

# **CHAPTER - I**

## **INTRODUCTION**

### **1.1 General View of Nepal**

Nepal is geographically located along the Himalayas between longitudes  $80^{\circ} 4'$  to  $88^{\circ} 12'$  East and latitudes  $26^{\circ} 22'$  to  $30^{\circ} 27'$  North. It is bordered by the two most populous countries of the world, India in the east, south and west and by China in the north. Nepal is roughly rectangular in shape and has an area of 147,181 square kilometers.

On the basis of its physical setting, Nepal has been broadly divided into three ecological zones/regions: the Mountain, the Hills and the Terai. The physical feature of the country varies from the lowland tropical plains to perpetual snowy ranges above 8,000 meters.

The mountain region includes the temperate highlands and trans-Himalayan valleys. Eight of the world's highest peaks including Mt. Everest (8,848 meters) lie in this region. The Hills region lies just below the mountain region and encompasses hills and valleys. The Terai region encompasses the low-lying tropical plains along the southern part of the country.

The climatic condition of Nepal is governed by its topographic extremities. Tropical, temperate and tundra types of climate are encountered in different altitudes of the country. The Kathmandu valley where the capital city of the country is situated, has an equable climate.

Most of the rivers in Nepal originate in the Himalayas. Glaciers are the sources of the big rivers of Nepal. The river system has a north-south direction along the Himalayas. The three major rivers of the country are the Koshi, the Gandaki and the Kanali.

Vegetation types in Nepal range from the tropical luxuriance in the south to the alpine zone in the north. Nearly 29 percent of land area of the country is covered by forests. About 850 species of birds, 175 species of mammals, 63 species of reptiles, 20 species of amphibians and 170 species of fishes have been found in Nepal.

Human settlement is sparse in the Himalayas region due to harsh environmental conditions. The Hills region is the traditional population zone of the country. The

Terai region due to its comparative advantage in transportation and agriculture resources has led to population migration from other regions.

Nepal is a multiethnic and multilingual country. The last census (2001) of the country counted a total population of 23.2 million. For 2006, the projected population is 25.9 million.

There are 5 development regions and 75 administrative districts in the country. Districts are further divided into municipalities and village development committees.

Economic growth of the country has not improved substantially over time to overtake population growth. As the current population growth is 2.25 percent per annum, the gain achieved by development activities has been overshadowed by growing population. Little over half (58.2%) of the population of working age reported usually economically active in 2001. Population Census 2001 reports that 53.1 percent population of age 10 years & over are employed and 5.1 percent are unemployed. Contributions of non agricultural activities are gradually increasing in the GDP. The revised estimates of per capita GDP and per capita GNP in terms of US dollar are 242 and 250 respectively for the year 2002/03. The currency is Nepalese Rupee.

Agriculture is one of the main important sources of national income which contributes about 40% in GDP. About 43% of total population was economically active in 2001 population census and among them 80% were engaged in agricultural activities. So the growth of GDP depends highly upon the growth in agriculture (Source: CBS- Nepal at a Glance 2006).

## **1.2 A Brief Introduction to Nepalese Economy**

Nepalese economy has undergone many changes since 1951 when Nepal received foreign aid and assistance for the first time from USA, India and UK in its development programme after the overthrow of Rana Rule and becoming democratic country. In 1950s India and USA were the main nations to assist Nepal. The aid amounted three thousand US dollar (Khadka, 1991:21). Since then many projects covering agriculture, transportation, communication, education, health, electricity etc. have been undertaken under foreign assistance.

The economic structure of the Nepalese economy is of a mixed type. Even in such a system the private sector has to play a predominant role in market oriented and competitive economic activities in order to increase production through efficiency enhancement in resource use. However, the government involvement in some the

specific and basic services department, pre requisites services and industries assisting in the improvement of the economic condition of the rural, poor and the downtrodden and relating to important defenses matters is still inevitable.

Nepal is facing the problem of new scientific ideas and technologies. It is becoming poorer day by day because of the uneducated resources mobilizations and steeply growing corruption almost in all the sectors and due to the one decade old conflict. This is directly hampering the economic status of the country and as a result, the country is marching towards poverty. The GDP of the country is just incomparable to other developing countries. This condition can be driven away by the amount of the increment in the profits of the organization whether the organization is profit based or non-profit based.

The structural unit of the governance of the organizations is missing in case of Nepalese institutions. The adverse effect of these strategically handicapped planning has given to greater poverty inside the country. Within the country, adaptations to new technologies are also practiced in the recent days. The Royal Nepal Academy for Science and Technology (RONAST) is engaged in preparing technology profile of industries located in ten industrial districts which revealed that some industries are still using old technologies, choice of technology has been done in haphazard manner, most industries are using Indian machinery and lack of workshops for repairing equipment and machinery has constrained smooth funning of industries (RONAST, 2001:14).

The economic performance has markedly deteriorated in recent months, halting the acceleration of output and export growth. Growth in non-manufacturing sector is projected to decelerate and manufacturing value added is expected to contract. Other constraining factors are the decline in export demand caused by global economic slowdown and internal factors such as frequent strikes, insurgency and terrorist attacks on economic targets and power shortages i.e. load shedding of electricity. The untimely hail and other natural catastrophes also adversely affect growth in the agricultural sectors.

Beginning from fiscal year 1950/51 till year 2002/03, Nepal has received foreign aid for 50 out of 53 years. No foreign assistance followed in during 1952/53-1954/55. Sum total of the foreign aid received by Nepal during five decades amounts to US\$4 billion 693 million, with loans comprising 59.9% and grants 40.6% when Nepal first foreign loan in 1963/64, loans compared 9.7% of total foreign aid. Loan, share in total aid, increased by 7.2 folds to 69.5 in 1998/99 in absolute dollar tern Nepal's foreign loan increased by 151 folds between 1964 and 1999. During the same period, grants increased by only 7.1 folds. Again comparison of this to improvement in infrastructure can be made. A dismal future is waiting the future generations in Nepal citizen (Acharya, 1998:25).

## **1.3 Public Enterprises:**

### **1.3.1 Meaning of Public Enterprise (PE)**

“Public enterprises are an autonomous body, which are owned and managed by government and which provide goods or services for a price. The ownership with the government should be 51% or more to take an entity PE”. (Narayan, 1997:23)

Public enterprise plays a very important role in most of the developing countries. The role of public enterprises differs from country to country basically due to political philosophy of existing governments. Public enterprises come into existence either by the way of deliberate policy of the government to bring certain activities under government control by creating new institution or by nationalizing them from private sector.

The term ‘public enterprise’ has been defined differently by different agencies and government to suit their own respective situation. UN has defined PE as “those organization, namely governmental enterprises and public corporations, which are entirely or mainly owned and or controlled by the public authorities consisting of establishment which by virtue of their kind of activities, technology and mode of operation are classified as industries”.

Public enterprises are generally owned and controlled by government and are usually autonomously organized with the government providing the initial capital and being responsible for a continuous overview of their activities.

In fact, public enterprises is an institution operating a service of an economic or social character, on behalf of the government, but as an independent legal entity, largely autonomous in its management, through responsible to the public, through government and parliament and subject to some direction, by the government, equipped on the other hand with independent and separate funds of its own and the legal and commercial attributer of a commercial enterprises. Public enterprises are generally owned and controlled by government and are usually autonomously organized with the government providing the initial capital and being responsible for a continuous overview of their activities.

By the above definition we can conclude public enterprises as following features:

- a) Financing by the government.
- b) Government ownership must be 51% or more.
- c) Autonomous in daily functioning.
- d) Legally independent entity.
- e) Control, direction and management by the government.
- f) Public accountable and service oriented.

### 1.3.2 Evolution of Public Enterprises

The First World War made the state realize the value of the policy of protectionism. Therefore, they started intervention in the trade and commerce. Many revolutionary changes like October revolution in Russia emergence of international labor force and Second World War etc. created an atmospheric favor of protectionism. Post Second World War period and the great depression of the thirties posed a serious challenge to many developing countries for economic development and recovery. The remedy advocated was rapid industrialization, central planning and government intervention in key areas of the economy. Moreover, it was felt that private sector lacked necessary resources to shoulder the new responsibility of undertaking the development task. This set the forces leading to the expansion of public enterprises in many countries.

The evolution of PEs in the world has taken place in such a way that one can hardly find any government remaining aloof from the industrial enterprises, through the degree of involvement may vary. In deed the very characteristic of the present century has been the acceptance of the role of the state involvement in the economy, no matter how loud the whole world cry for the total role played by the private sector. Even PEs does exist in a country like USA, where the strongholds of private enterprises exist. The USA makes the least use of the PEs. The USA has disbanded most of the PEs that expanded considerably mainly to meet the financial and procurement purposes (Shrestha, 1990:37).

Different factors have been remained responsible in different countries for the establishment and increasing role of PEs, which can be classified mainly as:

- Historical
- Ideological
- Pragmatic(economic)
- Incidental

Private ownership of production should be unconditionally encouraged except in instances where it is necessary to control it to stimulate national development and project the interests of people. More over the idea of keeping key and strategic investment sectors like steel, telecommunication, aircraft, nucleus etc. under the controlling hand of the state for the socio-economic development of the country had also ked to the evolution of PEs in developing country like us.

It is believed that Japan was the first to use PE systematically for promotional purpose. Soviet Union also used it properly for building up its socialist economy in those days. Indian is no exception to it. Public sector did exist in pre independence era too. But its real development process could take shape only after 1947 with the industrial policy 1948 resolution, which called for “the state to play a progressively

active role in the development industries.” In fact; it was the socialist orientation of the government, which led to the development of PEs in Sri Lanka owes to the second world war during which period, it was hard hit by supply position of essential commodities that the government to forcefully set up the PEs. The history of PEs in Thailand is associated with the upsurge of Thai nationalism in the 1930s. Mechanized spinning and weaving mills established in 1934, which was the first enterprise in Thailand (Shrestha, 1990:14).

Public enterprises represent the single largest economic sector in the world economy. They collectively, employ more people, command a greater asset base and swallow a greater proportion of global GDP than any single area of private sector activity. They still dominate many national economies and remain central in provision of essential services from telecom to drinking water in a majority of countries. They were at the forefront in the process of building an industrial and manufacturing base in the decade of 1950s all over of the world.

In conclusion, public enterprises play the major role in pursuing the industrialization activities in the country. But the important condition in today’s age of science and technology for industrialization is the availability of infrastructure. Such infrastructures mainly consist of communication, transportation and power facilities. In a developing country like Nepal, government has to play a paramount role for building these infrastructures by the help of public enterprises.

### 1.3.3 Public Enterprises in Nepal

Public Enterprise is a comparative phenomenon in the history of world economy. Public enterprise plays a very important role in most of the developing countries like Nepal. Public enterprises come into existence either by the way of deliberate policy of the government of brings certain activities under strict government control by creating new institution or by nationalizing them from private sector. Public enterprises in Nepal constitute a vital instrument for the socio-economy development of the country. It enjoys a strategic and crucial position in our mixed economy. They have been established in many sectors for the overall development of the country with different goals objectives (Shrestha, 1990:26).

Establishment of new enterprises and their role in other developing countries encourage Nepal Government to adopt the path of development through the public enterprises. Especially after the drawn of democracy in 1951 the government of Nepal has put emphasis on the growth and development of national economy. For this Nepal adopted the “mixed economy model” where both the public and the private sectors were expected to work harmoniously.

Since 2013 B.S., Nepal has witnessed growth and development of PEs. Nepal Government has to play this purpose to make massive investment of create necessary infrastructure and run some of the large manufacturing industries to the people. This has necessitated creation of number of public enterprises of instruments of national development. Nepal Bank Limited, a commercial bank, was established in 1994 B.S., which is the first public enterprise to have a separate legal entity in Nepal.

Nepal started its planned economic development in 1956 (2013 B.S.) with the launching of the first five year plan. Since then the number of PE has increased substantially in the various fields of national economy. There were 64 PEs in Nepal before the commencement of privatization era. To 2004 Nepal has privatized 24 PEs and there were 36 PEs in Nepal as of July 2004. Among them only 10 PEs constitute under manufacturing sector.

The PEs in Nepal can be categorized as follows:

- a) **Statutory Corporations:** These are public enterprises established under special status. NEA, NIDC, RNAC are some example of the statutory corporations of Nepal.
- b) **Companies:** Some PEs is established under the company act 2021 B.S. These companies are either fully owned or majority equity hold by Nepal Government and they are mostly operating in manufacturing and trading sector.

### 1.3.4 Types of Public Enterprises:

There are different types of public enterprises operating in their respective fields. According to functions and services given by the enterprises, they are classified into the following types (Joshi, 1993)

#### 1.3.4.1 Commercial Public Enterprises

These are mainly concerned about the commercial aspect of goods and expansion of the good. Nepal Oil Corporation, Nepal Agriculture Product Corporation, Nepal Goods Corporation etc. fall in this category.

#### 1.3.4.2 Manufacturing Public Enterprises

These enterprises mainly manufactured goods for public usage. Janakpur Cigarette Factory, Udayapur Cement Udhyog, Dairy Development Corporation etc. are some of the enterprises of this type.

#### 1.3.4.3 Financial Public Enterprises

These enterprises give financial aid to public. Nepal Agriculture Development Bank, National Commercial Bank, Industrial Development Corporation, Nepal Development Bank, National Insurance Corporation etc. are some of the name of this type.

#### 1.3.4.4 Public Utilities Public Enterprises

These types of enterprises are solely concerned of the services given to public. They have autonomous power to make their policy, yet public service remains their main objective. Nepal Telecommunication Corporation, Nepal Electricity Authority, Nepal Water Supply Corporation etc. fall in this category.

#### 1.3.4.5 Developmental or Service Public Enterprises

For only development purpose some enterprises have been established. These work in the public sector to uplift the development condition. In this category Nepal Engineering Consultancy, Economic Service Center, Agricultural Service Center etc. come under this category.

#### 1.3.4.6 Social Services Public Enterprises

Some of the enterprises are established to provide social service to the people. Gorkhapatra Corporation, Guthi Sansthan, Nepal Television, Cultural Corporation are some example of this category.

#### 1.3.5 Role of PEs in Nepalese Economy:

Public enterprises play the major role in pursuing the industrialization activities in the country. Nepal is one of the least developed countries of the world, which is still in its crawling stage of industrial development. More than 80% of the total populations is still in the rural areas and most of them are not yet getting minimum physical facilities that are necessary for human being. So in Nepal PEs are not matter of choice, rather they are a matter of necessity in various sector of economy where private sector has not come forward or are only in limited extent. PEs helped to increase the standard of living, regional balance of developing and they have contributed through import substitutions, export promotion and strengthening he revenue generation of the government. So the public enterprises play great role in the developing country like Nepal. PEs should be established for to mobilize enough economic funds and available resources for the rapid development of different kinds of planning. Role of PEs in Nepalese Economy can describe as following points:



- a) Development of infrastructure: Transportation, electricity, communication and irrigation are the main infrastructure development. There is development
- b) Accelerate the pace of economic development: Public enterprises play vital role to keep the accelerate speed of economic development in the developing country like Nepal. Private sector doesn't have interest where they can't get more income immediately. Thus, PE is very necessary in Nepalese economy. The government can mobilize the development work by producing saving from some monopoly professions.
- c) For appropriate investment pattern: Private sector doesn't have enough economic funds in Nepal. On the other hand, some economic investment also are using in the business sector, in which immediate economic gain can be taken. It is necessary to invest all the sectors for the development of the country. The using of enough economy in necessary sector through the medium of public enterprise, the process of investment can be improved.
- d) Balance development: Private sector invest in more profitable sector only. So that all the sectors don't have balanced development. Public sector is service wised instead of being profitable. Through the public sector, basis need and capital industries are developed. Likewise, private industries are only stabilized for comfortable and profitable sector. Thus PE helps to do balanced development in all sectors.
- e) Generate employment opportunities: Now these days number of educated person is increasing day by day. The government's office has become the only one place to employ the people due to the lack of investment in public sector. So establishment of PE solve the problems of unemployment in some respect.
- f) Import substitution: Although PE can't contribute in the establishment of strong export; its contribution in import substitution can't be disagreed. Government industry has helped to minimize the import of different goods like cement, cloth, matchstick, sugar, cigarette etc

In conclusion, in a developing country like Nepal PE play a great role in pursuing the industrialization activities in the country. However, their performance has been a challenge both to the planners and the PE managers. The important question addressed these days is how to manage them efficiently. It is sure that Nepal needs to make fairly extensive use of PEs as a catalytic agent in the process of moving towards development oriented economy at a certain stage in development process.

### 1.3.6 Profitability in Public Enterprises

Profit is the primary measure of business success in any economy. If a firm can not make profit, it can not obtain or hold capital for very long. If it can not obtain capital, it can not secure and retain other resources, such as, manpower, material and machines etc. In other words the more profitable enterprises are more attractive to the holders of the equity capital. Since, these enterprises can attract capital they have money needed to buy the other resources. The key here is that capital and other resources are scarce; they are allocated to the profit makers in roughly descending order of their profit potential. The economy performs this allocation function through a relatively free and open market system (Gray and Johnston, 1973:420).

Profit is one simple and an all embracing index, accepted and understood both by the public and private, which has a tremendous impact on the morale of enterprise itself. Because of this, profit planning is also necessary in public enterprises. It has to play their dual role i.e. one for supporting government's policies and programs and another for their own survivability and growth. For this, profit is essential for public enterprise. Profit planning plays key role for accomplishing the objectives of PEs and it provides a surface for expansion and capital addition. It is well accepted principles that public enterprises should be run on business principles and generate commercial profits, which is an accepted accounting practice whereby performance results are gauged in terms of net disposal profit after tax and costs including the provision for depreciation (Mathur, 1993:402).

PEs must be managed commercially so that they could generate profit and can survive in competition with private sector. The profit is the key for measuring efficiency of PE's in the free market economy.

### 1.3.7 Financial Performance of Nepalese PEs

In fact, PEs was established for rapid socio-economic development of the country. The role of public enterprises is stimulating the pace of economic growth in developing countries can hardly be understood; initially much hope and reliance were placed upon public sector organizations to speed up the process of economic development. However, country to the third world, most public enterprises, especially in the least developed countries, have displayed a level of performance, which can hardly be classed as promising. The PEs of Nepal as contributors to national economic development has been questionable as an analysis of financial performance of existing PEs show that financial positions of most PEs are far from satisfactory. The total losses of PEs were negatives Rs. 2524.1 million in fiscal year 2003/04 and it is expected Rs.2262.5 million profit in fiscal year 2004/05 on the expectation of profit of public utilities and financial sectors. The trading sectors are in huge loss of negative of Rs. 1958.8 million and manufacturing sectors loss is

negative of Rs. 117.10 million in the fiscal year 2003/04. The total capital employed by the government was Rs. 9690.0 million in 2003/04 and it is expected Rs. 8709.4 million in the fiscal year in 2004/05. However, the ratio of profit and capital employed accounts negative 2.61% in 2003/04 and it was expected positive 2.57% in the fiscal year in 2004/05. Only the public utilities sectors have positive ratio of profit and capital employed in the fiscal year 2003/04 (MOF, 2005:302).

Almost PEs is not able to generate the revenue for their daily expenses and they are operated by the government subsidy. So that almost of the PEs are the burden of national resources and they dump the national budget. The return is very poor. Rather than mobilizing internal surpluses for development and expansion purposes, they have become highly dependent on budgetary allocation by government as equity loan or subsidy. They have also appeared as leaders in affecting price increase, since cost consciousness has been awfully lacking in them. Absences of professional management, interference by government and lack of control and accountability have been largely responsible for their poor performance.

#### **1.4 Historical Background of Electricity Development in Nepal**

The development of electricity in Nepal has been basically based on the development of hydropower. The development of this infrastructure has been essentially carried by the government but the private sector has also contributed and set qualitatively important footing in this sector. There have been several government organizations through which the development has been coordinated.

The first pioneering projects Pharphing (500 KW) which was built in 1911 A.D. followed by Sundarijal (640 KW) in 1935 were is dated projects established upon the particular governmental agreements and were operated to supply domestic load to very limited areas without any significant planning giving the first taste of electricity to Nepal.

On the Terrain, some industries procured their own energy supply source and companies were formed to supply electricity to the developing industries. In 1940, with small utilities Morang Hydropower Co. was established with the capacities of around 100 kw which began the isolated operations. It was then followed by the Birjung Electric Supply Co. and the Dharan Electric Power Co. Until the 1960's, the few established industries had to depend on their own sources of energy. The power demand increased with the slow growing of industries, the impact of population growth, the internal migration and surge of tourism.

In the first step of the institutional development within the ministry of water resources, the development of electricity was organized with the specific role to develop electricity. In the second three year plan (1962-1965) Nepal Electricity

Corporation (NEC) was established on August 16, 1962 under Nepal Electricity Corporation Act, 1962 as a public enterprise to undertake marketing and development of electricity as well. NEC securely generated and distributed electricity in an efficient, economic and orderly manner in Bagmati Zone and Bhimphedi town in Makawanpur. In 1973, the small hydro development board was established to cover the specific sub sector of hydropower in the remote and rural areas. The aim was to develop hydropower within the range of 100-500 kw in isolated rural area promoting their electrification while over coming difficulties linked to electricity transmission to remote and difficult localities.

In 1976, the Water and Energy Commission (WEC) was constituted with direct dependence from the minister of water resources. This body had an advisory function toward the government in policy matters fro the coordinated development of water and energy resources. Power development boards were established to develop specific parts and project in the growing electrical system. The electricity supply system of the complete central and western development region were transferred to NEC on 12<sup>th</sup> February of 1978. Before that Bijuli Adda which was under the minister of water and power used to distribute the electricity in Kathmandu Valley. Bijuli Adda held monopoly in the matter of electricity management till 1962.

Another corporation of similar purpose emerged in the history of Nepal's PEs i.e. Eastern Electricity Corporation to bring uniformity, efficiency and regularity in the service of electricity distribution in the eastern development region.

Altogether there were agencies engaged in supplying the electricity to the consumers in the whole country as Nepal Electricity Corporation, Eastern Electricity Corporation and others like Nepal Government Electricity Department. Nepal Electricity Authority was created by Nepal Government through the NEA Act, 2041 and began its operation, supply of electricity securely, efficiently, economically and in an underlay manner at reasonable price for the overall development of country. At present NEA has total installed capacity of 613.557 MW.

## **1.5 An Overview of Nepal Electricity Authority:**

### **1.5.1 Historical Background of Nepal Electricity Authority (NEA)**

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. The history of Nepal Electricity Authority (NEA) started as follows:

Nepal Electricity Corporation (NEC) was established on Bhadra, 2019 B.S, under Electricity Corporation Act 2019 B.S. to generate and distribute electricity in secured, efficiently, economic and orderly manner in Bagmati Zone and Bhimpheedi town in Makawanpur. Before 2019 B.S., Bijuli Adda, which was under the ministry of water and power used to distribute the electricity in Kathmandu vally. Bijuli Adda held monopoly power in the management of electricity till 2019 B.S. In fact, Nepal Electricity Corporation was the modified form of Bijuli Adda regarding operational areas. The responsibilities of the Nepal Electricity Corporation got increase in 1973 B.S. to supply power in Narayani zone. In 2031 B.S. Eastern Zonal 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 Zonal Corporation (EZEC) 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 7 Kartik 2041 B.S., under the Nepal Electricity Authority Act, 2041. All format divisions 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 1<sup>st</sup> 2042 B.S. The specific objectives of NEA were to make effective and economical production, transmission and distribution of electricity and to manage properly the electricity supply. NEA passed the responsibilities of planning, operating and maintaining of all facilities associated with the power sector.

In this way NEA was established as a unified organization in 2042 B.S. NEA was founded as an independent corporation owned entirely by the government and according to commercial principle.

### 1.5.2 Objectives for establishing NEA

Objectives for establishing Nepal Electricity Authority can be traced as follows:

- a) To establish single organization that would work in all sector of electricity planning, survey, production, operation, maintenance and distribution of electricity.
- b) To manage the generation, transmission and distribution in order to capability, reliability and accessibility to all people for supply.
- c) To utilize and develop the huge amount of water resources of Nepal in a more coordinated way.

- d) To provide equal and extensive skill development opportunities for all employees working in the field of electricity.
- e) To overcome the duplication of work being practiced formerly by extensive of several electricity agencies.

### 1.5.3 Functions and Duties of NEA

As per the Nepal Electricity Authority Act, 2041 B.S., the functions and duties of NEA are as follows:-

- a) To recommend Nepal Government to determine the long term and short term policy relating to supply of electricity by generating, transmitting and distributing electricity pursuant to the prevailing law.
- b) To prepare plan for the production, transmission and distribution system of electricity and other related works and to construct, conduct, preserve and promote the production lines and other related facilities, which are necessary for the implementation of the plan.
- c) To average the production, transmission and distribution of electricity of adequate standard in the regions which are economically appropriate for the industrial and agricultural development and facility of the people.
- d) To fix electricity fee and other service charges relating to the electricity.
- e) To do necessary research works relating to production, transmission and distribution of electricity.
- f) To make and cause to make arrangement for higher training and study with a view to prepare expert manpower relating to production, transmission and distribution of electricity.
- g) To provide technical advice and consultancy relating to production, transmission or distribution of electricity.
- h) To do and cause to do other works that are necessary for the achievement of the objective of the authority.

### 1.5.4 Rights of NEA

The rights of the authority shall be as follows:-

- a) To raise loan from foreign government or foreign institution and international institution.
- b) To raise loan from national institutions, banks and individuals.
- c) To collect charge of electricity and service charges from the customers.
- d) To sell and buy electricity to and from foreign countries.
- e) To invest the amount, lying in the fund of the authority.
- f) To check the authority consumption of electricity applied by the authority.
- g) To do all work which seems to be inevitable and necessary for the fulfillment of the works and duties of its own.

### 1.5.5 Nepal Electricity Authority as a Public Utility

Nepal Electricity Authority as a public utility concern has a primary objectives of providing services that are basically important to the people in general. Since a public utility concern has a public interest, status, its profit planning system deserves the top most attention.

Nepal Electricity Authority has an endeavored to structure itself into an institution oriented towards self sustainable commercial operation and also meeting social obligations in the nation's interest. Nepal Electricity Authority is the largest government enterprises in Nepal. Being a public enterprise, it has been financed by the government and several bilateral and multilateral donor agencies. In this current pace of privatization also, government has rational to keep it under public sector. Thus, electricity, especially NEA becomes on of the main sectors of PEs, which the government will not privatize. At this juncture, it is apparent with the new environment of privatization.

### 1.6 Statement of the Problem

NEA is the biggest public enterprises in Nepal with the biggest investment with monopoly market of power. 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:-

- a) Whether the sales target stated in annual budget and actual sales are consistent or not.
- b) Whether cash collection and disbursement of NEA is in proper way of not.
- c) Whether NEA's revenue planning is effective or not.
- d) Whether NEA's production (i.e. supply) is based on sales (i.e. demand or not).

- e) Whether NEA's losses in transmission is in specified or estimated limit or not.

### **1.7 Need of the Study**

Revenue planning and cash management is a crucial part overall profit planning of business enterprises. Poor system of planning adversely affects profit planning. Thus, periodical analysis and review of revenue planning is necessary in order to ensure smooth functioning of an enterprise.

Other side, cash is the important asset for the operations of the business organization and public organization. The firm should keep sufficient cash, neither more nor less. Cash shortages are disrupting the firm's manufacturing operation while excessive cash is simply remaining idle, without contributing anything towards the firm's profitability. Thus, periodical analysis and review of cash management is necessary in order to maintain a sound cash position.

The present study is intended to analyzed and evaluate the revenue planning and cash management system and its application in Nepal Electricity Authority. This study will be useful to provide information and to draw attention of NEA management regarding what can be done for future planning of revenue and cash management.

### **1.8 Objectives of the Study**

The main objective of the research is to analyze revenue planning and cash management in NEA and recommend possible remedial measures.

#### **Specific objectives are:-**

- a) To analyze the relationship between total power available and losses in transmission.
- b) To make a comparative study of revenue generation of NEA.
- c) To evaluate financial performance of NEA.
- d) To review cash management aspect of NEA.
- e) To make recommendations for revenue management of NEA.

### **1.9 Significance of the Study**

Analysis of revenue planning and cash management is a crucial part of overall profit planning of business enterprises. The main importance of the study lies on the role of



Revenue Planning and Cash Management that considerably contributes to improve profitability and financial performance of NEA. The main purpose of the study is to forecast the future events and to overcome or reduce the risk.

This study will be useful to provide information and to draw attention of NEA management regarding what can be done for future planning and management of revenue.

### **1.10 Limitation of the Study**

The study is confined only about revenue planning and cash management of Nepal Electricity Authority. The following points are the main limitations of the study.

- a) The study is based on secondary data from NEA's record.
- b) The study covers only the revenue planning and cash management.
- c) The accuracy of this study based on true response and the data available from management of NEA.
- d) The study covers the analysis of only 5 years.

### **1.11 Research Methodology**

Research has its own method and way to commit. Basically the researches are done within the circle of statistics and other information either gained by fielding or from the secondary sources. Research also includes the testing and implementation in the related field.

Methodology is the key factor or anywhere for proper evaluation and proper examination. Methodology makes or breaks the results of the research. There is a very essential importance of the methodology for any type of work. It includes the style and efficiency of the research work. Improper or impractical methodology may hinder in the required objectives of the work. The methodology also reveals the framework and validity of the research works. To achieve optimum results in research work, firstly, there should be reliable system and conceptual exercise done as a prerequisite to research work. In this research work as far as practical, it has been given intensive attention to tune with the scientific methodology and to make the work very transparent while intensifying the validity of the research work.

Data and information are the lifeblood or major job of any research work. Together the required and essential information and data collection and processing the data is the major task. For fulfillment of the objectives and requirements of this study, secondary sources of data are used abundantly. Primary data is hard to obtain and time consuming to produce for the research. The authenticity of the primary data is

also under the question mark, so there arises the needed of the secondary data published by the related institutions. In this study work, the methodology mainly complies along with the secondary sources of data. The secondary data have been taken mainly from financial statement of NEA, auditor's reports, balance sheet, profit and loss a/c, cost detail sheet, some published and unpublished official records, previous thesis and magazine and newspaper.

To analyze the secondary data collected from various sources financial, accounting, statistical and mathematical tools such as ratio analysis, cost volume profit, mean, standard deviation, coefficient of correlation, regression analysis, coefficient of determination, coefficient of variation etc. are used. Tables, charts and graphs as per need are demonstrated.

Raw data will be managed in a proper form. Interpretation and explanations will be made wherever required in the course of the study. The research design of the present will be analytical and descriptive.

## **1.12 Organization of the Study**

The study has been segregated into five chapters. The titles of each of these chapters are as follows:

- Chapter one: Introduction**
- Chapter two: Review of literature**
- Chapter three: Research methodology**
- Chapter four: Presentations and analysis of data**
- Chapter five: Summaries, conclusion and recommendation**

The first introduction chapter covers general view of Nepal, brief introduction of Nepalese economy, objectives of the study, focus of the study, significance of the study, limitations of the study and organization of the study. Besides this the chapter also explains about the public enterprises and brief introduction to the NEA and its evolution.

The second chapter focuses on review of literature. It contains the conceptual framework of revenue planning and cash management, introduction need and importance scenario of NEA.

The third chapter deals with research methodology to be adopted for the study to satisfy the objectives of the study. This chapter consists of introduction, research design, time duration, sources of data, data collection method and procedure and tool used.

The fourth chapter is most important and plays vital role in this study. This chapter deals with presentation, analysis and interpretation of data as required by the objectives stated in this study. These collected data have been analyzed and interpreted by the help of various statistical and accounting tools and techniques.

The last chapter covers summary, conclusions and recommendations so that the whole picture of the study can be understood in short form.

## **CHAPTER - II**

### **RIVIEW OF LITERATURE**

Review of the literature is supported to revise the eminent literatures relating to the study. This chapter aims to gives a conceptual framework and makes a review of the relevant studies that have already been done in this research topic so that some new contributions could be given to the established body of knowledge. This chapter has been divided into three main sections. First section encompasses the conceptual framework. The second section presents the review of previous research works (thesis) on the topic. The final section explains the research gap.

#### **2.1 Conceptual Framework**

##### **2.1.1 Planning**

Planning is the basic foundation of profit and control. We should clear in the concept of planning. According to "Oxford Dictionary" planning means;

(To do something) arrangement for doing or using something, considered or workout in advanced.

Way of arrangement something especially when shown on a drawing scheme.

The planning means thinking and deciding in advance what is to be done in future. It is a method of thinking out acts and purposes before and planning starts with forecast and complete with determination of future events. It is the first essence of management and all other function performed within framework of planning.

"Planning is the process of developing enterprise objective and selecting a future course of action to accomplish them. It includes (a) establishing enterprise objectives, (b) developing premises about the environment in which they are to be accomplished, (c) selecting a course of action for accomplishing the objectives, (d) initiating activities necessary to translate plans into action and (e) current re-planning to correct deficiencies". (Welsch, Hilton and Gordon, 2000:3)

It is sometimes said that planning is the primary managerial function which logically precedes all other functions, since without planning manager would not have activities to organize, would not require a staff, would have no one to direct and would have no need to control. However, the managerial job is actually one in which all the managerial functions take place simultaneously rather than serially.

Planning is a hard task for it involves the ability to think to periodic, to analyze and to come to decide, to control the actions of its personnel and to cope with a complex

dynamic fluid environment. They bridge the gap between, which they are and where they want to go (Memoria, 1990). This statement obviously shows planning is a complex and hard job. Planning is a tool of developing and getting organizational objectives.

**Planning consists of the following steps:**

- a) Recognizing and making a tentative statement of the problem.
- b) Collecting and classifying relevant facts.
- c) Setting forth alternative course of action.
- d) Evaluating the pros and cons associated with these course and
- e) Selecting the course of action (the plan).

Planning means setting goals for the firm, considering various ways of meeting those goals, and picking out what appears to be the best way to meet the goals (Lynch and Williamson, 1984). In planning the management is concerned with laying sown objectivities and determining the courses of actions to be followed out of the several alternatives available to meet those objectives.

Planning is fundamentally choosing and a planning problem arises when an alternative course of action is discovered (Gotz, 1949). If there were no alternatives in objectives policy, program or procedure, planning would be so inflexible as hardly to exist. However, in practice, there are probably few, if any, business problems for which some kind of alternative dos not exist.

**The planning process of an enterprise would generally involve four fundamental steps:**

- a) Establishing the objectives
- b) Determining the short range objectives or goals
- c) Developing strategies and
- d) Formulating profit plan or budgets

Planning is the basis of controlling and it itself is framed on forecasting in the sense of taking a careful look what is likely to happen. It is of course impossible to forecast the future with complete accuracy. But the business planner identifies range of possibilities as to the future course of events and prepares to meet them. Planning is not however; merely an inevitable fate planning is also aimed at growing shape to the future.

Planning is essential to accomplish goals. It reduces uncertainty and provides directions to the employees by determining the course of action in advance. Formal planning indicates the responsibility of management and provides an alternative of grouping without direction. Planning on the other hand, involves the determination

of what should be done, how the goal may be reached and what individuals or units are to assume responsibility and be held accountable.

Thus, planning stands for future activity and formulates to meet the objectives of the management and we can point out the nature of planning as:

- Planning is an intellectual process.
- Planning is a goal-oriented task.
- Planning is a primary function of management.
- Planning pervades all managerial activities.
- Planning is directed towards efficiency.

Generally planning can be divided into two parts, which are as follows:

#### 2.1.1(i) Short - Term Planning or Tactical Planning

Tactical plans have shorter time frames and narrower scopes than strategic plans. Tactical planning provides the specific ideas for implementing the strategic plan. It is the process of making detailed decisions about what to do, who will do it, and how to do it. Tactical plans translate broad strategic goals and plans into specific goals and plans. These plans focus on functional areas of the organization. Because strategic plans are fairly broad, these have to be translated into specific plans. Each strategic plan is generally implemented through several tactical plans. Middle managers who are responsible for major divisions or branches in an organization develop tactical plans. The key task for them is to determine the specific details of targets, resource utilization and time frames. Tactical plans focus on the major actions that a unit must take to fulfill its parts of the strategic plan.

The short range planning is selecting to conform to fiscal quarters or years. Because of the practical needed for conforming plans to accounting periods and the some what arbitrary limitation of the long range to three or five years is usually based as has been indicated on the prevailing belief that the degree of uncertainty over long period makes planning of questionable value.

#### 2.1.1(ii) Long - Term Planning or Strategic Planning

The strategic plans are also known as "grand plans". They have a strong external orientation and cover the total organization. A strategic plan is the actions taken to achieve strategic goals. Such plans are developed at the corporate level. Senior executives are responsible for the development of these plans. These plans involve making decisions about the organization's long-term goals and strategies. The top managers scan the external environment for opportunities and threats to the organization.

Long term planning is used to determine the overall direction of organization. Successful enterprises have always done some long range planning. It is more important for broad and long living enterprises.

Long range planning five to ten years varying with the enterprise, sometimes extended to ten years. Long range planning is one of the most difficult times span involved in planning as many problems in short-range planning can be traced to the absence of a clear sense of direction and the practices which a comprehensive long range plan provides (Chorafas, 1990:325).

Thus, planning process, both short and long term, is the most crucial component of the whole system. It is both the foundation and the bond for the other elements because it is through the planning process that we determine what we are going to do, how are going to do and who is going to do it. It operates as the brain center of an organization and like the brain, it both reasons and communicates.

### 2.1.2 Planning and Forecasting

"Defined in its simplest terms planning is determination of anything in advance of action, it is essentially a decision making process that provides a basis for economical and effective action in the future. Effective planning sets the stage for integrated action to take places, reduces the number of unforeseeable crises, promotes the use of more efficient methods and provides the basis for the managerial function of control. Thereby assuring focus on organization objectives" (Edwin, 1969:49).

"A forecasting is a prediction of future event, condition or situation, whereas plan includes a program of intended future actions and desired results. Forecasting predicts the future events in such a way that the planning process can be performed more accurately. A forecast is not a plan, rather it is a statement and or a quantified assessment of future conditions about a particular subject (e.g. sales revenue) based on one or more explicit assumption. A forecast should always state the assumptions upon which it is based. A forecast should be view as only one input into the development of sales plan. The management of the company may accept, modify or reject the forecast, other inputs and management judgment about such related items as sales volume, prices, sales, efforts, production and financing. It is important to make a distinction between the sales, efforts, production and financing. It is important to make a distinction between the sales forecast and the sales plan primary because the internal technical staff should not be expected or permitted to make fundamental management decision and judgment implicit in ever-sales plan. Moreover, the influences of management actions are on sales potentials in difficult to quality for sales forecasting. Before, the elements of management experience and

judgment must hold the sales plan. Another reason for identifying sales forecasting as only one step in sales planning is that sales forecasting is condition" (American Accounting Association).

The distinction between forecasting and planning is not an easy one. Webster gives- "To plan ahead" as the leading definition for forecast. Forecasting is our best thinking about what will happen to us in the future. In forecasting we define situations and recognize problems and opportunities. In planning we develop objectives in practical detail and we correspondingly develop schemes of action to achieve these objectives.

### 2.1.3 Planning and Budgetary Control

Planning is the process of establishing future objectives and formulating means of meeting those objectives. Control on the other hand, is the means by which management ascertains that the various parts of the business perform efficiently and progress toward the predetermined plans. Budgetary control is the process by which management keeps efficiencies of each part of the company's operation. Determining in advance the expected sales volume, the expected cost of merchandise to be purchased or produced, the number of employees needed, and the expenses to be incurred effects planning. Control, on the other hand, is exercised through budget performance reports prepared for each subdivision of the company reflecting the budget, the actual results of operation, and any differences.

### 2.1.4 Revenue Planning

"Revenue results from the sale of good and rendering of services and is measured by the charge made to customers, client or tenants for goods and services furnished to them. 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)

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 PPC because (a) it provides for the basic management decisions about marketing, and (b) based on those decisions, it is an organized 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. Despite the views of a particular management, such a conclusion may be an implicit admission of incompetence. Simply, if it is really impossible to assess the future revenue potential of a business, there would be little incentive for investment in the business initially or for continuation of it except for purely speculation ventures that most managers and investors prefer to avoid". (Welsch, Hilton, Gordon, 2000:171)

"The company earns profit only when it is able to sell its product and not when it produces them. It is no use producing goods that are not likely to be sold and for which there is a limited demand. In some business, it is necessary to establish that the product will sell even before it is produced. In normal times of keen competition, the sales forecast must be realistic. It is undoubtedly true that past can provide experience and information which will be of assistance in estimating present and future revenue but care must be taken in presenting past facts to management so that incorrect conclusions may not be drawn there from" (Mohan, Goyal, 1992:10).

"The revenue plan should be designed to coordinate the efforts of the sales department, production department and all other departments. Many factors must be considered when sales budget is established, including sales trends, limitations on the supply of merchandise or the company's market, competing products, the expected amount of advertising, and general level of the economy. Since most of these unknown companies frequently maintain a specially trained staff to increase them"(Seiler & Robert, 1964:659-660).

"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).

### 2.1.5 Factor Influencing Revenue Planning

The factors influencing the level of revenues may be classified as internal and external as follows:

## **1. Internal Factors**

These include promotional aids, such as advertising, incentives to sales man, ability of the organization to satisfy demand, quantity of the finished product, changes in price etc.

## **2. External Factors**

These include the fluctuations in the size of population, the general level of prosperity, the extent and severity of competition in the market, government policy and regulation. Changes in fashion and tastes, degree of competition expected from new product etc. Elasticity of demand for the product is of obvious importance if prices are expected to undergo a change (Varma & Agrawal, 1996:329-330).

### **2.1.6 Preparation of Revenue Planning**

A planner should be completed the following steps for planning the revenue. They are listed below:

#### **Step1. Development Management Guidelines for Sales Planning**

All management particular in the sales planning process should be provided with specific management guidelines to be followed in revenue planning. Fundamentally, these guidelines should specify revenue-planning responsibilities. The purpose of these guidelines is to attain coordination and uniformity in the revenues planning process. The guidelines should emphasize enterprise objective, goals, and sales strategies. The guideline also should direct attention to such areas as product emphasis, general pricing policies, major marketing strategies, and competitive position.

#### **Step2. Prepare Sales Forecast**

One or more sales forecasts should be prepared. Each separate forecast should use different assumption, which should be clearly explained in the forecast. The management guidelines should provide the broad assumptions. Forecasting methods are broadly classified as a) quantitative b) technological c) judgmental. These forecasting methods include time-series smoothing, decomposition for time series, advanced time series, simple & multiple regression, and modeling. The forecasts should include strategic and tactical forecasts that are consistent with the time dimension.

### **Step3. Assemble Other Relevant Data**

In addition to step1 and step2, all other information relevant to developing a realistic revenue plan should be collected and evaluated. This information should relate to both constraints and opportunities. The primary constraints that should evaluate are: a) manufacturing capacity b) sources of raw materials and supplies, or goods for resale, c) availability of key people and a labor force, d) capital availability and e) availability of alternative distribution channels. These five factors require evaluation and coordination among the heads of the various functional areas in developing a realistic revenue plan.

### **Step4. Develop the Strategic and Tactical Sales**

Using the information provides in step 1,2&3, the management develops a comprehensive revenue plan to do this, the planning process must be structured to maximize a) motivation of the sales force and b) realism in the revenue plan. This process should recognize the importance of management goals both strategic and tactical. The process of developing a realistic revenue plan should be unique to each company because of the company's-its products, its distribution channels, and the competence of its marketing group. Four different participative approach widely used are characterized as follows; a) sales force composite b) sales division manager's composite c) executive decision and d) statistical approaches.

### **Step5. Securing Managerial Commitment to Attain the Goals in the Comprehensive Revenue Plans.**

Top management must be fully committed to attaining the sales goals that are specified in the approved revenue plan. This commitment requires full communication to the sales manager of the goals: approved marketing plan, and strategies by sales responsibilities. The commitment must be strong and ever present in day-to-day operations (Welsch, Hilton, & Gordon, 1999:176-182).

#### **2.1.7 Cash Management**

Before knowing about 'Cash Management' it is better to know about 'Cash'. Cash is the money, which the firm can disburse immediately without any restriction. The term cash includes coins currency and cheques held by the firm and balance in its bank accounts. Sometimes near cash items, such as marketable securities is also included in cash.

Cash is the important current asset for the operations of the business organization and public organization. Cash is the basic input needed to keep the business running on a country's basis, it is also the ultimate output expected to be realized by selling

the service or product manufactured by the firm. The firm should keep sufficient cash, neither more nor less. Cash shortages are disrupting the firm's manufacturing operations while excessive cash is simply remaining idle, without contributing anything towards the firm's profitability. Thus, a major function of the financial manager is to maintain a sound cash position.

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 add risk involving in the firm. The management of cash has been regarded as one of the conditioning factors in the decision making issues" (Ram M. Saksena). It is no doubt, very difficult to point out as to how cash is needed by a particular company, but it is very essential to analyze and fine out the solution to make an efficient use of funds for minimizing the risk of loss to attain profit objectives.

Good cash management means:

- Knowing when, where, and how your cash needs will occur,
- Knowing what the best sources are for meeting additional cash needs and
- Being prepared to meet these needs when they occur, by keeping good relationships with bankers and other creditors.

Cash flow management is the process of monitoring, analyzing, and adjusting business' cash flows. For businesses, the most important aspect of cash flow management is avoiding extended cash shortages, caused by having too great a gap between cash inflows and outflows. We won't be able to stay in business if we can't pay our bills for any extended length of time.

Therefore, we need to perform a cash flow analysis on a regular basis, and use cash flow forecasting so you can take the steps necessary to head off cash flow problems. Many software accounting programs have built in reporting features that make cash flow analysis easy. One of the most useful strategies for business is to shorten cash flow conversion period so that business can bring in money faster.

### 2.1.8 Functions of Cash Management

There are various functions of cash management. They are as follows:

**i) To cash planning:** Cash flows (inflows and outflows) should be planned to project cash surplus or deficit for the period. Cash budget is prepared for this purpose.

**ii) To design and managing cash flows:** The cash flows (inflows and outflows) should be properly managed. The inflows of cash should be accelerated and the outflows of cash should be decelerated as possible.

**iii) To maintain cash and marketable securities in amounts close to optimal level:** The firm should try to maintain the appropriate level of cash balances. The cost of excess cash and the danger of cash deficiency should be matched to maintain the optimal level of cash balances.

**iv) To place the cash and marketable securities in the proper institutions and in the proper forms:** The idle cash or precautionary cash balances should be properly invested to earn profits. The firm should take the appropriate decision about the division of such cash balances between bank deposits and marketable securities.

### 2.1.9 Importance of Cash Management

Cash the most liquid asset, is of vital importance to the daily operations of business firm. “Cash is both the beginning and the end of the working capital cycle- cash, inventories, receivable and cash. Its effective management is the key determinant of efficient working capital management. Cash like the blood stream in the human body gives vitality and strength to a business enterprise. The steady and healthy circulation of cash through out the entire business operation is the business solvency.” According to J.M. Keynes ‘it is cash, which keeps a business going. Hence, every enterprise has to hold necessary cash for its existence. In a business firm ultimately, a transaction results in either an inflow or an outflow of cash. In an efficient managed business, static cash balance situation generally does not exist. Adequate supply of ash is necessary to meet the requirement of the business. Its shortage may stop the business operations and may degenerate a firm into a state of technical insolvency and even of liquidation. Through idle cash is sterile; its retention is not without costs. Holding of cash balance has an implicit cost in the form of its opportunity costs. ‘The highest the level of idle cash the greater is the cost of holding it in the manner of loss of interest, which could have been earned either by investing it and securities or by reducing the burden of interest charges by paying off the loans taken previously. If the level of cash balance is more than the desired level with the firm, it shows mismanagement of funds. Therefore, for its smooth running and maximum profitability proper and effective cash management in a business is of paramount importance.

Efficient and optimal cash flow management is important to all firms. “Cash is a non earning asset in the sense that although it is needed to pay for labor and raw materials to buy fixed assets to pay taxes, to services debt, to pay dividends and so on cash management is to reduce cash holdings to the minimum necessary to conduct business” ( Weston & Copeland, 1981: 428).

Business analysts report that poor management is the major reason why most businesses fail. It would probably be more accurate to say that business failure is

due to poor cash management. For this, financial manager should take a look at the cash flow process to find out. The starting point for avoiding a crisis is to develop a cash flow projection. Smart business owners know how to develop both short-term (weekly, monthly) cash flow projections to help them manage daily cash, and long-term (annual, 3-5 year) cash flow projections to help them develop the necessary capital strategy to meet their business needs. They also prepare and use historical cash flow statements to gain an understanding about where all the money went.

Therefore, we need to perform a cash flow analysis on a regular basis, and use cash flow forecasting so you can take the steps necessary to head off cash flow problems. Many software accounting programs have built-in reporting features that make cash flow analysis easy. One of the most useful strategies for businesses is to shorten cash flow conversion period so that business can borrowing in money faster.

#### 2.1.10 Efficiency of Cash Management

Cash use a number of functions as it makes payment possible. It serves to meet emergencies. But if cash is kept idle it contributes directly noting to the earning of the corporation. As such corporation must adopt such a policy that makes optimum cash management possible. The financial manager of the corporation should try to minimize the corporations holding of cash wide still maintaining enough to insure payment of obligation. "For improving the efficiency of cash management effective method of collection and disbursement should be adopted. Some methods for efficiency of cash management are briefly described below". (Van Horne, 1974:426)

##### **a) Speedy cash collection**

A firm can conserve cash and reduce its requirement for cash balance if it can speed up its cash collection. Reducing the lag for gap between the times a customer pays his bill can accelerate cash collection and the time the cheque is collected and funds become available for use. Within this time gap, the delay is cause by the mailing time. The amount of cheques sent by customer but not yet collected are called deposit float. The greater the deposit floats, the longer the time taken in converting cheque into usable funds. There are mainly two techniques, which can be used to save mailing and processing time concentration banking, lock box system.

##### **b) Concentration Banking**

Concentration banking is a system of operating through number of collection centres, instead of a single collection centre centralized at the firm head office. In this system the firm will have a large number of bank account operated in the area where the firm its branches. All branches may not have the collection centres. The collection centres will be required to collect cheque from customers and deposit them in their local bank accounts. The collection centre will transfer funds above some predetermined minimum to a control generally at the firm's head office, each

day. A concentration bank is one where the firm has a major bank account usually the disbursement.

### **c) Slowing Disbursement**

Apart from speedy collection of account receivable the operation cash requirement can be reduce by slow disbursement of account payable. It may be recalled that a basic strategy of the cash management is delay payment as a long as possible without impairing the credit rating of the firm. Infect, slow disbursement represent a source of funds requiring no interest payments. There are some technique to delay payment is : avoidance of early payment centralized disbursement, float and accruable. "Quick collection and slow disbursement accomplish the corporation with adequate cash in hand for longer periods. Effective control of disbursement cash results in a faster turnover of cash." "Whereas the underlying objectives of collection are maximum acceleration, the objectives in disbursements are to slow them down as much as possible."

### **d) Cash Velocity**

Efficiency in the use of cash depends upon the cash velocity i.e. level of cash over a period of time.

$$\text{Cash Velocity} = \frac{\text{Annual sales}}{\text{Average sales}}$$

### **e) Synchronized cash flows**

Situation in which inflow coincides with out flows, there by permitting a firm to hold transaction balance a minimum.

### **f) Using Float**

Cheque written by the firm an not deducted from the bank records until they are actually received by the bank, possible a matter of several days Slag between the time the cheques is written until the time the bank receives it is known as float.

### **g) Transferring Fund**

There are two principal method-wire transfer and electronic depository transfer cheques. With a wire an electronic depository transfer cheque (DTC) arrangement in the movement of funds, an electronic cheque image is processed through an automatic clearing house. The funds become available on business day later. From small transfer, a wire transfer may be too costly

### **h) Minimum cash balance**

Corporations are required to keep a minimum cash balance requirement of a bank either for the service in record or in consideration of lending arrangement.

### **i) Overdraft system**

Systems where depositors may write cheques in excess of their balances with their banks automatically extend loans to cover the shortage. Most of the foreign countries use overdraft system.

### **j. Transferring Fund**

A transferring fund is a system for moving funds among accounts at different banks. The main transfer mechanisms are depository transfer cheques (DTC), electronic depository transfer cheques (EDTC) and wire transfers.

## 2.1.11 Different Techniques of Cash management

### **i. Cash planning**

Cash planning can help anticipate future cash flows and needs of the firm and reduce the possibility of idle cash balance and cash deficits. "Cash planning is a technique to plan for and control the use of cash." The forecasts may be based on the present operation or anticipated future operation. Cash plan is very crucial in developing the overall operation plans of the firm. Cash planning may be done on daily, weekly or monthly basis. It depends upon the size of the firm and philosophy of management.

### **ii. Cash budget**

Cash budget is the most significant device to plan for and control cash receipt and payment. "A cash budget is a summary statement of the firm's expected cash inflows and outflows over a projected time period." This information helps in the financing of these needs and exercise control over the cash and liquidity of the firm.

The time horizon of cash budget may differ from firm to firm. A firm whose business is affected by seasonal variations may prepare a monthly cash budget. Daily or weekly cash budget should be prepared for determining cash requirements if cash flows show extreme fluctuations. Cash budget for a longer interval may be prepared if cash flows are relatively stable.

### **iii. Short term Cash forecasting**

There are most commonly used methods of short term cash forecasting as follows.

#### **a. Receipt and disbursement forecast**

The prime aim of receipt and disbursement forecasts is to summarize these flows during a predetermined period. In the case of those companies where cash items of income and expenses involve cash, this method is favored to keep a close control over cash.



### **b. Adjusted net income method**

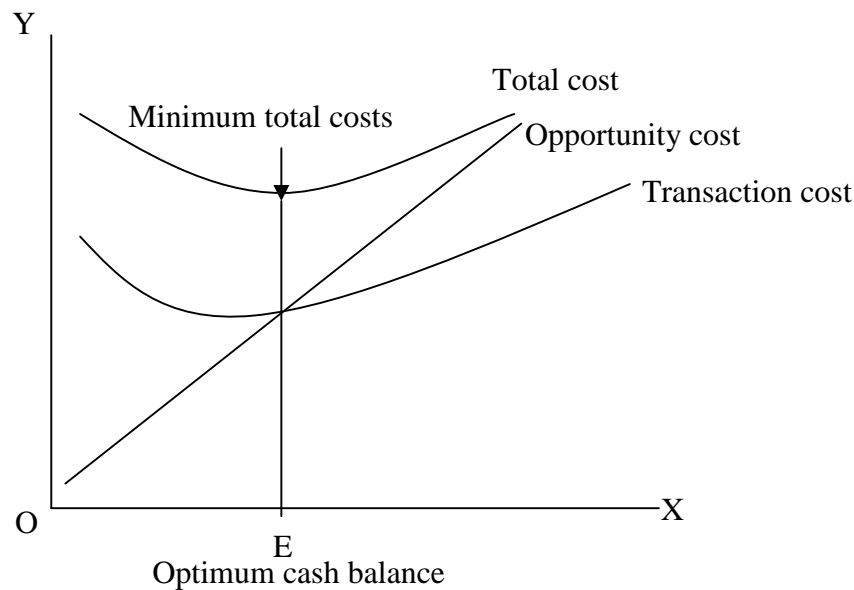
This method of cash forecasting involves the tracing of working capital flows. Sometime it is also called the sources and uses approach. Two objectives if the adjusted net income approaches are to project the company's need for cash at some future date and to show whether the company can generate this money internally or not, how much will have to either borrow or raise in the capital market. In preparing the adjusted net income forecasts items such as net income, depreciation, taxes, dividend etc. can easily be determined from the company's annual operating budget.

### **iv. Long term cash forecasting**

Long term cash forecasting are prepared to give an idea of the company's financial requirement of distant future. Once a company has developed long term cash forecast, it can be used to evaluate the impact of say new product development on the firm financial condition there, five or more years in future. The major uses of the long term cash forecasts are company's future financial needs, especially for its working capital requirement, to evaluate proposed capital projects and it help to improve corporate planning long term cash forecasting not only reflects more accurately the impact of any recent acquisitions but also foreshadows financing problems these new additional may pose for the company.

## **2.1.12 Determining the Optimum Cash Balance**

Financial manager responsibilities are to maintain a sound liquidity position of the firm. So that dues may be settled in time. The firm needs cash not only to purchase raw materials and pay wages but also for payment of dividend, interest, taxes and countless other purposes. The essence of liquidity is really the availability of cash to meet the firm obligations when they become due. Thus the cash balance is maintained for transaction purposes and an additional amount may be maintained as a safety stock. The financial manager should determine the appropriate amounts of cash balance. A trade off between risk and return influences such a decision. If the firm maintains a small cash balance, its liquidity position becomes weak and suffers from a lack of capacity of cash to make payment. But investing released funds in some profitable opportunities can attain a higher profitability. If the firm maintains a high level of cash balance it will have a sound liquidity position but forego the opportunity to earn interests. Thus the firm should maintain an optimum cash balance to find out the optimum cash balance the transaction costs and risk of too small a balance should be matched with the opportunity costs of too large a balance. The figure shows this trade-off graphically.



**Figure no. 2-1 Determination of optimum cash balance (Baumol, 1952:545)**

If the firm maintain larger cash balances its transaction costs would decline, but the opportunity costs would increase. At point 'E' the sum of the two costs is minimum. This is the point of optimum cash balance, which a firm should sack to achieve.

### 2.1.13 Cash Management Models

Optimal balance of cash is determined by the cost-benefit trade off between interests, income, transaction costs if no compensating balance were required. However with the existence of conversion delays and positive transaction cost, the firm would prefer to the hold some cash balance. There are different types of analytical models for cash management.

1. Baumol Model
2. Miller-Orr Model
3. Orgler's Model

#### **Baumol Model**

Baumol's Model, also known as Inventory model, is one of the simplest models to determine optimal cash under the condition of certainty. According to this model carrying cost of holding cash is balanced against the fixed costs of transferring marketable securities into cash or cash into marketable securities.

The purpose of this model is to determine the minimum cost amount of cash that a financial manager can obtain by converting securities to cash considering the cost of conversion and the counter-balance cost of keeping idle cash balances which otherwise could have been invested in marketable securities.

The total cash associate with cash management, according to this model, has two elements: (i) Cost of converting marketable securities into cash and (ii) the lost opportunity cost.

The conversion costs are incurred cash time marketable securities are converted into cash symbolically, total conversion cost per period.

$$=Tb/C..... (i)$$

Where,

b= cost per conversion assumed to be independent of the size of transaction

T= total transaction cash needs for the period.

C= Value of marketable securities sold at cash conversion.

The opportunity cost is derived from the lost/forfeited interest rate that could have been earned on the investment of cash balances. The total opportunity cost is the interest rate times the average cash balance kept by the firm. Symbolically, the average lost opportunity cost

$$=I(C/2).....(ii)$$

Where,

I= Interest rate that could have been earned

C/2= Average cash balance i.e. the beginning cash plus the ending cash balance of the period divided by 2

The total cost associated with cash management comprising total conversion cost plus opportunity cost of not investing cash until it is needed in interest-bearing instruments can be symbolically expressed as

$$I(C/2+ Tb/c).....(iii)$$

To minimize the cost, therefore the model attempts to determine the optimal conversion amount i.e. the cash withdrawal that costs the least. Symbolically, the optimal conversion (c\*) amount

$$C^* = \sqrt{2bT/i}.....(iv)$$

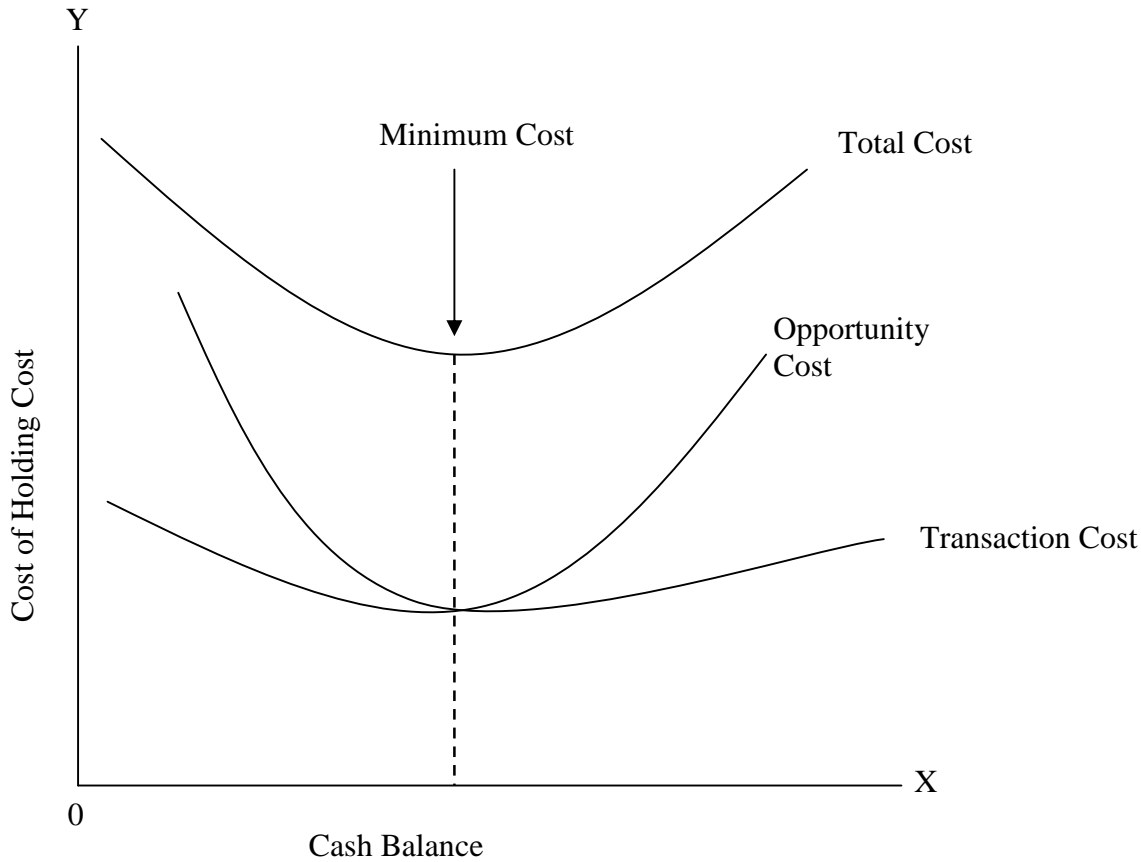
The model in terms of equation (iv) has important implications. First, as the total cash needs for transaction rises because of expansion/diversification etc., the optimal withdrawal increases less than proportionately. This is the result of economy of scale in cash management. Each project does not need its own additional cash balance. It only needs enough added to the general cash balance of

the firm to facilitate expanded operations. Secondly, as the opportunity interest rate increases the optimal cash withdrawal decreases. This is because as it increases it is more costly to forfeit the investment opportunity and financial managers want to keep as much cash invested in securities for as long as possible. They can afford to do this at the higher interest rates because at those higher rates any shortfall costs caused by a lower withdrawal are offset.

In sum, the model of cash management is very simplistic. Further, its assumption of certainty and regularity of withdrawal of cash do not realistically reflect the actual situation of any firm. In addition, the model is concerned only with transaction balances and not with precautionary balances. In addition, the assumed fixed nature of the cash withdrawals is also not realistic.

Nevertheless, the model does clearly and concisely demonstrate the economics of scale and the counteracting nature of the conversion and opportunity costs, which are undoubtedly major considerations in any financial manager's cash management strategy (Baumol, 1952:545-556).

The point on minimum cost will be justified by the following figure



**Figure no. 2-2 Baumol's model showing minimum cost of holding cash**

$$\begin{aligned} \text{Total Cost} &= \text{Holding Cost} + \text{Transaction Cost} \\ &= (\text{Average Cash Balance} * \text{Opportunity Cost}) + (\text{Cost per Transaction} * \\ &\quad \text{No. of Transaction}) \\ \text{Or, Total Cost} &= b (T/C^*) + I(c^*/2) \end{aligned}$$

### **Miller-Orr Model**

When cash balance fluctuates unpredictably, we use control theory to determine optimal behavior regarding cash holdings. Stochastic model/ Miller-Orr Model assume that cash flows are uncertain and unknown in advance. Theoretically, there are number of approaches to control theory. Among them, Miller-Orr Model, which specifies two controls limited i.e. upper and lower limit.

The objective of cash management according to Miller-Orr is to determine the optimum cash balance level, which minimizes the cost of cash management.

Symbolically,

$$C = bE(N)/t + jE(M) \dots \dots \dots (i)$$

Where

- b= the fixed cost per conversion.
- E (M)=the expected average daily cash balances.
- E (N)= the expected number of conversions.
- t= the number of days in the period.
- j= the lost opportunity costs.
- C= total cash management costs.

The Miller-Orr model is in fact an attempt to make the Baumol model more realistic as regards the pattern of cash flows. As against the assumption of uniform and certain levels of cash balances randomly fluctuate between an upper bound (h) and a lower bound (o). When the cash balances hit the upper bound (h), the firm has too much cash and should buy enough marketable securities to bring the cash balances back to the optimal bound (z). When the cash balances hit zero, the financial manager must return them to the optimum bound (z) by selling converting securities in to cash. According to the Miller-Orr model, as in Baumol Model, the optimal cash balance (z) can be expressed symbolically as

$$Z = \sqrt[3]{(3b^2)/4i + L} \dots \dots \dots (ii)$$

Thus, as in Baumol model, there are economies of scale in cash management and the two basic costs of conversion and the lost interest that have to be minimized. Miller-Orr model also specifies the optimum upper boundary (h) as three times the optimal cash balance level such that

$$\text{Upper Limit (h)} = 3Z - 2L \dots \dots \dots (iii)$$

$$\text{Average Cash balance} = (h + Z)/3$$

Further, the financial manager could consider the use of less liquid, potentially more profitable securities as investments for the cash balances in excess of h (Miller & Orr, 1966:413-435).

**Orgler's Model**

According to this model, an optimal cash management strategy can be determined through the use of a multiple linear programming model. The constrictions of the model comprise three sections

- a) Selection of the appropriate planning horizon

- b) Selection of the appropriate decision variables
- c) Formulating of the cash management strategy itself

The advantage of linear programming model is that it enables co-ordination of the optimal cash management strategy with the other operations of the firm such as production with less restriction on working capital balances. The model basically uses one-year planning horizon with twelve monthly periods because of its simplicity. It has four basis sets of decisions variables which influence cash management of a firm and which must be incorporated into the linear programming model of the firm. These are: (i) payment schedule, (ii) short term financing, (iii) purchase and sale of marketable securities and (iv) cash balance itself.

The formulation of the model requires that the financial manager first specify an objective function and then specify a set of constraints. Orgler's objective function is to minimize the horizon value of the net revenues from the cash budget over the entire planning period using the assumption that all revenue generated is immediately re-invested and that any cost is immediately financed. The objective function recognizes each operation of the firm that generates cash inflow or cash outflows as adding or subtracting profit opportunities for the firm is cash management operations. In the objective function decision variables which cause inflows such as payments on receivables have positive co-efficient, while decision variables which generate cash inflows, such as interest on short-term borrowings have negative co-efficient. The purchase of marketable securities would for example produce revenue and their have a positive co-efficient while the sale of those securities would incurred conversion costs and have a negative co-efficient. A very important feature of this model is that it allows the financial managers to generate cash management with production and other aspects of the firm (Orgler:1970:305).

#### 2.1.14 Cash Conversion Cycle

Cash conversion cycle, also known as asset conversion cycle, net operating cycle or just cash cycle, is a ratio used in the financial analysis of a business. The higher the number, the longer a firm's money is tied up in operations of the business and unavailable for other activities such as investing. The cash conversion cycle is the number of days between purchasing raw materials and receiving the cash from the sale of the goods made from that raw material.

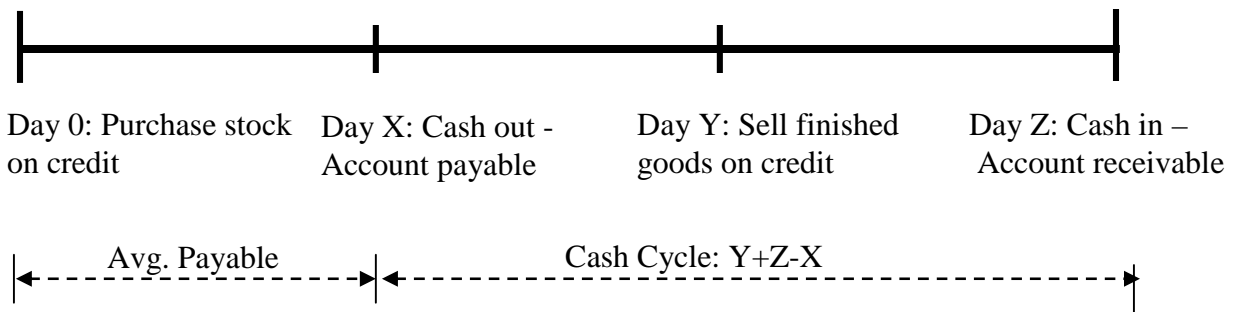
Cash conversion cycle = Average stockholding period (in days) + Average receivables processing period (in days) – Average payable period (in days)

Where,

Average stockholding period (in days) = closing stock / average daily purchases.

Average receivables processing period (in days) = accounts receivables / average daily credit sales.

Average payable processing period (in days) = accounts payable / average daily credit purchases.



The duration between the purchase of a firm's inventory and the collection of accounts receivable for the sale of that inventory, also known as cash cycle.

Cash Conversion Cycle = Inventory Processing Period + Days to Collect Receivables.

### 2.1.15 Credit Management

Credit policy can have significant influences on sales. In theory, the firm should lower its quality standard for accounts accepted as long as the profitability of sales generated exceeds the added costs of receivable is determined by the volume of credit sales and the average period between sales and collection.

Firm's objective of credit management is not only to collect receivable promptly, but also to give an outlook to the benefit cost trade off involve in various aspects of accounts receivable management. The important criteria to maintain benefit cost trade off the firm's receivable management are to set up credit policies. A firm's policy provides guidelines for determining whether to expand credit to a customer and how much credit and collection policies decision includes three dimensions.

#### I) Credit standards

- a) Sales revenue
- b) Investment in accounts receivable
- c) Bad debt expenses

#### II) Credit terms

- a) Cash discounts
- b) Cash discount period
- c) Credit period

#### III) Collection policies

- a) Correspondence
- b) Telephone calls



- c) Personal visits
- d) Legal action

### 2.1.16 Cash Flow

Cash flow simply refers to the flow of cash into and out of a business over a period of time. Watching the cash inflows and outflows is one of the major management tasks of an owner. The outflow of cash is measured by those checks of transactions that will write every month to pay salaries, suppliers, and creditors. The inflows are the cash, which receive from customers, lenders, and investors. Positive cash flow means if the cash coming “in” to the business is more than the cash going “out” of the business, the company has a positive cash flow. A positive cash flow is very good and the only worry here is what to do with the excess cash. Negative cash flow means if the cash going “out” of the business is more than the cash coming “in” to the business, the company has a negative cash flow. A negative cash flow can be caused by a number of reasons. For example: too much or obsolete inventory or poor collections of accounts receivable can be the cause of short of cash. If the company can’t borrow additional cash at this point, the company may be in serious trouble.

A Cash Flow Statement is typically divided into three components. These components are stated below:

#### **Operating Cash Flow:-**

Operating cash flow, often referred to as working capital, is the cash flow generated from internal operations. It is the cash generated from sales of the product or service of business. It is the real lifeblood of business, and because it is generated internally, it is under our control.

#### **Investing Cash Flow:-**

Investing cash flow is generated internally from non-operating activities. This component would include investments in plant and equipment or other fixed assets, nonrecurring gains or losses or other sources and uses of cash outside of normal operations.

#### **Financing Cash Flow:-**

Financing cash flow is the cash that flows to and from external sources; such as lenders, investors and shareholders. A new loan, the repayment of a loan, the issuance of stock and the payment of dividend are some of the activities that would be included in this section of the cash flow statement.

### 2.1.17 Cash Flow Projection

A cash flow projection is a forecast of the difference between cash coming “in” the business and cash going “out” of the business. The estimation or projection of cash flow is a powerful management tool for business. If we were to choose one financial management tool that we use on a routine basis, the cash flow projection and cash flow analysis would be the one to choose.

By knowing your cash position now and in the future, you can:

- a) Make sure business have enough cash to purchase sufficient inventory for seasonal cycles;
- b) Take advantage of discounts and special purchases;
- c) Properly plan equipment purchases for replacement or expansion;
- d) Prepare for adequate future financing and determine the types of financing (short-term credit line, permanent working capital, or long-term debt).
- e) Impress lenders with ability to plan and repay financing.

Moreover, it just makes good business sense to know where you are and where you are going with your company. A cash flow projection can help you do this. For a new or growing business, the cash flow projection can make the difference between success and failure. For an ongoing business, it can make the difference between growth and stagnation.

The cash flow projection shows how cash will flow in and out of the business and enables firms to budget the cash needs of the business over a period of time. The ability to predict and plan cash outlays means that firms won't be forced to resort to unexpected borrowing to meet your cash needs. The lack of liquidity can be a killer—even for profitable business. Lack of profits won't kill a business nearly as quickly as the lack of cash to pay your trade creditors. Remember, non-cash expenses such as depreciation can make your profits look negative, while your cash flow is positive. And you could also be showing a profit but have negative cash flow. That's why it is essential that we understand how to use a cash flow statement, and use it on a regular basis.

Preparing a cash flow projection is a something like preparing budget and balancing checkbook at the same time. Unlike the income statement, a cash flow statement deals only with actual cash transactions. Depreciation, a non-cash transaction, does not appear on a cash flow statement. Loan payments (both principal and interest) will appear on your cash flow statement since they require the outlay of cash.

Cash is generated primarily by sales. By in most businesses, not all sales are cash sales. Even if firms' have a retail business and a large percentage of sales are cash, it is likely that firm offer credit (charge accounts, term payments, lay-a-way, and trade

credit) to customers. Thus, we need to have a means of estimating when those credit sales will turn into cash-in-hand. Cash flow projections should be prepared for short-term (weekly, monthly), and long-term (annual, 3-5 years) planning purposes. They are used for deficient purposes and thus are generally prepared differently.

#### 2.1.18 Cash Flow Statement (CFS)

The Cash Flow Statement attempts to analyze the transactions of the firm in terms of cash i.e., the transactions generating cash and using cash. The focus in the cash flow statement is on cash rather than on working capital. So, the CFS provides a summary of sources of cash and uses of cash in the firm. The sources of cash may be the cash profits earned by the firm, issue of capital for cash, issue of other securities for cash, borrowings, sale of assets or investments etc. The uses of cash may be purchase of assets, investment, and redemption of debenture or preference share, repayment of loan, payment of tax, dividend distribution etc. The excess of sources of cash over the uses of cash would be the increase in cash during the year and vice-a-versa. Thus, the CFS summarizes the cash inflows and outflows. (Rustagi, 2001:155)

### **2.2 Review of Previous Research Work**

The Revenue Planning and Cash Management seem to be new subject of study for research and study. The researcher could find three researches made in the revenue planning and cash management in the partial fulfillment of the requirement for Master's Degree in Business Studies. But many researches have been made in the area of project planning and control of NEA and public manufacturing enterprises. As profit planning and control covers some aspects of revenue planning, researches made on these areas are taken into consideration for the sake of review to examine how efficiently they apply Profit Planning & Control tools. An attempt is made here to review some of the researches which have been submitted in revenue planning and profit planning & control in the context of Nepal.

#### 2.2.1 Mr. Jogindar Goet (1999)

Mr. Goet has made research on "Revenue Planning and Cash Management in Nepal, a case study of Nepal Electricity Authority", submitted to faculty of management Shanker Dev Campus for the partial fulfillment of M.B.S. on April, 1999. Using secondary sources to collect the data and other necessary informations Mr. Goet has pointed out following objectives and major findings.

### **Objectives:-**

- i) To make a comparative study of revenue generation of NEA;
- ii) To examine revenue planning, policies and practices of NEA;
- iii) To analyze the relationship between sales, production and losses in transmission;
- iv) To examine credit policy of NEA;
- v) To examine revenue management aspect of NEA;

### **Major Findings:-**

- i) No plan and program has been made about possible consumption of electricity in agricultural sector.
- ii) The revenue plans prepared by the branches and sub branches are not used to prepare central revenue plan.
- iii) NEA has not considered demand determinates such as family income, price of electricity, connection charges, cost of alternatives available, cost of auto generation of electricity, and reliability of NEA service while forecasting demand.
- iv) NEA has a practice to increase 10% in past year's figure to forecast next year's figures as a basis for forecast.
- v) Planned sales unit and sales revenues is highly and positively correlated, the correlation of actual sales unit and revenue is also positive and high.
- vi) NEA overdue amount of receivable is increasing year by year.

#### 2.2.2 Mr. Chiranjibi Acharya (2000)

Mr. Acharya has made research on "Profit Planning in Nepalese Public Enterprise, a case study of Nepal Electricity Authority", submitted to faculty of management Shanker Dev Campus for the partial fulfillments of M.B.S on July, 2000. In this study Mr. Acharya has pointed out following objectives and major findings.

### **Objectives:-**

- i) To examine the profit planning system applied in NEA;
- ii) To analyze the various functional budgets those are prepared by NEA;
- iii) To analyze the variance between budget and actual achievements of NEA;
- iv) To access the financial performance analysis of NEA, by applying financial tools;
- v) To make relevant suggestions and recommendation to the management of NEA on the basis of findings from the above analysis;

### **Major Findings:-**

- i) There is perfect positive correlation between the planned sales and actual sales.
- ii) The authority is unable to sell the electric services to its customer according to the production or total energy available.
- iii) Leakage, outage and theft is one of the major considerations in NEA. Due to this leakage there is a vast gap between sales and production and this leakage is reducing the NEA's profit annually.
- iv) Strengths and weaknesses are not analyzed in depth by NEA because of the monopoly situation or the absence of competitors and it is not alert toward its possible threats and opportunity.

### 2. 2.3 Mr. Ghana Shyam Thapa (2004)

Mr. Thapa has made research on "Profit Planning in Nepalese Public Enterprise, a case study of Nepal Electricity Authority," submitted to faculty of management Shanker Dev Campus for the partial fulfillments of M.B.S. on August,2004. In this study Mr. Thapa has pointed out following objectives and major findings.

### **Objectives:-**

- i) To examine the present profit planning premises adopted by NEA;
- ii) To highlight the various functional budgets of NEA;
- iii) To evaluate the variances between planning and actual performance of NEA;
- iv) To provide valuable suggestions and recommendations on the basis of study;

### **Major Findings;**

- i) NEA prepares both tactical and strategic profit plan but strategic plan is confined only to the level executives.
- ii) NEA is not successful to achieve sales target during the study period except in FY 2055/056.
- iii) Achievement of capital expenditure budget is satisfactory.
- iv) Operating costs have not been controlled effectively during the study period.
- v) NEA has not maintained sound liquidity during the study period.
- vi) NEA has not prepared plan and program for agriculture sector's consumption of electricity.

- vii) NEA has not considered demand determinates such as family income, price of electricity, connection charge, cost of alternatives available, cost of auto generation of electricity and reliability of NEA service while forecasting demand.

#### 2.2.4 Mr. Mahendra Rai (2004)

Mr. Rai has made research on Profit Planning in Public Utility Sector of Nepal – A case study of NEA; submitted to faculty of management, Shanker Dev Campus for the partial fulfillments of M.B.S. on May, 2004. In this study Mr. Rai has pointed out following objectives and major findings.

##### **Objectives:-**

- i) To examine profit planning system applied by NEA;
- ii) To analyze the financial performance of NEA by using various financial tools;
- iii) To observe the various functional budgets of NEA associated with comprehensive profit planning;
- iv) To evaluate budgeted and actual achievement of NEA;
- v) 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:-**

- i) Budgeted sales are more variable than actual sales.
- ii) Budgeted production is more fluctuating than actual production.
- iii) Authority formulates various functional budgets as a part of comprehensive profit plan.
- iv) NEA has been paying a large amount of interest on long term loan.
- v) Power leakage is significantly high in NEA.

#### 2.2.5 Mr. Kamal Raj Joshi (2004)

Mr. Joshi has made research on Revenue Planning and Cash Management of NEA; submitted to faculty of management, Shanker Dev Campus for the partial fulfillments of M.B.S. on November, 2004. In this study Mr. Joshi has pointed out following objectives and major findings.

##### **Objectives:-**

- i) To examine revenue planning, polices and practices of NEA;

- ii) To analyze the relationship between sales and production;
- iii) To make comparative study of revenue generation of NEA from different sector;
- iv) To review cash flow from operating, financing, and investing activities;
- v) To make suggestion effective of revenue mobilization of NEA;

### **Major Findings:-**

- i) NEA has a practice to increase 10 percent in past year figure to forecast next year's figure as a basis for forecast.
- ii) Average achievement of actual sales unit is consistent with internal sale but higher in external sales. It 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.
- iii) 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.
- iv) 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.
- v) 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.

#### 2.2.6 Mr. Rabin Dahal (2005)

Mr. Dahal has made research on Profit Planning System & Financial Conditions of NEA; submitted to faculty of management, Shanker Dev Campus for the partial fulfillments of M.B.S. on January, 2005. In this study Mr. Dahal has pointed out following objectives and major findings.

### **Objectives:-**

- i) To examine the present planning premises adopted by NEA on the basis of budgeting;
- ii) To observe the NEA's profit planning on the basis of overall managerial budgeting;

- iii) To analyze the variances between budgets & actual achievement of the authority;
- iv) To assess the financial performance of NEA;
- v) To recommend measures to be taken instantly and further to encounter with the identified budgeting and profit planning problems;

**Major Findings:**

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

**2.2.7 Mr. Lok Raj Bhatta (2006)**

Mr. Bhatta has made research on Revenue Planning and Cash Management of Public Utility in Nepal, a case study of Nepal Telecom; submitted to faculty of management, Shanker Dev Campus for the partial fulfillments of M.B.S. on March, 2006. In this study Mr. Bhatta has pointed out following objectives and major findings.

**Objectives:-**

- i) To analyze the gap between budgeted and actual revenue and its demand;
- ii) To examine cash collection and disbursement;
- iii) To review cash flow from operating, financing and investing activities;
- iv) To have information, control and security over cash balances and payment systems;

**Major Findings:-**

- i) Sales budget shows ISD sector's sales revenue is main revenue sources of Nepal Telecom, which contributes more than 40% in average.
- ii) Because of high demand of Telephone line there exist small gap between actual production and actual sales in lines.
- iii) 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.

- iv) Revenue per employee is increasing trend but Nepal Telecom has not incentive or motivating planning to promote employees.
- v) 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.

### 2.2.8 Mr. Kiran Neupane (2006)

Mr. Neupane has made research on A Study of Cash Management in Nepalese Public Enterprises, a case study of Salt Trading Corporation Ltd.; submitted to faculty of management, Shanker Dev Campus for the partial fulfillments of M.B.S. on July, 2006. In this study Mr. Neupane has pointed out following objectives and major findings.

#### **Objectives:-**

- i) To avail the daily necessary things to the general people in the reasonable price;
- ii) To carry out the export and import business;
- iii) To act as an agent for domestic as well as foreign companies;
- iv) To make investments in new as well as old industries;
- v) To import and distribute chemical goods and fertilizer;

#### **Major Findings:-**

- i) 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.
- ii) The STCL could not make the best use of available cash balance prudently.
- iii) The average cash turnover time in a year is found 40 times which is in fluctuating trend over the study period.
- iv) 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.
- v) 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.

- vi) 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.

### 2.2.9 Mr. Narayan Ghimire (2006)

Mr. Ghimire has made research on Impact of Budgeting on Profitability, a case study of NEA, submitted to faculty of management, Shanker Dev Campus for the partial fulfillment of M.B.S. on September, 2006. In this study Mr. Ghimire has pointed out following objectives and major findings.

#### **Objectives:-**

- i) To analyze the various functional budget of NEA;
- ii) To obtain a true picture of profit planning diversification of NEA;
- iii) To analyze the variance between budget and actual achievements of the authority;
- iv) To printout the major shortcomings and recommended suggestive measures;

#### **Major findings:-**

- i) Actual sales are more fluctuating than budgeted sales and budgeted sales is more fluctuating than actual production.
- ii) NEA has a practice of preparing both strategic and tactical budgeting but tactical short range plan is prepared for external purpose and strategic plan is prepared for internal purpose.
- iii) NEA has been paying huge amounts of interest on long term loan.
- iv) There is perfect correlation between budgeted and actual sales and budgeted and actual production.
- v) Actual sales are always less than actual production due to power loss which is a main problem of NEA.

### **2.3 Research Gap**

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**

Research Methodology is the way of to solve systematically about the research problem (Kothari, 1990). Research methodology is a general plan of how the researcher is going about answering the research questions he has set. In other words, the systematic and well-organized way for solving the research problem can be referred to as research methodology. This study has an ultimate concerned with the applicability and effectiveness of revenue planning and cash management system in manufacturing concern. So, the objective of this study is to analysis, examine and interpret the application of revenue planning and cash management of NEA, so, it requires an appropriate research methodology. The main contents of research methodology are mentioned as below:

#### **3.2 Research Design**

In order to make any type of research it is necessary to set research design, which fulfills the objectives of the study. Generally, research design means define procedure and techniques, which guide to study and profound ways for research variability. It is the planned structure and strategy of investigation conceived so as to obtain answers to research questions.

The research design of this study is descriptive as well as analytical approaches. This study is an examination and evaluation of revenue planning and cash management of NEA. Various functional budgets and other related accounting information and statements of NEA are the materials to analyze their achievement and effective application within the conceptual framework of revenue planning and cash management for solving the problems that has accursed in NEA. This is a case study research.

#### **3.3 Period Covered**

The present study covers two time dimensions, long rang and short range. The time period of five years for the purpose of trend analysis for long rang planning and the time period of one year (current year) for the purpose of short rang planning. Data are collected from fiscal year 2059/60 to 2063/064 for long range planning and for short range planning data are collected from fiscal year 2063/064.

### **3.4 Population and Sample**

As this research aims at studying the revenue planning and cash management of NEA as a sample for the study. So, Nepal Electricity Authority is a sample and population itself. This study is based on revenue planning and cash management of central office and branches, sub-branches of Nepal Electricity Authority. It is not centered with one branch. It is not possible to meet with all customers personally. For this, electricity subscribers were selected for this study using a stratified random sampling method.

### **3.5 Nature and Sources of Data**

Any type of study having small or large for that study data is necessary. Data should not be hypothetical but it should have quality of accuracy. Data are the arms and weapons for successful analysis. Data may be information, statistics, figures, charts etc. For successful analysis and to draw meaningful conclusion, collection of data is necessary.

This study is mostly based on secondary data. However, primary data and information have been obtained through informal discussions with executives and other related staffs of the NEA. Secondary data have been collected from the annual reports of NEA, balance sheet, profit and loss accounts, cost detail sheet, previous thesis and other relevant published and unpublished documents and other related publications. The required data were also collected from the website of NEA (i.e. [www.nea.org.np](http://www.nea.org.np)).

### **3.6 Research Variables**

The research variables of this present study are mainly sales in units and amounts, generation and purchase of power in units, contribution by different category, cash flow statement of NEA. Other variables are also used where it is necessary.

### **3.7 Tools and Techniques Employed**

This research is confined to examine the Revenue Planning and Cash Management of NEA. Therefore, the data have been collected and managed, analyzed and presented in suitable tables, formats, diagrams, graphs and charts. Such presentations have been interpreted and explained wherever necessary. To analyze the secondary data collected from various sources financial and statistical and mathematical tools are used. The financial tools used are ratio analysis, break even analysis etc. The statistical and mathematical tools used are percentage, standard deviation, coefficient of variation, correlation, regression, time series analysis etc.

### **3.8 Research Procedure**

The research procedure includes the following steps for resent study:-

- i) Collection of various books and other publications relevant for study.
- ii) Assimilation of useful secondary data.
- iii) Description and analysis of collect data in light of theoretical basis.
- iv) Tabulation and presentation of data through tables, charts, graphs etc.
- v) Analysis of data by using approved statistical and financial tools.
- vi) Extraction of valuable conclusion and recommendation.

# **CHAPTER -IV**

## **PRESENTATION AND ANALYSIS OF DATA**

### **4.1 Introduction**

The main purpose of this study is to examine the revenue planning and cash management in manufacturing enterprises in the context of profit planning and control in public utility concern. So, Nepal Electricity Authority has been selected for this purpose. To accomplish these objectives this chapter of study paper will analyze the various aspects of revenue planning and cash flow from operating, financing and investments activities and their related variance of the authority and also deals with the effectiveness of units and revenue separately.

### **4.2 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 than 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 or from other transaction in the ordinary course of business is same times describes as operating revenue.

Revenue plan is the key factor in profit planning and control. Unless there is a realistic and practical revenue plan one can not be sure of accuracy and practicability of other elements of profit plan.

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. The following table 4.1 presents the sales budget and actual sales in unit and Rupees respectively from the fiscal year 2059/060 to 2063/064.

**Table 4.1**  
**Revenue Trend of NEA**  
**From F/Y 2059/2060 to 2063/64**

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 %
2059/60	1642.500	11521.396	-	-	1534.313	9687.650	-	-
2060/61	1804.900	12238.800	9.89	6.23	1696.816	11237.490	10.59	16.00
2061/62	1906.622	12825.732	5.64	4.80	1795.233	11992.610	5.80	6.72
2062/63	1988.850	13275.383	4.31	3.51	1918.350	13264.360	6.86	10.60
2063/64	2145.480	14260.339	7.88	7.42	2066.270	14012.900	7.71	5.64

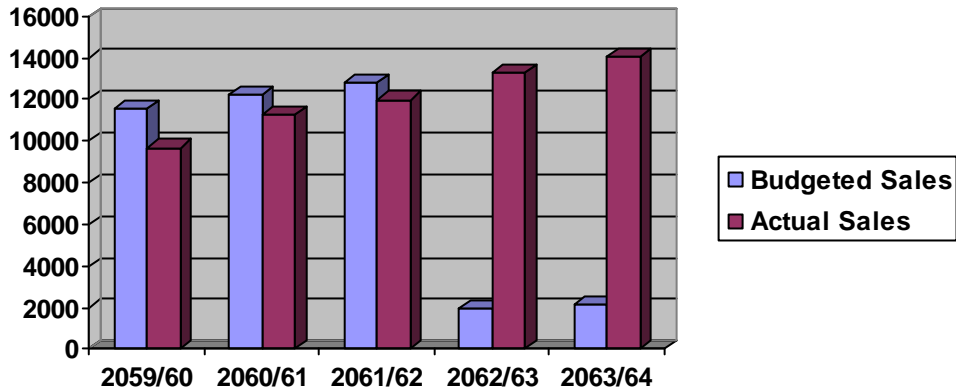
Source: Annual Report and Budget Book of NEA

It is clear from the Table 4.1 that in year 2060/061 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 2061/062 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 2062/63 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 2063/64, 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 graph.



**Graph 4.1  
Revenue Trend of NEA**



The above graph 4.1 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 4.2 shows the budgeted sales and actual sales with their respective achievements from the fiscal year 2059/060 to 2063/064.

**Table 4.2  
Budgeted Sales and Achievement in Unit and Rs  
From F/Y 2059/60 to 2063/64**

Fiscal year	Sales Unit in million (i.e. in GWH)			Sales Rs. In Million		
	Budgeted	Actual	Achievement %	Budgeted	Actual	Achievement %
2059/60	1642.500	1534.313	93.41	11521.396	9687.650	84.08
2060/61	1804.900	1696.816	94.01	12238.800	11237.490	91.82
2061/62	1906.622	1795.233	94.16	12825.732	11992.610	93.50
2062/63	1988.850	1918.350	96.46	13275.383	13264.360	99.92
2063/64	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 4.2 shows that the budgeted and the actual sales in unit and Rs with their respective achievements of NEA. In the FY 2059/060 the budgeted sales of NEA was 1642.500 million units and gradually increased up to the FY 2063/064, which is 2145.480 million units. on the other side the actual sales of NEA in FY 2059/060

was 1534.313 million units which is increased to 2066.27 million units up to FY 2063/064. 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 2059/060 the budget sales revenue was RS.11521.396 million. Annual targeted sales budgeted is increasing from the FY 2059/060 up to the FY 2063/064 In FY 2063/064 the budgeted sales was Rs.14260.339million. On the other side the actual sales revenue of NEA in FY 2059/060 was RS 9687.65 million which is reached to RS 14012.90 million up to FY 2063/064. Annual achievement in sales revenue is also in increasing trend except FY 2063/064. In FY 2059/060 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 2059/060. More than 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 below in Table 4.3

**Table 4.3**  
**Trends of Actual Sales of NEA**  
**From FY 2059/060 to 2063/064 (In Million)**

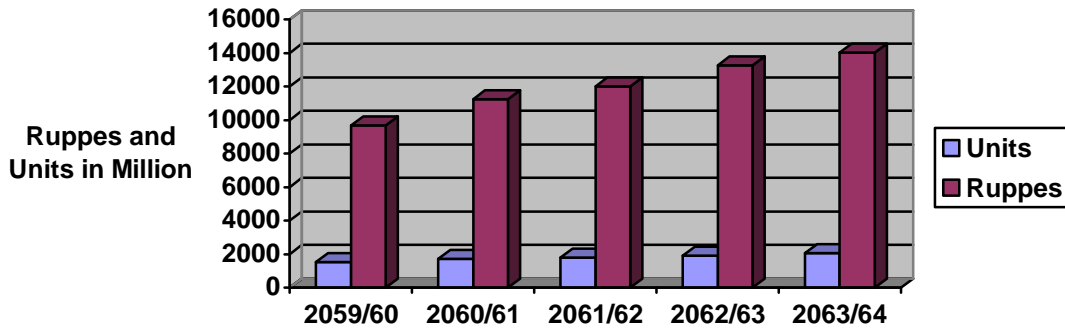
<b>FY</b>	<b>Units</b>	<b>Increase/Decrease</b>	<b>Rupees</b>	<b>Increase/Decrease</b>
2059/60	1534.313	-	9687.650	-
2060/61	1696.816	10.52	11237.490	16.00
2061/62	1795.233	5.80	11992.610	6.72
2062/63	1918.350	6.86	13264.360	10.60
2063/64	2066.270	7.71	14012.900	5.64

Source: Annual reports of NEA

The above table shows the increasing trend of actual sales of NEA since FY 2059/060 to 2063/064. The increment unit in FY 2060/061 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 2061/062, 2062/063 and 2063/064 are 5.80, 6.86 and 7.71 respectively. While on the other side the increment in terms of rupees in the year 2061/062, 2062/063 and 2063/064 are 6.72, 10.60 and 5.64 respectively. The increment in the fiscal year 2060/061 is maximum both in units in rupees while the minimum increment is in the FY 2063/064 both in units and rupees.

The trend of NEA can be shown effectively in the graph as follows;

**Graph 4.2**  
**Trend of Actual Sales of NEA**



The above graph 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.

### 4.3 Summary of Statistical Calculation

The table 4.4 presents the summary of statistical calculation.

**Table 4.4**  
**Summary of Statistical Calculation**

Statistical Tools	(In Rs. '00000')	
	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 4.4 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.

$$(Y - \bar{Y}) = r \frac{\dagger_y}{\dagger_x} (X - \bar{X})$$

Substituting the value from above table 4.4,

We have,

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

$$\text{Or, } Y - 12039.002 = 0.9804 \times 1.6393 (X - 12824.33)$$

$$\text{Or, } Y - 12039.002 = 1.6072 (X - 12824.33)$$

$$\text{Or, } Y - 12039.002 = 1.6072X - 20611.263$$

$$\text{Or, } Y = 1.6072X - 20611.263 + 12039.002$$

$$\text{Or, } Y = 1.6072X - 8572.261$$

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 2064/65 with the given value of budgeted sales 'X' .

Budgeted sales for 2064/065 (X) = Rs.15638.122.

Hence, the expected sales achievement

$$Y = 1.6072 \times 15638.122 - 8572.261 \\ = \text{Rs.}16561.328 \text{ million}$$

If the relationship between budgeted sales and actual sales remain the same as the previous years then the actual sales for the fiscal years then the actual sales for the fiscal year 2064/065 will be expected to be Rs.16561.328 million as stated 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

$$Y_c = a + bx \dots \dots \dots (i)$$

Where,

Y=Actual sales achievement

X=Deviation taken in time

a=Fixed value

b=Variable value

**Table 4.5**  
**Fitting Straight Line Trend by Least- Square**  
**From FY 2059/060 to 2063/064**

Fiscal Year (X)	Actual Sales in Rs.00000(Y)	$x=X-2061/062$	$x^2$	$xY$
2059/60	9687.65	-2	4	-19375.30
2060/61	11237.49	-1	1	-11237.49
2061/62	11992.61	0	0	0
2062/63	13264.36	1	1	13264.36
2063/64	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,

$$Y_c = 12039.002 + 1067.737x$$

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 2064/065.

The value of deviation {x} for fiscal year 2064/065 is 3.

We have,

$$\begin{aligned} Y_c &= 12039.002 + 1067.737x \\ &= 12039.002 + 1067.737 \times 3 \\ &= \text{Rs.}15242.213 \text{ million.} \end{aligned}$$

If the past sales trend does not change then the future actual sales will be Rs.5242.213 million in fiscal year 2064/065. 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 no 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 an alternative hypothesis and is denoted by  $H_1$ .

In a hypothesis testing the level of significance is set up. It is denoted by ' $\alpha$ '. 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( 30).

The t-test can be numerically presented as under:

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

Where,

$$\bar{X} = \frac{\sum X}{n} = \text{Sample Mean}$$

$\mu$  = population mean

$n$  = sample size

$S$  = standard Deviation of Sample

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

Now formulation of Hypothesis:

Null Hypothesis ( $H_0$ ): There is no significant different between actual sales achievement (i.e. sample mean) and budgeted achievements (i.e. population mean) or  $\bar{X} = \mu$

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

Hence applying t-test formula

We have,

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

Hence, (t) = -1.0325

Where,

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

$\mu$  = 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.

#### 4.4 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 4.6 shows category wise achievement of budgeted sales unit of NEA and Table 4.7 shows the category wise achievements of sales revenue. The detail calculations of this analysis are presented in appendix.

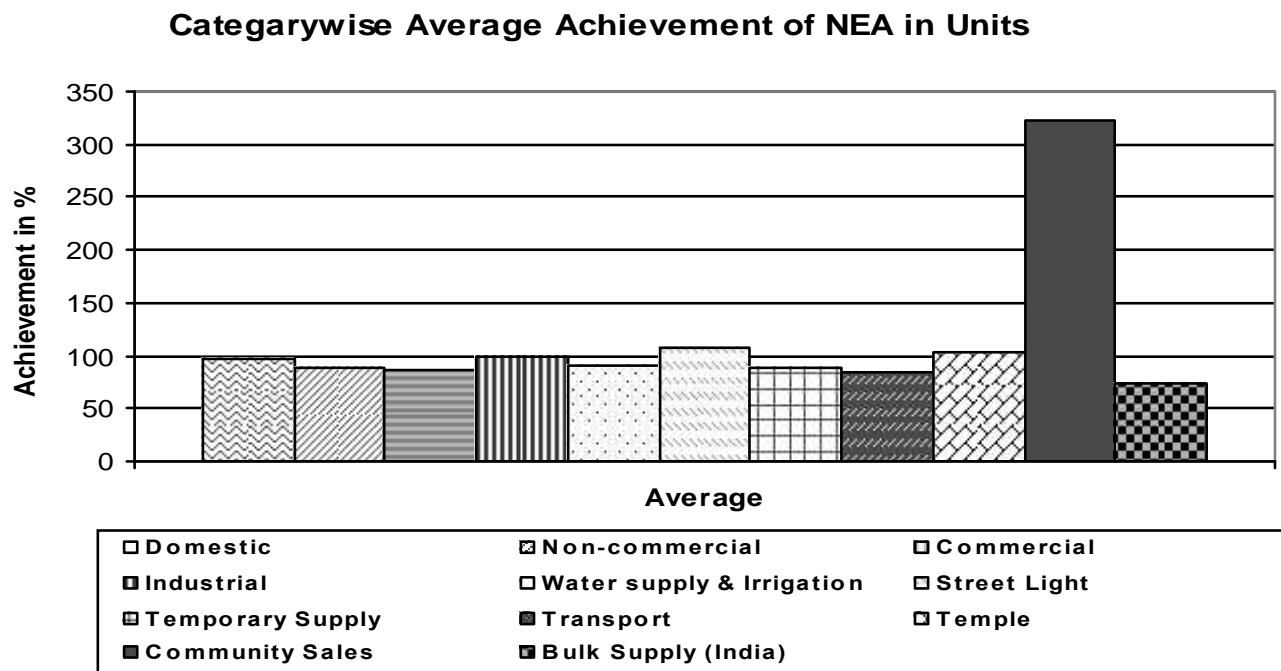
**Table 4.6**  
**Category-wise Achievement of Sales Units (%) of NEA**  
**From FY 2059/60 to 2063/64**

	2059/60	2060/61	2061/62	2062/63	2063/64	Average
Domestic	92.99	95.14	98.11	97.44	99.41	96.618
Non-commercial	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 supply &	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 Supply	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 Sales	1143.40	118.50	111.62	136.20	106.93	323.330
Bulk Supply (India)	78.74	96.12	57.58	68.62	72.14	74.640
<b>Average</b>	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 bar diagram 4.2.

**Diagram 4.3**



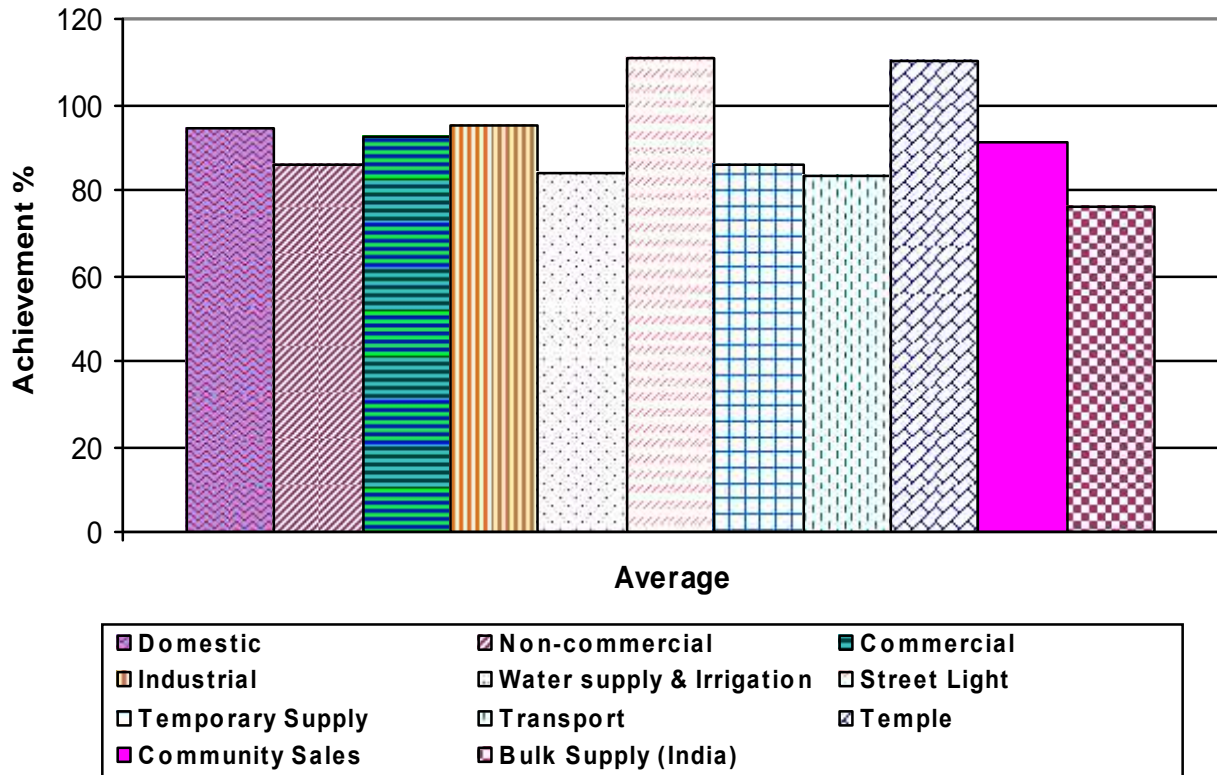
**Table 4.7**  
**Category wise Achievement of Sales Rupees (%) of NEA**  
**From FY 2059/60 to 2063/64**

	2059/60	2060/61	2061/62	2062/63	2063/64	Average
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 &	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
<b>Average</b>	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 diagram 4.3.

**Diagram 4.4**  
**Categorywise Average Achievement of NEA in Rs.**



The above table 4.6 & diagram 4.2 and 4.7 & 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 2059/060 is 92.99 which reached to 99.14 in the FY 2063/064. It is in increasing trend since FY 2059/2062. It has slightly gone down to be 97.44 in the FY 2062/063 in comparison to FY 2061/062, which is 98.11 in 2061/062. 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 2059/060 while the remarkable change in sales rupees has been during the year 2062/063.

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 2059/060 which then mounted to reach the peak or 110.52% in the year 2063/064. Likewise the achievement in Sales rupees in FY 2059/060 was 78.25% which then reached the peak of 109.69 in the FY2063/064. 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 2059/060 and FY 2063/064 in comparison to FY 2059/060. But achievement in sales Rupee is in increasing trend but has gone down only in during the year 2063/064 in comparison to FY 2061/062 and 2062/063. 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 2061/062 and minimum during the year 2059/060. 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 2061/062 and minimum during the FY 2059/060.

The community sales in rupees only started since the FY 2060/061. Since then it has exceeded 100% ranging from 118.50% in FY 2060/061 to 114.80% in FY 2061/062. Then has slightly declined during the year 2063/064. In terms of sales unit too, it has exceeded 100% in every consequent years from FY 2059/060 to 2063/064. The average community sales unit being 323.33%. The community sales unit in FY 2059/060 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 2059/060 and 2060/061 the sales were going well but during the years 2061/062 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 4.6 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 4.7 it can be concluded that achievement of sales rupees in domestic industrial street light, temple and community sales categories are satisfactory to some extent 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.

#### **4.5 Contribution of Each Category in Total Sales**

Contribution of each category in total sales unit and total sales revenue from fiscal year 2059/060 to 2063/064 are presented in table 4.8 and 4.9 respectively.

**Table 4.8**  
**Contribution of Each Category in Total Sales Units**  
**From FY 2059/60 to 2063/64**

Fiscal year	2059/60	2060/61	2061/62	2062/63	2063/64	Average
Particulars	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
<b>Total</b>	100	100	100	100	100	100

Source: Appendix III

**Table 4.9**  
**Contribution of Each Category in Total Sales Revenue**  
**From FY 2059/60 to 2063/64**

Fiscal year	2059/60	2060/61	2061/62	2062/63	2063/64	Average
Particulars	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
<b>Total</b>	100	100	100	100	100	100

Source: Appendix III

The above table 4.8 and 4.9 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%.

#### **4.6 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 2059/060 to 2063/064 is presented in table 4.10 as below:-

**Table 4.10**  
**Contribution of Consumers in Each Category**  
**From FY 2059/060 to 2063/064**

FY \ Category	2059/060	2060/061	2061/062	2062/063	2063/064	Average
	Contribution %	Contribution %	Contribution %	Contribution %	Contribution %	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	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	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 2059/060 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 2059/060 to 2063/064 were very low.

#### **4.7 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 2003 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 2059/060 to 2063/064.

**Table 4.11**  
**Total Revenue and Profit / (Loss) Trend of NEA**

Fiscal Year	Profit/(Loss) (In Million Rs.) (2)	Total Revenue (In Million Rs.) (1)	% of Profit/ (Loss) on Total Revenue (3)
2059/060	278.9	9687.65	2.88
2060/061	(1694.9)	11237.49	(15.08)
2061/062	(3475.2)	11992.61	(28.98)
2062/063	(4808.0)	13264.36	(36.25)
2063/064	(7300.6)	14012.90	(52.10)

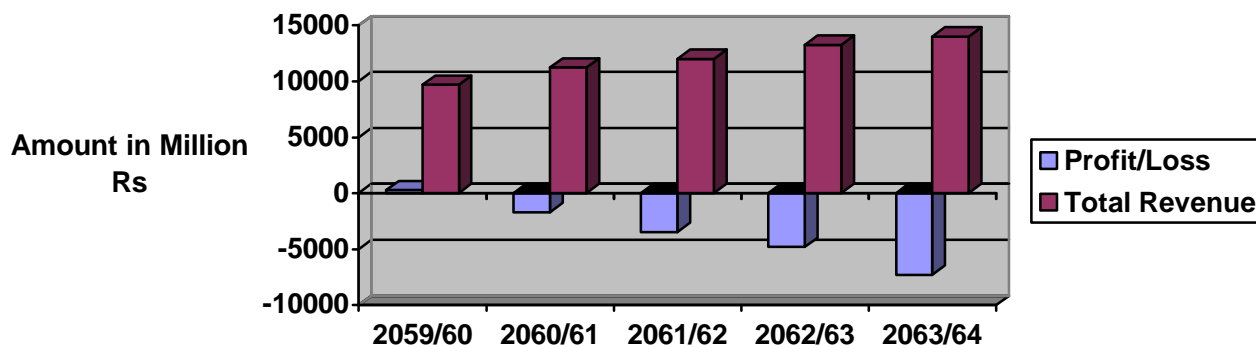
Source: Annual Report of NEA

The table above 4.11 gives the account of Total Revenue and Profit/(Loss) trend of NEA from FY 2059/060 to 2063/064. NEA during the fiscal year 2059/060 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 2059/060 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 graph.



**Graph 4.5**  
**Relationship between Revenue and Profit/Loss Trend of NEA**



The above line graph gives the clear picture of relationship between total revenue and profit/ (loss) of NEA during the research period of 2059/060 to 2063/064. 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 4.12**  
**Fitting Straight Line Trend by Least Square**  
**From F/Y 2059/60 to 2063/64**

F/Y (X)	Profit/loss (Y) (in Rs.000000)	$x = X - 2061/62$	$x^2$	$xY$
2059/060	278.9	-2	4	-557.80
2060/061	-1694.9	-1	1	1694.90
2061/062	-3475.20	0	0	0
2062/063	-4808.00	1	1	-4808.80
2063/064	-7300.60	2	4	-14600
	$\Sigma Y = -16999.80$	$\Sigma x = 0$	$\Sigma x^2 = 10$	$\Sigma xY = -18270.90$

Since  $x=0$  then,

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

$$b = \frac{\sum xY}{n} = \frac{-18270.90}{5} = -3654.18$$

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

We have,

$$\begin{aligned} Y_c &= -3399.96 + (-3654.18)x \\ &= -3399.96 - 3654.18x \end{aligned}$$

For the estimation of profit or loss for the year 2064/65,

We have,

$$\begin{aligned} a &= 3 \\ Y_c &= -3399.96 - 3654.18 \times 3 \\ &= -14,362.5 \text{ million} \end{aligned}$$

The estimated loss for the fiscal year 2064/065 will be Rs.14362.5 millions if the past profit 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 4.13**  
**Summary of Statistical Tools**

(In Rs. 000000)

Statistical Tools	Total Revenue "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

The above table 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  $6 \times PE$  (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.

#### 4.8 Analysis of Account Receivable of NEA

The following table 4.16 shows that the account receivable, sales revenue, average collection period and debtor turnover of NEA.

**Table 4.14**  
**Account Receivable, Sales Revenue, Average Collection Period and Debtor Turnover**  
**From FY 2059/060 to 2063/064**

Fiscal year	Sales Revenue in Rs.million (A)	Account receivable in Rs.million (B)	Debtor Turnover (C=A/B)	Average Collection Period=360/C
2059/060	9687.65	2284.9	4.24times	86.80days
2060/061	11237.49	3380.2	3.32times	109.94days
2061/062	11992.61	3735.7	3.21times	113.71days
2062/063	13264.36	3697.7	3.59times	101.67days
2063/064	14012.90	4064.6	3.45times	105.80days

Source: Annual Report of NEA

The above table 4.14 shows that sales revenue, account receivable, debtor turnover and average collection period of NEA from fiscal year 2059/060 to 2063/064. The debtor turnover and average collection period are calculated by using following formula:

$$\text{Debtor turnover} = \text{Sales/closing debtors or Sales /Account Receivable}$$

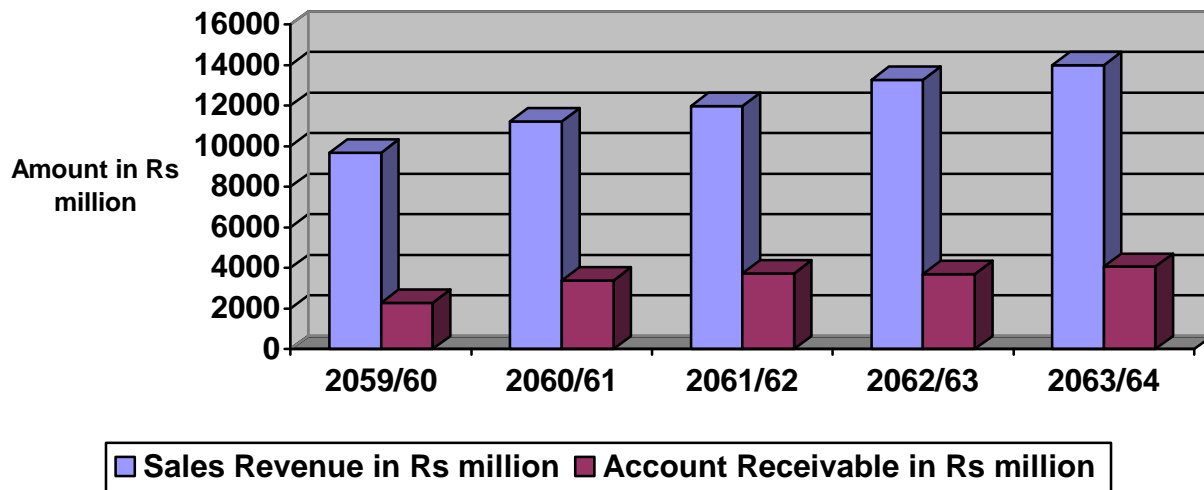
$$\text{Average collection period} = \text{Days in a year/Debtor Turnover}$$

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 2061/062. Then it has slightly gone up to 3.59 times during the year 2062/063 and then again it has decreased to 3.45 times in FY 2063/064.

The average collection period of NEA during the fiscal year 2059/060 was 86.08 days. It increased to 109/94 days and 113.71 days during the FY 2060/061 and 2061/062 respectively. Further more it decreased to 101.67 days during FY 2062/063. The above table shows that the collection period was good enough during FY 2059/060. This is so because the collection period was the lowest during the year 2059/060.

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

**Graph 4.6**  
**Relationship Between Sales and Account Receivable**



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

#### **4.9 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 2059/060 to 2063/064.

**Table 4.15**  
**Total Power Available, Sales and Power Loss**  
**From FY 2059/060 to 2063/2064(unit in million)**

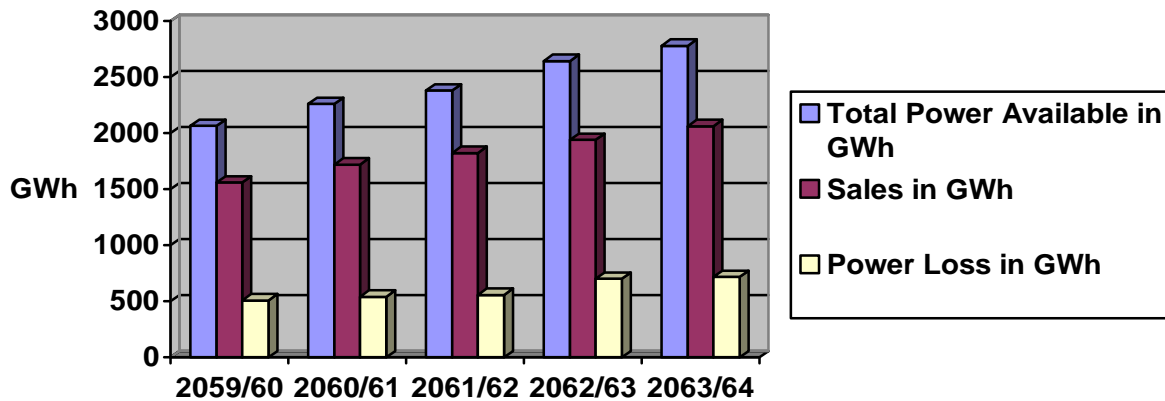
Fiscal Year	Total Power Available in GWh (Production + Purchase)	Sales in GWh (Total Sales + Self Consumption)	Power Loss In GWh	% of Power Loss Compared to Total Power Available	% of Power Loss Compared to Sales
2059/060	2066.33	1558.91	507.42	24.56	32.55
2060/061	2261.13	1719.16	541.97	23.97	31.53
2061/062	2380.89	1824.10	556.79	23.39	30.52
2062/063	2642.75	1940.60	702.15	26.57	36.18
2063/064	2780.92	2062.62	718.30	25.83	34.82

Source: Annual Report of NEA

Table 4.15 shows the relationship between total power available, sales, and power loss of NEA from 2059/60 to 2063/64. 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 following bar diagram 4.6.

**Diagram 4.7**  
**Relationship Between Total Power Available, Sales and Power Loss**



The above diagram shows the total power available, sales, and total power loss from fiscal year 2059/60 to 2063/64. 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 4.16**  
**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: Appendix VI

Table 4.16 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.

#### **4.10 Analyses of Financial Ratio**

A ratio is a relationship expressed in mathematical terms between two individual or groups of figures connected with each other in some logical manner. The ratio analysis is based on the premise that a single accounting figure by itself may not communicate any meaningful information but when expressed as a relative to some other figure, it may definitely give some significant information. The relationship between two or more accounting figures/groups is called a financial ratio. A financial ratio helps to summarize a large mass of financial data into a concise form and to make meaningful interpretations and conclusions about the performance and positions of a firm. The ratios can be studied by classifying into the following groups (Source: R.P. Rustagi, 2001: 53).

- I. Liquidity Ratios
- II. Leverage Ratios
- III. Activity or Turnover Ratios
- IV. Profitability Ratios

#### 4.10.1 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 2059/060 to 2063/064.

**Table 4.17**  
**Current Assets Ratio of NEA**  
**From FY 2059/060 to 2063/064**

Fiscal Year	Current Ratios
2059/060	1.23:1
2060/061	0.94:1
2061/062	0.76:1
2062/063	0.64:1
2063/064	0.65:1

Source: Appendix-VII

The above table 4.17 shows the current assets ratio of NEA from FY 2059/060 to 2063/064. It is clear from above table that all current assets ratios are less than 2:1 which 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 4.18 below shows the quick ratio of NEA from FY 2059/060 to 2063/064.

**Table 4.18**  
**Quick Ratio of NEA**  
**From FY 2059/060 to 2063/064**

Fiscal year	Quick Ratios
2059/060	0.50:1
2060/061	0.54:1
2061/062	0.46:1
2062/063	0.38:1
2063/064	0.39:1

Source: Appendix -VII

As the above table 4.18 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.

#### 4.10.2 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.

$$\text{Debt to total capital ratio} = \frac{\text{Total Debt}}{\text{Total capital}}$$

**Table 4.19**  
**Debt to Total Capital Ratio**  
**From FY 2059/060 to 2063/064**

Fiscal Year	Debt to total capital ratio
2059/060	0.72:1
2060/061	0.78:1
2061/062	0.82:1
2062/063	0.84:1
2063/064	0.84:1

Source: Appendix- VII

Table 4.19 shows the debt to total capital ratio. Debt to capital ratio of 0.67:1 is considered as satisfactory level. Debt to total capital ratio of NEA for all fiscal years starting since 2059/060 to 2063/064 is well enough satisfactory. The highest satisfaction was gained during the FY 2062/063 and 2063/064. The clarified level is in increasing level.

#### 4.10.3 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 4.20 below presents the capital employed turnover ratio of NEA.

**Table 4.20**  
**Capital Employed Turnover Ratio**  
**From F/Y 2059/60 to 2063/64**

Fiscal Year	Capital employed Turnover ratio
2059/060	0.15times
2060/061	0.17times
2061/062	0.18times
2062/063	0.18times
2063/064	0.18times

Source:-Appendix VII

The capital employed turnover ratio has increased from 0.15times during the FY 2059/060. This ratio then has remained constant to 0.18times from FY 2061/062to 2063/064. 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 4.21 presents the total asset turnover ratio of NEA.

**Table 4.21  
Total Asset Turnover Ratio  
From F/Y 2059/60 to 2063/64**

Fiscal years	Total Assets turnover Ratio
2059/060	0.13times
2060/061	0.15times
2061/062	0.15times
2062/063	0.15times
2063/064	0.15times

Source: Appendix VII

The above table shows the Total Assets Turnover Ratios. The total assets turnover ratios of NEA during the year 2059/060 are 0.13times. It then slightly went up to 0.15 times and remained constant to 0.15times, since FY 2060/061to 2063/064. 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 4.22**  
**Fixed Assets Turnover Ratio**  
**From F/Y 2059/60 to 2063/64**

Fiscal years	Fixed Assets turnover Ratio
2059/060	0.17times
2060/061	0.20times
2061/062	0.20times
2062/063	0.22times
2063/064	0.22times

Source: Appendix VII

In the above table the fixed asset turnover ratio is 0.17 times during the year 2059/060, which rose up to 0.20 during the FY 2060/061 and 2061/062. It further increased to 0.22 times during the year 2062/063 and 2063/064. 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 4.23**  
**Inventory Turnover Ratio of NEA**  
**From F/Y 2059/60 to 2063/64**

Fiscal years	Inventory Turnover Ratio
2059/060	9.16times
2060/061	11.05times
2061/062	11.44times
2062/063	9.66times
2063/064	10.42times

Source: Appendix VII

Inventory Turnover Ratio during the FY 2059/060 remained to 9.16 times. It increased to 11.05 times and 11.44times during 2060/061 and 2061/062 respectively. During the FY 2062/063 it went down to 9.66 times meeting the level of 2059/060 while increased to 10.42 times during 2063/064.

#### 4.10.4 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 4.24**  
**Gross Profit Ratio of NEA**  
**From FY 2059/060 to 2063/064**

Fiscal years	Gross Profit Ratio
2059/060	37.88%
2060/061	51.44%
2061/062	43.03%
2062/063	40.80%
2063/064	35.84%

Source: Appendix VII

The above table shows the Gross Profit Ratio of NEA during FY 2059/060 to 2063/064. The gross profit ratio has remained “between” 35.84% to 51.44%. The gross profit ratio remained below 38% during FY 2059/060 and 2063/064, while it was around 40% during FY 2061/062 and 2062/063. The highest gross profit ratio was achieved during FY 2060/061, 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 net 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 4.25 shows the net profit ratio of NEA from FY 2059/060 to 2063/064.

**Table 4.25**  
**Net Profit Ratio of NEA**  
**From FY 2059/060 to 2063/064**

Fiscal years	Net Profit Ratio
2059/060	-9.08%
2060/061	-17.74%
2061/062	-14.82%
2062/063	10.41%
2063/064	18.43%

Source: Appendix -VII

The above table 4.25 gives the Net profit Ratio of NEA during FY 2059/060 to 2063/064. Since FY 2059/060 to 2063/064 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 2059/060 to 2063/064. 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 4.26 presents the ROA of NEA from FY 2059/060 to 2063/064.

**Table 4.26**  
**Return on Assets (ROA)**  
**From FY 2059/060 to 2063/064**

Fiscal years	Return on assets (ROA)
2059/060	0.75%
2060/061	1.38%
2061/062	1.57%
2062/063	2.04%
2063/064	0.88%

Source: Appendix VII

The above table 4.26 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 2059/060 to 2062/063, 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 4.27 shows the return on capital employed {ROCE} of NEA from FY 2059/060to 2063/064. It is quite unsatisfactory.

**Table 4.27**  
**Return on Capital Employed [ROCE] of NEA**  
**From FY 2059/060 to 2063/064**

Fiscal years	Return on Capital Employed
2059/060	0.81%
2060/061	1.54%
2061/062	0.18%
2062/063	2.40%
2063/064	1.04%

Source: Appendix VII

The table 4.27 shows the return on capital employed ratio of NEA. The return on capital employed has fluctuated in every year since FY 2059/060 to 2063/064. The lowest return was during 2061/062 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 Cash Management of Nepal Electricity Authority**

Cash is the life blood of any organization. With out 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 2059/60 to 2063/6



**Table 4.28**  
**Cash Budget**  
**Nepal Electricity Authority (NEA)**  
**From F/Y 2059/60 to F/Y 2063/64**

Particular	2059/60	2060/61	2061/62	2062/63	2063/64
Opening Stock of Cash	741806	5339998	9931712	14942612	19481118
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:					
Government Sources	528600	990000	1110000	746700	3047800
Foreign Aid/ Debt	5060000	4030000	5250000	6008000	5072662
Electricity Charge (Govtt.Office)	500000				250000
Street Light Charge		300000	250000	250000	250000
Development fund	5758600	5020000	6360000	6754700	6120462
For Reinfrastructuring	100000	100000	50000		
<b>Total Cash Collection/ Available(A)</b>	<b>24679548</b>	<b>27976332</b>	<b>35929712</b>	<b>42549832</b>	<b>53584342</b>
Cash Disbursement:					
Operating Expensess	2491824	2606720	3178300	3631494	4288321
Long-term Interest Expensess	2718310	1750000	1343000	1200000	720000
Short-term Interest Expensess	20000				
Electricity Purchase	4968450	4950000	5160000	5822000	8522794
Royalty Payment	605276	700000	741000	600000	969383
Income Tax Payment	200000	50000	9000		
Capital Expensess	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 Instelment	674248	600000	635000	500000	500000
Repayment of Short-term loan Instelment	400000	600000	600000	700000	507500
Lending Fund	20000	30000	30000	30000	10000
Purchasae Budget (net)	99900	90000	190000	150000	250000
Contengency Fund	70000	150000	150000	150000	300000
Investment on Insurance	50000				72500
Investment on Retirement Fund	40000	50000	50000	50000	50000
<b>TotalDisbursement (B)</b>	<b>19939550</b>	<b>18644620</b>	<b>21587100</b>	<b>23668714</b>	<b>28070625</b>
Surplus/ Deficit(A-B)	4739998	9331712	14342612	18881118	25513717

Minimum cash balance	600000	600000	600000	600000	600000
Net Surplus/Deficit	5339998	9931712	14942612	19481118	26113717

Source: Annual Report and Budget Book of NEA.

The above table 4.28 shows the Cash Budget of NEA from fiscal year 2059/60 to 2063/64. It shows from where the total cash is received and total cash disbursement as well. During the fiscal year 2059/60 total cash available summed to Rs.24679548 in thousands while the disbursement total to Rs.19939550 in thousand. NEA during the fiscal year 2059/60 had maintained sum total of Rs.600000 as minimum cash balance, so the net surplus was Rs.5339998.

During the fiscal year 2060/61 and 2061/62, NEA's total cash available were Rs.27976332 and Rs.35929712 thousand respectively, while the total disbursement were Rs.18644620 and Rs.21587100 thousand respectively. The minimum cash balance during these fiscal year has been increased from Rs.500000 thousand to Rs.600000 thousand; as a result the net surplus came to be Rs.9931712 and Rs.14942612 respectively.

During the fiscal year 2062/63 and 2063/64 NEA's cash budget shows Surplu of Rs.19481118 and Rs.26113717 thousand respectively. The total cash available during these fiscal years were Rs.42549832 and Rs.53584342 thousand while the total disbursement were Rs.23668714 and Rs.28070625 thousand respectively.

In nutshell we can say that NEA's net surplus was increasing during fiscal year 2059/60 to 2061/62; but during fiscal year 2062/63 and 2063/64 it went for surplus.

### **(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, cash flow from investing activities and cash flow from financing activities. The detail calculation of cash flow statement is given below.

**Table 4.29 (a)**  
**Cash Flow from Operating Activities**  
**From FY 2059/60 to 2060/61**

(Amount in Rs.)

<b>Particulars</b>	<b>2059/60</b>	<b>2060/61</b>
<b>(A) Cash Flow from Operating Activities:</b>		
<b>Profit before interest, depreciation and</b>	<b>186,091,797.48</b>	<b>2073,028,605.86</b>
Prior year's adjustment	492,011,674.48	444,490,130.81
<b><u>Add: Adjustment for:</u></b>		
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)	-
<b>Operating Profit before Working Capital</b>	<b>4,997,993,029.07</b>	<b>2,464,789,149.10</b>
<b><u>Adjustment for working capital changes:</u></b>		
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)
<b>Cash Generation from Operations</b>	<b>825,314,591.70</b>	<b>4,858,360,014.17</b>
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)	-
<b>Cash generation before extra ordinary item</b>	<b>(646,664,659.97)</b>	<b>928,467,507.50</b>
Extraordinary Income	498,090,047.66	-
<b>(A) Net Cash Flow from Operating Activities</b>	<b>(148,574,612.31)</b>	<b>928,467,507.50</b>

Source:- Auditors' Report of NEA

**Table 4.29 (b)**  
**Cash Flow from Operating Activities**  
**From F/Y 2061/62 to 2063/64**

(Amount in Rs.)

Particulars	2061/62	2062/63	2063/64
<b>(A)Cash Flow from Operating Activities:</b>			
<b>1. Net Profit/(Loss) before taxes</b>	<b>(1,486,145,318.10)</b>	<b>(1,312,824,502.64)</b>	<b>(1,267,833,807.60)</b>
<b><u>Add: Adjustment for:</u></b>			
Interest on long-term loans	2,991,505,645.16	3,079,770,838.51	3,050,877,806.90
Depreciation on fixed assets	1,757,363,951.32	1,715,840,136.19	1,816,963,325.51
Deferred Revenue Expenditure written off	320,090,809.84	123,283,867.20	105,387,309.10
Fixed Assets written off	5,952,920.56	1,130.00	-
Provision for Doubtful Debtors	-	215,186,730.00	-
Provision for Loan & Advance	-	44,247,870.00	-
Contingency reserve	15,960,254.46	-	-
Provision for General reserve	-	17,011,292.38	-
Provision for loss on fixed assets	-	40,000,000.00	65,000,000.00
Provision for inventories	-	4,356,285.00	-
Staff loan and fixed assets written off	-	-	6,546,909.86
Bad Debt written Off	-	-	3,516,825.00
Loss on Stock	-	-	6,113,043.17
Prior Year's Depreciation	-	-	29,213,018.77
Provision for CWIP	80340,000.00	-	-
Loss on foreign exchange	59,152,513.26	-	42,713,652.33
Provision for incentives to staff of distribution	27,979,806.48	-	-
Provision for accumulated leave & medical facilities	21,647,479.00	14,268,643.38	12,096,460.89
Provision for gratuity & pension	13,935,042.10	1,958,104.18	-
Less: Extra-ordinary Income	-	-	-
Less: Interest on Deposits	(43,659,967.40)	(35,499,889.11)	(54,076,938.25)
Less: Dividend Income	-	(96,482,185.00)	-
Less: Gain of Foreign Exchange	-	(229,959,546.05)	-
<b>Cash flows from operation before working capital changes</b>	<b>3,764,123,136.68</b>	<b>3,581,158,774.04</b>	<b>3,816,517,605.68</b>
<b><u>Adjustment for working capital:</u></b>			
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)
<b>Cash generation from operations</b>	<b>3,062,360,321.11</b>	<b>3,144,955,923.04</b>	<b>3,656,517,066.49</b>
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)	-	-
<b>Cash generation before extra-ordinary item</b>	<b>2,545,565,879.22</b>	<b>2,556,652,684.00</b>	<b>2,484,760,147.06</b>
Extra-ordinary Income	-	96,482,185.00	-
<b>(A)Net Cash from Operating Activities</b>	<b>2,545,565,879.22</b>	<b>2,653,134,869.00</b>	<b>2,484,760,147.06</b>

Source:- Auditors' Report of NEA

The above table 4.29 (a) presents the cash flow from operating activities from F/Y 2059/60 to 2060/61 and table 4.29 (b) presents the cash flow from operating activities from F/Y 2061/62 to 2063/64. The amount of depreciation on fixed asset is in increasing position till F/Y 2061/62 while it has gone down during F/Y 2062/63 and once again it has climbed up during F/Y 2063/64. 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 2060/61. Provision for gratuity and pension has increased during F/Y 2060/61 while it has decreased in other F/Y of research period. Moreover it is nil during F/Y 2062/63 and 2063/64. Loss on fixed asset is only seen during F/Y 2060/61. 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 2060/61 and 2061/62.

Provision for inventories is only in F/Y 2060/61 and 2062/63 while it is also nil during other F/Y. Provision for Capital Work in Progress (CWIP) during F/Y 2060/61 is Rs.60,186,000 and during F/Y 2061/62 is Rs.80,340,000 while there is no provision for it other fiscal years. During F/Y 2059/60, 2061/62, and 2063/64 NEA has bared a loss of Rs.271, 647,306.43, 59,152,513.26 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 2062/63. Contingency reserve is only in F/Y 2061/62 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 2063/64 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 2058/59. 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 2062/63 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 2059/60, 2060/61, 2061/62, 2062/63, 2063/64 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 2063/64. Current Liabilities has increased during F/Y 2060/61, 2061/62, 2062/63 and 2063/64 while it has decreased during F/Y 2059/60 and 2061/62. Inter Unit Balance has increased during F/Y 2060/61, 2062/63 and 2063/64 while it has decreased during other fiscal years. Cash generation from operation is very high during F/Y 2060/61 and very low during F/Y 2059/60. 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 2060/61 which is Rs.956, 789.97 but nil during F/Y 2063/64. Payment on bonus is decreasing till F/Y 2061/62 but nil during 2062/63 and 2063/64. NEA has only paid property tax of Rs.228, 887.66 during F/Y 2059/60. Payment of reward to employees is only made during F/Y 2062/63. Extra-ordinary income is generated during F/Y 2059/60 and 2062/63 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 2059/60 while it is positively increasing from F/Y 2060/61 to F/Y 2062/63 and slightly declined during F/Y 2063/64 but not negative.

The table 4.30 presents the whole cash flow statement of NEA from F/Y 2059/60 to 2063/64. The net cash flow from operating activities during F/Y 2059/60 is negative while it has positively increased during F/Y 2060/61 till F/Y 2062/63 and has slightly decreased during F/Y 2063/64.

Analysis of cash flow from investing activities shows that the interest on deposits has concentrated in between Rs.54, 076,938.25 to Rs.35, 499,889.11 during the study period. Addition to fixed assets is very high during F/Y 2059/60 i.e.Rs.24, 251,799,255.68 and low during F/Y 2060/61 which is Rs.857, 647,593.68 with respect to other fiscal years of study period. There are no investments made by NEA on sales of fixed assets during F/Y 2060/61, 2061/62, and 2062/63, while it amounted to Rs.1,856,558.53 and Rs.20,000,000 during F/Y 2059/60 and 2063/64 respectively. Addition to CWIP during F/Y 2059/60 achieved by Re. 18,802,629,574.88 while in all other F/Y heavy investment has been made. The highest investment is made during F/Y 2063/64 which is Rs.5, 931,151,879.73. Addition to investment reached to Rs.100, 000,000 during F/Y 2061/62 and then decreased to Rs.62, 861,819.89 during F/Y 2063/64 but did not go below F/Y 2059/60. There is no addition to deferred revenue expenditure during F/Y 2062/63 while the figure is very high during F/Y 2059/60. The lowest figure among the study period is Rs.1, 44,767.42 which is during the F/Y 2060/61.

After the adjustment of all items of investment activities, it can be concluded that the cash flow from investment activities in F/Y 2062/63 is high, followed by F/Y 2063/64. The figure ranged in between Rs.4, 750,098,791.91 to Rs.7, 976,612,199.87.

The Cash flow from financing activities the analytical figure of increase in share capital, increase (decrease) in share allotment suspense A/C, increase (decrease) in foreign exchange reserve, increase (decrease) in general reserve, increase (decrease)

in capital reserve; consumer contribution, long-term borrowing, and prepayment of long-term loan.

There is no any increase in share capital except in F/Y 2062/63. The figure during F/Y 2062/63 is Rs.18, 000,000,000. Share allotment suspense A/C during F/Y 2062/63 has decreased by Rs.16,054,024,757.35 while in all other F/Y 2059/60 to 2063/64 has increased in-between the range of Rs.375,561,717.88 to Rs.2,951,293,549.28. Foreign exchange reserve is Rs.713, 493.87 during F/Y 2060/61 while it has decreased by same amount during F/Y 2060/61. There is no foreign exchange reserve at all in other study period. General reserve is only in F/Y 2063/64 which is decreased by Rs.53, 084.40.

Capital reserve on consumer contribution has decrease during F/Y 2059/60, 2060/61, and 2062/63 while it has increased during F/Y 2061/62 and 2063/64. Similarly long-term borrowing has increased and repayment of long-term loan has decreased throughout the whole study period. The highest increase in tong-term borrowing is Rs.4, 809,400,242.56 during F/Y 2059/60 and the highest decrease in repayment of long-term loan is figured out during F/Y 2063/64 which is Rs.974, 081,145.61.

In conclusion, the net cash flow from financing activities is in decreasing trend till F/Y 2061/62. It increased during F/Y 2062/63 and once again slightly decreased during F/Y 2063/64.

The net change in cash or cash equivalents that is the sum total of A, B, and C is negative during F/Y 2059/60, 2061/62, and 2063/64 which is due to high amount of investment in investing activities while it is positive during F/Y 2060/61 and 2062/63.

Since the net change in cash in F/Y 2059/60, 2061/62, and 2063/64 are negative respectively, the cash and bank balance at the end of the year is less then the cash and bank balance at the beginning of the year. The figure of cash and bank balance at the end of the year are Rs.664, 618,062.97, 10,036,422,746.20 and 1,258,653,613.18 during F/Y 2059/60, 2061/62, and 2063/64 respectively. The figure of cash and bank balance at the end of the F/Y 2060/61 and 2062/63 is greater than at the beginning balance. This result is due to the positive net change in cash. In nutshell, the closing balance of cash indicates whether NEA has sufficient cash or not.

#### 4.12 Major Findings

The major finding of this research study is based on the analyses of available data which are pointed out as follows.

- a. 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 5.64 to 16 respectively.
- b. Achievement has not been met during the research period. The highest achievement in unit 96.46% during the fiscal year 2062/063 and achievement in amount is 99.92% during the fiscal year 2062/063.
- c. 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.
- d. 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.
- e. 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.
- f. 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.
- g. The 't' test distribution shows that there is no significant difference between budgeted sales and actual sales of NEA.
- h. 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.
- i. 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.



- j. 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).
- k. Analysis of Profit and loss shows that NEA is in loss during FY 2060/061 to 2063/2064, where the % of loss on total revenue is 15.08 to 52.10% respectively. It is on profit only in FY 2059/060 which is 2.88% profit on total sales.
- l. The regression line calculated by least square method shows loss even in next fiscal year 2064/065 which figures out to be 14362.5 million in rupees.
- m. 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%.
- n. The correlation coefficient between total revenue and profit/ (loss) is negative .i.e. -0.9852.
- o. The coefficient of determination between total revenue and profit / (loss) is 0.9706 (97.06%).
- p. The Probable Error between total revenue and profit/ (loss) is 0.0089.
- q. 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.
- r. The highest percent of power loss in total power available is 26.57% which is during the FY 2062/063.
- s. Findings on analysis of financial ratio:
  - i) The highest current ratio and quick ratio is 1.23 and 0.54 during the FY 2059/060 and 2060/2061 respectively, while the lowest current ratio and quick ratio is 0.64 and 0.38 respectively during the year 2063/064.
  - ii) The highest and the lowest debt to total capital ratio is 0.84 and 0.72 during the FY 2062/063 and 2059/2060 respectively.

- iii) 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.
- iv) The highest gross profit ratio, return on assets and return on capital employed is 51.44% in FY 2060/061, 2.04% in 2062/063 and 2.40% in 2063/064 respectively. The net ratio is in negative during the whole research period.
- t. Analyses of cash budget shows net surplus of 37336 thousand rupees during FY 2060/061 and 66820 thousands rupees during FY 2061/062 respectively. While the net deficit is seen during FY 2062/063 and 2063/064 by (994296) and (12, 96600) thousand rupees respectively.
- u. The cash flow statement shows; cash from operating activities is negative during the FY 2059/060. Cash flow from investment activities is negative throughout the research period but financial activities are positive, this positive figure in financial activities is due to huge amount of borrowing.

## CHAPTER -V

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1. Summary

Planning is the essence of management. Without it we can not imagine efficient management. Management planning provides the basis for performance. In NEA revenue result from the sales of electricity which is measured by charges made to customers. Revenue is influenced by both internal and external factors. Most of the corporate planning process starts from revenue planning which co-ordinates the effort of revenue department, production department and all other departments. Many factors should be considered for revenue planning including revenue trends limitations of supply, potential competitors and general level of economy.

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 issue. It is no doubt, very difficult to point out as to how cash is needed by a particular company, but it is very essential to analyze and find out the solution to make an efficient use of funds for minimizing the risk of loss to attain profit objectives.

Nepal Electricity Authority is the largest government undertaking PEs in Nepal with the highest capital investment assets and human resources, Government of Nepal established NEA for development of electricity as a major infrastructure requirement for development. It has undertaken all the responsibility of planning construction, operation and generation all over the country. The main objective of NEA is to provide nationwide low cost and reliable electricity resources to people and to relate the infrastructure for the development of the country as a whole. Though NEA's market is purely monopoly it is continuously facing problem of liquidity, transmission loss and under capitalization.

As per the nature of the study secondary data's are used with descriptive and analytical approach for this research study five years data from fiscal years 2059/060 to 2063/064 has been used. Data are tabulated as per the requirement of the study.

Statically tools like arithmetic mean, standard deviation, and coefficient, coefficient of determination, probable error of correlation, regression, graphs, diagrams and hypothesis testing have been used to analyze the data. Similarly a financial tool that is ratio analysis has also been used.

This study has been organized in five main chapters consisting of Introductions, Review of literature, Research methodology, Presentation and Analysis of Data and Summary, Conclusion and Recommendations.

## **5.2. Conclusions**

Having analyzed the over all revenue planning and cash management of NEA the following conclusion are drawn.

1. During the whole study period the actual sales achievement is lower than budgeted targets. This fact is realized due to ineffective implementation of budgeted.
2. 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.
3. 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.
4. NEA should get consistency between budgeted and achievement level, especially in some sector such as bulk supply and street light.
5. NEA' is having loss of power every year which is adversely affecting in revenue generation.
6. 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.
7. NEA has failed to make collection plans of next year on the basis of previous years' collection.
8. The due amount of account receivable denotes inefficiency of NEA's collection policy.

9. 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.
10. The relationship between budgeted sales and actual sales is positive. This shows that sales in the future will increases.
11. The statistical tools (C.V) show that the actual sales are highly fluctuating during the entire research period.
12. 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.
13. NEA has not exercised in preparing monthly budget which is extremely necessary for planning and controlling.
14. NEA has not prepared plan and programs for agricultural sectors consumption of electricity.
15. The current ratio and quick ratio is below its standard which shows solvency position of NEA is not satisfactory.
16. The fixed assets turnover ratio shows that NEA is not utilizing its fixed assets to increase sales effectively.
17. The net profit ratio is in negative during the research period which indicates that NEA is not in sound position.
18. Cash budget shows that NEA is not in net surplus during FY 2062/063 and 2063/064 which is due to inefficiency in management, mainly due to high operation cost, interest and capital expenditure.

### 5.3 Recommendations

1. NEA's planners must be properly trained for budgeting and cash management.
2. NEA should excise to prepare plans and programs for agriculture sector, which is capable of massive consumption of electricity.
3. NEA should make a keen effort to prepare monthly budget for sales revenue.
4. NEA is paying a huge amount as interest on long- term loan, which is not good for authority. So, it should emphasized internal financing to minimize such burden. Therefore NEA must restructure its capital structure and for this issue the shares and refund the debt.
5. 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.
6. 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.
7. NEA should forecast planned collection for next year on the basis of actual collection of previous year.
8. NEA should reduce its huge amount of fixed cost resulting from over staffing, fuel and other overheads.
9. 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.
10. 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.

11. To generate adequate sales and profit NEA should efficiently utilize its total resources (total assets); because it's total turnover ratio seems low.
12. 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.
13. 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

Budgeted Sales (X) (in Rs '00000')	Actual Sales (Y) In Rs '00000'	$x = (X - \bar{X})$	$x^2$	$y = (Y - \bar{Y})$	$y^2$	$xy$
11521.4	9687.65	-1302.93	1697637.01	-2351.352	5528856.23	3063656.47
12238.8	11237.5	-585.53	342845.381	-801.512	642421.486	469309.321
12825.7	11992.6	1.402	1.965604	-46.392	2152.21766	-65.041584
13275.4	13264.4	451.053	203448.809	1225.358	1501502.23	552701.402
14260.3	14012.9	1436.009	2062121.85	1973.898	3896273.31	2834535.29
$\sum X = 64121.7$	$\sum Y = 60195$	$\sum x = 0$	$\sum x^2 = 4306055.01$	$\sum y = 0$	$\sum y^2 = 11571205.5$	$\sum xy = 69201$

achievements of NEA.

A) Budgeted Sales (X):

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

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

c. Coefficient of Variation

$$(C.V._x) = \frac{\dagger_x}{\bar{X}} \times 100 = \frac{928.01}{12824.33} \times 100 = 7.24\%$$

B) Actual Sales

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

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

c. Coefficient of

$$\text{Variation } (C.V._y) = \frac{\dagger_y}{\bar{Y}} \times 100 = \frac{1521.263}{12039.002} \times 100 = 12.63\%$$

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

We have,

$$\begin{aligned}
 & \text{Coefficient of Correlation (r)} \\
 & = \frac{\sum xy}{\sqrt{\sum x^2} \times \sqrt{\sum y^2}} = \frac{6920137.44}{\sqrt{4306055.01} \times \sqrt{11571205.5}} \\
 & = \frac{6920137.44}{2075.10 \times 3401.65} = 0.9804
 \end{aligned}$$

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

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

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

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

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



**Appendix 2**  
**Category-wise Achievement of Sales Units (%) of NEA**  
(Figure in million)

	2059/60			2060/61			2061/62			2062/63		
	Budget ed	Actual	Achiev ement %	Budget ed	Actual	Achiev ement %	Budget ed	Actual	Achiev ement %	Budget ed	Actual	Ac en
Domestic	600.00	557.94	92.99	648.60	617.11	95.19	689.40	676.37	98.11	750.00	730.83	97
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
Commercial	103.60	90.43	87.28	110.00	92.74	84.31	110.00	108.12	98.29	107.00	107.44	10
Industrial	605.00	596.68	98.62	660.00	629.51	95.38	677.90	689.80	101.76	725.00	763.77	10
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
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
Temporary Supply	0.90	0.28	31.33	0.50	0.35	69.60	0.29	0.25	86.55	0.35	0.39	11
Transport	6.50	5.64	86.69	7.00	5.53	79.00	7.20	5.47	75.99	7.00	5.72	81
Temple	2.80	2.48	88.43	2.80	2.81	100.39	2.98	4.11	137.95	4.50	4.20	93
Community Sales	0.50	5.72	1143.4	4.00	4.74	118.50	5.00	5.58	111.62	6.00	8.17	13
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

**Category-wise Achievement of Sales Ruppes (%) of NEA**

(In Rs. million)

	2059/60			2060/61			2061/62			2062/63	
	Budget ed	Actual	Achiev ement %	Budget ed	Actual	Achiev ement %	Budget ed	Actual	Achiev ement %	Budget ed	Actual
Domestic	4218.0	3641.4	86.33	4592.0	4249.8	92.55	4770.6	4578.9	95.98	5082.8	7987.0
Non Commercial	827.8	722.12	87.23	900.0	783.99	87.11	924.3	816.0	88.28	1058.9	862.4
Commercial	1046.4	818.75	78.25	1089.0	894.91	82.18	1089.0	986.0	90.55	999.7	1012.7
Industrial	4368.1	3608.1	82.60	4290.0	4039.6	94.16	4419.9	4380.2	99.10	4605.9	4799.7
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
Street Light	197.4	200.74	101.69	236.25	246.79	104.46	225.75	329.5	145.97	342.3	314.1
Temporary Supply	11.93	3.63	30.44	6.75	4.74	70.22	3.92	3.46	88.38	4.7	5.1
Transport	32.18	27.90	86.71	38.50	29.29	76.08	39.60	28.94	73.08	36.8	30.7
Temple	14.06	12.16	86.51	14.00	14.24	101.71	14.90	20.80	139.60	22.8	29.2
Community Sales	1.75	-	-	14.00	16.59	118.50	17.50	20.09	114.80	21.0	24.0
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

**Appendix 3 (a)**  
**Contribution of each Category in Sales Units**

	2059/60		2060/61		2061/62		2062/63	
	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
Non Commercial	78.22	5.09	80.74	4.75	83.01	4.62	91.34	4.76
Commercial	90.43	5.89	92.74	5.50	108.12	6.02	107.44	5.60
Industrial	96.68	38.89	629.50	37.10	689.80	38.42	763.77	39.81
Water Supply & Irrigation	29.28	1.91	29.98	1.76	31.67	1.76	36.12	1.88
Street Light	39.52	2.57	45.80	2.70	55.20	3.07	57.84	3.01
Temporary Supply	0.28	0.02	0.35	0.02	0.25	0.01	0.39	0.02
Transport	5.64	0.36	5.53	0.33	5.47	0.30	5.72	0.30
Temple	2.48	0.16	2.81	0.17	4.11	0.23	4.20	0.22
Community Sales	5.27	0.37	4.74	0.28	5.58	0.31	8.17	0.42
Bulk Supply (India)	133.86	8.72	192.24	11.32	141.24	7.57	112.53	5.87
<b>Total</b>	<b>1534.31</b>	<b>100</b>	<b>1696.82</b>	<b>100</b>	<b>1795.23</b>	<b>100</b>	<b>1918.35</b>	<b>100</b>

**Appendix 3 (b)**  
**Contribution of each Category on Sales Revenue**

	2059/60		2060/61		2061/62		2062/63	
	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
Non Commercial	722.12	7.45	783.99	6.98	816.01	6.80	862.37	6.69
Commercial	818.75	8.45	894.91	7.96	986.07	8.22	1012.66	7.86
Industrial	3608.13	37.24	4039.65	35.95	4380.22	36.52	4799.74	37.25
Water Supply & Irrigation	138.68	1.43	148.53	1.32	154.80	1.29	211.57	1.64
Street Light	200.74	2.07	246.79	2.20	329.52	2.75	314.11	2.44
Temporary Supply	3.63	0.04	4.74	0.04	3.46	0.03	5.06	0.04
Transport	27.90	0.29	29.29	0.26	28.94	0.24	30.72	0.24
Temple	12.16	0.13	14.24	0.13	20.80	0.17	29.17	0.23
Community Sales	-	-	16.59	0.15	20.09	0.17	24.04	0.18
Bulk Supply (India)	514.12	5.31	808.96	7.20	673.69	5.62	609.51	4.73
<b>Total</b>	<b>9687.65</b>	<b>100</b>	<b>11237.49</b>	<b>100</b>	<b>11992.61</b>	<b>100</b>	<b>12885.97</b>	<b>100</b>

**Appendix 4**  
**Contribution of each Category in Sales Units**

	2059/60		2060/61		2061/62		2062/63	
	Actual Consumer	Contribution %	Actual Consumer	Contribution %	Actual Consumer	Contribution %	Actual Consumer	Contribution %
Domestic	848540	95.93	930554	95.87	1010719	95.90	1113740	96.00
Non Commercial	8629	0.98	9722	1.002	9865	0.94	9950	0.88
Commercial	3898	0.44	5317	0.55	5454	0.52	6000	0.51
Industrial	18789	2.12	19833	2.04	21374	2.03	22500	1.98
Water Supply	251	0.03	305	0.03	352	0.03	370	0.03
Irrigation	1353	0.15	1721	0.177	2557	0.24	3400	0.22
Street Light	1048	0.12	1229	0.127	1437	0.14	1500	0.13
Temporary Supply	172	0.019	138	0.014	150	0.014	155	0.014
Transport	49	0.006	48	0.005	48	0.005	50	0.005
Temple	1800	0.203	1738	0.18	1959	0.186	2150	0.19
Community Sales	1	0.0001	1	0.0001	15	0.0014	35	0.0014
Bulk Supply (India)	5	0.0006	5	0.0005	5	0.0005	5	0.0005
<b>Total</b>	<b>884535</b>	<b>100</b>	<b>970611</b>	<b>100</b>	<b>1053935</b>	<b>100</b>	<b>1159855</b>	<b>100</b>

## Appendix 5

### 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'.

Total Revenue (X) (In Rs '000000')	Profit (Y) (In Rs '000000')	$x = (X - \bar{X})$	$y = (Y - \bar{Y})$	$x^2$	$y^2$	$xy$
9687.65	278.9	-2351.35	3678.86	5528856.228	13534010.9	-86
11237.49	-1694.9	-801.512	1705.06	642421.486	2907229.6	-13
11992.61	-3475.2	-46.392	-75.24	2152.218	5661.058	
13264.36	-4808	1225.358	-1408.04	1501502.228	1982576.6	-17
14012.90	-7300.6	1973.898	-3900.64	3896273.314	15214992.4	-76
$\sum X = 60195.01$	$\sum Y = -16999.8$	$\sum x = 0$	$\sum y = 0$	$\sum x^2 = 11571205.47$	$\sum y^2 = 33644470.6$	$\sum xy = -19$

A) Total Revenue (X):

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

b. Standard

$$\text{Deviation}(\dagger_x) = \sqrt{\frac{\sum x^2}{n}} = \sqrt{\frac{11571205.47}{5}} = 1521.263$$

c. Coefficient of Variation

$$(C.V._x) = \frac{\dagger_x}{\bar{X}} \times 100 = \frac{1521.263}{12039.002} \times 100 = 12.64 \%$$

B) Profit (Y):

a. Arithmetic Mean  $(\bar{Y}) = \frac{\sum Y}{n} = \frac{-16999.8}{5} = -3399.96$

b. Standard Deviation  $(\dagger_y) = \sqrt{\frac{\sum y^2}{n}} = \sqrt{\frac{33644470.61}{5}} = 2594.01$

c. Coefficient of

$$\text{Variation (C.V.}_y) = \frac{\dagger_y}{\bar{Y}} \times 100 = \frac{2594.01}{-3399.96} \times 100 = 76.29\%$$

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

We have,

$$\begin{aligned} & \text{Coefficient of Correlation (r}_{xy}) \\ &= \frac{\sum xy}{\sqrt{\sum x^2} \times \sqrt{\sum y^2}} = \frac{-19438248.91}{\sqrt{11571205.47} \times \sqrt{33644470.61}} \end{aligned}$$

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

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

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

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

## Appendix 6

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'.

<b>Total Power Available (X) (In GhW)</b>	<b>Power Loss (Y) (In GhW)</b>	$x = (X - \bar{X})$	$y = (Y - \bar{Y})$	$x^2$	$y^2$	$xy$
<b>2066.33</b>	<b>507.42</b>	<b>-360.07</b>	<b>-97.91</b>	<b>129650.40</b>	<b>9586.37</b>	<b>36007.00</b>
<b>2261.13</b>	<b>541.97</b>	<b>-165.27</b>	<b>-63.36</b>	<b>27314.17</b>	<b>4014.49</b>	<b>10580.00</b>
<b>2380.89</b>	<b>556.79</b>	<b>-45.51</b>	<b>-48.54</b>	<b>2071.16</b>	<b>2356.13</b>	<b>2200.00</b>
<b>2642.75</b>	<b>702.15</b>	<b>216.35</b>	<b>96.82</b>	<b>46807.32</b>	<b>9374.11</b>	<b>46800.00</b>
<b>2780.92</b>	<b>718.30</b>	<b>354.52</b>	<b>112.97</b>	<b>125684.43</b>	<b>12762.22</b>	<b>40000.00</b>
<b><math>\sum X = 12132.02</math></b>	<b><math>\sum Y = 3026.63</math></b>	<b><math>\sum x = 0</math></b>	<b><math>\sum y = 0</math></b>	<b><math>\sum x^2 = 331527.48</math></b>	<b><math>\sum y^2 = 38093.32</math></b>	<b><math>\sum xy = 108000.00</math></b>



A) Total Power Available (X):

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

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

c. Coefficient of Variation

$$(C.V._x) = \frac{\dagger_x}{\bar{X}} \times 100 = \frac{257.50}{2426.40} \times 100 = 10.61\%$$

B) Power Loss (Y):

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

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

c. Coefficient of

Variation  $(C.V._y) = \frac{\dagger_y}{\bar{Y}} \times 100 = \frac{87.28}{605.33} \times 100 = 14.42\%$

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  $(r^2) = (0.9633)^2 = 0.9279 = 92.79\%$