CASH MANAGEMENT AND REVENUE PLANNING OF NEPAL ELECTRICITY AUTHORITY

A THESIS

Submitted by:

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RECOMMENDATION

This is to certify that the thesis:

Submitted by

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Entitled

Cash Management and Revenue Planning of Nepal Electricity Authority

has been prepared as approved by this campus in the prescribed format of Faculty of Management. This thesis is forwarded for examination.

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VIVA-VOCE SHEET

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and found the thesis to be the original work of the student written according to the prescribed format. We recommend this thesis to be accepted as partial fulfillment of the requirements for Master of Business Studies (M.B.S.)

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DECLARATION

I hereby declare that the work reported in this thesis entitled **" Cash Management and Revenue Planning of Nepal Electricity Authority"** submitted to Office of the Dean, Tribhuvan University is my original work. It is done in the form of partial fulfillment of the requirements for the Master of Business Studies (M.B.S.) under the supervision and guidance of Dinesh Man Malego, Head of Research Department, Patan Multiple Campus.

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Abbreviation

A.D	- Anno Domini
A/C	- Account
A/R	- Account Receivable
ACP	- Average Collection Period
ARR	- Average Rate of Return
BS	- Bikram Sambat
BEP	- Break Even Point
CFFA	- Cash Flow from Financing Activities
CFIA	- Cash Flow from Investing Activities
CFOA	- Cash Flow form Operating Activities
CFS	- Cash Flow Statement
CV	- Coefficient of Variation
CVP	- Cost-Volume-Profit
F/Y	- Fiscal Year
FC	- Fixed Cost
GDP	- Gross Domestic Product
GDP	- Gross Domestic Product
i.e.	- That is
Ltd.	- Limited
MOF/NG	- Ministry of finance, Nepal Government
No.	- Number
NEA	- Nepal Electricity Authority
P.E.	- Probable Error
PE	- Public Enterprises
PPC	- Profit Planning and Control
ROI	- Return on Investment
S.d	- Standard Deviation
TU	- Tribhuvan University
VC	- Variable Cost

CHAPTER - I
INTRODUCTION

1.1 Background of the Study

Revenue planning is the future estimation of revenue which displays the projected sales, income and future cash inflow. The revenue planning estimates are only a guide to the level of future revenues, not a guarantee. If the economy remains strong, the planning estimates are likely to underestimate future revenues. But, if the economy fails to perform at the high level anticipated in the control, the planning estimates will overstate future revenues. The revenue planning process is a necessary part of overall profit planning and control (PPC) because (a) it provides for the basic management decision about marketing (b) based on those decisions, it is an organize approach for developing a comprehensive sales plan. If the revenue plan is not realistic, most, if not all of the other parts of the overall profit plan also are not realistic. Therefore, if the management believes that a realistic revenue plan cannot be developed; there is little justification for PPC.

Budgeting is the key to financial planning and control. Though profit planning is the essence of management and revenue planning is the starting point of overall planning process. Therefore, every business and non business organization should prepare revenue plan which is prepared on the basis of sales forecast. Systematically and properly prepared revenue planning only plays vital role for effective utilization of resources and control system.

"Revenue is the aggregate exchange value of goods and services provided to the customers. In other words, revenue is any from of income earned by the organization in an accounting period. Revenue results from the sale of goods and rendering of services and measured by the charge made to customers, client or tenants for. It also includes gains from the sale or exchange of assets other than stock in trade, interest and dividends earned on investments and other increases in the owner's equity except

those arising from capital contributions and capital adjustments. Revenue from ordinary sales or from other transaction in the ordinary course of business is some times described as operating revenue" (Bhattacharya & Dearden, 1980:137)

Cash is the most important assets for the operations of the business. It is an idle and non earning asset. Therefore, the firm should keep sufficient cash, neither more nor less. More cash balance reduce the rate of return on equity and hence the value of the firm's stock. The term cash includes coins, currency and cheques hold by the firm and balances in its bank account. Sometimes non cash items such as marketable securities or bank deposits are also included in cash. Cash management involves managing the cash of the firm to maximize firm's value by keeping ideal cash balance. The task of cash management is to determine how much cash a firm should have on hand at any time to ensure normal business operations continue without interruption. If a firm holds more cash than its requirements, shareholder's returns will not be maximized.

Cash management involves several functions such as cash planning, managing cash flows, identifying optimal cash balance and proper utilization of cash etc. The essence of cash management is the preparation of cash budget and cash flow statement which projects and identifies the inflow and outflow of cash. Thus, cash budget is also a key to the overall comprehensive profit plan. It provides measures and guide lines for effective control of cash.

Cash Management refers to the proper management of firm's cash position. It is concerned with all decision and acts that influence the determination of the appropriate level of cash and their efficient use as well as choice of the financing method, keeping in view of liquidity.

The cash and bank balance of a company is that the portion of its total current assets which is put to variables operative purpose and has the characteristics of greater divisibility liquidity and rapidity of turnover which influence the types and term of

financing. Hence, cash management is in itself a decision making area within the framework of the overall current assets management.

Cash Management has been the most intricate and challenging area of modern corporate finance as much as the management always face a trade off between the liquidity and profitability of the firm. Through most of the enterprise in Nepal have been well recognized the importance of proper cash management, they are still facing the problem of cash management.

Cash Management in public enterprise of Nepal is primarily based on the traditional practices, lacking in scientific approach. More serious aspect of cash management has been the absence of any formalize system of planning and cash budgeting in many of enterprise do have the practice of forecasting cash requirement or a form basis.

1.2 An Overview of Nepal Electricity Authority

NEA is the largest government enterprise in Nepal with country highest capital investment, assets and human resources. It has undertaken the overall responsibility for planning, construction, operation and generation of electricity in the nation.

Nepal Electricity Corporation (NEC) was established on Bhadra 2019 B.S., under Electricity Corporation Act 2019 to generate and distribute electricity in secured, efficiently, economic and orderly manner in Bagmati Zone and Bhimphedi town in Makwanpur. Before 2019 B.S, Bijuli Adda which was under the ministry of water and power used to distribute the electricity in Kathmandu valley. Bijuli Adda held monopoly power in the management of electricity till 2019 B.S. In fact, Nepal Electricity Corporation was the modified from of Bijuli Adda regarding operational areas. The responsibility of Nepal Electricity Corporation got increase in 2032B.S. to supply power in Narayani Zone. In 2032 B.S. Eastern Zone Electricity Corporation was established in Biratnagar to facilitate electricity supply to the eastern part of Nepal. In 2039 B.S. however both Nepal Electricity Corporation and Eastern Zone

Corporation were merged into a single organization, mainly three agencies namely NEC, EZEC and other electricity department, division, committees etc.

Nepal Electricity Authority was incorporated on 1 Bhadra, 2042 B.S, under the Nepal Electricity Authority Act, 2041. All format division and committees concerning electricity production, supply and distribution were (except Marshyandi Electricity Development Committee) amalgamated into Nepal Electricity Authority. Later Marshyandi Electricity Development Committee was also handed over to NEA after the completion of its construction work. NEA was established as a unified organization in Bhadra 1st 2042 B.S. The specific objectives of NEA is to generate, transmit and distribute adequate, reliable and affordable power by planning, constructing, operating and maintaining all generation, transmission and distribution facilities in Nepal's power system both interconnected and isolated.

1.3 Statement of the Problem

Revenue is the base of success of the firm. It is the aim of the business organization to maximize profit as well as to provide service. There is major role of revenue planning to provide service and in managing the organization. revenue is the heart of the organization through which other parts is function properly. There is not sure of getting revenue without planning. revenue is necessary to get profit. So, the concept of profit planning is becoming inevitable at the present time.

Cash management in public utility of Nepal is primarily based on the traditional practices, lacking in a scientific approach. A more serious aspect of cash management has been the absence of any formalized system of planning and cash budgeting in many enterprises do have the practice if forecasting cash requirement or a form basis.

NEA is the biggest public enterprises in Nepal with the biggest investment of authorized capital. There is a no market competition as other private enterprises and has higher future scope of production. Thus it should earn good net profit, which may

contribute to the development budget of country. Although, it aims to produce and distribute electricity power by service motive, it must generate profit at least to cover its cost of capital. The success of failure of any enterprises is measured on the bases of profitability or surplus. The profit depends on the systematic budgeting and financial performance. This research intends to explore the following problems:-

- What is the existing situation of revenue generation and cash management of NEA?
- Is there any gap between budgeting and actual revenue of NEA?
- Is there any relationship between total power available and loss in transmission?
- What is the financial performance of NEA?

1.4 Objectives of the Study

The main objective of the study is to analyze revenue planning and cash management of Nepal Electricity Authority. To identify problems and recommend possible remedial measures, therefore, the major objectives of the study are as follows.

- To point out existing situation of the revenue generation and cash management of NEA.
- To analyze the gap between budgeted and actual revenue of NEA.
- To analyze the relationship between total power available and losses in transmission.
- To examine the financial performance of NEA.

1.5 Significance of the Study

For the economic development and social enlistment of the country, public organizations play a vital role. So, the study of public enterprises can be useful because there have been a few studies conducted regarding revenue planning and cash management of NEA.

To specify its importance, the following points can be made:

- It will help to examine the application of cash management and revenue planning analysis of the company
- This study provide necessary recommendation for the improvement of the company
- It can be used as reference point by general public, creditors, investors, employees, shareholders of the company, local community, researcher of this area and others.
- It will provide information on the application of the tools under profit planning and cash management in different circumstance.

1.6 Limitation of the Study

Each and every research has some limitations. Basically, not availability of required data and information would be the major limitations of the study. The study has been conducted with the following limitations.

- Last five fiscal years data is taken the basis for the study.
- The study has based on secondary data.
- The accuracy of this study has based on the response and the data available from the management of the company.
- Due to limited time and resource constraint, these studies is neither the comprehensive nor extensive.
- The study has covered only the cash management and revenue planning .
- This study only concernes with fulfilling the partial requirement in Master of Business studies (MBS)

1.7 Organization of the Study

The whole study has been prepared in line with prescribed format and structured into five sections as follows: Chapter One is Introduction. It entitles "Introduction ". The reading materials in this chapter are general background of the study, overview of NEA, statements of problems, objectives of the study, significance of the study, limitations of the study and organization of the study. Chapter Two is Review of Literature. This

chapter is concerned with "Review of Literature". The various books, publications and previous unpublished research works have been reviewed. Chapter Three is Research Methodology. This chapter "Research Methodology" consists of the research design, sources of data collection and procedure. Tools used for analysis. Chapter Four are Data Presentation and Analysis. This chapter "Data Presentation and Analysis" presents of data collected from various sources by using various financial and statistical tools. This chapter also includes major findings of analysis. Chapter Five is Summary, Conclusions and Recommendations. This chapter "Summary, Conclusions and Recommendations" gives important suggestions to the concerned organization for the better improvement.

CHAPTER - II
REVIEW OF LITERATURE

2.1 Conceptual Framework

This chapter in concerned with the review of relevant literatures available in the books, journals, articles, research reports, newspapers, magazines, policy documents which are published or unpublished. Every study is very much based on past knowledge, study and experiences. The past knowledge or the previous studies should not be ignored as it provides foundation to the present study. Various thesis works have done in different aspects of nonperforming assets of different organization are also reviewed for the purpose of justifying the study. This chapter consists of two parts-theoretical Framework and Review of Related Studies. In theoretical framework, review of what has been written in academic books is carried out while review of related studies is further dividend into review of journals and review of master degree thesis.

Review of Literature refers to the reviewing of the past studies in the concerned field. such studies could be thesis/dissertations that are written earlier, books, articles, journals and any other publications concerning the subject matter, which were written prior by a person or an organization. The purpose of this literature review is to get acquainted with what has been accomplished in the concerned subject matter and what is yet to be studied and for tells worthiness of the study being undertaken.

2.1.1 Cash Management

The term cash is defined in various ways as per context. For instance, from an economist's point of view, cash is the means to satisfy human wants, whereas a lawyer states that is the legal tender of money issued by the government of the state. On the contrary, when it comes to the financial literature, cash is defined in yet another fashion from earlier definitions.

The term Cash Management is concerned with the management of current assets and current liabilities of the business, which is necessary for day to day operation. Cash management is concerned with the decision regarding the short–term funds influencing overall profitability and risk involving in the firm. The Management of cash has been regarded as one of the conditioning factors in the decision-making issues (Saksena, 1974; 31).

2.1.2 Revenue Planning

Revenue planning is the future estimation of revenue which displays the projected sales, income and future cash inflow. In other word, revenue planning is the projection of future income in advance for a specific period. Revenue plan provides the basis for management decision about marketing and other activities. It can be said that it is an organized approach for developing a comprehensive sales plan.

The revenue planning estimates are only a guide to the level of future revenues, not a guarantee. It the economy remains strong, the planning estimates are likely to underestimate future revenues. But, if the economy fails to perform at the high level anticipated in the control, the planning estimates will overstate future revenues.

"The logical starting point in developing the revenue planning is the estimates of sales. It does not follow, however, that the revenue estimation can be considered in isolation or that once the revenue estimates has been computed, the other elements of revenue and expenses will fall into place. There is circular relationship between sales and some expenses. In fact, the level or amount of certain expenses may have a considerable influence on the revenue. For example: the relationship between advertising and sales" (Finney, Miller, & Herbert 1963:389).

2.2 Review of Journal and Articles

W.J. Baumol, at his article "The Transaction Demand for cash: An inventory theoretic Approach" a quarterly journal of economics (vol. LXV, NOV 1952) identifies cash

maintenances as analogues to inventory maintenance and demonstrates that the model of economic order quantities that is applicable to inventory management is perfectly applicable in cash management too. He has presently model in view of minimizing the opportunity cost of holding cash and maximizing the return on the available funds, the cash balance should be maintained at a minimum level and the funds not required from immediate use be invested in the marketable securities.

The study conducted by Radhe Shyam Pradhan in a topic of "The demand for cash by corporation" has been useful to take knowledge regarding demand of cash.

Review of economic survey (2001/02, 2002/03, 2003/04)

The latest annual report on financial status of public enterprises (PES) published by ministry of finance has further highlighted the darker side of these government owned enterprises compared to previous financial performance.

As regards to the financial performance PES, most of them have incurred operating losses. In FY 2002/03 aggregating Rs. 1.61 billion, mainly due to operating loss of Rashtriya Banijya Bank amounting to Rs. 3.25 billion. During this period, profit level of public utility enterprises has been positive, losses of service and social sector has transformed into profit. Operating losses of PES belonging to industrial and trading sectors, however, has gone up. For instance, profit level of PES like Janakpur cigarette Factory, Industrial District Management Ltd, Nepal Telecom Company, Rashtriya Beema Sanstha and Citizen's Investment Trust have been going up. Similarly, Nepal Transit and warehousing management company, Royal Nepal Airlines, Nepal Television, Nepal Industrial

development Corporation are making operating profits from losses in FY 2002/03. At the same time, losses of Dairy Development Corporation, Royal Drugs Ltd and Agricultural Inputs co. have come down. Aggregate operating profit of PES in FY 2003/04 is estimated to improve further totaling Rs. 3.89 billion. The reason behind this optimism is reduction in losses of trading sector, recovery of loss-making financial sector into profit-making one, and increase in the profit of public utility sector. In FY 2001/02, net capital investment in the PES totaled Rs. 150.09 billion, which dropped to Rs. 97.23 billion in FY 2002/03. The reason for this drop in net capital investment is the decline in investment level in Public utility and financial sectors. Such investment in FY 2003/04 however, is estimated to reach Rs. 128.56 billion because of reversal of FY 2002/03 capital investment scenario. Net capital investment or profit ratio in FY 2001/02 was negative 3.65% which improved a little to minus 1.66% in the following year. The ratio is estimated to further improve into positive by 3.8% in F.Y. 2003/04. These above literature reviews indicated that almost all of the public enterprises are operating under loss. The financial performances of this PES have been seen disappointing. Cash management is no doubt an internal part of finance functions, and research undertaking on cash management function is one of the rarest undertakings as seen in T.U. Central Library.

Pandey (1997) has described some conceptual ingredients, which are based on his various research studies. We can learn lesson from it and helpful for this study indeed. He has described various except of cash management which are as follows; fact of cash management, motives for holding cash, cash forecasting and budgeting, managing the cash flows, counting disbursement, determinant of the optimum cash balance.

We also received some theoretical concept on the component of cash management from Van Horne books. He has categorized the various component of cash management. These are the functions of cash management; managing collection, transferring funds, concentration banking, lock-box system and other procedures, control of cash disbursements, payroll and dividend disbursements, zero balance account, electronic fund transfer, balancing cash and marketable securities, model for determining optimal cash.

Pradhan (2004) explained about cash and it management. He told that cash includes coins, currencies, cheque hold by a firm, and balances in its bank account, this money is immediately useable to pay bills. Some times near cash items are also included in cash, e.g., marketable securities. If the firm has excess cash, it may decide to convert it to short term investments. The financial manger will purchase low risk, high liquidity money market instrument that can be converted back to cash without delay if the need arises. The securities provide a small profit on cash that may not be needed immediately for the firm's operation. These securities are widely used as short term investment by the firm's operation. These securities are widely used as short term investment by the firm in developed countries. Each security offers different characters that make it suitable for different firms. He said cash management is also called management of money position because cash includes not only the cash or current in hand but also he readily convertible securities or other near cash items, e.g. time and demand deposit, readily available credit and so on. According to him concerning area of cash management areas of cash management are

- Management of cash flows into and out of the firms
- Management of cash flow within the firm
- Management of cash balance held by the firm at a point of time

2.3 Review of Related Studies

Joshi (2004) has made research on Revenue Planning and Cash Management of NEA. In this study Mr. Joshi has pointed out following objectives and major findings.

Objectives:-

1. To examine revenue planning, polices and practices of NEA;
2. To analyze the relationship between sales and production;
3. To make comparative study of revenue generation of NEA from different sector;
4. To review cash flow from operating, financing, and investing activities;
5. To make suggestion effective of revenue mobilization of NEA;

Major Findings:-

1. NEA has a practice to increase 10 percent in past year figure to forecast next year's figure as a basis for forecast.
2. Average achievement of actual sales unit is consistent with internal sale but higher in external sales. In indicates that the budgeted sales planning is less consistent with external sales market. Similarly, average achievement of sales revenue is also satisfied and highly consistent with internal and very small difference in external.
3. Category-wise revenue analysis of NEA shows that the achievement in domestic, non-commercial, commercial, streetlight, temple categories are more heterogeneous than budgeted. Community sale achievement is too high. It means there is some problem in planning.
4. Category-wise analysis of NEA shows that the major contribution of domestic and industrial categories to consumption of sales unit and increased in sales revenue.
5. Cash position of NEA shows that the cash from operating activities is in decreasing trend. It means, operating cost of NEA is too high. Similarly, the cash from investment activities is in highly increased up to 2057/58. Thereafter decreased but its return is very poor. It indicates that the utilization of assets is very poor. The cash from financing activities is highly increased in F.Y 2056/57. Thereafter, it is decreased.

Dahal (2005) has made research on Profit Planning System & Financial Conditions of NEA. In this study Mr. Dahal has pointed out following objectives and major findings.

Objectives:-

1. To examine the present planning premises adopted by NEA on the basis of budgeting;
2. To observe the NEA's profit planning on the basis of overall managerial budgeting;
3. To analyze the variances between budgets & actual achievement of the authority;
4. To assess the financial performance of NEA;
5. To recommend measures to be taken instantly and further to encounter with the identified budgeting and profit planning problems;

Major Findings:

1. There is positive and perfect correlation between budget and achievement of NEA is higher than the budgeted sales.
2. NEA ahs a practice of preparing both strategic long-range and tactical short-range profit plan.
3. Actual sales are less than actual production and it indicates the remarkable loss of power in NEA.
4. Total assets turnover ratio, profitability ratio and return on net capital employed ratio are not perfectly satisfactory.
5. There is perfect positive correlation between actual sales and actual production.

Bhatta (2006) has made research on Revenue Planning and Cash Management of Public Utility in Nepal, a case study of Nepal Telecom. In this study Mr. Bhatta has pointed out following objectives and major findings.

Objectives:-

1. To analyze the gap between budgeted and actual revenue and its demand;
2. To examine cash collection and disbursement;
3. To review cash flow from operating, financing and investing activities;

4. To have information, control and security over cash balances and payment systems;

Major Findings:-

1. Sales budget shows ISD sector's sales revenue is main revenue sources of Nepal Telecom, which contributes more than 40% in average.
2. Because of high demand of Telephone line there exist small gap between actual production and actual sales in lines.
3. Correlation and coefficient value shows that there are positive correlation between budgeted and actual sales units and Rs. By the regression line, it is clear that future revenue will increase with compare to budgeted if other things remaining same.
4. Revenue per employee is increasing trend but Nepal Telecom has not incentive or motivating planning to promote employees.
5. The collection of receivable from the customers in the company is very small decreasing year by year. It denotes efficiency of Nepal Telecom to collect its revenue in time. But A/R is low increasing in F/Y 2059/60. The decreasing trend of average collection period has shown the improvement of credit management and strict credit policy of the company.

Neupane (2007) has made research on A Study of Cash Management in Nepalese Public Enterprises, a case study of Salt Trading Corporation Ltd.; In this study Mr. Neupane has pointed out following objectives and major findings.

Objectives:-

1. To avail the daily necessary things to the general people in the reasonable price;
2. To carry out the export and import business;
3. To act as an agent for domestic as well as foreign companies;
4. To make investments in new as well as old industries;
5. To import and distribute chemical goods and fertilizer;

Major Findings:-

1. **Cash Management in the STCL is primary based on the traditional practices lacking in scientific approach. A more serious aspect of cash management has been the absence of any formalized system of cash planning and cash budgeting in STCL.**
2. The STCL could not make the best use of available cash balance prudently.
3. The average cash turnover time in a year is found 40 times which is in fluctuating trend over the study period.
4. Management has taken liberal credit policy to sales of goods. Hence, the cash and bank balance of the study period is minimal of account receivable.
5. Modern practices with respect to debt collection, monitoring the payment behavior of customers and relevant banking arrangements in connection with collection of receivables have been virtually ignored in STCL.
6. No optimum cash balance is maintained. The cash & bank balance with respect to current assets has been fluctuating trend similar is the case with respect to the total assets.

Thapa (2008) has conducted a research on the topic " Profit planning and control: A case study of Nepal Telecom. Mr. Thapa has pointed out the following objectives and major finding.

The main objectives of the study were.

1. To examine the present comprehensive profit planning system applied by NTC.
2. To evaluate the targeted variable and actual variables of NTC.

3. To analyze the gap between budgeted and actual revenue.
4. To examine the financial performance of NTC.

The major findings were as follows.

1. NTC is lacking the proper System of Performance report.
2. NTC has not practices of control policy considered controllable and inconsolable variables affecting the organization.
3. The sales plan and achievement is satisfactory to some extent.
4. Financial Performance of NTC is not so good.
5. NTC does not consider the use of flexible subjective.

Shrestha (2009) has made research on Profit Planning in Public Utility Sector of Nepal – A case study of NEA. In this study Mr. Shrestha has pointed out following objectives and major findings.

Objectives:-

1. To examine profit planning system applied by NEA;
2. To analyze the financial performance of NEA by using various financial tools;
3. To observe the various functional budgets of NEA associated with comprehensive profit planning;
4. To evaluate budgeted and actual achievement of NEA;
5. To provide a package of recommendations and suggestions to be taken instantly and further to be encountered with identified budgeting & profit planning problems on the basis of findings;

Major Findings:-

1. Budgeted sales are more variable than actual sales.
2. Budgeted production is more fluctuating than actual production.
3. Authority formulates various functional budgets as a part of comprehensive profit plan.
4. NEA has been paying a large amount of interest on long term loan.
5. Power leakage is significantly high in NEA.

Upreti, (2010) has conducted a research on the topic " Profit Planning and Control in Agriculture Development Bank Limited". Mr. Upreti has pointed out the following objectives and major findings.

The main objectives were as follows

1. To study and examine the financial performance of ADBL.
2. To analyze the various functional budget.
3. To evaluate present planning adopted by the bank.
4. To examine the variance between estimated and actual profit of the bank.
5. To provide suggestions for improvement in the overall profitability of the bank on the basis of study results.

The major findings of the study were as follows.

1. Specific goal and financial targets are not defined clearly to achieve the basis objectives of the bank.
2. The decision making process is highly centralized.
3. The bank has not practiced the short term and long term planning properly.
4. The revenue targets, in most of the year are under estimated. As a result there is high difference between target revenue and revenue achievement.
5. Actual revenue of the bank in the last years is in increasing trend, which shows the positive sign of the bank.
6. There is inadequate profit planning due to lack of planning experts.
7. Political situation is the major affecting factor to the banking activities.
8. Lack of investment in the productive sector, fluctuation of liquidity in the market, competition in the banking sector, strike, lockout and unsuitable situation within country are also the major affecting factors to the banking activities.
9. Advanced training to the personnel is lacking.
10. Controlling functions of the branches are so for being carried out directly by head office, which may be difficult in the days to come because of its wide geographical coverage.
11. Bank’s deposit collection is continuously incasing but loan disbursement is in decreasing trend.

12. Interest income of the banks is the highest among income items of the bank every year.

2.4 Concluding Reworks

This topic is also called the difference between the previous researches and the current research. Most of the past research studies are about profit planning system of public enterprise. The previous researches did not disclose which of the profit planning and control tools are in practices and which are not and why? The researcher could find only three research study so far that has been related to revenue planning of NEA. But these research studies were not analyzed the cash management system of NEA. So, there exists a research gap between the present and past researches. This research is conducted to fill up this research gap.

This research is a case study research. It is mainly based in secondary data. This study has tried to indicate the role of revenue planning and cash management and how effectively NEA is practicing the revenue planning and cash management system. This study has analyzed the financial position of NEA by applying the tools of ratio analysis and other mathematical and statistical tools. Finally it concludes the various findings of research and recommendations of NEA.

CHAPTER -III
RESEARCH METHODOLOGY

3.1 Introduction

Researcher needs sequential steps to adopt realistic study or studying a problem with certain object/objects in view. So that, Through Research methodology researcher can get appropriate guidelines and knowledge about the various sequential steps to adopt a systematic analysis. Research Methodology is the investigation tools of any certain area and it means clearly observation of certain objective. Research is the process of systematic and in-depth study or search for any particular topic, subject or area of investigation backed by collection presentation and interpretation of relevant details or data.

3.2 Research Design

The research design is an organized approach and not a collection of loose unrelated parts. It is an integrated system that guides the researcher in formatting, implementing and controlling the study. Useful research design can product the answers to the proposed research questions. The research design is thus an integrated frame that guides the researcher in planning and executing the research works.

Data and information are the lifeblood or major portion of any study. This study would be attempted to show the relationship between revenue planning and cash management for solving the problems that has accrued in NEA. A study design is the arrangement of the conditions for collection and analyze of data in manner that aims to combine relevance to the study purpose with the economy in producer. These studies will an intensive based on analysis of the past financial performance.

To fulfill the objective of the study secondary data is used and study design will descriptive as well as analytical.

3.3 Population and Sample

Population refers to the entire group of people, events, or things of interest that the researcher wishes to investigate. Or the population means the large group from the samples is drawn. The large group about which the generalization is made is called the population under study, or the universe, and small portion on which the study is made is called the sample of the study. The present public enterprises are the population of the study and NEA is selected as sample for the evaluation. Similarly, financial statements of years (beginning from the fiscal year 2007/08 to 2011/12) are covered as sample for the purpose of the study.

3.4 Nature and Sources of Data

This study is mostly based on secondary data. However, some primary data or information has been obtained through informal discussions with the executives and other staff of the company. Secondary data has been collected from annual published accounting and financial statements of NEA, thesis related to this field, other publication of the organization, Central Bureau of Statics etc.

3.5 Data Gathering Procedure

The research has been done within three months. The first one month has taken for the data collection, next month for analyzing the collected data and last one month for the preparing of the research report more prescribed and systematically.

3.6 Data Processing and Presentation

The information and data obtained from the different sources are in row form. From that information, direct presentation is not possible. So it is necessary to process data and converts it into required form. After then only, the data are presented for this study. This process is called data processing. For the study, only required data are taken form the secondary source and presented likewise, in some case graphical presentation is also made. For presentation, different tables are used. Likewise, in some case graphical presentation is also made. The calculations that are related to this

study are done with the help of scientific calculator as well as computer software program.

3.7 Research Variables

Sales revenue, production (Electricity line capacity installation) capacity utilization, profit & loss, total assets, profit margin, total capital employed, account receivable (debtor), cash flows, capital expenditures relating to long term and short period of NEA were the research variables of this present study.

3.8 Tools and Techniques Employed

This research was confined to examine the revenue planning and cash management of NEA. Therefore, the collected data were presented and demonstrated in suitable tables, formats, diagrams, graph and charts. Such presentations were interpreted and explained whenever necessary. To analyze the secondary data collected from various sources different financial, statistical and mathematical tools are used.

The financial tools used were –Profitability ratio, gross profit ratio, Net profit ratio, Return on assets(ROA), Return on capital employed(ROCE), Leverage ration, Debt to total capital ratio, Liquidity ratio, Current ratio, Quick ratio, Turn over ratio, Capital employed turnover ratio, Total assets turnover ratio, Fixed assets turnover ratio, Inventory turnover ratio(I/T) ratio, debtor turnover ratio, average collection period, cash flow budget, analysis of cash turnover, account receivable to cash and bank balance etc.

The statistical and mathematical tools used were - average, standard deviation, coefficient of variation, correlation coefficient regression analysis, percentage and mean etc. All the data and information were collected from secondary sources which were properly synthesized, arranged, tabulated and calculated to serve the objectives of the study.

CHAPTER -IV
PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

Data presentation and analysis are the central steps of the study. The main purpose of this chapter is to analyze and elucidate the collected data to achieve the objective of the study following the conversion of unprocessed data to an understandable presentation.

4.2 Cash Management of Nepal Electricity Authority

Cash is the life blood of any organization. Without cash no business activities can be taken place. So, it is necessary of any organization to manage cash properly. For the proper management of cash the concept of cash budget and cash flow is an important aspect in the world of business.

(A) Cash Budget of NEA

A cash budget shows the planned cash inflows, outflows and the ending position by interim period for a specific time span. Company should develop both long term and short term plans about their cash flows. A cash budget basically, includes two parts (i) the planned cash receipts, (ii) the planned cash disbursements. Planning of cash inflow and outflow gives the planned cash position for the budgeted period. Planning the cash inflows and outflows will includes (i) the need for financing probable cash deficits or (ii) the need for investment planning to put excess cash to profitable use.

NEA prepares short term cash budget with systematic way. NEA estimated its probable cash receipts and disbursements. The primary sources of cash inflows of NEA is sales of electricity, income from other services, interest income, and amount received from Government etc. Similarly, the major elements of cash outflow are

capital expenditure, interest on loan; amount reimbursed to Government, investment in small and major hydropower projects.

The following table shows the cash budget of NEA from fiscal year 2007/08 to 2011/12.

Table 4.1 Cash Budget

Nepal Electricity Authority (NEA)

From F/Y 2007/08 to F/Y 2011/12

Particular	2007/08	2008/09	2009/10	2010/11	2011/12
Opening Stock of Cash	741806	633990	1252500	874837	1006742
Cash Collection:-					
Electricity Sales	11390542	11569334	12235300	13488000	14739700
Income From Other Services	430000	627000	693000	537976	688000
Interest, Bonus, & Other income	170000		49700	306024	434600
Short-term& Long-term loan					3500000
Received From Government funds:					
Electricity Charge (Govt. Office)	500000				250000
Street Light Charge		300000	250000	250000	250000
Development fund	5758600	5020000	6360000	6754700	6120462
For Reinfrastructuring	100000	100000	50000		
Total Cash Collection/ Available(A)	**19090948**	**18250324**	**20890500**	**22211537**	**26989504**
Cash Disbursement:					
Operating Expenses	2491824	2606720	3178300	3631494	4288321
Long-term Interest Expenses	2718310	1750000	1343000	1200000	720000
Short-term Interest Expenses	20000				
Electricity Purchase	4968450	4950000	5160000	5822000	8522794
Royalty Payment	605276	700000	741000	600000	969383
Income Tax Payment	200000	50000	9000		
Capital Expenses	927042	910000	1118000	1080520	1306265
Reconstruction of Infrastructure	100000	100000	50000		
Investment on Project Approved by Govt.:					
By Government Sources	528600	990000	1110000	746700	3047800
By NEA Sources	795900	1037900	1972800	3000000	2453400
By Foreign Aid/ Debt	5060000	4030000	5250000	6008000	5072662
By Fund of Rural Electricity	170000				

Repayment of Long-term loan Instilment	674248	600000	635000	500000	500000
Repayment of Short-term loan Instilment	400000	600000	600000	700000	507500
Lending Fund	20000	30000	30000	30000	10000
Purchase Budget (net)	99900	90000	190000	150000	250000
Contingency Fund	70000	150000	150000	150000	300000
Investment on Insurance	50000				72500
Investment on Retirement Fund	40000	50000	50000	50000	50000
Total Disbursement (B)	**19939550**	**18644620**	**21587100**	**23668714**	**28070625**
Surplus/ Deficit(A-B)	(848602)	(394296)	(696600)	(1457177)	(1081121)
Minimum cash balance	(600000)	(600000)	(600000)	(600000)	(600000)
Net Surplus/Deficit	(1448602)	(994296)	(1296600)	(2057177)	(1681121)

Source: Annual Report and Budget Book of NEA.

Table No. 4.1 shows the Cash Budget of NEA from fiscal year 2007/08 to 2011/12. It shows from where the total cash is received and total cash disbursement as well. During the fiscal year 2007/08 total cash available summed to Rs.19090948 in thousands while the disbursement total to Rs.19939550 in thousand. NEA during the fiscal year 2007/08 had maintained sum total of Rs.600000 thousand as minimum cash balance, so the net deficit was Rs.-1448602 thousand.

During the fiscal year 2008/09 and 2009/10, NEA's total cash available were Rs.18250324 and Rs.20890500 thousand respectively, while the total disbursement were Rs.18644620 and Rs.21587100 thousand respectively. The minimum cash balance during these fiscal year has been Rs.600000 thousand; as a result the net deficit came to be Rs.-994296 and Rs.-1296600 thousand respectively.

During the fiscal year 2010/11 and 2011/12 NEA's cash budget shows deficit of Rs.-2057177 and Rs. -1681121 thousand respectively. The total cash available during these fiscal years were Rs.22211537 and Rs.2698504 thousand while the total disbursement were Rs.23668714 and Rs.28070625 thousand respectively.

(B) Cash Flow Statement of NEA

Cash flow statement is an important tool which provides information to its users about the ability of the enterprise to generate cash and its utilization. In recent years,

the statement of cash flows has come to be viewed as a part of full set of financial statement. NEA prepares short term cash budget in a systemic way. It estimate the probable cash receipts and cash disbursements with the help of other functional budget and estimates the probable future cash deficits or surplus. Cash flow statement signifies the movements of “Cash-in” and “Cash-out” of authority. Inflow of cash is known as source of cash and outflow of cash is called use of cash.

The actual cash flow statement is prepared on the heading of cash flow from operating activities is below:

Table 4.2 (a)
Cash Flow from Operating Activities
From FY 2007/08 to 2008/09

(Amount in Rs.)

Particulars	2007/08	2008/09
(A) Cash Flow from Operating Activities:		
Profit before interest, depreciation and	**186,091,797.48**	**2073,028,605.86**
Prior year's adjustment	492,011,674.48	444,490,130.81
Add: Adjustment for:		
Depreciation on fixed assets	1,371,097,891.27	1,651,926,066.91
Deferred Revenue Expenditure written off	512,462,146.51	411,080,964.91
Fixed assets written off	776,098.50	367,879.59
Loss on fixed assets	-	191,533,000.00
Provision for loss on fixed assets	37,000,000.00	-
Provision for Inventories	-	58,265,000.00
Provision for CWIP	-	60,186,000.00
Loss on foreign exchange	271,647,306.43	-
Provision for incentives to staff of Distribution	-	29,668,261.79
Provision for accumulated leave	99,448,000.00	10,766,984.78
Provision for gratuity & Pension	34,973,749.70	113,535,000.00
Less: Extra ordinary income	(498,090,047.66)	-
Less: Interest Income	(40,772,916.08)	(46,854,865.58)
Less: Sale of fixed assets	(1,856,557.53)	-
Operating Profit before Working Capital	**4,997,993,029.07**	**2,464,789,149.10**
Adjustment for working capital changes:		
Decrease (Increase) in Inventories	(97,250,974.68)	(17,362,683.85)
Decrease (Increase) in Accounts Receivable	(602,312,403.46)	(1,090,379,470.93)
Decrease (Increase) in Loan & Advances	(683,665,902.54)	(93,605,825.30)
Increase (Decrease) in Current Liabilities	(366,925,585.50)	1,182,039,915.80
Decrease (Increase) in Inter Unit Balances	110,680,308.78)	(120,324,950.64)
Cash Generation from Operations	**825,314,591.70**	**4,858,360,014.17**
Payment of Interest	(1,395,548,249.96)	(2,973,421,576.92)
Payment of Previous Years Corporate Tax	(57,875,265.25)	(956,417,789.97)
Payment of Bonus	(18,326,848.80)	(53,139.78)
Payment of Property Tax	(228,887.66)	-
Cash generation before extra ordinary item	**(646,664,659.97)**	**928,467,507.50**
Extraordinary Income	498,090,047.66	-
(A) Net Cash Flow from Operating Activities	**(148,574,612.31)**	**928,467,507.50**

Source:- Auditors' Report of NEA

Table 4.2 (b)
Cash Flow from Operating Activities
From F/Y 2009/10 to 2011/12

(Amount in Rs.)

Particulars	2009/10	2010/11	2011/12
(A)Cash Flow from Operating Activities:			
1. Net Profit/(Loss) before taxes	**(1,486,145,318.1)**	**(1,312,824,502.6)**	**(1,267,833,807.0)**
Add: Adjustment for:			
Interest on long-term loans			
Depreciation on fixed assets	2,991,505,645.16	3,079,770,838.51	3,050,877,806.90
Deferred Revenue Expenditure written off	1,757,363,951.32	1,715,840,136.19	1,816,963,325.51
Fixed Assets written off	320,090,809.84	123,283,867.20	105,387,309.10
Provision for Doubtful Debtors	5,952,920.56	1,130.00	-
Provision for Loan & Advance	-	215,186,730.00	-
Contingency reserve	-	44,247,870.00	-
Provision for General reserve	-	-	-
Provision for loss on fixed assets	15,960,254.46	17,011,292.38	-
Provision for inventories	-	40,000,000.00	65,000,000.00
Staff loan and fixed assets written off	-	4,356,285.00	-
Bad Debt written Off	-	-	6,546,909.86
Loss on Stock	-	-	3,516,825.00
Prior Year's Depreciation	-	-	6,113,043.17
Provision for CWIP	-	-	29,213,018.77
Loss on foreign exchange	80340,000.00	-	-
Provision for incentives to staff of distribution	59,152,513.26 27,979,806.48	- -	42,713,652.33 42,713,652.33
Provision for accumulated leave & medical facilities	21,647,479.00	14,268,643.38	
Provision for gratuity & pension			12.096.460.89
Less: Extra-ordinary Income	13,935,042.10	1,958,104.18	
Less: Interest on Deposits	-	-	-
Less: Dividend Income	(43,659,967.40)	(35,499,889.11)	-
Less: Gain of Foreign Exchange	-	(96,482,185.00)	(54,076,938.25)
	-	(229,959,546.05)	-
Cash flows from operation before working capital changes	**3,764,123,136.68**	**3,581,158,774.04**	**3,816,517,605.68**
Adjustment for working capital:			
Decrease (Increase) in inventories	(30,789,448.99)	(329,010,279.67)	11,763,967.12
Decrease(Increase) in receivable	(355,534,653.45)	(177,147,008.87)	(393,883,819.09)
Decrease(Increase)loan& advances	(6,485,160.99)	(79,600,038.83)	(196,410,987.14)

Increase(Decrease)in current liability	(461,265,603.68)	420,559,599.26	496,689,010.27
Decrease(Increase)inter unit balances	152,312,051.54	(271,005,122.89)	(78,158,710.35)
Cash generation from operations	**3,062,360,321.11**	**3,144,955,923.04**	**3,656,517,066.49**
Payment of interest on long-term loans	(373,033,386.11)	(588,302,301.04)	(1,171,756,919.43)
Payment of previous year's Tax	(114,090,531.13)	(938.00)	-
Payment of Bonus	(2,262.86)	-	-
Payment of reward to employees	(29,668,261.79)	-	-
Cash generation before extra-ordinary item	**2,545,565,879.22**	**2,556,652,684.00**	**2,484,760,147.06**
Extra-ordinary Income	-	96,482,185.00	-
(A)Net Cash from Operating Activities	**2,545,565,879.22**	**2,653,134,869.00**	**2,484,760,147.06**

Source:- Auditors' Report of NEA

Table No. 4.2(a) presents the cash flow from operating activities from F/Y 2007/08 to 2008/09 and table 4.2 (b) presents the cash flow from operating activities from F/Y 2009/10 to 2011/12. The amount of depreciation on fixed asset is in increasing position till F/Y 2009/10 while it has gone down during F/Y 2010/11 and once again it has climbed up during F/Y 2011/12. The amount of Interest on long-term loans has fluctuated in between Rs.2, 991,505,645.16 to 3,079,770,838.51. Deferred revenue expenditure written off has declined in every successive fiscal year during the research period. Provision for accumulated leave and medical facilities has decreased in every year except during F/Y 2008/09. Provision for gratuity and pension has increased during F/Y 2008/09 while it has decreased in other F/Y of research period. Moreover it is nil during F/Y 2010/11 and 2011/12. Loss on fixed asset is only seen during F/Y 2008/09. Provision for loss on fixed asset has increased from Rs.37, 000,000 to Rs.65, 000,000 and it is nil during F/Y 2008/09 and 2009/10.

Provision for inventories is only in F/Y 2008/09 and 2010/11 while it is also nil during other F/Y. Provision for Capital Work in Progress (CWIP) during F/Y 2008/09 is Rs.60,186,000 and during F/Y 2009/10 is Rs.59152513.26 while there is no provision for it other fiscal years. During F/Y 2007/08, 2009/10, and 2011/12 NEA has bared a loss of Rs.271, 647,306.43, 27979806.48 and 42,713,652.33 on foreign exchange. Provision for Debtors, provision for loan and advance, provision for general reserve are only during F/Y 2010/11. Contingency reserve is only in F/Y

2009/10 which is Rs.15, 960,920.56. Staff loan and fixed asset written off, bad debt written off, loss on stock and prior year's depreciation are only in F/Y 2011/12 which are Rs.6,546,909.86, 3,516,825.00, 6,113,043.17 and 29,213,018.77 respectively. Extra ordinary income and sales of fixed asset are only in F/Y 2007/08. Interest income is fluctuating from Rs.35, 499,889.11 to Rs.54, 076,938.25. Dividend income and gain of foreign exchange amounted Rs.96, 482,185 and Rs.229, 959,546.05 in only F/Y 2010/11 respectively.

The above statement of cash flow from operation before working capital changes shows the figure of Rs.4,997,993,029.07, 2464,789,149.10, 3764,123,136.68, 3581,158,774.04 and 3,816,517,605.68 during F/Y 2007/08, 2008/09, 2009/10, 2010/11, 2011/12 respectively. This shows that it is fluctuating trend.

Inventory, Account Receivable and Loan and Advances has increased during the study period except inventory during F/Y 2011/12. Current Liabilities has increased during F/Y 2008/09, 2009/10, 2010/11 and 2011/12 while it has decreased during F/Y 2007/08 and 2009/10. Inter Unit Balance has increased during F/Y 2008/09, 2010/11 and 2011/12 while it has decreased during other fiscal years. Cash generation from operation is very high during F/Y 2008/09 and very low during F/Y 2007/08. It has concentrated around three trillion.

Payment of interest on long-term loan is very high throughout the study period which varies from Rs.373, 033,386.11 to Rs.2, 973,421,576.92. Payment of previous year corporate tax is very high during F/Y 2008/09 which is Rs.956, 789.97 but nil during F/Y 2011/12. Payment on bonus is decreasing till F/Y 2009/10 but nil during 2010/11 and 2011/12. NEA has only paid property tad of Rs.228, 887.66 during F/Y 2007/08. Payment of reward to employees is only made during F/Y 2010/11. Extra-ordinary income is generated during F/Y 2007/08 and 2010/11 in the figure of Rs.498, 090,047.66 and 96,482,185.00 respectively.

Net Cash Flow from Operating Activities is negative during F/Y 2007/08 while it is positively increasing from F/Y 2008/09 to F/Y 2010/11 and slightly declined during F/Y 2011/12 but not negative.

4.3 Revenue Trend of NEA

Revenue results from the sales of goods and rendering of service. It is measured by the charge made to customers, clients or tenants for goods and services furnished to them. It also includes gains from the sales or exchange of assets other then stock in trade, interest and dividends earned in investments and other increases in the owners equity except those arising from capital contributions and capital adjustments. Revenue from ordinary sales on from other transaction in the ordinary course of business is same times describes as operating revenue.

Revenue plan is prepared on the basis of sales forecast. NEA has practice of preparing sales forecast the demand for the long term, which is known as long term load forecast. Sales nature of consumer are categorized like domestic, non-commercial, irrigation, street light, temporary supply, transport, temple, community sale, and bulk supply (India).

The beginning point for the evaluation of existing revenue planning practices is to analyze past trends of planned sales revenue and its achievements.

Table 4.3

Revenue Trend of NEA

From F/Y 2007/08 to 2011/12

Year	Budgeted sales		Increase over previous years		Actual sales		Increase over previous years	
	Unit in GWH	Amount in million in RS	Unit %	Amount %	Unit in GWH	Amount in million Rs.	Unit %	Amount %
2007/08	1642.500	11521.396	-	-	1534.313	9687.650	-	-
2008/09	1804.900	12238.800	9.89	6.23	1696.816	11237.490	10.59	16.00
2009/10	1906.622	12825.732	5.64	4.80	1795.233	11992.610	5.80	6.72
2010/11	1988.850	13275.383	4.31	3.51	1918.350	13264.360	6.86	10.60
2011/12	2145.480	14260.339	7.88	7.42	2066.270	14012.900	7.71	5.64

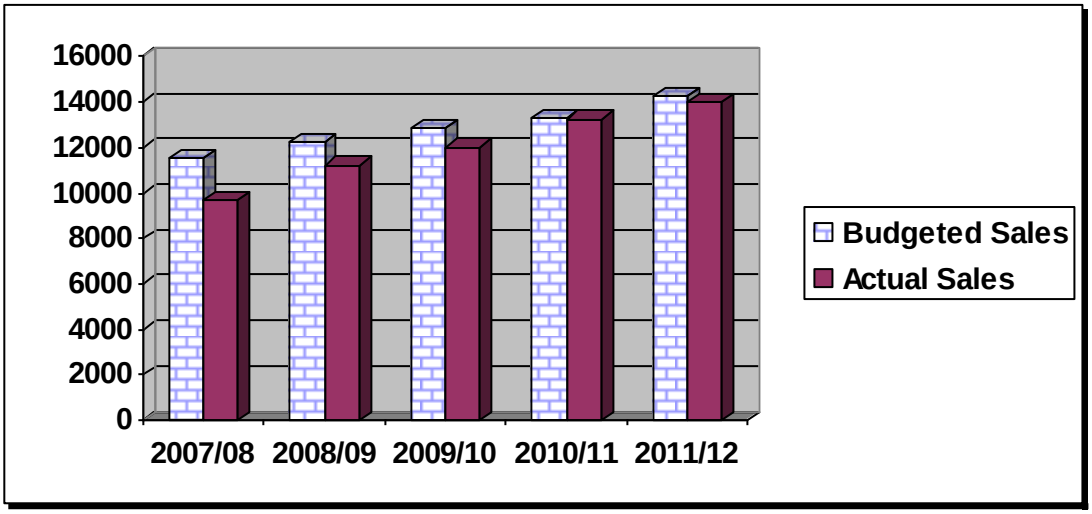
Source: Annual Report and Budget Book of NEA

Table 4.3 shows in year 2008/09 budgeted sales in unit and Rs are increased by 9.89% and 6.23% respectively. At the same period actual sales revenue in unit and Rs. are increased by 10.59% and 16% respectively. Similarly in fiscal year 2009/10 planned growth in sales unit and revenue are 5.64% and 4.80% respectively. At the same period actual sales in units and Rs. are increased by 5.80% and 6.72% respectively. In fiscal year 2010/11 budgeted sales in unit is increased by 4.31% and 3.51% increased in budgeted sales revenue. At the same period increased in actual performance in units and Rs are 6.86% and 10.605 respectively. In fiscal year 2011/12, there was an increase in sales unit by 7.88% and by 7.42% in sales revenue. At this period achievement are 7.71% and 5.64% in sales unit and revenue respectively. It shows that there is no consistent between budgeted and actual sales revenue, It is clear that the forecast of demand is not realistic.

The revenue trend of NEA can be efficiently presented by the help of following figure.

Figure No. 4.1

Revenue Trend of NEA



Source: Annual Report and Budget Book of NEA

The above figure no. 4.2.1 shows the budgeted revenue trend of NEA is always higher than the actual revenue trend during the research period that means the target has not been met in the entire research period.

Table 4.4 shows the budgeted sales and actual sales with their respective achievements from the fiscal year 2007/08 to 2011/12.

Table 4.4

Budgeted Sales and Achievement in Unit and Rs

From F/Y 2007/08 to 2011/12

Fiscal year	Sales Unit in million (i.e. in GWH)			Sales Rs. In Million		
	Budgeted	Actual	Achievement %	Budgeted	Actual	Achievement %
2007/08	1642.500	1534.313	93.41	11521.396	9687.650	84.08
2008/09	1804.900	1696.816	94.01	12238.800	11237.490	91.82
2009/10	1906.622	1795.233	94.16	12825.732	11992.610	93.50
2010/11	1988.850	1918.350	96.46	13275.383	13264.360	99.92
2011/12	2145.480	2066.270	96.31	14260.339	14012.900	98.26
Average	-	-	94.87	-	-	93.52

Source: Annual reports and budget book of NEA

The table 4.4 signifies that the budgeted and the actual sales in unit and Rs with their respective achievements of NEA. In the FY 2007/08 the budgeted sales of NEA was 1642.500 million units and gradually increased up to the FY 2011/12, which is 2145.480 million units. on the other side the actual sales of NEA in FY 2007/08 was 1534.313 million units which is increased to 2066.27 million units up to FY 2011/12. The annual achievement in units is not less than 93.41 percent. This shows that achievements are satisfactory regarding the sales unit.

In the same way in the FY 2007/08 the budget sales revenue was RS.11521.396 million. Annual targeted sales budgeted is increasing from the FY 2007/08 up to the FY 2011/12 In FY 2011/12 the budgeted sales was Rs.14260.339million. On the other side the actual sales revenue of NEA in FY 2007/08 was RS 9687.65 million which is reached to RS 14012.90 million up to FY 2011/12. Annual achievement in sales revenue is also in increasing trend except FY 2011/12. In FY 2007/08 achievement in sales revenue was 84.08 percent, 99.92% and 98.26% respectively.

In conclusion, the sales budget shows that the actual achievement is high except during FY 2007/08. More then 91% achievement is satisfactory. It denotes that an actual achievement is near to budgeted achievement. Average achievements over five year are 94.87% and 93.52% in units and Rs. respectively, which is good signal for NEA. Lastly if the actual sales are increase under this figure NEA will achieve good prosperity in coming days.

Trends of Actual Sales of NEA are presented in Table 4.5

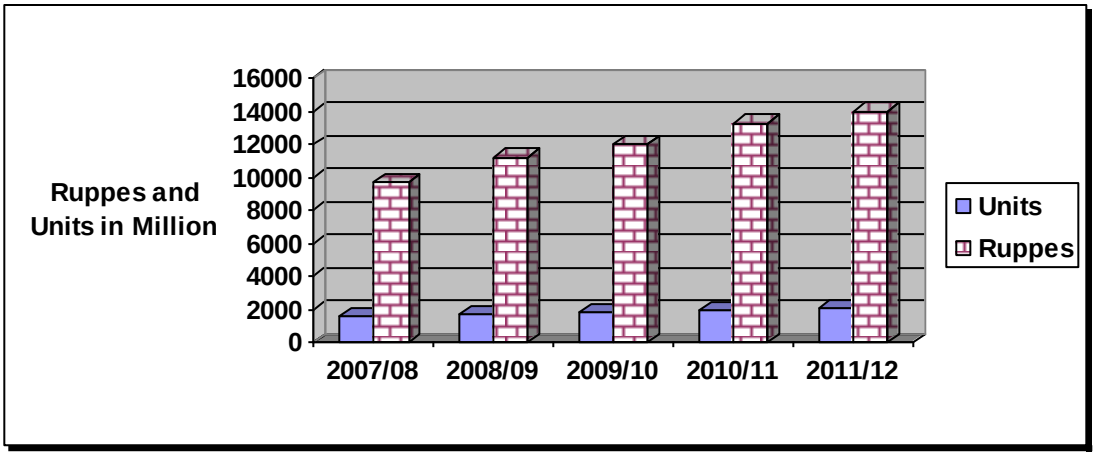
Table 4.5
Trends of Actual Sales of NEA
From FY 2007/08 to 2011/12 (In Million)

FY	Units	Increase/Decrease	Rupees	Increase/Decrease
2007/08	1534.313	-	9687.650	-
2008/09	1696.816	10.52	11237.490	16.00
2009/10	1795.233	5.80	11992.610	6.72
2010/11	1918.350	6.86	13264.360	10.60
2011/12	2066.270	7.71	14012.900	5.64

Source: Annual reports of NEA

Table 4.5 shows the increasing trend of actual sales of NEA since FY 2007/08 to 2011/12. The increment unit in FY 2008/09 was seen to be 1534.313 units which is increment by 16% in terms of Rupees. Similarly the increment in unit in the fiscal year 2009/10, 2010/11 and 2011/12 are 5.80, 6.86 and 7.71 respectively. While on the other side the increment in terms of rupees in the year 2009/10, 2010/11 and 2011/12 are 6.72, 10.60 and 5.64 respectively. The increment in the fiscal year 2008/09 is maximum both in units in rupees while the minimum increment is in the FY 2011/12 both in units and rupees.The trend of NEA can be shown effectively in the figures as follows;

Figure No. 4.2
Trend of Actual Sales of NEA



Source: Annual reports of NEA

Figure No. 4.2 shows that the actual sales in rupees and sales in units are in increasing trend during the research period. But the increment in sales in rupees is higher than the increment in the sales units.

4.4 Summary of Statistical Calculation

The table 4.15 presents the summary of statistical calculation.

Table 4.6

Summary of Statistical Calculation

(In Rs. '00000')

Statistical Tools	**Budgeted Sales in Rs. 'X'**	**Actual Sales in Rs. 'Y'**
Mean	12824.33	12039.002
Standard Deviation	928.01	1521.263
Co-efficient of Variation (C.V.)	7.24 %	12.63 %
Correlation of Co-efficient (r)	0.9804	
Co-efficient of Determination (r^2)	0.9612	
Probable Error (P.E.)	0.0117	

Sources: Appendix-I

The above table 4.6 shows the value of statistical tools. A distribution having more C.V is considered more variable or more heterogeneous or less consistent. A distribution having lesser C.V is considered less variable or more homogeneous or more consistent or more uniform. It also states that the actual sales are more deviated or fluctuated year by year as the coefficient of variation of the actual sales as shown in the table is greater than the budgeted sales. The C.V of actual sales is 12.63% where as budgeted sales is 7.24%.

Another statistical tools"' correlation coefficient" can be used to analyze the degree of relationship or association between the degree of relationship or association between the budgeted sales and actual sales. To find out the correlation between budgeted sales and actual sales we can use Karl Pearson's correlation coefficient which is denoted by 'r'. Karl Pearson's correlation coefficient is the most commonly used

measure of the relationship between the two variables. The value of correlation coefficient is 0.9804 which shows that there is highly positive correlation between budgeted sales and actual sales achievement. That means the actual sales should increase as the budgeted sales and vice- versa.

A regression line can also be fitted to show the degree of relationship between the budgeted sales and actual sales and to forecast on estimate the possible actual sales achievement with given budgeted sales. For this purpose, the actual sales have been assumed to be assumed to be dependent upon the budgeted sales, as independent. So, the regression line of actual sales (Y) on budgeted sales (X) on Y on X is as follows.

$$\left(Y-\overline{Y}\right)=r\frac{\sigma_y}{\sigma_x}\left(X-\overline{X}\right)$$

Substituting the value from above table 4.6,

We have,

$$Y-12039.002=0.9804\ \frac{1521.263}{928.01}\left(X-12824.33\right)$$

Or, $Y-12039.002=0.9804\times1.6393\left(X-12824.33\right)$

Or, $Y-12039.002=1.6072\left(X-12824.33\right)$

Or, $Y-12039.002=1.6072X-20611.263$

Or, $Y=1.6072X-20611.263+12039.002$

Or, $Y=1.6072X-8572.261$

The above regression line shows that there is a positive relationship between budgeted sales and actual sales. It is obvious that the actual sales are in increasing trend and it will be increased by Rs.1.6072 million with increasing the budgeted sales for Rs.1million.By the help of this regression equation, we can estimate the expected sales achievement for the fiscal year 2012/13 with the given value of budgeted sales 'X' .

Budgeted sales (X)= Rs.15638.122.

Hence, the expected sales achievement

Y =1.6072 ×15638.122 -8572.261

=Rs.16561.328 million

If the relationship between budgeted sales and actual sales remain the same as the previous years then the actual sales for the fiscal year 2012/13 will be expected to be Rs.16561.328 million as stared up by the above regression equation.

Another statistical tool called least square methods can be used to analyze the trend of actual sales and to estimate the possible future sales for a given time (years). This tool is considered as a time factor because time and element is also an important factor to analyze the trend with the passage of time the sales achievement will be changed, which can be expressed by the components of time series.

A straight line trend by the method of least squares will show the relationship between actual sales and years (time). For the least square method, it is assumed that the sales are consistently changed (increased or decreased) with the change in time. To fit the straight line trend, time factor is considered as independent variable(X) and actual sales achievement(Y) is assumed as dependent upon time (years).

Now the straight line trend by least square method for actual sales upon time is expressed by

Yc =a +bx…….(i)

Where,

Yc=Actual sales achievement

X=Deviation taken in time

a=Fixed value

b=Variable value

Table 4.7

Fitting Straight Line Trend by Least- Square

From FY 2007/08 to 2011/12

Fiscal Year (X)	Actual Sales in Rs.00000(Y)	x=X-2009/10	x^2	Xy
2007/08	9687.65	-2	4	-19375.30
2008/09	11237.49	-1	1	-11237.49
2009/10	11992.61	0	0	0
2010/11	13264.36	1	1	13264.36
2011/12	14012.90	2	4	28025.80
	$\sum Y$ =60195.01	$\sum x$ =0	$\sum x^2$ =10	$\sum xY$ =10677.37

Since, $\sum x$=0, then,

$$a = \frac{\sum Y}{n} = \frac{60195.01}{5} = 12039.002$$

$$b = \frac{\sum xY}{\sum x^2} = \frac{10677.37}{10} = 1067.737$$

Now the best fit of straight line trend is obtained by substituting the value of 'a' and 'b' in equation {1} i.e. Y_c= a + bx, we get,

Y_c=12039.002+1067.737 x

This trend line equation shows the positive relationship between time [years} and actual sales achievements. The actual sales will be increased by 1067.737 million every year if the sales trends of past years continue in the future.

By using this trend line equation, we can estimate the actual sales for fiscal year 2012/13.

The value of deviation {x} for fiscal year 2012/13 is 3.

We have,

Yc=12039.002+1067.737x

=12039.002+1067.737 ×3

=Rs.15242.213million.

If the past sales trend does not change then the future actual sales will be Rs15242.213 million in fiscal year 2012/13. By the help of least square method we can say that the trend of actual sales will have an increasing pattern.

In addition to this, hypothesis testing or test of a Hypothesis can be used. Hypothesis testing is a well defined a clear cut decision making procedure. Hypothesis testing begins with an assumption or supposition, called a hypothesis that we make about a population parameter.

In hypothesis testing, the first thing is to set up a hypothesis about a population parameter. Then we collect sample data, produce sample statistics, and use this information to decide how likely it is that our hypothesized population parameter is correct. Suppose we assume a certain value for a population mean. To test the validity of our assumption we gather sample data and determine the difference between the hypothesized value and the actual value of the sample mean. Then we judge whether the difference is significant. The smaller the difference, the greater the likelihood that our hypothesized value for the mean is correct. The larger the difference, the smaller the likelihood. The statistical hypothesis may be divided into two types: Null hypothesis (H_0) and alternative hypothesis (H_1). The null hypothesis in testing the significance. States that there is mo real difference in the sample mean and the population mean and is denoted by (H_0). Any hypothesis which is complementary to the null hypothesis is called on alternative hypothesis and is denoted by H_1.

In a hypothesis testing the level of significance is set up. It is denoted by 'α' {alpha}. We generally use 5 %.{ 0.05} level of significance unless otherwise stated. For a hypothesis testing student's t-distribution or't' test is adopted here which was developed by W.S.Gosset. The t- distribution {t-test} is used when the sample is 30 or less than 30($\leq$30).

The t-test can be numerically presented as under:

$$t = \frac{\overline{X} - \mu}{\frac{S}{\sqrt{n}}}$$

Where,

$\overline{X} = \frac{\sum X}{n}$ =Sample Mean

μ = population mean

n = sample size

S =standard Deviation of Sample

$= \sqrt{\frac{\sum x^2}{n-1}}, x = X - \overline{X}$

Now formulation of Hypothesis:

Null Hypothesis (H_o): There is no significant different between actual sales achievement (i.e. sample mean) and budgeted achievements (i.e. population mean) or $\overline{X} = \mu$

Alternative Hypothesis (H_1): There is significant different between actual achievement and budgeted Sales or $\overline{X} \neq \mu$.

Hence applying t-test formula

We have,

$$t = \frac{\overline{X} - \mu}{\frac{S}{\sqrt{n}}} = \frac{12039.002 - 12824.33}{\frac{1700.824}{\sqrt{5}}} = -\frac{785.328}{760.63} = -1.0325$$

Hence, (t) = -1.0325

Where,

$\overline{X}$ = Sample mean or actual sales mean.

μ = Population mean or budgeted sales

S = Sample S.D. =1700.824

Therefore degree of freedom (d.f.) = n-1 = 5-1= 4

Tabulated value of 't' at 5% level of significance for 4 d.f.for two tail test =2.776.

The tabulated value of 't' (i.e. 2.776) is greater than computed value of t (i.e. 1.0325). So, the alternative hypothesis is rejected and null hypothesis is accepted. Therefore we can say that there is no significance difference between actual sales and budgeted sales of NEA.

4.5 Category-wise Analysis of Revenue

While preparing revenue plan, the emphasis needs to be given to category of customer. Different segment or category has different tariff rare and most if the activity of NEA is based on the customer's .It is serving. Therefore, analysis of sales of each category of customer is important. The major aspect of this analysis is to measure the achievement of actual sales and actual sales revenue of each category of NEA.

Table 4.8 shows category wise achievement of budgeted sales unit of NEA and Table 4.8 shows the category wise achievements of sales revenue. The detail calculations of this analysis are presented in appendix.

Table 4.8

Category-wise Achievement of Sales Units (%) of NEA

From FY 2007/08 to 2011/12

FY	2007/08	2008/09	2009/10	2010/11	2011/12	Average
Domestic	92.99	95.14	98.11	97.44	99.41	96.618
Non-	96.57	89.71	89.81	81.56	87.85	89.100
Commercial	87.28	84.31	98.29	100.41	110.52	86.162
Industrial	98.62	95.38	101.76	105.35	96.55	99.532
Water	92.96	81.04	95.54	83.99	97.11	90.128
Street Light	97.09	101.78	128.36	96.41	110.91	106.910
Temporary	31.33	69.60	86.55	112.57	137.74	87.558
Transport	86.69	79.00	75.99	81.64	99.67	84.498
Temple	88.43	100.09	137.95	93.42	94.42	102.922
Community	1143.40	118.50	111.62	136.20	106.93	323.330
Bulk Supply	78.74	96.12	57.58	68.62	72.14	74.640
Average	181.282	91.906	98.324	96.146	101.205	113.77

Source: Appendix-II

The Category wise average achievement in units of NEA during the whole research period can be efficiently shown in the following figure no. 4.3.

Figure No. 4.3

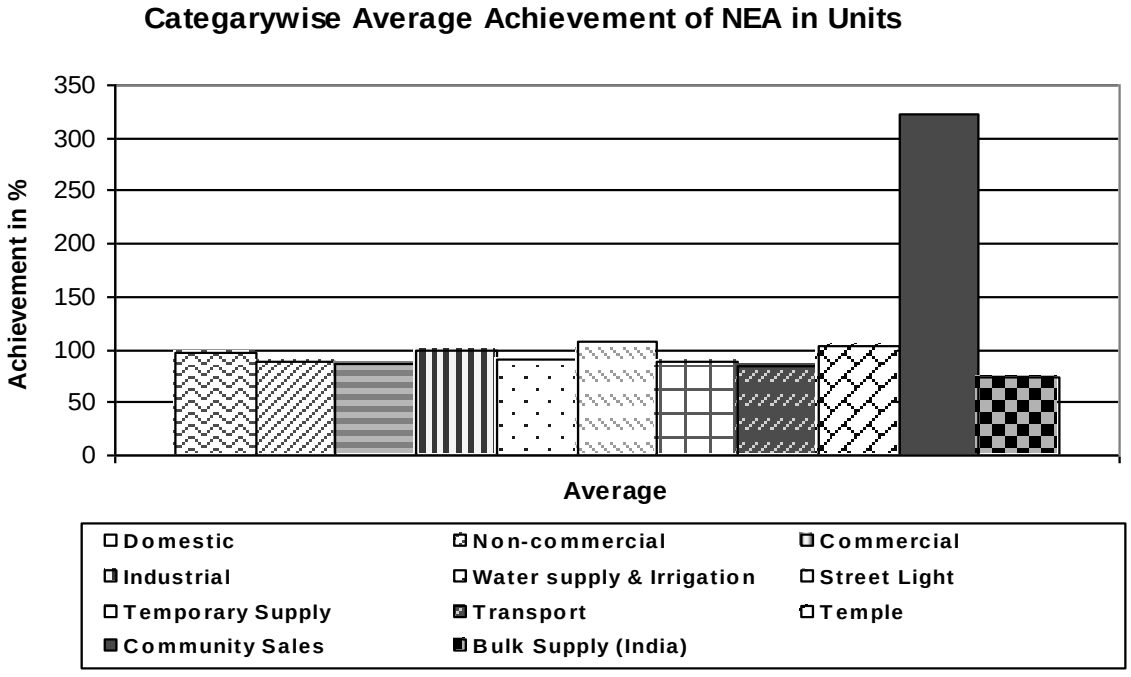


Table 4.9

Category wise Achievement of Sales Rupees (%) of NEA

From FY 2007/08 to 2011/12

Fiscal year	2007/08	2008/09	2009/10	2010/11	2011/12	Avera
Domestic	86.33	92.55	95.98	98.12	98.52	94.30
Non-commercial	87.23	87.11	88.28	81.44	85.80	85.97
Commercial	78.25	82.18	90.55	101.29	109.69	92.39
Industrial	82.60	94.16	99.10	104.21	95.79	95.17
Water supply & Irrigation	87.88	78.88	95.25	81.16	76.12	83.89
Street Light	101.69	104.46	145.97	91.77	110.91	110.96
Temporary Supply	30.44	70.22	88.38	107.09	132.88	85.80
Transport	86.71	76.08	73.08	83.46	96.83	83.23
Temple	86.51	101.71	139.60	127.94	95.54	110.26
Community Sales	-	118.50	114.80	114.48	106.93	90.94
Bulk Supply (India)	79.59	92.98	58.19	72.59	77.99	76.27
Average	73.38	90.80	99.02	96.69	98.82	91.74

Source: Appendix-II

The above average achievement of sales revenue of NEA during the research period can be shown in the following figure no. 4.4.

Figure No. 4.4

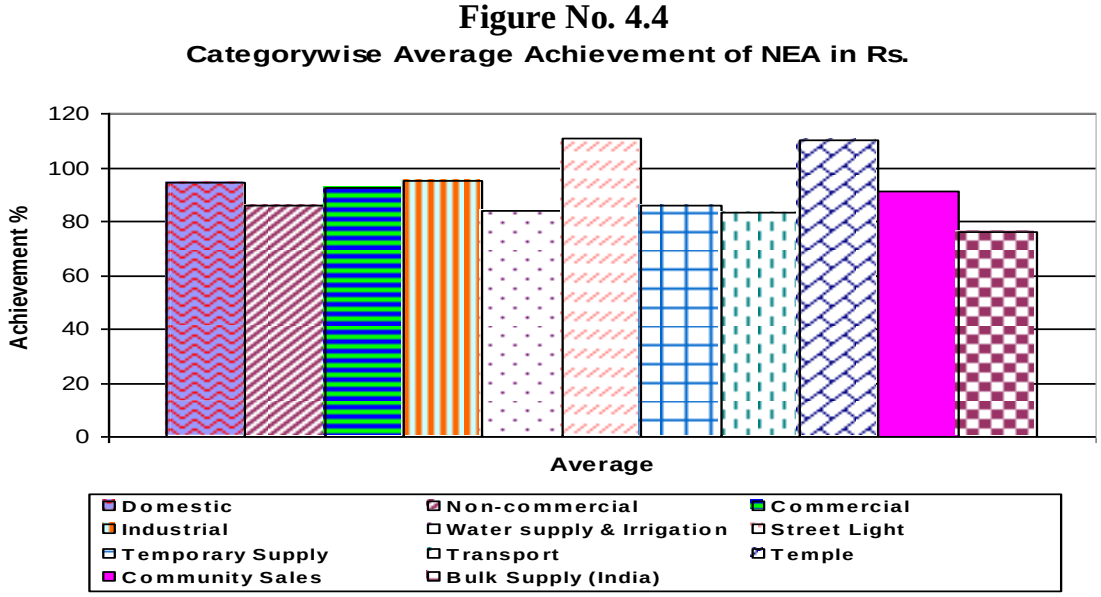


Table 4.9 & figure 4.3 and 4.4 & diagram shows the category wise achievement of sales unit and category wise achievement of sales rupees of NEA. The categories are

domestic, Non- domestic, commercial, Industrial, water supply and irrigation, street light, Temporary Supply, Transport, Temple, community sale and Bulk Supply {India} respectively.

It is predicated that the average domestic achievement of sales units is 96.618 while the average domestic achievement of sales Rupee is 94.3. The domestic sales unit in FY 2007/08 is 92.99 which reached to 99.14 in the FY 2011/12. It is in increasing trend since FY 2009/2010. It has slightly gone down to be 97.44 in the FY 2010/11 in comparison to FY 2009/10, which is 98.11 in 2009/10. Similarly a domestic sales rupee is in increasing trend. The mean figure of domestic shows that mean domestic in sales unit is in better position than mean domestic in rupees of NEA.

In the non-commercial category, the average achievement is 89.10 and 85.97 in sales unit and sales rupees respectively. The sales unit has gone slightly down after the FY 2007/08 while the remarkable change in sales rupees has been during the year 2010/11.

The average achievement in commercial category is 96.162 and 92.392 in sales unit and sales Rupees respectively. Both the sales are in good increasing trend. The commercial achievement sales unit was 87.28% in the year 2007/08 which then mounted to reach the peak or 110.52% in the year 2011/12. Likewise the achievement in Sales rupees in FY 2007/08 was 78.25%which then reached the peak of 109.69 in the FY2011/12. This shows that sales unit is in better position than sales rupees.

In the industrial, the average sales unit is 99.53 and the average sales Rupees is 95.172. The achievement in sales unit has gone down in the FY 2007/08 and FY 2011/12 in comparison to FY 2007/08. But achievement in sales Rupee is in increasing trend but has gone down only in during the year 2011/12 in comparison to FY 2009/10 and 2010/11. Though there are ups and downs in sales unit it is in better position than sales rupees.

In water supply and irrigation category, the average sales Rupee is 83.858 which is low but nor the least in comparison to other. The average sales unit is 90.128 which is around the Averages of average.

The street light categories in both sales unit and sales Rupees are in fluctuating trend. The average achievement in sales unit is 106.91 which is the highest mean. The average achievement in sales Rupees is 110.96 which is a highest mean in comparison to other categories of mean.

In the Temple category, the achievement in sales unit exceeds hundred percentages. It is 102.922 which is next to the highest average. The sales unit is maximum during the FY 2009/10 and minimum during the year 2007/08. The average achievement in sales rupees is 110.26. This average is also next to the highest percentage. The sales rupees are maximum during the FY year 2009/10 and minimum during the FY 2007/08.

The community sales in rupees only started since the FY 2008/09. Since then it has exceeded 100% ranging from 118.50% in FY 2008/09to 114.80% in FY 2009/10. Then has slightly declined during the gear 2011/12. In terms of sales unit too, it has exceeded 100% in every consequent years from FY 2007/08 to 2011/12. The average community sales unit being 323.33%. The community sales unit in FY 2007/08 very high. It figures out to be in thousand while in other consequent FY it is only in three digits. Therefore, NEA must revise the calculation of realistic demand of electricity in this category on the basis of sufficient home task.

The last category in the above table is the bulk supply {India}. The average achievement of sales unit in this category is 74.64%. The sales unit seems to be unsatisfactory. It has the lowest average sales unit. The average achievement of sales rupees is 76.268%. This is also not satisfactory sales in comparison to other category. During the year 2007/08 and 2008/09 the sales were going well but during the years 2009/10 it went down below 60%. These fluctuating figures suggest that the planning

in this category is not satisfactory. In succeeding years, NEA must calculate the demand of electricity on the basis of realistic information and sufficient home tasks.

It can be concluded from the above table 4.10 that achievement of sales unit in domestic, industrial, street light temple and community sales categories are relatively satisfactory but lacks consistency in planning. Similarly from table 4.9 it can be concluded that achievement of sales rupees in domestic industrial street light, temple and community sales categories are satisfactory to some extend but this too shows lack of consistency in planning.

In conclusion, it can be suggested that NEA must calculate the demand of electricity in each categories on the basis of realistic information and sufficient home tasks.

4.6 Contribution of Each Category in Total Sales

Contribution of each category in total sales unit and total sales revenue from fiscal year 2007/08 to 2011/12 are presented in table 4.10 and 4.11 respectively.

Table 4.10
Contribution of Each Category in Total Sales Units
From FY 2007/08 to 2011/12

Fiscal year / Particulars	2007/08	2008/09	2009/10	2010/11	2011/12	Average
	Contribution (%)	Contribution (%)	Contribution (%)	Contribution (%)	Contribution (%)	Contribution (%)
Domestic	36.36	36.37	37.67	38.09	39.21	37.540
Non-commercial	5.09	4.75	4.62	4.76	4.90	4.824
Commercial	5.89	5.50	6.02	5.60	5.97	5.796
Industrial	38.89	37.10	38.42	39.81	38.88	38.620
Water supply & Irrigation	1.91	1.76	1.76	1.88	2.06	1.874
Street Light	2.57	2.70	3.07	3.01	3.14	2.898
Temporary Supply	0.02	0.02	0.01	0.02	0.03	0.020
Transport	0.36	0.33	0.30	0.30	0.29	0.316
Temple	0.16	0.17	0.23	0.22	0.24	0.204
Community Sales	0.37	0.28	0.31	0.42	0.38	0.352
Bulk Supply (India)	8.72	11.32	7.87	5.87	4.90	7.736
Total	100	100	100	100	100	100

Source: Appendix-III

Table 4.11
Contribution of Each Category in Total Sales Revenue
From FY 2007/08 to 2011/12

Fiscal year / Particulars	2007/08	2008/09	2009/10	2010/11	2011/12	Average
	Contribution (%)	Contribution (%)	Contribution (%)	Contribution (%)	Contribution (%)	Contribution (%)
Domestic	37.59	37.82	38.18	38.70	39.09	38.28
Non-commercial	7.45	6.98	6.80	6.69	6.77	6.94
Commercial	8.45	7.96	8.22	7.86	8.30	8.16
Industrial	37.24	35.95	36.52	37.25	36.88	36.77
Water supply & Irrigation	1.43	1.32	1.29	1.64	1.43	1.42
Street Light	2.07	2.20	2.75	2.44	2.72	2.43
Temporary Supply	0.04	0.04	0.03	0.04	0.07	0.04
Transport	0.29	0.26	0.24	0.24	0.22	0.25
Temple	0.13	0.13	0.17	0.23	0.18	0.17
Community Sales	-	0.15	0.17	0.18	0.10	0.14
Bulk Supply (India)	5.31	7.20	5.62	4.73	4.12	5.40
Total	100	100	100	100	100	100

Source: Appendix-III

The above table 4.10 and 4.11 gives the contribution of each category with respect to total sales in sales units and in sales rupees respectively.

The industrial category gives the highest contribution in sales unit. The sales unit remained in between 37.10% and 39.81% averaging to 38.62% while the contribution in sales rupee was in between 35.95% and 37.25% whose average remained to 36.77%. The second highest contributing category in sales unit is Domestic category. The contribution in sales unit was between 36.36% and 39.21%. The average contribution was 37.54%. Similarly the contribution in sales rupees was in between 37.59% and 39.09% having the average contribution of 38.28%.

Like wise bulk supply India has the contribution in between 4.90% and 11.32% averaging to 7.736% in sales unit and averaging to 5.40% in sales revenue. Similarly the average contribution of commercial, Non commercial, street light and water supply and irrigation in sales unit are 5.797%, 4.824% 2.898% and 1.874% respectively. But rest other category have less than 1% contribution.

The highest contribution in sales revenue is from domestic category in sales unit followed by industrial. The average contribution of commercial, Non commercial, Bulk supply (India) street light, and water supply and irrigation are 8.16%, 6.94%, 5.40%, 2.43%and 1.42% respectively. All other category has average contribution below 1%.

4.7 Contribution of Consumers in Each Category

The detail studies about contribution of each category with no. of consumers are presented in appendix 4. The brief analysis of the results of contribution of consumers in each category from FY 2007/08 to 2011/12 is presented in table 4.12

Table 4.12

Contribution of Consumers in Each Category

From FY 2007/08 to 2011/12

Fiscal year / Category	2007/08 Contribution %	2008/09 Contribution %	2009/10 Contribution %	2010/11 Contribution %	2011/12 Contribution %	Average Contribution %
Domestic	95.93	95.87	95.90	96.02	96.08	95.96
Non-Commercial	0.98	1.002	0.094	0.858	0.782	0.912
Commercial	0.44	0.55	0.52	0.517	0.482	0.502
Industrial	2.12	2.04	2.03	1.940	1.799	1.99
Water Supply	0.03	0.03	0.03	0.032	0.030	0.03
Irrigation	0.15	0.177	0.24	0.293	0.504	0.273
Street Light	0.012	0.127	0.14	0.129	0.121	0.127
Temporary Supply	0.019	0.014	0.014	0.013	0.013	0.015
Transport	0.006	0.005	0.0005	0.004	0.004	0.0048
Temple	0.203	0.018	0.186	0.185	0.179	0.187
Community Sales	0.0001	0.0001	0.0014	0.003	0.005	0.0019
Bulk Supply{India}	0.0006	0.0005	0.0005	0.0004	0.0004	0.0005
Total	100	100	100	100	100	100

Source: Appendix-IV

The contribution of domestic category of consumer during the FY 2007/08 ranks in the first position. The contribution in total sales is between 95.87% and 96.08% averaging to 95.96%. Like wise industrial category ranks in the second position. Its contribution lies between 1.799% to 2.12%, the average contribution lies being 1.99%. The contribution of all other category of consumer is below 1%. The average contribution of Non- commercial , commercial Irrigation, Temple, Street, light, Temporary supply, Water supply, Community Sales and Bulk supply {India} are 0.912%,0.502%, 0.273%, 0.187%, 0.127%, 0.015%, 0.0048%, 0.0019% and 0.0005% respectively. Except Domestic and Industrial category the contributions of consumer during FY 2007/08 to 2011/12 were very low.

4.8 Relationship Between Total Revenue and Profit

Profit is the major element of each and every business endeavor for survival and future development. Business without Profit exists nowhere. No matter the concept of profit is changing from time to time. It presents reasonable profit approach seems to hold a strong position. Profit is the nerve center of any business organization. So it can be said that profit is the blood circulation of any organization. Profit is essential to pay expenditure dividends and to get benefits from opportunities and financials contribution to natural treasury is a source of revenue as well as mobilization of domestic resources. Profit of any organization highly depends upon sales relationship.

NEA has been generating negative returns. NEA is unable to earn profit from years 2008/09 and is not able to pay loan. There is no effective control system for reward and punishment system. The following table shows the profit and loss trend of NEA from FY 2007/08 to 2011/12.

Table 4.13

Total Revenue and Profit / (Loss) Trend of NEA

Fiscal Year	Profit/(Loss) (In Million Rs.)	Total Revenue (In Million Rs.)	% of Profit/ (Loss) on Total Revenue
2007/08	278.9	9687.65	2.88
2008/09	(1694.9)	11237.49	(15.08)
2009/10	(3475.2)	11992.61	(28.98)
2010/11	(4808.0)	13264.36	(36.25)
2011/12	(7300.6)	14012.90	(52.10)

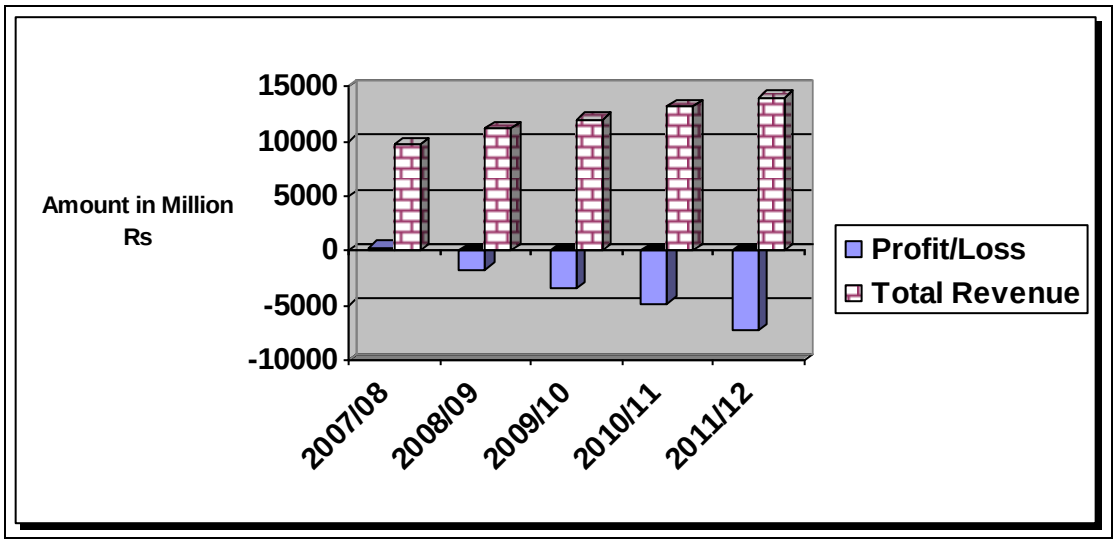
Source: Annual Report of NEA

The table above 4.13 gives the account of Total Revenue and Profit/(Loss) trend of NEA from FY 2007/08 to 2011/12. NEA during the fiscal year 2007/08 was in very strong position. It was in profit of 278.9 millions while the total revenue was 9687.65 million. The percentage of profit was 2.88. Since, after FY 2007/08 it went in loss. The loss was in increasing trend starting from 1694.9 million to the height of 7300.6 million. This shows that the percentage loss started from 15.08 and reached to 52.10.

The relationship between total revenue and profit can be presented by the following figure.

Figure No. 4.5

Relationship between Revenue and Profit/Loss Trend of NEA



Source: Annual Report of NEA

Figure No.4.5 gives the clear picture of relationship between total revenue and profit/ (loss) of NEA during the research period of 2007/08 to 2011/12. The total revenue is in increasing trend whereas the profit is in decreasing trend that shows the relationship between total revenue and profit is in totally inverse direction.

The least square method can be used to analyze the trend of profit/ (loss) and to estimate the possible future profit or loss for a given time of year. Considering the time factors as independent and profit or loss as dependent factor upon time. It will show the relationship between year and profit or loss.

Let, the straight line trend be $y_c = a+bx$

Table 4.14

Fitting Straight Line Trend by Least Square

From F/Y 2007/08 to 2011/12

F/Y (X)	Profit/loss (Y) (in Rs.000000)	X=X-2009/10	x^2	XY
2007/08	278.9	-2	4	-557.80
2008/09	-1694.9	-1	1	1694.90
2009/10	-3475.20	0	0	0
2010/11	-4808.00	1	1	-4808.80
2011/12	-7300.60	2	4	-14600
	∑Y=-16999.80	∑x=0	$\sum x^2=10$	∑xY=-18270.90

Since ∑x=0 then,

$$a = \frac{\sum Y}{n} = \frac{-16999.80}{5} = -3399.96$$

$$b = \frac{\sum xY}{\Sigma x^2} = \frac{-18270.90}{10} = -1827.09$$

Now substituting the value of 'a' and 'b' in the above equation,

We have,

Y_c= -3399.96 + (-1827.09)x

= -3399.96 – 1827.09x

For the estimation of profit or loss for the year 2012/13,

We have,

X= 3

Y_c= -3399.96-1827.09×3

= -8881.23 million

The estimated loss for the fiscal year 2012/13 will be Rs. 8881.23 millions if the past profit/loss trend continues. With the help of least square method we can say the trend of loss of NEA is increasing.

To analyze the relationship between sales and profit of NEA some statistical tools are used which are presented below.

Table 4.15

Summary of Statistical Tools

(In Rs. 000000)

Statistical Tools	Total Renenue "X"	Profit "Y"
Arithmetic Mean	12039.002	(3399.96)
Standard Deviation	1521.263	2594.01
Coefficient of variation	12.64%	76.29%
Correlation Coefficient	-0.9852	
Coefficient of Determinant	97.06%	
Probable error	0.0089	

Source: Appendix-V

Table 4.5 shows that the profit is more deviated than sales being CV 76.29% as compared to CV 12.64% of total revenue. The correlation coefficient is used to analyze the relationship between total revenue and profit. From above table the value of correlation is -0.9852 which is low negative correlation between total revenue and profit. That means total revenue and profit moves in quite opposite direction.

One very convenient and useful way of interpreting the value of co-efficient of correlation is coefficient of determination (r^2). The value of coefficient of determination between total revenue and profit is 0.9706 which shows that profit is expanded up to 97.0649% only by total revenue and remaining part by other factors.

The significance of correlation can be tested or verified by probable error. If the value of "r" is less than six time of P.E there is no evidence of correlation i.e. the value of "r" is not significant. Here the value of "r" is smaller than 6×PE (i.e. -0.982<0.0534) that means the value of 'r' is not significant. So it can be concluded that the value of profit will go on for opposite direction of total revenue.

4.9 Analysis of Account Receivable of NEA

The following table 4.25 shows that the account receivable, sales revenue, average collection period and debtor turnover of NEA.

Table 4.16

Account Receivable, Sales Revenue, Average Collection Period and Debtor Turnover

From FY 2007/08 to 2011/12

Fiscal year	Sales Revenue in Rs.million (A)	Account receivable in Rs.million (B)	Debtor Turnover (C=A/B)	Average Collection Period=360/C
2007/08	9687.65	2284.9	4.24times	86.80days
2008/09	11237.49	3380.2	3.32times	109.94days
2009/10	11992.61	3735.7	3.21times	113.71days
2010/11	13264.36	3697.7	3.59times	101.67days
2011/12	14012.90	4064.6	3.45times	105.80days

Source: Annual Report of NEA

Table No 4.16 shows that sales revenue, account receivable, debtor turnover and average collection period of NEA from fiscal year 2007/08 to 2011/12. The debtor turnover and average collection period are calculated by using following formula:

Debtor turnover = Sales/closing debtors or Sales /Account Receivable

Average collection period = Days in a year/Debtor Turnover

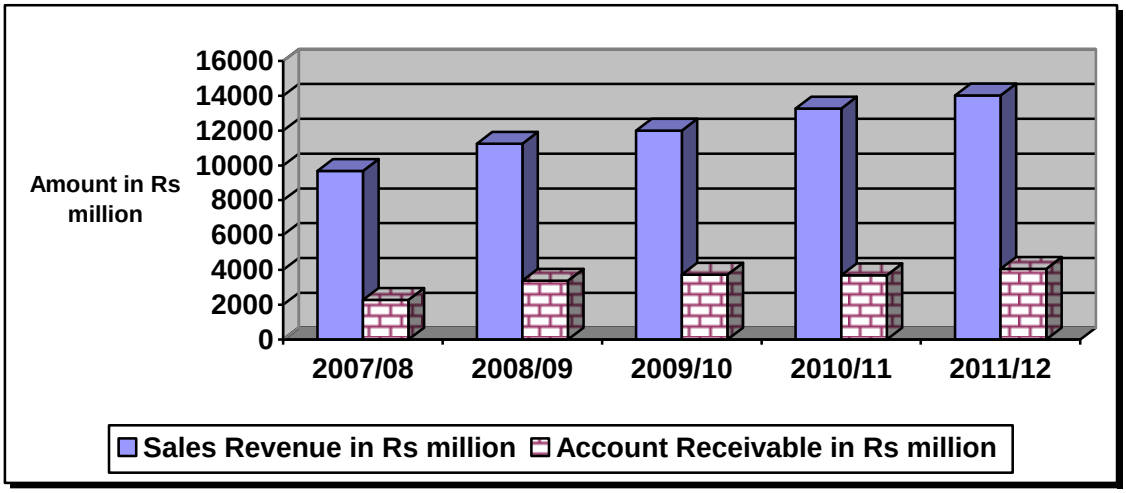
The table shows that as sales revenue increases, it puts impact on Account receivable, so does account receivable increases. Debtor Turnover is in decreasing trend. It decreased from 4.24 times to 3.21 times during the FY 2009/10. Then it has slightly gone up to 3.59 times during the year 2010/11 and then again it has decreased to 3.45 times in FY 2011/12.

The average collection period of NEA during the fiscal year 2007/08 was 86.80 days. It increased to 109.94 days and 113.71 days during the FY 2008/09 and 2009/10 respectively. Further more it decreased to 101.67 days during FY 2010/11. The above table shows that the collection period was good enough during FY 2007/08. This is so because the collection period was the lowest during the year 2007/08.

The relationship of sales and account receivables can be shown by figure as follows:

Figure No. 4.6

Relationship between Sales and Account Receivable



Source: Annual reports of NEA

FigureNo.4.6 shows that both the sales and account receivables are increasing in the whole research period. Account receivable is increasing with the increase in sales.

4.10 Relationship between Total Power Available and Power Loss

Power loss is the most crucial issue of NEA. Every fiscal year power is not utilized fully. Normally 15% of electricity loss out of actual production is considered. Leakage, outage and theft are manor causes of power loss. The following table shows the total power available, total sales and power loss of NEA from fiscal year 2007/08 to 2011/12.

Table 4.17
Total Power Available, Sales and Power Loss
From FY 2007/08 to 2011/12(unit in million)

Fiscal Year	Total Power Available in GWh (Production + Purchase)	Sales in GWh (Total Sales + Self Consumption)	Power Loss In GWh	% of Power Loss Compared to Total Power Available	% of Power Loss Compared to Sales
2007/08	2066.33	1558.91	507.42	24.56	32.55

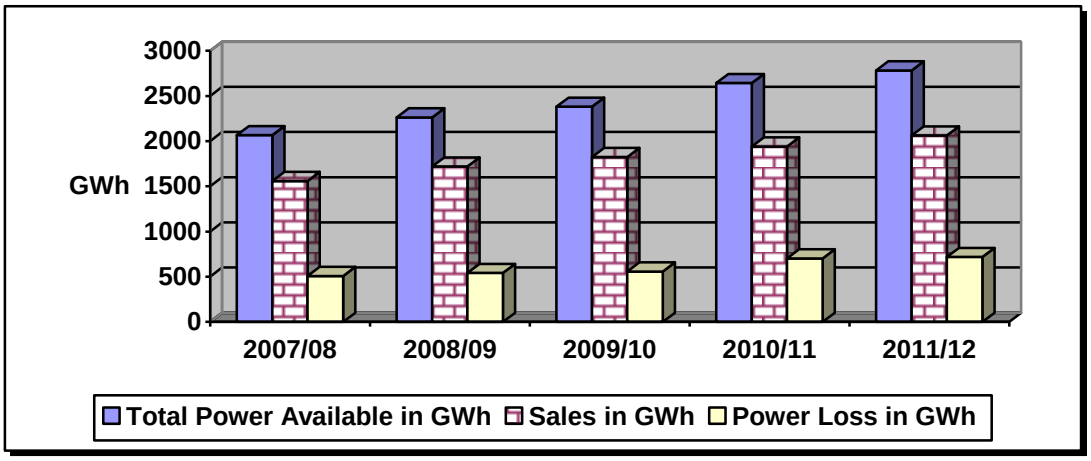
2008/09	2261.13	1719.16	541.97	23.97	31.53
2009/10	2380.89	1824.10	556.79	23.39	30.52
2010/11	2642.75	1940.60	702.15	26.57	36.18
2011/12	2780.92	2062.62	718.30	25.83	34.82

Source: Annual Report of NEA

Table 4.17 shows the relationship between total power available, sales, and power loss of NEA from 2007/08 to 2011/12. It is clearly seen that percentage of power loss is fluctuating with respect to total power available and total sales though the total power available, total sales and power loss are found to be in increasing trend during the same period. The percentage of power loss with sales is found to be higher than the percentage of power loss with total power available. This shows that the effort to decrease the power loss is found to be ineffective.

The total power available, sales and the total power loss can be compared by the help of figure no. 4.7.

Figure No. 4.7
Relationship between Total Power Available, Sales and Power Loss



Source: Annual reports of NEA

Figure No 4.7 shows the total power available, sales, and total power loss from fiscal year 2007/08 to 2011/12. The power loss is increasing with the increase in total power available and sales.

To analyze the relationship between total power available and power loss of NEA some statistical tools are used which are presented below.

Table 4.18

Summary of Statistical Calculation

Statistical Tools	Total Power Available "X"	Power Loss "Y"
Arithmetic Mean	2426.40	605.33
Standard Deviation	257.50	87.28
Coefficient of Variation	10.61%	14.42%
Correlation Coefficient	0.9633	
Coefficient of Determinant	92.79%	

Source: Annual reports of NEA

Table 4.18 shows that the power loss of NEA is more variable than total power available having higher CV. The correlation coefficient between total power available and power loss is 0.9633. That means there is highly positive correlation between total power available and power loss which shows that power loss of NEA increases with increase in total power available. The coefficient of determination between total power available and power loss is 92.79% that means power loss is explained up to 92.79% by total power available and remaining portion by other factors.

4.11 Analyses of Financial Ratio

4.11.1 Profitability Ratios

The profitability ratios measure the profitability or the operational efficiency of the firm. The main objective of a company is to earn profit. Profit is both a means and an end to the company. Therefore profitability shows the overall efficiency of the company. Profitability ratios are the measure of its over all efficiency. Generally profitability ratios can be calculated in term of the company's sales investments and earning and dividends. The following are the main types of profitability ratios.

A. Gross Profit Ratio

Gross profit ratio is also termed as gross profit margin. This ratio shows the relationship between gross profit and net sales and it measures the overall

profitability of the company in terms of sales. It is generally expressed in percentage. Following table shows the gross profit ratio of NEA.

Table 4.19

Gross Profit Ratio of NEA

From FY 2007/08 to 2011/12

Fiscal years	Gross Profit Ratio
2007/08	37.88%
2008/09	51.44%
2009/10	43.03%
2010/11	40.80%
2011/12	35.84%

Source: Annual reports of NEA

Table No. 1.9 shows the Gross Profit Ratio of NEA during FY 2007/08 to 2011/12. The gross profit ratio has remained "between" 35.84% to 51.44%. The gross profit ratio remained below 38% during FY 2007/08 and 2011/12, while it was around 40% during FY 2009/10 and 2010/11. The highest gross profit ratio was achieved during FY 2008/09, i.e. 51.44%. It is obvious that higher the gross profit, higher the strength of the authority.

B. Net Profit Ratio

This ratio is also called net profit margin. This ratio measured the overall profitability of a business by establishing the relationship between met profit and net sales. This ratio is calculated by dividing net profit after tax by net sales. It is expressed in terms of percentage. The following table 4.20 shows the net profit ratio of NEA from FY 2007/08 to 2011/12.

Table 4.20

Net Profit Ratio of NEA

From FY 2007/08 to 2011/12

Fiscal years	Net Profit Ratio
2007/08	-9.08%
2008/09	-17.74%
2009/10	-14.82%
2010/11	10.41%
2011/12	18.43%

Source: Annual reports of NEA

The above table 4.20 gives the Net profit Ratio of NEA during FY 2007/08 to 2011/12. Since FY 2007/08 to 2009/10 NEA could not make any Net profit, it has only experienced the net loss. So, it has only achieved a bitter negative net profit ratio in every successive year since 20010/11 to 2011/12. This data of loss in net profit ratio of NEA suggests the Authority to have a well organized planning and monitoring of the activities those results to bring the authority to have positive results.

C. Return on Assets (ROA)

This ratio measures the relationship between the total assets and net profit after tax plus interest. It measures the productivity of the assets and determines how effectively the total assets have been used by the company. The table 4.21 presents the ROA of NEA from FY 2007/08 to 2011/12.

Table 4.21

Return on Assets (ROA)

From FY 2007/08 to 2011/12

Fiscal years	Return on assets (ROA)
2007/08	0.75%
2008/09	1.38%
2009/10	1.57%
2010/11	2.04%
2011/12	0.88%

Source: Annual reports of NEA

Table No. 4.21 draws the picture of return of Assets in percentage of NEA. The Return on asset is positive, but it is very low. It is in increasing position since 2007/08 to 2010/11, which was 0.75%, 1.38%, 1.57%, and 2.04% respectively. In conclusion it can be concluded that NEA has very low productivity of assets. Hence it is suggested to NEA's management group to manage its management for increasing the productivity of assets.

D. Return on Capital Employed (ROCE)

The net result of operation of a business is either profit or loss. The fund used by the company to generate profit consists of both proprietors/ shareholders fund and borrowed funds. Therefore, the company's overall performance can be judged in terms of capital employed. This ratio measure the relationship between capitals employed and net profit after tax plus interest. This ratio indicates how well the management has used the fund supplied by creditors and owners. Higher ratio indicates the efficient of fund entrusted to the firm by creditor and owners. Table 4.4 shows the return on capital employed {ROCE} of NEA from FY 2007/08to 2011/12. It is quite unsatisfactory.

Table 4.22

Return on Capital Employed [ROCE] of NEA

From FY 2007/08 to 2011/12

Fiscal years	Return on Capital Employed
2007/08	0.81%
2008/09	1.54%
2009/10	0.18%
2010/11	2.40%
2011/12	1.04%

Source: Annual reports of NEA

The table 4.22 shows the return on capital employed ratio of NEA. The return on capital employed has fluctuated in every year since FY 2007/08 to 2011/12. The lowest return was during 2009/10 i.e. 0.18%. The return on capital employed is very low in every year. This shows that capital employed is very low.

4.11.2 Leverage Ratios

Leverage ratios are also called long term solvency ratios or capital structure ratios. The term "solvency" implies the ability of a company to meet the payments associated with its long- term debts. Thus solvency ratios are the measure of the company's ability to meet its long term obligations. Generally, these ratios are expressed in proportions. The following are the major types of leverage ratios.

A. Debt to Total Capital Ratio

B. Debt-equity Ratio

Among the two we will discuss only the A, which is frequently used in NEA.

A. Debt to Total Capital Ratio

This ratio shows the relationship between total debt and total capital employed by the company. Total capital includes long term liabilities plus shareholders equity. Total capital is also regarded as permanent capital or capital employed or long term fund. This ratio is ascertained by using the following formula.

Debt to total capital ratio=Total Debt/Total capital

Table 4.23
Debt to Total Capital Ratio
From FY 2007/08 to 2011/12

Fiscal Year	Debt to total capital ratio
2007/08	0.72:1
2008/09	0.78:1
2009/10	0.82:1
2010/11	0.84:1
2011/12	0.84:1

Source: Annual reports of NEA

Table No. 4.23 shows the debt to total capital ratio. Debt to capital ratio of 2:3 is considered as satisfactory level. Debt to total capital ratio of NEA for all fiscal years starting since 2007/08 to 2011/12 is well enough satisfactory. The highest satisfaction was gained during the FY 2010/11 and 2011/12. The satisfaction level is in increasing level.

4.11.3 Liquidity Ratios

The liquidity refers to the maintenance of cash, bank balance and those assets which are easily convertible into cash in order to meet the liabilities as and when arising. So, the liquidity ratios study the firm's short term solvency and its ability to pay off the liabilities. It should be intuitive to observe that a firm, no matter how profitable it is, cannot continue to exist unless it is able to meet its obligations as they arise. The day to day problems of financial management consists of highly important task of finding sufficient cash to met current obligations. To the extent that the firm has to make payments to its suppliers before it is paid for the goods and services it provides, a

cash short fall has to be met, usually through the short term borrowings. Although this financing of working capital needs is routinely done in most firms, the liquidity ratios have been devised to keep a track on the extent of the firm's exposure to the risk that it will not be able to meet its short term obligations.

These ratios as a group are intended to provide information about a firm's liquidity and the primary concern is the firm's ability to pay its current liabilities. Consequently, these ratios focus on current assets and current liabilities. The liquidity ratios provide a quick measure of the firm by establishing a relationship between its current assets and its current liabilities. If a firm does not have sufficient liquidity, it may not be in a position to meet its commitments and thereby may loose its credit worthiness. The liquidity ratios are also called the balance sheet ratios because the information required for the calculation of liquidity ratios is available in the balance sheet only. Some of the common liquidity ratios are as follows.

A. Current Ratio:

Current ratios show the relationship between current assets and current liabilities. The current ratio is a measure of firm's short term solvency. It indicates the availability of currents assets in rupee for every of current liability. In other words it is an indicator of firm's ability to meet its short term obligation. It is also known as short term solvency ratio or working capital ratio. Generally current ratio of 2 times or 2:1 is considered to be satisfactory. The table below presents current ratio of NEA from fiscal year 2007/08 to 2011/12.

Table 4.24

Current Assets Ratio of NEA

From FY 2007/08 to 2011/12

Fiscal Year	Current Ratios
2007/08	1.23:1
2008/09	0.94:1
2009/10	0.76:1
2010/11	0.64:1
2011/12	0.65:1

Source: Annual reports of NEA

Table No. 4.24 shows the current assets ratio of NEA from FY 2007/08 to 2011/12. It is clear from above table that all current assets ratios are less than 2:1which is considered to be standard. All current ratios lie "between" 0.64 to 1:23 in the above table. Since the current ratio of 2:1 is considered as satisfactory, therefore solvency position of NEA is not satisfactory being current ratio less than standard.

B. Quick Ratio:

It is also called the acid test ratio or liquid ratio. This ratio establishes the relationship between quick/liquid current assets and the current liabilities. A current assets is considered to be liquid if it is convertible into cash without loss of time and value. On the basis of this definition of liquid assets, the inventory is singles out of total current assets as the inventory is considered to be potentially illiquid. The reason for keeping inventory out is that it may become obsolete, unsaleable or out of fashion and always requires time for realizing into cash. Moreover, the inventories have tendency to fluctuate in value. Another item which is generally kept out is the prepaid expenses because by nature these prepaid expenses are not realizable in cash. So, the quick ratio looks for the ready availability or convertibility into cash. Generally, a quick ratio of 1:1 is considered to be satisfactory because this means that the quick assets of the firm are just equal to the quick liabilities and there does not seem to be a possibility of default in payment by the firm. The quick ratio is considered to be a better test of liquidity than the current ratio.

The table No. 4.25 shows the quick ratio of NEA from FY 2007/08 to 2011/12.

Table No. 4.25
Quick Ratio of NEA
From FY 2007/08 to 2011/12

Fiscal year	Quick Ratios
2007/08	0.50:1
2008/09	0.54:1
2009/10	0.46:1
2010/11	0.38:1
2011/12	0.39:1

Source: Annual reports of NEA

TableNo. 4.25 states that the quick ratio of NEA in all fiscal years is below the standard (1:1). So it can be concluded that the quick ratio of NEA is unsatisfactory in any fiscal years.

4.11.4 Turnover Ratios

A turnover ratio or an activity ratio is a measure of movement and thus indicates as to how frequently an account has moved/turned over during a period. It shows as to how efficiently and effectively the assets of the firm are being utilized. The activities ratios therefore, measure the effectiveness with which the firm uses its resources. These ratios are usually calculated with reference to sales/cost of goods sold and are expressed in terms of rate or times. The activity ratios may be calculated for all the specific assets, however, some of the important activity ratios are as follows:

A. Capital Employed Turnover Ratio

Capital turnover ratio establishes the relationship between the amount of sales and capital employed. It shows how efficiently capital employed in the NEA has been utilized in generating its sales revenue. Table No. 4.26 presents the capital employed turnover ratio of NEA.

Table No. 4.26

Capital Employed Turnover Ratio

From F/Y 2007/08 to 2011/12

Fiscal Year	Capital employed Turnover ratio
2007/08	0.15times
2008/09	0.17times
2009/10	0.18times
2010/11	0.18times
2011/12	0.18times

Source:- Annual reports of NEA

The capital employed turnover ratio has increased from 0.15times during the FY 2007/08. This ratio then has remained constant to 0.18 times from FY 2009/10 to 2011/12. The capital employed turnover ratio explains that, the higher the turnover ratio, the more effective utilization of the creditor's fund.

B. Total Asset Turnover Ratio:

This ratio shows the relationship between total assets and sales. Total assets turnover ratio indicates how well the firm's total assets are being used to generate its sales. A higher total assets turnover ratio indicated better utilization of total assets in generating sales and lower total assets turnover ratio indicates over investment in total assets. Generally, a higher ratio is preferable which gives the result if better profitability. The following table 4.27 presents the total asset turnover ratio of NEA.

Table 4.27
Total Asset Turnover Ratio
From F/Y 2007/08 to 2011/12

Fiscal years	Total Assets turnover Ratio
2007/08	0.13times
2008/09	0.15times
2009/10	0.15times
2010/11	0.15times
2011/12	0.15times

Source: Annual reports of NEA

Table No.4.27 shows the Total Assets Turnover Ratios. The total assets turnover ratios of NEA during the year 2007/08 are 0.13times. It then slightly went up to 0.15 times and remained constant to 0.15times, since FY 2008/09to 2011/12. This shows that the total asset turnover ratio of NEA is not satisfactory. One of the reasons behind it that the NEA has invested large amount in assets.

C. Fixed Assets Turnover Ratio:

Fixed assets turnover ratio is also termed as the ratio of sales to fixed assets. Fixed assets turnover ratio indicates how efficiently the fixed assets are used. It measures the efficiency with which the firm has been using its fixed assets to generate sales. A higher fixed assets turnover ratio indicated better utilization of fixed assets in generating sales and lower fixed assets turnover ratio indicates over investment in fixed assets. Following table shows the fixed assets turnover ratio of NEA.

Table No. 4.28
Fixed Assets Turnover Ratio
From F/Y 2007/08 to 2011/12

Fiscal years	Fixed Assets turnover Ratio
2007/08	0.17times
2008/09	0.20times
2009/10	0.20times
2010/11	0.22times
2011/12	0.22times

Source: Annual reports of NEA

Table No.4.28 the fixed asset turnover ratio is 0.17 times during the year 2007/08, which rose up to 0.20 during the FY 2008/09 and 2009/10. It further increased to 0.22 times during the year 2010/11 and 2011/12. It indicates that NEA has unsatisfactory fixed assets turnover ratio. It is because of large investment in fixed assets.

D. Inventory Turnover Ratio (I/T Ratio):

This ratio is also called stock turnover ratio. This ratio shows the relationship between the cost of goods sold and the average inventory. This ratio measures how frequently the company's inventory turned into sales. It, therefore, shows the efficiency with which the company's inventory has been converted into sales. There is no ideal standard for evaluating an I/T Ratio of a firm so it should be compared with the I/T Ratio of other firms or past I/T Ratio of the same firm. Since the I/T Ratio is a test of efficient inventory management, the higher the I/T Ratio, the better its is. But this is true only up to a point and a very high I/T Ratio may signal problems e.g. a firm may have a high I/T Ratio if it is maintaining a low level of inventory. The following table shows the Inventory Turnover Ratio of NEA.

Table 4.29
Inventory Turnover Ratio of NEA
From F/Y 2007/08 to 2011/12

Fiscal years	Inventory Turnover Ratio
2007/08	9.16times
2008/09	11.05times
2009/10	11.44times
2010/11	9.66times
2011/12	10.42times

Source: Annual reports of NEA

Inventory Turnover Ratio during the FY 2007/08 remained to 9.16 times. It increased to 11.05 times and 11.44times during 2008/09 and 2009/10 respectively. During the FY 2010/11 it went down to 9.66 times meeting the level of 2007/08 while increased to 10.42 times during 2011/12.

4.12 Major Findings

- Analysis of Profit and loss shows that NEA is in loss during FY 2008/09 to 2011/12, where the % of loss on total revenue is 15.08 to 52.10% respectively. It is on profit only in FY 2007/08 which is 2.88% profit on total sales.
- The highest contribution of consumer is 95.96% in average which is gained by Domestic category of consumer; while the lowest is 0.0005% in average is gained by Bulk supply (India).
- The analyses of category wise achievement of sales unit and sales rupees of NEA i.e. 106.911 and 110.96% shows that the highest achievement is achieved by street light while the lower is made by bulk supply{India},i.e. 74.64% and 76.26% respectively.
- The highest contribution in total sales in unit and in rupees in category wise contribution of NEA are contributed by Domestic sales which is 37.54%and 38.28% in average while the least contribution is 0.02% and 0.04% in average respectively contributed by Temporary supply.

- Achievement has not been met during the research period. The highest achievement in unit 96.46% during the fiscal year 2010/11 and achievement in amount is 99.92% during the fiscal year 2010/11.
- The highest current ratio and quick ratio is 1.23 and 0.54 during the FY 2007/08 and 2008/2009 respectively, while the lowest current ratio and quick ratio is 0.64 and 0.38 respectively during the year 2011/12.
- The highest and the lowest debt to total capital ratio is 0.84 and 0.72 during the FY 2010/11 and 2011/12 respectively.
- The highest capital employed turnover ratio, total assets turnover ratio fixed assets turnover ratio and inventory turnover ratio is 0.18 times, 0.15 times 0.22 times and 11.44 times during the research period.
- The highest gross profit ratio, return on assets and return on capital employed is 51.44% in FY 2008/09, 2.04% in 2010/11 and 2.40% in 2011/12 respectively. The net profit ratio is in negative during the whole research period.
- The coefficient of determination is 0.9612{96.12%}. This means that sales are explained by budgeted sales up to 96.12% and the remaining portion i.e. 3.88% is explained by other factors.
- Budgeted sales and actual sales both in unit and amount are in increasing trend. Increase in actual sales in percentage both in unit and amount are fluctuating, from 5.80 to 10.59 and 5.64to 16 respectively.
- The correlation coefficient (r) of budgeted sales and actual sales is 0.9804 which shows that the correlation is highly positive. This means they move to the same direction.
- The probable error is 0.0177 which is six times less than correlation coefficient i.e. 0.9804>0.0702. Hence the correlation coefficient is significant.
- The regression line Y=1.6072'X'-8572.261; shows the positive relationship between budgeted sales and actual sales. The actual sales will increase by Rs.1 million while in the next fiscal year actual sales will reach to Rs.16561.328million if other factors remaining constant.

- The‘t’ test distribution shows that there is no significant difference between budgeted sales and actual sales of NEA.
- The correlation coefficient between total revenue and profit/ (loss) is negative .i.e. -0.9852.
- The coefficient of determination between total revenue and profit / (loss) is 0.9706 (97.06%) and The Probable Error between total revenue and profit/ (loss) is 0.0089.
- The regression line calculated by least square method shows loss even in next fiscal year 2012/13 which figures out to be 8881.23 million in rupees.
- The coefficient of variation shows that profit and loss is highly fluctuating than actual sales. The CV of total revenue is 12.64% and CV of profit and loss is 76.29%
- The cash flow statement shows; cash from operating activities is negative during the FY 2007/08.
- The highest account receivable sales revenue, debtor turnover and average collection period during the research period are 4064.6 million 14012.90 million, 4.24times and 113.71days respectively.
- The highest percent of power loss in total power available is 26.57% which is during the FY 2010/11.
- Analysis of cash budget shows net deficit is seen during FY 2007/08 to 2011/12.

CHAPTER -V
SUMMARY, CONCLUSION AND RECOMMENDATIONS

This is the concluding chapter of this study. This chapter is divided into three sections: Summary, Conclusions and Recommendations. In this chapter summary of the study is provided in brief. It has been a concern from the first chapter to the end. Findings of calculations, which have been drawn using different tools and technique based on the data provided by the concerned companies, are concerned here in conclusions section. In the last section of this chapter some recommendations have been given, which are useful to stakeholders and to concerned companies as well. They can use these recommendations to take some corrective actions to draw decisions.

5.1 Summary

As per the nature and requirement of the study, secondary data are used with the descriptive and analytical research design. For this research study five years data from the fiscal year 2007/08 to 2011/12 has been used. Data are tabulated and presented as per the requirement of the study. For the analysis of data different statistical tools like arithmetic mean, standard deviation, coefficient of correlation, coefficient of variation, coefficient of determination, probable error of correlation, regression graph, diagrams and hypothesis testing have been used. Similarly, financial tools such as ratio analysis and variance analysis have also been used.

This study on "Cash Management and Revenue Planning and of Nepal Electricity Authority" is primarily prepared for the partial fulfillment of the requirement of the master of business studies (MBS). This study is mainly based on secondary provided by concern companies, security board of Nepal (SEBON). Among the listed public enterprises Nepal Electricity Authority is selected as a sample of study. The main objective of the study is to revenue planning and cash management of NEA. However due to the time and resource constraints all types of analysis are not conducted. The collected information is presented analyzed and conclusion is drawn from the study.

Chapter-One is concerned with the introduction of the whole study. It explained about the concentration of the study objectives and organization of the study which provides guideline for entire study.

Chapter-Two is for the review as well as the review of related previous studies is conducted.

Chapter-Three specifies the guidelines, tools and research design to achieve the objectives of the study.

In Chapter-Four this is analyzing chapter, which deals with presentation and analysis of relevant data through definite source of research methodology with accounting, financial and statistical analysis related to revenue planning and cash management.

In chapter Five main findings are concluded as the conclusion of the study. Based on the analysis and conclusion of the study some recommendations are made in this chapter.

5.2. Conclusion

- During the whole study period the actual sales achievement is lower than budgeted targets. This fact is realized due to ineffective implementation of budgeted.
- NEA' is having loss of power every year which is adversely affecting in revenue generation.
- NEA has failed to make collection plans of next year on the basis of previous years' collection.
- NEA should take under consideration the demand determinants such as price of electricity cost of auto generation of electricity, family income, cost of alternative and reliability of NEA service while forecasting demand
- The due amount of account receivable denotes inefficiency of NEA's collection policy.
- NEA has bared a loss. The loss is in increasing pattern with respect to sales revenue. The reality of loss is due to high investment in fixed assets.

- NEA should get consistency between budgeted and achievement level, especially in some sector such as bulk supply and street light.
- In comparison to Actual sales profit is highly fluctuating during the entire research period. This shows that there may arise a question mark to the management of NEA for not meeting its sustainable profit in the long run.
- Cash budget shows that NEA is not in net surplus during FY 2007/08 and 2011/12 which is due to inefficiency in management, mainly due to high operation cost, interest and capital expenditure.
- The fixed assets turnover ratio shows that NEA is not utilizing its fixed assets to increase sales effectively.
- The current ratio and quick ratio is below its standard which shows solvency position of NEA is not satisfactory.
- NEA has not prepared plan and programs for agricultural sectors consumption of electricity.
- The net profit ratio is in negative during the research period which indicates that NEA is not in sound position.
- The category wise achievement both in sales and unit shows fluctuation in mean, which is due to ineffective and timely planning. So, the categories having mean below hundred percent should be increased.
- The relationship between budgeted sales and actual sales is positive. This shows that sales in the future will increases.
- The loss figure suggests that approximately 15% is accounted for loss due to technical reasons and 10% non- technical loss that may be attributed chiefly to the irresponsible and unauthorized use of electricity. Other factors contributing to non technical losses are faulty metering devices in use, unaccountable public installation such as temple and street lights and NEA's inefficiency to records its own consumption.
- The statistical tools (C.V) show that the actual sales are highly fluctuating during the entire research period.
- NEA has not exercised in preparing monthly budget which is extremely necessary for planning and controlling.

5.3 Recommendations

- NEA should get consistency between budget and achievement level, especially in some sector such as water supply and irrigation, street light, temporary supply, community sales and bulk supply to India.
- NEA should consider demand determinants such as family income, price of electricity, connection charge, cost of alternative sources, cost of self-generation of electricity and reliability of NEA service while forecasting demand.
- NEA should try to reduce overdue amount of receivables. NEA should provide incentive to staff to encourage them for collection of overdue amount of receivable. In revenue collection, any kind of pressure, nepotism and biases should strictly be discouraged.
- To generate adequate sales and profit NEA should efficiently utilize its total resources (total assets); because it's total turnover ratio seems low.
- NEA should introduce programs and action plans for the reduction of transmission loss, both technical and non-technical. NEA can improve its efficiency in the metering device instantly either by changing old meters or utilizing only efficient meter readers or by improving its transmission system. Non-technical loss can be reduced by adopting effective managerial, social, legal and other measures.
- NEA should pay more effort to manage the supply to the profitable sector such as domestic, industrial, commercial, non-commercial and temporary supply. Traffic rate for water supply and irrigation supply to India should be revised in such a way by which NEA could cover operating cost at least.
- NEA should excise to prepare plans and programs for agriculture sector, which is capable of massive consumption of electricity.
- NEA should make a keen effort to prepare monthly budget for sales revenue.
- NEA should consider demand determinants such as family income, price of electricity, connection charge, cost of alternative sources, cost of self-

generation of electricity and reliability of NEA service while forecasting demand.

- NEA should forecast planned collection for next year on the basis of actual collection of previous year.
- NEA's planners must be properly trained for budgeting and cash management.
- NEA should reduce its huge amount of fixed cost resulting from over staffing, fuel and other overheads.
- NEA should adopt standard costing system and also establish a cost control centre for cost control purpose; NEA should reduce high operating cost to reduce loss.

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Appendix – I

Budgeted sales are assumed to be independent variable and denoted by 'X'. Actual sales are assumed as dependent variable and denoted by 'Y'. Now, calculation of arithmetic mean, standard deviation, co-efficient of variation, correlation co-efficient, co-efficient of determination and probable of error of correlation between budgeted sales and actual sales achievements of NEA.

Fiscal Year	Budgeted Sales (X) (in Rs '00000'	Actual Sales (Y) In Rs '00000'	$x = \left(X - \overline{X}\right)$	x^2	$y = \left(Y - \overline{Y}\right)$	y^2	xy
2007/08	11521.4	9687.65	-1302.93	1697637.01	-2351.352	5528856.23	3063656.47
2008/09	12238.8	11237.5	-585.53	342845.381	-801.512	642421.486	469309.321
2009/10	12825.7	11992.6	1.402	1.965604	-46.392	2152.21766	-65.041584
2010/11	13275.4	13264.4	451.053	203448.809	1225.358	1501502.23	552701.402
2011/12	14260.3	14012.9	1436.009	2062121.85	1973.898	3896273.31	2834535.29
	$\sum X = 64121.7$	$\sum Y = 60195$	$\sum x = 0$	$\sum x^2 = 4306055.01$	$\sum y = 0$	$\sum y^2 = 11571205.5$	$\sum xy = 6920137.44$

A) Budgeted Sales (X):

a. Arithmetic Mean $\left(\overline{X}\right) = \frac{\sum X}{n} = \frac{641221.70}{5} = 12824.33$

b. Standard Deviation $\left(\sigma_x\right) = \sqrt{\frac{\sum x^2}{n}} = \sqrt{\frac{4306055.01}{5}} = 928.01$

c. Coefficient of Variation $\left(C.V._x\right) = \frac{\sigma_x}{\overline{X}} \times 100 = \frac{928.01}{12824.33} \times 100 = 7.24\%$

B) Actual Sales

a. Arithmetic Mean $\left(\overline{Y}\right) = \frac{\sum Y}{n} = \frac{60195}{5} = 12039.002$

b. Standard Deviation $\left(\sigma_y\right) = \sqrt{\frac{\sum y^2}{n}} = \sqrt{\frac{11571205.5}{5}} = 1521.263$

c. Coefficient of Variation $\left(C.V._y\right) = \frac{\sigma_y}{\bar{Y}} \times 100 = \frac{1521.263}{12039.002} \times 100 = 12.63\,\%$

C) Coefficient of Correlation (r) between budgeted sales and actual sales achievement
We have,

$$\text{Coefficient of Correlation (r)} = \frac{\sum xy}{\sqrt{\sum x^2} \times \sqrt{\sum y^2}} = \frac{6920137.44}{\sqrt{4306055.01} \times \sqrt{11571205.5}}$$

$$= \frac{6920137.44}{2075.10 \times 3401.65} = 0.9804$$

D) Coefficient of Determination $\left(r^2\right) = \left(0.9804\right)^2 = 0.9612$

E) Probable Error of Correlation Coefficient $P.E.(r) = 0.6745 \times \frac{1 - r^2}{\sqrt{n}}$

$$= 0.6745 \times \frac{\left(1 - 0.9612\right)}{\sqrt{5}} = 0.0117$$

F) Standard Deviation of Actual Sample $= \sqrt{\frac{\sum y^2}{n-1}}$

$$= \sqrt{\frac{11571205.5}{5-1}} = 1700.82$$

Appendix-II
Category-wise Achievement of Sales Units (%) of NEA

(Figure in million)

	2007/08			2008/09			2009/10			2010/11			2011/12		
	Budgeted	**Actual**	**Achievement %**	**Budgeted**	**Actual**	**Achievement %**	**Budgeted**	**Actual**	**Achievement %**	**Budgeted**	**Actual**	**Achievement %**	**Budgeted**	**Actual**	**Achievement %**
Domestic	600.00	557.94	92.99	648.60	617.11	95.19	689.40	676.37	98.11	750.00	730.83	97.44	815.00	810.1	99.41
Non Commercial	81.00	78.22	96.57	90.00	80.74	89.71	92.43	83.01	89.81	112.00	91.34	81.56	115.00	101.03	87.85
Commercial	103.60	90.43	87.28	110.00	92.74	84.31	110.00	108.12	98.29	107.00	107.44	101.41	111.70	123.45	110.52
Industrial	605.00	596.68	98.62	660.00	629.51	95.38	677.90	689.80	101.76	725.00	763.77	105.35	832.05	803.35	96.55
Water Supply & Irrigation	31.50	29.28	92.96	37.00	29.98	81.04	33.15	31.67	95.54	43.00	36.12	83.99	44.00	42.73	97.11
Street Light	40.70	39.52	97.09	45.00	50.80	101.78	43.00	55.20	128.36	60.00	57.84	96.41	58.50	64.88	110.91
Temporary Supply	0.90	0.28	31.33	0.50	0.35	69.60	0.29	0.25	86.55	0.35	0.39	112.57	0.53	0.73	137.74
Transport	6.50	5.64	86.69	7.00	5.53	79.00	7.20	5.47	75.99	7.00	5.72	81.64	6.00	5.98	99.67
Temple	2.80	2.48	88.43	2.80	2.81	100.39	2.98	4.11	137.95	4.50	4.20	93.42	5.20	4.91	94.42
Community Sales	0.50	5.72	1143.4	4.00	4.74	118.50	5.00	5.58	111.62	6.00	8.17	136.20	7.50	8.02	106.93
Bulk Supply (India)	170.00	133.86	78.74	200.00	192.25	96.12	245.27	141.24	57.58	164.00	112.53	68.62	140.00	101.00	72.14

Category-wise Achievement of Sales Rupees (%) of NEA

(In Rs. million)

	2007/08			2008/09			2009/10			2010/11			2011/12		
	Budgeted	Actual	Achievement %	Budgeted	Actual	Achievement %	Budgeted	Actual	Achievement %	Budgeted	Actual	Achievement %	Budgeted	Actual	Achievement %
Domestic	4218.0	3641.4	86.33	4592.0	4249.8	92.55	4770.6	4578.9	95.98	5082.8	7987.0	98.12	5444.2	5363.5	98.52
Non Commercial	827.8	722.12	87.23	900.0	783.99	87.11	924.3	816.0	88.28	1058.9	862.4	81.44	1083.3	929.5	85.80
Commercial	1046.4	818.75	78.25	1089.0	894.91	82.18	1089.0	986.0	90.55	999.7	1012.7	101.29	1037.7	1138.2	109.69
Industrial	4368.1	3608.1	82.60	4290.0	4039.6	94.16	4419.9	4380.2	99.10	4605.9	4799.7	104.21	5283.5	5061.1	95.79
Water Supply & Irrigation	157.82	138.68	87.88	188.30	148.53	78.88	162.53	154.8	95.25	260.7	211.6	81.16	258.3	196.6	76.12
Street Light	197.4	200.74	101.69	236.25	246.79	104.46	225.75	329.5	145.97	342.3	314.1	91.77	336.4	373.1	110.91
Temporary Supply	11.93	3.63	30.44	6.75	4.74	70.22	3.92	3.46	88.38	4.7	5.1	107.09	7.4	9.8	132.88
Transport	32.18	27.90	86.71	38.50	29.29	76.08	39.60	28.94	73.08	36.8	30.7	83.46	31.5	30.5	96.83
Temple	14.06	12.16	86.51	14.00	14.24	101.71	14.90	20.80	139.60	22.8	29.2	127.94	26.2	25.0	95.54
Community Sales	1.75	-	-	14.00	16.59	118.50	17.50	20.09	114.80	21.0	24.0	114.48	26.6	28.5	106.93
Bulk Supply (India)	646.0	514.12	79.59	870.0	808.96	92.98	1157.7	673.7	58.19	839.7	609.5	72.59	725.2	565.6	77.99

Appendix-III (a)
Contribution of each Category in Sales Units

	2007/08		2008/09		2009/10		2010/11		2011/12	
	Actual Sales	**Contribution %**	**Actual Sales**	**Contribution %**	**Actual Sales**	**Contribution %**	**Actual Sales**	**Contribution %**	**Actual Sales**	**Contribution %**
Domestic	557.94	36.36	617.11	36.37	676.36	37.67	730.83	38.09	110.19	39.21
Non Commercial	78.22	5.09	80.74	4.75	83.01	4.62	91.34	4.76	101.03	4.90
Commercial	90.43	5.89	92.74	5.50	108.12	6.02	107.44	5.60	123.45	5.97
Industrial	96.68	38.89	629.50	37.10	689.80	38.42	763.77	39.81	803.35	38.88
Water Supply & Irrigation	29.28	1.91	29.98	1.76	31.67	1.76	36.12	1.88	42.73	2.06
Street Light	39.52	2.57	45.80	2.70	55.20	3.07	57.84	3.01	64.88	3.14
Temporary Supply	0.28	0.02	0.35	0.02	0.25	0.01	0.39	0.02	0.73	0.03
Transport	5.64	0.36	5.53	0.33	5.47	0.30	5.72	0.30	5.98	0.29
Temple	2.48	0.16	2.81	0.17	4.11	0.23	4.20	0.22	4.91	0.24
Community Sales	5.27	0.37	4.74	0.28	5.58	0.31	8.17	0.42	8.02	0.38
Bulk Supply (India)	133.86	8.72	192.24	11.32	141.24	7.57	112.53	5.87	101.00	4.90
Total	**1534.31**	**100**	**1696.82**	**100**	**1795.23**	**100**	**1918.35**	**100**	**2066.27**	**100**

Appendix-III (b)
Contribution of each Category on Sales Revenue

	2007/08		2008/09		2009/10		2010/11		2011/12	
	Actual Sales	**Contribution %**	**Actual Sales**	**Contribution %**	**Actual Sales**	**Contribution %**	**Actual Sales**	**Contribution %**	**Actual Sales**	**Contribution %**
Domestic	3641.43	37.59	4249.81	37.82	4578.99	38.18	4987.04	38.70	5363.46	39.09
Non Commercial	722.12	7.45	783.99	6.98	816.01	6.80	862.37	6.69	929.48	6.77
Commercial	818.75	8.45	894.91	7.96	986.07	8.22	1012.66	7.86	1138.21	8.30
Industrial	3608.13	37.24	4039.65	35.95	4380.22	36.52	4799.74	37.25	5061.11	36.88
Water Supply & Irrigation	138.68	1.43	148.53	1.32	154.80	1.29	211.57	1.64	196.63	1.43
Street Light	200.74	2.07	246.79	2.20	329.52	2.75	314.11	2.44	373.06	2.72
Temporary Supply	3.63	0.04	4.74	0.04	3.46	0.03	5.06	0.04	9.86	0.07
Transport	27.90	0.29	29.29	0.26	28.94	0.24	30.72	0.24	30.50	0.22
Temple	12.16	0.13	14.24	0.13	20.80	0.17	29.17	0.23	25.04	0.18
Community Sales	-	-	16.59	0.15	20.09	0.17	24.04	0.18	28.47	0.21
Bulk Supply (India)	514.12	5.31	808.96	7.20	673.69	5.62	609.51	4.73	565.60	4.12
Total	**9687.65**	**100**	**11237.49**	**100**	**11992.61**	**100**	**12885.97**	**100**	**13721.41**	**100**

Appendix-I Contribution of each Category in Sales Units

	2007/08		2008/09		2009/10		2010/11		2011/12	
	Actual Consumer	**Contribution %**	**Actual Consumer**	**Contribution %**	**Actual Consumer**	**Contribution %**	**Actual Consumer**	**Contribution %**	**Actual Consumer**	**Contribution %**
Domestic	848540	95.93	930554	95.87	1010719	95.90	1113740	96.02	1229750	96.08
Non Commercial	8629	0.98	9722	1.002	9865	0.94	9950	0.858	10010	0.782
Commercial	3898	0.44	5317	0.55	5454	0.52	6000	0.517	2170	0.482
Industrial	18789	2.12	19833	2.04	21374	2.03	22500	1.940	23020	1.799
Water Supply	251	0.03	305	0.03	352	0.03	370	0.032	380	0.030
Irrigation	1353	0.15	1721	0.177	2557	0.24	3400	0.293	6450	0.504
Street Light	1048	0.12	1229	0.127	1437	0.14	1500	0.129	1550	0.121
Temporary Supply	172	0.019	138	0.014	150	0.014	155	0.013	165	0.013
Transport	49	0.006	48	0.005	48	0.005	50	0.004	54	0.004
Temple	1800	0.203	1738	0.18	1959	0.186	2150	0.185	2290	0.179
Community Sales	1	0.0001	1	0.0001	15	0.0014	35	0.003	58	0.005
Bulk Supply (India)	**5**	0.0006	5	0.0005	5	0.0005	5	0.0004	5	0.0004
Total	**884535**	**100**	**970611**	**100**	**1053935**	**100**	**1159855**	**100**	**1279902**	**100**

Appendix-V

Relationship Between Total Revenue & Profit:

Total Revenue is assumed to be independent variable denoted by 'X' and Profit as assumed to be dependent variable denoted by 'Y'.

Fiscal Year	Total Revenue (X) (In Rs '000000')	Profit (Y) (In Rs '000000')	$x=\left(X-\overline{X}\right)$	$y=\left(Y-\overline{Y}\right)$	x^2	y^2	xy
2007/08	9687.65	278.9	-2351.35	3678.86	5528856.228	13534010.9	-8650234.82
2008/09	11237.49	-1694.9	-801.512	1705.06	642421.486	2907229.6	-1366626.05
2009/10	11992.61	-3475.2	-46.392	-75.24	2152.218	5661.058	3490.53
2010/11	13264.36	-4808	1225.358	-1408.04	1501502.228	1982576.6	-1725353.08
2011/12	14012.90	-7300.6	1973.898	-3900.64	3896273.314	15214992.4	-7699465.49
	$\sum X=60195.01$	$\sum Y=-16999.8$	$\sum x=0$	$\sum y=0$	$\sum x^2=11571205.47$	$\sum y^2=33644470.6$	$\sum xy=-19438248.9$

A) Total Revenue (X):

a. Arithmetic Mean $\left(\overline{X}\right)=\frac{\sum X}{n}=\frac{60195.01}{5}=12039.002$

b. Standard Deviation $\left(\sigma_x\right)=\sqrt{\frac{\sum x^2}{n}}=\sqrt{\frac{11571205.47}{5}}=1521.263$

c. Coefficient of Variation $\left(C.V._x\right)=\frac{\sigma_x}{\overline{X}}\times 100=\frac{1521.263}{12039.002}\times 100=12.64\,\%$

B) Profit (Y):

a. Arithmetic Mean $\left(\overline{Y}\right) = \dfrac{\sum Y}{n} = \dfrac{-16999.8}{5} = -3399.96$

b. Standard Deviation $\left(\sigma_y\right) = \sqrt{\dfrac{\sum y^2}{n}} = \sqrt{\dfrac{33644470.61}{5}} = 2594.01$

c. Coefficient of Variation $\left(C.V._y\right) = \dfrac{\sigma_y}{\overline{Y}} \times 100 = \dfrac{2594.01}{-3399.96} \times 100 = 76.29\,\%$

C) Coefficient of Correlation (r) Between Total Revenue and Profit (r_{xy}):

We have,

$$\text{Coefficient of Correlation } (r_{xy}) = \frac{\sum xy}{\sqrt{\sum x^2} \times \sqrt{\sum y^2}} = \frac{-19438248.91}{\sqrt{11571205.47} \times \sqrt{33644470.61}}$$

$$= \frac{-19438248.91}{3401.65 \times 5800.38} = -0.9852$$

D) Coefficient of Determination $\left(r^2\right) = \left(-0.9852\right)^2 = 0.9706 = 97.06\%$

E) Probable Error of Correlation Coefficient $P.E.(r) = 0.6745 \times \dfrac{1 - r^2}{\sqrt{n}}$

$$= 0.6745 \times \frac{(1 - 0.9706)}{\sqrt{5}} = 0.0089$$

Appendix -VI

Relationship between Total Power Available and Power Loss:

Total Power Available is assumed to be independent variable which is denoted by 'X' and Power Loss is assumed to be dependent variable which is denoted by 'Y'.

Fiscal Year	Total Power Available (X) (In GhW)	Power Loss (Y) (In GhW)	$x = \left(X - \overline{X}\right)$	$y = \left(Y - \overline{Y}\right)$	x^2	y^2	xy
2007/08	2066.33	507.42	-360.07	-97.91	129650.40	9586.37	35254.45
2008/09	2261.13	541.97	-165.27	-63.36	27314.17	4014.49	10471.51
2009/10	2380.89	556.79	-45.51	-48.54	2071.16	2356.13	2209.06
2010/11	2642.75	702.15	216.35	96.82	46807.32	9374.11	20947.00
2011/12	2780.92	718.30	354.52	112.97	125684.43	12762.22	40050.12
	$\sum X = 12132.02$	$\sum Y = 3026.63$	$\sum x = 0$	$\sum y = 0$	$\sum x^2 = 331527.48$	$\sum y^2 = 38093.32$	$\sum xy = 108932.14$

A) Total Power Available (X):

a. Arithmetic Mean $\left(\overline{X}\right) = \frac{\sum X}{n} = \frac{12132.02}{5} = 2426.40$

b. Standard Deviation $\left(\sigma_x\right) = \sqrt{\frac{\sum x^2}{n}} = \sqrt{\frac{331527.48}{5}} = 257.50$

c. Coefficient of Variation $\left(C.V._x\right) = \frac{\sigma_x}{\overline{X}} \times 100 = \frac{257.50}{2426.40} \times 100 = 10.61\%$

B) Power Loss (Y):

a. Arithmetic Mean $\left(\overline{Y}\right) = \frac{\sum Y}{n} = \frac{3026.63}{5} = 605.33$

b. Standard Deviation $\left(\sigma_y\right) = \sqrt{\frac{\sum y^2}{n}} = \sqrt{\frac{38093.22}{5}} = 87.28$

c. Coefficient of Variation $\left(C.V._y\right) = \frac{\sigma_y}{\overline{Y}} \times 100 = \frac{87.28}{605.33} \times 100 = 14.42\%$

C) Coefficient of Correlation (r) Between Total Power Available and Power Loss (r_{xy}):

We have,

Coefficient of Correlation (r_{xy}) $= \frac{\sum xy}{\sqrt{\sum x^2} \times \sqrt{\sum y^2}} = \frac{108932.14}{\sqrt{331527.48} \times \sqrt{38093.32}}$

$= 0.9633$

D) Coefficient of Determination $\left(r^2\right) = \left(0.9633\right)^2 = 0.9279 = 92.79\%$