ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

ASSESSMENT OF SOURCE OF FUNDS, POWER SYSTEM EFFICIENCY, ELECTRICITY TARIFF AND FINANCIAL PERFORMANCE:

CASE OF ETHIOPIAN ELECTRIC POWER AND ETHIOPIAN ELECTRIC UTILITY

BY

ALEMAYEHU MENGISTU

ID No. GSE/0026/07

ADVISOR: YITBAREK TAKELE (DR.)

MARCH, 2017

ADDIS ABABA

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

ASSESSMENT OF SOURCE OF FUNDS, POWER SYSTEM EFFICIENCY, ELECTRICITY TARIFF AND FINANCIAL PERFORMANCE: CASE OF ETHIOPIAN ELECTRIC POWER AND ETHIOPIAN ELECTRIC UTILITY

BY

ALEMAYEHU MENGISTU

ID No. GSE/0026/07

A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF MANAGEMENT IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF EXECUTIVE MASTER OF BUSINESS ADMINISTRATION

MARCH, 2017

ADDIS ABABA

DECLARATION

I declare that the research project paper entitled with “Assessment of Source of Funds, Power System Efficiency, Electricity Tariff and Financial Performance: Case of Ethiopian Electric Power and Ethiopian Electric Utility” is my original work under the supervision and guidance of Dr. Yitbarek Takele. All the materials used for the study have been fully acknowledged. This work has not been previously submitted for any higher institution for any diploma, degree or other similar work.

Declared by

Alemayehu Mengistu _____ **MARCH, 2017**

Student Signature **Date**

Approved by Board of Examiners

_____	_____	_____
Advisor	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

STATEMENT OF CERTIFICATION

This research project entitled with “Assessment of Source of Funds, Power System Efficiency, Electricity Tariff and Financial Performance: Case of Ethiopian Electric Power and Ethiopian Electric Utility” has been submitted for examination with my approval as the university advisor.

Advisor:Dr. Yitbarek Takele

Signature: _____

Date:_____

ACKNOWLEDGEMENTS

At the onset, I would like to thank the Almighty God for giving me Grace to overcome trials and temptation to complete this academic advancement.

I am great full to express my utmost gratitude to my advisor Dr.Yitbarek Takele for his expert guidance, constructive comments, suggestions and encouragement without which this work could have not been completed.

I would like to extend my appreciation to Ato Atalay Abebe, Ato Siyoum Techane, Ato Hiwot Eshetu, Ato Kefyalew Mergiya, and Ato Hagos Teklu for their kind advice and help in providing necessary documents and arrangements for discussions. I also highly appreciate and acknowledge the assistances and encouragements kindly provided by 2014 EMBA Entrant students.

Last but not least, my special gratitude goes to my family for their invaluable encouragement throughout the study period and individuals who always stood by my side.

TABLES OF CONTENTS

ACRONYMS/ABBREVIATIONS

CBE	=Commercial Bank of Ethiopia
EEP	= Ethiopian Electric Power
EEPCo	=Ethiopian Electric Power Corporation
EEU	=Ethiopian Electric Utility
FGD	= Focus Group Discussion
GDP	= Gross Domestic Product
GTP_I	= The first Growth and Transformation Program
GTP_II	= The second Growth and Transformation Program
GWH	= Giga Watt Hour
HV	=High Volt
ICS	= Interconnected System
KPI	=Key Performance Indicators
KV	= Kilo Volt
KWH	=Kilo Watt Hour
MWH	=Mega Watt Hour
O & M	=Operation and Maintenance
SCS	=Self Contained System
V	= volt

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Electric power has cascading, everlasting and vicious effect on the economy, social and political performance of any country, and has great role wherever people live and work be it in manufacturing, services etc. Source of funds, power system efficiency and electric tariff were considered as the basic causes for success or failure of GTP_II plan to develop and operate electric power which is expected to energize the planned economy.

The objective of this paper was to assess source of finance, power system efficiency, electric tariff and financial performance and to identify the related challenges to each source of Ethiopian Electric Power and Ethiopian Electric Utility. So as to meet this objective both qualitative and quantitative approaches were used. For the qualitative study, profound data was collected from key informants and focus group discussant and analyzed using content analysis approaches. Descriptive analysis was used to analyze quantitative data collected from different documents.

The findings of the research show that In GTP_I 32% of total investment covered from foreign loans, 57% expended from bond sales to CBE and 11% is spent from own sources and none of GTP_I major plans achieved fully fundamentally because of financial limitations. In GTP_II 38% of the total estimated investment in the sector expected from foreign loans, 44% is planned to be covered from bond sales to CBE and the remaining 18% is left for own source financing scheme. Each source has exposed the enterprises for different challenges such as the foreign loan exposed the enterprises for high foreign currency requirements to purchase goods and services, to repay matured principal loans and interests. Although bond sales to CBE is less costly relative to foreign loans and it is one of the biggest instrument or channel for the government to subsidize the sector, CBE couldn't provide the required fund on time and as the amount of this loan is very huge the enterprises are not able to repay the interest from its revenue. In addition to these, more than 20% of the produced energy is sacrificed for electric system loss and the existing tariff system doesn't represent the fact on the ground.

In order to provide sufficient, reliable and sustainable energy for the whole public, the government and the enterprises are expected to optimize the power system efficiency, update the electric system tariff and find alternatives of smooth financing such as opening the sector's door for private investors.

Key Words: - Source of funds, foreign loans, bond sales to Commercial Bank of Ethiopia, power system loss, electric tariff.

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

The consumption of electric energy is quite indispensable for having better quality of life and economic performance. The living standard and prosperity of a nation vary directly with increase in use of electric power. Sufficient, reliable and sustainable source of electricity is a major prerequisite for a sustained and successful economic development effort and poverty reduction. In order to assure efficient and reliable electric power supply, availability of a reasonably priced and reliable source of finance is a mandatory requirement.

A power sector is considered financially sustainable if it is able to provide sufficient electricity and make investments to meet changing future demand while generating adequate revenues to cover costs and operating according to environmental and social norms (IISD, 2014). In Ethiopia, the government subsidies the electric sector in different ways including direct investment in the sector, facilitating domestic and foreign loans with low interest rate, long grace period, looking for donor for the sector, encouraging investors in the sector through different benefit package including exempting from any type of taxes (Ethiopian Electric Power Corporation Annual Report, 2011/12). Assessing sources of fund is used to identify risks and financing costs related with each source of fund that indicate which sources of fund stabilizes the financial performances of the enterprises.

In electricity supply to final consumers, losses refer to the amounts of electricity injected into the transmission and distribution grids that are not paid for by users. Total losses have two components: technical and non-technical. Technical losses occur naturally and consist mainly of power dissipation in electricity system components such as transmission and distribution lines, transformers, and measurement systems. Non-technical losses are caused by actions external to the power system and consist primarily of electricity theft, non-payment by customers, and errors in accounting and record-keeping (Background Paper for the World Bank Group Energy Sector Strategy, 2009). In Ethiopia, electric power interruption is becoming a day to day phenomenon, even there are times that electric power interruption occurs several times a day. Reviewing the amount of energy which is sacrificed for energy loss on average each year in terms of birr used to assess the effect of electric system efficiency on financial performance of Ethiopian Electric Power and Ethiopian Electric utility.

A good electricity tariff must recover cost of infrastructure building, must have a satisfactory net return on the capital investment, must recover cost of metering, billing, collection and

miscellaneous services, must recover cost of operation, supplies, maintenance of losses and should provide incentive for using power during the off-peak hours (World Resources Institutes, 2014). The current electricity tariff of Ethiopia is set before twelve years by the government.

In the first Growth and Transformation Program (GTP_I) the country planned to increase its electricity production capacity from 2,100 MWH to 10,000Mega Watt Hour (MWH), to build more than 10,000km transmission line and to get in touch with electricity access coverage of 75% of the households, but at the end of GTP_I none of these big plans fully achieved.

At the end of the second Growth and Transformation Program (GTP_II) Ethiopia has a plan to have additional 17,000MWH installed electric producing plants, to build more than 10,000Km transmission lines, to raise electricity access coverage to 80% of the households and lower electric loss to 11%. In order to achieve these objectives EEP and EEU should have reliable sources of finances, efficient power system management and updated electric tariff systems. This research project focussed on the assessment of sources of funds, power system efficiency, electric tariff and financial performance of EEP and EEU and basic challenges related with each factors.

1.2. Background of Ethiopian Electric Power and Ethiopian Electric Utility

Ethiopian Electricity Power Corporation was responsible for generation, transmission, distribution and sales of electricity power. It was split into Ethiopian Electric Power (EEP) and Ethiopian Electric Utility (EEU) on December 9, 2013 by Councils of Ministers Regulation No 302/2013 and 303/2013 respectively.

EEP is established with authorized capital of Birr 139 Billion, of which 34.7 Billion is paid up capital in cash and kind, with basic objectives of constructing and operating electric generation plants, constructing and operating 132 and above kilo volt transmission lines and substations, and purchase bulk electricity power and same sale. EEP, with head office at Addis Ababa, has more than 20 generation stations,8 regional Transmission and substation Offices, more than 20 generation, transmission and substation project offices throughout the country and has more than 10 000 permanent and contract employees. EEU is established with the authorized capital of Birr 64.7 Billion, of which 16 Billion is paid up capital in cash and kind, mainly to undertake construction and operations of off-grid electricity generation, 66 and below kilo volt transmission lines and substations, distributions, universal electricity access works and retail of electricity. EEU, with head office at Addis, has branch offices at regions and werda level and it has more than 16,000 permanent and contract employees.

1.3. Statement of the Problem

The power sector is a key driver of any economy: it is not only a major contributor of gross domestic product (GDP), but also provides key inputs for most industries and supplies the basic needs for the residential sector. Ethiopia has planned to become middle income country and to transform its economy from agriculture base to manufacturing by 2025. The manufacturing sector uses more energy than any other sector such as agriculture, services or residential (International Energy Outlook, 2016).

In order to have reliable and sustainable energy to fuel the planned economy it requires a huge amount of investment in different sources of energy along with related infrastructures and as the source of energy diversified and the amount of produced energy increased parallel to delivering networks, the power system requires highly integrated systems to transport the produced energy to the end users as it should be, otherwise there would be high power interruption which would be major cause for power loss. Over and above these, the price to deliver electricity to the end users should be reasonable for both the electric suppliers and users' sides.

According to discussions made on 2014/15 annual report during meeting of the two enterprises employees with senior managements and boards, source of funds, power system efficiency and electric tariff were considered as the basic causes for success or failure of GTP_II plan. This initiated the researcher to assess source of funds, power system efficiency, electric tariff and financial performance of the two enterprises and identify basic challenges related with each factor.

Therefore, the purpose of this project was to assess the source of funds, power system efficiency, the electricity tariff and financial performance of EEP and EEU. The project also recommended that what additional alternative source of fund should be considered, alternative electricity tariff scheme should be taken before changing the electricity tariff, and how the enterprises reduce power system loss to have reliable and sustainable source finance.

1.4. Research Questions

In line with the above problem statement, the following were research questions.

- What are the basic source of funds to finance projects and operational activities in EEP and EEU and the challenges related with each source?
- Are EEP and EEU making investment in a way that they meet future demand of electric power?

- What are the effects of power system efficiently on the organizational financial performance?
- What are the tariff categories and their contributions for the generated revenues?
- Is there significant difference in electricity tariff with those countries which have similar electricity source?

1.5. Objectives of the research

1.5.1. General Objective

The general objective of this research paper was to assess source of fund, power system efficiency, electricity tariff and financial performance of Ethiopian Electricity Power and Ethiopian Electricity Utility.

1.5.2. Specific Objective

The specific objectives of the study were:

- To identify the share of each major source of funds on overall financing of projects and operational activities.
- To analyze the subsidy of government to the electric sector.
- To analyze the efficiency of production and supply of electricity.
- To identify challenges related with each source of funds, power system efficiency and tariff.
- To identify whether EEP and EEU are able to charge tariffs in such a manner that they can cover all their costs including operating, maintenance and investment costs.
- To identify the effect of electricity tariff, efficiency of power system and source of funds on financial performance.

1.6. Significance of the study

This study is believed to help in assessing the major sources of funds, power system efficiency, existing electric tariff shortage and financial performance of EEP and EEU and the challenges related (risks and financing cost) with the aforementioned factors. The findings provide possible recommendations to the enterprises and governments in effort they would make to take appropriate administrative and policy decisions. Moreover, it will also serve as a stepping stone for those who are interested to conduct advanced research works in the field under consideration. Obviously, it also helps to enhance the researcher's knowledge in research practices and in the contemporary concepts and theories in this regard.

1.7. Scope of the study

The study was delimited to identify source of funds, efficiency of power system, electricity tariff and financial performance of both operational and projects of Ethiopian Electric Power and Ethiopian Electric Utility Enterprises.

1.8. Limitation of the Study

This study did not cover all aspects of the Ethiopian Electric Power and Ethiopian Electric Utility performance. Therefore the findings could not be generalized to the performance of the enterprises as a whole as it focused only on the financial performance.

1.9. Organization of the Paper

This research paper is organized into five chapters. Chapter two which focus on reviewing literatures that are related with the issued considered under the research project. Chapter three describes research design and methodology and it includes the research design, data type and source, method of data collection, method of data analysis and ethical consideration. In Chapter four, the gathered data are statistically analyzed using the required statistical tools and the results of the analysis of the data are interpreted and discussed. The last chapter that is chapter 5 includes summary of findings, conclusion and recommendation. In addition to the above chapters, list of reference materials and appendices for Focus Group Discussions and Key informative Interview tools are added at the end of the paper.

CHAPTER TWO

REVIEW OF RELATED LITRATURE

Introduction

Under this chapter literatures related to concepts of financial performance, efficiency of power system and electricity tariff have been reviewed. The literatures are obtained from books, government and non government organizations' publications and other dependable sources.

2.1. Financial Performances

The International Institute for Sustainable Development (2014) points out a power sector is considered financially sustainable if it is able to provide sufficient electricity and make investments to meet changing future demand while generating adequate revenues to cover costs and operating according to environmental and social norms. To measure this, four criteria are proposed:

2.1.1. Ability to recover investment and operating costs with net operating profit

In order to recover the cost of the infrastructure at least its costs and revenues should be balanced. The fund could be covered from different types of sources for instance from company equity, commercial or non commercial loans, soft loans, grants, bonds issued for different organizations/individuals, or combinations of any of these. Each financing instrument has its own advantages and cost on infrastructures (Financing renewable energy Options for Developing Financing Instruments Using Public Funds, 2015).

In addition to these direct costs other costs such as taxes, foreign exchange gains/loss, interests and subsidies would affect the final costs. The generation cost such as sources of energy (gas, coal, oil, hydro, or renewable), operation and maintenance costs, and all costs incurred to produce the required energy should be properly identified. On top of generation costs, the costs of transmission and distribution should also be known. These costs can then be added with taxes and other charges, if applicable, to calculate the final retail unit costs. Because of the different sector structures and fuel mixes, the unit costs of electricity can vary greatly across countries (Tallapragada, 2009).

Another indicator that illustrates the efficiency of the power system on the production side is system losses during transmission and distribution. These losses can be measured by subtracting the total electricity sold at the end distribution point from the total supply of electricity to grid (Tallapragada, 2009). Power system loss has technical and non-technical

components. Minimizing these losses can help the sector reduce its costs; hence improve its financial performance (Antmann, 2009).

On the revenue side, statistics about revenues may come from power companies' financial reports. Revenues can be in aggregated or disaggregated by sector to identify which sectors are the major consumers of electricity. The difference in prices across countries may be due to different technology mixes and system capacity, but it can result from government policies. Some governments may tax electricity heavily to discourage high consumption and promote power efficiency. On the other hand, others may subsidize power to protect certain groups of consumers (e.g., poor households or energy-intensive industries that are considered critical to the economy). Therefore, tariff settings and adjustments is another important indicator to assess the level of control the government exerts on producers regarding pricing which affects the financial viability of an entity (Beaton, Gerasimchuk, Laan, Lang, Vis-Dunbar & Wooders, 2013).

The difference between total costs and revenues will allow for an estimation of net profits/losses, which indicates the ability of the sector to have cost-reflective investment. The ratio of net profits/ losses over revenues will provide an idea of the profit margin of the sector. Additional power sector financial sustainability indicators include Debt ratio, or the proportion of debt to the firm's assets, indicates the risks it faces. A high debt ratio means that the company finances a lot of its assets via debt and has low borrowing capacity, which may hinder its ability to finance its future investments and the current ratio measures the company's ability to pay its short-term obligations with its existing resources. A ratio of less than 1 means that the company may have difficulty meeting creditors' demands if they are due, unless it has good long-term prospects against which it can borrow. It could be concluded that sources of finances, power system loss and tariff has a direct effect on the financial performances of power sectors.

2.1.2. Ability to reliably meet demand

The ability to reliably meet demand indicates the ability of the sector to provide reliable power to meet the needs of the users and the economy, which can be measured by the ratio of installed capacity to demand. To be able to reliably meet demand, the sector may intervene in both the supply and demand sides (Tallapragada, 2009). On the demand side, price is a major factor that influences electricity consumption and on the supply side, the sector needs to ensure that it has sufficient installed capacity in place to meet demand. This indicates that in any ways the financial performance has effect on ability to meet demand.

2.1.3. Ability to make investments

As demand changes over time, the sector needs to continuously make investments to ensure that it can meet future needs as well. Necessary investments include capital expenditure for generation, transmission and distribution. Investments can be evaluated based on relative increases in capacity and expenditure. Capacity growth captures the changes in installed capacity over a certain period and investment expenditure growth reflects the changes over time in the spending for new assets and replacing depreciating ones. In order to fulfil the future electric power demand, the encountering investment should be made based on the assessed demand (iisd, 2014).

2.1.4. Ability to operate according to environmental and social norms

The systemic performance of the electricity sector is important and should cover both its social and environmental performance. Specifically, if the electricity sector fails to meet social and environmental norms it may face higher costs in the future as pressure to conform to social and environmental expectations. Since consumers are the source of revenue for the power sector, its ability to meet the customers' needs should therefore be an important aspect of social performance. The main dimensions of customer service should include (1) access and (2) affordability. Because electricity is increasingly considered to be part of human basic needs, access to electricity should be an important indicator of the performance of the power sector in particular, and a country's human development in general. Increasing access to electricity may enhance the growth of the economy and help resolve many health and environmental issues caused by traditional biomass (Sovacool, 2012). Affordability helps quantify the implications of the tariff structure on the purchasing power and well-being of consumers which indicates whether households are able to purchase enough electricity to meet subsistence requirements. The production and consumption of power place a heavy burden on the environment. For example, the combustion of fossil fuels emits carbon dioxide and other greenhouse gases that lead to global warming. Climate change is not only an environmental issue, but also affects the economy and human welfare. These indicate that the company should financially be sustainable to act as per social and environmental norms.

2.2. Efficiency of the power system

Efficiency of the power system on the production side is system losses during transmission and distribution which can be measured by subtracting the total electricity sold at the end distribution point from the total supply of electricity to grid (Tallapragada, 2009). These losses are often presented as the share of total power supply to allow for comparison across countries

and should be factored into the cost calculation of the utility. These have two components: technical and non-technical losses. Minimizing both technical and non-technical losses can help the sector reduce its costs; hence improve its financial performance.

Technical losses occur mainly due to power dissipation in conductors and transformers during transmission and distribution, and are typically around 5 to 10 per cent in developed countries. Countries can reduce technical losses by upgrading equipment and improve system planning and modelling, but the benefit should be weighed against the cost of investment (Antmann, 2009).

Non-technical (or commercial) losses comprise of units that are delivered and consumed, but for some reason are not recorded as sales. They are attributed to metering errors, incorrect meter installation, billing errors, illegal abstraction of electricity, and unread meters. Non-technical losses are almost nonexistent in developed countries but are quite prevalent in developing countries where management is weak and there are a large number of customers who cannot afford cost-reflecting electricity tariffs. Nevertheless, some countries have managed to implement effective strategies to reduce non-technical losses, for example, by adopting advanced metering infrastructure, working with communities or the private sector to enhance monitoring, and subsidizing low income consumers to ensure affordability (Antmann, 2009). Power system efficiency directly relates with the outage of power, as number and restoration time increased, both the supplier and the end users would suffer financial losses. Therefore, power system efficiency directly relates with the financial performance of a power supplier.

2.3. Definition and Concept of electricity tariff

Electricity tariff (electricity pricing or the price of electricity) is a schedule of fees or prices that relate to the receipt of electricity from a specific provider. It varies widely from country to country, and may vary significantly from locality to locality within a particular country. The price of electricity power supply depends largely on the type of the source of the electricity power, government subsidies, government and industry regulation, and even local weather patterns. In standard regulated monopoly markets, electricity rates typically vary for residential, commercial, and industrial customers. Regulatory agencies often require that power companies provide detailed documentation regarding those costs of operation as a means of justifying request for a price increase (Ref.www.eepco.gov.et, http://en.wikipedia.org/wiki/Electricity)

A good electric tariff should have a satisfactory net return on the capital investment, should recover cost of capital and operations, should be simple and comprehensive to the public, should be uniform over large population and should provide incentive for using power during the off-peak hours (Gupta, B.R, 2000).

2.3.1. Factors for Electricity Tariff Setting

A. Objectives of electricity Tariff Determination

World Resource Institute (2014) states that promoting investment, improving utility performance, improving service quality, enhancing energy security, improving the financial health of electric utilities, promoting energy efficiency, expanding services, and alleviating poverty are the basic objectives of proper electric tariff setting . Electric tariff has direct effect on the activity of any country, some countries have an annual review period, whereas others have a multi-year determination period but allow for intermediate adjustments and some don't allow even to adjust based on the inflations. (http://www.wri.org/publication/10- questions-electricity-tariffs).

B. Basis of Electricity tariff rates setting

Electricity tariffs depend on a utility's costs, which can include costs related to generation, transmission and distribution. How these costs shape the tariff depends on the methodologies used to determine the tariff, the structure of the electricity sector, and the efficiency and performance of the utility. In any case, entities engaged in tariff determination should disclose information about utility costs to all stakeholders

The nature of the costs—whether they are internal and controllable, or external and non-controllable—is relevant when evaluating how costs shape the electricity tariff. For example, costs associated with employee wage increases are controllable because they can be planned for. In contrast, costs associated with an increase in general inflation, or currency depreciation is non-controllable. However, the risks associated with uncontrollable costs can be anticipated and reduced through better planning.

Utility costs associated with power projects can be classified as fixed or variable, and are recovered from consumers through tariffs (Sreekumar, 2004).

C. Tariff Structure

A tariff structure is a set of rules and procedures that determine how many different categories of consumers are charged. The prices customers pay for utility services can vary from category to category and from utility to utility. The tariff structure for residential consumers has three essential elements. The fixed charge per billing period must be low, at least for small-use

customers, to ensure that access to essential levels of electric service is affordable; Different tariffs are charged for different levels of energy consumption. Most countries have “increasing block tariffs,” in which essential needs service is priced at a low rate, and incremental and discretionary usage is priced at a higher rate and differential rates are set for seasonality and times of-use that closely align prices with costs.

The tariff structure should be simple to implement, but should also ensure accountability for the use of electricity and adequate recovery of revenue for the utility. Depending on the objectives of the tariff determination and needs of the utility, different tariff structures can be adopted.

The most common tariff structure is a two-part tariff, in which each consumer is required to pay a fixed charge (or several fixed charges) per billing period (for example, minimum consumption charges, load charges, or connection fees) and additional charges based on actual consumption. Other tariff structures include single-part tariffs, block tariffs, seasonal tariffs, and time-of-use (time-of-day) tariffs. The tariff structure can have a significant impact on crucial issues of public interest, such as achieving the stated objectives of the tariff revision, improving the performance and efficiency of the utility, and enhancing accountability to consumers. For example, if an objective is to improve bill collection efficiency, then the tariff might offer a discount to consumers who pay on time to incentivize timely bill payment and thus reduce revenue losses to the utility.

D. Subsidies in the Electricity Tariff

The electricity sector is capital and natural resource intensive. Subsidies are sometimes offered to electricity generators to encourage them to deploy new technologies, and may also be offered to industries to encourage investment. Further, many countries cross-subsidize electricity, whereby one group of consumers pays higher rates for electricity to cover or subsidize lower rates for other consumers. Subsidies are sometimes criticized for jeopardizing the financial viability of utilities, for being subject to capture by unintended groups, and for leading to inefficient use of natural resource. Poorly designed subsidies can also lead to the inefficient use of natural resource. Moreover, poorly designed or implemented subsidies can have perverse effects. For example, cross-subsidies resulting in very high electricity tariffs for industrial users can lead those users to opt for alternative source, such as captive power.

In order to minimize negative effects of subsidies, and to ensure that the objectives of the subsidies are being met, periodic reviews of the subsidy, its benefits, beneficiaries, and outcomes is a crucial exercise to be completed by regulators. A tariff determination process that provides a transparent view of subsidies and cross-subsidies is more likely to be aligned

with the public interest. Periodic review and analysis of the outcomes of subsidy allocations can prompt measures to prevent perverse impacts.

Subsidies exist where governments provide a direct transfer of funds or potential direct transfer of funds or liabilities, forgo or otherwise fail to collect revenue, provide goods or services below market rates or purchase goods above market rates and provide income or price support (Beaton et al. 2013):

Electricity Tariff Subsidies are policies that decrease energy prices or production costs through same form of unrequited value transfer to economic agents (individuals, firms, or other institutions; public or private). The financing of subsidies of subsidies can take place in a number of ways, including explicit subsidies, implicit subsidies, and cross-subsidies. Explicit subsidies are transfers from the government budget the producer or consumer that receiving the subsidy, and are transparently reflected in the budget, whereas implicit subsidies occur where there is no immediate transfer from the government to the company to cover the shortfall in revenue caused by the presence of the subsidy, and Cross-subsidies are policies that reduce costs to particular types of customers or regions by increasing charges to other customers or regions.

2.4. Litigation of Ethiopia to Electric Tariff

The new Ethiopian Energy regulating proclamation no 810/2013 has been issued in 2014 G.C by replacing proclamation no 86/1987. Notwithstanding the provisions of Article 42(2) of Proclamation no 810/2013 regulations, directives and standards issued pursuant to the Electricity Proclamation No.86/1997 shall remain in force until replaced by regulations, directives and standards issued under Proclamation no 810/2013.

Pricing procedure for interconnected System (ICS) and large isolated systems No. 1/2005 and Pricing procedure for small and very small self contained (SCS) No. 2/2005 are issued by electric agency in accordance with articles 32(2) of the Council of Minister's Electricity Operation regulation No 49/1999 which is issued under electricity proclamation No. 86/1997.

The following are some of the principles that should be considered during electricity price setting, stated in the aforementioned pricing procedures 01/2005 and 2/2005.

- In setting electricity price cost reflective Price Structure is required to be developed by utilities.
- In designing a Price Structure the utilities take into consideration that prices shall:-
    - Accurately reflect costs so as to achieve economic efficiency, via efficient allocation of resource.
    - Ensure equity and fairness between different types of consumers.

- Be implementable with less difficulty.
- Utilise appropriate metering and supply technology.
- To be simple to understand, and
- Accommodate customer's ability to pay.

- Price Structures shall be designed and updated on the basis of estimates of marginal (average) costs that shall be prepared at four years interval.
- Cost build up Basic Price Structure Methodology shall be used for generation, transmission, distribution and supply cost.
- End-user price is determined on the bases of the aggregates of; generation, transmission and distribution capacity costs; and energy costs and loss factors at an appropriate voltage level.
- The Price Structure shall contain a full justification for marginal costs of capacity, energy, voltage of supply, methodologies for calculating marginal costs, season and time-of-day and for fixed (metering and billing) and variable components of cost and for interruptible and non-interruptible supply;
- Price that is designed for low-income household (lifeline price) may deviate from the rule that prices should be cost-reflective. Prices for low-income households shall be aimed primarily at the poor.
- Special low Price may be charged to users who consume below certain KWh per month. Such level of consumption may be subsidised from those other electricity consumers whose consumption is less sensitive to electricity price.
- The Price Structure shall consider generate sufficient revenues to maintain the financial viability and allow them to attract funds to finance required investments, reflect the costs imposed on the electricity system by different users, be competitive in comparison with similar services and provide incentives for electricity to be supplied and used efficiently.

2.5. Conceptual Framework

The under stated figure is the concept map that depicts the relationship among source of funds, Electric Power system efficiency, electricity tariff and financial performance of the enterprises.

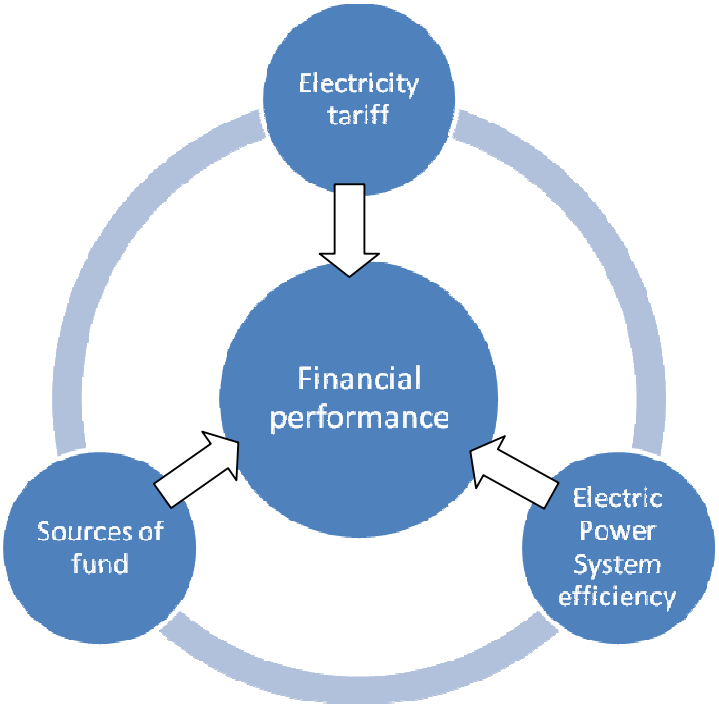

Figure 1 Relationship among variables

Author's Diagram

With regard to the relationship among these four variables, it is believed by the enterprises that when one or all of the variables, be it source of fund, electricity tariff or electric power system efficiency, changed the financial performance of the enterprises would change towards the net effect directions of the dependent variables.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

Under this topic, a brief explanation about how the desired data were collected, discussed, analyzed and interpreted was explained. The Research methodology included the collection of data both from primary and secondary source. The source was basically included in the review of reference materials, proclamations and regulations, annual company's reports, policy & procedures and brochures. The collected qualitative data were analyzed using simple descriptive statistics such as percentages and figures. The qualitative data which were gathered from Focus Group Discussion (FGD) and Key informant Interview (KII) results were analyzed using content analysis. The interpretation and discussion were made together. Finally, based on the outcome of the analysis, conclusion and recommendation was drawn.

3.1. Research Design and Approach

In this study descriptive analysis was used. Descriptive statistics such as mean, range and percentage were used to describe the data. A brief explanation about how the desired data were collected, analyzed and interpreted is covered.

The general objective of this research was to assess the extent to which electric power system efficiency, source of funds and the electricity tariff practices affected the financial performance of Ethiopian electric Power and Ethiopian electric Utility. Therefore, so as to meet this objective, both qualitative and quantitative approaches were used. For the qualitative study, profound data was collected from key informants and focus group discussants. For the quantitative part data collected from different documents, was triangulated with Focus Group Discussion and information collected from Key informants of the two enterprises.

3.2. Population and Sampling

For this study all professional employees of Ethiopian electric Power and Ethiopian Electric Utility were target population. Focus Group Discussion was held with purposely selected professionals from both companies. The researcher was used purposive sampling technique to randomly stratifying identified concerned offices and then selected key professional staffs from each enterprise as informative ones. The study was focused on strategic and investment, Portfolio Management, marketing and business Division and finance offices from Ethiopian electric Power. Planning, finance and distribution offices were the focus of the study from Ethiopian Electric Utility Company. Five key staffs were selected from each office.

3.3. Data type and source

Primary and secondary data were used for this study. Primary data was collected from key informants of EEP and EEU professional staffs. Secondary data such as annual reports, tariff documents, different management reports, strategic documents, performance reports, proclamations and regulations and other related documents were collected from different offices of the two enterprises and analyzed.

3.4. Methods and Instruments of data collection

The methods of data collection for this study included six discussions with focus groups (each having five members), data from five key Informant Interviews (KIIs) including senior management members and document reviews. The data collection instruments were Key Informant guide, FGD guide, and document analysis guide. Document review was enriched with both the qualitative and quantitative data collected through other instruments.

3.5. Method 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 analysis was conducted based on the collected documents, discussions made with focus group and key informative staffs.

For the quantitative data, simple descriptive statistics such as percentage, charts, figures etc were 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 made use of 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 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.

3.6. Validity and reliability of research instrument

In order to increase the reliability and validity of this research project, appropriate techniques had been used when collecting and analyzing data. The researcher tried to secure validity by precisely defining major concepts, matching the items to the research questions, triangulating data sources.

3.7. 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). Focus Group discussion members and Key Informative Staffs 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 do so. 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 source of data used in this research.

CHAPTER FOUR

FINDING AND DISCUSSIONS

Introduction

In this chapter, financial source to execute operational and projects activities, electric power system efficiency and basic factors to be considered in determinations of electricity tariff of Ethiopian Electric Power and Ethiopian Electric Utility were discussed and analyzed in details. The gathered data were statistically analyzed using the required statistical tools and the results of the analysis of the data are interpreted and discussed.

4.1. Source of Funds

Ethiopia has planned to become middle income country and to transform its economy from agriculture base to industrialization by 2025(The World Bank report released on November 23, 2015). To achieve this objective, electric power is the major input for the overall economic transformation. The country has also planned that the electric sector should reach on the capacity of carrying the middle income economy before five years of getting to middle income countries category. Annual report (Ethiopian Electric Power Corporation 2009-2013; Ethiopian Electric Power and Ethiopian Electric utility 2013-2015) indicate that electric sales, local and foreign loans and government's direct investment to the sector are major source of fund to finance projects and operational activities.

For example, as of July 7 2015 the two companies get birr 17.3 billion grants and government contribution from different source including around birr 11 billion government contribution to create electric access for rural areas, birr 4.7 billion grants from various agencies, birr 30 million grant for grand Ethiopian renaissance electric dam from individuals and organizations. Getting grant and contribution has positive impact on the financial performance (cash inflow) of the two enterprises, but the amount to be contributed or granted may be very insignificant and late to budget and schedule works to finish projects on time. The annual reports and other documents show that the government gives direct contribution only for creating electric access for rural areas. Other projects including macro projects are being mainly financed from bond sales to Commercial Bank of Ethiopia and Loans from foreign Lenders. Source of funds to finance projects from 2010/11 to 2014/15 for electric power are summarized in the following table.

Table 1: EEPCO, EEP and EEU Fund Source

Source of fund	Currency	Budget Year; in Billions					
		2010/11	**2011/12**	**2012/13**	**2013/14**	**2014/2015**	**Total**
Foreign loan	Birr	1.o	1.1	6.9	6.6	44.1	**59.7**
	%	6%	4.5%	23.6%	16%	57%	**31.5%**
Bond Sales to CBE	Birr	13	19.8	18	30	28	**108.8**
	%	79%	81%	61.4%	72%	36%	**57.4%**
Own source fund	Birr	2.5	3.5	4.3	5.0	5.7	**21**
	%	15%	14.5%	21%	12%	7%	**11.1%**
Total	**Birr**	**16.5**	**24.4**	**29.2**	**41.6**	**77.8**	**189.5**

Source: EEPCO, EEP, EEU, CBE and www.eep.gov.et from 2010/11 to 2014/15 annual report

As can be seen from the above table from 2010/11 to 2014/15 budget year, 31.5% (Birr 59.7 Billion) of total fund(Birr 189.5 Billion) covered from foreign loan, 11.1% of the required fund covered from own source and the remaining 57.4% of the total required fund covered from bond sales to Commercial Bank Of Ethiopia (CBE). Within the abovementioned budget years total investment costs increased from birr 16.5 billion to birr 189.5 billion. The table also shows that within the five budget years, bond sales to CBE takes the upper hand by covering 57.4% (Birr 108.8 Billion) of the total required funds. Although own source fund share increased from birr 2.5 billion to birr.5.7 billion at the end of 2014/15 budget year, it had the smallest contribution to (11.1%) for the total investment in the stated budget years.

In GTP_II Ethiopian Electric Power and Ethiopian Electric Utility have strategic plans to start generation projects from hydro, wind, solar, geothermal and biomass which have 14,561 MWH and 69,400 GWH energy installed capacity, build 10,000 kilo meter transmission lines which have 66 to 500 kilo volt capacity, build 98 new substations and rehabilitate 50 substations, create electric access for more than 10,203 towns and villages to reach the coverage 90%, build 45,962 kilo meter medium voltage and 42,859 kilo meter low voltage distribution lines and erect 20,410 transformers and increase no of customers to 6,955,000 (EEP and EEU GTP_ II Plan, 2014/15). The financial requirements and expected source for these projects are schemed as follows.

Table 2: EEP estimated fund requirement.

No	Work to be Done	GTP_II Planned Expenditure (Birr, in Billions)					
		2015/16	2016/17	2017/18	2018/19	2019/20	**Total**
1	Generation Building	90.47	118.13	105.93	92.30	80.17	**487.00**
2	Transmissions and Substations Rehabilitation and Building	20.58	14.66	21.02	16.09	16.53	**88.88**
3	Electric Access Program	2.88	4.80	4.80	8.44	19.21	**40.13**
	Total	**113.93**	**137.59**	**131.75**	**116.83**	**115.91**	**616.01**

Source: NPC and EEP GTP_II Plan.

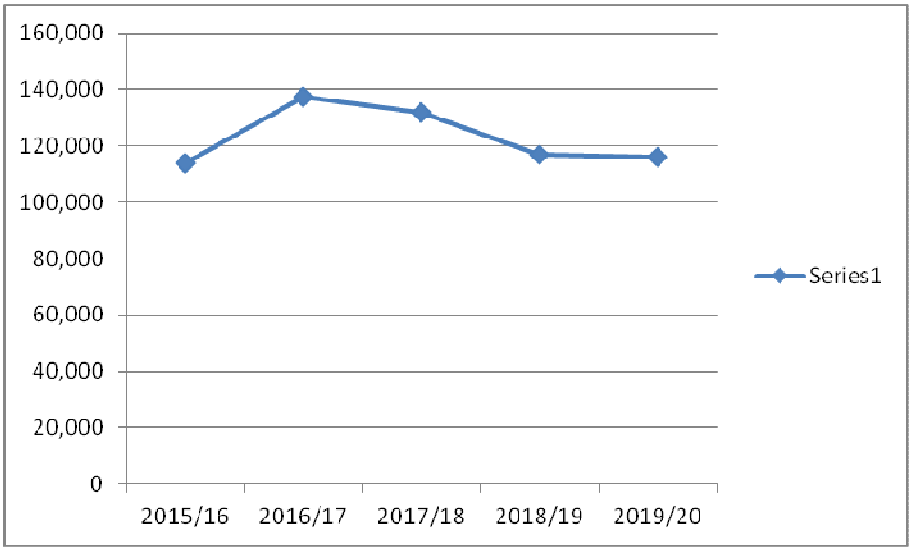

Figure 2: Yearly financial requirment for EEP(in Millions)

The above table and figure revealed that in GTP _II, of the total birr 616.01 billion planned to be invested, the generation infrastructure building budgeted to take 79.1%, transmission and substation rehabilitation and construction expected to have a share of 14.4 % and the remaining 6.5% is planned for electric access constructions. Average yearly financial requirement for GTP _II plan is Birr 123 billion. The above table and figure also show that investment of Ethiopian Electric Power on generations, transmissions and substations construction expected to decrease after 2016/17, but investment requirement for electric access creation looked forward to increase from birr 2.88 billion in 2015/16 to birr 19.21billion in 2019/20 budget year. Expected source of funds and the planned amount from each source is shown as follows.

Table 3: EEP Projects Expected Source of Finance

No	Source of Finance	GTP_II Planned Expenditure (Birr in Millions)					
		2015/16	2016/17	2017/18	2018/19	2019/20	Average
1	Foreign Loan	40%	40%	40%	40%	40%	40%
2	Bond Sales to CBE	55%	48%	42%	39%	39%	45%
3	Own Source Finance	5%	12%	18%	21%	21%	15%

Source: NPC and EEP GTP_II Plan, 2016.

As can be seen from the above table to finance GTP_II plan, the percentage (share) for bond sales to commercial Bank of Ethiopia expected to decrease from 55% to 39% within 2015/16 to 2019/20 budget year, the major source of project financing is expected to be bond sales to Commercial Bank of Ethiopia, whereas for the same period the percentage for own financing is expected to increase from 5% to 21%, but still it is the smallest source to finance the GTP_II Plan. The table also shows that there is no plan to change foreign loan financing share in the plan years. To finance the GTP_II plan EEP has a plan to get 40% of its average financial requirement from foreign loan and donation, 45% from bond sales to Commercial Bank of Ethiopia and 15% from own source of financing.

Table 4: EEU Project Estimated Finance Requirement

No	Work To Be done	GTP_II Planned Expenditure (Birr, in Billions)					Total
		2015/16	2016/17	2017/18	2018/19	2019/20	
1	Distributions	11.14	12.93	12.97	13.25	13.26	63.54

Source: NPC and EEU GTP_II Plan.

Table 5: EEU Projects' finance Source scheme/schedule

No	Source of Finance	GTP_II Planned Expenditure					
		2015/16	2016/17	2017/18	2018/19	2019/20	Average
1	Foreign Loan	15%	15%	15%	15%	15%	15%
2	Bond Sales to CBE	49%	43%	36%	33%	33%	39%
3	Own Source Finance	36%	42%	49%	52%	52%	46%

Source: NPC and EEU GTP_II Plan.

Tables 4 and 5 show that in GTP _ II, Ethiopian Electric Utility requires to invest around Birr 63.54 billion, birr 12.71 billion on average for each year, to accomplish its strategic objectives. Of which 46% planned from own source finance, 39% expected from bond sales to Commercial Bank of Ethiopia and 15% is from foreign loan. Financial requirement is expected to increase from birr 11.14 billion to birr 13.26 billion from 2015/16 to 2019/20. The share of own source fund requirement expected to increase from 36% in 2015/16 to 52% for 2019/20

budget year, but the share of bond sales to Commercial Bank of Ethiopia expected to decrease for the same strategic period from 49% to 33%. And foreign loan share is expected to remain 15% of the total required fund from 2015/16 to 2019/20 budget year.

Comparing table 2 and table 4, it can be concluded that projects under EEP are more capital intensive than projects under EEU. That is why government planned to invest more than birr 616 billion in EEP from 2015/16 to 2019/20 budget years.

The following table, table 6, shows expected fund source and scheme for EEP and EEU overall investment requirement for GTP_II plan.

Table 6: EEP and EEU merged GTP_II planned investment.

Source of Fund	Currency	Budget Year; in Billions					
		2015/16	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**Total**
Foreign loan	Birr	47.24	56.97	54.65	48.72	48.35	**255.93**
	%	38%	38%	38%	37%	37%	38%
Bond Sales to CBE	Birr	68.12	71.60	60.00	49.93	49.58	**299.23**
	%	54%	48%	41%	38%	38%	**44%**
Own source fund	Birr	9.71	21.94	30.07	31.42	31.23	**124.37**
	%	8%	15%	21%	24%	24%	**18%**
Total	**Birr**	**125.07**	**150.51**	**144.72**	**130.07**	**129.16**	**679.53**

Source: NPC, EEP and EEU Combined GTP_II Plan.

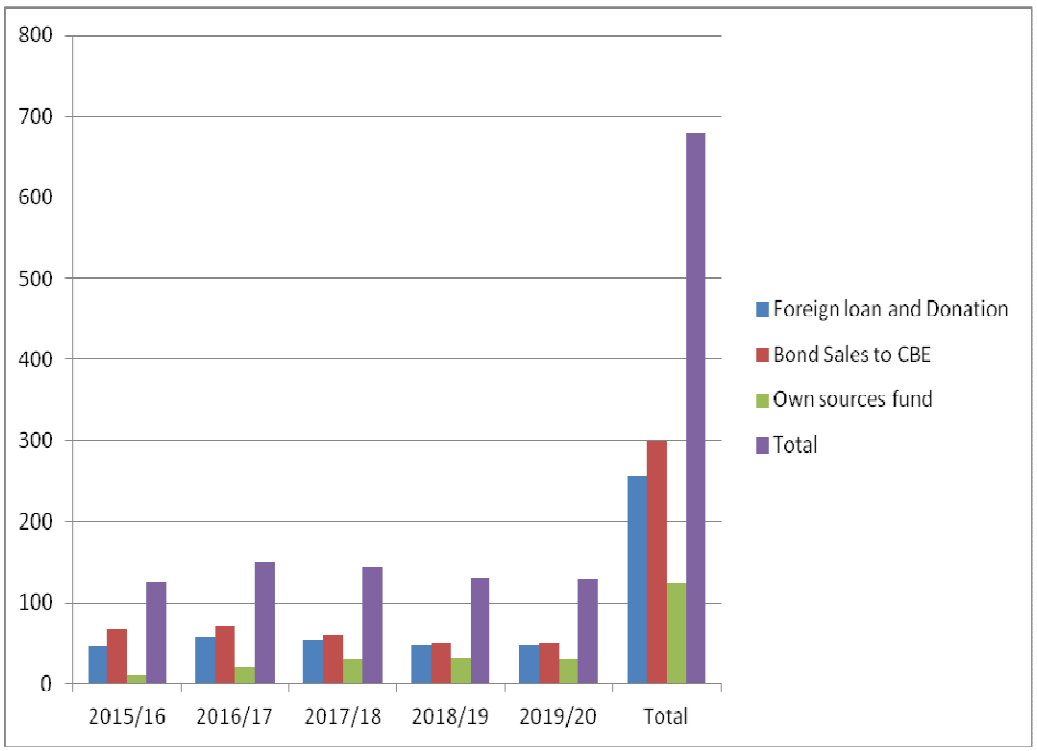

Figure 3: EEP& EEU Combined Expected fund Requirement in GTP_II Plan.

Table 6 and figure 3 indicate that the EEP and EEU have planned to invest more than Birr 679.54 billion within the second Growth and Transformation Program budget years. Within the strategic period (2015/16 to 2019/20) on average only 18% of the total investment requirement is expected to be covered from own source. 44% of the source, the largest expected source, is expected from bond sales to Commercial Bank of Ethiopia. 38% of the total fund is expected from foreign loan.

From table 1 and table 6 it can be concluded that bond sales to Commercial Bank of Ethiopia was birr 13 billion at the end of 2010/11 and it is expected to reach birr 313 billion at the end of 2019/20. This shows bond sales to Commercial Bank of Ethiopia are the main and permanent source of fund to finance electric sector infrastructures constructions. The aforementioned tables also show that at the end of 2010/11 budget year foreign loan was birr 1 billion, 6% of total investment, the share of this source of finance expected to grow to birr 255.93 billion at the end of 2019/20 by covering 38% of the total required finances. At the end of 2010/11 own source fund covered 15% of the total investment by investing birr 2.5 billion, the share of this part is expected to boost to birr 121.63 billion (18% of the total financial requirement).

Since Commercial Bank of Ethiopia is governmental public enterprise (institute), it may not be as strict as private or foreign lenders for lending these governmental projects. 38% of the finance is expected from foreign loan. Relative to local lenders foreign lenders would be more formal and strict to follow international rules and standards, so that foreign lenders may not release the finance on time. As per report of National bank of Ethiopia (2013/14) the purchasing power of Ethiopian Birr relative to American Dollar is decreasing year to year, this may expose EEP and EEU for foreign currency exchange loss which may again adversely affects the financial performance of the enterprises.

4.2. Government Subsidization

As can be seen from the above section (section 4.1) the electricity sector is capital intensive. Annual reports of former Ethiopian Electric Power Corporation, Ethiopian Electric Power and Ethiopian Electric Utility (EEPCO, EEP and EEU reports, 2010/11-2015/16) indicate that Ethiopian Government subsidizes the electric sector in different ways including direct transfer of birr 1 to 1.2 billion each year to create electric access for towns and villages, coordinates for low interest rate loan which have 3 to 10 years grace periods and 10 to 40 years instalment repayment periods from local and international lenders, looking for local and international

donations, gives guarantees for lenders, exempts the sector from paying Value added Tax(15% of the price of Goods and Services purchased) and exempted the sector from paying annual profit dividend. The government also cross-subsidizes electricity tariff, whereby one group of consumers pays higher rates for electricity to cover or subsidize lower rates for other consumers. Some of the subsidies and their effect on financial performance of EEP and EEU are discussed analyzed as follows.

4.2.1. Arranging Loans with Low interest rate, long grace and repayment period

The annual reports of the two companies indicate that one of the biggest sources of funds to finance projects is bond sales for Commercial Bank of Ethiopia. CBE purchases bond from EEP and EEU at 6% simple interest rate with three years grace period and to collect within ten years semi-annually; however, according to National Bank of Ethiopia 2013/14 annual report, from 2009/10 to 2013/14 average national Nominal Lending Rate is 11.88%. One of the biggest government subsidies for the electric sector is reflected on bond sales as shown below.

As can be seen from the above table, column A, at the end of 2014/15 budget year bond sales to CBE reached to birr 126.30 billion. The interest of the bank for buying the bond from the two enterprises changed from 5% to 6% in 2011/12 budget year. Had EEP and EEU borrowed the money by average nominal interest rate, they would have paid more than birr 38.54 billion (column G) for interest in steady of Birr 17.55 billion (column D). The interference of government saved the companies from paying additional birr 20.57 billion for interest from 2009/10 to 2014/15(column H). As the amount of bond sales to CBE increased from 2009/10 to 2014/15, the subsidy of the government was also increasing (Column H). In addition to the annual reports discussions made with focus groups and key informants show that the government reached on a decision of subsidising the sector using this approach after discussing with stakeholders. The discussion also shows that since the macro projects of the enterprises are under constructions phase, to reduce shortage of finance that the enterprises would encounter the bank prolongs the principal repayment period. There are bonds repayment schedules revised more than four times to extend the repayment period.

Table 6 indicates that at the end of 2019/20 budget year, the two companies planned to borrow additional birr 301.980 billion from Commercial Bank of Ethiopia to accomplish the strategic objectives of GTP_II. Assuming that the loans will be collected from CBE, EEP and EEU (suppose that the companies will borrow half of the planned amount at the beginning of 2019/20 which is 49,576.41/2=24.788 billion) are expected to pay at least birr 24.21((126.3+277.192=403.49)*0.06) billion for interest only at the end of GTP_II for one

year. However, if the government was not willing to subsidize the sector in this way, only for the year 2019/20 EEP and EEU are expected to pay birr 47.93 (403.49*11.88%) billion instead of birr 24.21 Billion. This analysis reveals that only for 2019/20 budget year, the government has a plan to subsidise the sector by birr 23.72 billion.

4.2.2. Facilitating foreign Loans and Other Subsidies

Ethiopian Electric Power was Established by Councils of Ministers Regulation No. 302/2013 and Ethiopian Electric Utility was established by Councils of Ministers Regulation No. 303/2013 which indicate that on 9 December 2013, when former Ethiopian Electric Power Corporation split into Ethiopian Electric Power and Ethiopian Electric Utility, the corporation had debt birr 109,392,199,714 and equity birr 46,433,340,256. The debt-Equity ratio of the company (birr 109,392,199,714/ birr 46,433,340,256) was 2.36. This shows the corporation had no enough capital to pay its loan. On the other hand the corporation had huge investment plan from own source fund, bond sales to CBE and foreign loan. And different annual company reports show that annual expenditure and expense are by far greater than the revenue they generated and expected to generate.

One of the biggest sources to finance projects, which will also expected to be the largest source at least in the next five years, is foreign loan. The companies get the loan in the form of either in cash or supplier credits. The loan could be concessional (These are loans that are extended on terms substantially more generous than market loans. The concessionality is achieved either through interest rates below those available on the market or by grace periods, or a combination of these. Concessional loans typically have long grace periods) and non concessional (provided with a market-based interest rate) or commercial loans (A commercial loan is a debt-based funding arrangement between a business and a financial institution, typically used to fund major capital expenditures and or cover operational costs that the company may otherwise be unable to afford).

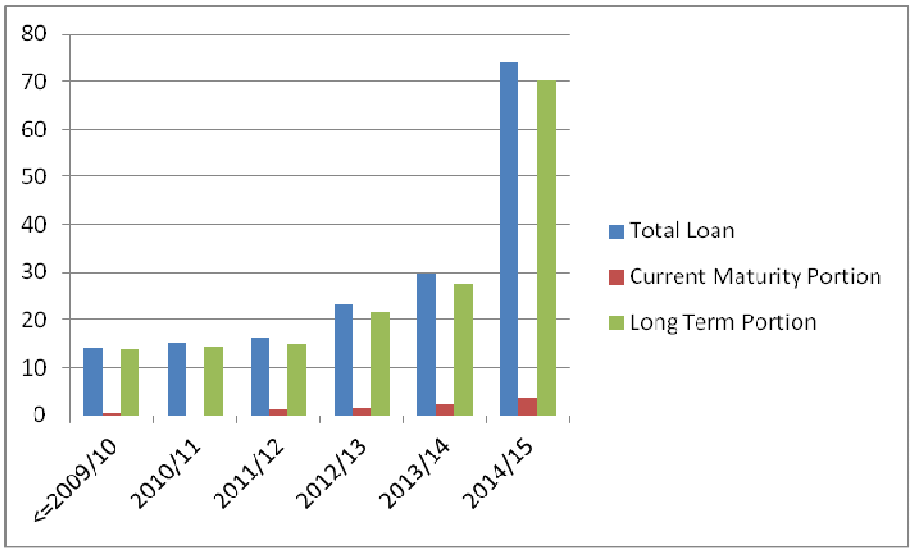

Figure 4: EEP and EEU Foreign Loan Trend

Table 8 and figure 4 indicate that at the end of 2014/15 foreign loan has increased more than fivefold of 2009/10 budget year loan and for the same period current maturity portion has increased more than eight folds. This shows that the two companies require additional fund to settle the debt.

The loans have 1% to 6% interest rate, 1 year to 10 years grace period and 3 to 40 years instalment repayment periods. For example to build a 500kilo volt Transmission line from Grand Ethiopian Renaissance Electric Dam to Dedessa then to Holeta with related substations, a $1,002,970,414 a commercial loan agreement signed between Ethiopian Electric Power Corporation and China Electric Power Equipment and Technology company limited on April 26, 2013. The loan has 5.7% interest rate, 3 years grace period and 12 years repayment period (Fortune News Paper published on April 28, 2013 [vol. 13, no 678]). From 2010/11 to 2014/15 foreign loan increased on average by birr 11,927,424,701 for each year, but reports of the two enterprise indicate that for the same period revenue of the two companies, not the profit, increased only by birr 4.2 billion.

Loan agreement documents of the two companies indicate that foreign lenders want to deal about certainty of revenue streams, financial ratios and covenants such as Weighted Average Cost of Capital, Lender Protection and termination Compensation. Lenders, especially commercial lenders, have high concern for financial performance and stand of borrowers (covenants) to lend with confidence because the covenants indicate that how much the companies are strong to pay their loans. To minimize the doubt of foreign lenders the government through Ministry of Economy and Development/Cooperation (MoFED/C)

supported and is supporting the former corporation, EEP and EEU by issuing guarantee letters for local and international lenders to protect the lenders.

4.3. Are EEP and EEU able to make investment to ensure future demand of electric power?

Ethiopia has a plan to become a lower middle income country by 2025, and EEP and EEU have taken the responsibility to produce and supply electric power that energizes the planned economy.

The above section, section 4.1, shows that EEP and EEU planned to get 38% of the total estimated fund from foreign loan, 44% from sales of bond to CBE and 18% from own source finance. To materialize the fund from these different sources the government is giving different subsidies for the enterprises such as low interest rate local loan and giving guarantee letters to protect lenders. Unless the enterprises able to complete macro projects at least according to their first time contract schedules, a huge amount of interest for bond sales to commercial Bank of Ethiopia and foreign loans, matured principal repayment for local and foreign loans additional money required to compensate devaluations of Ethiopian birr to American Dollars are expected to be paid. This indicates that EEP and EEU are not able to make investment from own source to ensure future demand of electric power. The government should support/subsidize the enterprises more strongly than the previous years.

4.4. Are EEP and EEU able to recover investment and operating costs with net operating profit?

4.4.1. Total Income

Total income of the companies relating to the service they provide can be grouped into two parts.

1. Revenue from sales of services which directly related with the purpose of the companies including sales of electricity, connection fee from new customers, service charge based on customer request such as relocating meters, upgrading meter capacity and meter service charges.
2. Other incomes which include gain on sales of property, plant and equipment, compensation on damage, sales of scrap materials, house rent, fines, club sales and other non direct services. The aggregate income statement of EEP and EEU from 2010/11 to 2014/15 is summarized as follows.

Table 9: Total Income of EEP and EEU in Billions

Budget Year	Revenue	Revenue change (%)	Other Income	Other income change (%)	Total Income	Total Income change (%)
2010/11	2.23		0.31		2.54	
2011/12	3.08	38	0.37	21.00	3.45	36
2012/13	3.93	76	0.36	16.00	4.29	69
2013/14	4.48	100	0.48	56.00	4.96	95
2014/15	5.15	131	0.55	79.00	5.70	124
Total	**18.87**	**86.25**	**2.07**	**43**	**20.94**	**81**

Source: EPCo, EEP and EEU annual report from 2010/11 to 2014/15

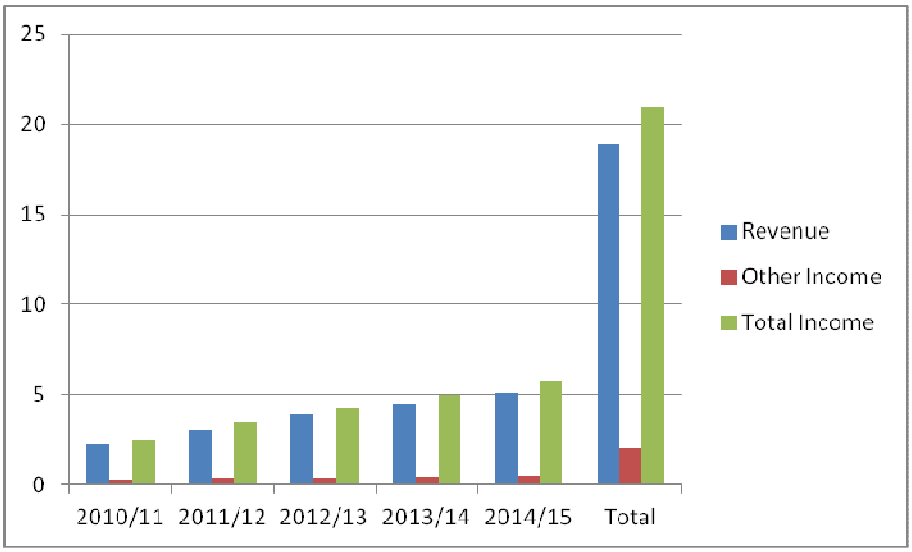

Figure 5: Income Trend from 2010/11 to 2014/15

The above table and figure indicate that from 2010/11 to 2014/15 revenue from both companies' objectives related activities and other incomes was increasing; taking 2010/11 budget years revenue as a base in 2011/12 both company objective related and other income revenues increased by 38% and 36% respectively. At the end of 2014/15 budget year the total income incremental reached to 124%. Relative to 2010/11 total revenue, from 2010/11 to 2014/15 the average total income was increased by 81% for each year.

According to the companies' 2014/15 annual report, the current 2421 mwh installed capacity is expected to be doubled when Gibe _III hydropower plant which has 1870 MW installed capacity and Genale Dawa _III hydropower plant which has 254 MW installed capacity are commissioned and energized at the end of 2016. This means that the revenue from sales of energy expected to be doubled with less amount of operating cost incremental.

2014/15 annual reports of EEP and EEU show that the average yearly objective related revenue is around birr 5.15 billion. When this is doubled in 2016/17 budget year, it becomes around birr 10.3 billion. But for the same period table 4.1.6 indicates that 15% of project costs which is around 21.94 billion is expected to be covered from own source. In addition to this 2014/15 annual EEP and EEU reports show that total income collection of the two companies is around birr 5.706 billion, but for the same period the two companies has paid birr 6.442 billion for local loan interest. This shows that the total income generated by the two companies let alone to finance other operational expenses and project costs, it cannot cover interest expense for local loans.

Since total income of the two companies could not cover interest for local loan and other expenses, the companies are obliged to pay matured portion of foreign loan (especially suppliers' credit loan), interest for foreign loans, and interest for local loans, and project costs from bond sales for commercial bank of Ethiopia. This extreme cash shortage has negative impact on project schedule and foreign lenders confidence. The change in revenue from electric sales is summarised and discussed as follows.

Table 10: Actually Generated Revenue from electric sales (in Billions)

Budget Year	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Actually Generated Revenue from electric sales	2.6	2.8	2.7	3.2	3.9	15.2

Source: EPCo, EEP and EEU Annual Report from 2010/11 to 2014/15

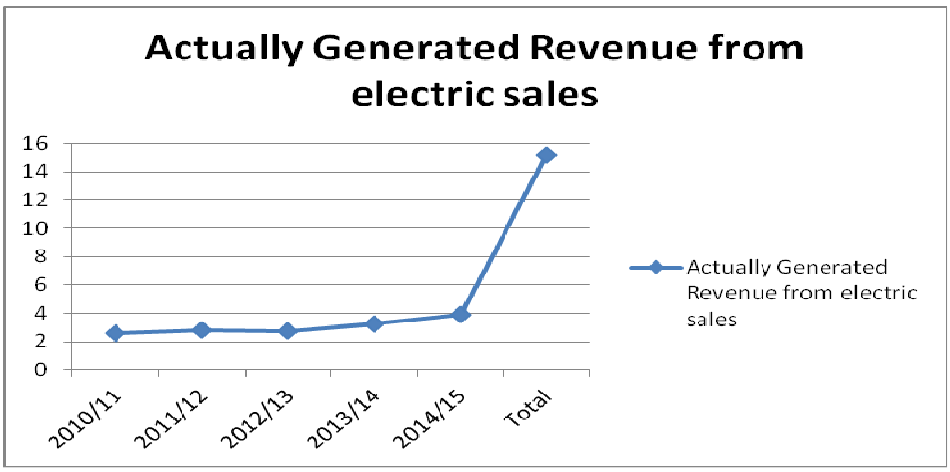

Figure 6: Actually Generated revenue from electric sales trend

Different electric power producing plants were became operation from 2010/11 to 2014/15. For example Gibe II with installed capacity of 420MWH and Beles with installed capacity of 460 MWH which are hydropower plants have become operational since 2010, Adama I with

installed capacity of 51 MWH and Ashegoda (120 MWH installed capacity) which are wind power plants have become operational in 2014. These plants, as can be observed from the above table 10 and figure 6, have increased the actual revenue generated from 2010/11 to 2014/15 budget years, however the revenue generated from the new generation plants are not able to provide sufficient and sustainable finance to back projects .

4.4.2. Electric Power Production and Supply costs and Other Expenses

Cost of production and distribution includes salaries, wages and allowance, material and supplies, productive assets depreciation to generate, transmit and distribute the produced electricity for the users. Other operating expenses of the companies include marketing and sales salaries, wages and allowance, material and supplies, non productive assets depreciation and other administrative expenses. The companies cost of production and distribution and other expenses are shown as follows.

Table 11: EEP and EEU cost and expense from 2010/11 to 2014/15

Budget Year	Cost and Expense in billions					
	Production to Distribution Cost	Production to Distribution Cost Change (%)	Operating Expenses	Operating Expense Change (%)	Total cost and Expense	Total Cost and Expense Change (%)
2010/11	1.13		1.41		**2.54**	
2011/12	0.96	(15.04)	1.24	(12.05)	**2.20**	(13.39)
2012/13	1.70	50.44	1.81	28.37	**3.51**	38.20
2013/14	2.17	92.04	2.33	65.25	**4.50**	77.17
2014/15	2.50	121.24	2.68	90.07	**5.18**	104.00
Total	**2.11**	**65.93**	**2.37**	**45.92**	**4.48**	**54.84**

Source: EEPCo, EEP and EEU 2010/11 to 2014/15 Annual Report

Table 9 and figure 7 shows that cost of production to distribution was increasing from 2010/11 to 2014/15 budget year, it was birr 1.13 billion at the end of 2010/11 budget year and reached birr 2.5 billion in 2014/15 which is inflated by 121.24%. Other operating expense amount is higher than the production to distribution cost for the stated period of time.

The above table also shows that both the production to distribution cost and other operating expense are increasing from 2010/11 to 2014/15, but when the researcher compares the operating expense change to production to distribution cost change the rate of production to distribution cost is higher than the rate of other operating expense. From 2010/11 to 2014/15

the production and distribution cost has increased on average by 65.93 percent, the other expense increased on average by 45.92 percent and the aggregate cost and expense of the two enterprises on average increased by 54.84%.

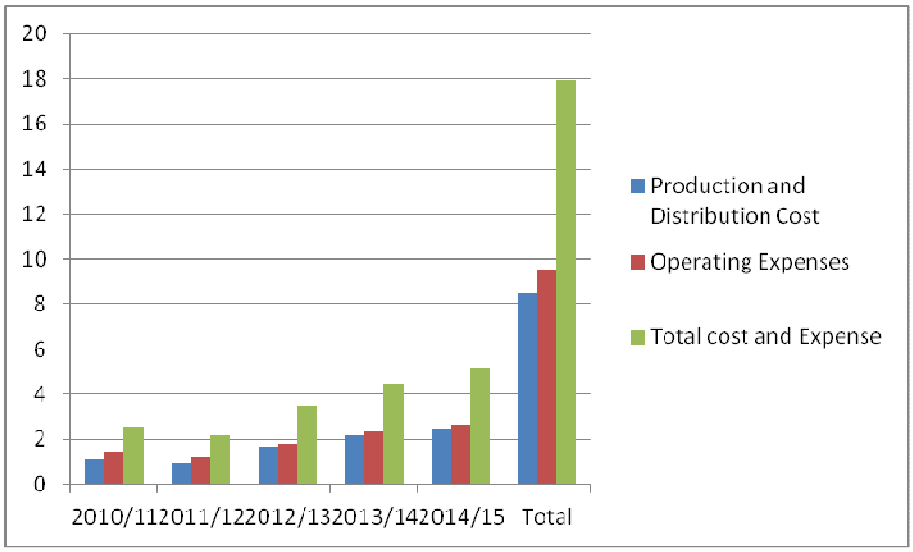

Figure 7: EEP and EEU cost and expense trend from 2010/11 to 2014/15

Both total income and total cost and expense were increasing from 2010/11 to 2014/15, total income and total cost and expenses of the enterprises are compared in the following table which is followed by its discussions and analysis.

Table 12: Total Income and Total expense of EPCo,
EEP and EEU from 2010/11 to 2014/15 in billions

Budget year	Total Income	Total cost and Expense	Profit
2014/15	5.70	5.18	0.52
2013/14	4.96	4.50	0.56
2012/13	4.29	3.52	0.77
2011/12	3.46	2.21	1.25
2010/11	2.54	2.53	0.01
Total	**20.95**	**17.94**	**3.11**

Source: EPCO, EEP and EEU annual Reports

Total income was increasing in higher rate than total expense, but the rate varies from year to year within the budgeted year. The main source of the total income was electric energy sales which were generated from hydro power plants which depends on the amount of water collected from rain or rivers by different dams. If the collected water in dams is high, higher revenue and lower production cost would be expected and the other way round is expected if the collected water is low. 2010/11 Income Statement of Ethiopian Electric Power Corporation

(EEPCo) indicates that smallest amount of profit. The main factor for this result was that enough amount of water was not collected during that time; EEPCo used diesel generators, which requires high cost, to cover some basic demands of electricity. On the other hand in 2011/12 there was enough amount of water collected and resulted the highest amount of profit which means the company didn't use diesels to produce electricity. Change in the total income and change in total cost and expense from 2010/11 to 2014/15 is compared in the following table.

Table 13: Change in Total income and Total expense and cost of Production of EEP and EEU from 2010/11 to 2014/15

Budget Year	Total Income Change (%)	Total Cost and Expense Change (%)	Profit (%)
2010/11			**0**
2011/12	36	-12.95	**48.95**
2012/13	69	38.73	**30.27**
2013/14	95	77.62	**17.38**
2014/15	124	104.26	**19.74**
Average	81	51.92	**29.08**

Source: EPCO, EEP and EEU annual Reports

The above table demonstrates that relative to 2010/11 budget year's total income for 2011/12 has increased by 36% but for the same comparison total cost and expense has decreased by 12.95% with net effect of 48.95 profits. From 2010/11 to 2014/15 both total income and cost of production and expense were increasing, but the rate for total cost and expense relative to total income change was higher which resulted in decreasing rate for profits. At the end of 2014/15 total income was increased by 124% relative to 2010/11 total income, for the same period total expense increased by 104.26%.

As per table 2 indicates that within 2010/11 to 2014/15 Ethiopia has Invested in the electric sector more than birr 189.5 billion, but the total profit, after tremendous subsidy of government, for the same period of time is around birr 3.11 billion. This shows that unless the government subsidized with the sector with different mechanism, section 4.4 of this research indicates that EEP and EEU are not able to recover investment and operating cost with net operating profit.

4.5. What were/are the main challenges to get the fund from each source?

4.5.1. Challenges for Foreign Loans

Even though the government gives guarantee for loans, the discussion made with focus groups and key informative staffs show that foreign lenders need to be highly secured for their funds than local lenders. Loan agreement documents of the two companies indicate that foreign lenders want to deal about certainty of revenue streams, financial ratios and financial covenants (such as Debt-Equity ratio, Loan Life cover ratio, debt Service Coverage ratio, Rate of Return,) Lender Protection and termination Compensation.

The loan life coverage ratio (LLCR) is a financial ratio used to estimate the ability of the borrowing company to repay an outstanding loan. The Loan Life Coverage Ratio (LLCR) is calculated by dividing the net present value (NPV) of the money available for debt repayment by the amount of senior debt owed by the company. In corporate finance, the Debt-Service Coverage Ratio (DSCR) is a measure of the cash flow available to pay current debt obligations. The ratio states net operating income as a multiple of debt obligations due within one year, including interest, principal, sinking-fund and lease payments (http://www.investopedia.com/terms).

Annual reports of EEPCO, EEP and EEU indicate that the financial ratios and covenants are not as per the lenders requirement. Some foreign lenders are not willing to release the loan on time which is a big cause for some delayed project. For example when foreign loans increase, foreign lenders pre condition requirements increase which cause finance shortage and hence projects cannot be completed as per their schedules. This has been reflected on Gibe_III HydroPower Project, Genale Dawa HydroPower Project, Tana Beles to Debremarkos to Sululta 400KV Transmission Line, and on other lots of transmission lines and substations projects (EEPCo, EEP and EEU, 2009-2014/15).

The other big challenge relating with foreign loan is currency devaluation. According to National Bank of Ethiopia annual report of 2013/14, since 2010 the average Ethiopian Birr to American Dollar devaluation is around 4.4%. This shows that at the end of each year the companies are expected to have 4.4% of their foreign loan additional fund to cover the foreign exchange losses.

If GTP_ II foreign loan expectation is secured, the loan increases on average by birr 51 billion each year. If again the Ethiopian Birr to American dollar devaluation continued by the same rate, on average the two companies will be exposed for more than birr 3.094 billion ((birr 70,268,869,257.45 +51 billion) *4.4%) for foreign currency exchange loss only for 2015/16 budget year. This has negative impact on the annual income statement of the two companies

which show the financial performance and stand of the companies by increasing cash outflows and reducing profit which again has negative impact on next borrowing.

According to the discussions made with focus group discussant and key informant, most of currently signed loans are commercial loans with a minimum of 5% interest rate and three years grace period which exposes the enterprises for other foreign interest payments.

4.5.2. Challenges for Bond Sales to Commercial Bank of Ethiopia

To achieve the second Growth and Transformation Program (GTP_II) Strategic objectives, Ethiopian Electric Power and Ethiopian electric utility estimated to have around birr 680 Billion. 44% of the estimated fund is expected from bond sales to Commercial Bank of Ethiopia. Annual budget and report of 2013/14 and 2014/15 of EEP and EEU shows that the two companies budgeted to sale bonds with a values of birr 53 billion and 65 billion respectively, but they sold bonds with values of birr 30.90 billion and birr 36 billion in each year. Regarding to the bond sales plan 58% of 2013/14 budget year and 55% of 2014/15 budget year plan was achieved. The reports and discussions with key informative staffs also indicate that most of the time the bank didn't buy the bond as EEP and/or EEU planned to sale the bond. Because of permanent financial shortage EEP and EEU are not paying interest for bonds sold to CBE from the revenue they generated, rather the bank collects its matured interest revenue from bonds intended for projects which means the enterprises sale bon to CBE to pay their annual interest expense. In addition to selling huge amount of bond each year, EEP and EEU are not paying the matured bonds, rather they negotiate with the bank to extend the bond life.(for instance bonds with 3 years grace period sold to CBE in 2004 are not still repaid). This exposes the enterprises to pay very large amount of interest expense each year. At the end of 2014/15 EEP and EEU paid birr more than 5 billion for interest of bond sales to CBE. If bonds are not sold according to their schedules, the shortage of finances cause projects for time overrun which also has direct negative financial impact on financial performance of the enterprises.

4.5.3. Challenges for Own Source Fund

18% of estimated fund for GTP_II plan is expected to be covered from own source of finances. In 2015/16 budget years EEP and EEU planned to collect birr 9.71 billion from energy sales and related services, but the unaudited income statements of the budget year show that only birr 6.3 billion was collected. Some power generating plants such as Reppi waste, Genal Dawa_III hydropower power plants were expected to be operational before or within 2015/16 budget year, but were not able to become operational. In addition to this very high energy loss

and lower average electric tariff, which will be discussed in the next section, were some of the basic reasons for lower collections. Unless at least some projects are completed as per their schedule reduced the demand supply gap, the existing electric power supplying plants would be exposed for overloading which cause for power interruption. By its very nature currently it is impossible to save powers once if it is generated. As the number of power interruption increased, it directly affects the revenue which is assumed the basic source of internal source.

4.6. Electric Power System loss

Ethiopia planned to change currently existing annual 85 KWH per capita consumptions to the lower middle income countries consumption level which is around 1,269 KWH yearly (EEP GTP_II, 2016). To achieve and maintain this objective sustainably, additional infrastructures for electric power production and delivery to customer should be constructed and the produced energy should be managed in an efficient way. System losses is one of the most essential power sector efficiency performance indicators, especially for developing countries, as it provides information about power system efficiency and overall performance of a power utility in terms of energy that it produces, procures, sells and bills to customers. Electric power transmission and distribution losses include losses in transmission between source of supply and points of distribution and in the distribution to consumers. (http://www.iea.org/stats/index.asp). The main components of power system losses are technical losses (e.g. heat or copper losses, magnetic losses, or transformation losses) and non-technical losses (e.g. meter failure, meter tampering or fraud, un-metered or illegal connections, or data encryption losses in billing and theft). Total system losses, as referred here, do not include collection losses that occur due to customer unwillingness or inability to pay, failures in billing and collections.

In the second Growth and Transformation Program, Ethiopia has a plan to reduce overall electric power system average annual loss (both technical and non-technical) from 26% to 11%. It has taken middle income countries whose electric power sources are dominated by hydroelectric as a benchmark. The benchmarked countries such as Turkey (14%), Brazil (16%), and Philippines (11%) have electric system losses. From 2010/11 to 2014/15 the energy planned to produce, produced, billed for customers and given up for power system losses are summarized in the following table which is followed by discussion, analysis and interpretations.

Table 14: Energy Produced and Billed in GWH from 2010/11 to 2014/15

Source: 2014/15 Annual Reports of Ethiopian Electric Power

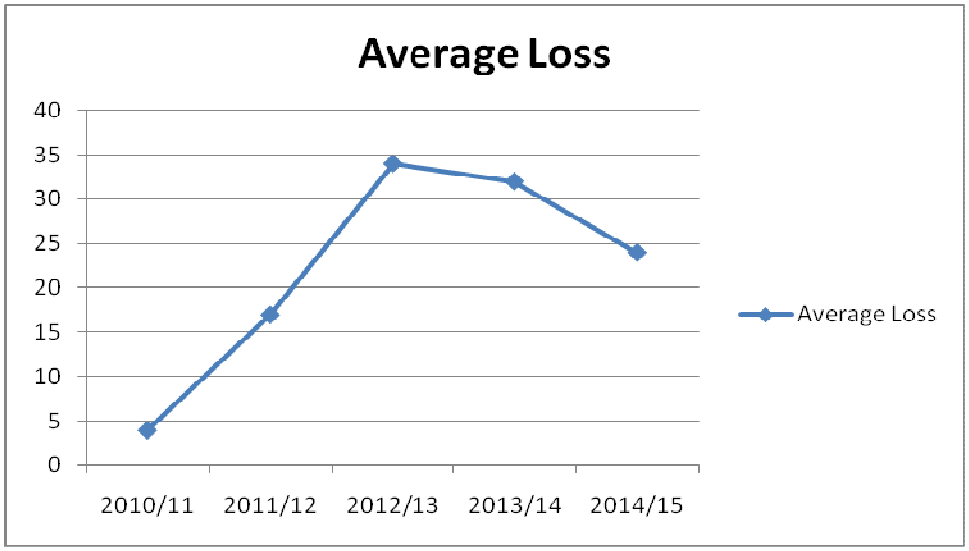

Figure 8: Electric Loss trend in Ethiopia

As can be seen from table 14 within the aforementioned budget years former Ethiopian Electric Power Corporation, Ethiopian Electric Power and Ethiopian Electric Utility have planned to produce 41,853.12 GWH energy, produced 37,010.61 GWH energy (88.4% of the plan), billed 27,150.44GWH (65% of the plan) energy and given up 9,860.17GWH energy for the five years or 1,972.034GWH or 1,972,034MWH energy on average for each year for system loss. 33.60% of its total production was lost in 2012/13 budget year. The above table and figure also indicate that electric loss is increasing from 2010/11 to 2012/13 budget year, but there is positive progress in reducing electric loss in the last two years. Average loss for the five years is 26.64%. Compared to average electric loss of benchmarked countries, electric loss in Ethiopia is very high. The overall generation performance relative to the plan for the country is 88% which requires performance improvement. The average electric system loss for the five years are compared with the annual productions of five power plants as stated underneath.

Table 15: energy produced by plants (2014/15)

No	Hydro Power Plant	Produced energy in MWH
1	Gibe I	891,941
2	Finchaa	819,188
3	Amerti Neshe	128,360
4	Awash II	66,185
5	Awash III	65,493
Total		1,971,167

Source: EEP 2015/16 report

According to 2015/16 EEP annual report, for the whole 2015/16 budget year, Ethiopia produced 1,971,167 MWH energy from the aforementioned 5 (Table 15) hydro power plants. But table 14 indicates that from 2010/11 to 2014/15 average annual energy loss was 1,972,034MWH energy. This indicates that Ethiopia scarified the whole energy produced from more than five hydropower plants for system loss every year.

Table 14 also shows from 2010/11 to 2014/15 produced 37,010.61GWH energy and 9,860.17GWH for the five years or 1,971,167MWH energy given up for system losses. Had Ethiopia put its electrical loss to 11% and using birr 0.56 per KWH as average electric tariff, it could have saved more than Birr 4.9 billion for the five years or more than Birr 982,429,632.80 million per year. It is an evidence for that the enterprises are not managing their power system loss effectively and efficiently.

Optimal range of system losses varies from system to system and from time to time. Total system losses typically range between 7% - 10% in developed countries while they are about 30%-50% in Sub-Saharan Africa. To compare system loss in Sub-Saharan African countries, it differs substantially according to the level of system losses, which ranges from 14.5% in Angola to 68% in Swaziland. (World Bank: Monitoring Performance of Electric Utilities: Indicators and Benchmarking in Sub-Saharan Africa (2009)).

Table 16: Sub-Saharan African Countries Electric system Loss

No	Country	Average Annual Loss (%)	No	Country	Average Annual Loss (%)
1	Angola	14.5	7	Benin	18.2
2	Botswana	14.8	8	Namibia	18.4
3	Burundi	15.0	9	Swaziland	68.0
4	Gabon	17.8	10	Congo	55.6
5	Cote d'Ivoire	18.1	11	Togo	46.0
6	Kenya	18.1	12	Zimbabwe	43.0

Source: world Bank 2009 Report

As can be seen from the above table most of the Sub- Saharan countries electric loss is very high. To reduce these loss countries should implement effective strategies tools. Some of recommended strategies and tools include: Conducting system energy balances to determine the main source of electricity losses, Performing targeted energy accounting by customer type and location, to pinpoint areas of highest losses, Implementing energy accounting throughout stages (geographic area, administrative area, electrical unit such as substation, feeder, transformer, etc.) to identify the locations where management should have more focus and create accountability.

4.7. Electric Tariff in Ethiopia

Ethiopian Electric Power Corporation, which was public enterprise established by regulation No. 18/1997, had been given the responsibilities to construct infrastructures for electricity production, distribution and sales of electricity for the public using electric tariff set via Ethiopian Electric agency. The corporation managed interconnected systems (connected to national grid) and self contained system (a system used only specific area mainly from diesel generator). As of December 9, 2013 the corporation was split into Ethiopian Electric Power

and Ethiopian Electric Utility. Using proclamation no 86/1997 which is now replaced by proclamation No.810/2013, Ethiopian Government has assigned Ethiopian Energy Authority to take the responsibility of review national grid related to tariff and submit its recommendation to the government for approval; and, upon approval, regulate the implementations thereof. Using the proclamation as base regulations, directives and standards are issued and principles considered during electricity price setting.

Some of the basic factors that should be considered during the tariff setting process stated in the electricity pricing procedure 1/2005 and 2/2005 are the Price Structure is required to be cost reflective, Ensure equity and fairness between different types of consumers, Accommodate customer's ability to pay, shall be designed and updated on the basis of estimates of marginal (average) costs that shall be prepared at four years interval, Generate sufficient revenues to maintain the financial viability and allow them to attract funds to finance required investments and provide incentives for electricity to be supplied and used efficiently.

However, the current price of electric tariff is set before twelve years, during this time cost of production of electricity increased more than five folds. For example the starting salary for junior engineer when the current tariff was set was birr 1041, but according to salary scale of EEP and EEU in 2014/15 the enterprises are hiring a junior engineer by birr 4,750, annual payroll cost increased from 200 million to 1.1 billion. Costs of other input, which are used to supply the electric to customers increased significantly and are increasing. Currently after the government subsidized the electric sector, the existing electric power generation costs are about nine US cents per kilowatt-hour. Nevertheless, the current average price of electricity or electric tariff is at US six cents per kWh. *(October 31, 2015 during a panel discussion at the Ethiopia Summit, dubbed "Driving Continued Growth", organized by The Economist Events and held at Sheraton Addis).* These comparisons prove that principles to consider basic factors in electric pricing setting which are stated in procedure 1/2005 and 2/2005 are violated.

In Ethiopia although tariff should include the total cost of production and supply of electrical energy and reasonable profit, yet it cannot be the same for all types of consumers. It is because the cost of producing electrical energy depends to a considerable extent upon the magnitude of electrical energy consumed by the user and his/her load conditions. Considering the basic factors set on electric price setting procedure 1/2005 and 2/2005 the pricing process should be fair, due consideration has to be given to different types of consumers (e.g., industrial, domestic and commercial) while fixing the tariff.

Taking this in to account the Ethiopian electric utility's tariff system is divided in to two types of electric utility supply each with different categories namely Inter-connected system/ICS/ and self contained system/SCS/. The former is the national grid system which interconnects the

supply from hydroelectric power plants, wind power plant, diesel power plants and one geothermal power plant. The latter is for remote areas that the national grid does not reach. It connects small scale power plants (hydropower, solar and diesel energies) to the surrounding household's off-grid.

Currently Inter-connected system/ICS/ electricity tariff of Ethiopia includes the following categories (www.eepco.gov.et).

1. Domestic Tariff/tariff 10/:- is set for the Domestic customer and its voltage range starting from 220V single phase up to 220/380 Volt three phase.
2. Commercial Tariff /tariff 20/:- is set for the Commercial or general purpose customer and its voltage ranges starting from 220 Volt single phase up to 220/380 Volt three phase. Schools, hospital, shop, church and other similar institutes are included under this category.
3. Active staff/Tariff 13/:-This tariff category is set for the EEP/EEU Active staff customer and its voltage range starting from 220 Volt single phase up to 220/380 Volt three phase .
4. Street light Tariff /tariff 30/:-Street light tariff category is set for the Street light And its voltage range starting from 220 Volt single phase up to 220/380 Volt three phase.
5. Industrial low voltage Tariff /Tariff 41/:- Industrial low voltage category is set for the Industrial Low Volt (220/380) three phase
6. Industrial low voltage Tariff /Tariff42/:-Industrial 15KV and its category is set for the Industrial 15kv industries.
7. Industrial low voltage Tariff /Tariff44/:-Tariff 44 OR Industrial 132KV category is set for the Industrial 132KV three phase.

The SCS at present has categories of domestic/tariff 15/, Commercial/tariff 25/, Active staff/Tariff 18/, Street light/tariff 35/, Industrial low voltage/Tariff 46/, Industrial low voltage/Tariff 47/ and own consumption tariff/15/. Each category has its own coefficient and Kilo Watt Hour ranges. For example, in domestic category multiply by birr 0.273 the first 50 KWH consumption, multiply the next 50 KWH consumption by birr 0.3564 and multiply above 500KWH consumption by birr 0.6943. This indicates that the existing tariff system has advantages one of which is enhance subsidizing a higher tariff category customer for a lower tariff category customer, considers the economic condition of the users, depends based on consumption and is stable for a long period of time. On the other hand the tariff system doesn't initiate down load time usage, each tariff category is a very different customer mix, and is not updated to show the real situations.

4.7.1. Revenue from Electric Power Sales

One of the biggest sources of fund to finance projects and operational activities of EEP and EEU are revenue that collected from sales of electricity to different customers group by categorising electric tariffs. Revenue generated from sales of electricity from 2010/11 to 2014/15 with different tariff categories, percentages of electricity consumed by each tariff category and the share of each tariff category on the revenue of the enterprises are shown in the following table.

Table 17 Indicates that from 2010/11 to 2014/15 from the consumed 28,150.46GWH energy birr 15.09 billion was billed using average tariff birr 0.56 per KWH. The table also demonstrates commercial, domestic, Industrial - hv (132 kv), Industrial - hv (15 kv) and Industrial – lv tariff categories of customers consumed 98.08% of the billed energy and 98.05% of the revenue is generated from the same tariff categories of customers. Furthermore, the table shows the largest amount of billed energy is consumed by domestic customers; whereas the retired staffs consumed the smallest amount billed energy from 2010/11 to 2014/15 budget years. For the same budget years the largest amount of revenue is collected from commercial tariff categories and the least amount of revenue is collected from retired staffs.

From 2010/11 to 2014/15 consumption electric power and contribution for revenue from commercial, domestic, Industrial - hv (132 kv), Industrial - hv (15 kv) and Industrial – lv interconnected system tariff categories of customers are shown in the following tables.

Table 18: Energy Consumption (GWH) by commercial, Domestic and Industry tariff Customers

No	Tariff	Budget Year;					
		2010/11	2011/12	2012/13	2013/14	2014/15	**Total**
1	Ics – commercial	1.42	1.39	1.15	1.65	1.63	**7.24**
2	Ics – domestic	1.3	1.51	1.57	1.92	2.43	**8.73**
3	Ics - industrial - hv (132 kv)	0.12	0.19	0.23	0.39	0.57	**1.5**
4	Ics - industrial - hv (15 kv)	0.55	0.54	0.69	0.56	0.85	**3.19**
5	Ics - industrial – lv	1.19	1.38	1.2	1.21	1.53	**6.51**
Total		**4.58**	**5.01**	**4.84**	**5.73**	**7.01**	**27.17**

Source: EEP and EEU annual report

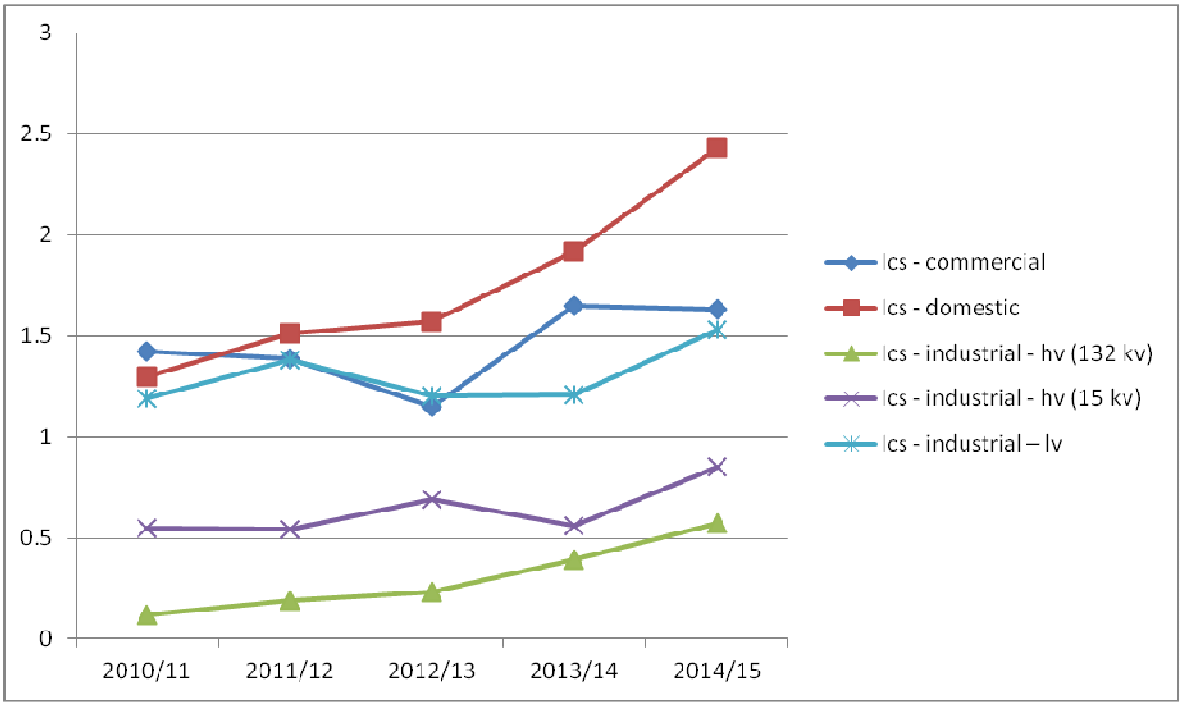

Figure 9: Consumption (KWH) by Commercial, Domestic and Industry Tariff customers

The above table and figure show that in the given strategic period domestic tariff consumption is increasing in fastest rate than the other categories; The electric access created for villages and towns by government cost, being low price of electricity relative to firewood and other bio fuels for household consumptions are some of the reasons for stepper increase of electric consumptions in domestic tariff.

Commercial and industrial (high voltage 15 kv and low voltage) tariff consumptions were also increasing, but in a fluctuating rate. Industrial high voltage (132 kv) tariff consumption was increasing constantly from 2010/11 to 2014/15.

Table 19: Revenue from Commercial, Domestic and Industry customers

Tariff	Budget Year; in millions				
	2010/11	2011/12	2012/13	2013/14	2014/15
Ics - commercial	980.41	962.29	792.23	1,137.03	1,123.73
Ics – domestic	560.73	653.57	702.89	870.19	1,142.15
Ics - industrial - hv (132 kv)	46.90	70.49	88.27	149.03	215.02
Ics - industrial - hv (15 kv)	225.04	221.05	281.86	229.76	347.54
Ics - industrial - lv	686.41	798.85	692.30	700.37	882.09

Source: EEP and EEU annual report

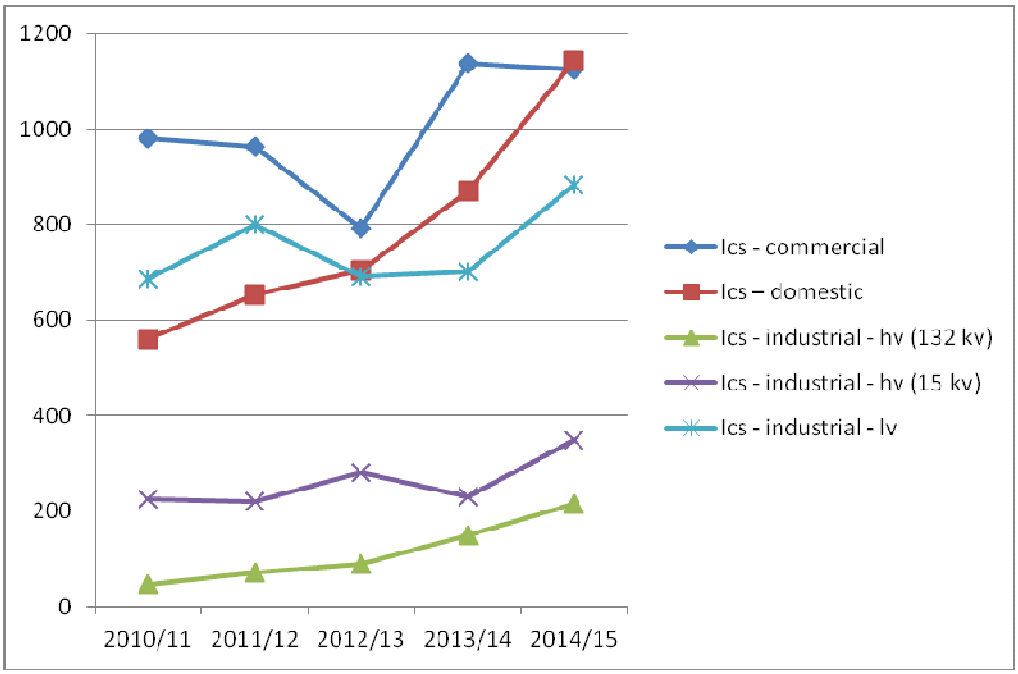

Figure 10: Revenue by Birr from Commercial, Domestic and Industry customers

The above table and figure demonstrate that revenue collected from commercial tariff categories decreased from 2010/11 to 2012/13 budget years, but after 2012/13 budget year the revenue from this tariff category was increasing in fastest rate. Revenue from domestic tariffs was increasing from 2010/11 to 2014/15; revenue from industries tariffs was also increasing.

4.7.2. Electric Tariff by countries

Africa is growing fast-and so are its power needs. Over the 5-years from 2005 to 2010, in Ethiopia, Kenya and Tanzania-GDP was growing around 13.4% per annum. And electricity demand grew more than 7% per annum. If 7% growth rate continues for another two decades, electricity needs in the region will quadruple. (International Renewable Energy Agency Report, 2010) . As can be seen from table 20 below, Ethiopia has the cheapest electric tariff compared to Eastern Africa Pool and Southern Africa Pool.

Table 20: Typical electricity tariffs in east and southern Africa

Power Pool	Country	Residential tariff US Cent per kWh	Commercial tariff US Cent per kWh
Eastern Africa Power pool	Ethiopia	6.3	7.7
	Kenya	15.4	15.9
	Tanzania	17.2	14.0
Southern Africa Power Pool	Mozambique	13.4	14.7
	South Africa	15.1	16.1
	Zambia	5.3	4.9

Source: International Renewable Energy Agency Report (2010)

The above table shows in the Eastern Africa Power Pool Tanzania has the most expensive residential electric tariff (17.2 US cents per KWH) compared to Kenya (15.4 US cent per KWH) and Ethiopia (6.3 US cent per KWH); in the same power pool zone Kenya has the most expensive commercial tariff relative to Ethiopia and Tanzania. In the Southern power pool zone South Africa has the most expense electric tariff in both residential and commercial tariff categories relative to Mozambique and Zambia. Both residential and commercial electric tariff are the lowest tariff in Zambia compared to Eastern Africa power pool and South African Power pool zone countries.

Electric tariff differs from country to country depending on factors such as source of the power, demand and supply time. The following table also shows average electric tariffs by countries.

Table 21: tariff by countries

No	Country	Average Electric Tariff US Cent/KWH
1	Ethiopia	5.6
2	China	7.5 to 10.7
3	Brazil	16.20
4	Egypt	0.7 for the first 50 kWh/Month to 9.6
5	France	19.39
6	Germany	36.25
7	India	8 to 12
8	South Africa	8 to 16
9	Turkey	12.57 to 18.63
10	UK	20.0
11	US	8 to 17 ; 37

Source: www.eepco.gov.et and www.wikipidia/electric energy rating

The table demonstrates that average electric tariff in Germany, UK, France, Brazil, Turkey and US is more than two fold electric tariff of Ethiopia. Ethiopia is selling electric to its customers approximately US 6 Cents/KWH. This will be the biggest privilege for investors mainly for those who aspire to join the manufacturing industry which consumes a lot of energy. On the other hand it is discouraging for those investors who want to produce independently and sale/export electricity. This research indicates that on one hand Ethiopia requires a very large amount of fund from internal source of fund to finance macro electric sector projects, on the other hand electric system loss is very high relative to the standards and countries which have similar source of power on top of this electric tariff in Ethiopia is very low compared to different countries in the world and the required investment.

Therefore, the government of Ethiopia has to strengthen the subsidy to the sector, control electric system power loss, has to open the door to the independent power producers and distributors, has to have incentives tariff system for those who use electricity at the time there is no high electric requirements (off time) and should add electric tariff reasonably on selected tariff categories.

4.8. Effects of Finances on EEP and EEU Physical Performance

In addition to the operational activities plans EEP and EEU have very big strategic plans to realize electric sector macro projects that require a very huge amount of financial investments. In the aforementioned sections it was discussed and analyzed that the availability and viability of finance have been affected by a lot of internal and external, controllable and uncontrollable factors which have a direct effect on the physical performance of operational and project activities of entities. The effects of financial performance on physical performance of some projects are illustrated as follows.

Table 22: projects status

No	Project Name	Feasibility study completion date	Commencement Date	Project Life	7 July 2015 project status (%)
1	Gibe III hydro power plant	May 2006	July 2006	6 years	90.92
2	Genale Dawa III hydropower plant	Augest 2007	March 2011	41/2 years	77
3	Adama II Wind Power Plant	Feb.2012	June 2013	2 years	95.81
4	Geba hydropower plant	2012	Not started	56 months	-
5	Rappie Waste to Energy	Nov, 2011	18 months	January 2014	39.28

Source: EEP 2014/15 annual reports

The above table demonstrates that projects are not commenced as soon as the feasibility study completed and the project life of Gibe III hydro power plant, Genale Dawa III hydropower plant and Rappie Waste to Energy projects construction period extended more than 30% of their initially estimated life. Adama II Wind Power Plant project is executed almost as per the initial schedule whereas Geba hydropower plant was not started even at the end of 2014/15 budget year. According to discussions made with key informants of the enterprises shortage of finance is the major cause although there are technical problems for time overruns of projects.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This part of the research deals with the summary of major findings, conclusions and recommendations that are based on the conclusion.

5.1. Summary of major findings

Ethiopia has a plan to become middle income country and to transform its economy from agriculture base to industrialization by 2025. To achieve and keep sustainably this strategic objective the country planned to have electric power infrastructure and the power that energizes the middle income economy before five years of getting to the intended economy group.

Annual reports of Ethiopian Electric Power Corporation, Ethiopian Electric Power and Ethiopian Electric utility indicate that electric sales, local and foreign loans and government's subsidy to the sector are major source of fund to finance projects and operational activities. Findings indicate that as of 2010/11 budget year the corporation had invested birr 16.5 Billion of which 79% covered from bond sales to Commercial Bank of Ethiopia, 15% covered from own source and the remaining 6% of the total required fund filled from foreign loan. From 2010/11 to 2014/15 budget year total investment costs increased from birr 16.5 billion to birr 189.5 billion; bond sales to CBE covers 57.4% of the total required funds, own source fund took a share of 11.1% for the total investment and the remaining 31.5% covered from foreign loan.

In GTP_II which ranges from 2015/16 to 2019/20 Ethiopia has a plan of investing more than birr 679.5 billion on the constructions and rehabilitations of electric power generations plants, transmission lines, substations and distribution projects. 38% of the total fund is expected from foreign loan, 44% of the required fund is expected to be covered from bond sales to CBE and the remaining 18% likely to be filled from own source of funds. At the end of 2019/20 bond sales to Commercial Bank of Ethiopia is expected to reach birr 301.98 billion and foreign loan is would rise to birr 255.93 billion.

Government of Ethiopia subsidizes the electric sector in different ways including direct transfer of birr 1 to 1.2 billion each year to create electric access for towns and villages, coordinates for low interest rate loan which have 3 to 10 years grace periods and 10 to 40 years instalment repayment periods from local and international lenders, gives guarantee letters for lenders, looks for local and international donations, exempts the sector from paying Value

added Tax(15% of the price of Goods and Services purchased) and exempted the sector from paying annual profit dividend. The government also cross-subsidize electricity tariffs whereby one group of consumers pays higher rates for electricity to cover or subsidize lower rates of other consumers. CBE purchases bond from EEP and EEU at 6% simple interest rate, when average national Nominal Lending Rate is 11.88%, with three years grace period and to pay within ten years semi-annually. If the financing scheme is implemented as per the approved plan schedule, the government subsidy to the electric sector will rise to more than birr 23.72 billion per year after 2019/20 budget year. At the end of 2009/10 foreign loan of the corporation was birr 14.21 billion, which shoot up to 73.85 billion at the end of 2014/15, but reports of the two enterprise indicate that for the same period revenue of the two companies increased only by birr 4.2 billion. This has led lenders to uncertainty about the money they lent to EEPCO, EEP and EEU.

Loan agreement documents of the two companies indicate that foreign lenders want to deal about certainty of revenue streams, financial ratios and covenants such as Weighted Average Cost of Capital, Lender Protection and termination Compensation. The other big challenge relating with foreign loan is currency devaluation. According to National Bank of Ethiopia annual report of 2013/14, since 2010 the average Ethiopian Birr to American Dollar devaluation is around 4.4%. This shows that at the end of each year the companies are expected to have 4.4% of their foreign loan addition fund to cover the foreign exchange losses.

2014/15 budget year annual reports of EEP and EEU show that total income collection of the two companies was around birr 5.706 billion, but for the same period the two companies paid birr 6.442 billion only for local loan interest. This shows that the total income generated by the two companies let alone to finance other operational expenses and project costs, it cannot cover interest expense for local loans. Since total income of the two companies could not cover interest for local loan and other expenses, the companies are obliged to pay matured portion of foreign loan (especially suppliers' credit loan), interest for foreign loans, and interest for local loans, and project costs from bond sales for commercial bank of Ethiopia. This extreme cash shortage has negative impact on project schedule and foreign lenders confidence.

Within 2010/11 to 2014/15 budget years Ethiopia has invested in the electric sector more than birr 189.5 billion, but the total profit, after tremendous subsidy of government, for the same period of time is around birr 3.11 billion. This shows that unless the government subsidized the sector with different mechanism, EEP and EEU are not able to recover investment and operating cost with net operating profit.

In the second Growth and Transformation Program, Ethiopia has a plan to reduce overall electric power system average annual loss from 26% to 11%. From 2010/11 to 2014/15 budget

years former EEPCO, EEP and EEU have planned to produce 41,853.12 GWH energy, produced 37,010.61 GWH energy (88.4% of the plan), billed 27,150.44GWH (65% of the plan) energy and given up 9,860.17GWH for the five years or 1,972.034GWH or 1,972,034MWH energy on average for each year for system loss. Average electric system loss for the five years was 26.64%. Compared to average electric loss of benchmarked countries, electric system loss in Ethiopia is very high. Had Ethiopia put its electric system loss to 11% and using birr 0.56 per KWH as average electric tariff, it could have saved more than Birr 4.9 billion for the five years or more than Birr 982,429,632.80 million per year. It is an evidence for that the enterprises are not managing their power system loss effectively and efficiently. Optimal range of system losses varies from system to system and from time to time. Total system losses typically range between 7% - 10% in developed countries while they are about 30%-50% in Sub-Saharan Africa.

Some of the basic factors that should be considered during the tariff setting process stated in the electricity pricing procedure 1/2005 and 2/2005 are the Price Structure is required to be cost reflective, Ensure equity and fairness between different types of consumers, Accommodate customer's ability to pay, shall be designed and updated on the basis of estimates of marginal (average) costs that shall be prepared at four years interval, Generate sufficient revenues to maintain the financial viability and allow them to attract funds to finance required investments and provide incentives for electricity to be supplied and used efficiently. However, the existing price of electric tariff is set before twelve years, during this time cost of production of electricity increased more than five folds. After a very large amount of government subsidy, it costs about nine US cents to produce a unit of kilowatt-hour energy, but the average electric tariff is at US six cents per kWh. In Ethiopia although tariff should include the total cost of production and supply of electrical energy and reasonable profit, it varies for different types of customers based on the amount and conditions of the customers.

The research indicates that from 2010/11 to 2014/15 from the consumed 28,150.46GWH energy birr 15.09 billion was billed using average tariff birr 0.56 per KWH of which 98.08% of the billed energy and 98.05% of the revenue consumed and billed from commercial, domestic and Industrials customers. The research also demonstrates that in the given strategic period domestic tariff consumption was increasing in fastest rate than the other categories, but commercial and industrial (high voltage 15 kv and low voltage) tariff consumptions were increased in a fluctuating rate and industrial high voltage (132 kv) tariff consumption was increasing constantly from 2010/11 to 2014/15.

Electric tariff differs from country to country depending on factors such as source of the power, demand and supply time. In the Eastern Africa Power Pool zone Tanzania has the most

expensive residential electric tariff (17.2 US cents per KWH) compared to Kenya (15.4 US cent per KWH) and Ethiopia (6.3 US cent per KWH); in the same power pool zone Kenya has the most expensive commercial tariff relative to Ethiopia and Tanzania. In the Southern power pool zone South Africa has the most expense electric tariff in both residential and commercial tariff categories relative to Mozambique and Zambia. Both residential and commercial electric tariff are the lowest tariff in Zambia compared to Eastern Africa power pool and South African Power pool zone countries. The research also confirm that average electric tariff in Germany, UK, France, Brazil, Turkey and US is more than two fold electric tariff of Ethiopia.

In general the research indicates that on one hand Ethiopia requires a very large amount of fund from internal source of fund to finance including macro electric sector projects, on the other hand electric system loss is very high relative to the standards and countries which have similar source of power on top of this electric tariff in Ethiopia is very low compared to different countries in the world and the required investment.

5.2. Conclusions

To achieve premeditated objectives and uphold the sustainability of the socio economy, the power sector has irreplaceable effect. Taking this in to account the government has given special attention especially in the last ten years. The following are the conclusions drawn from the findings of the study:

The findings indicate that one of the basic sources of fund to finance projects and operational activities is foreign loans. The cash flow of this source is hindered by different factors such as lenders prerequisites for their loan pay back securities, lenders preference to give commercial loans rather than concessional loans, currency devaluations, lenders promise keeping on amount and loan release times. According to National Bank of Ethiopia annual report of 2013/14, since 2010 the average Ethiopian Birr to American Dollar devaluation is around 4.4%. This shows that at the end of each year the companies are expected to have 4.4% of their foreign loan additional fund to cover the foreign exchange losses. As the foreign loan increases, the exposure for exchange loss is expected to increase.

These challenges expose the enterprises for serious cash flow problems which have direct depressing effect on financial performances of the enterprises. The government and enterprises should find alternative sources of finance which at least reduce the negative impact of the aforementioned challenges such as subsidizing local input manufacturers for the enterprises, working jointly with local institutes like universities to replace foreign consultants, practically reduce power system loss, increasing electric price on selected categories of customers. The other major source of funds to finance projects and operational activities is bond sales to Commercial Bank of Ethiopia. From 2010/11 to 2014/15 the enterprises invested around birr 190 billion on different projects of which 57.4% is covered from this source of finance. In GTP_II the enterprises planned to invest more than 680 billion, still 44% of this investment is expected from bond sales to Commercial Bank to Ethiopia. The findings indicate that relative to foreign loans this source of fund is more reliable and less costly, but still there are very significant challenges emanated from this source to use it as reliable and smooth sources of fund such as the bank couldn’t provide the required amount of fund on time, couldn’t solve foreign currency requirements of the enterprises, since the enterprises do not repay the matured principal the amount of interest is very large amount to pay.

Although it is the one of the instrument or channel preferred by the government to subsidize the sector for instance in 2014/15 EEP and EEU generated 9,515.06 GWH or 9,515,000,000 kWH energy. This implies only for 2014/15 budget year the government has subsidized more than birr 0.74 (birr 7 billion divide for 9,515,000,000 kWH energy) for each produced kilo watt

energy. Relative to the income of the enterprises it is expense sources of funds. Since total income of the two companies could not cover interest for local loan and other expenses, the companies are obliged to pay matured portion of foreign loan (especially suppliers' credit loan), interest for foreign loans, and interest for local loans, and project costs from bond sales for commercial bank of Ethiopia. This extreme cash shortage has negative impact on project schedule and foreign lenders confidence. Within 2010/11 to 2014/15 Ethiopia has Invested in the electric sector more than birr 189.5 billion, but the total profit, after remarkable subsidy of government, for the same period of time is around birr 3.11 billion. This shows that unless the government subsidized with the sector with different mechanism, EEP and EEU are not able to recover investment and operating cost with net operating profit.

Therefore, the government should reduces the burden of the this financing source using different alternatives such as repaying the bank loan from other sources which reduces at least the interest expenses, rather than facilitating this loan type, the government should increase the amount of direct fund injections to the sectors and enterprises should search less costly and reliable sources.

Optimal range of electric power system losses is natural and acceptable which varies from system to system and from time to time. Total system losses typically range between 7% - 10% in developed countries while they are about 30%-50% in Sub-Saharan Africa. The findings indicate that on one hand there is a serious financial shortage to finance projects and operational activities on the other hand the enterprises sacrifice more than 20% of the produced energy for power system loss which reduces the revenue of the enterprises about birr 982 million per year. Although it requires finance to reduce the power system loss, it is a resource near to cash so therefore prior focus should be given to reduce cash shortage and cascading effect on the users' side. As electric coverage and consumptions per capita increase, societies' life dependency on electric power gradually increases. This entails that every society becomes sensitive for any tariff change this is one of the reason why the government subsidizes the sector rather than adjusting the price according to the fact on the ground. After remarkable subsidy, the existing tariff do not cover the production and operation cost and is not time/season sensitive and has no incentives mechanism that provokes to use at idle time. But it has also a positive side such as it considers usage, enforces some customers group to subsidise another group. Since the negative side outweighs the positive side the existing electric tariff needs to be updated on selected customers.

The findings revealed that the physical performance of the enterprises, both on the projects and the operation activities, are negatively affected due to finical constraints; Which indicates

that finance constraints have a vicious, multi and cascading effect on the overall financial performances of the enterprises.

5.3. Recommendations

Based on the research findings, the following recommendations are forwarded to the government, EEP and EEU and other concerned stakeholders in effort they would make to devise and improve the enterprises' financial performance.

- Former Ethiopian Electric Power Corporation has been split into EEP and EEU as of December 9, 2013. One of the responsibilities given for EEP is to produce and buy electricity at bulk and sale same. Purchasing electricity at bulk from EEP and retailing to customers is given for EEU. But in contrast to the establishing regulations of the two enterprises there is no electric tariff set between the two enterprises until this research has been written. In order to properly identify and control electric system loss and finance their projects as per their schedule, the two enterprises should have their own electric tariff.

- Ethiopian Electric Power and Ethiopian Electric Utility planned to invest more than Birr 680 billion to achieve their second Growth and Transformation Program plan. 38% of the total investment requirement is expected from foreign loans, 44% from bond sales to Commercial Bank Of Ethiopia and only 18% of the total investment requirement is expected from own source. The foreign loan is exposed for interest rate fluctuations, foreign exchange currency devaluations, external financers' financial stand, external financers' interest and requirements and overall world economic conditions. The fund expected from bond sales to Commercial Bank of Ethiopia is very high which exposes the enterprises for high aggregate interest expense and matured principal repayments. These all factors hinder the inflow of cash for the projects and operational activities. Therefore, the government should find additional or alternative source of finance such as inviting Independent Power Producers, getting local suppliers' credit and should add reasonable amounts on tariff on selected customer groups.

- To maximize their mutual benefits, the government and the enterprises shall devise appropriate tariff system and alternative solutions to increase the enterprises revenue such as instead of increasing tariff in all categories, the enterprises shall devise new program for high power user industries at the night shift when there is idle power generation and encourage the industries to use with lower tariff system from the normal time tariff.

- Subsidising the electric sector and providing electricity with low price helps to attract manufacturing industries and relaxes regular users' life. To provide sufficient and reliable energy it requires huge amount of investments and relatively long period of time to return the capital. Therefore to attract investor to the sector, the two enterprises have to recommend to the concerned bodies reasonable electric incremental prices.

- The enterprises set a target to reduce the electric loss to 11%, but this requires well organized demand side management, modernizing electrical transmitting and distributing equipments, to control theft and related activities which again require high investment. Considering 11% loss as acceptable, the enterprises are losing more than birr 980 million per year which may fully finance a small project. The two enterprises shall reduce power loss by improving their power system efficiency.

- The enterprises should try to devise use soft loan financial schemes in their loan agreement and improve their financial management system to use optimally.

- The government of Ethiopia shall continue to subsidise on the energy sector and can get the return from the economy and social capital growth.

REFERENCES

Alagappan,L., R. Orans and C. Woo. 2011. What drives renewable energy development? Energy Policy 39: 5099-5104.

Anderson David R., Sweeney Dennis J. and Williams Thomas A. (2011): statistics for business & economics, Mason, USA.

Antmann, P. (2009). Reducing technical and non-technical losses in the power sector Background Paper for the World Bank Group Energy Sector Strategy. Washington, DC: World Bank. Retrievedfromhttp://siteresources.worldbank.

Barnard, H. 2010.An analysis of municipal tariff determination.

Beaton, C., Gerasimchuk, I., Laan, T., Lang, K., Vis-Dunbar, D., & Wooders, P. (2013). A guidebook to fossil-fuel subsidy reform for policy-makers in Southeast Asia. Geneva: International Institute for Sustainable Development. Retrieved from http://www.iisd.org/publications/pub.aspx?id=2801

Benchmarking Analysis of the Electricity Distribution Sector in the Latin American and Caribbean Region, World Bank Report, 2007

Bhagavan (Ed) (1999): 'Reforming the Power Sector in Africa' Zed Books Ltd, London, United Kingdom

http://ec.europa.eu/economy_finance/publications/.

http://eepublishers.co.za/printarticle/ameu-convention-2010.html.

Ethiopian Electric Power Corporation Annual Reports (2009, 2015).

Ethiopian Electric Power and Ethiopian Electric Utility establishment councils of Ministers Regulation Number 302/2013 and 303/2013.

Ethiopian Energy regulating proclamation no 810/2013 has been issued in 2014 G.C by replacing proclamation no 86/1987

Ethiopian Electric Power Growth and Transformation Program II strategic document: Plan commission Report (2014, 2016).

Financing renewable energy Options for Developing Financing Instruments Using Public Funds (2015).

http://www.investopedia.com/terms

http://en.wikipedia.org/wiki/Electricity

http://www.wri.org/publication/10- questions-electricity-tariffs

International Energy Agency (IEA). (2012). World energy outlook - Methodology for power access analysis. Paris: International Energy Agency, OECD.

International Energy Outlook (2016): U.S. Energy Information Administration Office of Energy Analysis

International Journal of Scientific & Engineering Research, Volume 4, Issue 6, June-2013

http://www.iea.org/stats/index.asp

Monitoring Performance of Electric Utilities Indicators and Benchmarking in Sub-Saharan Africa; the world Bank, 2009

Project Management Body of Knowledge (2013): A Guide to the Project Management Body of Knowledge (5th ed.), Project Management Institute, Inc. Pennsylvania, USA.

Sovacool, Benjamin K. (2012). The political economy of energy poverty: A review of key challenges. Power for Sustainable Development, 16, 272–282

Sreekumar, N., and G. Sant. 2004. Know Your Power: A Citizen's Primer on the Electricity Sector. Pune: Prayas Energy Group. Online at: http://prayaspune.org/peg/ publications/item/151.html

Tariffs and Subsidies in Zimbabwe's Reforming Electricity Industry: Steering a utility through Turbulent Times

Themarketingreview.com, 2000,1, 61-75. Writing Research Proposal.

www.worldbank.org/energy/refine

Appendices

I. Focus Group Discussion Tool

Addis Ababa University
Department of Management
Focus Group Discussion (FGD) guide

The main objective of FGD was to validate or triangulate the information collected from different documents. The discussion was held mainly with professional employees and managements of different concerned departments. Six FDGs, where each had five members, were held about source of funds to finance projects and operational activities, government's subsidy for the electric sector, basic challenges related with each source of funds, electric power system loss and electric tariff in Ethiopia.

1. Do you believe that EEP and EEU have reliable and sustainable source of funds to finance projects and operational activities? Why?
2. Do you believe that the government is subsidizing the sector as it is expected?
3. Do you think that the enterprises expected to be exposed for financial shortage to pay principal loan and interest unless electric tariff changed?
4. Do you believe that the current electric loss could be reduced significantly without investing more?
5. Do you believe that electric tariff change to the whole customer group necessary?
6. What challenges expect that encounter each source of finance? Why?

II. Key informative interview Tool

Addis Ababa University

Department of Management

Key informative interview guideline

Using semi structured interview guide interview was held with five purposely selected key informant to collect in-depth information about expectations of the management and employees

to source of funds, electric system loss reducing mechanisms, existing tariff impact on project performance, impact of purchasing power of Ethiopian birr relative to American Dollar devaluation on project performance and factors that must be considered to add electric tariff.

1. Was there enforcing factors to get commercial foreign loans?
2. Do you think the government gives more priority to electric sector projects than other projects in the country?
3. Do you think that EEP and EEU are able to recover investment and operating costs with net operating profit?
4. What are the main challenges to get the fund from each source?
5. Do you think that EEP and EEU have managed the power system efficiency to the maximum they can do with the existing financial constraints
6. Do you believe that the government properly understands the impact of foreign commercial loan on financial performance?
7. Was the current repeated power interruption directly related to revenue of the enterprises?