

INVENTORY MANAGEMENT PRACTICES OF ETHIOPIAN ELECTRIC UTILITY: THE Case of Addis Ababa City

BY

WOLDEABREHA BERHANE

**THE DISSERTATION SUBMITTED TO THE DEPARTMENT OF
MANAGEMENT, FACULTY OF BUSINESS AND ECONOMICS, IN
FULFILMENT OF THE REQUIREMENTS OF EXECUTIVE MASTERS OF
BUSINESS ADMINISTRATION, ADDIS ABABA UNIVERSITY,
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**January 2015, Addis
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DECLARATION

I declare that the work done in the project entitled “**Inventory Management Practices of the Ethiopian Electric Utility: The case of Addis Ababa City**” is my original work under the supervision and guidance of Dr. Mohammed Seid, Department of Management, Addis Ababa University. This work has not been previously submitted for any higher institution for any diploma, degree or other similar work.

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CHAPTER ONE: INTRODUCTION

Under this chapter the researcher tried to introduce readers about background of the study, statement of the problem, objective of the study, significance of the study, scope /delimitation of the study and limitation of the study

1.1 Background of the study

A management that can't decide strategically could fail to run an organization in the right direction. Whether it is a private or public sector, the acquisition, storage, issuance, and usage of stock is crucial in running operations of the business. Organizations allocate resources for their activities. To achieve business's objectives, organizations have to acquire, allocate and control both material and financial resources. Inventory management as one of the key activities of business functions, has always been a major preoccupation for the company's growth and survival.

Inventory management is concerned basically with planning and control of materials. There must be a store, where to buy, when to buy, and how much to buy to control materials. The purpose of inventory management is to ensure uninterrupted supply of inventory at lowest possible cost for ongoing operation of business. Management has compare different cost components such as cost of supplying inventory, inventory holding costs, and costs resulting from insufficient inventory when making decision on inventory.(Hugo, Badenhorst-weiss, and Van Rooyen 2002:169)

According to Wild (2002:4), inventory management is key activity which organizes the availabilities of material for the smooth ongoing operation. It coordinates purchasing, manufacturing, storing and distribution functions to meet the marketing needs and customer satisfaction. This role includes the supply of new products consumables; spare parts, obsolescent items, and all other items that help to have satisfactory operation to customers. Inventory enables a company to support customer satisfaction by making the operation with high quality. Clodfelter (2003:279) adds that a good inventory management system offers the following benefits:

1. The proper relation between operation and inventory management can better be maintained. Without proper inventory management procedures in place, the warehouse can be overstocked or under stocked.
2. Inventory management systems provide with information needed to take markdowns by identifying slow moving items, key items, obsolete materials, and fast moving items. If an organization has full information regarding these issues, the organization can get chance to make necessary adjustment and make the operation smoother.

Inventory is one major area of logistics that has received a great deal of management attention. Management should realize that holding excessive inventory is simply too expensive. Therefore, a great deal of effort has been expended to eliminate unnecessary stock without affection the ongoing operation. Management's goal should be to hold only what is necessary to satisfy customer requirements and manage it effectively' (Gourdin 2001:82)

Inventory management problems preoccupy profit making organization and nonprofit institutions as well. Inventory management has often meant too much inventory and too little management or too little inventory and too much management. Inventories were common to electricity supply companies, agriculture, manufacturing, wholesalers, hospitals, churches, prisons, universities, governments etc. This indicates how inventories and their management were important and deserve a serious attention in order to achieve organizational objective.

1.2 Background to Ethiopian Electric Utility (EEU)

According to EEU's website/corporation history, Electric Power was introduced to Ethiopian during Minilik in the late 19th Century. Around the year 1898 the first power generator was installed to provide electric power to the palace. In addition to the diesel power generator, the first water power generation plant namely Aba samuel was constructed on the Akaki river in the year 1912 by Minilik to supply electric power to major roads & the public around the palace and small factories. (www.eepco.gov.et, public relation)

The effort of the government to expand the electric power supply to the public was hindered because of the Italian invasion of our country in the year 1936. The Italian company called Coneil overtook the diesel generator and distribution system that was owned by the

government. In the year 1941 a public organization called Enemy property Administration was established and retook all the generation and distribution system of the electric power in the country. (www.eepco.gov.et, public relation)

Shewa Electric Power was replace the former company in the year 1948 and managed to increase power supply to other administrative regions in addition to Shewa. In order to represent the country as a whole, Shewa Electric was replaced by in the year 1955 and Board of Directors was appointed by the government to supervise the company. Then after the Ethiopian Electric Light and Power Authority (EELPA) was established after eight months age of the Ethiopian Electric light and Power with ten thousand dollars capital divided in to one thousand share of per value. (www.eepco.gov.et, public relation)

The purpose of the change in name was the new company to engage in the business of production, transmitting, disturbing and selling of electric energy (which was also the major thematic areas the Ethiopian Electric Power Corporation up to last year) to the public of Ethiopia and carry on any other lawful business. Board of Directors was assigned by the government and its electric power production capacity was 35 GWH with 12500 customers.

In order to accommodate the new changes in the environment, by regulation No. 18/1997, the Ethiopian Electric light and Power Authority was transformed to the Ethiopian Electric Power Corporation (EEPCo) by reorganizing its functions in order to accommodate new environmental changes. The purpose of EEPCo was to reorganize the former authority on the principles of commercialization and decentralization. (www.eepco.gov.et, public relation)

After serving for year, in 2014, the Ethiopian Electric Power Corporation is divided in to two separate companies namely; The Ethiopian Electric Utility and The Ethiopian Electric Power. This study focuses on the Ethiopian Electric Utility because all the customers were getting service from this company.

The current annual electricity production capacity of the utility is about 2400 MW and the number of customers is more than 1.3 million. Although the utility has been increasing the number of customers by more than 20% annually, this does not mean that the utility has met the demand for electric power. The utility has a plan to increase the power generation capacity to 10000 MW by 2017. To achieve this plan, the government is constructing mega hydro, wind

and geothermal electric power generation plants in different parts of the country.

The new management of the utility has set standards for new customers to supply power. The standard to serve new customer of single phase is one month and high voltage six months. Even though there was standard for resupplying of power for those customers who faced power interruption due to different reason, the new Indian management didn't mentioned in the new procedure. There were a significant number of customers on waiting list. The period covers from 26/09/2001 EC to 30/12/2006 EC and most of the customers were domestic/residential customers. This means there were customers on waiting list for more than five years to get electric power. The waiting list doesn't incorporate 9 service centers of south Addis Ababa region and big customers. In Addis Ababa city there were more than 7,724 domestic customers on waiting list and Birr 14,132,452.00 is collected from 4432 customers. Had it been the information regarding the customers on waiting list and cash collected is complete, it is easy how the issue is significant.

The main reasons for the waiting list mentioned on the remark column were shortage of electric wires, cables, pole, KWH meter and transformer.

1.3 Problem statement

These days there is frequent power interruption throughout the country and in Addis Ababa in particular. Since the problem is becoming severe in the country, the Federal Democratic Republic of Ethiopia's president officially presented the challenge to the parliament during his opening speech of the 2007 E.C parliamentary session. Moreover, our daily experience shows that there is client dissatisfaction relating to EEU's service delivery. For instance, there is long waiting list of new connection request. Furthermore, it is not uncommon to hear the frequent complaints of citizens and organization through different FM radios due to the recurrent power interruption and delays in maintenances as well.

Though the problem is this much serious, the major factors contributing for the problem were not properly identified. That was why; the researcher wanted to see if lack of proper inventory management by EEU had a contribution for the existence of the mentioned problem having the following objectives in mind.

1.4 Research Objectives

The main objective of this study is to find out whether inventory management is one of the determinant factors for quality services, strength of the operations, and recommend possible solutions. The specific objectives of this study were:

- To assess the inventory management practices and the level of attention given to it in EEU
- To attest whether poor inventory management system is one of the contributing factors of poor electric power service provision or not
- To assess how the inventory management affects operation and whether it gives room for unethical practices.
- To assess how the inventory management practices is affecting not to meet standards set forth and the satisfaction of new and existing customers 'needs(if any)
- To evaluate the level of management awareness about material shortage and customer dissatisfaction
- To investigate whether clear channel of command is set for effective inventory management or not
- To come up with research and literature recommendations in order to improve the inventory management system of the utility

1.5 Research questions

The basic purpose of inventory management in electric service providing companies is to specify

- What does the inventory management practices and the level of management attention seems in EEU?
- Is inventory management system contributing factors for poor electric power service provision?
- What were the factors that affecting the inventory management and were there any unethical practices?

- How the material management is affecting operations standards for customer service?
- Is the management aware about material shortage and existing customer dissatisfaction?
- Is there clear channel of command inventory management?

1.6 Significance of the Study

Despite all the efforts made by the government to increase power generation and supplies, frequency of power interruptions and customers' dissatisfactions that were observed from long waiting lists has remained a challenge regardless of changes in management and organizational re-structuring. There is limited to no evidences as to whether these problems were attributable to inventory management practices or not. Therefore, this study is vital in generating and filling evidence gaps that serve as inputs for management of EEU to improve the operations there by citizens and organizations were gotten satisfactory electric power supply which helps them contribute for their nation's development.

1.7 Scope of the Study

There were Fifteen (15) regions in EEU. Due to time and resource limitation, the study is limited to four regions located in Addis Ababa city. The study is delimited to distribution operation and electric service in Addis Ababa city. There were 48 service centers under the four regions in Addis Ababa and the 15 of them were sampled for this study.

1.8 Limitation of the Study

This study was not going to cover all aspects of the electric utility. Therefore the findings were not being generalized to the operations as a whole because operation includes power generation, transmission, distribution and electricity sales. The study didn't cover other factors that contribute to power interruption and customer dissatisfaction. The study is limited to role of inventory management to distribution part operations of the utility.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

Under this sub section, literatures and theories related to the inventory management have been reviewed.

2.1 Definition and Purpose of inventory

Inventory management is defined as a science based art of ensuring that just enough inventory stock is held by an organization to meet demand (Coleman, 2000; Jay & Barry, 2006).). Inventory is the availability of any stock or resources at right quantity and quality used in an organization. An inventory management system is the set of policies that controls and monitors inventory level and determine what level should be maintained, how large orders should be made and when stock should be replenished so as to support the operation of the business. (Miller, 2010).

The availability of materials whenever and wherever required activities were essential for the procurement, storage, sales, disposal or use of material can be referred to as inventory management. Individual responsible for inventory management have to know the space they have for storage and provide information when materials reach at their minimum level and utilize available storage space resourcefully, so that available storage space is not exceeded. They have to assist the organization to decide what quantity to order, how to order and when to order so that stock is available on time and at the optimum cost (Benedict and Margeridis,1999). Inventory management involves planning, organizing and controlling the flow of materials from their initial purchase unit through internal operations to the service point through distribution (Smaros, et al., 2003).Inventory constitutes one of the largest and most tangible investments of any organization which also decides their success in operation.

Inventory plays a decisive role in the growth and survival of an organization in the sense that failure to an effective and efficient management of inventory was mean that the organization was fail to meet its objectives. Customer desire has always been a vital issue in accompany not only to maintain sales but also to survive as a company. (Goldsby, 2003). Kotler (2002), points that

Inventory management refers to all the activities and organizations involved in maintaining inventory for their operation so that adequate supplies were available and the costs of over or under stocks were low.

Inventory management is required at different locations within multiple locations to protect the regular and planned course of operation against the random disturbance of running out of materials. The scope of inventory management covers replenishment lead time, carrying costs of inventory, inventory forecasting, inventory valuation, inventory visibility, future inventory pricing, physical inventory, available physical space for inventory, quality management, replenishment, and returns. Balancing these competing requirements leads to good inventory management system, which is an on-going process as the business needs shift and react to the wider environment (Ghosh and Kumar, 2003).

All organizations keep a supply of inventory for the following reasons:

1. To maintain independence of operations. A supply of materials at a lost work center allows that flexibility in operation inventory allows management to reduce the number of setups.

The time that it takes to do identical operations will naturally vary from work unit to work unit.

The sum total performance of an organization is the collective performance of workstation located at different localities or units. Therefore, to meet business goal, effective and efficient inventory management at all work station is crucial.

2. To meet variation in product demand. If the demand for the product or service is known precisely, it may be possible to provide services exactly to meet the demand.

But demand is not completely known because we can't have full information about customers, and a safety or buffer stock must be maintained to absorb variation.

3. To allow flexibility in service provision scheduling. A stock of inventory relieves the pressure on the service provision to get the goods out. This leads to longer lead times, which permit service planning for smoother flow and lower cost operation through larger lot size production.

4. To provide a safeguard for variation in inventory delivery time. When material is ordered from a vendor, delays can occur for a variety of reasons: a normal variation in shipping time, a shortage of material at the vendor's plant causing backlogs, an unexpected strike at the vendor's plant or at one of the shipping companies, a lost order, or a shipment of incorrect or defective material.

5. To take advantage of economic purchase order size. There were costs to purchase materials. The larger each order is the lower ordering cost of the materials because of the bulk purchase. Organization has to decide the quantity and time to procure materials economically. Materials

have to purchase by comparing the ordering and storing costs. The most economical point where materials to be procured is at the lowest cost of storage and order cost.

Inventory Management plays a decisive role in the enhancement of efficiency and competitiveness of business enterprises. There is increased need for organizations to in place effective inventory management practices as a strategy to improve their quality of business operation.(Rajeev, 2008). Effective inventory management system means holding an appropriate quantity of inventory with better quality. Too much inventory consumes unnecessarily our limited space, creates a financial burden, and increases the possibility of materials to be obsolete. Too little quantity of inventory often disrupts business operations, and increases the likelihood of poor customer service (Dimitrios, 2008).

Wise inventory management requires the analysis of the costs of maintaining certain levels of inventory as there were costs involved in holding too much stock. There were also costs involved in holding too little hence the need to put in place an effective stock management system to ensure reliable business operation (Atrill, 2006). The Economic Order Quantity (EOQ) model is very important for determining the optimal inventory level that takes into account the inventory carrying costs, stock-out costs and total costs which were helpful in the determination of the appropriate inventory levels to hold. (Ross et al. 2008). Large organization rely on quantitative and computer program to get more information on their inventory management but small firms make use of management judgment without quantitative or computerized systems for decision making on inventory.

Just-in-time inventory management techniques were increasing in popularity, as were automated time-phased inventory re-order system. Some inventory management practices such as assessing inventory levels and balancing stock-out costs against expenses related to higher inventory levels were seldom used in practice (Romano, 2011).

Maintaining optimal inventory levels reduces the cost of possible interruptions or of loss of business because of scarcity of inventory, reduces supply costs, and protects from customer dissatisfaction. The inventory conversion period has a negative effect on a business's performance. Shortening the inventory conversion period could increase stock out costs of inventory which results in losing sales opportunities and leads to poor performance (Deloof, 2003). The importance of firms keeping their inventory at an optimum level by analyzing the

relationship between working capital management and corporate profitability will lead to excessive tying up of capital at the expense of profitable operations.

Inventory management has impact on demand and supply of products, buffer stock to cover for supply uncertainty and lead time. The quantity of inventory ordered at particular intervals does affect the replenishment intervals. (Sander et al. 2010)

Gruen&Corsten (2007) indicated that, stock-outs have serious implications for businesses and they affect consumers, retailers, and manufacturers. Consumer purchase behaviors, such as product replacement, delayed purchase, or not making a purchase sometimes result from such events. Zinn& Liu (2008) suggest that when organizations faced with a stock-out, a consumer search for a substitute product if they have alternatives. Once customer lost, the consumer may be lost forever, resulting in a negative impact on the long-term built good will of the organization. Even a loyal consumer may visit another firm to find the desired product, a situation that may result into loyalty switching. Repeated stock outs negatively affect not only manufacturers but retailers through the loss of customers and employee time.

Scholars like (Basuroy, S., Mantrala, M., and Walters, G. (2001). Suggest that to reduce stock outs and improve performance, businesses should employ effective inventory management practices and automatic replenishment programs.

On effective inventory management on the performance of businesses, Sushma & Phubesh (2007) in their study established that businesses' inventory management policies had a role to play in their profitability performance. Mismanagement of inventory will lead to tying up excess capital at the expense of profitable operations and suggested that managers can create value for their firms by keeping inventory to an optimum level.

Effective inventory management processes helps increase operational efficiency of firms; improves customer service; reduces inventory and distribution costs; and enables businesses track items and their expiration dates consequently balance between availability and demand (Pandey, 2004).

2.2 Objectives of Inventory Management

The main objective of a good inventory management is to place an order at the right time from the right source with the right quantity and quality. While developing an appropriate inventory management system of inventory the following objectives should be kept in mind:

- Organizations should try to minimize the possibility inventory obsolescence by giving due attention during procurement of materials. Besides materials storage, distribution and usage should be appropriate to avoid shrinkage or obsolescence of the materials.
- A firm should maintain inventory to such a level that smooth and unhampered service provision is ensured without any obstruction.
- Investment in inventory should be kept at minimum so that undue amount is not locked up in it as investment in inventories involves costs.
- A firm should maintain sufficient amount of inventory to meet the demand of customers regularly because if not done customers may shift to the competitors, which will result in permanent loss to the firm.

So it is essential to have necessary inventories which were sufficient to the operation of the organization. Excessive inventory is an idle resource on which resource is tied up rather than investing on other better alternative. The investment in inventories should be just sufficient in the optimum level. The major dangers of excessive inventories were:

- High customer dissatisfaction and failure of operation
- The unnecessary tie up of the firm's funds and loss of profit.
- Excessive carrying cost, and
- The risk of liquidity.

The excessive level of inventories consumes the scarce funds of business, which cannot be used for any other purpose and thus involves an opportunity cost. The carrying cost of inventory, such as the cost of shortage, handling insurance, recording and inspection, were also increased in proportion to the volume of inventories.

The low level of inventories may result in frequent interruptions in the production or service provision schedule resulting in under-utilization of capacity and poor operation that leads to customer dissatisfaction. The aim of inventory management thus should be to avoid excessive inventory and inadequate inventory and to maintain adequate inventory for smooth running of

the business operations. Efforts should be made to place orders at the right time with the right source to purchase the right quantity at the right price and quality for the operations of the organization.

2.3 Demand management

Demand for inventory generates forecasts based on sales history, currently scheduled orders, scheduled marketing activities and customer information (Veinott 1966). Demand of inventory should be done collaboratively and interactively both internally across the firm's functional components and externally with supply chain partners to develop a common and consistent forecast.

The forecast must also incorporate feedback from customers to integrate the influence of combined demand generation activities because unless the customers were satisfied the inventory demand forecast is meaningless.

Practically, inventory demand management and forecasting were closely related, and forecasting is an extensive topic in itself (Bowersox et al., 2002).

2.4 Stock Control

2.4.1 Introduction

Stock control is defined as the means by which materials of the correct quantity and quality were made available at the time when they were required, with due regard to economy in storage and ordering costs, purchase prices and working capitals.

The modern stores management has a wide variety of functions that they have to perform as efficiently as possible. The way in which stores management carries out these tasks will be reflected in the overall efficiency of the organization because it is key supporter to the operation. The Primary concern in the management of stock control must be to provide the right goods in the right condition at the right price in the right place at the right time.

The control procedure of inventory should:-

- Safeguard stock against loss, obsolescence or misuse
- Maintain stock at appropriate level of quantity.
- Ensure that the inventory of the organization is properly used for business operations

- Ensure that the inventory is duly accounted for purchasing and controlling purpose depending on individual organization.

2.4.2 Reasons for Holding Stock

Every organization has warehouse for its inventory since in contrary the quantity of inventory organizations need, they need inventory to run their business. Generally, organization hold inventory in their stores for one or more of the following reasons :-(Marrison, P. 100-101)

- Operational risks or possible charges in program require the holding of stock as a precaution against serious breakdown or interruption of production or other activities.
- Delivery of inventory may not be exactly matched with usage day by day.
- Discounts or improved prices for bulk purchases more than offset the cost of storage.
- The cost of storage is outweighed by the saving in production of quantities in excess of immediate requirement.

The common factor in every stock management is that stock serves to bridge operation of an organization with customer service.

The two possible reasons exist for this bridging operation of inventory:-

- (a) Stocks were held because time is required to the procurement process or move inventory from store to store or from store to operation sites.
- (b) Stocks were required for organizational work units to schedule their working responsibilities independently. The work units may locate indifferent geographical areas and their operation should be bridged by the stock.

Inventory control is concerned with the acquisition, storage, handling and use of inventories so as to ensure the availability of inventory whenever needed, providing adequate provision for contingencies, deriving maximum economy and minimizing wastage and losses.

Inventory control ensures that the supply of required quantity and quality of inventory at the required time and at the same time prevent unnecessary investment in inventories.

Inventory control is one of the most vital phases of material management. Reducing inventories without impairing operating efficiency frees working capital that can be effectively employed

elsewhere. Inventory control can move a company ahead or return back by breaking its operations.

A sound inventory control system is in a large measure for balancing operations. It is the focal point of many seemingly conflicting interests and considerations both short range and long range because too much or too little inventory affects negatively the operation of an organization.

The aim of a sound inventory control system is to secure the best balance between “too much and too little.” Too much inventory carries financial rises and too little reacts adversely on improved continuity operation of an entity. The real problem is not the reduction of the size of the inventory as a whole but to secure a scientifically determined balance between several items that make up the inventory.

The efficiency of inventory control affects the flexibility of the firm in either direction. Insufficient procedures may result in an unbalanced inventory. Some items out of stock, other overstocked, necessitating excessive investment which could hamper the operation. These inefficiencies ultimately will have adverse effects upon profits and by large customer satisfaction. Turning the situation round, difference in the efficiency of the inventory control for a given level of flexibility affects the level of investment required in inventory. The less efficient is the inventory control, the greater is the investment required. Excessive investment in inventories increase cost and reduces profits.

Control of inventory is exercised by introducing various measures of inventory control by companies, such as ABC analysis, JIT, fixation of norms of inventory holdings and reorder point and a close watch on the movements of inventories.

2.5 Inventory Costs

2.5.1 Inventory Carrying Cost

According to Douglas M. Lambert there were four major components of inventory carrying cost: capital cost, storage space cost, inventory service cost, and inventory risk cost.

1. Capital Cost. Also sometimes called the interest or opportunity cost which type focuses upon what having capital tied up in inventory. The capital cost is frequently the largest component of inventory carrying cost. A company usually expresses it as a percentage of the value of the

inventory the company holds. All companies seek to reduce inventory because management recognizes that holding excessive inventory provides no value added to the firm's operations.

2. Storage Space Cost. This cost category incorporates handling costs associated with moving products into and out of inventory, and storage costs such as rent, heating, and lighting. Such costs may vary considerably from one circumstance to the next.

3. Inventory Service Cost. This carrying cost component includes insurance and taxes. Depending upon the product value and type, the risk of loss or damage may require high insurance premiums. In most cases, there will be few, if any; significant changes from year to year in the tax and insurance components of the inventory carrying cost such as marine or inland insurance.

4. Inventory Risk Cost. This major component of inventory carrying cost reflects the very real possibility that inventory value may decline for reasons largely beyond corporate control. The inventory risk costs most of the time were due to management problem and includes the costs associated with obsolescence, pilferage, damage, theft, and other risks to inventoried product.

2.5.2 Order/Setup Cost

The other inventory cost affecting total inventory cost is ordering cost or setup cost. Ordering cost refers to the expense of placing an order for additional inventory to the company, and does not include the cost or expense of the product itself. Setup cost refers more specifically to the expense of changing or modifying a production or assembly process to facilitate product line changes. Following some the inventory order costs.

Order cost. The costs associated with ordering or acquiring inventory have both fixed and variable components (Parlar 2000). Cost of the information system, facilities, and technology available to facilitate order placement activities can be considered as part of fixed order costs. The fixed order cost will remains constant in relation to the number of orders placed.

There were also a number variable order costs that vary in relation to the number of orders that were placed for more inventories. Some of such variable costs include reviewing inventory stock levels; Preparing and processing order requisitions or purchase orders; Preparing and processing receiving reports; Checking and inspecting stock prior to placement in inventory and preparing and processing payment.

Setup Cost. Production setup costs may be more obvious than ordering or acquisition costs. Setup costs were expenses incurred each time a firm modifies a production line to produce a different item for inventory. The set up cost has both fixed and variable cost components. The fixed portion of setup cost might include use of the capital equipment needed to change over production facilities, while the variable expense might include the personnel costs incurred in the process of modifying or changing the production line.

2.6 Inventories Control Techniques

2.6.1 ABC Analysis of Inventories

The ABC inventory control technique is based on small part of an organization's inventory could take a lion share of the total inventory, while a relatively large number of items may from a small part of the money value of stores. The money value is ascertained by multiplying the quantity of material of each item by its unit price.

The segregation of inventory into value/volume group enables management to allocate their resources in relation to relevant group as to minimize the impact on total cost. Since companies invest most of their fund on high value item, this approach recommends high value items were more closely controlled than low value items. Each item of inventory is given A, B or C denomination depending upon the amount spent for that particular item. "A" or the highest value items should be under the tight control and under responsibility of the most experienced store personnel, while "C" or the lowest value may be under simple physical control because if high control is in place it may be more than their investment cost.

The following example could make the issue more clear:

"A" Category – 5% to 10% of the items represent 70% to 75% of the money value.

"B" Category – 15% to 20% of the items represent 15% to 20% of the money.

"C" Category – The remaining number of the items represent 5% to 10% of the money value.

The relative position of these items show that items of category A should be under the maximum control, items of category B may not be given that much attention and item C may be under a loose control.

2.6.2 Advantages of ABC Analysis

1. It ensures a closer and a more strict control over such items, which were having a sizable investment.
2. It helps management to in planning its inventory need
3. It releases working capital, which would otherwise have been locked up for a more profitable channel of investment.
4. It reduces inventory-carrying cost.
5. It enables the relaxation of control for the 'C' items and thus makes it possible for a sufficient buffer stock to be created.
6. It enables the maintenance of high inventory turnover rate.

CHAPTER THREE: RESEARCH METHODOLOGY

This study was basically explanatory. Under this topic, a brief explanation about how the desired information was collected, analyzed and interpreted was explained. The Research methodology included the collection of data both from primary and secondary sources. The sources were basically included questionnaire, the review of reference materials, brochures and policy & procedures. The collected qualitative data were analyzed using simple descriptive statistics like percentages and graphs. The qualitative data which were gathered from Focus Group Discussion (FGD) and key informative Interview (KII) was interpreted qualitatively. The interpretation and discussion were made together. Finally, based on the outcome of the analysis, there was a summary conclusion and recommendation.

3.1 Research Design and Approach

The general objective of this research was to assess the extent to which the inventory management practices impacted the operation of the utility and how the management was implementing the inventory management. Therefore, so as to meet this objective properly, both qualitative and quantitative approaches were used. During the qualitative study (a case study approach), deep information about applications of inventory management was gathered from key informants. On top of that, quantitative data were gathered from employees to supplement the quantitative data through Focus Group Discussion of service center employees.

3.2 Target Population, Sample and Sampling Procedure

Under this sub topic issues in line with target population, sample and sampling procedures were explained one by one

3.2.1 Target population

The target population was all employees and management members of the research sites 15(service centers of EEU in Addis Ababa). It was to mean that the target population of the study was the 100 permanent management and non-management staffs who were working in the Addis Ababa regions of Ethiopian Electric Utility (EEU).

3.2.2 Sample size and Sampling Procedures

The sample of the study was 100 respondent employees who were selected expected to fill questionnaires. Out of 200 staff members who have connection with inventory management, 100 were selected using availability, experience of the EEU systems, and professional mix (convenient sampling) sampling to fill the questionnaire as the numbers of the population possessing the required characteristics were small in number.

3.2.3 Method and Instruments of data collection

The methods of data collection for this study included survey, four focus group discussions (FGD), key informant interviews (KIIs) with one senior management member and document review. The data collection instruments were questionnaire, interview guide, FGD guide, and document analysis guide.

Since each instrument had its own exclusive importance, questionnaire was selected to be filled by the sampled employees of the utility. Questionnaires were distributed to all 100 employees in the sampled service centers of the Addis Ababa regions in order to assess their view as to how inventory management affected the operations and customer satisfaction.

In addition to the questionnaires, FGD, document review and KIIs were held to cross validate findings. The FGD was selected one from the four regions where most of the employees were at office during the visit and covered topics that might introduce personal bias while the KII was addressed some sensitive items that might not be discussed in groups. Document review was also enrich both the qualitative and quantitative data to be collected through other the other instruments

3.2.4 Methods of Data analysis

This chapter presented the output of data analysis. The presentations were in form of tables, charts, and texts. The data analysis of this study was done from both qualitative and quantitative standpoint for the purpose of achieving the objective of the study. The presentation was according to the objectives of the study. The analysis below was done based on returned questionnaires distributed to respondents.

The background information of respondents was deemed necessary because the ability of the respondents to give satisfactory information on the study variables greatly depends on their background. The background information of respondents solicited data on the samples and this has been presented below categorized into; gender, education levels, work unit, age and length of service years in the organization.

For the quantitative data, SPSS software was applied and simple descriptive statistics such as percentage, charts, graphs etc was used to analyze such data. On the other hand, qualitative data was analyzed using content analysis technique. Content analysis was the process of extracting desired information from a text by systematically and objectively identifying specified characteristic of the text (Smith, 2000 in Hoyle et al. 2002).

More specifically, analysis of qualitative data was followed the following procedures recommended by Cresswell (2003):

- The data was read a number of times to identify points that were significant for the study
- Thematic contents was formulated based on the major project questions
- List out the emerging theme titles on a separate sheet in to find connection between them.
- A master list of themes were produced and ordered coherently. The relevant information was organized under each theme and was analyzed.

3.2.4 Reliability

It involves the extent to which we were measuring some attribute in a repeatable way (Betz and Walish, 1995). Among other factors, reliability of case study research appears to be affected seriously by the researchers' bias and by interviewees' response without proper understanding of the questions (Hoyle, et. al. 2002). While the researcher's bias might be inevitable, in this research maximum effort has been made to avoid all these and other problems. For example, the researcher was tried to put clear instructions at the beginning and be sure that all questions were answered based on proper understanding of respondents. Moreover, ethical considerations including anonymity were helpful in this regard.

3.2.5 Validity

It referred the extent to which the data actually measured the specific phenomenon that we were claiming to study. So in this study, the researcher tried to secure validity by precisely defining major concepts, matching the items to the research questions, triangulating data sources, etc.

3.2.6 Ethical issues

Ethics as applied to research generally refer to considerations to protect and respect the rights of participants and other parties associated with the activity (Reynolds, 1982). Similarly, ethical issues of this research had been given special attention starting from problem identification up to interpretation stage using the ethical guide lines specified by Cresswell (2003 pp.93-97). Respondents were informed clearly about the purpose of the study, the right to participate voluntarily, the right to ask questions including personal address of the researcher, the right to get the copy of the study, and the right to have their privacy respected; the right not to respond to question that they didn't want to respond too. On top of these, every necessary care had been taken not to put participants at risk of social, psychological, physical and economic harm. Still, due attention was given to the possibility of harmful information that might be disclosed during data analysis process. The last but not least, the researcher was dreadfully careful about duly acknowledging all materials and sources of data used in this research.

CHAPTER FOUR: FINDING AND DISCUSSIONS

4.1 Background of respondents

4.1.1 Introduction

The background information of respondents was deemed necessary because the ability of the respondents to give satisfactory information on the study greatly depends on their background. Thus, the background information of respondents were categorized into gender, education levels, work unit, age and length of service in the organization and presented as follow.

4.1.2 Gender characteristics of respondents

The study examines and describes the gender details of respondents and displayed in table 1 below. The electric service provision may be affected by the gender of employees due the nature of the work. The gender composition might have an impact on the inventory management and operation of the utility and that is why it is important to see the gender characteristics of the utility. The gender composition might have an impact on ethical behavior of employees when managing inventory.

Table 1: Gender character

	Frequency	Valid Percent
Female	35	39.8
Male	53	60.2
Total	88	100.0

Source: primary data

The above table shows that 60.2% of the respondents were males and 39.8% were female. This may indicate that there were still low levels of employment of females in the company. This was necessary for the study to get a balanced picture of the respondents' views regarding inventory management practices of the utility.

4.1.3 Marital Status of the respondents

The study examines the marital states of respondents and it has been presented in table2 below. The researcher wants to study about the marital status of employees as most married people were not interested to work on holidays as well as weekends which obviously affect the quality of services. The marital status of employees may have physical or physiological stress and this may affect the quality of service. Besides the marital status could have effect on the ethical behavior of employees.

Table 2: marital status of respondents

	Frequency	Valid Percent
Single	30	34.1
Married	58	65.9
Total	88	100.0

Source: primary data

Table 2 reveals that 65.9% of the respondents were married and the rest 34.1% were single. This indicated that more employees of the utility were married. And unless the organization is systematic to motivate these employees, they may not be happy to work on different holidays as well as weekends though the nature of the work demands it.

4.1.4 Description of age groups of respondents

The study obtained details about the age groups of the respondents for purposes of understanding their age and possibly the experience they possess in their respective positions. Details of the findings were shown in table 3 below. Employees' attitude towards corruption and commitment may be affected by their age. To provide quality service to customers, ethics is very important. Age is included in the study to assess if most of the employees were under the category of the productive age or not.

Table 3: Age group of respondents

	Frequency	Valid Percent
< 21	9	10.2
21-30	20	22.7
31-40	35	39.8
>40	24	27.3
Total	88	100.0

Source: Primary data

The above data shows that more respondents were in the age group between 31-40, followed by 40+, 21-30 and 18-20 in the order of 39.8%, 27.3%, 22.7% and 10.2% respectively. From this we can understand that most of the employees of the utility were under the category of productive age (assuming legally Ethiopian starts work at the age of 18 years).

4.1.5 Work Experience of Employees

The study has investigated the work experience of employees in the utility and the findings were presented in the table below. As we all know, the nature of the work needs caution and commitment to serve customers. On top of this, silly mistake may take life or result in power interruption at the same time unnecessary cost to the utility. To minimize this, employees of the utility need to have sufficient work experience who can proactively understand the nature of the materials and technology.

Table 4: Experience of respondents

	Frequency	Valid Percent
0-5	9	10.2
6-10	28	31.8
11-15	18	20.5
>15	33	37.5
Total	88	100.0

Source: Primary data

The above table shows that a significant number of employees served the utility for more than 15 years (33), followed by 6-10 years (28), 11-15 (18) and up to 5 years (9). This information represents 37.5%, 31.8%, 20.5%, and 10.2% respectively. This could also show that even though the utility is in service for decades, 62.5% of the employees served less than 15 years. This indicates that even if the utility is in service for decades, the employee turnover is high. This resulted in losing of employees who know the inventory management system of the utility.

4.1.6 Work units of respondents in the utility

The study sought and obtained detailed information in the utility about the responsibility of respondents for the purposes of understanding their role in the inventory management.

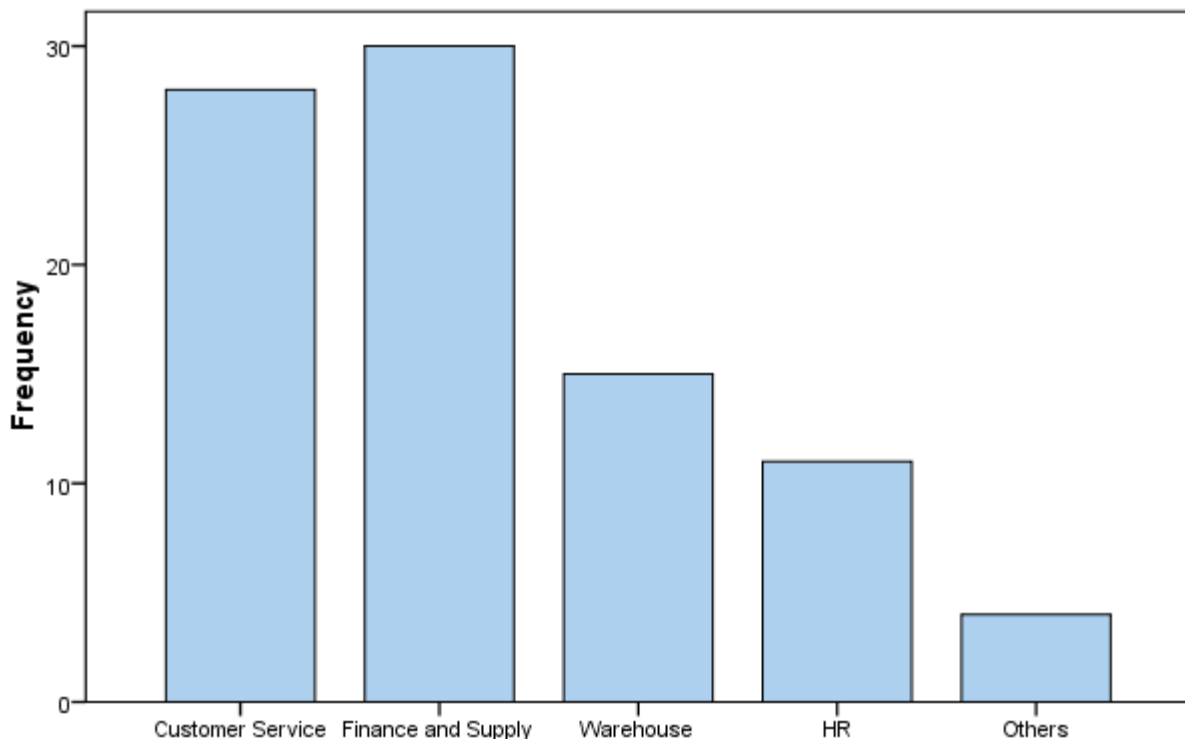


Figure 1: Employees' work units

The above figure reveals that most of the respondents in the study were working in the areas of customer service and Finance & supply work units which represent 31.8% (28) and 34.1% (34) respectively, followed by warehouse 17% (15) and human resource 12.5% (11). Employees who work in other work units like MIS and procurement were 4.5% (4).

It can be revealed from the above description that the majority of the respondents in this study were those directly responsible for the inventory management of the utility.

4.1.7 Educational level of respondents

Details about the education levels of respondents were obtained and the results were revealed in figure2 below;

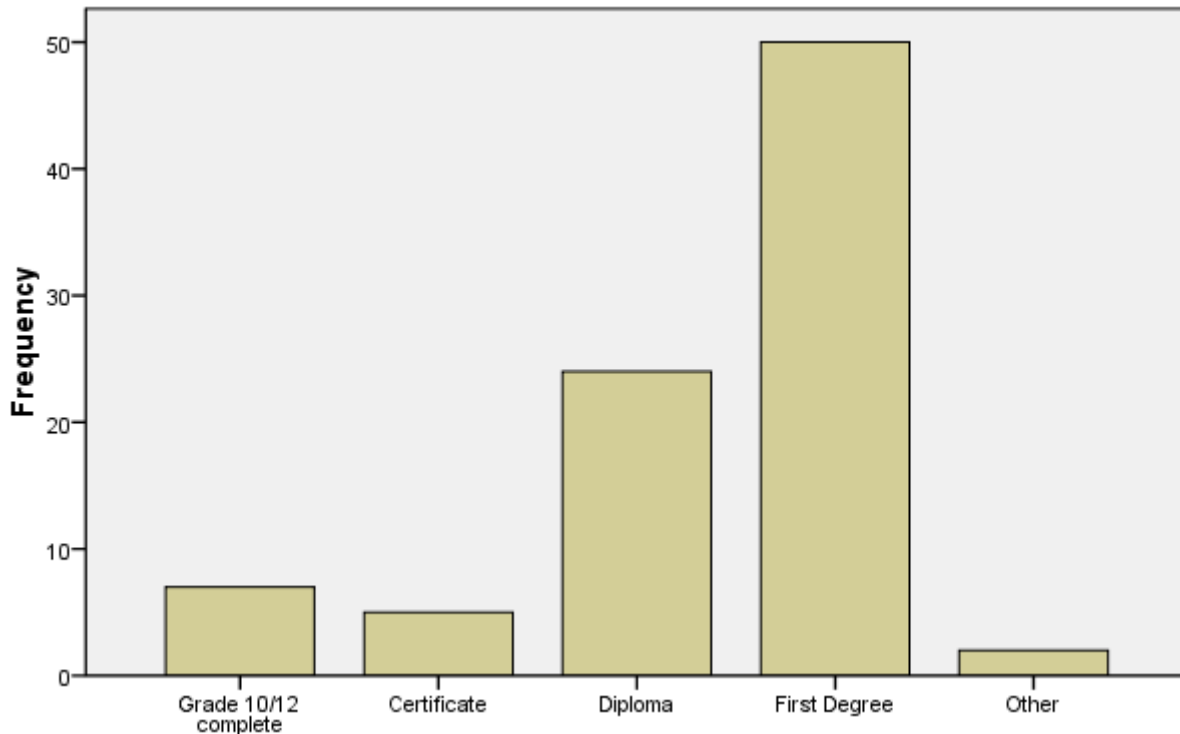


Figure 2: Educational background

The above table shows majority of the employees of the utility were first degree holders followed by diplomas, grade 10/12 complete, masters and certificates in the order 56.8%, 27.3%, 8%, 5.7% and 2.3%. This means that the respondents were adequately qualified persons to manage the operations of the utility properly.

4.2 Inventory Management Challenges and performances

Project objectives were sought to determine factors affecting inventory management, inventory management channel of command and how materials management is affecting operation of the

utility. To address this, the respondents were asked to indicate challenges in inventory management, service provision expectation, inventory management improvement and chain of command in inventory management of the utility. The results were showed below.

Table 5: Inventory management challenges and practices

Item	Yes	No	Total
Challenges in inventory management process	70	18	88
Service provision Expectation	72	16	88
Inventory Management improvement	22	66	88
Chain of Command in inventory Management	59	29	88

Source: Primary data

4.2.1 Challenges in inventory management

Table 5 illustrates that 80% (70) of the respondents replied that the utility has faced challenges in inventory management and this was affecting the operation of the company.

4.2.2 Service provision Expectation

In regard to the utility's ability to meet its service provision expectation, the respondents seem to think that the utility is providing services below expectation of the employees and customers. Table 5 showed that 82% (72) respondents think that the utility is providing service below expectation and this is a major source of customer dissatisfaction. They had given open ended question and strengthen this idea by providing the following reasons:

- customer dissatisfaction is high,
- No sufficient inventory for new & existing customers,
- many customers were on waiting list for a long period of time,
- to manage the inventory no right person at the right place,
- unnecessary inventory wastage by employees,

- high power fluctuation, most of the problems were secrete to customers which were source of complaints,
- standards set to provide service to customers were not adhered,
- policies related to inventory management lacks clarity,
- Substations and power transformers were not upgraded due to mainly material shortage.

4.2.3 Improvement of inventory management system

Table 5 indicates that the inventory management system of the utility doesn't show improvement from time to time. Rather, the respondents think that the inventory management is becoming weaker and weaker in the contrary and failed to meet the expectation. That is why 75% (66) respondents replied that there is no improvement in the inventory management process of the utility. According to the respondents, the utility's failure to improvement is attributed to:

- the inventory supply is less & quality is poor,
- supervisors were not assigned on merit basis,
- there is less commitment at all levels,

4.2.4 Chain of command of inventory management

Table 5 illustrates that the chain of command of the utility is convenient to inventory management. The respondents think that the problem is not related to the chain of command but to implementation. As displayed in the table that, 67% (59) respondents believe that the chain of command of the utility regarding to inventory management is appropriate to the utility but there were other problems. The following ideas were provided by respondents as supplementary information to the aforementioned impression: assignment of unskilled personnel, obsolete materials not disposed on time & mislead balances because they were stocked with the new ones, and less attention given by supervisors.

4.3 Inventory management and practice of EEU

Respondents were given a statement that reads 'the EEU has a minimum and maximum stock level system that alerts the management when to purchase an item' and their level of agreement was sought on a 1 to 5 scale. Accordingly, the chart below presents their level of agreement to this statement.

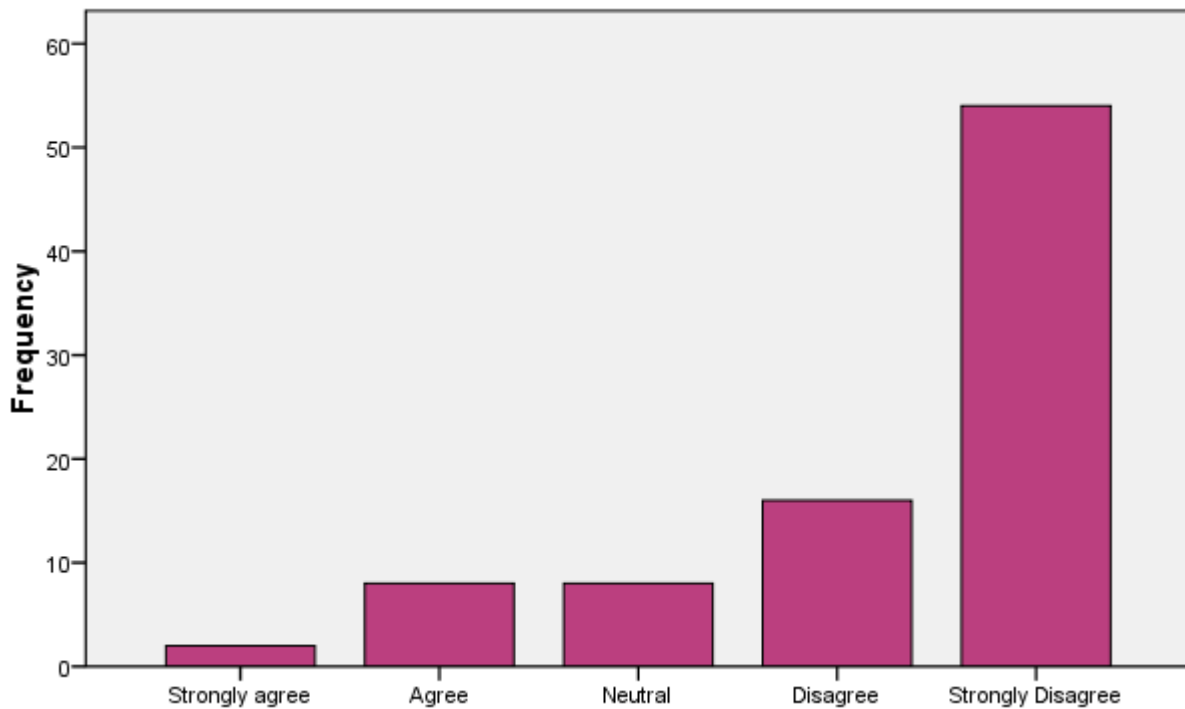


Figure 3: EEU has a minimum and maximum stock level system

As can be seen from the chart, 79.6% (n=88) of the respondents had either disagreed or strongly disagreed to the statement that EEU has stock threshold level indicating that there was practice of using minimum/maximum stock level as a standard of inventory management.

This implies that there were high possibilities of running out of stock. This in turn may lead to long customer waiting list and thereby dissatisfaction.

Moreover, regarding a statement that reads 'EEU has a system that can easily move from stores/work units/regions where materials were in excess to work units/stores/regions where there is shortage' and the level of agreement to the statement by the respondents were summarized in the table below.

Table 6: Inventory movement among work units/sites/warehouses

Level of agreement	Frequency	Valid Percent
Strongly agree	1	1.1
Agree	9	10.2
Neutral	8	9.1
Disagree	25	28.4
Strongly Disagree	45	51.1
Total	88	100.0

As can be seen from the above table, 79.5% (n=88) of the respondents had either disagreed or strongly disagreed to the statement showing that inventory movement between warehouses/work units/sites was difficult or impossible even the service delivery is compromised due to shortage of inventory in the other site. The most common reason given by respondents for the lack of flexibility were: (a) there was misunderstanding among the different work units; (b) bureaucratic system putting bottlenecks in place; (c) due to lack of stock level threshold, staff were not aware of the existence of such materials in their warehouses; and (d) due to fear of untimely stock replenishment, some staff had developed an attitude to reserve materials for their own sites/districts/regions and were unwilling to share.

In a similar way, the respondents were given a statement that reads 'EEU proactively informs its customers when it faces material shortage' and the level of agreement to this statement was summarized in the table below:

Table 7: Customers awareness about material shortage

	Frequency	Valid Percent
Strongly agree	1	1.1
Agree	5	5.7
Neutral	5	5.7
Disagree	22	25.3
Strongly Disagree	54	62.1
Total	87	100.0

From the above table, it is evident that 87.4% of the respondents had disagreed or strongly disagreed. This shows that the EEU has no practice of proactively informing its customers of the service interruptions or delay of new connections due to material shortage. This leads customers not only to be dissatisfied by the EEU services delivery but also to have distorted guesses about the power supplies.

The following narrative show the management is not transparent to customers

“The challenging issue that the utility faced is lack of management transparency to the employees and customers regarding the material shortage”. (Key Informative Interview, KII)

4.4 Inventory management to service standards and practices

A statement that reads ‘The Utility is serving its new customers as per the standards set for new connection and maintenance’ was given to respondents and their responses were summarized using the following diagram

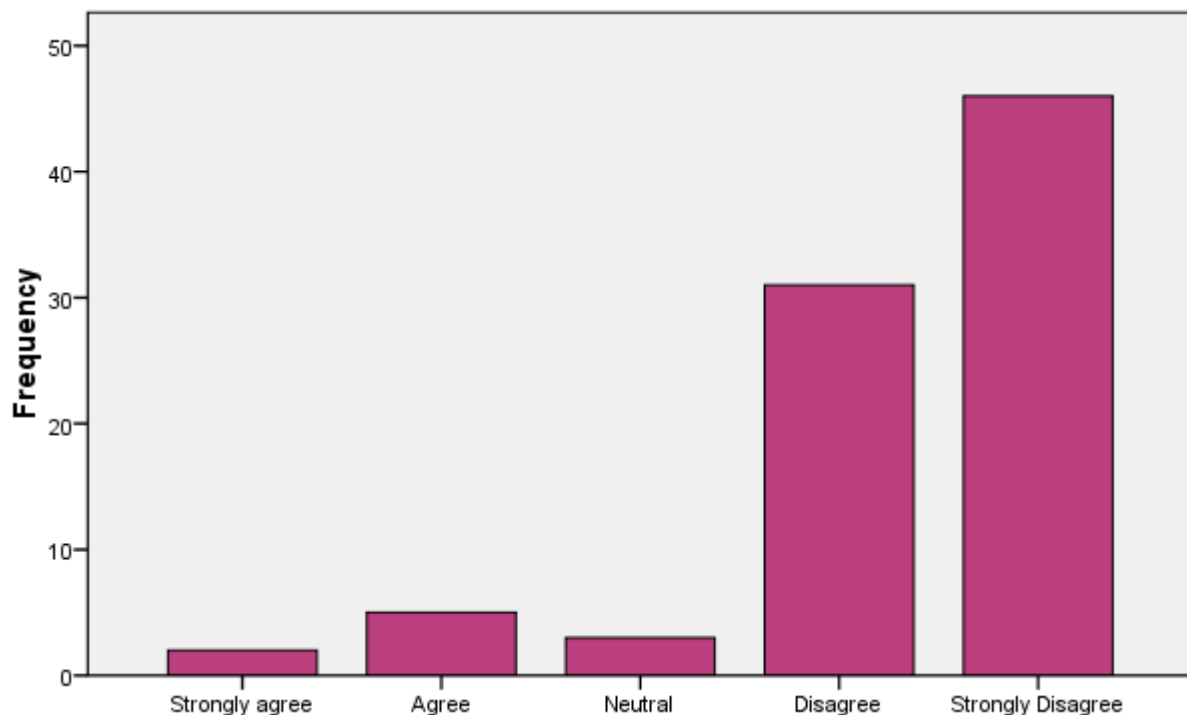


Figure 4: Level of adherence to customer service standards by EEU

As it is illustrated in the above figure, 88.5%, n=88 respondents had disagreed or strongly disagreed to the given statement. This shows that the EEU didn't adhere to the standards set to supply power to new customers and reconnect power interruption. The former corporation (Ethiopian Electric power Corporation) had set standard to provide power to resident customers within less than a week and EEU reset the standard to a month. Since there were more than 7724 customers paid estimation cost requested by the utility but on waiting list due to shortage of materials. Among these, 4,432 customers paid birr 14,132,452.00. The utility collected power connection costs from the customers and failed to supply key materials (Pole, cables, Kw meter, and transformer) to provide power. This resulted in high customer dissatisfaction and most customers to think the case may not be due to material shortage but because of power export or other unknown reasons. This implies that the utility failed to meet standards and its operation is affected significantly due to materials management problems.

More over respondents were given a statement read 'The EEU is adhering to the standard set for customer services' and their responses were summarized in the table below.

Table 8: Service provision standards

	Frequency	Valid Percent
Strongly agree	4	4.6
Agree	10	11.5
Neutral	15	17.2
Disagree	30	34.5
Strongly Disagree	28	32.2
Total	87	100.0

As indicated on the table, only 16.1% (n=88) of the respondents revealed that they agree or strongly agree to the statement. Among the respondents, 66.7% (58) think that the utility is not adhering to the standards set to provide electric power to customers. There were customers waiting to get service for five years and this indicates that there is a huge gap from the standard (one month).

The following quotation from the key informative interview reinforce the above observation

“The utility has standards to provide electric service to new customers within a month after effecting payments. But due to the shortage of materials we have the utility is not adhering to standards and the reports of the service centers show that there were customers on waiting list for more than four years. Even some customers were requesting the utility to refund their cash”. (KII)

4.5 Unethical behaviors in inventory management

Respondents were give a statement read ‘The material shortage that the Utility faced exposed some employs to unethical behavior like corruption ‘and their level of agreement to the statement was summarized in the pie chart below:

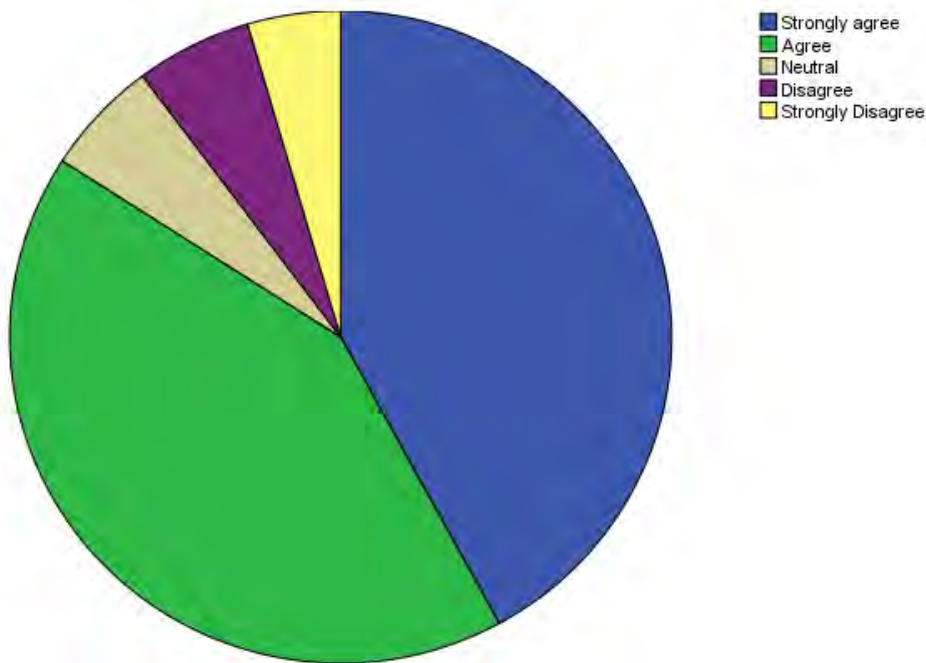


Figure 5: Employees ethical behavior

As shown on the chart, 84%, n=88 of the respondents agreed or strongly agreed to the given statement. This revealed that few employees of the utility might consider the current material shortage as an opportunity to deal corruptive activities with customers. The operation of the utility might be hampered due to unethical behavior few employees of the utility. Corrupted employees might collect money from their clients illegally and bring the required materials from the organization and give the demanded services to the spender needy clients in return to the unlawful payment. This could indicate that corrupted employees were using the organization's materials for their own dishonest activities. On the opinion box, customers suggested that the utility might need to take remedial action because some employees never give service unless the customers give money. Male and unmarried employees deal more for corruptive activities than married and female employees.

The following quotations express similar view about corruptive activities of the employees

"Customers claim that they requested corruption by employees of the utility to get service and some cases were forwarded to ethics & anti-corruption commission. When the utility start to take corrective action, most of the cases become complicated because of linkage with higher management members. Customers claim that an employee of the utility request money for any simple service and this

situation is becoming worse from time to time. Employees were using the current material shortage as an opportunity for their unethical practice”. (KII)

“The customers assume that all employees of the utility were corruptive and no service was provided with the procedures of the utility. The customers were correct because there were corruptive employees who use the current material shortage as a good opportunity but the utility management is unable to take any remedial action”. (FDG)

The respondents were give a statement read as ‘I believe that the management of the EEU doesn’t want to use the local materials because of their personal benefit’ and their agreement to the statement was summarized on the table as follows:

Table 9: Local material utilization

	Frequency	Valid Percent
Strongly agree	15	17.0
Agree	29	33.0
Neutral	21	23.9
Disagree	13	14.8
Strongly Disagree	10	11.4
Total	88	100.0

As illustrated in the table above, 50% (44) of the respondents had agreed or strongly agreed that the management of the utility prefers materials to be procured from abroad for their personal benefit. The other 26.2% of the respondents disagree or strongly disagree to the given statement. The rest 23.9% (21) of the respondents revealed that they were neither of the above. The management could get more room to deal with the supplies regarding their personal benefit. During the local purchase, employees and stakeholders could get more space and therefore the system may be more transparent than foreign procurement. If the materials were procured from local market, most of the supplies were government enterprises and there is no loophole for the

management. This situation could also be obstacle for the self-sufficiency strategy of the country. If the management brings its personal benefit before the utility's and customer interest, it is difficult to solve the current high customer complaints and come back to the standards by minimizing the existing huge new customers on waiting list.

Respondents were given a statement read 'I observed that Service Centers have always reserve materials to some special individual customers (other than legally allowed)' and their responses were summarized in the table as follows:

Table 10: Materials utilization for illegally activities

	Frequency	Valid Percent
Strongly agree	23	26.1
Agree	36	40.9
Neutral	13	14.8
Disagree	7	8.0
Strongly Disagree	9	10.2
Total	88	100.0

As shown in the table, 67%, n=88 respondents agreed or strongly agreed that employees of service reserve inventory illegally to customers. As per the policy of the utility some customers like hospitals should be given priority. The service centers were expected to provide service as per waiting list priority. The respondents revealed that such activities could result in:

- (a) Over estimation new customers to get left over materials
- (b) Increasing customer dissatisfaction because service centers provide service in contrary to waiting list priority
- (c) Unethical activities that could expand to others
- (d) Disappointment of committed employees

- (e) Making more complicated and costly to improve the inventory management of the utility.
- (f) Public distrust and hampers the operations of the utility

Respondents were also given a statement read 'I observe that some employees and management members need to continue the current material shortage' and their level of agreement to the statement were summarized as follows:

Table 11: Futurity of materials shortage

	Frequency	Valid Percent
Strongly agree	20	22.7
Agree	24	27.3
Neutral	14	15.9
Disagree	16	18.2
Strongly Disagree	14	15.9
Total	88	100.0

The table above illustrates that 50%, n= 88 of the respondents agree or strongly disagree to the given statement. Half of the respondents think that some employees and management members need the current material shortage to continue. Among the respondents 34.1% agree or strongly reveal that the employees and management don't need the material shortage to continue. The respondents also added that their interest is to arrange personal benefits. This implies some management and employees of the utility don't worry regarding the customer dissatisfaction and poor operation services of the utility due material shortage.

4.6 Management awareness about material shortage and customer dissatisfaction

A statement read 'I believe that the management has no full information about the shortage of materials because the service centers don't report on time' was given to the respondents and their level of agreement was summarized in the figure follows:

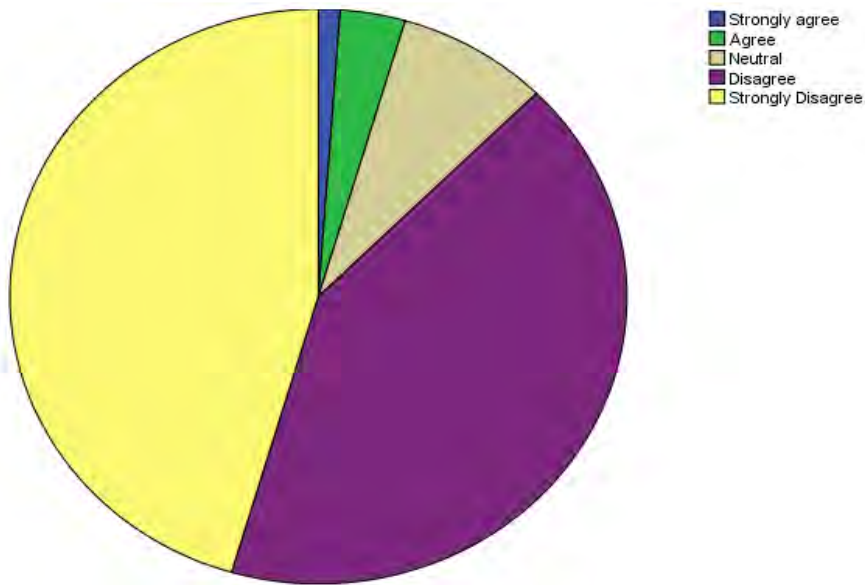


Figure 6: Management awareness to material shortage

The figure indicates that 87.5%, n=88 of the respondents had disagreed or strongly disagreed to the given statement and few respondents (4.5%) agreed or strongly agreed that the management of the utility didn't have full information about the shortage of materials. Most of the respondents think that the management has full information regarding the material shortage.

The management got report regarding customers on waiting list, power interruption status, maintenance and emergency and reason for outstanding activities. The respondents believe that the management has full information about the material shortage and the material shortages had to be solved or at least the customers should be informed properly.

The management transparency problem could lead the customers and even employees to guess the root causes of the material shortage.

The following narrative, too, share the same sentiment regarding management awareness to the material shortage,

“The service centers report customers on waiting list and the reason for not getting the electric service. When the issue is discussed during management board meeting, some members recommend purchasing from local manufacturers. The utility fails to assess possible options and present to board for remedial actions. I believe that the management has full information but not ready to solve the problem”. (KII)

Respondents were also given a statement read ‘As an employee of the Utility, you were well informed about the cause of the material shortage’ and their agreement to the statement were summarized as follow:

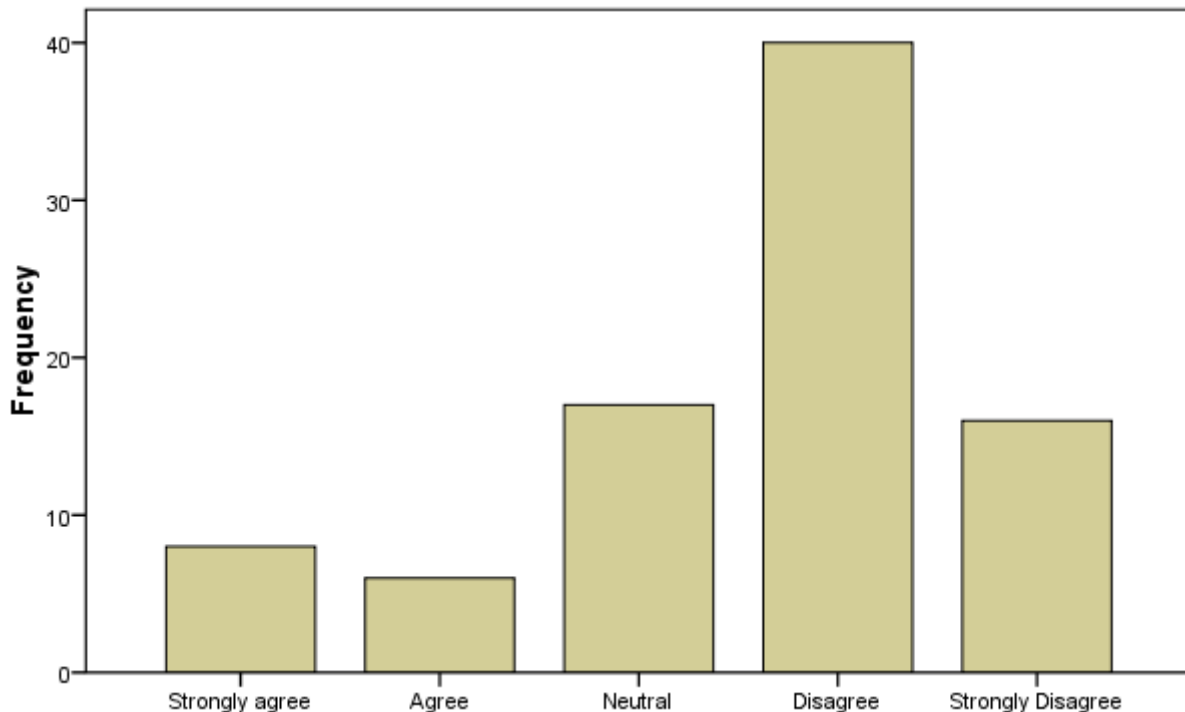


Figure 7: Employees information about material shortage

The figure shows that 16.1% (n=88) think that they agreed or strongly agreed to the statement. Majority of the respondents (64.4%) knew that there was shortage of materials but they had information gap regarding the causes of material shortage and had disagreed or strongly disagreed to the statement. The employees of the utility were involved on day to day operation

of the utility but they were not aware about the causes of the material shortage. This implies that:

- (a) There is transparency problem of the management
- (b) Employees working at community level were at front to the customers but they couldn't provide correct information to their customers
- (c) This could increase customer dissatisfaction
- (d) The employees might be forced to guess and provide groundless information
- (e) The information gap could affect the commitment of the employees
- (f) It could affect the sense of ownership and blaming the management.

The following quote supports this view

“Our sense of ownership to the utility is decreasing from time to time because of the absence of transparency from the management of the utility. We receive customers request but we couldn't provide service and we force to be disappeared from the customer because we have no concrete reason to tell them for delayed service. The good will the utility had is degrading due to the current poor quality operation of the utility”. (Focus Group Discussion, FGD)

A statement read as 'The current major customers' dissatisfaction is directly related to material shortage' was given to respondents and their level of agreement to the statements were summarized on the figure below:

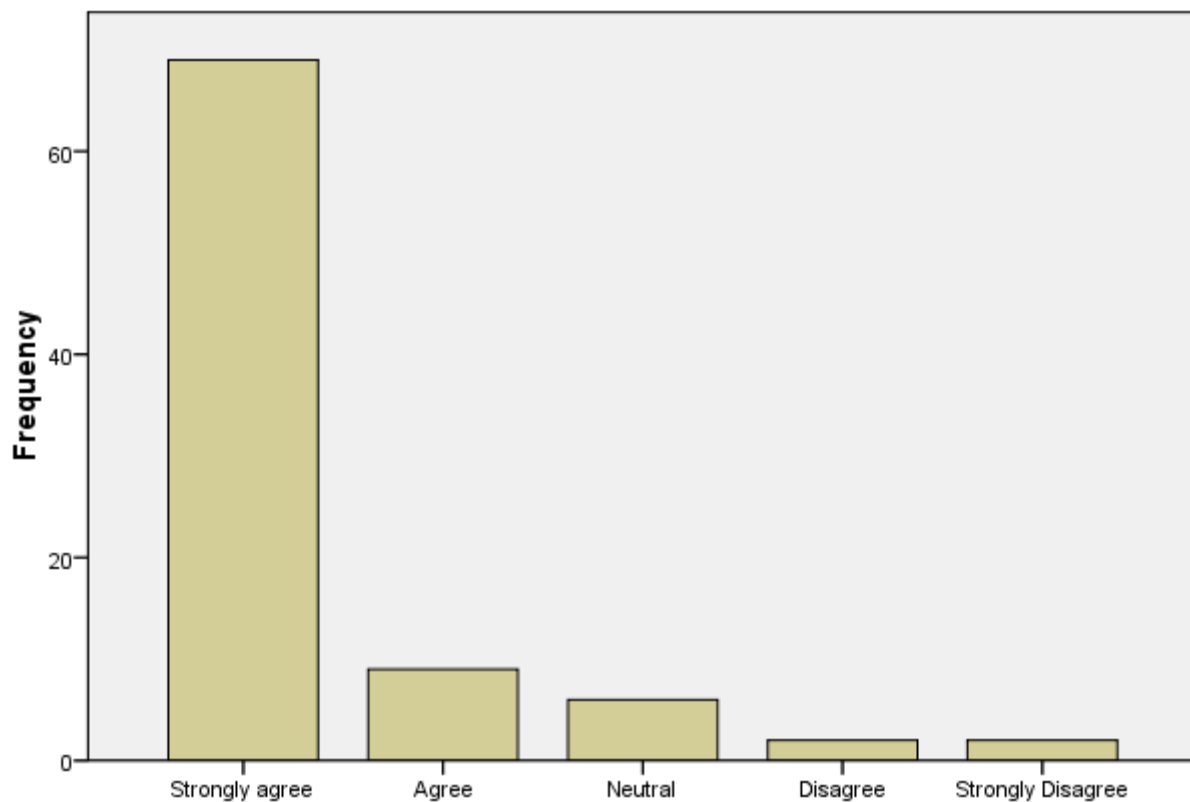


Figure 8: customer dissatisfaction and material shortage

As shown in the figure above, 88.6% (78) respondents had agreed or strongly agreed to the statement. This indicates that the current many customers on waiting list could directly relate to material shortage. Many customers might think the repeated power interruption and delaying new connection for years was due to power export to neighboring countries or shortage of power generation. This could also be implied that the practices of the utility were very poor in providing information to customers about material shortages. This indicated that the utility set aside the right of customers about getting proper and timely information regarding problems faced because the day to day life of customers is directly connected with power. The major materials very important to new connection/upgrading and maintenances were: Kw meter, different types of cables, different size of wires, transformer, box, pole and accessories. Some of the important materials like wires and poles don't need hard currency or can be purchased from local market. The utility publicized that the power demand increases by more than 25% every year and planning of materials for the planned new connections and existing customers was expected from the utility. Otherwise, tiding up of customers' cash for years is poor practice and need to be improved or the utility has collect cash for those customers eligible to get power at

least within the budget year. Most of the customers put their opinion on the opinion box of the utility that they were highly dissatisfied because the employees told them there was no material to serve them. The reports and documents of the service revealed that the customers were not getting service due to material shortage.

The following narratives from the Focus Discussion Group and Key Informative Interview support this idea

“Material shortage was the main cause for the current repeated power interruption and management problem also have their contribution. To provide quality operation, the material shortage should be addressed unless and otherwise the customer dissatisfaction and poor operation was never solved”. (FDG)

“As all the public know, there is repeated power interruption in the city and the public guess different reasons. I strongly think that the major factor for the power interruption is the material shortage. The key materials for service provision were known but the utility management fails to supply them”. (KII)

Respondents were given a statement read ‘I believe that the government self-sufficiency strategy ambiguously rushed in to without the local suppliers such as Metals and Engineering Corporation (METEC) prepared well’ and their responses to the statement were summarized in the table below:

Table 12: Government's self sufficiency strategy

	Frequency	Valid Percent
Strongly agree	14	16.7
Agree	30	35.7
Neutral	34	40.5
Disagree	4	4.8
Strongly Disagree	2	2.4
Total	84	100.0

The above table indicates that, 52.4% n=84 of the respondents had agreed or strongly agreed to the given statement and 40.5% of them were neutral. Few of the respondents (5.2%) had disagreed or strongly disagreed to the statement. This implies that the self-sufficiency strategy of the government contributed to the material shortage. The government company-Metals and Engineering Corporation advertised repeatedly that the company is producing or maintaining some basic materials (transformer, kw meter, and wires) but there is high shortage of these materials.

The following quote supports the reflection of respondents

“I believe that the self-sufficiency strategy of the government is appropriate because the utility gives chance to get materials from local market easily. The problem is that the local manufacturers’ production capacity especially for materials like transformer was not sufficient to the utility. The gap should be filled by procuring from abroad until they fulfill the demand because there is high material shortage”. (KII)

4.7 Inventory management system contribution to poor electric service provision and operation

A statement read ‘Service Centers request materials based on their safety stock level and time required to purchase (Lead time) materials’ was given to the respondents and their level of agreement as follows:

Table 13: inventory request by service centers

	Frequency	Valid Percent
Strongly agree	3	3.4
Agree	5	5.7
Neutral	5	5.7
Disagree	39	44.3
Strongly Disagree	36	40.9
Total	88	100.0

As illustrated in the table, 85.2% n=88 of the respondents revealed that the service centers of the utility didn't request inventory on time and agreed or strongly agreed to the statement. Only 9.1% of the respondents had agreed or strongly agreed to the statement. The other 5.7% (5) think that they were neutral to the statement. The responses of the respondents show that the problem refilling stock is not from the regional offices/head office side but the service center had contributed a lot. The utility doesn't use economic order quantity when purchasing materials and no safety stock which can serve until the inventory were procured and delivered to service centers.

Since the utility doesn't have safety stock system and considers the lead time while purchasing materials, the utility could incur high ordering cost. On the other hand, there could be rush time to during receiving, inspecting and delivery of the materials to address the customer complaints and this may resulted in receiving of poor quality materials. Such conditions may be a loophole for corruptive behavior, since majority of the respondents revealed that the employees of the utility use the material shortage as an opportunity for unethical activities.

A statement was given read 'I observe that there were a lot of obsolete materials mixed with new materials at warehouses' to the respondents to reveal their level of agreement and their responses were summarized as follows:

Table 14: Inventory storage system

	Frequency	Valid Percent
Strongly agree	59	67.8
Agree	14	16.1
Neutral	9	10.3
Disagree	5	5.7
Total	87	100.0

As indicated in the table, 83.9% of the respondents had agreed or strongly agreed to the statement. The computerized stock system and reports generated from the system shows stock balances including obsoletes. The computerized system should assist the utility to know the quantity available so as to decide to purchase materials. The obsolete materials were not disposed for years and were stored with new materials. This practice could make the inventory management of the utility more complex. It is difficult to make decisions based on the information of the stock system. This leads the management to procure materials without any concrete information regarding the remaining stock balance and could result in stock outs. Service centers might give promise to customers to provide services assuming that they have enough inventories in their stock. Obviously, this could be source of customer dissatisfaction.

The following quote shows this.

“There were obsolete materials due to technology change or other reason held as stock for decades mixed with new materials. This situation misleads the type and quantity to be procured. The computerized stock system of the utility is not supporting the inventory management of the utility in this regard. Key materials found on dropped on road side in contrary to the serious materials shortage the utility has. Employees over estimate materials required for customers and issue them. The customers had paid for the materials on road side and they were among the main opportunities for corruption”. (KII)

A statement read ‘I believe that the current inventory management system support the utility when and quantity to purchase’ was given to the respondents and their level of agreement to the statements were summarized as follow:

Table 15: Inventory management system and quantity to be ordered

	Frequency	Valid Percent
Strongly agree	4	4.6
Agree	6	6.9
Neutral	9	10.3
Disagree	13	14.9
Strongly Disagree	55	63.2
Total	87	100.0

The table indicates that 75.1%, n=87 of the respondents had disagreed or strongly disagreed to the statement. Only 11.5% (10) respondents think that the inventory system could assist the utility when and quantity to be purchased. This implies that the inventory management system of the utility has problems and it could hamper the operations of the utility. Unless the utility able to know when and quantity to be purchased, it is difficult to run the operation smoothly and minimize customer dissatisfaction.

The following quote illustrates this.

“There is foreign currency shortage to procure materials but the major cause for the current power interruption in the country is not this. The main problem the utility faced is its inventory management problem at all levels and less ethical behavior with some employees. Shortage materials take the lion share for the current power interruption the customers were facing. The government of Ethiopia has given great attention to mega power projects but the utility has sufficient resource to run the operation if the problem with its inventory management is solved”. (KII)

Respondents were given a statement read 'I observed key materials dropped on street sides but customers don't get power due to absence of these materials' and their responses were summarized in the figure below:

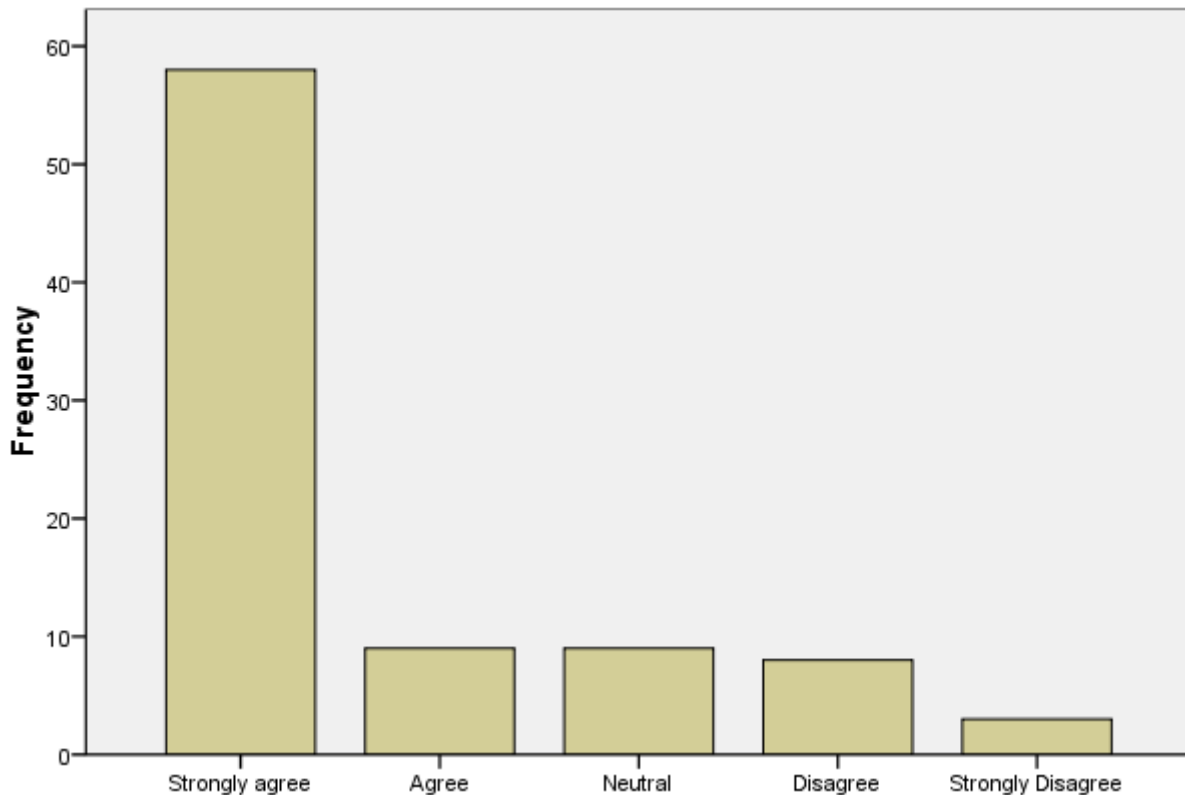


Figure 9: Key materials dropped on street

The figure above illustrates that 77%, n=88 of the respondents think that there were key materials dropped on streets. Almost all the new applicants didn't get power because of material shortage but materials found on streets. This implies that the material shortage is not only due to supply shortage but also mismanagement of the materials. Materials were issued based on work orders and there could be leftovers. If these inventories were not managed properly: (a) Could be source of misuses (b) Employees could over estimate inventory for personal benefits (c) Could open for unethical negotiation with customers

A statement read 'I observe that there were instances that the stock cards show balance but no actual balance in the computer system or vice versa' was given to the respondents and their level of agreements was summarized as follows:

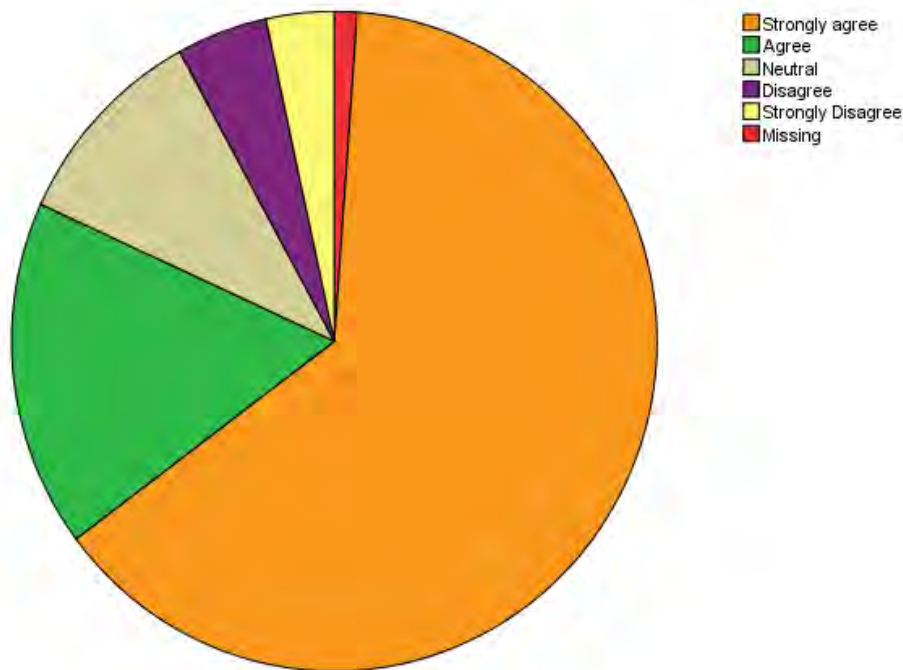


Figure 10: Stock card and computerized system balances

The above figure shows that 81.6% (71) respondents agreed or strongly agreed that the stock card could show balance but not the computer system or vice versa. In principle the stock card, different stock reports and computer system balance should be reconciled. If not, it is difficult to rely on either the computer system or stock cards. Work units could plan to perform different operation activities based on the stock card or computer system.

The respondents were given a statement read 'I observe the regions/head office provides materials in a way that service delivery time standards were met' and their level of agreement were summarized in the table below:

Table 16: inventory supply by region/head office to service centers

	Frequency	Valid Percent
Strongly agree	2	2.3
Agree	5	5.7
Neutral	13	14.9
Disagree	43	49.4
Strongly Disagree	24	27.6
Total	87	100.0

Only 8% (7) respondents had agreed or strongly agreed that the head office/region supply inventory to service centers in a way that the service centers could able to meet standards. The head office/regional offices were responsible to purchase and supply materials to service centers. Had it been the inventory management of the utility is good; the regional office/head office can access the warehouses of the service centers and could know the balances. Service centers receive new applicants and collect estimation costs expecting that the regional offices/head office could refill the material shortage. When procuring materials, the utility had no practice of considering re-order quantity, re-order level, re-order point, and safety stock to procure the materials at minimal ordering and storage cost. This could in turn result in repeated stock out of materials and customer dissatisfaction.

Respondents were given a statement read 'This days, customers were forced to stay long on waiting list due to materials shortage' and their responses to the statement were summarized as follow:

Table 17: Customers on waiting list

	Frequency	Valid Percent
Strongly agree	52	59.1
Agree	26	29.5
Neutral	5	5.7
Disagree	2	2.3
Strongly Disagree	3	3.4
Total	88	100.0

As illustrated on the table above, 88.6% (78) respondents revealed that they agreed or strongly agreed to the statement and only 5.7% of the respondents disagreed or strongly disagreed to the statement. This implies that the major cause for the current customers on waiting list is shortage of materials. The respondents added that, even though there were many customers on waiting list, the utility still collects cash from the customer without any effort to solve the problem. The regions/service centers report to the management of the utility regarding customers on waiting list but no directive is issued to adjust the acceptance procedure of new applicants.

Respondents were given a statement reads 'The Utility uses ABC inventory system by giving more attention to the most important materials and less attention to C items' and their level of agreement has been summarized in the table as follows:

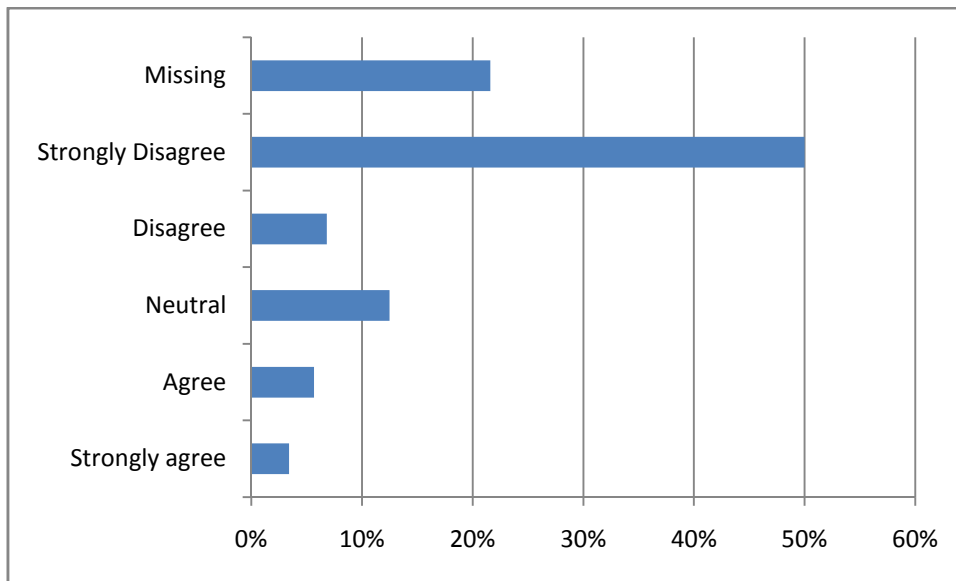


Figure 11: Implementation of ABC inventory management

As indicated in the figure above, the professional background of most respondents allow them to respond to the statement agreed that the utility didn't use the ABC inventory management system. Among the respondents, 57% (n=88) had disagreed or strongly disagreed to the given statement and 22% of the respondents were not responded because they don't have knowledge about ABC. The respondents' response implied that the utility does not give any special attention to materials which were very important to its operational services. Had it been the utility implement ABC inventory management system, the number of obsolete materials could be less than the current situation and the utility could adhere to the standards by minimizing the current huge number of customers on waiting list. The practice of the utility relating to ABC inventory management system resulted in failing to provide services to customer on time and becomes source of customer dissatisfaction.

Respondents were given chance give any additional opinion regarding inventory management of the utility and its role to operation. Their responses were summarized as follows:

- (a) The employees assigned at warehouses don't get training
- (b) Inventory management is a bottle neck to EEU to improve its operation
- (c) I feel bad to go to office because of customer complaints

- (d) We were killing the country because of the material shortage and it needs immediate solution
- (e) Materials procured were with poor quality
- (f) Accountability and transparency should be in placed
- (g) Strong internal control over inventory is needed
- (h) METEC failed to meet its too ambitious electric materials supply and it aggravated the customer dissatisfaction
- (i) The current inventory management is poor and not well organized
- (j) Implementing minimum and maximum inventory management system
- (k) The bureaucratic bottle neck should be solved to improve the inventory management
- (l) The management and employees should free of corruptive activities

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

The inventory management practices of the utility have gaps that need attention of the management so as to run the operation smoothly. The management had information about the material shortages but failed to solve the problem. Some employees used the current problem in inventory management practices as an opportunity for unethical activities and the management didn't take remedial action. Because of the transparency problem of the management, the employees were not aware of the root cause of the problem and most customers were forced to assume the power interruption was due to power export or shortage of power energy. The work units were not ready to give materials to others because they fear that there was no guarantee when the inventory could be refilled.

The study concludes that utility should see its inventory management as a key functional part which can determine the quality of electric service provision. There was a problem of inventory management at all levels and its result was reflected directly on customer dissatisfaction and poor quality electric service provision. Even though there were other causes cited by the respondents for power interruption, which was out of the scope of this project, all respondents agreed that the main one was material shortage. The study found out that enhancement in the level of effectiveness in inventory management practices would result in increased business performance of Ethiopian Electric Utility (EEU). Thus, it can be implied that inventory management of the utility has very crucial role to the operation of the utility while there were critical issues that needs improvement in the EEU's inventory management. Some of these issues were economic order of quantity; application of ABC inventory management rules; planned self-reliance in material supply where domestic production and supply is opted; transparency to customers and employees; strong attention from the Board of Directors/Government; strengthen internal control systems to reduce misuses and increase ethical awareness of the employees.

5.2 RECOMMENDATIONS

Based on the major finding of the project work, the following recommendations were made in order to improve the inventory management of the utility and support the quality of operation. The recommendation if adopted will create room for better operation, effective utilization of resource, better employees' ethics, better sense of ownership, and economic use of materials for organization.

5.2.1 To the utility

- For the organization to be sure of consistent quality of electric service, the utility should identify very important inventory which can hamper the operation and need to in warehouse. The long waiting list of customers is due to shortage of some key materials and by implementing ABC inventory system the problem could be minimized and in return it could improve the customer satisfaction
- The self-sufficiency strategy of the government should be assisted by supporting the local manufactures to improve quality of inventory and awareness to the utility employees should be given. The manufacturers should be clearly informed that unless they produce quality materials and supply on time there will never guarantee to purchase materials from them. Continuous awareness creation should be given to the employees and management to change the negative thinking to locally produced materials.
- The management of the utility should be transparent to its employees and customers when material shortage is there. The board of management and Ministry of energy, water and Irrigation should also take necessary remedial actions on the utility for the corruptive activities claims raised by the customers.
- To avoid materials dropped on street sides, inventory estimation of new and existing customers should be given due attention. If so the materials found on street can be used for other customers on waiting list and the unethical activities of some employees of the corporation could be minimized.
- Stock levels should be fixed for items and materials purchased and held in stores in order to help provisioning. These levels, (maximum, minimum and re-order levels) could be

fixed based on the previous purchasing order and the result adjusted in the light of what is likely to occur in the future.

- The utility should adhere to the new customers' electric service provision standards. Since customers don't get service as per the standard, they were forced to deal with unethical employees and get power through corruption.
- For the organization to be sure of customer satisfaction and for proper accountability, a good character, honest and trustworthy Personnel who strive to provide quality operation better inventory management system should be recruited and employed.
- For easy identification of materials in the stores and to reduce the misleading practices due to storing new materials with obsolete once an appropriate inventory management system should be employed. This can be done by disposing obsolete materials on time, and proper planning during procurement. The computerized store system shows as if key materials were available but when request to issue the materials they were obsolete. This situation results in avoiding employees' trust by customers and aggravates customer dissatisfaction. The system could be based upon the nature of the store systems, the purpose for which items were bought, or on any other basis regarded as suitable for the utility.
- For operation free of corruptive activities and to in place transparent electric service provision, the management of the utility should proactively provide right information to the employees and the public. The public at large assumes that the power interruption is due power export or shortage of power generation in the country. Besides most of the employees don't have clear information regarding the root cause of material shortage. This situation results in that the employees at service centers to refer to the head office management to the materials shortage and the customer dissatisfaction could be high due to the blurred information.

5.2.2 To the Ethiopian Government

The aforementioned limitations of EEU obviously requires the government's due attention as it is the major government sector which seriously affects the lives of the individuals, groups, communities the economy of the country in general. The lives of

almost all urban residents were directly dependent on electric power. If the government failed to improve the current repeated power interruption due to shortage of materials, it hampers the economy of the country and aggravates the customer dissatisfaction.

5.2.3 To the interested researchers

The researcher recommended that capable researchers to conduct a comprehensive research in EEU regarding other causes for the repeated power interruption in the country.

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Appendices

I. Questionnaire

I wish you good day my dear respondents!

I am **Executive Masters of Business Administration student at Addis Ababa University**; carry out a study about the **impact of inventory management on the operations of the Ethiopian Electric Utility in Addis Ababa**. It was a common agreement that Electric power was life to human entity and inventory management was a means to dispense it in a sustainable and equitable manner. I prepared this questionnaire as a structured technique to collect primary data on inventory management of Ethiopian Electricity Utility (EEU). Since your feedback was very vital and will be used for academic purpose, I exceedingly appreciate if you could take few minutes to provide me with such relevant information. I can assure you that your response will be kept confidential and it will not be disclosed to any person or institution in and /or outside this organization. If you have any question please don't hesitate to email me through **zegeye68@gmail** (**የጽሑፍ መልስ ለሚፈልጉ ጥያቄዎች መልስ አማርኛ መስጠት ይቻላል::**)

Thank you in advance

Section A: Demographic Data. Please answer by Ticking where applicable

1. Gender: 1. Female 2. Male
2. Marital Status
 1. Single 2. Married 3. Divorced /separated 4. Widowed
3. Age: 1. Below 21 2. 21-30 3. 31-40 4. 41& above
4. How many years have you worked for the organization?
 1. 0 to 5 years 2. 6 to 10 years 3. 11 to 15 years 4. Over 15 years
5. Indicate your work unit/section:
 1. Customer service 2. Finance & supply 3. warehouse 4. HR 5 Others _____
6. Education Level: 1. grade 10/12 complete 2. Certificate 3. Diploma 4. First degree Others (Specify)_____

Section B: Inventory management, practices and challenges. (Please answer by ticking or describe as appropriate)

7. Was the Company faced with challenges in the process of managing its inventories?
 1. Yes 2. No

8. If yes to Question 7, what were such challenges?_____
- _____
- _____
9. Do you believe that the utility was providing service to its customers below expectation?
1. Yes 2. No
10. If your answer was 'yes' or 'no' to question 9, please describe your reasons.
- _____
- _____
- _____
- _____
11. Do you believe that the utility's inventory management system was improved from time to time?
1. Yes 2. No
12. If your answer to question 11 was No, please describe your reasons.
- _____
- _____
- _____
- _____
13. Do you believe that the utility's chain of command/structure was convenient to inventory management?
1. Yes 2. No
14. If your answer to question 13 was yes or no, please describe your reason briefly.
- _____
- _____
- _____
- _____

Section C: Please read the following statements carefully and choose the level of agreements (1-5) that best reflects your position regarding the given statements

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	1	2	3	4	5
15. The Ethiopian Electric Utility (EEU) has a minimum and maximum stock level system that alerts the management when to purchase an item					
16. The EEU has a system that can easily move from stores or work					

units/regions where materials were in excess to work units where there was shortage					
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17. If not, were case where customers faced problems regardless of the availability of materials in other stores _____

18. The EEU proactively informs its customers when it faces material shortage					
19. The Utility was serving its new customers as per the standards set					
20. If this question was not in your professional area, please go to Q21. The Utility uses ABC inventory system by giving more attention to the most important materials and less attention to C items which were more in quantity but less investment					
21. The current major customers' dissatisfaction is directly related to material shortage					

22. If strongly disagree/disagree, please describe briefly any cause of customer dissatisfaction either fully or partly

23. The material shortage that the Utility faced exposed some employs to unethical behavior like corruption					
24. This days, consumers were forced to stay long on waiting lists due to shortage of materials					
25. The EEU was adhering to the standard set for new customers, and simple & major maintenance					
26. As an employee of the Utility, you were well informed about the cause of the material shortage					

27. If your answer was strongly disagree/disagree or strongly agree, please describe your reason/s

28. I observe the regions/head office provides materials in a way that service delivery time standards were met					
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29. If you strongly agree/agree to the timely material dispatch from region/head office to the site, what do you think of frequent power interruption

30. Service Centers request materials based on their safety stock level and time required to purchase (Lead time) materials					
31. I believe that the government self-sufficiency strategy ambiguously rushed in to without the local suppliers (eg Metals and engineering Corporation (METEC) prepared well					
32. I believe that the management of the EEU don't want to use the local materials because of their personal benefit					

33. I believe that the management has no full information about the shortage of materials because the service centers don't report on time					
34. I observed that Service Centers have always reserve materials to some special individual customers (other than legally allowed)					
35. I observe that some employees and management members need to continue the current material shortage					

36. If your answer was strongly agree/agree, do you think they get personal benefit?

37. I observe that there were a lot of obsolete materials mixed with new materials at warehouses					
38. I observe that there were instances that the stock cards show balance but no actual balance in the computer system or vice versa.					
39. I believe that the current inventory management system support the utility when and quantity to purchase					
40. I observed key materials dropped on street sides but customers don't get power due to absence of these materials.					

41. Do you have any additional point to mention regarding the inventory management of the utility and its impact causing to operations of the utility?_____

II. Focus Group Discussion Tool

Addis Ababa University

Department of Management

Focus Group Discussion (FGD) guide

The main objective of FGD was to validate the information collected through questionnaires. The discussion was held mainly with employees of the service center employees. Four FDGs were held about management problems in inventory management, material quality, employees' commitment, inadequate staffing, causes of power interruption, and technical errors of employees in inventory management.

1. Do you believe that the self-sufficiency strategy was proper? Why?
2. Was there problem in materials management in the utility? If so, what were the problems?
3. Do you believe that the technical errors of employees destroy materials?
4. Do you think that there was less staff commitment which was contributing a lot to power interruption than materials shortage?
5. Do you believe that some employees save materials at their office and use for unethical activities like corruption?
6. Do you believe the utility was adhering to the standards for customer service?

III. Key informative interview Tool

Addis Ababa University

Department of Management

Key informative interview guideline

Using semi structured interview guide interview was held with one purposely selected key informant to collect in-depth information about commitment of the management and employees to inventory management, shortage of currency to purchase materials, impact of power export to power interruption, and timely remedial actions of the management to power interruption due to material shortage.

1. Was there foreign currency shortage to purchase materials?
2. Do you think the government give more priority to projects than the operation which cause material shortage?
3. Was the current repeated power interruption directly related to shortage of materials or power export?
4. Do you believe that the current material shortage give more rooms to fraudulent activities of the employees?
5. Do you believe that the management and board of management aware of the current material shortage? If so, why remedial action was not taken for a long period of time?
6. Do you believe that the utility was weak in collecting left over materials and found on street sides? Why were these materials dropped there?
7. There were obsolete materials stored for years which make the materials management more complex. Do you believe? If yes, why was this case happened?