ways. Workers may change for a short duration but, eventually, if the old ways are still frozen in place, workers will return to the old ways without regard for the new methods to which they have been introduced.

Edgar Schein, after years of helping organizations make permanent changes, offers an updated version of the Lewin model. Schein writes that for unfreezing to occur successfully, three conditions must be met. First, employee expectations about outcomes for a given action are consistently not being met; this is what Schein calls disconfirmation. Second, this lack of expected outcomes must generate anxiety about missed goals or guilt about the violation of some ideal. Third, employees must feel a sense of psychological safety so they can recognize that past ways of operating were inadequate. In other words, workers must feel psychologically that making a particular change is safe. Unfreezing typically takes the largest proportion of time in the overall organizational change process. If unfreezing has been successful, change itself becomes much easier. According to Schein, motivation and readiness to change are essential to

the process, but organizational members will also need to identify with someone who is spearheading the change, such a manager, an analyst, or a key user. For refreezing to be effective, workers have to accept and act on the new ways of operating, and the local group of people they interact with in the organization must also be receptive and supportive of the change.

The Lewin and Schein models are general representations of any organizational change process. How can these models be applied to information systems implementation? There are several guidelines we can glean from the Lewin and Schein models. First, analysts should understand the importance of refreezing. Users have been known to enthusiastically use a new system for a short while after installation, only to fall back on old methods later. In some cases, users have used the new system just enough to keep from getting into trouble, but they have depended on paper versions of the old system they created and keep going. For example, a factory worker may refer to old hard copy blueprints taped to the side of the toolbox rather than the new blueprint that accompanies the job. Workers may begin to rely on the old system if the new system behaves other than as expected, especially if the worker senses the possibility of errors in the new system. In other cases, users have used the new system in ways they were not designed for in order to make the new system seem more like the old one.

Stage 1: Unfreezing	Creating motivation and readiness to change through disconfirmation; creation of guilt or anxiety: provision of psychological safety
Stage 2: Changing Through Cognitive Restructuring	Helping employees to see things, judge things, feel things, and react to things differently based on a new point of view
Stage 3: Refreezing	Helping employees to integrate the new point of view into their personal view and into their local organizational relationships

Second, we should be aware that unfreezing might take a great deal of time. Third, for change to be successful, we may have to act as an advocate for the new system and be willing to be the person with whom the users identify. If we cannot assume this role, we may have to find someone in the user ranks to perform it. Finally, for refreezing, we must consider how those who interact with users will react to the new system.

Seeing implementation as an organizational change process, with the three phases of unfreezing, changing, and refreezing, will not guarantee that an implementation effort is successful. However, such a perspective will allow the analyst team to plan and manage the change process involved in implementation better than if the process were only viewed as a technical exercise.

2.6.9.2. Organizational issues in systems implementation

Despite the best efforts of the systems development team to design and build a quality system and to manage the change process in the organization, the implementation effort sometimes fails. Sometimes employees will not use the new system that has been developed for them or, if they do use the system, their level of satisfaction with it is very low. Why do systems implementation efforts fail?

Why Implementation Sometimes Fails, the conventional wisdom that has emerged over the years is that there are at least two conditions necessary for a successful implementation effort: management support of the system under development and the involvement of users in the development process (Ginzberg, 1981B). Conventional wisdom holds that if both of these conditions are met, we should have a successful implementation. Yet, despite the support and

active participation of management and users, information systems implementation sometimes fails.

2.6.9.3. Documenting the system, Training, and Supporting Users

Documenting the system, training, and supporting users are three processes that comprise part of the implementation stage of the systems development life cycle. Although the process of documentation proceeds throughout the life cycle, it receives formal attention during the implementation phase because the end of implementation largely marks the end of the analysis team's involvement in system development.

2.6.10. Project Close-Down

Closing down a project involves many different activities, from dealing with project personnel to planning a celebration of the project's ending. Evaluate the team members, reassign most to other projects, and perhaps terminate others. Notify all of the affected parties that the development project is ending and that the project now is switching to maintenance mode. Second task is to conduct post-project reviews both with your management and with your customers.

2.6.11. Maintaining Information Systems

Once an information system is installed, the system is essentially in the maintenance phase of the SDLC. When a system is in the maintenance phase, some person within the systems development group is responsible for collecting maintenance requests from system users and other interested parties, like system auditors, data center and network management staff, and data

analysts. If the change request is approved, a system change is designed and then implemented. As with the initial development of the system, implemented changes are formally reviewed and tested before installation into operational systems.

2.7. Business process Re-engineering

Many information system change requests we will receive will ask for incremental improvements in systems, but will assume that the business will continue to operate as in the past. In fact, the user's request for a new system may simply be motivated by a desire to automate the current manual steps with which the user is comfortable, yielding cost efficiencies, fewer errors, better customer service, and a host of other benefits. If we take the user's request as submitted, we will miss the opportunity to study whether automation would support a radically different way of doing business, which would result in gains an order of magnitude greater than is possible by simply automating existing procedures.

The competitiveness of our global economy has driven most companies into a mode of continuously improving the quality of their products and services (Dobyns and Crawford-Mason, 1991 as cited by Jeffery). Organizations have realized that creatively using information technologies can yield significant improvements in most business processes. Consequently, during the late 1980s and early 1990s, the concept of Total Quality Management (TQM) was embraced as a method for identifying ways to continuously and incrementally improve business products and services. TQM is based on the premise of continuous improvement: the identification of ways to continuously improve customer satisfaction, product quality, or customer service. Using this approach requires that all aspects of the business be measured so

that performance over time can be understood. It is only through measurement that improvements can be made. TQM has generally been viewed as a successful initiative, but many believe that applying TQM restricts one's vision for dramatic gains.

Although TQM still has its advocates, a new concept for viewing business improvement, Business Process Re-engineering (BPR), surfaced in the early 1990s. Many of the concepts of TQM and BPR are similar; however, one fundamental philosophy of BPR is to use information technologies to radically change or re-engineer business processes to yield dramatic improvements in products and services. Thus, the idea is not just to improve each business process but, in a systems modeling sense, to reorganize the complete flow of data in major sections of an organization to eliminate unnecessary steps, achieve synergies between previously separate steps, and become mort responsive to future changes. Companies such as IBM, Procter and Gamble, Wal-Mart, and Ford are actively pursuing BPR efforts and have had great success. Yet many other companies have found difficulty in applying TQM and BPR principles (Moad, 1994 as cited by Hoffer et. el.). Nonetheless, both TQM and BPR concepts are actively applied in both corporate strategic planning and information systems planning as a way to radically improve business processes.

CHAPTER THREE

Organizational Background

3.1 Introduction

Electric Power was introduced to Ethiopian in the late 19th Century, during the regime of Minilik. The first generator was given to Minilik around 1898 to light the palace. In addition to the use of generators, Minilik constructed the first Hydro Power Plant on Akaki River in the year 1912 in order to supply power to small factories that had been established in Addis Ababa. Consequently, the power supply that had been limited to small factories and the palace was extended to public places and major roads in the vicinity of the palace.

However, the effort of the government to extend the power supply to the public was hindered by the Italian invasion of Ethiopia in the years 1936. During this temporary occupation, the Italian company called Coneil overtook the generation and distribution of electric power. The company installed generators at different places and extended the power supply to the then major towns.

After the Italians were driven out from Ethiopia in the year 1941, an organization called Enemy property Administration was established and took over along with other activities the generation and distribution of power to the public.

In the year 1948, an organization that had been vested with the power to administer the enemy property was evolved to an organization called Shewa Electric Power. The new organization Shewa although with limited capacity, managed to increase the power supply not only in Shewa but also to other administrative regions. In light of its function, its name was changed to "Ethiopian Electric light and Power" in the year 1955. Soon after its establishment, the supervision and management of the organization was vested in the Board of Directors appointed by the government. After eight months of its establishment, the Ethiopian Electric light and Power was transformed to the " Ethiopian Electric Light and Power Authority" (1956 Charter of the Ethiopian Electric Light and Power). The newly established Authority was conferred with the powers and duties of the previous Ethiopian Electric Light and Power.

The purpose of the Ethiopian Electric Light and Power Authority was to engage in the business of production, transmitting, distributing and selling of electric energy to the public of Ethiopia and carry on any other lawful business incidental or appropriate hereto which was calculated directly or indirectly to promote the interest of the authority or to enhance the value of its properties.

At the time of its establishment, the capital of the authority was ten million Ethiopian dollars divided into one thousand shares of per value of ten thousand Ethiopian dollars each. It was also determined that, the Board of Directors appointed by the government to exercise all the powers of the Authority. In addition to this, it was decided that the Head Office of the Authority to be in Addis Ababa, with branch offices at different places as necessary. At that time the annual electricity production capacity of the authority was 33 GWH while the number of customers was 12,500.

In light of the socio economic development of the country the authority continued to increase the scope of its operation in order to accommodate new changes. After being in operation for about 50 years in this manner, major changes in the objective and structural set up of the organization took place relative to the changes in the socio-economic condition of the country.

In order to accommodate the new changes in the environment, the Ethiopian Electric light and Power Authority was transformed to the Ethiopian Electric Power Corporation by reorganizing its functions on the basis of the principles of commercialization and decentralization. Accordingly, the Ethiopian Electric Power Corporation as public enterprise was established for indefinite duration by regulation No. 18/1997, and conferred with the powers and duties of the previous Ethiopian Electric Light and Power Authority.

The purpose of the Corporation is to engage in the business of producing, transmitting, distributing and selling electrical energy (in accordance with economic and social development policies and priorities of the government) and to carry on any other related activities that would enable it achieve its purpose. At the time of establishment, the authorized capital of the Corporation was 6.1 billion Birr of which 2.67 Billion Birr was paid up in cash and kind.

It was determined by the establishment regulation that the Corporation shall have its Head Office in Addis Ababa and may have branch offices elsewhere, as may be necessary.

Currently, the annual electricity production capacity of the Corporation is about 3112GWH and the number of customers is about 1.3 million. Although the Corporation has been increasing the number of customers by more than15% annually, but this does not mean that the Corporation has met the demand for electric power. Hence, the Corporation is required to think and work strategically to meet the power supply need of the socio-economic development of the country.

3.2. EEPCO' Current Organization Structure

The Corporation is presently organized under Seven Groups, these are: Generation Construction, Generation Operation, Transmission and Substation, Distribution, Human Resource and Service, Finance and Universal Electrification Access Program. Accordingly, The General Manager is the Chief Executive Officer of EEPCO responsible for organizing, directing, administering and controlling its activities. The General Manager reports to the Management Board that is accountable to the Ministry of Mining and Energy. In accordance with proclamation No. 25/1992, the Management Board is mainly responsible for policy matters.

Generation Construction Group is responsible for the design of Power System facilities and Generation Projects and Provision of Centralized Engineering Service. Generation Operation Group handles all activities related to all existing Power Generation Plants. Transmission and Substation Group is responsible for the design of Power System facilities, Transmission and Substation Projects and Provision of Centralized Engineering Service and all activities related to the existing Power Transmission lines and Substation. The Distribution Group handles all activities related to Distribution and Sales of electricity. The Group is structured on the basis of functional

and geographic territories yielding eight regional offices. Human Resources and Services group administers the policies and programs that govern the organizational structure, employee benefits and development. The Group is also responsible for providing services in the area of procurement, transport and insurance. The Finance Group is concerned with the financial affairs of EEPCO. The Group is responsible for the provision of financial cases [policies and procedures, financial management and budget control, preparation of financial forecast, financial plan, financial reports and book of account. The Universal Electricity Access Program Group is responsible body to implement the Program that has been launched by the Government, to increase the electric coverage of the country. According to the master list of EEPCO, Currently the corporation has about 11,354 employees. The current EEPCO structure is attached as an annex.

3.3 EEPCO Vision and Mission

EEPCO Vision

"TO BE A CENTER OF EXCELLENCE IN PROVIDING QUALITY ELECTRIC SERVICE AT EVERY ONE'S DOOR AND BEING COMPETETIVE EXPORT INDUSTRY".

EEPCO Mission

"TO PROVIDE ADEQUATE AND QUALITY ELECTRICITY GENERATION, TRANSMISSION, DISTRIBUTION, AND SALES SERVICES, THROUGH CONTINUOUS IMPROVEMENT OF UTILITY MANAGEMENT PRACTICES RESPONSIVE TO THE SOCIO-ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION NEED OF THE PUBLIC."

3.4. Electric Supply System

Currently the Corporation maintains two different supply systems; namely, the Interconnected System (ICS), which is mainly supplied from hydroelectric power plants, and the Self Contained System (SCS), which consists of mini-hydropower plants and a number of isolated diesel generating units that are widely spread over the country.

3.5 Generation

The ICS consists of 8 hydro, 12 diesels and one geothermal power plant with total installed capacity of 662.6 MW, 43.32 MW and 7.3 MW respectively. However, due to aging of the plants the dependable total capacity is only 601.11 MW. Over 98 % of the total generation in the country comes from the ICS.

The SCS consists of three small hydropowers and several diesel power plants. Generation in this system is mainly by diesel power plants having an aggregate capacity of 31.66 MW. The contribution from the small hydropower plants is only 6.15 MW.

3.6. Transmission

- The high voltage network consists of both 230 kV and 132 kV transmission voltages, and 66 kV and 45 kV sub-transmission voltages. Presently there are 6,489.22 KMs of lines in service.
- Supply of the distribution network is provided by step down substations connected to the respective transmission and sub-transmission voltages. Common winding arrangements include

45/15 kV, 66/15 kV, 132/15 kV and 132/66/15 kV. In total there are 104 transmission substations and substations in hydro power stations supplying the distribution system

3.7. Distribution

- Power distribution in both ICS and SCS is effected at a primary voltage of 15 kV, consisting entirely of 3-phases, 3-wire feeders, and is stepped down to a utilization voltage of 380/220 V (3-phase, 4-wire) using 3-phase transformers.
- The distribution system consists of 11,169.99 km of 15 kV lines, 8,140 distribution transformers and 9,796.28 km of 380/220V lines. At present about 1.3 Million customers are connected in both the ICS and SCS.

3.8 EEPCO's Goal and Objectives

In order to provide quality service delivery, EEPCO, has formulated clear goals and objectives, which would enable it to satisfy the customers need and plays its role on the power market. The Corporation has put six strategic goals, each goal accompanied by specific objectives. To make clear the corporate goals with their respective objective are described briefly underneath.

- **Bring institutional change by implementing the capacity building program.**
- Increasing Generation capacity from 791MW to 2258MW by the end of year 2002 E.C.
- Increasing energy production from 3112GWh to 10907GWh by the end of year 2002 E.C.
- Increasing energy sales from 2100GWh to 9435GWh by the year 2002 E.C.

- Increasing transmission network coverage of 230 kV, 132 kV and 66 kV lines from 7,927 km to 1, 2201 km.
- Upgrading the transmission voltage level to 400 kV by extending a new 1252 km transmission line.
- Interconnection of regional power systems by completing the feasibility studies.
- Maintaining of 30,000 km of transmission lines.
- Extending medium and low voltage distribution lines from 25000 to 136320 km.
- Constructing 23 new substations.
- Undertaking feasibility study for substation construction projects.
- Rehabilitating 15 sub stations.
- Maintaining 9876 km of medium and low voltage lines.
- Rehabilitating 7946 km of medium and low voltage lines.
- Increasing the electricity coverage from 16% to 50%.
- Increasing the number of customers from 976,618 to 2,600,000.
- Increasing the number of electrified towns from 648 to 6,678.
- Increasing collection from Birr 911,440,000 to 4,184,000,000.
- Introducing tariff structure acceptable by all stakeholders.

3.9. Major Achievements so far

Currently the numbers of electrified towns under EEPCO are *961*. The ICS accounted for *3066.86* GWh and the SCS only *45.14 GWh* in recent year, or more than 98% of the total EEPCO sales are covered from the ICS. EEPCO currently provides electricity to about 1,225,192 customers. Even though the power market is extensively spread along a wide geographical area, only very few, demand centers contain much of the supply. These centers are clustered around the capital, southeast and north of the country. The share of Addis Ababa's sales from the total load has been 50%. The second important market center is the central region, which includes Nazareth and the surrounding areas, which constitute 20 % of the ICS sales. The share of the rest of the regions is less than 10 % of the total system sales.

The electric power service of the majority population of the country is in a condition of relative poverty and energy insecurity. They use firewood for cooking and heating thereby exploiting an ever-diminishing resource and contributing to soil erosion and habitat destruction. If the quality of life of that population is to be improved and environmental degradation to be halted then a considerable amount of new electricity generation capacity must be constructed.

3.10. EEPCO billing system and project Objective

Description of the old system

The old Customer Information and Billing System or CIBS system of EEPCo is an in-house developed system running on an IBM AS/400 main frame located at the head office in Addis Ababa, operating a centralized database for the whole of EEPCO.

The general impression of the old CIBS application is that the system takes care of the billing process in an efficient manner, despite the lack of flexibility of the old hardware and standard software. However, the software has over the years been modified to such an extent that it is no longer economical to use and only one person in EEPCO knows how to develop/make changes to the software. The billing system process follows monthly procedures and produces daily reports based on entries from defined source forms/documents.

The billing processes starts with the production of meter reading sheet used by meter readers and ends with payment at a various collection centers. The customer service section and the Data processing Unit in Addis Ababa are involved at the district level in this process. The old CIBS is more than 30 years old and was developed by EEPCO's own resources. The Corporation was the first company in Ethiopia using such computer. Over the years, the system has been modified to meet EEPCO's changing needs. In July 1999 the monthly meter reading and billing practice was replaced by an average consumption calculation system, where meter reading takes place only once every 4 months. The new system appears to be complicated and has resulted in many complaints from customers.

The old billing process and EEPCO Internal time Schedule

The main internal process from meter reading to payment is presented using a flow chart as an annex at the end of this paper.

The duration of each function in the main process is as follows:

- Meter reading : 20 days
- Data entry and control : 1 month
- Bill calculation and printing : 5 days
- Bill cutting and distribution : 5 days
- Distribution to collection centers : 5 days
- Collection of Money : 20 days

Ideally, the whole process should not take more than 2 months and 25 days. However, experience shows that the average was 3 months and 15 days.

Drawbacks of the old system

- ❖ Limitation to manage to the ever increasing number of customers and the information need.
- ❖ Hardware is costly to maintain and upgrade.
- ❖ Technology puts limitation on the further development of an integrated Management Information System.
- ❖ Programming and reporting facilities are limited or time consuming.
- ❖ All CIBS activities are centralized and the system has already become a bottleneck for further improvement of bill production, money collection and customer relations.

New Billing System (CMS) Project objective

The Corporation has carefully considered the introduction of a new billing system. The old system has outlived its lifetime and only a new billing system will be able to meet the current and future expansion and challenges. The prime objective of the introduction of a new billing

system in the Corporation is to improve customer management up to the international professional standards expected from a large power utility.

This will include general efficiency and improved customer management / service, but more specifically be focused on a reduction of non-technical losses and a reduction of the time from meter reading to the time the customer receives the bill. A clear objective is to improve the management of the customer database. To achieve this, each district will be responsible for the maintenance of customer information to be used in its customer database with satisfactory customer history for each customer. This means that the database will always be up-to-date thus allows much better follow-up of payment defaulters. Accordingly, the Corporation has clearly stated that improved customer service is one of its key objectives. Better customer service will encompass a wide range of services and communication with the public, such as more information to customers, with the emphasis on improved “user friendliness”, e.g. the information included on bills.

Some major customer service improvement and business objectives to be achieved after the implementation of the project were Rapid response to customer requirements, User-friendliness, Payment Flexibility, Reduction of non-technical losses, Decentralization of the billing system and Improved Collection Performance.

CHAPTER FOUR

The Change Management Process in practice

4.1 Introduction

Today, a reliable and efficient Customer Information and Billing System (CIBS) is crucial for the efficient commercial operation of a power utility. It is an important tool for ensuring proper revenue generation and timely revenue collection. The CIBS is also the interface with the customers and can be used to provide improved customer service such as correct and reliable billing information.

A modern CIBS system is capable of operating together with other information systems. Typically, for technical operations it can be used with a Network Information and Planning

System (NIPS), where CIBS system provides information regarding customer consumption at different transformer levels. This is crucial information necessary for the planning of future extensions of distribution and transmission networks. This information can also be used for the reinforcement of old networks. Information regarding generated revenue and collection is also key input to the Accounting and Financial Management System (AFMIS).

Documents and Brochures show that in 2002 G.C EEPCO had around 550,000 customers (approximately 11% of the population), of which some 520,000 were connected through the ICS network. The numbers of electrified towns were 444, of which 389 are within the ICS network. The yearly total consumption is about 1.4 TWH of which 50 GWH through the SCS network.

The customer base has been divided into Domestic, Commercial, Streets Light, Small Industry, LV Large Industry, HV Large Industry and Boiler and Own Consumption main tariff groups. The domestic customers represent 84% of the total number of customers, and 39% of the total consumption. Commercial customers represent about 14% of the total number of customers and 20% of the total consumption. Large industry consumes 40% and represents only 1.5% of the total number of customers.

The old billing system was operated remotely from the four main districts in Addis Ababa and from the eight Regional offices. Nearly 50% of the customers are found in Addis Ababa. Close to 15% are found in seven of the major towns where the Regional offices are located. Nearly 75% of the total revenue is collected from Addis Ababa and those seven major towns.

4.2 Overview of Old Billing System

The billing system process follows monthly procedures and produces daily reports based on entries from defined source forms/ documents. The major activities in the billing process were Meter Reading, Data Entry, Bill Calculation, Bill Printing, Bill Cutting and Batching and Bill Dispatch.

Codes used to identify customers are; meter reading book number, account number and contract number. The customer identification structure was as follows:

a	a	b	b	b	c	c	c	c	d	d	d	d	d	d	e	e	e	e	e	e

a – Region number : 2 digit 01 - 08

b – district code : 3 digits

c – Book number : 4 digits

d – Account number : 6 digits

e – Contract number : 6 digits

The old EEPCO billing system does not include any information regarding transformers. The account number is an internal EEPCO code for the house number. The contract number is unique in one District.

Meter Reading

In the old system, approximately 160 meter readers, (Addis Ababa only) were involved in the meter reading process. Whilst the Meter Reading Unit performs the meter reading, the District Data Processing Unit produces the reading sheets. The District Data Processing Unit was also responsible, for carrying out a control of the completed reading sheet before data entry and for carrying out validity checks of the entered meter readings.

The customer base was divided into groups or reading areas with different meter reading schedules. The various groups are then divided into sub-groups and assigned a meter reader responsible for the actual reading of the meter readers with a reading book for a period of 30 days. On average, each meter reader reads 80 meters per day. Meters for domestic customers were read every 4^{th} month. Meters for industrial customers were read every month, including active, reactive and maximum power.

To ensure that the reading carried out was for the right customer, the meter number, account number, contract number and property number from the meter reading book was compared with similar information recorded on the customer's meter card. The meter reader also makes a cursory inspection of the meter and connections. In cases where it was suspected that electricity was not being metered correctly, these were reported immediately to the Meter Reading Unit.

The meter readers report their daily progress to the Meter Reading Work Unit. The Meter Reader Supervisor checks each and every reading and compares them with the historical records. Any irregularity found was reported to the head of the Customer Services Section. If necessary,

the Meter Reader Supervisor will visit the customer's premises to clear up any misunderstandings as part of the customer service, thus maintaining customer trust and confidence in EEPCO. After completing the meter readings, the Meter Reading Work Unit submits at the end of the day, the completed meter reading sheets to the Data Processing Unit for billing.

Data Entry

The Data Entry Unit in the Data Processing Unit enters the data into the main database. The key fields for a customer are Book Number, Account Number and Contract Number. Different books are used for "general" customers and "Power" customers. The "general" customers have single-phase meters. The "power" customers have both active and reactive meters. These are industrial customers with a power rating above 10 KW.

The customers have different tariff codes depending of whether the connection is through the ICS or the SCS power system.

Table 4-1 Old Tariff Codes

ICS Code	Tariff Description	SCS Code
10	Domestic	15
11	Retired Staff's Consumption	16
12	Own Consumption	17
13	Staff's Consumption	18
20	Commercial	25

30	Street Light	35
41	Low Voltage Industrial	46
42	High Voltage Industrial (15kv)	47
44	High Voltage Industrial (132kv)	49

The Data Control Unit carries out validation of input data. If irregularities are found, the Data Entry Unit carries out the necessary corrections. If meter readings or consumption are outside certain control parameters, the Meter Reading Unit is responsible for the quality check and any corrections made to the collected information.

Bill Preparation and Distribution

Preparation and distribution of bills include the following activities: -

Calculation: After the meter reading is finalized and the final quality check and necessary corrections carried out, the main database is updated. Processing/calculation of bills is carried out for groups/sub-groups of customers. The main data source for a group/sub-group of customers is the meter reading book identified by a specific identification number.

The calculated monthly consumption and the monthly bill are based on the actual meter readings for the four-month period. The consumption for each month in the four-month period is the meter reading divided by four. Due to the delay in the meter reading and billing process the calculated consumption is only available 2 months after the meter reading has been carried out.

As has already been stated, customers are categorized in different tariff groups. These tariffs normally have an energy charge, a power charge (for high power consumers) and a service charge as a fixed component. The service charge is different for various groups of customers, and also varies depending on 1 or 3 phase supply. Domestic tariffs have several price levels depending on the actual consumption (first 50 KWH 0.2730 Birr/KWH, next 50 KWH 0.2921 Birr/KWH etc.).

Printing: The bills are printed at the Data Entry Unit, organized as a part of the Data Processing Unit. The invoice is an integrated invoice/receipt. When the customer pays a bill, one part of the invoice is given to the customer as a receipt. The paper used for invoices in normally imported and is expensive.

Cutting: The printed invoices are separated into individual invoices by a cutting machine located at the Head Office, Regional offices and AAR District Offices.

Batching: Invoices are organized into groups of customers that are suitable for money collection at the respective collection centers.

Distribution: The distribution of bills is prepared by the Bill Dispatch Unit at the Data Processing Unit and given to the Collection Section/ District Managers for distribution to the respective collection centers. The invoices are not distributed to each and every customer. The customer collects the bill at the designated allocated collection canter at the time of payment.

All customers are informed through notice board or media about which collection center is to be used and on which days the payment can be made.

Collection: The collection centers are the most frequent contact points used by EEPCO and the customers. The collection centers are normally located within walking distance from where the customers live. There are several collection centers in each District. These are responsible for:

- Money collection from all customers.
- Consolidation of cash collection reports.
- Reconciliation of daily receipt
- Daily bank deposit of the money collected.

Customers are only allowed to pay at designated collection centers. The customers belonging to one Collection Center are divided into 4 groups. The payment period for one group of customer is specified to be 5 days, and the different dates for payment are: $26^{th} – 30^{th}$, $1^{st} – 5^{th}$, $6^{th} –10^{th}$ and 11^{th} - 15^{th} of every month in Ethiopian calendar.

The work at the Collection Centers is done manually. There is no computerized system and the collecting of money is separated from the banks. The splitting of the different customer groups into different paydays means or assumed that there is no major congestion at the collection centers, in practice not.

It would appear that customers are normally paying their bills on time, e.g. data from one District office shows that only 900 out of 45000 customers (mostly domestic customers) do not pay their monthly bill. The EEPCO policy on late payment is clear: disconnect the electricity without warning.

However, in practice customers will get a reminder before electricity is actually disconnected. Since the administration costs of a disconnection are substantial, EEPCO. Prefers to "wait and see" before disconnection takes place. The disconnection/re-connection fee is 15 Birr and Birr 30 for Single-phase and Three-phase meters respectively. The old collection process puts a high responsibility on the cahiers at the collection centers. The distributed bills are papers with a face value, (for EEPCO. they can be compared with a bank note and must be treated as such); lost bills are the responsibility of the cashiers.

EEPCO has an archive of not settled bills covering several years. However, there is no systematic recovery of money from these old bills. When a customer wants to be connected, any outstanding old bills have to be paid before connection takes place.

The Billing Time Schedule

The billing cycle and the way the consumption was calculated appear to be unnecessarily complicated and difficult to explain to the customers. Most of the customer complaints were related to the number of estimated consumption units presented on the bill. Many customers read their own meter each month, compare the value with the calculated units, and in many cases they observe a difference in disfavor of the customer. The process from start of meter reading to payment of the first month takes 2 to 3 months. In addition comes the period of payment of 5-8 days. Ideally, the whole process should not take more than 2 months and 25 days. However, pioneer of the new system said that the average was 3 months and 15 days.

Customer Service

Claims from customers are received every day. Most of the claims are related to billing and technical problems; e.g. low voltage, unstable supply and faulty meter readings.

There were claims about the way consumption was calculated and presented on the bill (the average calculation). The customers do not have enough information about how the billing system operates and how the bills are calculated. There was also uncertainty about when the meter readers come next time. When customers are checking their own bill with their own readings, it is not easy to find out whether the bill is correct or not.

There is an organized Customer Service Section in most Districts, except in Districts with the classification I/II. However, the district manager handles customer claims and queries. As an example, secondary data (monthly report submitted to region office) from one district shows, 400 claims are received monthly out of a total customer base of 45,000 customers.

4.3 The decision for change

The prime purpose of the introduction of a new system in EEPCO is to improve its customer management and collection up to the international professional standards expected from a large power utility operating in an increasingly competitive environment.

Management objectives

This will include general efficiency and improved customer service, but more specifically be focused on a reduction of non-technical losses and a reduction of the time from meter reading to the time the customer receives the bill to 5-five- working days. The old collection time of 5-7 days was considered to be very good and suggested that the old revenue collection routines at the

collection centers remain unchanged. Hence, only a limited improvement of collection time is expected from the new billing system.

A clear objective was to improve the management of the customer database. To achieve this, each District will be responsible for the maintenance of customer information to be used in its customer database with satisfactory customer history for each customer. This means that the database will always be up-to-date thus allow much better follow-up of payment defaulters.

EEPCO has made every effort to improve customer service as one of its key objectives. Better customer service will encompass a wide range of services and communication with the public, such as more information to customers, with the emphasis on improved "user friendliness", e.g. the information included on bills.

4.4 The new Corporate Billing Process

Meter Reading

To strengthen the monthly meter reading and billing not later than five days after the reading has been made, instead of past's practice of reading every four months. Meter reading in this context is considered as a continuous process throughout the month. Entering of metering reading for billing will have to be done on a daily basis. Hence, the customer database would also be updated daily.

Bill Processing, Printing and Distribution

Once the data input for a particular period has been completed, the processing of the bills can take place. The processing will be controlled and initiated by the District. The printed bills will

be distributed to the collection centers. It is essential that the dispatch of bills be synchronized with the payment periods for each payment zone within the district to ensure that the bills have arrived at the collection centers when the customers come to pay their bills. In the fully computerized collection centers, however, a delayed bill will not delay payment of bills because all necessary data for registration of the bill will be available on the collection center terminals.

In districts without computerized collection centers, it is absolute requirement that the bills arrive at the centers in time. Delayed distribution of bills to these centers will immediately disturb the payment routines. Printing and distribution of bills to each and every collection center is a time consuming and costly exercise. Substantial cost-reductions are possible if the volume of printing is reduced and the distribution is streamlined.

Fully computerized collection centers with online communication to the database, means that it is realistic to think of a solution where bills are being printed at the collection center when the customers come to pay. It is also possible to foresee a system where no bills are being printed, but the information is available on screen at the collection center and the receipt includes all the data shown on the invoice. For the customer this would be similar to the old situation.

Revenue Collection

EEPCO old revenue collection system was able to collect the majority of the due bills in 5 – 7 days after the bills have reached the collection centers. The new billing system take in the old revenue collection routines with the adjustments necessary to fit the requirements set by the new billing system, e.g. improved customer information with notification of the amount to be paid.

Linkage to Accounting System

In the previous system, the billing system was run on the IBM AS/400 computer in Addis Ababa together with the accounting system and the other auxiliary systems. Hence, data from the billing system is transferred directly to the accounting system. The new billing and accounting system will run as an integrated system and the two systems will communicate directly but they are running in different servers.

Data required from the billing System to the Accounting System

The customer database will be maintained in the billing system; hence only consolidated data is transferred to the accounting system. In principle, the nature of the data to be transferred from the billing system to the accounting system will be similar to the old system; i.e. consolidated values of billed revenues and payments made by customers. This data will form the basis for the reported revenues in the Income Statement and the value of Trade Debtors in the Balance Sheet. The billing processing generates consolidated data on billed revenues. These revenues will be credited revenue accounts and debited the Trade Debtor account. As data on payment of bills is being entered, the Trade Debtor account is being credited and the cash on hand account debited.

It is intended that each Region be run as an autonomous entity. All financial data will then have to be structured by Region. In the accounting system, the full account string will identify the Region. In the billing system, a similar identification of Districts and Regions will take place.

Each tariff category has a separate account number in the Chart of Account. The tariff category and elements will be used to consolidate revenues in the accounting system by type of revenue as well as by District and Region.

4.5 The change process in stakeholders view

Before we proceed to the data analysis or discussing the stakeholders view toward the change process analysis of the respondents profile is necessary.

Description	Personal Information	ICT	Finance	Service center	Total	
		No	No	No	Number	Percentage
1. Age	18-30	2	11	23	36	57
	31-40	6	15	-	21	33
	Above 40	-	6	-	6	10
2. Sex	Male	8	26	19	53	84
	Female	-	6	4	10	16
3. Education Qualification	College diploma	1	8	0	9	14
	First degree	7	24	23	54	86
4. Position	Managerial	2	9	23	34	54
	None managerial	6	23	-	29	46
5.CMS Training	Yes	8	14	17	39	62
	No	-	18	6	24	38

Table 4-2 Personal profiles of respondents.

As can be seen from the above table, most of the respondents are in the range of 18-30 years. Especially, service center heads/ sales and reception heads are 100% with the range of 18-30 years and they are young.

Above 86% of the respondents have first degree and 14% the respondents posses diploma. Neither of the respondents has below 12 grades or 12 grades complete nor Masters degree or above educational background. Of the respondents 54% holds a managerial position. While the rest are expertises in their subject area. And 62% of the respondents were taken CMS /the new billing system/ training. However, almost all respondents claim that, the training was not adequate to make use of the functionality of the new system.

According to Jeffery et el. (2002), the process of managing changes especially in information system changes, management shall give enough attention to all stakeholders to deal with the people side problem. All or 100% respondents agree with the gap between the then existing situation and a desired situation. Therefore, the decision made to change the old system with advanced new system to handle existing and future developments was inevitable. However, secondary date demonstrate the project does not properly linked with the corporate strategic management plan to include all towns and semi town or village customers. The billing process lacks strategic alignment with the corporate major objectives due to:

- The design of the project considers for a less than 550,000 customers with about 5-10% yearly increment, while the Corporation reaches 1.2 million customers at the time of the project hand over.
- The billing system assumes a total of 34 district offices for gradual expansion of the billing system, but the Corporation has practiced to electrify hundreds of towns. See the table and graphs below: -

EEPCO'S HISTORICAL DATA OF ELECTRIC ENERGY GENERATION, ELECTRIC ENERGY SALES, CUSTOMER NUMBER AND EMPLYEE NUMBER OVER THE PAST TEN YEARS (1997-2006). Table 4.3

No.	Years	Electric Energy Generation (GWH)	Electric Energy Sales (GWH)	Customers Number (In thousands)	Employees Number	Remark
1	1997	1614	1323	536	8353	
2	1998	1628	1359	552	8361	
3	1999	1653	1332	574	8213	
4	2000	1689	1376	597	8047	
5	2001	1812	1412	625	7947	
6	2002	2009	1621	655	7908	
7	2003	2064	1707	698	8105	
8	2004	2316	1847	777	9890	
9	2005	2587	2524	903	10582	
10	2006	2890	2408	1077	11354	

***Source: EEPCO 50th Golden Jubilee Bulletin**

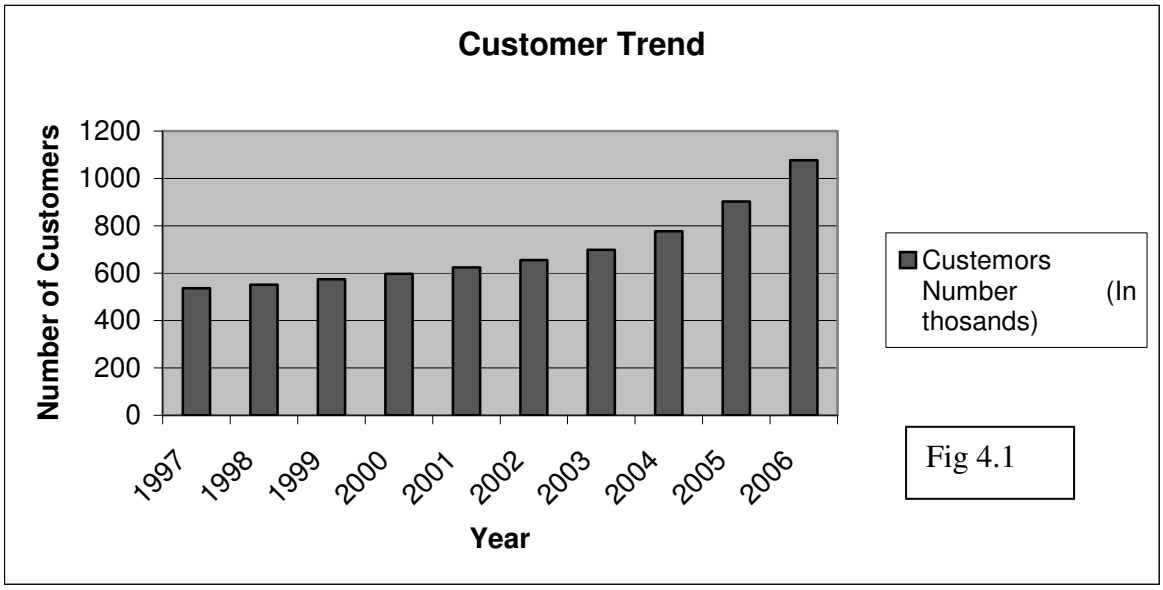

Customer Trend
Number of Customers
1200
1000
800
600
400
200
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Year
Custemors Number (In thosands)

Fig 4.1

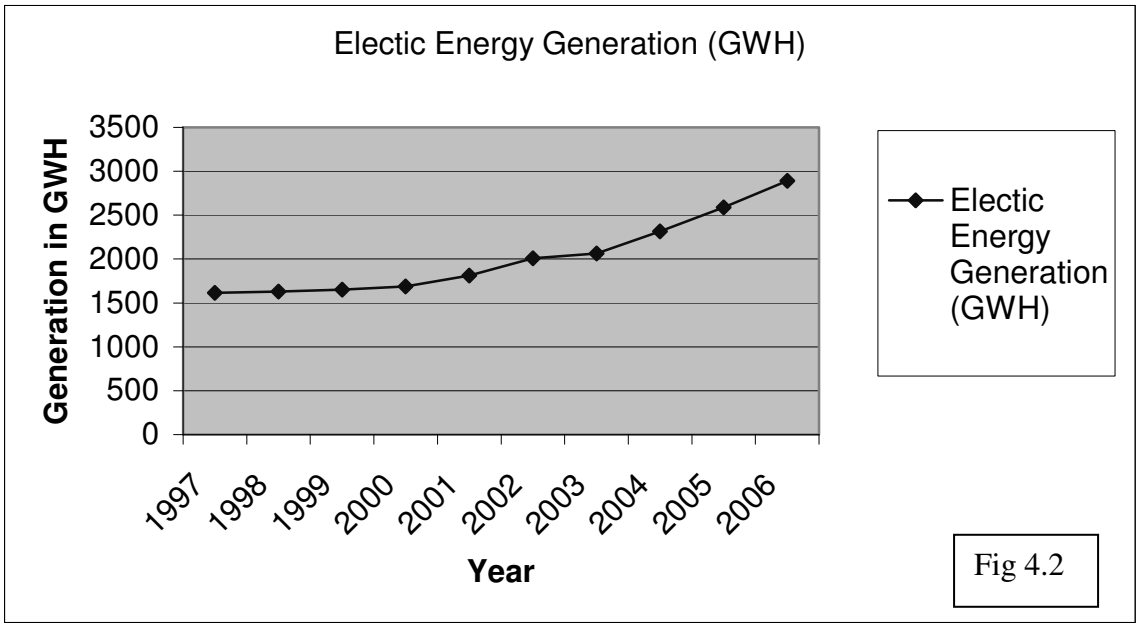

Electic Energy Generation (GWH)
Generation in GWH
3500
3000
2500
2000
1500
1000
500
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Year
Electic Energy Generation (GWH)

Fig 4.2

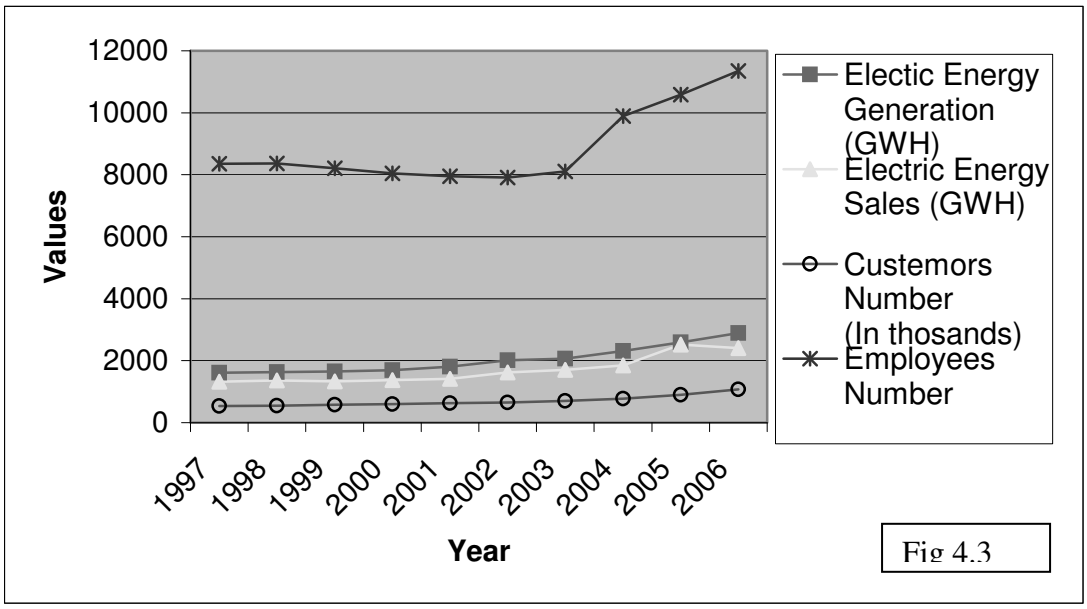


Fig 4.3

All respondents from the finance unit and ICT department of the Corporation agrees the necessity of participation of stakeholders in requirements determination, requirements structuring, and generating alternative system design strategies and selecting the best one. However, among the respondents 7(87%) and 26 (81%) of the ICT and finance departments' respective work unit claim all stakeholders (Finance, Information Resource, Distribution etc) were not participated in an appropriate level. They simply left to the project office, consultant and the contractor as a result they demonstrate many difficulties at the implementation stage. The system has designed and employed:

- A standard C program for its background computing activities.
- Uses Visual Basic 6 for developing menus and control toolboxes.

However, programmers and IT professionals of the Corporation claim for a large company like EEPCO employing structural programming is not advised due to high maintenance cost and difficulties in modifying the program to incorporate change requests. In addition to this there was a claim by the Corporation, Ethiopian Telecommunication Corporation, the Internet service

provider, network traffic was very congested, unavailable and unreliable, as a result EEPCO faces the problem in data transferring and managing the system. The problem backs to the design phase of the system which was firstly recommended to be a radio and VSAT however the Corporation was forced to change the strategy to ETC ETHIO Stream Digital Data Network (DDN) broadband network system without proper prediction of data traffic and capability of ETC network.

Former System Employees, most or 90 % of the old system Information resource and Information technology divisions employees claims that they were marginalized on the over all process of designing and implementation of the new billing system. In addition to this, they claim that the Corporation forced us to overtake the new system without a preconceived knowledge and adequate training. Most of them agree, the current outsized customer Compliant in relation to the billing system emanates from improper management of the change. This is in contrary to the comprehensive effort made by the Corporation to improve customer service with the new customer management system.

Addis Ababa Region is one of the regional offices under the distribution group of EEPCO. The region was structured in to Five (5) major districts and 32 service centers. Accordingly, the region encompasses about 50% of the corporate customers and 50% of the electric sales revenue. It contributes a lion share of the annual sales and part of the earned profit of EEPCO. Based on this I made a discussion on the performance of the new billing system in relation to customer management. Among the 32 service center heads 23 individuals or 72% of them are discussed the matter and the result is briefly discussed here under.

Even though there was much dissatisfaction with the new billing system, there are considerable additional features from the system. From the outset, most of the Head of service center of Addis Ababa region were uncomfortable with the functionality of CMS, and there was considerable anxiety and confusion regarding how the new system would be used effectively. During the discussion held with the heads, there were complaints that the billing system was not a standard one that can assist to manage current customers of EEPCO with the given operating environment. Such complaints, however, were never overtly voiced; instead they were informally expressed around the Corporation, but informally discussed with me. Nevertheless, I observed, even though the managers were unhappy with the CMS, they are trying to use the system, since it was a directive or an already implemented billing system.

EEPCO's responses to customers' complaints are examined in terms of quick and late response. Of the total customer respondents, 102 (97%) are direct customers to EEPCO while the rest are order executers, 83(79%) said that the Corporation's response to customers' complaints in relation to billing is so late (delayed). According to the respondents, only 21% have got quick response, like wise, those individuals listening customer complaints are also examined in terms of their compliant handling ability. In this regard, 16(70%) of the respondents say that they are not satisfied by their performance due to poor incentive, poor office layout, high staff turnover, and poor customer management system. Therefore, it shows that EEPCO is expected to improve its complaint handling activities.

Table 4.4 Frequency distribution showing how long did it take to the customer to pay his /her bill.

No	Waiting Time in minute	No. Of respondents	%
1	1-15	-	-
2	16-25	30	29
3	26-45	36	34
4	46-60	17	16
5	Above 60	18	17
6	No response	4	4
	Total	105	100

The above distribution discloses waiting time at a collection center in order to pay bill for the electric power used. Of the total number of respondents, none (0%) finish their payment between 1-15 minutes. 30 (29%) of the respondents were forced to spend from 16-25 minutes. Still 36 (34%) of the respondents hold to spend 26-40 minute, again 17(16%) said they were waiting from 41-60 minutes. Finally, 18(17%) of the respondent had spent above 60 minutes, and 4(4%) of the respondent did not given answer to the Question. According to many respondents waiting up to 15 minutes could be tolerable to pay bills at the service center. Here the deviation between customer's expectation and the actual time they spent for payment is high. Officials of the Corporation who were interviewed while conducting this survey explained that, although, significant improvements have been achieved overtime, they accepted that there is still an immense problem in service delivery. And they also suggested that, the Corporation should put much more effort on providing and maintain its services so as to satisfy the need of customers.

Customers were requested to rate their satisfaction level on the overall performance of the Corporation in providing its services. Accordingly, of the respondents 8 (8 %,), 74(70%) and 18(17%) said that they are satisfied, partially satisfied and not satisfied respectively. Where us the rest 5(5%) are indifferent.

All service center and sales & reception heads agrees that, the system was rollout without proper procedural manual and preparation to manage problems in relation to balances brought forwarded and negative bills. For that reason, many service centers are forced to make an adjustment on the printed legal electric bill manually without the consent of the higher body of the Corporation. Despite the notice printed on the back of the bill "Do not accept any tempered bill from any EEPCO personnel" such action may cause severe legal issue in the court of justice and loosing the benefit of fidelity insurance in case of cash shortage. In addition to this, these may also be a favorite ground for embezzlers to deceive corporate money. Among the customers of the Corporation responded to the questionnaire 46% of them are requested to pay an already settled balance brought forward and 11% of the respondents' claims that the Corporation has produced a negative amounted bill in different months.

Among the service center and sales & reception heads 14(61%) of them responds the project has not deliver enough training to the users of the system. Especially all district managers and CIPC supervisors clam the CIPC and data entry employees are not well trained: -

- To register newly connected customer. i.e. Create premises, Add meter point, Create customer, Create account, Create service point, Handle unusual readings ,Add meter ,Create installment agreements and Prepare the file and send to head office

- Reconnection – generating reconnection service order and updating it. The customer disconnected because of non-payment on time, pays a penalty and applies for reconnection. The CIPC and cashers are responsible to transfer and enter the data into the system. However, due to some collection files are not uploaded to the CMS as a result the system doesn't reconnect the service. Such practice contributes to increase customer claims and dissatisfaction.
- Meter change– existing customer requests meter change due to the need for additional power, meter faulty practice etc. Customer information processing center is in charge to generate meter removal service order and new meter installation service orders. Identifying customers enrolled before and after the installation of the new billing system is necessary for the transaction to take place correctly. The task is not done properly as a result customers are treated differently or out side the procedure, the work request is not resolved from payment made in the erroneous collection. In addition to the above problems the system has problems in relation to tariff changes because it requires de-enrolling the service to edit the old tariff and to create the new tariff.

Unlike the old system, the new billing system uses two ways of meter reading data entry. These are the online meter reading data entry and the use of local reading application (LRA). Despite the discrepancy and negligence in transferring meter reading data with the cut of time, meters due for reading are extracted and down loaded into a stand-alone system that is used to manage reading (LRA). The LRA was realized after experiences in managing readings between the central service and remote sites. The meter reading data is loaded into handheld data capture device (flash memory). This facility will help service centers and meter reading supervisors for

field validation, to re-visit the data before introducing the reading data into the main server and the capability to store reading data incase of central server is down. According to the 90% and 70% of the collection center and information technology respective respondents, claims that, more than 50% of the customer complaints arise due to the poor management of meter reading, cut of period management and corrupted reading data while transferring to the main system using hand held storage media.

Billing

Before the introduction of the new billing system EEPCO uses a system that bills based on / procedures to bill on ordinary current bill produced on monthly basis. The new billing system have designed with the capability to produce ordinary current billing on bill per account on a monthly basis (same to old system), Closing account billing-accounts settlement for outgoing customers, Group account billing for customers with large multiple account, Adjustment billing amended accounts (e.g. reading adjustment, unit adjustment, and/or incorrect tariff), Re-bill accounts, e.g. cancel and re-bill whole cycle /bill day.

Unlike the old system, the new billing system has a facility for payment arrangements. The system provides an on-line facility where arrangements for payments by installments can be made for unpaid bills. The system provides a facility to set the following: -

- Number of installments
- Interests to be accrued
- Selection of bills to offset by the installments

The new system automatically advises on the payments for each installment upon choosing the number of installments and the due data for each installment. When the installment is due for payment, it can be sent as a bill to the customer for payment. If the customer does not pay the installment all the pending debt becomes immediately due for collection. The system also allows the cancellation of the payment plan after the customer has paid several installments, and allows the customer to settle the rest as a lamp sum.

In the billing system, the billing process can be done in the following ways, depending on the characteristics of the supplies. Billing in the reading cycle is one of the options that involves the ordinary billing which produces one bill per supply on a monthly basis or as per the reading frequency defined, whether reading are available (actual reading) or not (estimated). Second option of billing is the option of billing out of the reading cycle. This will occur if any exceptions are detected by the system during the billing process. These supplies are set-aside until the necessary amendments for correct billing have been made. Finally, there is also an on-line billing option that occurs when final accounts billing by customer request, rebilling, fraud billing and additional charges.

The system also provides on online facility to view the bill for the current and historical periods. These enable to see on-line the history of all financial transactions including billing, adjustment, additional charges and all payments. The system allows printing at any on-line workstation the copy of the statements and copy-bills (i.e. an exact copy of any bill sent to the customer).

Printed bill information

The old system bill was not able to convey enough detail information about the payment and information of customers. The new bill format carries or provides the following detail information.

Table 4.5 **Printed** bill information

No.	Description	Old system	New system	Remark
1	Customer name	√	√	
2	Contract number	√	√	
3	Customer address	√	√	
4	Customer Telephone number	√	√	
5	Meter number	√	√	
6	Account number	√	√	
7	Bill items	X	√	
8	Bill number	√	√	
9	Tariff category	√	√	
10	Meter Reading date	X	√	
11	Billing Date	√	√	
12	Due date	√	√	
13	Balance brought forward	X	√	
14	Miscellaneous charges	X	√	
15	Fixed charges	√	√	
16	Taxes	√	√	
17	Previous reading	√	√	
18	Mode of reading (Actual us estimation)	X	√	
19	Meter constant	√	√	
20	Consumption	√	√	
21	Charges	√	√	
22	Service Number	X	√	
22	Total balance	√	√	
23	Age analysis–segmented as follows - Current - 30 days - 60 days - 90 days and above	X	√	
24	Message to the customers	X	√	
25	Meter Reading sequence No.	X	√	
26	Book Itinerary No.	X	√	

Almost all respondents agree that the new bill format exceeds the former bill in many attributes, which can convey additional valuable information to the customers. In addition to this, all employees' said that, the Corporation has gained financial benefit as a result of changing the old imported bill by an A4 size locally printed bill while the quality of information is increased. See the Annexed sample Bill.

Collection capabilities

According to my observation to the practical application of the system and secondary documents the system allows two modes of cash collections. These are the on-line collection and off-line collection modules. The former form of collection allows the customer to pay in any of the Corporation collection Centers, and updates the customers' account instantly. From then on, this collection contributes to the calculation of the account balance and may be referenced from any on-line workstation. When bills are not paid, the system automatically produces disconnection order, which once solved, change the state of the supply to show that it is disconnected when the bills and the reconnection fee are paid using the online collection window or the off-line collection application, the supply status is returned to normal and a reconnection order generated, while the later off-line collection facility accepts payment inputs through handheld memory storages from offices and collection centers without an online facility. In case when the online system is down or where there is no communication for online collection, the system can receive payment through an offline Local Collection Application (LCA). The Local Collection Application is a sub system of the billing system, which is designed to collect cash independently of the main system. The LCA payments are transferred to the main billing system either by establishing an online connection or through memory disks.

Table 4.6 Comparison of payment modes in practice at Addis Ababa Region

No.	Payment mode	No. of collection center used	Percentage (%)	Remark
1	Online collection	3	9	
2	Off line collection	29	91	
	Total	32	100	

Based on the above table, we can see that 91% of the collection centers have an offline collection system while 3 or 9% of the collection centers of the Corporation in Addis Ababa region have a direct access to the corporate billing system to perform online collection. It is also discussed that no service center has an online collection facility outside Addis.

Table: 4.7 Customer payment made outside their localities.

No.	Region	Number of customer settle their bill outside	Remark
1	Addis Ababa	6	
2	Central	0	
3	Northern	0	
4	North East	0	
5	North west	0	
6	Eastern	0	
7	Southern	0	
8	Western	0	
	Total	6	

From the above we can conclude that the payment flexibility future to customers that allows settling their bill in any place is not utilized. This shows that neither the Corporation nor the

customers are willing to take advantage of the future. The problem can be originated from the Corporation reluctance to introduce the facility to its customers.

Among the functional requirements (design) of the billing system is updating all payments made within 24 hours of receipt. However, all respondents agree except in Addis Ababa Region, the feature is not in use in other regions of the Corporation. This is due to the absence of fast telecom networks and the distance (remoteness) of collection centers to the corporate network.

Debt Management

The information communication technology department respondents claims, although users have the limitation to fully utilize the features of the system, unlike the old AS/400 based system, the current system provides a new feature known as debt management. The purpose of the debt management is to ensure the timely collection of all receivables owed to EEPCO so as to minimize receivables on the most effective way, consistent with good standards and a high level of acceptance by customers. The module handles the management of defaulting customers. It is managed through credit actions, which are the process of controlling overdue accounts through a series of actions and warning procedures even beyond the suspension or de-enrolment of the service, right up to the write-off of debts if necessary. In contrast, 61 % of the respondents in managerial capacity (customer service) claim the system have several superseded features than the former but due to the absence of proper implementation and training the system creates many problems. Among the problems, collection centers have no any access to know the payment history of all customers from the system; in contrast they forced customers to come with copy of their bill to track the history of the payment. In addition to this, interviewed finance heads and

accountants of the Corporation responds, the system makes some trouble on their day to day activities due to: -

- The time gap between the CMS report and Aggresso accounting system. (The system doesn't update the component of trial balance, receivable and cash on hand accounts, in relation to billing on time).
- The new system doesn't enable to follow-up the timely collection of all corporate receivables.
- There was a problem to disconnect customers with outstanding balances because the system doesn't generate a disconnection order automatically as designed.

ETHIOPIAN ELECTRIC POWER CORPORATION

OUTSTADING BILL BALANCE MAY/PRINTED JUNE 27/2007/

Table 4.8

Region	Current Bal	30 days Bal	60 days Bal	90+ days bal	Credit	Total Debt
ADDIS ABABA	40885898.84	20251825.13	14047954.9	28801085.02	-5564314.37	98422449.52
CENTRAL	13233208.54	21411106.35	15225555.75	25115767.52	-4259839.32	70725798.84
EASTERN - DIRE DAWA	32724.61	9229934.82	7760780.54	14496844.99	-104821.83	31415463.13
NORTH-EASTERN (DESSIE)	14386130.89	5228751.74	3235453.92	4386908.75	-1214984.34	26022260.96
NORTHERN (MEKELE)	9111320.63	6157878.37	1952093.61	4793045.8	-2913929.09	19100409.32
NORTH-WESTERN (BAHAR DAR)	5741675.07	5993029.79	2959364.76	6529107.47	-1675686.68	19547490.41
SOUTHERN (AWASA)	13581977.12	17018222.04	12312288.19	24251046.76	-4730607.17	62432926.94
WESTERN (JIMMA)	5708948.21	6894530.96	3399109.87	14423994.01	-428647.20	29997935.85
TOTAL	**102681883.91**	**92185279.20**	**60892601.54**	**122797800.32**	**-20892830.00**	**357664734.97**

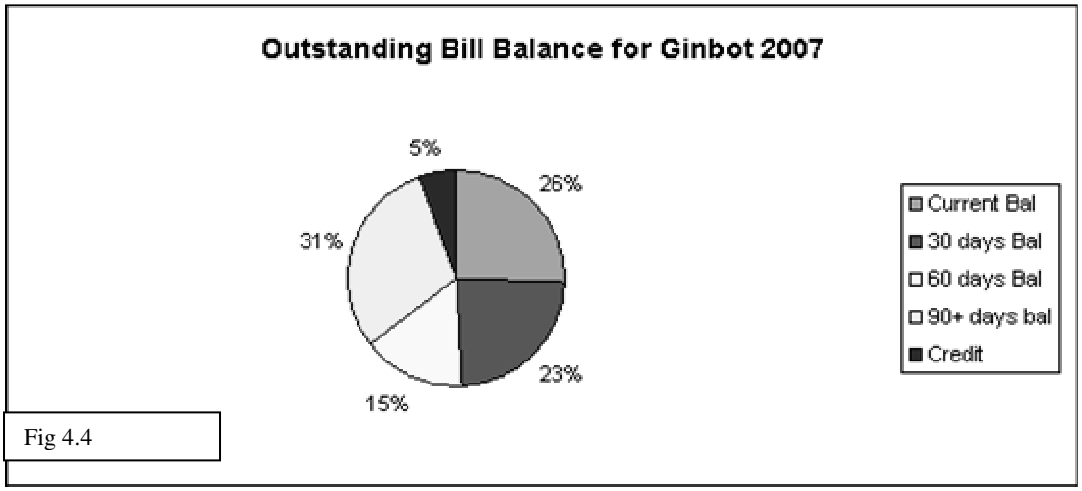


Fig 4.4

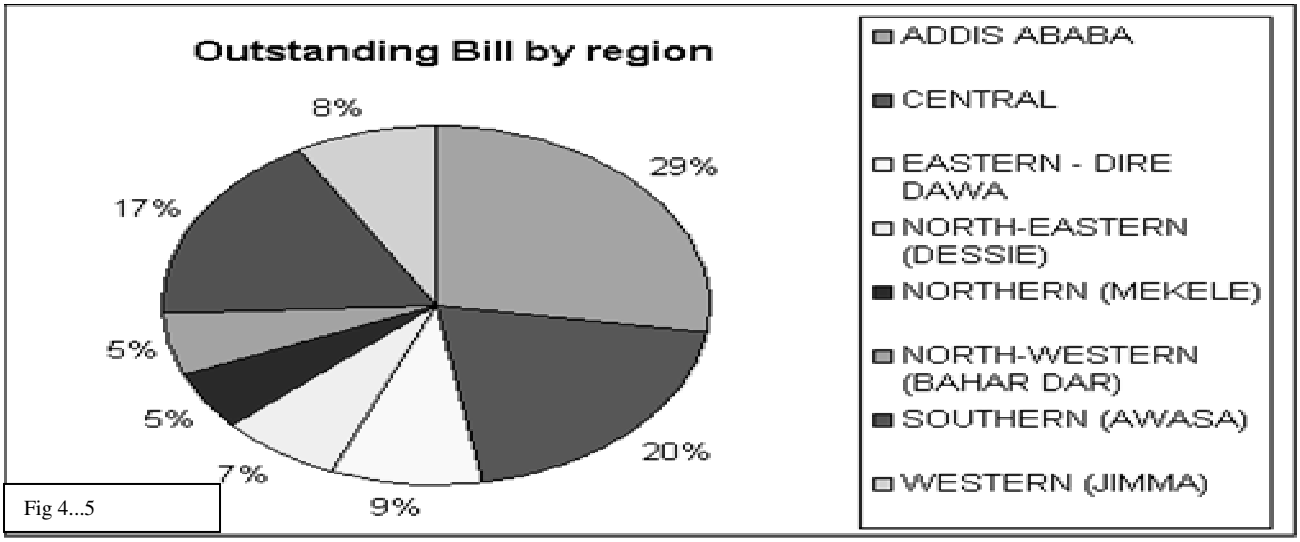


Fig 4...5

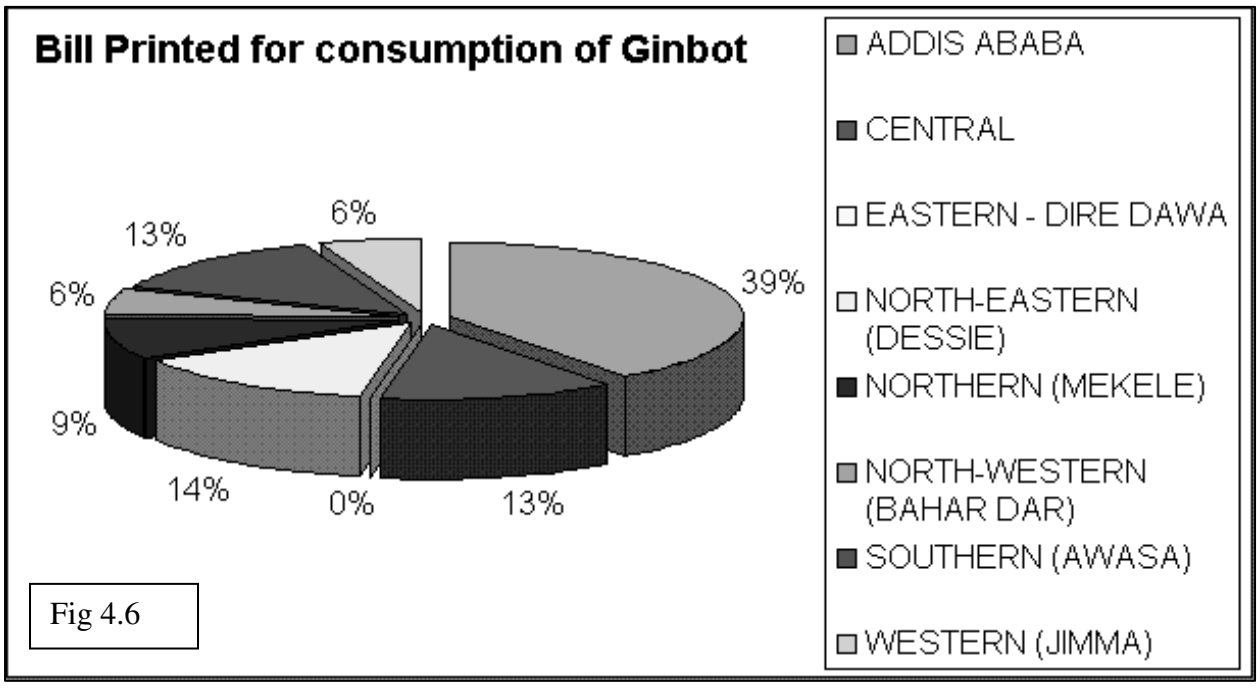


Fig 4.6

Customer service Management

The new billing system provides different access methods to find customer or to access customer information among the methods they use through: -

- The name of a customer
- Identification number of the customer, e.g. EEPCO. ID, passport,
- Supply point number provided by the system during contracting.
- Address of the supply
- The meter number
- The account number of the customer etc.

In general, the data of a customer can be accessed through a search using any of the details of the customer entered during registration (enrollment).

The system uses a friendly graphical user interface to navigate, query, maintain and view data. It is possible to access all information held on a customer via an on-line screens where the on-line facility exists. All the customer information available in the system can be accessed through a unique window. The customer detail can be viewed online upon running the various queries in the system. The corresponding authorized users can perform amendments of the customer data online. The CMS as part of its standard functionality keeps data on updated to customer information to allow auditing of these changes on the event that this is required later. This information includes: -

- Detail on the user making the changes
- The date and time that the changes were made

- The program or module used to make the changes.

However, the above designed features of the system are not fully utilized by system users. The super users and CIPC employees interviewed describes, in contrast to the system capabilities to provide many customer related benefits. There is a problem in identifying and grouping customers, identifying individual that make a change in customer database due to the poor management of user ID and password.

Management Information

The system has a user-friendly facility for ad-hoc reporting. These are a pre-defined management reports. This includes, Meter Reading, Billing, Cash processing, Debt Management, General reports etc

Any system must cater for internal accounting controls, which are concerned with controls to ensure that management criteria are followed. These includes authorization of criteria are followed. These include authorization of transactions, pre and post certifications, classification of transactions in accounting records, security of critical records etc. However, the new system only uses the system log in with a valid user name and password to allow access to authorized users only. The system users can only access functionality on the system that is granted to them by their profile. During an interview with some of the meter readers, bill cashiers and accountants, the internal control of the system have a problem due to users' negligence and system problems. Among the problems described by them:- users are not aware to use secretly and change periodically their passwords, the system doesn't force users to revise their password in prescribed manner, and check and balance are not go with accordance to principal control mechanism. The system does not have facility to authorize transactions.

When this research was on progress, the numbers of regional offices of EEPCO were changed from eight to fifteen. Addis Ababa region has been restructured into four regions while the four additional regions are in the remote area of the country, i.e. Gambela, Assossa, Semera and Jijiga. However, this change of boundaries, defining new regions with existing district is not currently defined how to be integrated with the billing system. The Corporation has failed to decide in advance the tackling mechanism of these changes. As it explained in the introductory part of this study document the system is codified with region numbers and districts. Therefore, the change option shall consider the integrity of the data within the existing districts when they transfer to the target region.

Communication between Stakeholders

As it was discussed in chapter two the primary communication objective of the unfreezing stage was to prepare the corporate participant for the change. A change process as project and the project have different stakeholders. Jeffery et el. (2002), describes to challenge the status quo the first thing to do is to communicate need for a change. In IT project, like the one under study, demands a strong change agents to provide the discrepancy between necessary outcomes and actual outcomes. These change agents are system analysts in our case. Most of the respondents claim that the project has employed temporary or contract employees to minimize the communication gap between different stakeholders. In practice, these temporary employees lack work experience and corporate citizenship. To reinforce the above idea they claim to see the difference between the permanent and temporary project employees turn over.

No.	Description	No of employees assigned to the project	Number of employees left the project	Percentage (%)	Remark
1	Permanent project employees	16	3	19	
2	Contract or temporary project employees	11	9	82	
	Total	27	12	44	

Table 4.9 ICT employee's turnover

During the implementation or change stage the process has to move from abstraction with theoretical outcomes to reality with practical outcomes. At this stage EEPCO has practiced that former bill cashiers' and data entry employees were replaced with technical and vocational graduates of 10+1, 10+2, and 10+3 young new employees. As a result the change process begins to have a considerable corporate impact. Because most of the workforce ware not directly involved and have not know exactly what was happening as result a lot of uncertainly and rumors, that can discourage employees, emerged. Due to the gap between these all stakeholders newly recruited young employees were frustrated and exact data was not available but more than 50% of them left the Corporation.

Addis Ababa Region finance division employees claim that as the change moves from piloting and even at the time of piloting in the Western District of the Region the Project doesn't communicate and report the progress to stakeholders properly. As a result, those who lose their power in such process often inflated the actual problems, and in practice problems are unanswered with facts, as a result they become part of the common anxiety.

According to the discussion made with different stakeholders, the project is winded and handed over to the operational divisions. However, the respondents' claims that the Corporation had neither formally celebrate the change nor reach the refreezing stage. The Corporation in practice has build structures and processes that support the new ways of doing. But, the result was not assessed to recognize if the change creates an efficient result, to reward people with the achievement, to evaluate the control effectiveness of the billing system and to clarify the role relationships between different stakeholders of the customer management system.

4.6 Summary teleconference participant

On July 01, 08, and 15, 2007 a live Radio Fana teleconference was held on capacity building, specifically on EEPCO's service delivery performance. The specific issues raised by the participants of the teleconference were summarized as follow.

Table 4.10 Summary of Teleconference Participants

No	Problem or issue raised	Number of participants raised the issue	Percentage of Total	Remark
1	Delay in Emergency Service.	7	14	A participant can raise more than one issue.
2	Billing System	42	86	
3	Street light problem	3	6	
4	Others	16	33	
	Total participants	49		

Beside their appreciation to the Corporation effort in electrifying the rural and urban areas and the construction of big hydroelectric power generation plants, customers' claims were on the new billing system. Accordingly, 86% of the participants were claim on the billing and collection system of the corporation. Among the problems rise: -

- Exaggerated bill amount
- Absence of monthly meter reading.
- Requesting Settled bill Balance as a forward amount.
- Negative Bill.
- Long queue to settle their bill.
- New Customers are not billed on time or enrolled to the system on time etc.

From these, it is possible to conclude that the research findings are directly correlated with the issues raised by teleconference participants. In the final session of July 15,2007 teleconference, members of middle management of the corporation i.e. EEPCO Civil Service Reform Department Director, Corporate customer and distribution Director, EEPCO Public Relation Manager and Board office Head were admit and appreciate the problem raised by customers and finally promised to take a corrective action to enhance the service delivery of the corporation.

4.7 Bill Collection Performance

The new billing system was first rolled out staring November 2005 at Addis Ababa Region, following June 2006 in Mekele and Central Regions, in September 2006 Awassa and Jimma regions are begin the system, finally DireDawa, Baherdar, and Dessie Regions rollout in November 2006 and they start using the system. Following the rollout of the system the collection performance of the corporation is summarized as follow.

From the following table and chart we can observe that, collection performance of the corporation has steadily declined since the rollout of the new billing system in regions. This may increase number of failure to pay and enlarged the collection standard period (5-7) and it may

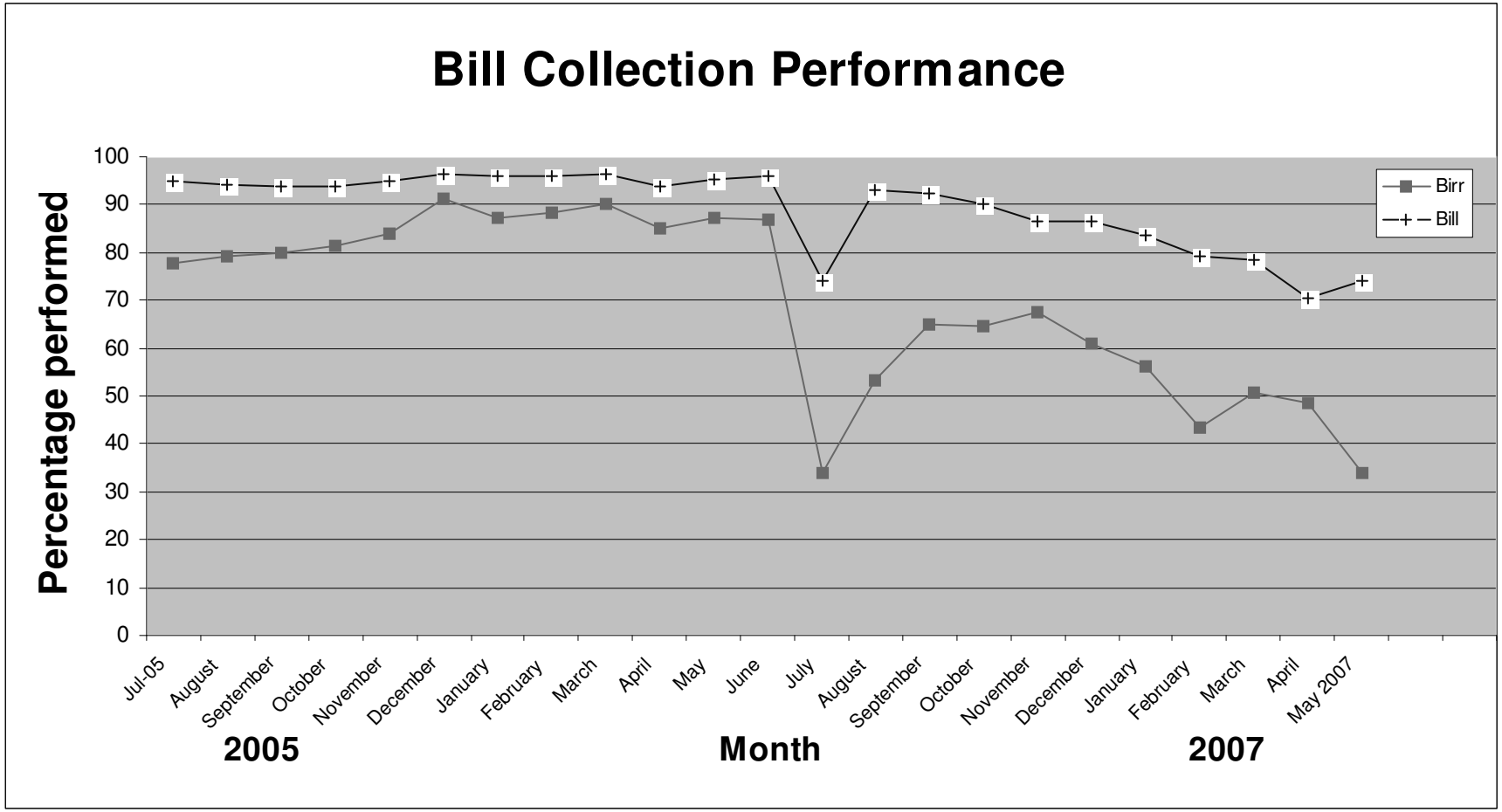
have considerable impact on the working capital structure of the Corporation. Therefore, one of the steps tone objectives of the project / change to improvement of timely bill collection is not well achieved as intended.

Ethiopian Electric Power Corporation

Bill Collection Performance Summery **Table 4.10**

Year	Month	Bill to be Collected		Collected		Uncollected Balance		% Collected in Birr		No of Bills				Remark
		Current	Credit (New Connection)	Current	Credit (New Connection)	Current	Credit (New Connection)	Current	Credit %	Total Bills	Sold	Remain	Sold %	
1998 Budget Year	Jul-05	52,101,051.64	2025971.26	40413089.17	1741842.04	11,687,962.47	284129.22	78	86	613276	582470	30806	95	
	August	92647577.20	3055933.84	73230208.84	2546856.69	19,417,368.36	509077.15	79	83	913457	859061	54396	94	
	September	87042902.45	3292211.37	69421814.78	2716839.34	17,621,087.67	575372.03	80	83	923688	864749	58939	94	
	October	94487086.23	3514361.79	76761387.55	2959058.56	17,725,698.68	555303.23	81	84	933502	877021	56481	94	
	November	81347036.03	3512281.51	68173784.79	3012571.83	13,173,251.24	499709.68	84	86	837779	793444	44335	95	
	December	44055237.25	3139592.8	40120204.66	2678372.45	3,935,032.59	461220.35	91	85	569274	547869	21405	96	
	January	45576902.9	3100690.4	39786168.35	2713837.34	5,790,734.55	386853.06	87	88	576184	552772	23412	96	
	February	47903681.42	3272523.22	42324286.09	2982266.81	5,579,395.33	290256.41	88	91	583011	559983	23028	96	
	March	46358268.62	3427420.69	41803112.44	3080558.28	4,555,156.18	346862.41	90	90	590844	568339	22505	96	
	April	48529242.98	3615924.83	41353100.58	3122104.59	7,176,142.40	493820.24	85	86	598575	560986	37589	94	
	May	48345854.94	3745638.67	42197991.38	3284983.45	6,147,863.56	460655.22	87	88	605583	577459	28124	95	
	June	49780992.9	3803725.2	43194532.85	3438712.2	6,586,460.05	365013	87	90	614070	589011	25059	96	
1999 Budget Year	July	271042931.4	1213836.81	91704101.06	647289.666	179,338,830.33	566547.144	34	53	1069008	791434	277574	74	
	August	161899480.5	2127171.4	86229562.97	1835509.13	75,669,917.57	291662.27	53	86	1012374	942007	70367	93	
	September	156703911.8	2283555.38	101891062.5	1910203.49	54,812,849.28	373351.89	65	84	1021453	941895	79558	92	
	October	159083601.1	3436919.5	102484031.1	1915666.21	56,599,569.99	1521253.29	64	56	1038886	934780	104106	90	
	November	165212110.1	1492112.71	111305961	1110915.46	53,906,149.09	381197.25	67	74	1031421	893632	137789	87	
	December	184321195	1413342.35	112418297.4	1050501.32	71,902,897.63	362841.03	61	74	1106596	955943	150653	86	
	January	185431909.4	1164386.99	104165663.2	769309.08	81,266,246.20	395077.91	56	66	1048058	876010	172048	84	
	February	242389995.1	2927717.48	105591726.2	1129482.69	136,798,268.84	1798234.79	44	39	1096432	869901	226531	79	
	March	198479161.8	2494527.38	100830307.9	869902.16	97,648,853.91	1624625.22	51	35	1047020	822309	224711	79	
	April	222059487.9	1094063.88	107431995	611785.04	114,627,492.94	482278.84	48	56	1166466	819934	346532	70	
	May 2007	271042931.4	1213836.81	91704101.06	647289.66	179,338,830.33	566547.15	34	53	1069008	791434	277574	74	
	June													

AAR Collection report year 1998 was not available.


Bill Collection Performance
Percentage performed
100
90
80
70
60
50
40
30
20
10
0
Birr
Bill
Jul-05
August
September
October
November
December
January
February
March
April
May
June
July
August
September
October
November
December
January
February
March
April
May 2007
2005
Month
2007

CHAPTER FIVE

Summary, Conclusions and Recommendations

In the preceding chapters we discuss the research problem and its approach, the conceptual framework or related literature of change management. Company setup was also presented in chapter three of this report. In the Change Management Process in practice portion of the paper, I tried to present measurable change objectives of the billing system; the attractive features of the new billing system, i.e. flexible payment option, Local Reading Application and Local Collection application and the online real processing system of the newly implemented system were presented. In addition to this, the challenges and difficulties faced while design and implementing of the project were discussed with help of the opinion collected from end user and customers of the Corporation. In general, the management of the change process was dully assessed and presented in the body of the paper. Now summary of findings, conclusions and recommendations of the study are presented hereunder.

5.1 Summary

5.1.1 The Corporation has properly discovered the problem in relation to the IBM As/400 based billing system. According to the respondents change is in evitable in the Corporation to manage the current and future customers' number growth and information needs.

5.1.2 Out of the 32 and 8 finance work units and ICT department respondents respectively 28(87%) and 5(62%) respective of them agree that at the very

beginning of the change process (project) EEPCO management was not communicated the objective and the future outcomes of the project.

5.1.3 Of the respondents, 100% of the ICT department, finance and Addis Ababa Region employees support the change of the old billing system by a new comprehensive customer management system.

5.1.4 The respondents believe that the Corporation has faced difficulty in managing and operating the new system due to network congestion and hardware limitation.

5.1.5 The new billing system has faced a problem due to the failure in defining system functional requirements during the design of the system. Most of the respondents agree with stakeholders' participation in system development. However, of the ICT department respondents 87% claim major stakeholders were not participated in the design and implementation of the new system.

5.1.6 The corporate new billing system was not fully functioning online real time billing and collection. Only 9% of Addis Ababa region service center has a direct access to the main corporate network.

5.1.7 As of Ginbot 1999 / May 2007 the Corporation has more than 92 million a 30 day outstanding bill balance, more than 60 million a 60 day outstanding bill balance and more than 122 million 90 plus day outstanding bill balance. This was extremely large comparing to the same month Ginbot/May 2006 data.

5.1.8 Out of the customer respondents, 48(46%) witnesses that they are billed incorrectly with balance forward been already settled amount and of them customer 12(11%) respondents say they encounter a negative bill balance in different months.

5.1.9 The responsiveness of the Corporation to the customer compliant is evaluated negatively by 83(79%) of the customer respondents. The rest 19(18%) says it was satisfactory while 3% of the customer respondents are indifference.

5.1.10 The Corporation has encountered a record of abnormal (negative) cash at bank balances in most of the district offices account while there exist a positive cash balance.

5.1.11 The payment flexibility feature of the new system was not utilized. Only six customers were able to settle their bill outside their locality/ district office.

5.1.12 The researcher finds that, the project office doesn't perform stakeholders' analysis; end users of the system were not participated/consulted from problem identification up to the implementation of the billing system in a proper manner. Currently, no body can explain full history of the project due to the frequent dismissal of project managers and absence of proper documentation of project history. Users of the system were frustrated due to poor performance of the system. There is no sense of urgency in relation to the actual system problem to correct the deviations to maintain the expected performance.

5.2 Conclusion

5.2.1 The Corporation has properly identified the need for change of the old billing system with a modern and comprehensive billing system. The decision for change was made at the right time but the implementation of the change project delayed for long time i.e. the time gap between the floating of the term of reference May 16, 1997 and the signing of the contract agreement on October

18, 2004. As a result, the Corporation does not duly perform or assess the strategic alignment of the system by changing the scope with respect to the strategic plan revisions.

5.2.2 The billing system is behaving slowly; the main problem arises due to the wrong network or communication strategy adopted by the Corporation. That was mainly happened because the initial VSAT strategy was forcedly changed to the currently implemented ETC broadband network communication strategy.

5.2.3 Due to the design and requirement definition problems the newly installed hardware is not capable to run 1.2 million customers without hardware upgrading. This was a problem in relation to improper forecast of future customer growth and the problem was discovered before the hand over of the project to the operational divisions.

5.2.4 The project was named as the "decentralization of billing system of EEPCO". However, in practice the system database i.e. the main CMSPROD database is running in the head office of the Corporation in Addis. As a result, all users are forced to use the corporate network and the particular database is not accessible and if some batches are running the database is very busy to handle any other request. This contradicts with the system functional requirement of updating all collections to the main database within 24 hrs.

5.2.5 The Corporation/ Project had failed to encourage the participation of the former IBM As/400 based employees. As a result, the employees were discouraged and as a learning Corporation they were loss the chance to learn from the development cycle of the project.

5.2.6 Due to the absence of proper and adequate training to the system users, it was observed many customers are requested to pay an already settled balance bill as a balance brought forwarded. In addition to this, customers are billed with a negative amount for unknown reasons.

5.2.7 There is no clear procedure to handle printed bills after the collection cutoff date. If a certain bill is not sold on the respective time span (refer to the collection span) the printed bill is invalid. However, some collection centers and districts are sold those bills after the cut off period. As a result, the next bill of the customer includes the already settled amount as a balance brought forward.

5.2.8 Some Meter readers are not duly read customer KWHM within the given time interval. In effect, many customers monthly bill was processed on estimation based on their past consumption trend by the system. This encourages customers to suspect their bill and to come with complain. There is no clear mechanism to monitor the meter readers so as to get a quality reading data.

5.2.9 The project has not made a stakeholder analysis to identify internal customers that can be affected by the change process. As a result, functional requirements were not properly identified, system specification or requirements were not properly described at the design stage and some users are not informed the pilot implementation activity and its progress, like Addis Ababa region finance.

5.2.10 The Aggresso Accounting system and the billing system of the Corporation are not properly mapped. As a result, the receivable account of these two systems and the cash at bank balances of the corporate accounts are different.

Especially, the cash at bank and cash on hand account of many district offices of the Corporation shows abnormal or credit balance.

5.2.11 System users are not conscious enough to handle their user account. It was observed that many users are putting/writing their user account and password on their desks. One user knows the password of almost all users in that particular service center. Users profile is not updated in a predefined consequent manner.

5.2.12 There was a huge backlog of inserting data of newly connected customers to the system. This creates customers to be billed lately and to pay greater amount than they expect due to the progressive structure of the corporate tariff. The main reasons for such backlogs are the problem in relation to the system speed and the remoteness of the currently electrified towns or villages.

5.2.13 The good news is the introduction of Local Collection Application (LCA) and Local Reading Application. The bad news is these new features are challenged by garbage data due to the absence of proper data handling mechanism. Reading and collection data at offline collection centers are transferred to the main system using hard held memory devices. However, the data was not uploaded to system within the cutoff time.

5.2.14 It takes a lapse of time to enroll a new customer to the system. Especially, it was a cumbersome task to CIPC employees to go through different consecutive menus to enroll customer and make change on customer profile. They forced to run several menus to add/ register a single new customer to the system.

5.2.15 There was a communication gap between different stakeholders and this planned change. As I defined in the second chapter it was necessary to have a proper communication at different stages of the change unfreezing, changing or moving and refreezing. Even I believe the first communication/information about the change to come from the senior management. In practice, in the project there was no clearly defined communication strategy as a result the process became full of uncertainty.

5.2.16 Finally, the corporation has tried to realize a radically change /to made a revolutionary change/ in its billing /CMS system by implementing an advanced Information Technology infrastructure, by circumventing previous staffs and decentralizing the billing system. However, based on the finding of the study listed above the corporation has failed to achieve the project objective that are listed at the end of part 3.10 of this report.

5.3 Recommendation

5.3.1 Employees shall be retrained in order to master the new skill required by the billing system to operate and maintain the system at the expected level.

5.3.2 The Corporation shall encourage diversity. Specially, former employees shall gain a credit and allowed to participate in any change process. There should be a mechanism to explore contradictions, to encourage different viewpoints by accepting a certain level of internal conflict and differences if any.

5.3.3 From the data collected and the summary of the radio teleconferences, the billing system of the Corporation is faced many technical and procedural problem. Therefore, the management of the Corporation shall generate a sense of urgency to tackle the difficulties.

5.3.4 A close liaison between the project office/change manager and the affected stakeholders and end users should be maintained.

5.3.5 The Corporation should reconsider the availability of other network communication technologies to reduce the problem of the telecom infrastructure for data transfer. At the same time exhaustive discussion with ETC to get additional bandwidth or either to obtain permission for other communication strategies on the ground of failure to execute their commitment shall not be omitted.

5.3.6 The Corporation shall introduce computerized hand held meter reading technology to minimize customer compliant and to increase data integrity. At the same time it will help to monitor meters readers malfunctioning and to maintain a system of accountability for failure of acting as the prescribed procedure.

5.3.7 For remote and rural areas there was an IT technology that can be read and bill energy meter simultaneously. The Corporation shall try to introduce such technology to properly handle customer data and to collect its receivables on time.

5.3.8 In some service centers located in Addis Ababa, there was an introduction of a prepaid meter system. It was advised to strengthen the action. However, it was equally necessary to evaluate and make some adjustment to make it compatible with the billing and accounting system of the Corporation.

5.3.9 The management should appreciate the billing system problems and try to tackle them by advising different stakeholders.

5.3.10 The Corporation shall reduce the number of negative bills and wrongly billed balance brought forwards to minimize customer complaints.

5.3.11 Approved procedural and operational manual shall be prepared and distribute to all concerned users of the system.

5.3.12 Users profile shall be managed carefully. Users shall be forced to hide their password and make a periodic update or change on their password to protect the vulnerability of the system. Introduce a system of accountability for sharing of password and problems encountered as a result of the sharing.

5.3.13 Effort should be exerted to identify the gap between the billing and the accounting system outstanding bill amount. And identify the reason for abnormal (credit) cash at bank account. Try to be sure the compatibility of the Agresso Accounting and the Billing system.

5.3.14 Proper procedure shall be developed to manage the unsold printed bill after the cutoff time. Example, stamp or punch (make hole) to indicate their valueless ness.

5.3.15 Exceptions triggered by the system shall be resolved properly. Especially minimizing reading exceptions is the basic solution to reduce customer compliant and to correct inflated and deflated revenue recognitions.

5.3.16 The Local Reading Application and Local collection Applications should work based on strict deadline and data should be transferred to the main system according to the timetable.

APPENDIX

Addis Ababa University
Faculty of Business and Economics

MBA Program

The purpose of this questionnaire is to gather data regarding the currently implemented Decentralization of Billing system (Customer Management System-CMS) of EEPCO. The study is purely for academic purpose and thus not affects you in any case. So, your genuine, frank, timely response is vital for the success of the study. Therefore, I kindly requested you to respond to each question item carefully.

Note:

1. No need of writing your name.
2. Where alternative answers are given, encircle your choice and put X mark where necessary.
3. Please give more attention and return the completed questionnaire before June 30, 2007.
4. If you need further explanation you can contact me (Telephone No. 0911675972) and discuss the matter.

Thank you, for your cooperation and timely response in advance.

Section I Personal Information.

1. Age _____
2. Sex_____
3. Educational Qualification

   a). Below grade 12 d). College diploma g). PHD and above

   b). Grade 12 completed e). First Degree (BSc, BA)

   c). High School diploma f). Second Degree (MSc, MA)

4. Field Specialization _____
5. Current Position_____
6. Have you got any training related to CMS before? a) Yes b) No
7. In what field of specialization have you been trained? _____

PART I

II. Opinion in relation to the participation of the finance group of EEPCO in the design and implementation of the new billing system.

1. Do you think stakeholder participation in designing and implementation of a new system worthy?

   Yes ☐ No ☐

   Why? _____

   _____

2. Does the finance group participate in the Design & Implementation of the new billing system?

   Yes ☐ No ☐

   In your opinion, who is the owner of the newly developed billing (CMS) system?

   _____

3. In your opinion, do you consider as the end-user of the customer management system?

   Yes ☐ No ☐

4. What roles does your work unit play in the design process of the new billing system (CMS)?

   _____

   _____

5. What roles does your work unit play in the implementation process of the new billing system (CMS)?

   _____

   _____

6. Is the change objective of the project communicated to you at the very beginning?

   Yes ☐ No ☐

7. If you are the end user of CMS have you ever participate (take) in training programs? Yes ☐ No ☐

   If No, why? _____

_____

III. Opinion in relation to the compatibility of the newly implemented billing system and EEPCO Agresso accounting system.

1. In your opinion, how do you evaluate the compatibility of the Billing and Accounting systems of the corporation?

   _____

   _____

   _____

2. Is the new billing system mapped to the accounting system to reflect a proper financial position of the corporation?

   Yes ☐ No ☐

   If your answer is No, could you list the reason for your opinion?

   _____

   _____

   _____

3. As the new billing system implemented, is the chart of account adjusted to fit to the new system?

   Yes ☐ No ☐

   If No, why? _____

   _____

   _____

   If No, what are the problems? _____

   _____

   _____

4. Does the customer satisfaction in relation to Billing (CMS) improved with the implementation of the new system?

   Yes ☐ No ☐

   If No, what are the problems? _____

   _____

_____

PART II

Questioner to be completed by ICT Department workers

1. Is the change made from the old system to the current (CMS) system inevitable?

   Yes ☐ No ☐

   If yes, why? _____

   _____

   If No, why? _____

   _____

2. Are you participated in the problem identification and any system design and implementation activities?

   Yes ☐ No ☐

   If yes, how do you evaluated your contribution, _____

   _____

   If No, why? _____

   _____

3. In your opinion, how do you evaluate the participation of stakeholders in the system development life cycle?

   Enough ☐ Not enough ☐

   If it is not enough, why? _____

   _____

   _____

4. Do you believe implementation process of the new billing (CMS) system go correctly?

   Yes ☐ No ☐

   If No, what shortcomings were there? _____

   _____

_____

_____

5. As system operator /developer do you get enough training to operate, develop or modify the new billing system if a change request arises?

   Yes ☐ No ☐

   If your answer is No, what are the problems? _____

   _____

   _____

   _____

6. Is there appropriate CMS Management Policy & Procedure?

   Yes ☐ No ☐

7. Are you familiar with new system policy & procedure?

   Yes ☐ No ☐

8. Is it distributed and exposed to all concerned users of the system?

   Yes ☐ No ☐

9. If your answer for question No. 8, is 'No' why? _____

   _____

   _____

10. In your opinion, is the new system supersedes the old system?

    Yes ☐ No ☐

11. If your answer for question No 10 is yes? What are the additional benefits derived from the new billing (CMS) system?

    _____

    _____

12. What are the shortcomings of the new system?

_____

_____

_____

13. Does the new billing system (CMS) attain the intended goals?

Yes ☐ No ☐

14. If your answer for question # 13 is No? Why?

_____

_____

_____

15. Are ale stakeholders participate in the identification and definition of functional requirements of the system?

Yes ☐ No ☐

If your answer for question # 16 is No? Why?

_____

_____

_____

16. Is the change objective of the project communicated to you at the very beginning?

Yes ☐ No ☐

17. List any problem encountered during your activity in operating /functioning the new CMS (billing) system? _____

_____

_____

_____

_____

PART III

Questionnaire to be completed by Managers, service center heads and Sales and reception heads.

1. Do you believe the new billing system (CMS) is more valuable to EEPCO than the old one?

   Yes ☐ No ☐

   If you say yes /No why?

   _____

   _____

   _____

2. Are the reports producing in relation to billing currently satisfy to your works units?

   Yes ☐ No ☐

   If no, what are the reasons?

   _____

   _____

   _____

3. If you are working in the new billing system, are you satisfied with its delivery?

   Yes ☐ No ☐

   If yes, what are the major areas you are satisfied?

   _____

   _____

   _____

   If no, what are the major areas you are not satisfied?

   _____

   _____

   _____

4. In your opinion, does the new billing system reduces the non-technical losses (such as alert messages for meters not read regularly etc)?

   Yes ☐ No ☐

   If No, what shortcomings are there?

   _____

   _____

   _____

5. Do you believe the new system helps EEPCo to manage its customer data and sales properly?

   Yes ☐ No ☐

   If No, what are the problems? _____

   _____

   _____

6. Does EEPCO Management well know the system and assess the weakness and try to improve?

   Yes ☐ No ☐

If No, why?

_____

_____

_____

7. Is the balance brought forward and negative bill management procedure clear?

   Yes ☐ No ☐

   If Not, why?

   _____

   _____

   _____

8. Do you have full confidence on the data you encode and the reports produced by the system?

   Yes ☐ No ☐

9. Is the training you took enough to handle your works?

☐ Yes, I take enough training

☐ No, it is not enough.

If your answer for question # 9 is no, why? _____

_____

_____

_____

10. Are you using all the facilities of the system?

Yes ☐ No ☐

If No, what facilities are not in use?

_____

_____

_____

11. In your opinion, does the replacement of the old system with new billing system managed properly?

Yes ☐ No ☐

If No, What are the problems?

_____

_____

_____

12. Is the system providing reliable information in relation to customer account and customer information?

Yes ☐ No ☐

If not, why?

_____

_____

_____

13. Does the new belling system help you in following up outstanding bill receivables?

Yes ☐ No ☐

If No, why? _____

_____

_____

14. Is the controlling system of the billing system better than the old one?

Yes ☐ No ☐

If No, what are the causes?

_____

_____

_____

15. Does the bill collection performance of the corporation improved after the implementation of the new billing system?

Yes ☐ No ☐

If No, what are the reasons?

_____

_____

_____

16. What is approximate number of customers in your service center? _____

17. How much is the number of complaints you receive per month?

Below 100 ☐ 201-300 ☐

101-200 ☐ Above 300 ☐

18. Is the new billing system enables you to have a rapid response to customer compliant?

Yes ☐ No ☐

If No, why?

_____

_____

_____

Iv. General

1. Are your familiar enough how to raise transactions and clear accounts based on CMS out puts?

   Yes ☐ No ☐

   If No, what are the problems?

   _____

   _____

   _____

2. Does the new belling system help you in following up outstanding bill receivables?

   Yes ☐ No ☐

   If No, why? _____

   _____

   _____

3. Is the controlling system of the billing system better than the old one?

   Yes ☐ No ☐

   If No, what are the causes?

   _____

   _____

4. Does the bill collection performance of the corporation improved after the implementation of the new billing system?

   Yes ☐ No ☐

   If No, what are the reasons?

   _____

   _____

5. Does the new billing system reduce the workload of finance?

   Yes ☐ No ☐

   If Yes, how _____

   _____

   _____

If No, why _____

_____

_____

6. Shall the corporation produce unqualified financial statements in the coming years (by avoiding trade receivable qualifications)?

Yes ☐ No ☐

If No, why?

_____

_____

7. Are all concerned work units integrated well in such away that leads to get all the intended benefits from the billing system?

Yes ☐ No ☐

If No, where and what are the gaps? _____

_____

_____

8. Is the resource you have sufficient so as to handle all the new billing system assignments?

Yes ☐ No ☐

If No, what remain? _____

_____

_____

PART IV

Questioner to be answered by EEPCO customers.

1. Are you a direct customer of EEPCo?

   Yes ☐ No ☐

2. For how long time are you a customer of the corporation?

   ☐ Greater that 10 years

   ☐ 5 – 10 years

   ☐ Less than 5 years

3. Are meter readers of the corporation take meter reading on a regular basis?

   Yes ☐ No ☐

4. Is the electric consumption bill always accurate?

   Yes ☐ No ☐

   If No, why? _____

   _____

   _____

5. Have you ever been bring about any compliant related to electric consumption?

   Within the past two years?

   Yes ☐ No ☐

6. If your answer for question # 5 is "Yes" can you explain the reason for your compliant? _____

   _____

   _____

7. If your answer for question # 5 is "Yes" How did you rate the response for your compliant?

   Quick ☐ delayed ☐

8. Are you comfortable with the new billing system print out bill receipt format?

   Yes ☐ No ☐

Do you get all necessary information on the printed bill?

Yes ☐ No ☐

Any suggestion related to bill format _____

_____

_____

9. In your opinion, is the corporation prepared electric factor (Bill) on time?

Yes ☐ No ☐

If your answer is No, for, how long does the corporation delay the bill? _____

_____

_____

9. Haw do you evaluate the waiting time to settle your bill in minutes?

☐ Up to 15 ☐ 46-60

☐ 16-30 ☐ >60

☐ 31-45

10. How do you evaluate the service delivery of the corporation?

Satisfactory ☐ partially satisfied ☐ Not satisfied ☐

11. Have you ever requested to pay balance previously settled?

Yes ☐ No ☐

12. Have you ever encountered a negative bill balance in your account?

Yes ☐ No ☐

13. Any suggestion /comment or idea to improve the billing system or customer management system (CMS) of the corporation?

_____

_____

_____

_____

Ethiopian Electric Power Corporation
Existing Tariff Structure ***as of Hamle 1998 EFY (July 2006 G.C.)***

1. Table 1 - Electric Tariff Rates

Tariff Category	Consumption (kWh /Month)	Tariff Rate (Birr/kWh)
I. Domestic		
Equivalent Flat Rate		0.4735
First Block	First 50 kWh	0.2730
Second Block	Next 50 kWh	0.3564
Third Block	Next 100 kWh	0.4993
Fourth Block	Next 100 kWh	0.5500
Fifth Block	Next 100 kWh	0.5666
Sixth Block	Next 100 kWh	0.5880
Seventh Block	Above 500 kWh	0.6943
II. General		
Equivalent Flat Rate		0.6723
First Block	First 50 kWh	0.6088
Second Block	Above 50 kWh	0.6943
III. Low Voltage Time- of- Day Industrial		
Equivalent Flat Rate		0.5778
Peak		0.7426
Off Peak		0.5435
IV. High Voltage Time-of-Day Industrial 15 kv		
Equivalent Flat Rate	.	0.4086
Peak		0.5085
Off Peak		0.3933
V. High Voltage Time-of-Day Industrial 132 kv		
Equivalent Flat Rate	.	0.3805
Peak		0.4736
Off Peak		0.3664
VI. Street Light Tariff		
Equivalent Flat Rate		**0.4843**

2. Table 2 - Service Charge Rate

Tariff Category	Consumption	Birr/Month
1. Domestic		
1 Phase	**kWh/Month**	
	0-25	1.400
	26-50	3.404
	51-105	6.820
	106-300	10.236
	Above 300	13.652
3 Phase		17.056
Active/Reactive		37.564
2. General		
1 Phase		14.494
3 Phase		22.558
Active/Reactive		35.258
3. Low Voltage Time -of-Day 3 Phase - 380v		53.570
4. High Voltage Time-of-Day (15kv) 3 Phase		54.009
5. High Voltage Time-of-Day(132kv) 3 Phase		54.009
6. Street Light		
1 Phase		14.494
3 Phase		22.558
Active/Reactive		35.258

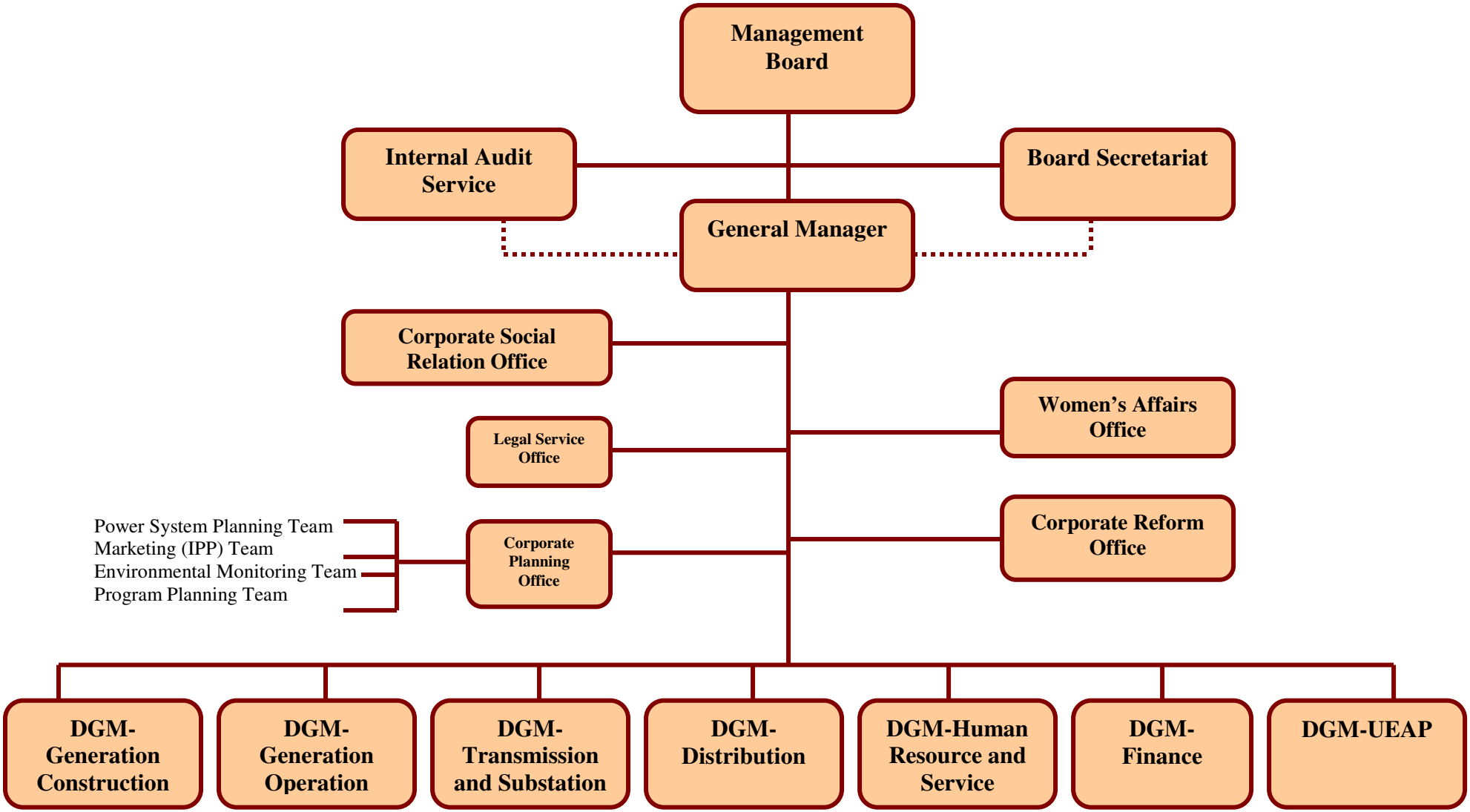
3. Table 3 - Minimum Charge (For Industrial and High Power Consumers)

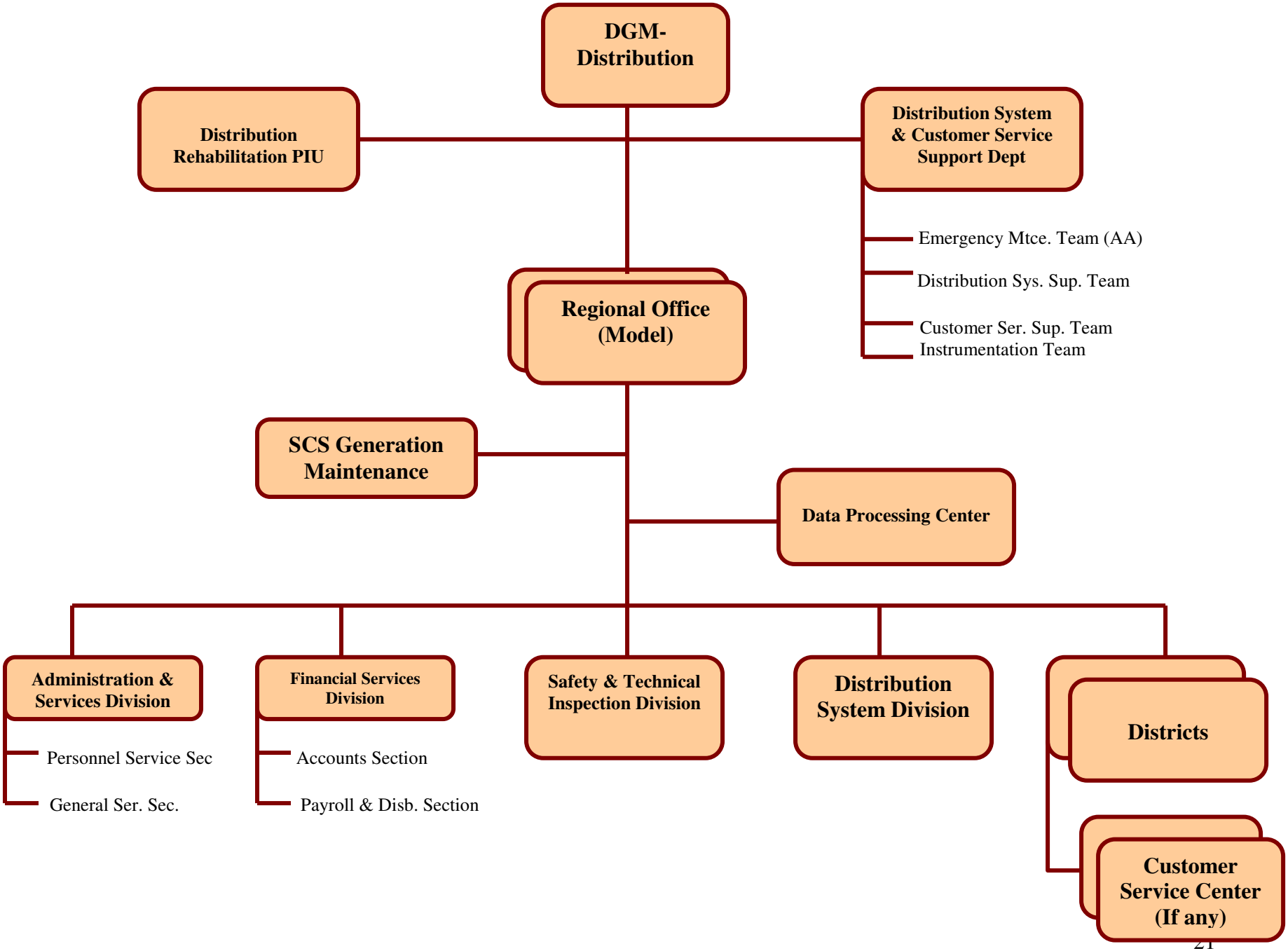
System and Consumer Identification	Consumption	Birr/Month
1. ICS		
	kWh/Month	
High Voltage Consumer	First 20 kW	31.086
	Next 400 kW	15.543
	For the balance	7.771
Low Voltage Consumer	First 20 kW	34.197
	Next 200 kW	17.104
	For the balance	8.552

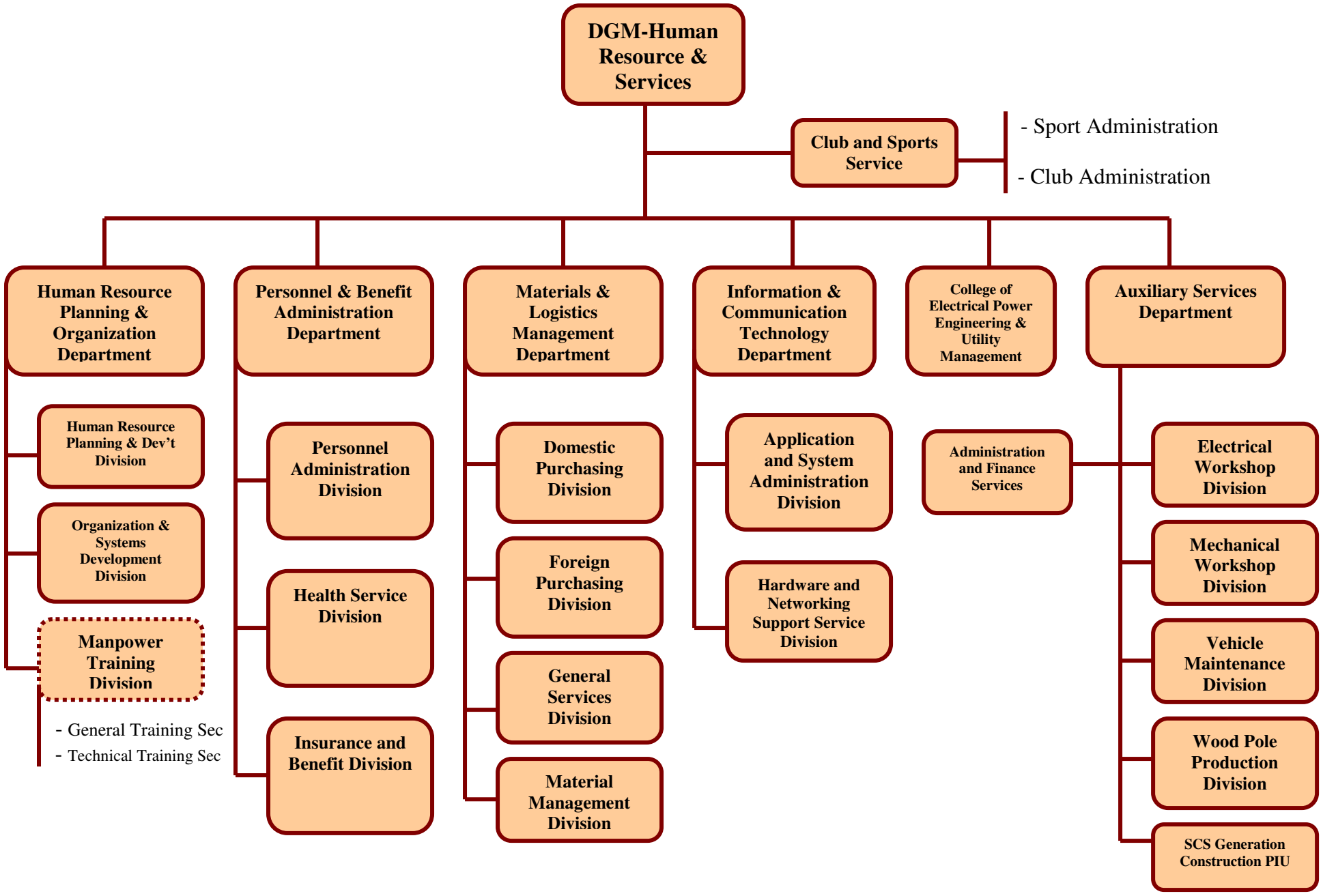
2. SCS - Low Voltage Consumer	First 20 kW Next 200 kW For the balance	41.968 20.203 10.102

4. Table 4 - Power Factor (For Industrial and High Power Consumers)

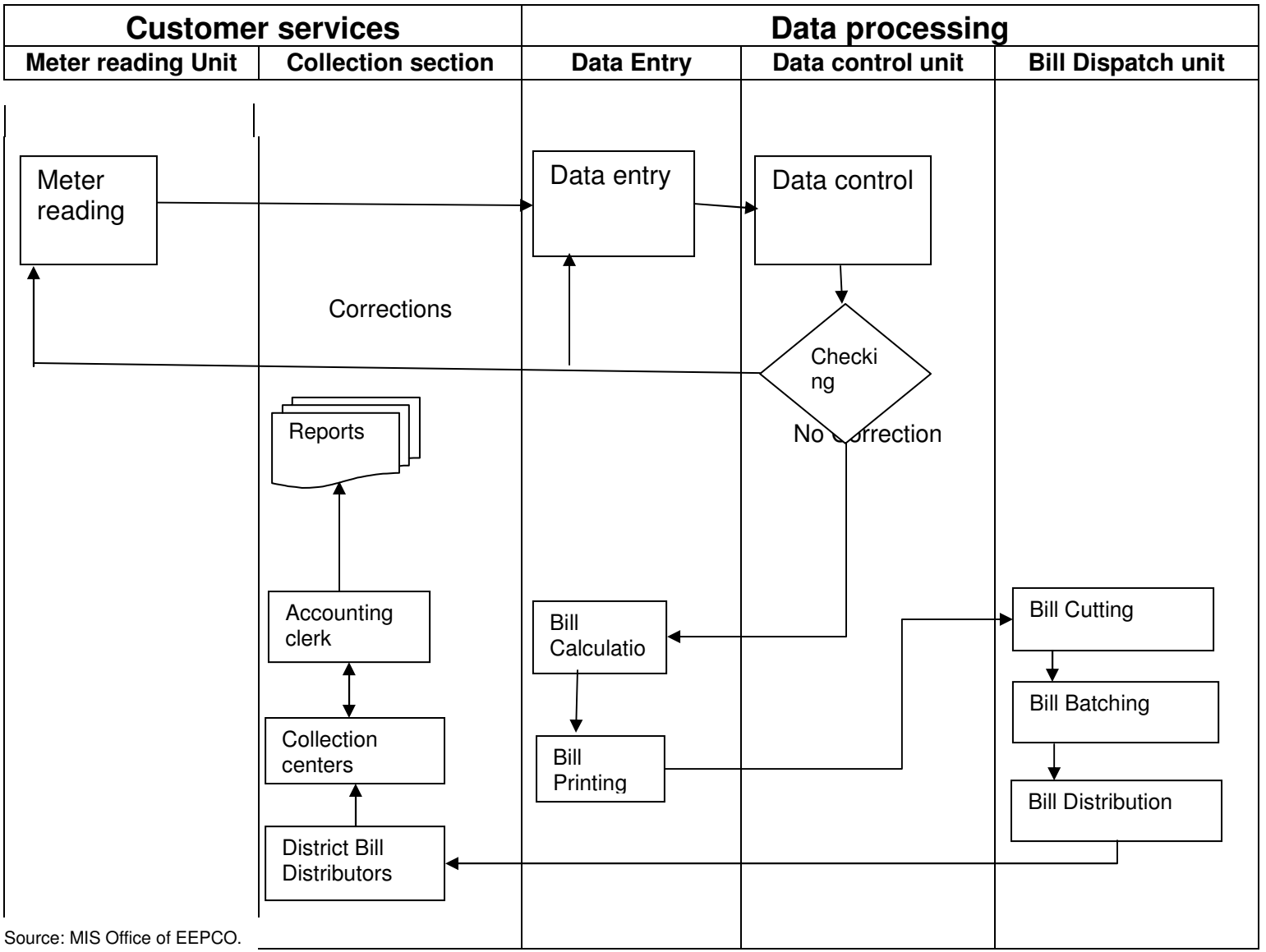
System and Consumer Identification		Birr/Month
1. ICS High Voltage Consumer		61.634
Low Voltage Consumer		68.369
2. SCS - Low Voltage Consumer		83.363


Management Board
Internal Audit Service
Board Secretariat
General Manager
Corporate Social Relation Office
Women's Affairs Office
Legal Service Office
Corporate Reform Office
Power System Planning Team
Marketing (IPP) Team
Environmental Monitoring Team
Program Planning Team
Corporate Planning Office
DGM-Generation Construction
DGM-Generation Operation
DGM-Transmission and Substation
DGM-Distribution
DGM-Human Resource and Service
DGM-Finance
DGM-UEAP


DGM-
Distribution
Distribution
Rehabilitation PIU
Distribution System
& Customer Service
Support Dept
Emergency Mtce. Team (AA)
Distribution Sys. Sup. Team
Customer Ser. Sup. Team
Instrumentation Team
Regional Office
(Model)
SCS Generation
Maintenance
Data Processing Center
Administration &
Services Division
Personnel Service Sec
General Ser. Sec.
Financial Services
Division
Accounts Section
Payroll & Disb. Section
Safety & Technical
Inspection Division
Distribution
System Division
Districts
Customer
Service Center
(If any)


DGM-Human Resource & Services
Club and Sports Service
- Sport Administration
- Club Administration
Human Resource Planning & Organization Department
Human Resource Planning & Dev't Division
Organization & Systems Development Division
Manpower Training Division
- General Training Sec
- Technical Training Sec
Personnel & Benefit Administration Department
Personnel Administration Division
Health Service Division
Insurance and Benefit Division
Materials & Logistics Management Department
Domestic Purchasing Division
Foreign Purchasing Division
General Services Division
Material Management Division
Information & Communication Technology Department
Application and System Administration Division
Hardware and Networking Support Service Division
College of Electrical Power Engineering & Utility Management
Administration and Finance Services
Auxiliary Services Department
Electrical Workshop Division
Mechanical Workshop Division
Vehicle Maintenance Division
Wood Pole Production Division
SCS Generation Construction PIU

EEPCO BILLING PROCESS CHART



Source: MIS Office of EEPCO.

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