CHAPTER I

INTRODUCTION

1.1 Background of the study

Biodiversity and hydro energy provide great promise for the economic prosperity of the country. Hydropower is a vital input needed to fuel the engine of economic growth and to fulfill the basic needs of the entire population of a country.

Hydropower is the most critical input for raising the quality of life around us. This input can be fed into sectors of agricultural, industrial production, telecommunication, telemedicine etc. For a country like ours it definitely makes a lot of impact for our overall development. This saying can also be emphasised from the government statements that power development should be emphasised and made the priority of the state.

Hydropower projects in Nepal have been deemed to be expensive primarily because of the fact that the cost of access roads and power evacuation transmission lines are added on to the hydropower projects. If the government, donor agencies, and multilateral lending agencies focus more on road construction and transmission line development, the capital burden on private developers as well as government undertakings can be reduced.

An intensive study over the years of various projects in Nepal shows private-public partnership is a must. Private developers are taking great strides to achieve what was virtually considered an impossible in the past.

1.1.1 Hydropower of Nepal: It's potential

Several private and public organizations are trying to tap into the huge water potential of the country. As new data are being released by various intellectuals in this field, the latest baffling data is that Nepal can produce up to 200,000 MW. This potential can only be harnessed or the shortage of demand through which our country is reeling at present can only be overcome by public-private partnership. Even after having such a humungous potential in hydropower only 40 % of the population have access to electricity including 33 % provided by NEA, 7% from alternative source of energy. With the load factor of 52%, this translates into 1500kWh per capita of electricity for the present population. If the potential is fully exploited and sold at an average rate of 6 cents per kWh, the resulting tune of the revenue earned per annum would be 23 million USD. (Source Vidyut, Vol. 2, 2062)

National Water plan has envisage generating 2100 MW by 2017, 4000 MW by 2027 which will result in economic growth of 6 %. Even then, it is estimated that the electricity accounts for a very small share of the total energy consumption in the country. On the other hand there are excellent prospects for power exports of significant volume of electricity from Nepal to India. This time is right to explore the possibilities and invest in it. There will also be significant markets for domestic consumption of electricity with economic growth and business and industrial expansion.

The range of the project for FDI in Nepal right now in terms of generation capacity and or the size of investment are very large hydropower projects. Thus there is a wide range of investment opportunities.

1.2 Focus of the study

Evaluation of private organization financial performances enables us to evaluate various factors governing the sustainability of the companies. This can impact these companies in their future plan and policy decision making process and also overcome weaknesses in their future endeavors. This detail study of the topic mentioned could also impact individuals and corporate organization by providing them insight into the performance. Basically this research work is concerned with the financial performance evaluation of selected to hydropower companies.

1.3 Statement of the problem

The sole leader in the country's power sector regarding construction, owning and operating is a public enterprise known as Nepal Electricity Authority. Private sectors are also making their presence felt in this sector though in smaller scale, their efforts are highly applaudable given the present circumstances. These private power developing companies have their own human resources, capital mix, management, employees and assets.

To sustain the private sector, it needs enough income for its shareholders and employee. By keeping other factors constant income can be increased by better performance which increases efficiency and effectiveness of human and non-human production factors.

The companies under scrutiny in this report are BPC and NHPC. The outcome of the findings would be the present financial scenario of these companies is good, better or worse.

Finance is an integral part of business. Business cannot be operated without finance. A proper finance can well execute the development, management of a hydropower project. Thus, the topic under review will put emphasis on this. Other questions that would also be answered by this report would be the financial positions of the companies, their financial ratios status, contemporary steps to performance improvement, stakeholders benefits, future investment after the evaluation of the project.

PPA rate provided by NEA is low so private sector are not interested to invest in hydro project in this scenario this study is going to see how private sector are financially capable to run the hydro project.

1.3 Objectives of the study

The study basically aims to evaluate the financial performance of Butwal Power Company Limited (BPCL) and National Hydro Power Company Limited (NHPC) and to suggest specific recommendation based upon the specific objectives of the study. The objectives will be:-

- To see the financial performances of NHPC and BPCL and ascertain comparative conclusions through financial evaluation taking relevant variables.
- To ascertain present trend of performance in hydropower sectors.
- To provide necessary suggestions on the basis of study findings.

1.4 Significance of the study

Financial statement provides vital information for decision making process of business enterprise. At regular period private and public enterprise prepares financial statements. These financial statements provide in depth knowledge of financial status of an organization. These financial performance indicators provide information for future companies and budding entrepreneurs with the knowledge of different financial parameters.

1.5 Limitations of the study

The main purpose of this study is to conduct a crucial research on the financial performance evaluation of private public hydropower sector for the partial fulfillment of MBS degree. There are some limitations as mentioned below:

- This study is being conducted on the previous years of 5 years.
- The secondary data is basic input of the study and thus accuracy of conclusions derived from them highly depends upon the reliability of these data.
- The study is mainly concerned with NHPC and BPCL out of various hydropower companies in study and suggestions offered may not be applicable to any other private or public hydropower companies.

1.6 Organization of the study

The aim of this dissertation is to explain the financial position of Nepalese private or public hydropower companies. Here NHPC and BPCL are being considered. The major chapters of the study are as follows:

Chapter one: Introduction

This chapter will contain a brief overview of hydropower potentials in our country, development overview, and brief account of various private and public hydropower companies. Chosen hydropower companies would be detailed. This chapter includes background, statement of problems, objectives of the study, significance, focus of study, limitation of the study and organization of the study.

Chapter Two: Review of Literature

The second chapter deals with the received of literature, which consists of conceptual framework and review of relevant studies.

Chapter Three: Research Methodology

This chapter is concerned with the research methodology used in this study. It consists of research design, sources of data, population and sample and method of analysis.

Chapter Four: Data presentation and analysis

This chapter contains presentation and analysis of data

Chapter Five: Summary, conclusions and recommendations

This chapter is associated with the summary, conclusion and recommendations.

1.6 Conclusion

As per analysis and interpretation of data I hope to achieve my purpose of study. This study would enable me to better understand the financial aspect of the companies.

CHAPTER II

REVIEW OF LITERATURE

2.1. Theoretical Framework

The review of literature is a fundamental part of planning of the study. The main purpose of literature review is to find out what works have been done in the area of the research problem and what have been done in the area of the research problem and what have to be done in the field of the research study being undertaken. Every search requires a clear cut idea on the problem of study and its solution, which emerges from the review of literature. "Scientific research must be based on post knowledge. The previous studies cannot be ignored because they provide the foundation of the present study".

This chapter reviews the available literature relating to Nepal electricity authority and view expressed by various scholars and researchers on the profitability and financial performance of public enterprises. So far as analysis of financial performance in the context of Nepalese enterprises is concerned, some studies have been undertaken by the management experts and students describing the financial performance of public enterprises.

Power plays significant role in the sustainable development of an economy that drives society towards the path of modernization. Nepal being one of the rich countries in hydropower sector, many important literatures are available in this field.

Some of the notable literatures relevant to the study are reviewed in this study to identify the relevance of the present study.

2.1.1. Conceptual Framework

2.1.1.1 Financial Analysis

Financial analysis is designed to determine the relative strengths and weakness of a company, whether the company is financially sound and profitable relative to other companies in its industry and whether its position is improving or deteriorating over time. Investors need such information in order to estimate future cash flows from the company and to evaluate the riskiness of these flows. Managers need to be aware of their company's financial positions in order to detect potential problems and to strengthen weakness (Weston & Brigham, 1987:259)

Financial analysis is the key tool for financial decision and starting point for making plan before using sophisticated forecasting and budgeting procedures. The value of this approach is the quantitative relation that can be used to diagnose strengths and weakness in a company's performance. Financial performance is the main indicator of the success or failure of a company and the focus of financial statements and significant relationship that exists between them (Khan & Jain, 1999:4.1).

Financial performance analysis involves the use of various financial statements. The financial statements contain summarized information of a company's financial affairs, organized systematically by the top management. These statements are used by investors and financial analysis to examine the company's performance in order to make investment decision (Pandey, 1999:29.30).

Financial statements are prepared from the accounting records maintained by the company. They disclose financial information of a company during a financial year and explain what has actually happened and divided over the past few years, in the form of income statement and balance sheet.

2.1.1.2. Financial Statements

The financial statements contain summarized information organized systematically of the firm's financial affairs. Preparations of the financial statements are used by investors and financial analysts to examine the firm's performance in order to make investment decisions. Financial statement discloses financial information relating to any business concern during a financial year, which is presented in the form of income statement and balance sheet usually prepared at the end of each financial year.

Financial statement reports what has actually happened to earning and dividend over the past few years. Financial statements are prepared from the accounting records maintained by the enterprises. The basic objective of financial statements is to assist in decision making. Evidently comprise the income statement and balance sheet.

Income statement

The income statement presents a summary of revenues and expenses of a firm for the specific period, the period could be month, quarter, six months or a year depending on the time period for which revenues and expenses are summarized.

Balance sheet

The balance sheet or statement of financial position portrays the financial structure of the company in terms of its economic resources and respective interests or claims on such researches. A balance sheet shows the financial position of a company by detailing. The sources

of fund and the utilization of these funds properly classified and arranged in a specific manner. It communicates information about the assets and liabilities and owners, equity of company as on a specific date usually at the end of each financial year.

2.1.1.3 Tools of financial statement analysis

Analysis and interpretation of financial statement can be done through various techniques for analyzing comparative financial statement fund flow; ratio analysis and rest of hypothesis are widely used.

2.1.1.3.1 Comparative Financial Statement

Comparative financial statements are statements of the financial position of a business so designed as to provide time prospective to the consideration of various elements of financial positions of embodied in such statements. The focus of the financial analysis is on key figures contained in the financial statements and significant relationship that exists between them. (Khan & Jain 1992)

Financial analysis may be of two type's viz. vertical analysis and horizontal analysis. Financial statement like a balance sheet or profit and loss account, of a certain period of the business at a point of time is known as vertical analysis. It is also known as state analysis.

In horizontal analysis, a series of statement relating to number of years are reviewed and analyzed. It is also known as dynamic analysis because it measures the change position or trend of the business over a number of years. This study is based on horizontal analysis. The balance sheets and income statement which is alone are prepared in a comparative form because they are most important statements of financial position.

2.1.1.3.2 Comparative Balance Sheet

Balance sheet is the statement prepared at the end of each financial year to reflect the position of assets, liabilities and capital. Increase and decrease in various assets and liabilities as well as proprieties equity or capital brought, about by the conduct of a business can be absorbed by a comparison of the balance sheet at the beginning and end of the period, such observation after yield considerable information which is valuable in forming an opinion regarding the progress of the enterprises and to facilitate comparison, a single device known as the comparative balance sheet may be used.

Comparative balance sheet is the tool of financial statement analysis. Balance sheets of at least two years are compared and the changes between data are indicated in absolute amount as well as in percentage increase or decrease. Thus it may be defined as the study of the same item, group of items and computed two or more balance sheet of the same

business enterprises on different dates and the study of the same item, group of items and computed two or more balance sheet of the same business enterprises on different dates and the study of the defined of proportion computed from these figure on te different dates. Main advantage of this analysis is that it describes of particular nature of business enterprises and of the enterprises as a whole.

2.1.1.3.3 Comparative Income Statement

The income statement is the summary of revenue and expenses showing net income or loss of any firms. Profit and loss account or income statement shows the profitability of a firm. The statement helps in deriving meaningful conclusions as it si very easy to ascertain the change in sales volume, administrative expenses, selling and distribution expenses, cost of sales etc (Jain & Narang, 1998:12)

Comparative income statement shows the operating result for number of accounting periods so that changes in absolute data from one period to another period may be stated in terms of absolute change or in terms of percentage. It contains the same column as the comparative balance sheet and provides the same type of information, the amount balance, increase and decrease in money amounts and the percent of increase or decrease. It is the tool of financial statement analysis which compares at least two years figures in terms of rupees and percentage.

2.1.1.3.4 Fund flow analysis

The statement of change in financial position prepared to determine only the sources and uses of fund between two dates of balance sheet is known as funds flow statement. It is prepared to summarize the change in assets and liabilities resulting from financial and investment transactions during the period as well as these change occurred due to change in owner's equity. It is also aimed to depict the way in which the company used its financial resources during the period. (Pandey, 1999:64)

The methods of preparing funds flow statement depends essentially on the sense in which the term fund is used. There are three concept of fund: cash concept, total resource concept and working capital concept, the word fund is synonymous with cash whereas total resource concept represents the total assets and resources as fund. And under working capital concept, the term fund refers only to working capital.

However, the concept of fund as working capital has gained wide acceptance as compared to other concepts. Therefore, when conducting funds flow analysis, any transaction that increases the amount of working capital is taken as source of fund whereas transaction that decreases working capital is treated as application. But any transaction that affects current assets or current liabilities however not changing in working capital is not taken as source or use.

The utility of this technique stems from the fact that it enables shareholders creditors and interested parties to evaluate the used funds and to determine how these uses were financed. In the light of information supplied by funds flow statements outsiders can decide whether or not to invest in the company. It enables financial exports to detect the imbalance in the use of funds and undertake remedial measures. It is also helpful to the financial pattern of a company.

2.1.1.3.5 Ratio Analysis

Powerful and most widely used tool of financial analysis is ratio analysis. A financial analysis is the relationship between two accounting figures, expressed mathematically or the term ratio refers to the numerical or quantitative relationship between two items/ variables.

This type of relationship can be expressed as percentage, fraction and proportion of numbers.

Ratio analysis is defined as the systematic uses of ratio to interpret the financial statements so that the strengths and weakness of a firm as well as its historical performance and current financial condition can be determined. (Khan and Jain, 2003; 80)

Ratio analysis is a powerful tool of financial analysis. A ratio is defined as "the indicated quotient of two mathematical expressions" and as the relationship between two or more things. In financial analysis, a ratio is used as a benchmark for evaluating the financial position and performance of a firm. The absolute accounting figures reported in the financial statements do not provide a meaningful understanding of the performance and financial position of a firm. (Pandey, 1999:19)

i) Liquidity ratio

Liquidity ratios are used to judge a firm's ability to meet short-term obligations. From them, much insight can be obtained in to the present cash solvency of a company and its ability to remain solvent of adversities. Essentially, we wish to compare short term obligations with the short-term resources available to meet these obligations. (Van Horne, 2004:351)

Liquidity ratios measure the ability of the firm to meet its current obligation. In fact analysis of liquidity needs the preparation of cash budgets and cash and flow statements, but liquidity ratios by establishing a relationship between cash and other current assets to current obligations, provide a quick measure of liquidity. (Pandey, 1999:115)

So liquidity ratios are used to measure the ability of a firm to meet its short term obligations and from them the present cash solvency as well as ability to remain solvent in the event adversities of the same can be examined. A very high degree of liquidity means resources of a firm is unnecessarily being tied up as idle assets in current assets, which is earning nothing. The important liquidity ratios are:

a) Current Ratio
b) Quick Ratio
c)

ii) Activity Ratio

Activity ratio is concerned with measuring the efficiency in asset management and used to judge how effectively the firm is using its resources. In this sense, these ratios are also called efficiency ratios or asset utilization/management ratios. Besides, such ratios are called turnover ratios because they indicate the speed with which assets are being converted or turned over into sales. The greater the rate of turnover or conversion, the more efficient the utilization\management if other thing being equal. (Khan and Jain, 2003:140)

a. Debtors Turnover Ratio
b. Total Assets Turnover Ratio
c. Average Collection Period

iii) Leverage Ratio\Capital Structure Ratio

The leverage or capital structure ratios may be defined as financial ratios which throw light on the long term solvency of a firm as reflected in its ability assure the long-term endives with regard to (i) periodic payment of interest during the period of the loan and (ii) repayment of principal of maturity or in predetermined installments at due dates. (Khan and Jain, 1999:4.10)

Leverage ratios may be calculated from balance sheet items determines the proportion of debt in total financing. Many variations of these ratios exist: but all these ratios indicate the same thing – the extent to which the firm has relied on debt in financing assets. Leverage ratios are also computed from the profit and loss items by determining the extent to which operating profits are sufficient to cover the fixed charges. (Pandey, 1999:118)

Leverage ratios are calculated to measure long term financial position/solvency of firm.

The leverage ratios are as follows:

a. Debt to Equity Ratio
b. Debt to Total Capital Ratio
c. Coverage Ratio

iv) Profitability Ratio

Profitability is a measure of operating efficiency that can be measured by profitability ratio. It indicates degree of success in achieving desired profit levels, measure management's overall effectiveness as shown by the return generated on sales and investment. These ratios are composed of "A group of ratio showing the combined effects of liquidity, asset management and debt management on operating result". (Weston and Brigham, 1987:145)

So such ratios are regarded as a central measure of the earning power and operating efficiency of a firm. These groups of ratios consist of many ratios. They are as follows:-

a) Gross Profit Margin
b) Net Profit Margin
c) Return on Total Asset
d) Return on Capital
e) Return on Shareholder's Equity

Hydropower Potential in Nepal

Based on an average rainfall of about 1400 mm, 174 billion cubic meters of water per year is assumed to be surface run-off from Nepal. There are about 6000 big and small rivers of three main river systems namely Gandaki, Koshi and Karnali and two border rivers Mechi to the east and Mahakali to the west. Due to the high concentration and intensity of perception during the monsoon period, about 72% of the total run off is instantaneous, while the rest is conserved as snow and ground water which drains into the rivers during the dry season. All the major river basins except those of the southern rivers originate from the Himalaya or the Tibetan plateau. The total run off per year from Nepal, including run off from Tibetan catchments is estimated to be about 200 billion cubic meters. Based on the estimation, there exists a theoretical of 83000 MW and economically viable potential about 42000 MW in the present context. (Source: Vidyut; vol. 2, Falgun 2058)

Hydropower development and classification

Although the hydropower has been generated in Nepal since the construction of the Pharping hydropower plant way back in 1911, expansion of hydropower plants come into operation after long intervals of 25 and 29 years. As the demand of electricity increased mainly onwards from 60s bigger hydropower plants were constructed.

In ten years period from 1965 to 1975 the installed capacity of hydropower increased almost 20 times.

Establishment of small hydel development board in 1975 to electrify remote lying district centers through isolated small scale hydropower projects led to categorization of hydropower plants in Nepal as follows:-

- Mini-micro hydropower - < 100 kW
- Small hydropower – 100 kW to 5000 kW
- Medium hydropower – 5000 kW to 300 MW
- Big hydropower - >300 MW

Presently, hydropower schemes are considered as small only if they have capacity between 100 kW and 10 MW. The objective of this classification is that min-micro hydropower plants are meant for isolated rural areas and grid connection, medium hydropower plants are envisaged for national demand of power and energy and large hydropower projects are planned for long term national demand and provision of export to neighboring countries.

I) Mini-micro hydropower

Mini-micro hydropower plants are popular and economical in scattered and isolated settlements in Nepal. There are number of agencies and institutions including NGOs and INGOs supporting in the implementation of mini-micro hydropower plants. Government of Nepal is providing subsidy up to 75 % for electromechanical equipment through ADB/N to interested developers of such schemes. Apart from ADB/N, Danish funded energy support Assistance Program (ESAP) and UNDPs rural energy development program (REDP), involved in implementation of mini-micro hydropower schemes in hilly areas of Nepal. There are about 30,000 traditional water mills and ADB/N has finished for more than 500 water turbines ranging from 5 to 20 kW, mostly of course flow type. Micro Hydropower plants have an average installed capacity of about 6 kW, with an average US$ 550 per kW about 90% of Nepalese population lives in

rural areas and only about three percent of rural population has access to electricity. These days portable type peltry sets also are popular in remote areas of Nepal that have capacity from few hundred watts to one kilowatt.

II) Small Hydropower

In 1975 government of Nepal established small hydel development board (SHDB) mainly to electricity the remote lying district centers through isolated small scale hydropower plants. Extension of Nepal grid system to these centers is not economically viable. Presently all 75 districts headquarters have been electrified either by the construction of isolated small hydropower plants or extension of national grid system. There are all together 48 (including private sector) small hydropower plants in Nepal and few of them have been connected to the national grid system and two isolated SHPs are under construction by NEA. Formation of NEA took place in 1985 by merging electricity department, electricity corporation and electricity development boards. After this development, the NEA has had been entrusted to carryout planning, survey, design, construction, operation and maintenance of electricity generation and distribution facilities throughout Nepal. Since then the activities of SHDB was handed over to small hydropower department with the jurisdiction of NEA. Apart from government of Nepal, internal resources, financing of SHPs was done through different international institutions and foreign governments like ADB, OPEC fund, UNCDF, Switzerland, Austria and Yugoslavia. But most of the SHPs located in the remote part of the country could not even the operation and maintenance cost that prompted leasing of eleven SHPs to interested private entrepreneurs.

III) Medium hydropower

All major hydropower interconnected to the national grid system fall in this category. The main objective of medium hydropower projects in Nepal is to satisfy the house demand for power and energy, primarily in those areas connected by the national grid system. Although studies of large hydropower projects and construction of medium size projects such as Marsyangdi Hydropower project were handled by the ministry of water resources in the past, the NEA now is solely responsible for planning, construction, operation and maintenance of the power sub-sectors.

Kaligandaki “A” hydropower project of 144 MW was completed by NEA. At present, middle Marsyangdi hydropower project 70 MW, Chamelia hydropower project 30 MW and Kulekhani III hydropower project 14 MW were constructed by NEA. Private sector also in engaged in the development of medium size hydropower development after concluding PPA with NEA. Private sector construction projects such as Khimti 60 MW, Bhotekoshi 36 MW, Chilime 20 MW and Jhimruk 12 MW. Operation and maintenance of existing plants, distribution of generated power, development of transmission system and study on medium sized and small hydropower projects are being executed by NEA.

IV) Large Hydropower

Nepal's power system at present is incapable to absorb electric energy from large hydropower projects. This type of projects can be considered only for the purpose of exporting electricity to neighboring countries India and China. Exporting electricity to China is a bit difficult due rough terrain of the Himalayas in the North. India is only viable option for export of electricity in the present context. Unless an agreement can be reached between Nepal and India to share benefits, such as expensive electricity, regulation of water for irrigation, flood control and navigation, there will be no potential for implementing these projects. Efforts are underway and official discourses are taking place regularly. But due to complex issues that are related with the whole gamut of water resources development, desirable result are not emerging as aspired by the people of both the countries.

The ministry of water resources has been conducting feasibility studies and field investigation for two large multipurpose projects, the Karnali multipurpose project (6480 MW). Other big project West Seti (750 MW) and UpperKarnali (300 MW) are in process of development by private sector. Upper Tamakoshi (309 MW) will be construct by NEA.

In 1974 memorandum of understanding had been signed between Government of Nepal and Snowy Mountain Corporation of Australia to developed West Seti project and recently another MOU have been signed between NEA and Ely see Fran tire Trust of France to develop Upper Karnali Project jointly. The purpose of these projects is to export electricity to neighboring countries, especially India. Some portion of generated power may fulfill long term national demand for power and energy. (Source: Vidyut; vol. 2, Falgun 2058)

2.2. Review of related studies

2.2.1. Review of related journals (Articles)

Hydropower development has always been vital issues for lots of Nepalese writers and journals. This section is devoted to the review of some major articles published in journals, reports, newspapers and articles concerning state and problems of hydropower development in the country and financial performance of private hydropower companies.

Mr. Prachar Pradhan (2064) in his article " *Challenges and issues on the domestic hydropower projects and prospective on export oriented hydropower projects*" has

written about hydropower potential, hydropower generation, existing status, power demand forecast by 2020 for domestic scenario and power generation expansion.

He said about hydropower potential of Nepal that, the Karnali and Mahakali river systems represents approximately 43 percent of Nepal theoretical hydropower potential and 55 percent of the technical/ economical potential.

Mr. Pradhan also mentioned that, now the total installed capacity in NEA integrated system is 615 MW including 152.613 MW hydro plants operated by the private sector and NEA's thermal power (diesel operated) of 55 MW. Although total hydropower capacity in the system is 556 MW, only about 452 MW can be generated from hydropower stations during the winter season when the power demand will be at its peak. During the time of power deflect; about 50 MW is imported from India as per the Indo-Nepal power exchange agreement. Nepal and India have agreed in principle to increase this level of exchange from 50 MW to 150 MW. Nepal is also entitled to 70 million units of energy annually from Tanakpur in the far west under the Mahakali Treaty. NEA continues to be sole purchase of independent power producer (IPP). Till date, twenty two PPA's totaling 228.840 MW have been concluded of which 152.613 MW have already been commissioned (as of July 2007). (VIDYUT: 2064 Bhadra)

Dr. Bekh B. Thapa and **Bharat B. Pradhan (1995)** said in an article "*Energy sector perspectives*" says that hydro power is Nepali's major resource endowment-numerous attractive run-off river and multipurpose hydro schemes have been identified but remain undeveloped, small and micro hydro potential remains virtually unused in the hill and mountain areas and despite Nepal's small sized, only about 10.50 % of the population have access to electricity supply, where as about 40% of domestic connections are concentrated in the Kathmandu valley.

Mr. Surya Nath Bastola (1994) in his book "*Water resources development of the highly mighty Himalayan Rivers*", has stated geographical and geological conditions of the country has given rise to such a river system in country. It surveys that some of the cheapest hydropower stations in the world can be developed in the country. Revealed by the up to date study, 15 million kW of hydropower potentiality is much greater compared to our power market, external inputs for industry, traction, rural electrification etc.

A report "*Nepal hydro power strategy and options*", prepare for **HMG/N** by **USA (1992)** the main points are that although the country is well endowed with great bio-mass and hydropower resources, recently the place of industrialization has been severely constrained by the lack of energy and power. Unless the power constraints are moved, much industrial growth cannot be achieved, even agricultural growth likely to be constrained due to lack of energy for lift, irrigation and processing of agricultural commodities.

Arjun P. Shrestha (1991) book on "*Hydro power in Nepal: Issues and concept of development*" has expressed that the major achievements in the economic development of Nepal could be realized through proper harvesting of the vast water resources. But a nearly 100 percent dependency on overseas professionals and a failure to gradually develop our own manpower prevents realization of this goal. The opportunities in hydropower development do not connote nearly approving new projects but also commitment to maintaining and optimizing the efficiency of existing hydropower plants. Such opportunities means institutional development in Nepal would be to open the door for privatization, where there would be a chance for development through competitor and decrease of bureaucratic control. As the development of hydropower in Nepal has always been dictated by many constraints and conditions, projects are selected by planning procedures, which is deliberately designed to produce a "no option" situation in decision making.

2.2.2. Review of related Acts/Plans

2.2.2.1. Hydropower development policy, 1992

Regarding different models of investors' participation for the hydropower development in Nepal, the government of Nepal has formulated the hydropower development policy 1992. In this policy, the GoN has declared as investment may be made for the projects relating to generation, transmission and distribution of hydroelectricity as follows:

- Sole or joint venture of one or more private national investors.
- Joint investors
- Joint venture of the government and one or more national or foreign investors.
- Hundred percent investments of one or more than one foreign investors.
- Joint venture of the national or foreign investors.

Hydropower development policy 1992 has made a provision of exemption of income tax to the newly established hydropower companies for certain years to inspire and facilitate them in the field of hydropower generation. In this regard, the provisions made by the hydropower development policy 1992 are as follows:-

An exemption of income tax shall be given to the projects of private sector generating and distributing electricity from the hydroelectric project up to the capacity of 1000 kW.

- Hydro electric project, constructed under to investment of private sector, producing more than 1000 kW shall be granted exemption from income tax for a period of fifteen years starting from the date of its commercial production.
- Any private entrepreneur, who constructs electric substation, and transmits by extending distribution lines be granted exemption from income tax for a period of ten years.

- If the private companies take on contract for purpose of operation, maintenance and management of the hydroelectric plant or transmission and distribution lines under the ownership of Nepal government, such companies shall be granted exemption from income tax for a period of 5 years.
- The income tax shall be less than ten percent of the corporate income tax which the government imposes from time to time.
- If the investor reinvests in the hydroelectric project in order to diversify the project or to expand its established capacity by twenty five percent or more, or to modernize the technology or to develop the subsidiary industry, such investor may deduct an amount of fifty percent of the new additional fixed asset, from the taxable income of such hydroelectric projects. Such deduction may be at a time or from time within three years.

2.2.2.2. Electricity development policy – 2058 (2001)

Government of Nepal envisaged achieving the following by 2007 in its "electricity development policy – 2058"

- A dominant private sector contributing 75 percent of total investment in hydropower
- Boosting of industrial consumption's by 125 percent
- Establishment of power development fund and infrastructure development banks
- Boosting of hydro capacity to meet a demand of 820 MW of which 70 MW to be exported
- Privatization of NEA

Electricity development policy – 2058 is imposed with the following objectives:-

- To utilize the existing water resources of the country and produce electricity at a low cost.
- To make the electricity service dependable, reliable and extend qualitative service within the whole kingdom at a reasonable rate.
- To tie up the electrification with the economic activities.
- To extend the rural electrification in order to support rural economic development.
- To develop hydropower as an exportable commodity.

"Electricity development policy – 2058" adopts the following policies to achieve above objectives:-

- Efforts shall be made to maximize the use of country's hydropower potential in order to meet the domestic demand of electricity.

- Construction and implementation of hydropower projects shall be encourage to promote on the principles of build own operate transfer (BOOT).
- For making the electricity service dependable, reliable and extension of qualitative service delivery within the kingdom at reasonable cost; the existing public sector institutions shall be restructured to promote the participation by creating competitive environment of community/corporations, institutions, local agencies and private sector in hydropower production, transmission and distribution.
- Small and medium hydropower projects shall be developed and promoted for domestic use in order to strengthen the situation of domestic power supply. The priority shall be given to develop hydropower projects on a competitive basis suitable to the electricity.
- The hydropower projects shall be identifies for export purpose. The private sector shall export the electricity by developing such projects.
- The major multipurpose storage projects shall be developed in a way to render the maximum downstream benefit to the country.
- The electrification program in the rural areas shall be encouraged.
- The rural electrification program shall be expanded in order to make the electricity services available to maximum people. A "Rural Electrification Fund" shall be established for this purpose.
- The rural electrification development program shall be based on mobilization of people's participation.
- To deliver reliable and dependable electricity services and make it easily available to consumers' proper attention shall be given to safeguard their interests.
- For supplying the electrical energy at a reasonable rate, the electricity tariff fixations process shall be made transparent and reasonable.
- The unauthorized leakage of electricity shall be controlled. For this purpose necessary technical measures shall be adopted and legal arrangements shall be formulated besides these measures, emphasis shall be given to mobilized people participation to control the leakages.
- Incentives shall be provided for the proper utilization of electrical energy. In this context, incentives shall be provided for the use of electrical energy for village water supply, irrigation, industry and tourism sectors when electricity demand is low (when supply is in excess of demand).
- The appropriate incentive provisions shall be made to attract national and foreign investment for the development of hydropower and transparent process shall be followed.
- Capital market shall be operated for investment in the electricity sector.
- The use of local labour and skill shall be given priority in implementing the hydropower projects.
- The industry producing the construction materials and equipments to be used in the electricity sector shall be encouraged to develop the industry.

- Proper arrangements shall be made to provide appropriate benefits at the local level while operating hydropower projects.
- The adverse effects on environmental shall be minimized caused due to the development and operation of hydropower projects and proper arrangements shall be made to resettle the displaced families.
- Hydropower shall be developed to replace the biomass and thermal energy in order to contribute towards environmental conservation.
- Regarding multipurpose projects, the government could become a partner with private sector looking at the responsibility of irrigation development.

2.3. Review of related thesis

Various research works have been carried out by MBS students in different aspects of banking, NEA and hydropower companies such as financial performance, fund management, cost volume profit analysis etc. studies and reviews on financial performance, fund management, cost volume profit analysis of other organization and their recommendation are relevant to this study. In this context, some reviewed previous thesis is as follows.

Shrestha (**1996**) on the topic "***Financing power development in Nepal: a case study of NEA***" points out that the power is a capital intensive sector for country like Nepal but there was no clear-cut policy for its development and its financing existed prior to the era of planned development. It was started in a planned way with the introduction of first five year Plan (1956-61). Power is a capital intensive sector, for country like Nepal, it is impossible to shoulder all the cost of investment. Therefore, she has been mobilizing foreign resources since the first Five Year Plan. The trend of financing in power development shows that the Nepalese government only covers about 15 to 25 percent of the total investment whereas 75 to 85 percent of investment is covered by foreign aid. The share of international loan is greater that the grant. The study also says that the main issues of financing in power development in Nepal are the shortage of capital, dependency on foreign aid, constraints in exporting power, risk of investment etc. frequent changes in the government policies and inadequate legal provision, geographical complexity, lack of trained manpower and modern technology are other constraints. According to the study, observing the power deficiency problem, it can be said that there is market within the country. But while analyzing the country's market with respect to the economically feasible power potentiality and with the large scale projects, the scarcity of the sizeable market is in front.

He also explains that the power distribution in different regions is unbalanced. About 13% power is accessible to the people is accessible to the people out of which only 2 % rural people have received its benefits. Similarly, about 50-60 percent power is consumed in Kathmandu valley. The growth demand of power is about 20% in the Kathmandu valley and about 10% outside the valley.

Luitel, (2004) conducted a research work "***Profit Planning and Control of Nepal Electricity Authority***" having the objective of analyzes the effectiveness of profit planning in NEA, study the various budgets used by authority, trend of profit and profit planning. He summarized the thesis that NEA has a challenge to operate in a manner that improves the key business processes; comprehensive profit planning and control or budgeting continuous to be prime importance in al organizations profit plans can be broadly divided in two groups as functional plan and financial plan. Functional plan includes sales plan, production plan, raw material plan, direct labor plan and expenses plan. Financial includes income statement and projected balance sheet. The [paramount consideration in today's age of global throat cut competition in business is profit. In this regard, NEA's profit planning system is appraised in this research. This research paper tried to examine that to what extent the authority is applying comprehensive profit planning system.

He also concludes that NEA does not systematically prepare the long term strategic plan as well as short tactical plan. It usually forecasts sales and refers it as budget such forecasts are made with the help of previous year forecast and systematic forecasting practice has not been applied. There is high relationship between actual production and planned production. Power losses are interesting year by year. Over the study period, the high electricity loss is situated in FY 059/060 i.e. 23.66%. NEA is unable to supply electricity power to the demand of customers because demand is increasing every year. The surge in consumers is increasing at whopping rate of 9.28 %.

He has recommended following recommendation for to improvement of NEA:-

1. NEA must have in depth analysis of its strength and weakness. It must try to overcome its weaknesses by using the strength keeping in mind the extremely dismal and widely fluctuating profitability position of NEA.
2. To increase the good financial position of the NEA, cost volume profit relationship, different ratio and cost of production must be considered while pricing of the electricity. CVP analysis helps to the management to make effective and scientific profit plan.
3. NEA's first responsibility is to control the losses of electricity but authority have not controlled it. So NEA should pay more attention to those policies which help to reduce shortage.
4. There should be proper coordination between individuals' goal needs and organizational goal needs.
5. NEA should have a efficient management system to have control over costs. It must maintain the fixed cost to minimum standard should leave the variable cost increase uncontrollably. It should apply standard costing system and should establish a cost control centre.

Amatya, (2005) conducted a research study on the title of "***An evaluation of financial performance of Nepal Electricity Authority***" has examined the financial strength and weakness of NEA based on its liquidity, activity, profitability and leverage ratios.

The main objective of her studies is as follows:-

- To analyze financial performance of NEA through financial analysis taking relevant variables.
- To identify major weakness and strengths of NEA.
- To find out the past and present challenges undergone by NEA.
- To provide some suggestions and recommendation based on the findings for the improvement of financial performance.

Major findings of her study were:-

- The current assets are not been used in the profitable manner, the excess of the current assets utilization has increased the opportunity loss.
- Long term as well as short term debt utilization has increased the opportunity loss.
- Long terms as well as short term debt utilization are also seen more irrational in the sense that their turnover ratio is not satisfactory.
- Capital employed according to profitability is not seemed to be reasonable as there is negative relationship between these variables.

Dahal, (2007) conducted a research study on the title of "***Cost-Volume profit Analysis of public enterprises and private company Ltd. (A comparative analysis between NEA and BPC)***".

He concerned with profit and cost analysis of NEA and Butwal Power Company Limited. He used secondary data of annual reports of their companies.

The main objectives of his study were as follows:

- To study and analyze existing position of costs of NEA and BPC Pvt. Ltd.
- To identify breakeven point of both enterprises for avoiding losses.
- To compare and analyze P/V ratio, BEP and volume of these enterprises.
- To examine problems being faced by these two enterprises and recommend for solving these problems on the basis of study results.

Major findings of his study were:

- Sales of BPC are increasing every year in fluctuating rate while sales has increased in lower rate than BPC for NEA. BPC forecasted sales for FY 2064/65 is Rs. 575.73 million and forecasted sales for NEA for FY

2064/65 is Rs. 14518.6 million. The sales plan of both BPC and NEA are not systematic. So it is difficult to achieve their target of increasing operating income.

- Variable cost of BPC is less compare to its fixed cost. Contribution margin ratio of NEA is very less while it is satisfactory in case of BPC.
- BPC running in profit while NEA is suffering from loss. BPC has earned reliable profit and has made it able to stand as one of the most successful enterprise of the country. In other hand, loss of NEA is gradually increasing. No any systematic plans have been implanted for preventing the loss and improve profit by NEA.
- BPC has high P/V ratio which reduces the breakeven level of the company but in the case of NEA P/V ratio is very less which increase the BEP sales of the authority.
- BPC's margin of safety is in average above 50 percent which indicates the safety of the company. But NEA's margin of safety is negative due to high BEP sales than actual sales or there is no safety margin in NEA.

Based on above findings, Mr. Dahal has recommended that:

- In Nepal most of the enterprises have no practice of CVP analysis in systematic manner. So. It is suggested that every enterprises should apply or practice CVP analysis.
- CVP analysis shows the relationship among the variables related to cost, revenue and profit. Study of relationship between these variables helps improve the business condition. So, this tool is very much important to every organization.
- BPC and NEA have many expert and skilled manpower but these enterprises have ignored the practice of CVP analysis. They have not classified or segregated various types of costs into fixed and variable. It is essential to classify the costs which help in controlling cost.
- Cost plan of both enterprises are not systematically maintained. So cost of every sector should plan properly. It is necessary to establish cost control program in these enterprises. It will maintain the discipline on cost control.
- NEA is operating in monopoly situation, strength, weakness, threats and opportunity should properly analyze to gain future opportunities.
- Sales revenue of both enterprises is in increasing trend but it is not sufficient to cover the cost and earn desired profit. The variable cost of NEA is very high which is required to reduce in future make profit. Sales plan of these enterprises should clearly maintain and improve to catch market opportunity.
- BPC and NEA should consider BEP analysis while preparing sales plan, production plan and setting price of its products.

Subedi, (**2008**) conducted a research study on the title of "***Fund Management of hydropower companies (with special reference to Chilime Hydropower Company Limited, Butwal Power Company Limited and National Hydropower Limited)***". He was concerned with fund management of these companies analyzing various ratios of five years. He used secondary data of balance sheet and profit and loss a\c of these companies.

The main objectives of his study were as follows:

- To draw the overviews of the development of private and public hydropower companies in Nepalese hydropower sector.
- To evaluate the fund management and financial positions of public hydropower companies with the help of various financial tools.
- To analyze the present trends of public hydropower companies.
- To suggest and recommend possible guidelines on the basis of major findings.

Major findings of his study were as follows:

- Current ratio of CHPCL, BPCL and NHPL were in fluctuating trend throughout the study period. The mean ratio of BPCL was higher than CHPCL and NHPL. Likewise CV of NHPL was lower than CHCPL and BPCL, which means that CHCPL and BPCL had more fluctuation in ratios as compared with NHPL. Mean ratio shows the high liquid position of BPCL, which shows the hydropower company did not have proper investment plan. CHPCL and NHPL had lower mean ratio than that of BPCL but these companies may face the problem of working capital if they need to pay current liabilities on demand. Current ratios were in slightly fluctuating trend for CHCPL, BPCL and NHPL. All three hydropower companies could not maintain the conventional standard of 2.1. However, the average ratio of BPCL was greater than that of CHPCL and NHPL, which signifies that BPCL was more capable of meeting immediate liabilities in contract to CHPCL and NHPL.
- Return on shareholders' equity ratio measures the return on shareholder's investment in hydropower companies. The average ratio of CHPCL for the return on shareholder's equity was higher than that of BPCL and NHPL. Likewise, the CV of CHPCL was lower. The ratios of BPCL and NHPL were increasing trend throughout the study period. But the ratios of CHPCL were in fluctuating trend. Average return on shareholders' equity ratio of CHPCL was fluctuating trend.
- Long term debt to net worth ratio showed CHPCL and NHPL had higher long-term debt for the beginning years and it was in decreasing trend. It shows that both companies were repaying their debt and they were in sound position for the settlement of solvency. Average ratio in NHPL was higher than that of CHPCL.
- In the beginning two years, the hydropower companies applied funds on investing activities because they had to acquire fixed assets and set up their business at that

- period. After the commercial operation started, CHPCL and NHPL applied their higher funds on financing activities for the repayment a long term loan.

Mr. Subedi has drawn following recommendations:

- CHPCL and NHPL both hydropower companies have very low liquidity position because the both current and quick ratios are below the standard. Both hydropower companies cannot pay short term liability at the time of their creditor's demand. It may create difficult situation in future. So, both hydropower companies should keep sufficient level of current and quick assets to maintain their liquidity position.
- Profitability position of NHPL was weaker than that of CHPCL and BPCL. It should improve overall efficiency by investing its fund in more returnable assets i.e. risky area through proper risk analysis techniques.
- Debt servicing capacity of NHPL appeared weak. So, it is better to search more profitable investments by utilizing its capital and revolving fund. The capital adequacy position of NHPL seems to be less satisfactory than that of CHPCL. So, it needs to raise the net worth.
- Earning of NHPL could not grow proportionately because of high cost bearing outsider's fund I.e. debt capital. Therefore, NHPL is suggested to increase the equity financing and minimize the debt capital.
- Government should formulate plans and policies to attract private as well as public investors for the growth of hydropower companies creating investment friendly environment and focusing on their security in the hydropower development.

Khatiwada, (2009) conducted a research study on the title of "***Financial Performance analysis of Butwal Power Company***" examines the financial strengths and weakness of BPC based on its ratio analysis, income and expenditures analysis and least square trend analysis. He has also used statistical tools.

The main objectives of his research are as follows:-

- To highlight about Butwal power company's objective, policy, growth etc.
- To study the trend of financial performance and analyze the related financial indicators.
- To analyze financial strength and weakness of Butwal power company
- To provide recommendation and suggestions on the basis of study and findings.

The major findings of his research are:

- The current ratio indicates that the company is using excessive current assets in the first three fiscal years. If it's maintaining the current ratio in the later 3 years

near to its normal standard. It reveals that the company is in perfect liquidity position. The firm is in strong credibility position.

- The debtors' turnover reflects that debtor's turnover ratio of Butwal Power Company is fluctuating each year but is better in last two years study period than the first two year.
- Fixed assets turnover ratio shows that Butwal Power Company utilized is fixed assets in better way in later years in comparison to previous years except in 2059/060. Increment in fixed assets turnover ratio indicates the improved work efficiency and financial condition. It shows the efficiency of a concern on utilizing its fixed assets.
- The total assets turnover ratio of BPC in the study period is not good, it shows the increment in ratio but increment is not satisfactory. Higher ratios indicate better utilization of total assets of the organizations. To improve the total assets turnover ratio BPC should utilize total efficiency. But the company is improving efficiency utilization of total assets.
    - The non operating income to total income ratio shows in 2060/61 the non operating income took a high percentage in total income. It explains that the income of the company is diversified a lot which can help the company to sustain in hard times.
    - The local sales to bulk sales ratios shows that BPC has extended the sales system to the local and Nepal electricity authority by power purchase agreement. This helps the company in overcoming dependency regarding power sell and diversify selling process which comes handy during difficult times.

The recommendations are as follows:

- The company (BPC) is in strong credibility position. It should enjoy capital of less cost by borrowing fund.
- The company has kept very high liquidity ratio. The investment in current assets is excessive which should be controlled.
- Debtors' turnover ratio of the company should be improved and made higher which can help the company to encash its sales in proper time to avoid cash shortage.
- Fixed assets turnover ratio shows the utilization of the assets in percentage. The finding shows that the fixed assets are utilized properly and efficiently. It helped to improve financial condition of the company.
- Total assets turnover ratio is not found satisfactory. To improve the total assets turnover ratio BPC should utilize its total efficiency. It is found that the company is improving its efficiency of utilizing total assets.
- The trend analysis revealed that the company has done better in total sales but worse in operating income. It should improve the trend of operating income in increasing order.

2.4 Research Gap

Even though numerous research works has been carried out in the field of performance evaluation of hydropower companies, there is still lack of certain aspects of this research. Those shortcomings are tried to avoid in this research as much as possible.

Chapter III

Research Methodology

3.1 Introduction

Research is a systematic and organized effort to investigate a specific problem that needs a solution. This process of investigation involves a serious of well thought out activities of gathering, recording, analyzing and interpreting the data with the purpose of finding answers to the problem, thus the entire process by which we attempt to solve problems or search the answers to questions is called research.

A suitable and simple research methodology is followed in order to achieve the stated objectives of the study and as well as to make it easier in visualizing the total study clearly. This chapter includes research design, sources and types of data.

3.2 Research design

Research design is the plan, structure and strategy of investigation conceived so as to obtain answer to research questions and to control variable. The plan is the overall scheme or program of the research. It includes an outline of what the investigator will do from writing the hypothesis and their operational implications to the final analysis of data. The structure of the research is more specific. It is the outline, the scheme, the paradigm of the operation of the variables. Research design is the plan of attack: what approach to the problem will be taken? What methods will be used? And what strategies will be most effective.

The comparative evaluation of NHPCL and BPCL, descriptive and analytical approaches were used to evaluate the financial performance of these hydropower companies. Descriptive approach is utilized for conceptualization, problem identification, conclusion and suggestion of the study whereas analytical approach will be followed by the presentation and analysis of data. The data have been analyzed on the basis of standard financial formulas used in the books of financial management.

3.3 Population and Sample

The numbers of private-public companies which are into hydropower sectors of Nepal are considered as population. In current scenario there are about 30 companies in operation. Among them two companies are selected for this study. They are:-

1. National Hydropower Company Limited (NHPCL)
2. Butwal Power Company Limited (BPCL)

3.4. Sources of data

The main sources of data for the purpose of this study are the published financial statements of NHPC and BPCL. The study is thus mainly based on the secondary data. It constitutes mostly the annual reports which comprises of balance sheet and profit and loss account statement. Information has also been from various publications, journals and articles.

3.5. Data collection procedure/Techniques

For thus research following methods are used:

A. Secondary Data: the secondary data are collected from published accounting statements of the companies under review, various journals and articles on hydropower companies.

3.6. Data Processing

Data obtained various sources cannot be directly used in their original form. Further they need to be verified and simplified for the purpose of analysis. Data information, figures and facts so obtained need to be checked, rechecked, edited and tabulated for computation. According to the nature of data, they have been inserted in meaningful tables. Homogenous data have been sorted in understandable manner, odd data excluded from the table. Using financial and statistical tools, data have been analyzed and interpreted.

3.7. Data Analysis tools

3.7.1. Tools for secondary data analysis

3.7.1.1 Financial tools

Financial tools are those, which are used for the analysis and interpretation of financial data. They attempt to explore the financial state of a business and convey the strengths and weakness of it policies and strategies. Ratio analysis is used as the basic tool for this study in order to summarize the quantitative judgments about the companies' financial performance. The importance of ratio analysis lies in the fat that it presents facts on a comparative basis and enables the drawing of inference regarding the performance of a company (Khan and Jain, 1999:4.33)

The following ratios are used for evaluating the performance of selected sample companies:

i. **Liquidity ratios**

This ratio measures the firm's ability to satisfy its short term commitments out of current or liquid assets. These ratios focus on current assets and liabilities and were used to ascertain the short term solvency position of a firm. The two primary test of liquidity are current ratio and quick ratio.

a) Current ratio (CR)

A current ratio (CR) is the quantitative relationship between current assets (CA) and current liabilities (CL). So this ratio is calculated by dividing current assets by current liability.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{Current\ Liabilities}$$

Current assets include cash and those assets that can be converted into cash within a year. This study accumulates stock, current work in progress, debtors and receivable cash and advance and deposit to produce the current assets. Similarly creditors and payables, provisions, advances and deposit have been pulled together to produce current liabilities.

If Current ratio < 2.1 (The company is not good in solvency)

If Current Ratio = 2.1 (The company is in adequate condition in solvency)

If Current Ratio > 2.1 (The company may have an excessive investment in current assets)

b) Quick ratio (QR)

This is also termed as acid test ratio or liquid ratio. It is also another measure of short term solvency of a firm. Quick ratio is defined as the quantitative relationship between quick and current liabilities. It is calculated as follows:

$$Quick\ Ratio = \frac{Quick\ Assets}{Current\ Liabilities}$$

Though advance and deposits are considered less liquid in accounting terms, in this study, they have been found to be convertible into cash quite simply. Therefore, only inventory has been left out of current assets to compare quick assets.

ii. **Activity/Efficiency/Assets Management Ratio**

Assets management ratios are also known as turnover ratios or activity ratios or efficiency ratios. These ratios look at amount of various types of assets and attempt to determine if they are too high or too low at current operating levels. They provide the measure for how effectively the firm's assets are being managed. If too many funds are tied up in certain types of assets that could otherwise be employed more productively elsewhere, the firm is not as profitable as it should be. Following ratios are calculated to measure how efficiently a firm employs the assets.

a) Fixed Assets Turnover Ratio

This ratio is calculated as follows

$$Fixed\ Assets\ Turnover = \frac{\text{Sales}}{Net\ Fixed\ Assets}$$

It is defined as the gross fixed assets minus depreciation. This study accumulates fixed assets. Capital work in progress and investment in new project to produce net fixed assets.

b) Total assets Turnover Ratio

It shows the relationship between sales and total assets. So this ratio is calculated by dividing sales by total assets i.e.

$$\text{Total Assets} = \frac{\text{Sales}}{\text{Total Assets}}$$

Total assets constitute the fixed assets as well as current assets and investment of the company. This study accumulates fixed assets, work in progress, and investment in new project, current assets and differed revenue expenditure to produce the net current assets.

c) Average collection Period (ACP)

It is obtained as follows:-

$$\text{Average Collection Period} = \frac{\text{Sales}}{\text{Debtor's turnover ratio}}$$

This defines time period for the collection of credit sales. The duration of credit should be shortening for the organization. So less ACP is better for the company.

d) Debtor's Turnover Ratio

It is calculated as follows:-

$$\text{Debtor's Turnover Ratio} = \frac{\text{Net Sales}}{\text{Closing Debtors}}$$

Higher ratio is much preferred.

e) Capital employed turnover Ratio

It is calculated as follows

$$Capital\ Employed\ Turnover\ = \frac{Sales}{Capital\ Employed}$$

The ratio measures the relationship between sales and capital employed. Higher ratio indicates better utilization of capital employed resulting in higher profit.

iii. Profitability Ratio

Profitability is the end of result of a number of corporate policies and decision. It measures how effectively the firm is being operated and managed. Besides owners and managers, creditors are also interested to know the financial soundness of the firm. Owners are eager to know their returns where as manager are interested in their operating efficiency. So they calculate profitability ratios because expectations of both owners and managers are evaluated in terms of profit earned by the firm. Following are the major ratios used to measure the profitability of a firm.

a) Net profit Margin

It is the ratio between net income and sales of a firm. It shows the firm's ability to generate net income per rupee of sales and is calculated as:

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}}$$

This ratio explains the relationship between net profit after tax and sales. Higher ratio denotes higher profitability of the enterprises. Lower ratio indicates increase in indirect expenses, in capable management and lower income sources.

b) Gross profit margin

This ratio is calculated as follows:-

$$\text{Gross profit Margin} = \frac{\text{Gross profit}}{\text{Sales}}$$

It reflects the profitability of a company and measures the ability to get profit. This ratio should be able to cover all indirect expenses at least. Higher ratio is favorable to the organization. Lower ratio reflects unfavorable purchase policy, lighter production cost, lower selling price or higher investment in fixed assets.

c) Operating Expenses ratio

It is given by

$$\text{Total Operating Expenses Ratio} = \frac{\text{Operating Expenses}}{\text{Sales}}$$

This study accumulates power plant expenses, distribution expenses and consultancy service expenses to produce operating expenses.

d) Return on Assets (ROA)

It is also called the firm's return on total assets, measure the overall effectiveness of management in generating profit with its available assets. The higher the firm's return on assets, the better it is doing in operation and vice versa. It is calculated as follows:

$$\text{Return on Assets} = \frac{\text{Net profit after tax} + \text{interest}}{\text{Total Assets}}$$

e) Return on share holder's equity

It measures the return earned by the shareholders i.e. owners of the company. To analyze whether the company been able to provide higher return on investment to the owner or not, this ratio is necessary. This can be calculated as follows:

$$Return\ on\ Shareholder'sEquity = \frac{Net\ Profit\ After\ Tax}{Shareholder'sequity}$$

The higher ratio is desirable from the point of view of the owners of the firm and represents the higher profitability of the firm and vice versa.

iv. **Leverage/ Capital Structure Ratio**

The leverage or capital structure ratio may be defined as financial ratios which throw light on long term solvency of a firm as reflected in its ability to assure the long term creditors with regard to (i) periodic payment of interest during the period of the loan (ii) repayment of principal on maturity or in predetermined installments at the due dates. This ratio indicates the mix of fund provided by owners and lenders. As a general rule, there should be an appropriate mix of debt and owners' equity in financial mix of the company's assets.

i. Debt-Equity Ratio (D/E Ratio)

Debt to Equity Ratio is calculated dividing total debts by total shareholder's equity. This ratio shows the relationship between debt capital and equity capital.

$$Debt\ to\ Equity\ Ratio = \frac{Total\ Debt}{Shareholder's\ Equity}$$

This ratio accumulates equity, reserve and surplus to produce shareholders equity.

ii. **Debt to total Assets Ratio**

This ratio shows the relationship between debt capital and total assets.

$$Debt\ to\ total\ Assets\ ratio = \frac{Total\ Debt}{Total\ Assets}$$

v. **Invisibility Ratio**

An analysis of invisibility ratio helps the investors to know about the performance of the company. Therefore, following ratios have been calculated to rest earning capacity.

i. **Earning Per Share (EPS)**

This ratio is calculated dividing net profit after taxes (EAT) by number of equity share outstanding. The profitability of a company from the point of view of ordinary shareholders is the earning per share. EPS calculations made over years indicate whether or not the company's earnings power on per share has changed over that period. EPS shows the amount earning attributes to each equity share. If earning per share is high market price of the share may be increased in the market and vice versa. High ratio shows the sound profitability position of the components.

$$Earning\ Per\ Share = \frac{Net\ profit\ After\ Tax}{Number\ of\ Shares\ Outstanding}$$

ii. **Dividend Per Share (DPS)**

It is the per share earnings distributed to the shareholders. It can be calculated by following formula:

$$Dividend\ Per\ Share = \frac{Total\ Dividend\ Distributed}{Number\ of\ Share\ Outstanding}$$

This shows per rupee earnings actually distributed to common stockholders per share held by them. High ratio is favorable for the shareholders.

iii. **Dividend Payout Ratio**

It is the ratio between dividends per share to earning per share is known as dividend payout ratio. It is calculated as follows:

$$Dividend\ Payout\ Ratio = \frac{Dividend\ Per\ Share}{Earning\ Per\ Share}$$

It determines the portion of per share dividend paid out of per share earning. The higher ratio is better to the shareholders. It builds faithfulness of the company.

3.7.1.2. Statistical tools

Statistical tools present the relationship among certain variables based on past trend and help predict future values of one or more variable given the change in other associated variables. These tools are useful to researcher in order to draw liable financial consumptions from data available. The following statistical tools are used in this study for evaluating the performance of selected companies.

I. Arithmetic Mean

Arithmetic Mean (AM) is the most commonly used of all the average. This is due to the simplicity of its calculation and other advantage. It is used to calculate the average value of quantitative data closed end class intervals and when the distribution does not have very large and very small items. It is also used to obtained average value of distribution having closed ended class intervals and having non-extreme items.

Arithmetic Mean of given set of observation is their sum divided by the number of observations. In general, if X_1, X_2, X_3……X_n are the given observations and N being number of observations, then arithmetic mean usually denoted by

$$\bar{X} = \frac{X1 + X2 + X3 \ldots . + Xn}{N} = \frac{\sum X}{N}$$

II. Coefficient of Variation

It is the method which calculates risk. It is the standardized measure of the risk per unit of return. It is the percentage variance in the mean. Standard deviation being considered as the total variation in the mean. It is one of the relative measures of dispersion that is useful in comparing the amount of variation in data group with different mean. Coefficient of variation, denoted by CV is given by:

$$\text{CV} = \frac{\sigma}{X} * 100\ \%$$

Where $\sigma = \sqrt{\frac{\Sigma X^2}{n} - (\frac{\Sigma X}{n})^2}$

Comparing the variability of two distributions we compute the coefficient of variation for each distribution. A distribution with smaller CV is said to be more homogenous of uniform or less variable than other.

III. Co-efficient of Correlation (r)

It is a statistical tool for measuring the intensity of the magnitude of linear relationship between two series. Karl Pearson's correlation coefficient measures the degree of linear association between two variables. Let X and Y are two variables. Karl Pearson's correlation coefficient between X and Y is generally denoted by r_{xy} or simply by r only. It is also called product moment correlation coefficient or simple coefficient or simply a correlation. It is defined as follows:

$$r = \frac{N\sum XY - \sum X \sum Y}{\sqrt{N\Sigma X^2 - (\Sigma X)^2} - \sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

Where,

N = Number of observation

$\sum X$ = Sum of observation in series X

$\sum Y$ = Sum of observation in series Y

$\sum X^2$ = Sum of squared observation in series X

$\sum Y^2$ = Sum of squared observation in series Y

$\sum XY$ = Sum of the product of observation in series X and Y

Values of r lies between -1 and +1, r=1 implies that there is a perfect correlation between the variables. The variables are said to be perfectly negatively correlated if r=-1 and perfectly positively correlated if r = +1. If r= 0, the variables are not correlated at all except other than in form of logarithm, quadratic or exponential.

IV. Probable error of correlation coefficient (PE)

Probable error of correlation coefficient is an old measure of testing the reliability of an observed value of correlation coefficient. It is calculated to find the extent to which correlation coefficient depends upon the condition of random sample. Probable error of correlation coefficient denoted by PE(r) is obtained by:

$$PE(r) = 0.6745 * \frac{1-r^2}{\sqrt{N}}$$

where $\frac{1-r^2}{\sqrt{N}}$ is standard error. The value 0.6745 is used in this formula because in a normal distribution 50 % of the observations lie in the range p = ± .6745

PE is used to test if an observed value of sample correlation coefficient is significant of any correlation in the population. If r>6 PE, correlation is significant otherwise not.

V. Least Square Linear Trend

Trend Analysis is very useful and commonly applied tool to forecast the future event in quantitative term, on the basis of the tendencies in the dependent variable in the past period. The straight line trend implies that irrespective of the seasonal and cyclical as well as irregular fluctuation, the trend values increase by absolute in arithmetic progression. Mathematically,

$Y = a + bX$

Where
Y = value of the dependent variable

a = Y – intercept

b = Slope of the trend line

X = Value of the independent variable

Normal equations fitting above equation are:

$\sum Y = Na + b\sum X$

$\sum XY = a\sum X + b\sum X^2$

Since, $\sum X = 0$, $a = \frac{\Sigma Y}{N}$ and $b = \frac{\sum XY}{\sum X^2}$

3.8. Research Variables

The research variables are mainly related with the financial statements of NHPC and BPCL. Profit and loss account, balance sheet, cash flow statement and time period are the main research variable of the study, these variables are measured in terms of various components of ratios.

Chapter IV

Presentation and analysis of data

In this chapter, the data have been analyzed and interpreted using financial and statistical tools following the research methodology dealt in the third chapter. In the part of analysis, various tables have been inserted in the required tables according to their homogenous nature. This chapter is divided into presentation of data from secondary sources and major findings of the study.

1. **Presentation and analysis of data from secondary sources**
   This section includes the data related with the study from secondary sources. Secondary sources mean the data of the private-public sectors hydropower companies derived from their annual reports, webpage and other already published sources. The presentation and analysis of these numerical data include ratio analysis.

i) **Liquidity ratios**

Liquidity ratios are used to judge the company's ability to meet the short term obligations. These ratios involve the relationship between current assets and current liabilities and measured by current ratio and quick ratio.

a) **Current Ratio**

Current ratio measures the liquidity position of the company. The standard current ratio should be 2:1 and it is also defined by the nature of the company. The current ratio of different sampled years has been presented in the table below.

Table No. 1

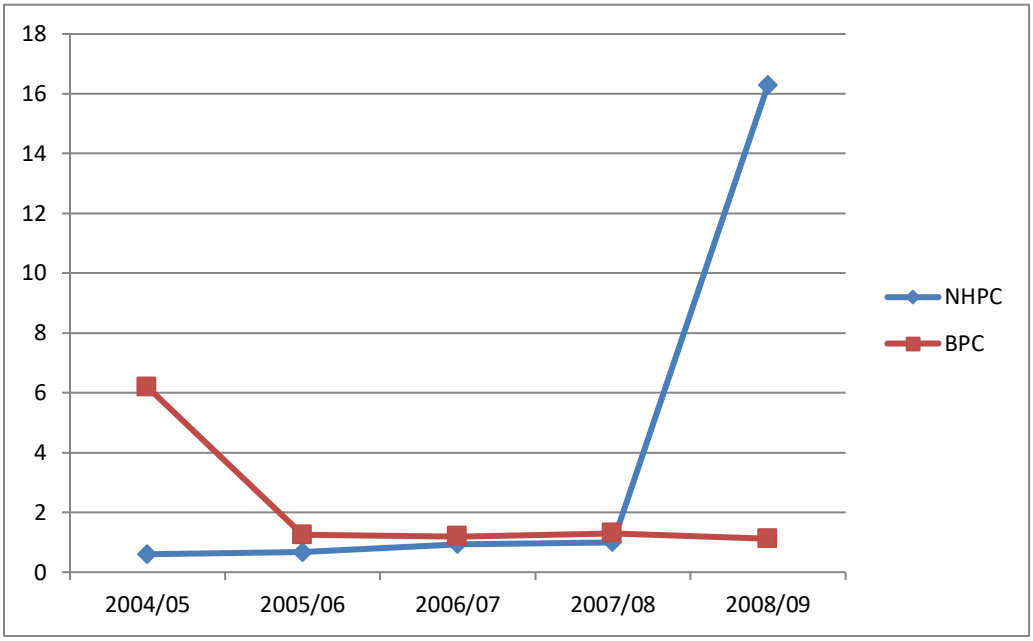
Calculation of Current Ratios (In'000)

Fiscal year	Current Assets		Current Liabilities		Ratio (Times)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	335,582	154,563	54,172	256,769	6.19	0.60
2005/06	543,416	157,538	433,619	234,787	1.25	0.67
2006/07	670,674	198,147	562,584	208,851	1.19	0.94
2007/08	776,080	172,955	595,871	172,149	1.30	1.00
2008/09	802,170	457,811	717,933	28,107	1.12	16.30
Mean ($\bar{X}$)					2.21	3.90
S.d (σ)					2.23	6.93
CV (%)					100.72	177.67

Sources: Annual report of BPC and NHPC of F/Y 2004/05-2008/09

The ratio analysis shows that there is fluctuation in current ratio for both the companies. The analysis is based on 5 years data of both BPC and NHPC. From the annual data of the fiscal year 2008/09, it is evident that NHPC has cash in hand in its various bank accounts which can serve the purpose during liquidation. The conventional standard of current ratio of 2.1 is surpassed by both the companies in average. Improvement of current ratios of NHPC in last fiscal year shows that it is fully capable to liquidate its assets. However, before last year NHPC current ratio was below satisfactory level whereas comparatively BPC ahs higher. Both companies current ratio seems satisfactory but BPC is more than satisfactory as its ratio over the years is satisfactory.

Figure No. 4.1
Graphical Representation of Current Ratios



The graphical representation shows considerable change in ratio of NHPC in FY 2008/09. Similarly, there is fluctuation in current ratio of BPC in different year.

b) Quick ratio

The quick ratio is more accurate guide to measure the liquidity position of any company. Generally, a quick ratio of 1:1 (quick assets equal to current liabilities) is considered satisfactory as it means a company can easily meet all current claims.

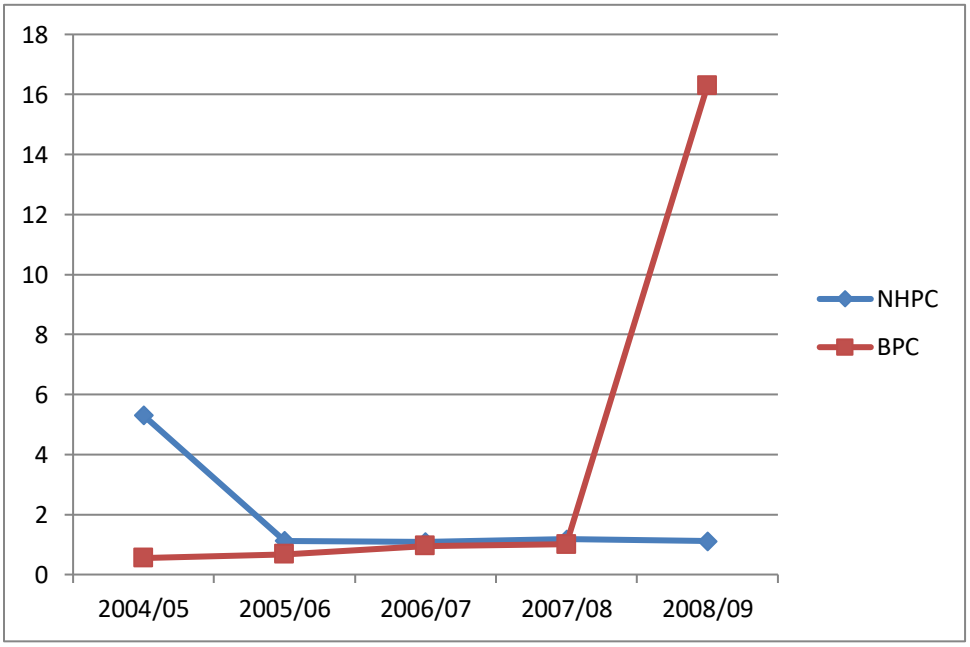
Table No. 4.2
Calculation of Quick Ratio **(In 000)**

Fiscal Year	Quick Assets		Current liabilities		Ratio (Times)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	287,544	142,632	54,172	256,769	5.30	0.55
2005/06	485,793	157,538	433,619	234,787	1.12	0.67
2006/07	611,778	198,147	562,584	208,851	1.09	0.94
2007/08	701,432	172,955	595,871	172,149	1.18	1.00
2008/09	802,170	457,811	717,933	28,107	1.12	16.30
Mean (X)					1.96	3.89
S.d (σ)					1.87	6.94
(CV)%					95.12	178.28

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

Since quick ratio test is also known as acid test ratio as it only takes into consideration those assets which can be turned into cash immediately, the ratio obtained above is satisfactory.

Figure No. 4.2
Graphical representation of Quick Ratios



The graphical representation shows the fluctuating trend of both companies. The fluctuation is more in case of BPC in the initial fiscal year and has been consistent after that whereas the ratio of NHPC increases in the last fiscal year.

ii) **Activity/ Efficiency/ Assets Management Ratios**

Assets management ratios are also known as turnover ratios or activity ratios or efficiency ratios. These ratios look at the amount of various types of assets and attempt to determine if they are too high or too low at current operating levels. They provide the measure for how effectively the firm's assets are being managed. If too many funds are tied up in certain types of assets that could otherwise be employed more productively elsewhere, the firm is not profitable as it should be. Following ratios are calculated to measure how efficiently a firm employs the assets.

a) Fixed Assets Turnover Ratio

Fixed Assets Turnover ratio measures the efficiency with which the company is utilizing its investment in its various net fixed assets. Generally high fixed assets turnover ratio indicates efficient utilization of fixed assets while inefficiency in utilization is shown by low fixed assets turnover ratio.

Table No. 4.3
Calculation of Fixed Assets Turnover Ratio

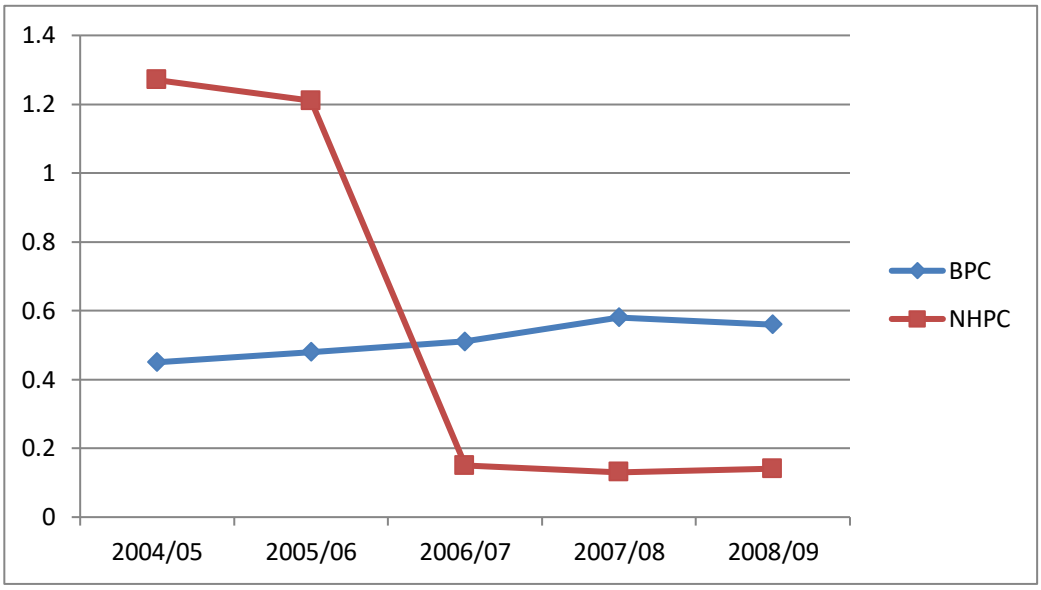
(In '000)

Fiscal Year	Sales		Net Fixed Assets		Ratio (Times)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	323,134	215,465	714,016	169,432	0.45	1.27
2005/06	358,419	213,368	743,605	176,457	0.48	1.21
2006/07	379,769	219,564	743,893	1,417,300	0.51	0.15
2007/08	421,687	195,581	725,742	1,445,202	0.58	0.13
2008/09	430,800	189,265	765,339	1,389,642	0.56	0.14
Mean(X)					0.52	0.58
(σ)					0.05	0.60
CV (%)					10.49	103.95

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

The above ratio analysis table shows that the utilization of fixed assets by BPC is below par whereas in the initial years NHPC has made optimum utilization of its resources. But thereafter the ratio of NHPC has taken a dip due to less sales and improper utilization of its fixed assets. CV of NHPC is higher than BPC and shows that volatility of ratio is higher in NHPC.

Figure No. 4.3
Graphical representation of Fixed Assets Turnover Ratio



Graphical representation also shows the same scenario as in the table above. BPC has an increasing trend in its ratios over the year but NHPC has considerable increase in the years 2004 and 2005 and after that a sharp decline and gets stabilized below the ratios of BPC.

b) Total Assets Turnover Ratio

Total assets turnover ratio indicates the sales generated per rupee of investment in the total assets. Generally higher turnover ratios show efficiency in utilization of companies' scarce resources and vice versa.

Table No. 4.4
Calculation of Total Assets Turnover Ratio

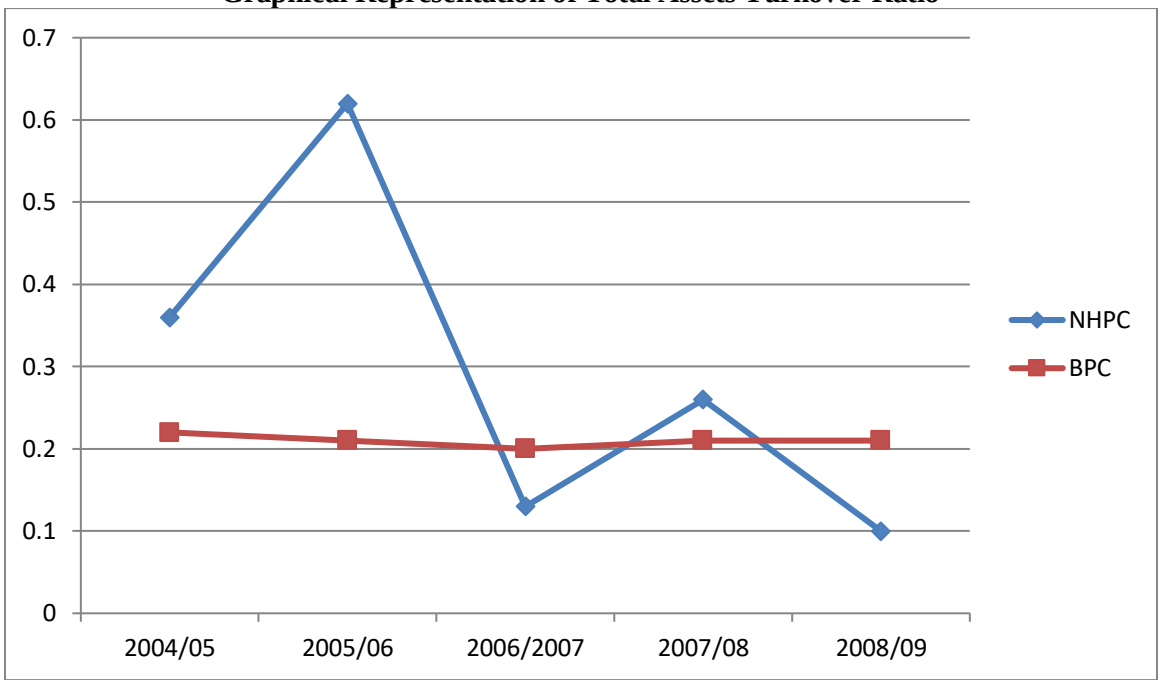
In '000

Fiscal Year	Sales		Total Assets		Ratio (times)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	323,134	215,465	1439,238	595,365	0.22	0.36
2005/06	358,419	213,368	744,447	670,001	0.21	0.62
2006/07	379,769	219,564	1882,271	1625,489	0.20	0.13
2007/08	421,687	195,581	1986,926	1628,198	0.21	0.26
2008/09	438,840	189,265	2132,439	1942,494	0.21	0.10
$(\bar{X})$					0.21	0.29
(σ)					0.01	0.21
CV(%)					3.37	71.41

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

Above table reveals a fluctuating and unsatisfactory trend of TATOR of BPC with a mean of 0.21, in contrast to mean of 0.29 of NHPC. This shows that BPC has not utilized its current assets effectively. In case of NHPC, FY 205/06 looks promising but after that the ratios have decreased considerably. The CV of 71.41 % shows volatility of the ratios in NHPC. Higher the percentage of CV higher the volatility.

Figure No. 4.4
Graphical Representation of Total Assets Turnover Ratio



Graphical representation of total assets turnover ratio shows fluctuation in TATOR of NHPC. There is huge fluctuation in between FY 2004/05 and 2006/07. Comparatively, BPC's TATOR is very stable for the considered period.

c) Receivable Turnover Ratio

The debtor's turnover ratio specifies the amount of transaction with debtors within a specified time period. This ratio indicates the velocity of debt collection of a company. In other words, it indicates the number of times average debtors are turned over during a year. Generally high debtor's turnover is the indication of good receivable management. Debtor's turnover ratio is calculated by dividing sales by closing debtors/receivable.

Table No. 4.5

Calculation of Debtor's Turnover Ratio (DTR)

In '000

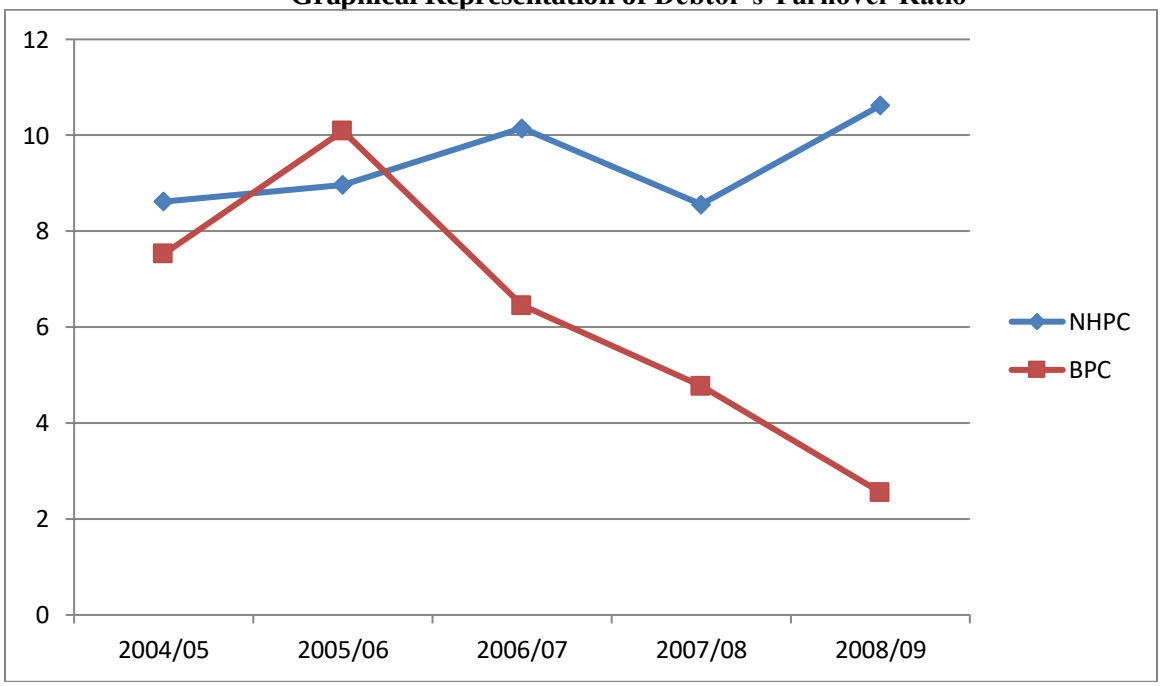
Fiscal Year	Sales		Closing Debtors		Ratio (times)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	323,134	215,465	42,921	24,982	7.53	8.62
2005/06	358,419	213,368	35,512	23,772	10.09	8.97
2006/07	379,769	219,564	58,918	21,628	6.45	10.15
2007/08	421,687	195,581	88,407	22,841	4.77	8.56
2008/09	438,840	189,265	171,359	17,817	2.56	10.62
$(\bar{X})$					6.28	9.38
(σ)					2.84	0.94
(CV)%					45.20	10.04

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

Above table reveals a fluctuating trend of DTR of BPC and a less fluctuating DTR of NHPC. Due to increase in receivables, DTR has decreased to 2.56 in last fiscal year for BPC whereas the DTR has increased due to loss in total sales of electricity. The mean of 9.38 looks good in case of NHPC and its lower value of standard deviation show a stable trend of ratios. Lesser percentage of CV also helps to understand the ratios volatility by suggesting ratios as less volatile. Overall, DTR of NHPC is better compared to BPC.

Figure No. 4.5

Graphical Representation of Debtor's Turnover Ratio



Graphical representation shows the decreasing trend of DTR for BPC and a fluctuating trend in DTR of NHPC.

d) Average Collection Period (ACP)

The average collection period provides the average turnover day's receivable and outstanding the average times. It takes to convert them into cash. Short average collection period shows the timely payment of debt and long average collection period indicates in efficiency of the company in collection of receivables.

Table No. 4.6
Calculation of Average Collection Period (ACP)

In '000

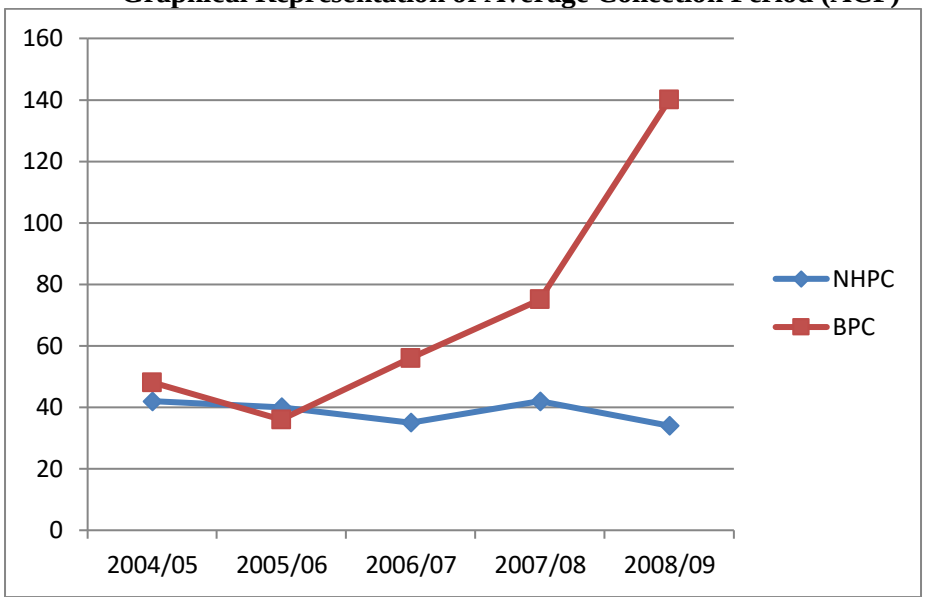
Fiscal Year	Days in a Year	Debtor's Turnover Ratio		Average Collection Period (Days)	
		BPC	NHPC	BPC	NHPC
2004/05	360	7.53	8.62	48	42
2005/06	360	10.09	8.97	36	40
2006/07	360	6.45	10.15	56	35
2007/08	360	4.77	8.56	75	42
2008/09	360	2.56	10.62	140	34
$(\bar{X})$				71	39
(σ)				41.10	3.85
(CV)%				57.88	9.97

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

Above table shows a fluctuating trend in ACP of BPC with a mean of 71 days whereas NHPC has ACP of 39 days which is way better than BPC. Low CV percentage of NHPC shows less volatility of ratio data of NHPC as compared to BPC. Overall analysis reveals that receivables management is poor in case of BPC.

Figure No. 4.6

Graphical Representation of Average Collection Period (ACP)



Graphical representation also indicates clearly that the ACP of NHPC is higher than ACP of NHPC

e) Capital Employed Turnover Ratio

Capital employed is the amount entrusted by the owner and long term loan financiers to the firm. It includes the amount of owner's equity and debentures, bond and long term loan. The amount of capital employed represents the net current assets and long term assets of the firm. Capital employed turnover ratio is calculated to know effectiveness in utilizing the capital employed by dividing sales by capital employed. The high ratio indicates better utilization of capital employed resulting in high profit.

Table No. 4.7

Calculation of Capital Employed Turnover Ratio

In '000

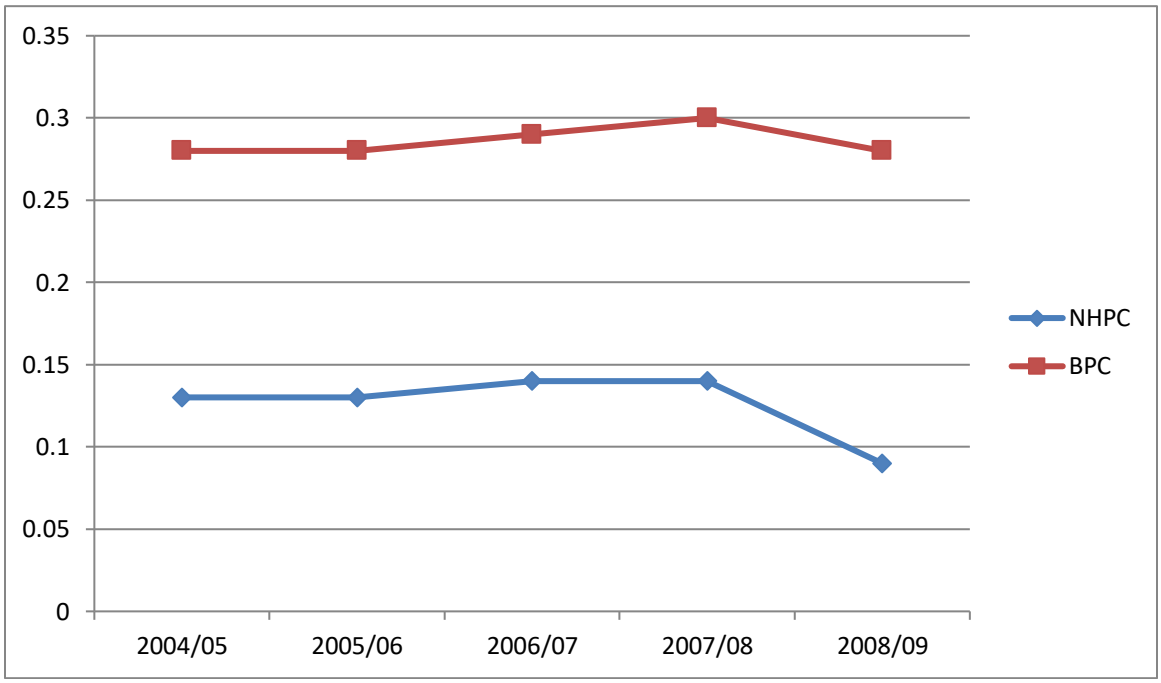
Fiscal Year	Sales		Capital Employed		Ratio (times)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	323,134	215,465	1380,528	1600,000	0.28	0.13
2005/06	358,419	213,368	1300,568	1598,955	0.28	0.13
2006/07	379,769	219,564	1294,863	1575,528	0.29	0.14
2007/08	421,687	195,581	1395,820	1445,202	0.30	0.14
2008/09	438,840	189,265	1546,266	2085,896	0.28	0.09
($\bar{X}$)					0.29	0.13
(σ)					0.01	0.02
(CV)%					3.13	16.46

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

All ratios in above table show satisfactory fluctuation for NHPC and BPC. The last FY 2008/09 show decrease in CETR because there is increase in capital employed. Except those values the other statistical tools also indicate stable ratios and less volatility of the analysis.

Figure No. 4.7

Graphical Representation of Capital Employed Turnover Ratio



The graphical representation also indicates the CETR of NHPC lesser than BPC as the sales of BPC is higher. The graph also shows small variations in CETR of BPC and CETR of NHPC.

iii) Profitability Ratio

Profitability ratio measure the success of the company in earning a net return on sales or on investment. These ratios give the decision about how effectively the company is being managed. It is true that higher the profitability ratios better the financial position and vice versa.

a) Net Profit Margin

The Net profit margin is the ratio between net income and sales of a firm. It shows the firm's ability to generate net income per rupee of sales.

Table No. 4.8
Calculation of Net Profit Margin

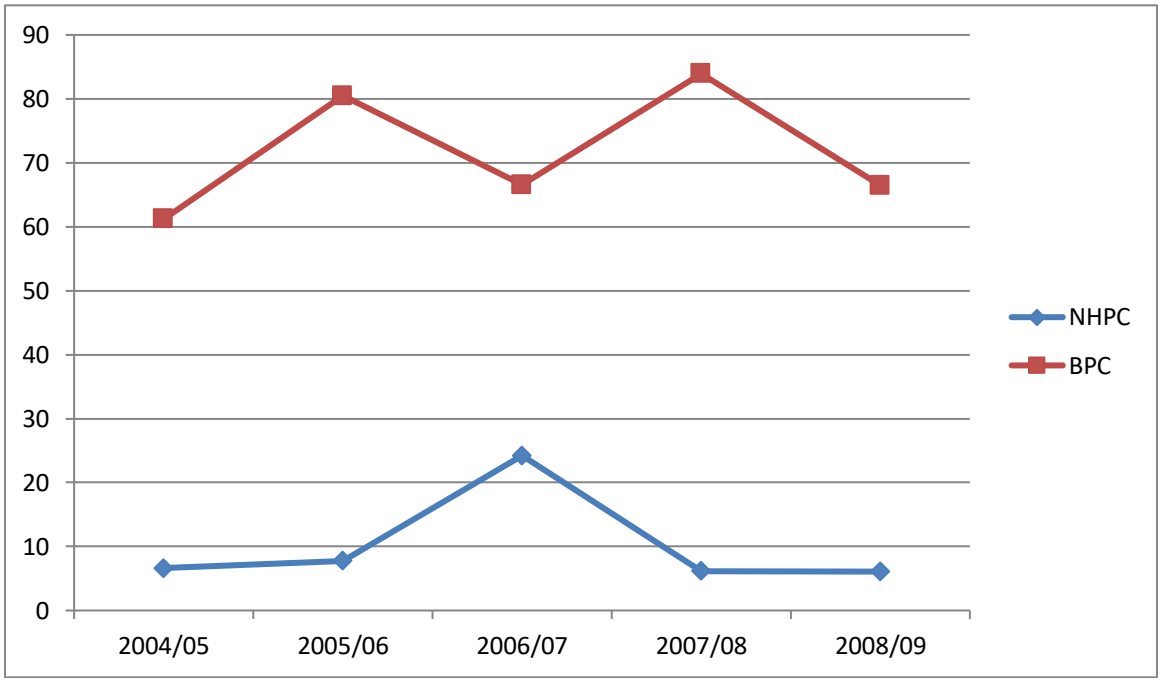
In '000

Fiscal Year	Sales		Net Profit After Tax		Ratio (%)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	323,134	215,465	197,761	14,222	61.20	6.60
2005/06	358,419	213,368	288,419	16,631	80.47	7.79
2006/07	379,769	219,564	252,840	53,168	66.58	24.22
2007/08	421,687	195,581	353,879	12,087	83.92	6.18
2008/09	438,840	189,265	291,592	11,513	66.44	6.08
($\bar{X}$)					71.72	10.17
(σ)					9.88	7.88
(CV)%					13.77	77..47

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

The above table shows fluctuating trend of NHPC ratio. The NPR seems to be at satisfactory rate for NHPC. The fluctuation occurs due to decrease in sales in case of NHPC. Volatility of ratios is seen to be high in case of NHPC whereas reliability of data is more compared to that of BPC as standard deviation value is less. Overall BPC seems to be in more profit than NHPC as its early net profit margin is commendable.

Figure No. 4.8
Graphical Representation of Net Profit Margin



The graphical representation shows the fluctuating trend in ratios of BPC and NHPC. The values of BPC are higher than that of NHPC.

b) Operating Profit ratio (OPR)

Operating profit ratio expresses the relationship between operating profits and is usually expressed in percentage. The operating profit should adequate to cover operating expenses and to provide fixed charges, to pay dividend and build up reverses, operating profit ratio is calculated by dividing operating profit by net sales as follows.

Table No. 4.9
Calculation of Operating Profit Ratio

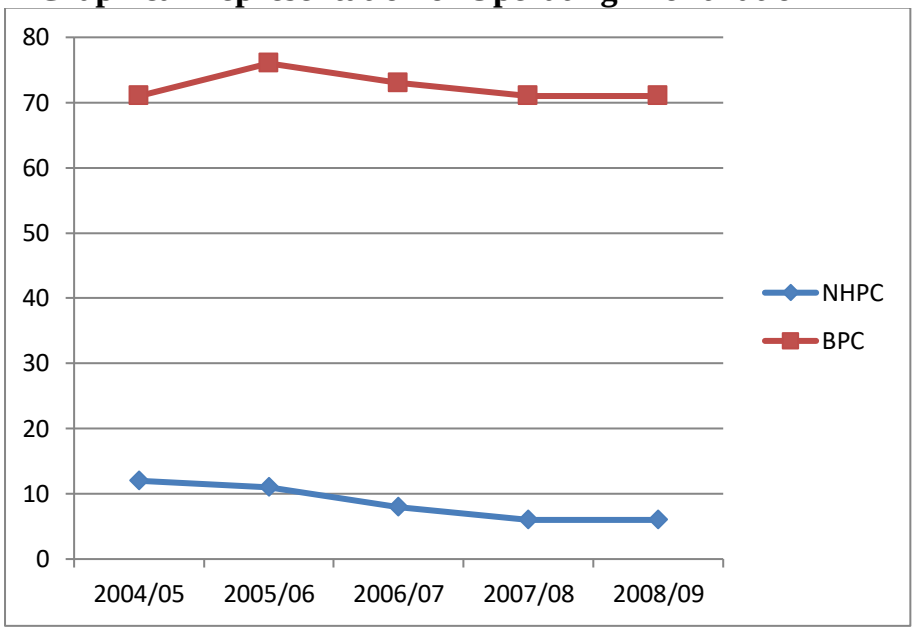
In '000

Fiscal Year	Sales		Operating Profit		Ratio (%)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	323,134	215,465	230,695	25,335	71	12
2005/06	358,419	213,368	358,419	23,271	76	11
2006/07	379,769	219,564	379,769	16,970	73	8
2007/08	421,687	195,581	421,687	12,329	71	6
2008/09	438,840	189,265	438,840	11,748	71	6
(X)					72	9
(σ)					2	3
(CV)%					3	32

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

Above table depicts that the operating profit ratio of BPC is stable. The percentage ratio to be maintained is well above 40 % for BPC whereas the percentage is far less in case of NHPC.

Figure No. 4.9
Graphical Representation of Operating Profit ratio



Graphical representation shows higher OPR for BPC and lesser OPR for NHPC.

c) Operating Expense Ratio

Operating expenses ratio is the yardstick of operating efficiency. The calculation of this ratio comprises computation of all operating cost of goods sold and general administrative expenses. In general higher operating ratio is inefficient due to higher operation cost in terms of sales. Lower operating ratio is favorable, as it will generate higher operating income, which will be sufficient to meet interest, dividend and other expenses of the company.

Table No. 4.10

Calculation of Operating Expenses Ratio

In '000

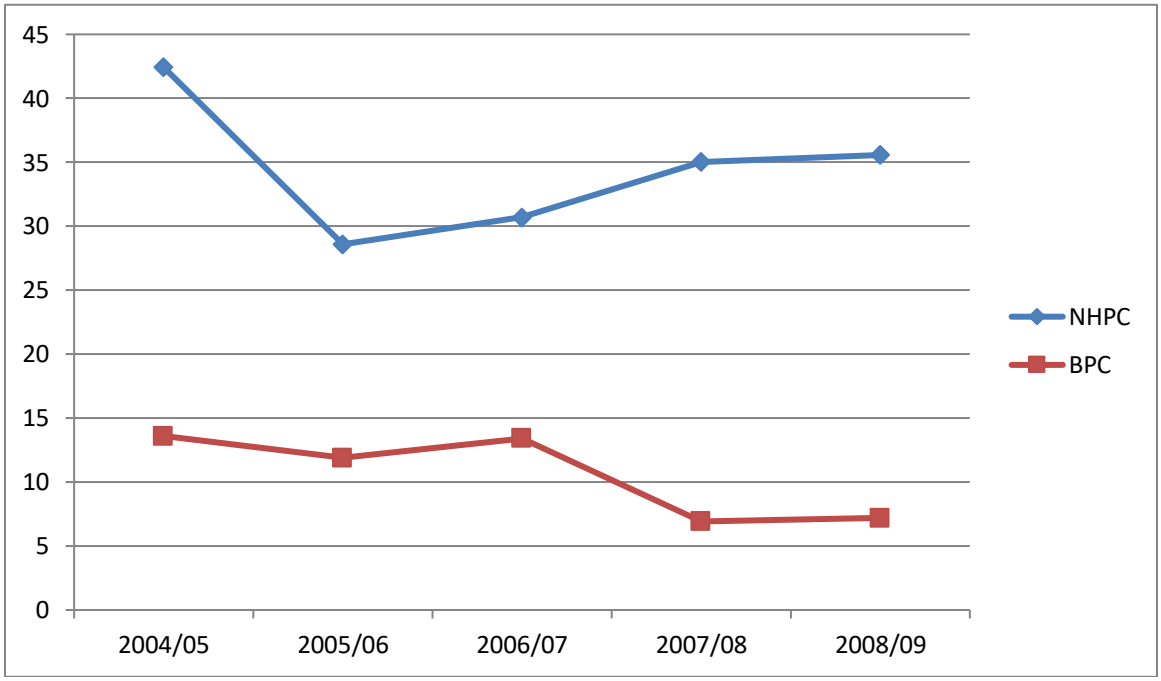
Fiscal Year	Sales		Operating Expenses		Ratio (%)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	323,134	215,465	104,799	29,320	42.43	13.60
2005/06	358,419	213,368	102,461	25,376	28.59	11.89
2006/07	379,769	219,564	116,642	29,472	30.71	13.42
2007/08	421,687	195,581	147,685	13,537	35.02	6.92
2008/09	438,840	189,265	156,148	13,621	35.58	7.20
$(\bar{X})$					34.47	10.61
(σ)					5.33	3.31
(CV)%					15.46	31.17

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

Above table show fluctuating trend of operating expenses ratio of BPC with a mean ratio of 34.47 %. It shows that the operating expenses of BPC are higher compared to NHPC with mean 10.61 % and that its OER is lesser compared to BPC. Deviation trends and CV also indicates less data volatility and variations.

Figure No. 4.10

Graphical Representation of Operating Expenses Ratio



The OER of NHPC is lesser than OER of BPC which is depicted by the graphical representation.

d) Return of Total Assets (ROTA)

Return of total assets (ROTA) which is often called the firm's return on total assets, measure the overall effectiveness of management in generating profit with it available assets. The higher the firms return on assets the better it is doing in operation and vice versa.

Table No. 4.11
Calculation of Return of Total Assets (ROTA)

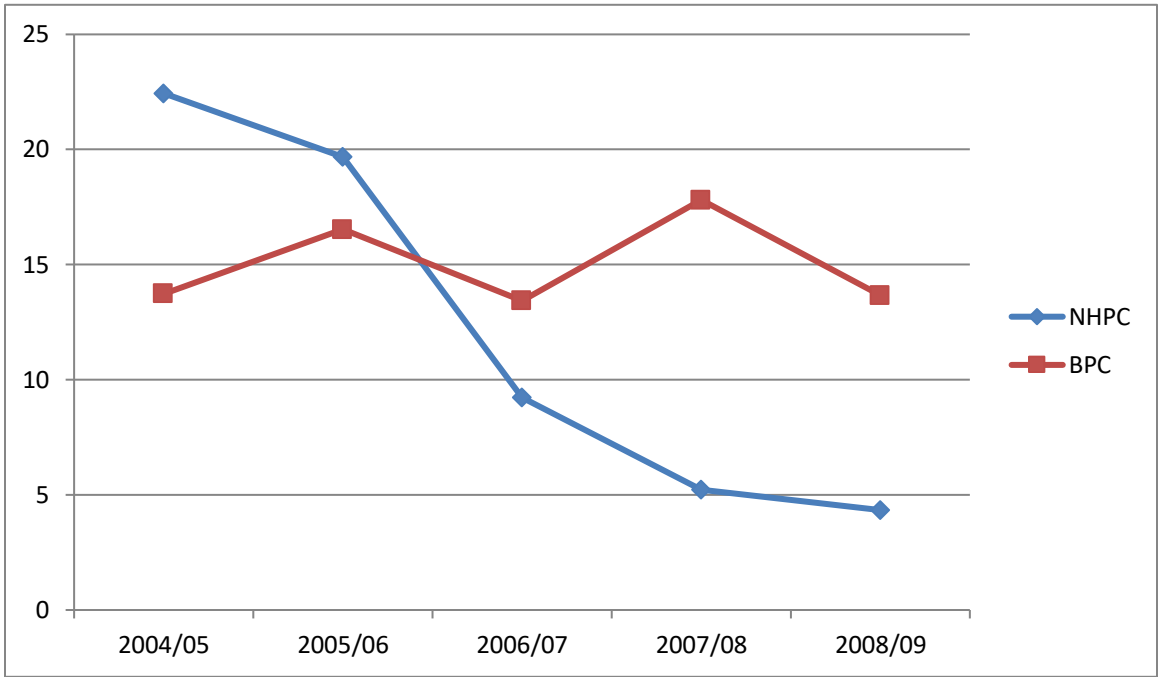
In '000

Fiscal Year	Net Profit + Interest		Total Assets		Ratio (%)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	197,761	150,380	1439,238	670,001	13.74	22.44
2005/06	288,419	131,899	744,447	670,001	16.53	19.69
2006/07	252,840	149,961	1882,271	1625,489	13.43	9.23
2007/08	353,879	85,175	1986,926	1628,198	17.81	5.23
2008/09	291,592	84,329	2132,439	1942,494	13.67	4.34
($\bar{X}$)					15.04	12.19
(σ)					2.00	8.37
(CV)%					13.32	68.67

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

Above table reveals a fluctuating trend of ROTA of NHPC with a mean ratio of 12.19 %. BPC does not carry load burden therefore does not include interest calculation while computing ROTA. ROTA in case of NHPC has decreased after that due to increase in total assets and decrease in net profit. CV percentage is 68.67% in case of NHPC which shows high volatility in ratios. Mean and standard deviation shows satisfactory ratio analysis for NHPC compared to BPC. So investors and lenders are unwilling to invest in NHPC with higher CV percentage.

Figure No. 4.11
Graphical Representation of Return of Total Assets (ROTA)



The graph also shows the fluctuation as well as the decreasing ROTA in NHPC.

e) **Return on shareholders' Equity(ROSHE)**
Return on shareholders' equity measures the return earned by the shareholder's i.e. owners of the company. To analyze whether the company been able to provide higher return on investment to the owner or not, this ratio is necessary. Higher ROE is favorable as it indicates higher return for shareholders at each rupee of investment.

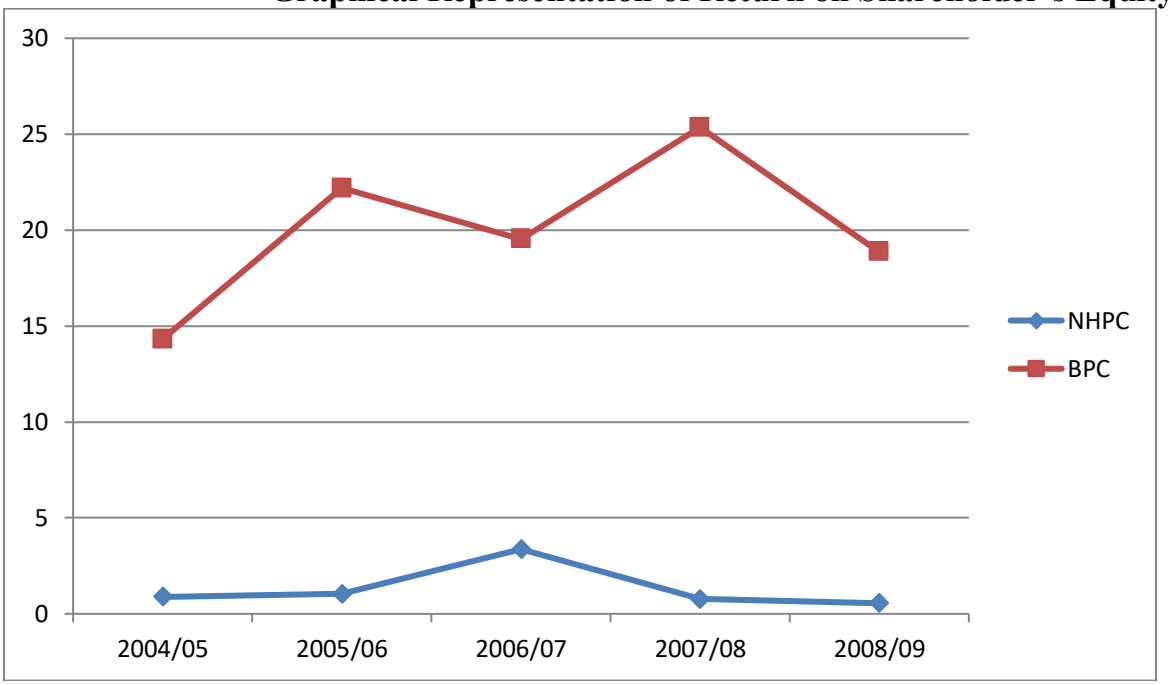
Table No. 4.12
Calculation of Return on Shareholder's Equity
In '000

Fiscal Year	Net Profit after Tax		Shareholders' Equity		Ratio (%)	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	197,761	14,222	1380,528	1598,955	14.32	0.89
2005/06	288,419	16,631	1300,568	1598,955	22.18	1.04
2006/07	252,840	53,168	1294,862	1575,528	19.53	3.37
2007/08	353,879	12,087	1395,820	1569,586	25.35	0.77
2008/09	291,592	11,513	1546,266	2085,896	18.86	0.55
($\bar{X}$)					20.05	1.32
(σ)					4.10	1.16
(CV)%					20.44	87.44

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

The above table shows that the BPC has attractive ROSHE compared to NHPC as its mean ratio is 20 times that of NHPC. This is due to more numbers of shareholder's in the market and considerable decrease in profit after tax.

Figure No. 4.12
Graphical Representation of Return on Shareholder's Equity



Graphical representation also shows fluctuation in ROSHE of BPC compared to NHPC. ROE of NHPC is less than ROE of BPC.

iv) Leverage/Capital Structure Ratio

Leverage ratio also called as capital structure ratios are calculated to judge the long term financial position of the company. This ratio indicates the mix of fund provided by owners and lenders.

a) Debt-Equity Ratio (D/E ratio)

Debt to shareholders equity is calculated dividing total debts by total shareholders' equity. This ratio shows the relationship between debt and equity capital.

b) Debt-to-total Assets ratio

Debt to Total assets ratio is calculated dividing total debt by total assets. This ratio shows the relationship between debt capital and total assets.

Table No. 4.13
Calculation of Leverage Ratios

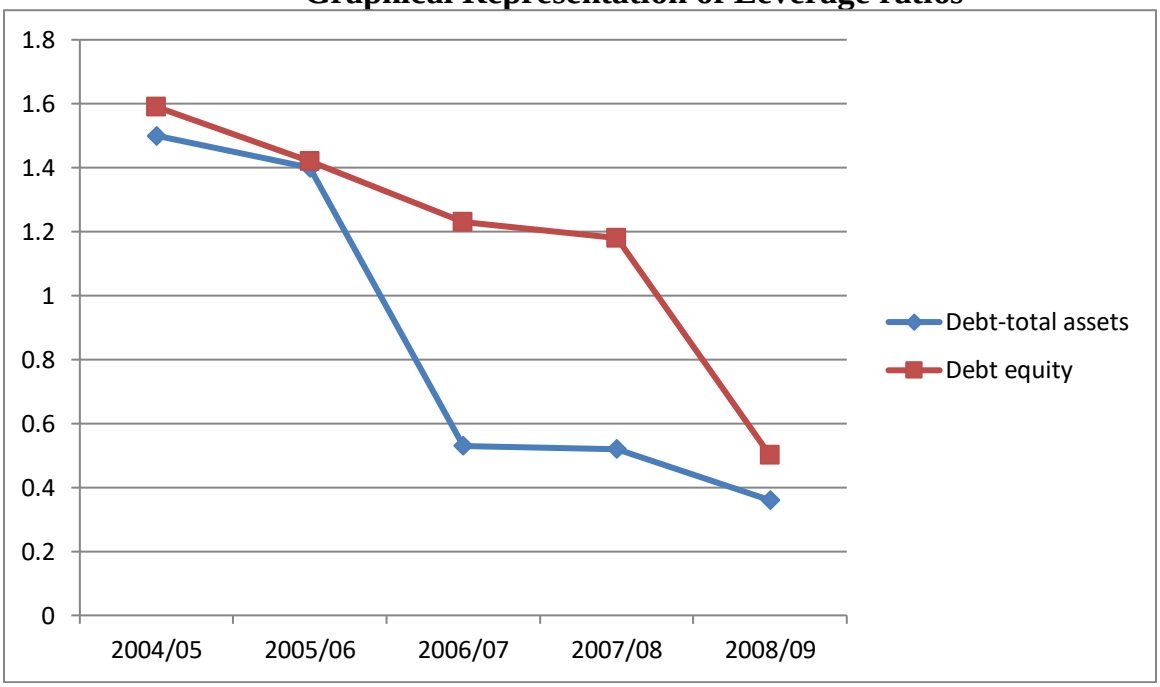
In'000

Fiscal Year	Total Debt of NHPC	Shareholders' Equity of NHPC	Total Assets of NHPC	Leverage ratios of NHPC	
				Debt to Equity	Debt to Total Assets
2004/05	1005,625	632,333	670,001	1.59	1.50
2005/06	939,358	659,596	670,001	1.42	1.40
2006/07	868,262	707,265	1625,489	1.23	0.53
2007/08	849,128	720,458	1628,198	1.18	0.52
2008/09	697,497	1388,399	1942,494	0.50	0.36
$(\bar{X})$				1.18	0.86
(σ)				0.42	0.54
(CV)%				35.09	62.89

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

The above table reveals a decreasing trend of leverage ratios of NHPC. The debt to shareholder's equity ratio has declined from 1.59 to 0.50 due to decrease in total debt and increase in shareholder's equity. Similarly, total debt to total assets is also decreasing trend from 1.50 to 0.36.

Figure No. 4.13
Graphical Representation of Leverage ratios



The above graphical representation shows drastic decrease in debt-total assets ratio and debt equity ratio for NHPC.

vi. Invisibility ratio

An analysis of invisibility ratios helps the investors to know about the performance of the company. Therefore following ratios have been calculated to rest earning capacity.

a) Earning per share (EPS)

This ratio is calculated dividing net profit after tax by number of equity share outstanding. The profitability of a company from the point of view of ordinary shareholders is the earning per share (EPS). EPS calculations made over years indicate whether or not the companies earning power on per share has changed over that period. EPS shows the amount of earning attributes to each equity share. If earning per share is high market price of the share may be increased in the market and vice versa. High ratio shows the sound profitability of the components.

Table No. 4.14
Calculation of Earning per share

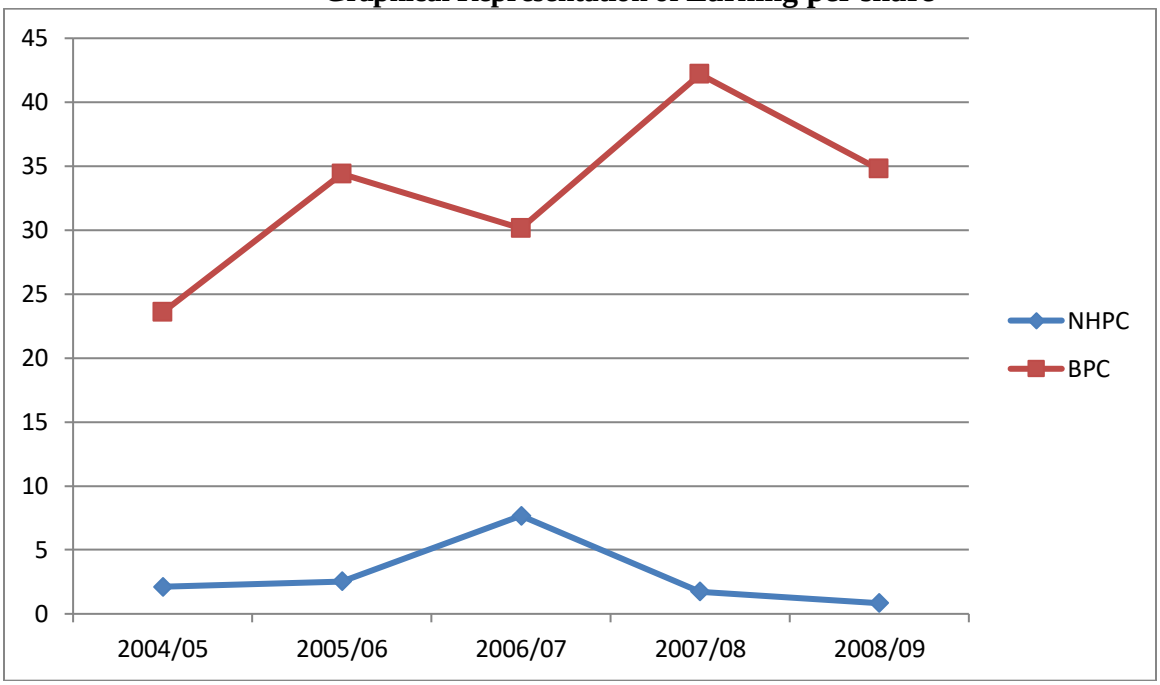
Fiscal Year	Earning after Tax		No. of Equity Share		Rs.	
	BPC	NHPC	BPC	NHPC	BPC	NHPC
2004/05	197,761,775	14,222,000	8,390,580	6,565,359	23.57	2.1
2005/06	288,418,689	16,631,282	8,390,580	6,565,359	34.37	2.53
2006/07	252,839,960	53,168,559	8,390,580	6,930,359	30.13	7.67
2007/08	353,879,380	12,087,560	8,390,580	6,941,410	42.18	1.74
2008/09	291,592,169	11,513,823	8,390,580	13,863,462	34.75	0.83
$(\bar{X})$					33.00	2.97
(σ)					6.83	2.70
(CV)%					20.68	90.74

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

The above table shows EPS of both NHPC and BPC. EPS of BPC is seen to be encouraging as it shows good EPS. But in case of NHPC, EPS is too low due to less earning. Due to low mean ratio of EPS, CV is very high in case of NHPC and investors are unwilling to buy shares.

Figure No. 4.14

Graphical Representation of Earning per share



The graphical representation shows EPC of BPC is higher than EPS of NHPC.

b) Dividend per Share (DPS)

The dividend per share (DPS) is the per share earnings distributed to the shareholders. It can be calculated total dividend distributed divided by number of outstanding shares. This ratio shows per rupee earnings actually distributed to common stock holders per share held by them. High ratio is favorable for the shareholders.

c) Dividend Payout Ratio

This ratio is the ratio between dividends per share (DPS) to Earning per share (EPS) is known as dividend payout ratio. It determines the portion of per share dividend paid out of per share earnings. The higher ratio is better to the shareholders. It builds faithfulness of the company.

4.1.6 Correlation Analysis

Karl Pearson's coefficient of correlation is most widely used in practice to measure the degree of relationship between two variables of the company. So, it measured by using the following formula.

I) Correlation between Total Sales and Total Assets

The coefficient of correlation between total sales and total assets of both companies for the different sampled year has been calculated in the following table.

Correlation between Total Sales and Total Assets of NHPC

In '000

Year	Sales (X)	Total Assets (Y)	X^2	Y^2	X*Y
2004/05	215,465	595,365	46,425,166,225	354,459,483,225	1.28280E+11
2005/06	213,368	670,001	45,525,903,424	448,901,340,001	1.42957E+11
2006/07	219,564	1,625,489	48,208,350,096	2,642,214,489,121	3.56899E+11
2007/08	195,581	1,628,198	38,251,927,561	2,651,028,727,204	3.18445E+11
2008/09	189,265	1,942,494	35,821,240,225	3,773,282,940,036	3.67646E+11
Total	∑X=	∑Y=	$\sum X^2$=	$\sum Y^2$=	∑XY=
	1,033,243	6,461,547	214,232,587,531	9,869,886,979,587	1,314,227,000,000

Correlation (r) = -0.64 Probable Error (P.E.) = 0.178

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X)^2}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}} = -0.64 \text{ (See Annex I)}$$

$$P.E. = 0.6745 * \frac{1 - r^2}{\sqrt{N}} = 0.178 \text{ (See Annex I)}$$

Correlation between Total sales and Total assets of BPC

In '000

Year	Sales (X)	Total Assets (Y)	X^2	Y^2	X*Y
2004/05	323,134	1,439,238	104,415,581,956	2,071,406,020,644	4.65067E+11
2005/06	358,419	1,744,447	128,464,179,561	3,043,095,335,809	6.25243E+11
2006/07	379,769	1,882,271	144,224,493,361	3,542,944,117,441	7.14828E+11
2007/08	421,687	1,986,926	177,819,925,969	3,947,974,929,476	8.37861E+11
2008/09	438,840	2,132,439	192,580,545,600	4,547,296,088,721	9.358E+11
Total	∑X=	∑Y=	$\sum X^2$=	$\sum Y^2$=	∑XY=
	1,921,849	9,185,321	747,504,726,447	17,152,716,492,091	35.78E+11

Correlation (r) = 0.97 Probable Error (P.E.) = 0.015

$$r = \frac{N\Sigma XY - \Sigma X\Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}} = 0.97 \text{ (See Annex II)}$$

$$P.E. = 0.6745 * \frac{1-r^2}{\sqrt{N}} = 0.015 \text{ (See Annex II)}$$

The coefficient of correlation between total sales (X) and total Assets(Y) of BPC and NHPC came to be 0.97 and -0.64 respectively. This suggests that the two variables have positive relation to each other in BPC and negative relation to each other in case of NHPC.

However, coefficient of correlation in BPC appeared more than six times of P.E. i.e. 0.97 > 6*0.015which implies that the relation between Total Sales and Total Assets is at significant level. Similarly, coefficient of correlation in NHPC also appeared less than 6 times of P.E. i.e.-0.64 < 6*0.178, which implies that the relation between total sales and total assets is not at significant level.

II) Correlation between Total Sales and Net Profit after tax

The coefficient of correlation between total sales and total assets of both companies for the different sampled year has been calculated in the following table.

Correlation between Total Sales and Net Profit after tax of NHPC

In '000

Year	Sales (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/05	215,465	14,222	46,425,166,225	202,265,284	3064343230
2005/06	213,368	16,631	45,525,903,424	276,590,161	3548523208
2006/07	219,564	53,168	48,208,350,096	2,826,836,224	11673778752
2007/08	195,581	12,087	38,251,927,561	146,095,569	2363987547
2008/09	189,265	11,513	35,821,240,225	132,549,169	2179007945
Total	∑X= 1,033,243	∑Y= 107,621	$\sum X^2$= 214,232,587,531	$\sum Y^2$= 3,584,336,407	∑XY= 22,829,640,682

Correlation (r) = 0.62 Probable Error (P.E.) = 0.186

$$r = \frac{N\Sigma XY - \Sigma X\Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}} = 0.62 \text{ (See Annex III)}$$

$$P.E. = 0.6745 * \frac{1-r^2}{\sqrt{N}} = 0.186 \text{ (See Annex III)}$$

Correlation between Total Sales and Net Profit after tax of BPC

In '000

Year	Sales (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/05	323,134	197,761	104,415,581,956	39,109,413,121	63903302974
2005/06	358,419	288,419	128,464,179,561	83,185,519,561	1.03375E+11
2006/07	379,769	252,840	144,224,493,361	63,928,065,600	96020793960
2007/08	421,687	353,879	177,819,925,969	125,230,346,641	1.49226E+11
2008/09	438,840	291,592	192,580,545,600	85,025,894,464	1.27962E+11
Total	∑X= 1,921,84	∑Y= 1,384,491	∑X^2= 747,504,726,447	∑Y^2= 396,479,239,387	∑XY= 540,487,353,648

Correlation (r) = 0.78 Probable Error (P.E.) = 0.120

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}} = 0.78 \text{ (See Annex IV)}$$

$$P.E. = 0.6745 * \frac{1-r^2}{\sqrt{N}} = 0.120 \text{ (See Annex IV)}$$

The coefficient of correlation between Total Sales (X) and Net Profit after Tax(Y) of BPC and NHPC came to be 0.78 and 0.62 respectively. This suggests that the two variables have positive relation to each other in BPC and positive relation to each other in case of NHPC.

However, coefficient of correlation in BPC appeared more than six times of P.E. i.e. 0.78 > 6*0.120 which implies that the relation between Total Sales and Net Profit after Tax is at significant level. Similarly, coefficient of correlation in NHPC also appeared less than 6 times of P.E. i.e.0.62 < 6*0.186, which implies that the relation between total sales and Net Profit after Tax is not at significant level.

III) Correlation between Total Assets and Net Profit after tax

The coefficient of correlation between total sales and total assets of both companies for the different sampled year has been calculated in the following table.

Correlation between Total Assets and Net Profit after tax of NHPC

In '000

Year	Total Assets (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/05	1,439,238	14,222	2,071,406,020,644	202,265,284	20,468,842,836
2005/06	1,744,447	16,631	3,043,095,335,809	276,590,161	29,011,898,057
2006/07	1,882,271	53,168	3,542,944,117,441	2,826,836,224	1.00077E+11
2007/08	1,986,926	12,087	3,947,974,929,476	146,095,569	24,015,974,562
2008/09	2,132,439	11,513	4,547,296,088,721	132,549,169	24,550,770,207
Total	∑X= 9,185,321	∑Y= 107,621	∑X^2= 17,152,616,492,091	∑Y^2= 3,584,336,407	∑XY= 198,124,070,190

Correlation (r) = 0.022 Probable Error (P.E.) = 0.30

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}} = 0.022 \text{ (See Annex V)}$$

$$P.E. = 0.6745 * \frac{1-r^2}{\sqrt{N}} = 0.30 \text{ (See Annex V)}$$

Correlation between Total Assets and Net Profit after tax of BPC

In '000

Year	Total Assets (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/06	1,439,238	197,761	104,415,581,956	39,109,413,121	2.84625E+11
2005/06	1,744,447	288,419	128,464,179,561	83,185,519,561	5.03132E+11
2006/07	1,882,271	252,840	144,224,493,361	63,928,065,600	4.75913E+11
2007/08	1,986,926	353,879	177,819,925,969	125,230,346,641	7.03131E+11
2008/09	2,132,439	291,592	192,580,545,600	85,025,894,464	6.21802E+11
Total	∑X= 9,185,321	∑Y= 1,384,491	$\sum X^2$= 17,152,716,492,091	$\sum Y^2$= 396,479,239,387	∑XY= 2,588,603,743,893

$r = \frac{N\Sigma}{\sqrt{N\Sigma X^2-(\Sigma}}$ = 0.75(See Annex VI)

Correlation (r) = 0.75 Probable Error (P.E.) = 0.132

$P.E. = 0.6745 * \frac{1-r^2}{\sqrt{N}}$ = 0.132(See Annex VI)

The coefficient of correlation between Total Assets (X) and Net Profit after Tax(Y) of BPC and NHPC came to be 0.75 and 0.022 respectively. This suggests that the two variables have positive relation to each other in both BPC and NHPC.

However, coefficient of correlation in BPC appeared more than six times of P.E. i.e. 0.75 < 6*0.132 which implies that the relation between Total Assets and Net Profit after Tax is not at significant level. Similarly, coefficient of correlation in NHPC also appeared less than 6 times of P.E. i.e.0.02 < 6*0.30, which implies that the relation between total sales and Net Profit after Tax is not at significant level.

4.1.7 Least Square Linear Growth Trend Analysis

Trend analysis is a mathematical method which is widely used to find out future tendencies based on past findings and present assumption. Furthermore it is applied for finding out a trend for those series which change periodically in absolute amount.

I) Least square trend analysis of Total Sales Growth of BPC

In '000

Fiscal Year	Time	X=Time-3	Sales (Y)	X^2	X*Y	Trend Value (Y=α+βX)

2004/05	1	-2	323,134	4	-646,268	384,369.8
2005/06	2	-1	358,419	1	-358,419	325,433.8
2006/07	3	0	379,769	0	0	295,965.8
2007/08	4	1	421,687	1	421,687	295,965.8
2008/09	5	2	438,840	4	877,680	325,433.8
		$\sum X = 0$	$\sum Y =$ 1,921,849	$\sum X^2 =$ 10	$\sum XY =$ 294,680	
		$\alpha = 384,369.8$			$\beta = 29,468$	
2009/10	6	3				384,369.8
2010/11	7	4				472,773.8
2011/12	8	5				590,645.8

Least square trend analysis of Total Sales Growth of NHPC

Fiscal Year	Time	X=Time-3	Sales (Y)	X^2	X*Y	In '000 Trend Value ($Y=\alpha+\beta X$)
2004/05	1	-2	215,465	4	-430,930	220,686.0
2005/06	2	-1	213,368	1	-213,368	213,667.3
2006/07	3	0	219,564	0	0	206,648.6
2007/08	4	1	195,581	1	195,581	199,629.9
2008/09	5	2	189,265	4	378,530	192,611.2
		$\sum X = 0$	$\sum Y =$ 1,033,243	$\sum X^2 =$ 10	$\sum XY =$ -70,187	
		$\alpha = 206648.6$			$\beta = -7018.7$	
2009/10	6	3				185,592.5
2010/11	7	4				178,573.8

2011/12	8	5	171,555.1

The Y-intercept (α) and slope of the trend (β) of total sales of BPC remained to be Rs.384, 369.8 and Rs. 29,468 respectively. During the study period, total sales of BPC exposed and increasing trend. The trend equation of total sales is given by

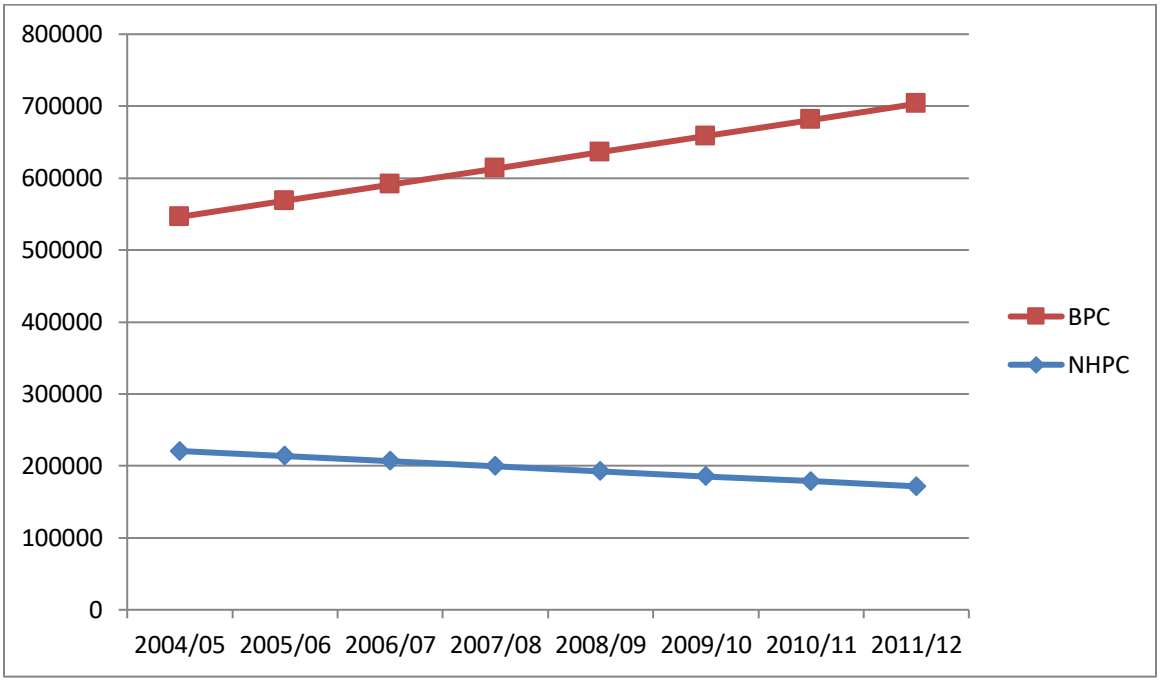
$$Y = 384,369.8 + 29,468\ X$$

According to the above trend equation, the forecasted value of total sales of BPC for coming years is shown in above table.

Similarly, the Y-intercept (α) and slope of the trend line (β) of total sales of NHPC remained to be Rs. 206648.6 and Rs. -7018.7. During the study period total sales of NHPC exposed a decreasing trend. The trend equation of total sales is given by

$$Y = 206648.6 - 7018.7\ X$$

From this trend equation, the forecasted value of total sales for NHPC for coming 3 years is shown above table.



The graph shows the forecasted future sales growth of BPC and NHPC.

II) Least square trend analysis of Net After Tax Growth of BPC

In '000

Fiscal	Time	X=Time-	Net Profit	X^2	X*Y	Trend

Year		3	after Tax (Y)			Value (Y=α+βX)
2004/05	1	-2	197,761	4	-395,522	109,637.0
2005/06	2	-1	288,419	1	-288,419	193,267.6
2006/07	3	0	252,840	0	0	276,898.2
2007/08	4	1	353,879	1	353,879	360,528.8
2008/09	5	2	291,592	4	1,166,368	444,159.4
		∑X = 0	∑Y = 1,384,491	∑X^2= 10	∑XY = 836,306	
		α = 276,898.2			β = 83630.6	
2009/10	6	3				527,790.0
2010/11	7	4				611,420.6
2011/12	8	5				695,051.2

Least square trend analysis of Net after Tax Growth of NHPC

Fiscal Year	Time	X=Time-3	Net Profit after Tax (Y)	X^2	X*Y	In '000 Trend Value (Y=α+βX)
2004/05	1	-2	14,222	4	-28,444	18,911.4
2005/06	2	-1	16,631	1	-16,631	20,217.8
2006/07	3	0	53,168	0	0	21,524.2
2007/08	4	1	12,087	1	12,087	22,830.6
2008/09	5	2	11,513	4	46,052	24,137.0

			∑X = 0	∑Y = 107,621	∑X²= 10	∑XY =13064
		α = 21,524.2				β = 1306.4
2009/10	6	3				25,443.4
2010/11	7	4				26,749.8
2011/12	8	5				28,056.2

The Y-intercept (α) and slope of the trend (β) of total sales of BPC remained to be Rs. 276,898.2 and Rs. 83630.6 respectively. During the study period, net profit after tax of BPC exposed and increasing trend. The trend equation of total sales is given by

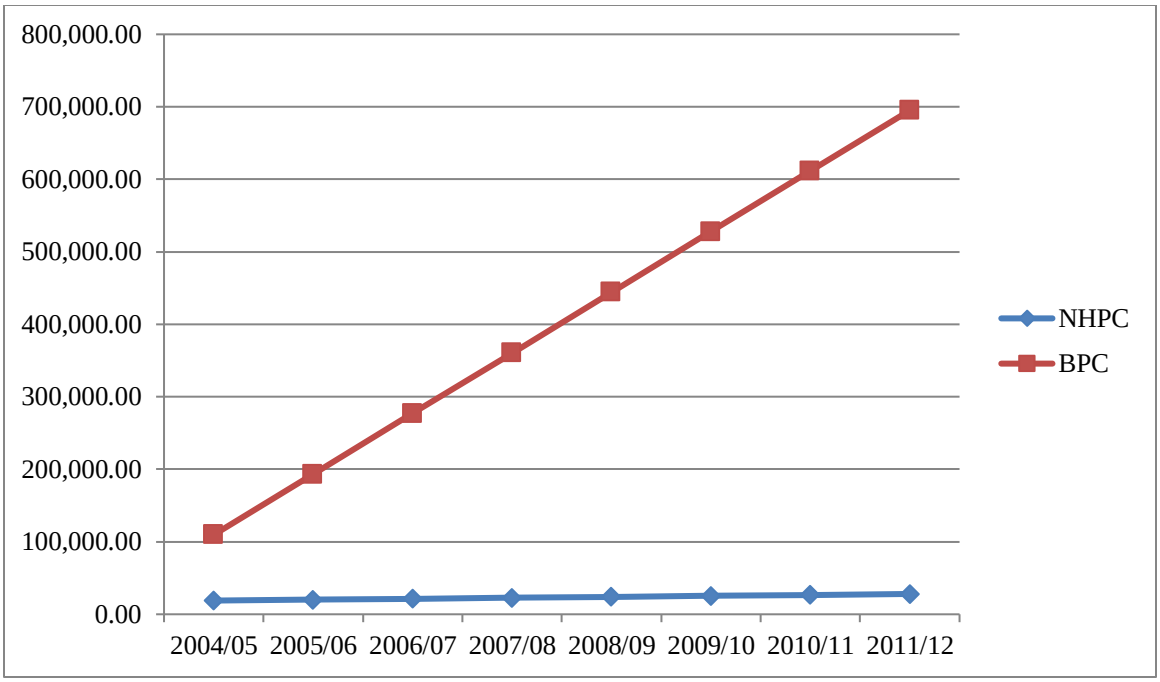
$$Y = 276,898.2 + 83630.6\ X$$

According to the above trend equation, the forecasted value of net profit after tax of BPC for coming years is shown in above table.

Similarly, the Y-intercept (α) and slope of the trend line (β) of total sales of NHPC remained to be Rs. 21,524.2and Rs. 1306.4. During the study period net profit after tax of NHPC exposed a increasing trend. The trend equation of net profit after tax is given by

$$Y = 21,524.2 + 1306.4\ X$$

From this trend equation, the forecasted value of total sales for NHPC for coming 3 years is shown above table.



The graph above show the future trend line of net profit after tax for NHPC and BPC.

III) Least square trend analysis of Earning per share of BPC

Fiscal Year	Time	X=Time-3	Earning per share (Y)	X^2	X*Y	In '000 Trend Value ($Y=\alpha+\beta X$)
2004/05	1	-2	23.57	4	- 47.14	26.96
2005/06	2	-1	34.37	1	- 34.37	29.98
2006/07	3	0	30.13	0	0	33.00
2007/08	4	1	42.18	1	42.18	36.01
2008/09	5	2	34.75	4	69.50	39.03
		$\sum X = 0$	$\sum Y = 165$	$\sum X^2 = 10$	$\sum XY = 30.17$	
		$\alpha = 33$			$\beta = 3.017$	
2009/10	6	3				42.05
2010/11	7	4				45.06

2011/12	8	5				48.08

Least square trend analysis of Earning per share of NHPC

In '000

Fiscal Year	Time	X=Time-3	Earning per share (Y)	X^2	X*Y	Trend Value (Y=α+βX)
2004/05	1	-2	2.1	4	-4.2	2.308
2005/06	2	-1	2.53	1	-2.53	2.641
2006/07	3	0	7.67	0	0	2.974
2007/08	4	1	1.74	1	1.74	3.307
2008/09	5	2	0.83	4	1.66	3.640
		∑X = 0	∑Y = 14.87	$\sum X^2$= 10	∑XY = -3.33	
		α = 2.974			β = 0.333	
2009/10	6	3				3.973
2010/11	7	4				4.306
2011/12	8	5				4.639

The Y-intercept (α) and slope of the trend (β) of Earning per share of BPC remained to be Rs. 33 and Rs. 3.017 respectively. During the study period, earning per share of BPC exposed an increasing trend. The trend equation of Earning per share is given by

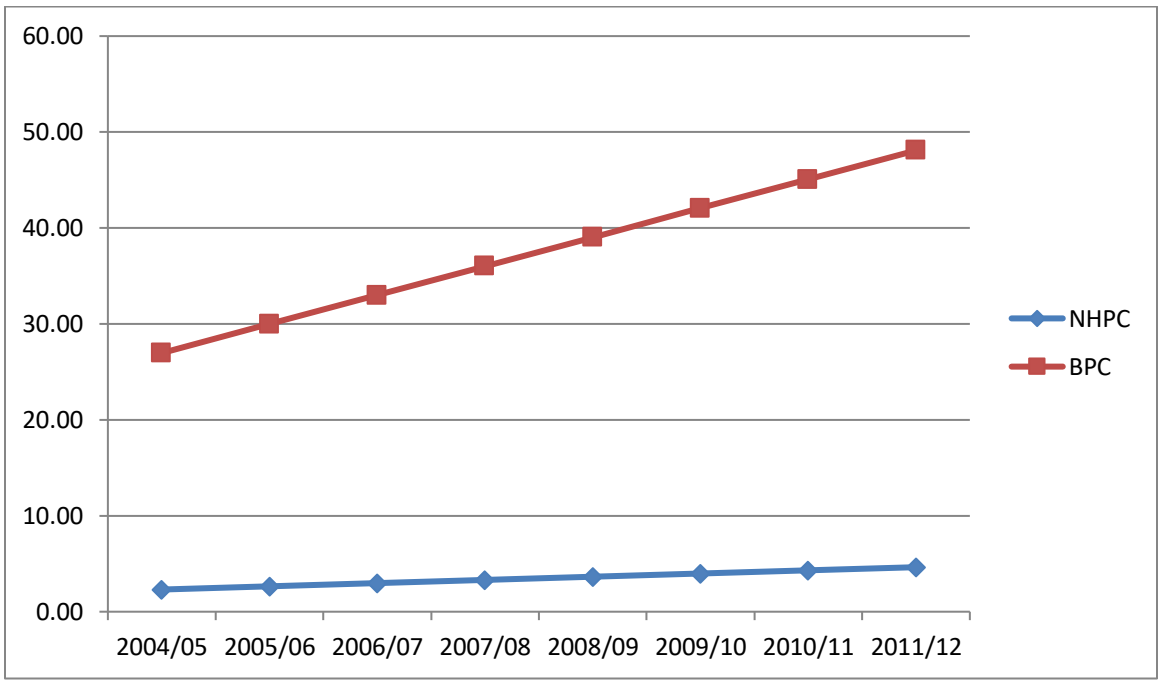
$$Y = 33 + 3.017\ X$$

According to the above trend equation, the forecasted value of Earning per share of BPC for coming years is shown in above table.

Similarly, the Y-intercept (α) and slope of the trend line (β) of Earning per share of NHPC remained to be Rs. 2.974 and Rs. 0.333. During the study period Earning per share of NHPC exposed an increasing trend. The trend equation of Earning per share is given by

$$Y = 2.974+0.333\ X$$

From this trend equation, the forecasted value of Earning per share for NHPC for coming 3 years is shown above table.



The graph above show the future trend line of Earning per share for NHPC and BPC.

4.2 Major findings of the Study

From above analysis and interpretation of data, the following findings have been made.

Current ratio o BPC and NHPC are in fluctuating trend. The current ratio of NHPC is more than BPC. CV of NHPC is higher than BPC which clearly indicates that NHPC has more fluctuations in ratios as compared with BPC. Mean ratio shows high liquid position of BPC and NHPC. Investment plan in the initial phase caused this problem. Both companies could maintain the conventional standard 2:1. However the average ratio of NHPC is more than BPC, which signifies that NHPC is more capable of meeting immediate liabilities in contrast to BPC.

Mean quick ratio of NHPC is more than BPC, which shows more fluctuation in quick position. Quick ratio of both NHPC and BPC are unstable, but in comparison to each other BPC is more stable. Both companies have been able to maintain the standard ratio of 1:1. The average ratio of NHPC is more, therefore, NHPC is able to maintain high liquid position but the high CV percentage suggest high fluctuating trend in NHPC ratios.

Mean ratio of fixed assets turnover ratios of NHPC is higher than BPC. It indicates that NHPC has efficient utilization of fixed assets. Since CV percentage is higher in case of NHPC than that of BPC, fixed asset turnover ratio is in favor of BPC.

The total asset turnover ratios of NHPC indicate unsatisfactory fluctuation. The ratio is higher for NHPC than BPC but its CV is higher than BPC which indicates high volatility. Therefore, BPC has more favorable condition as per its low CV value stable increment ratios.

Average debtor's turnover ratio of NHPC and BPC are 6.28 and 9.38; it indicates that NHPC has maintained good receivable management as well as its CV percentage is less compared to BPC.

Mean ratio of average collection period of BPC and NHPC is 71 and 39 days respectively. It indicates that NHPC has maintained more efficiency in collection of receivable. Similarly, both companies receivable period was fluctuating and NHPC has higher CV than NHPC. This indicates NHPC has managed its receivable well.

The mean ratio of capital employed turnover ratio o BPC and NHPC is 0.29 and 0.13 respectively. It indicates that the capital employed ratio of NHPC in the study period does not seem good. CV of BPC is lower which indicates volatility in ratio trend.

The mean of net profit margin of BPC and NHPC came to be 71.72 and 10.17 respectively. It indicates that BPC has maintained good net profit ratio. Similarly, CV of NHPC is higher. This shows the trend of NHPC's net profit margin is volatile than BPC.

The mean of operating profit ratio of BPC and NHPC is 72 % and 9 % respectively. This means that then operating profit earned by BPC is better compared to NHPC. The less sale of electricity has led to decrease in OPR of NHPC. The fluctuation in ratio is more in BPC as compared to NHPC. CV of NHPC is more compared to BPC which indicates volatility in ratios.

Mean of operating expense ratio of BPC and NHPC came to be 34.47 % and 10.61% respectively. This indicates the operating expenses of BPC are high due to its investment in various ventures whereas NHPC only has its investment in the daily operation of hydropower. The CV indicates that NHPC has high fluctuating trend.

Return on total assets of NHPC is more fluctuating trend than BPC. CV of NHPC is higher than CV of BPC. Similarly mean of ROTAs of BPC and NHPC came to be 15.04 and 12.19 respectively; it indicates that BPC made better return to use its total assets rather than BPC.

Return on shareholders' equity ratio measures the return on shareholders' investment in the hydropower companies. The average ratio for the return on shareholder's equity of BPC and NHPC are 20.05 % and 1.32 % respectively. The average ratio of BPC is higher than NHPC. CV of NHPC is very high which causes the ratio to be volatile.

Debt to equity ratio of NHPC is slightly increasing and decreasing but not that satisfactory. Its mean ratio and CV came 1.18 and 0.86 % respectively. Similarly, mean and CV of debt to asset ratio is 35.09 % and 62.89 % respectively for NHPC. In contrast there was no debt capital in BPC and it was fully financed by equity.

Mean ratio of EPS of BPC and NHPC are Rs. 33.00 and Rs. 2.97 respectively, it reveals that NHPC has low EPS than BPC and CV of EPS for NHPC is higher which indicates high volatility. EPS of BPC is satisfactory.

Dividend payout ratio of BPC is good because it has paid out dividend in regular fiscal year whereas NHPC has not paid any dividend yet. Its mean and CV values clearly indicate that and in terms of dividend payout ratio BPC is superior to NHPC.

The coefficient of correlation between sales and total assets of BPC and NHPC came to be 0.97 and -0.64 respectively. This value of correlation indicates the positive relation between values in case of BPC and negative relation in case of NHPC. However, considering the probable error of

BPC and NHPC, since the value of r is less than 6 P.E., the correlation is at less significant level.

The coefficient of correlation between sales and net profit after tax of BPC and NHPC came to be 0.78 and 0.62 respectively. This value of correlation indicates the positive relation to each other for BPC and negative relation to each other for NHPC. However, considering the probable error of BPC and NHPC, since the value of r is less than 6 P.E., the correlation is at less significant level.

The coefficient of correlation between total assets and net profit after tax of BPC and NHPC came to be 0.75 and 0.022 respectively. This value of correlation indicates the positive relation to each other for BPC and NHPC. However, considering the probable error of BPC and NHPC, since the value of r is less than 6 P.E., the correlation is at less significant level.

The trend equation forecasts the coming two year value of total sales by BPC as Rs.472, 773.8 and Rs. 590,645.8 thousand respectively. Similarly, the trend equation forecasts the coming two year value of total sales by NHPC as Rs. 185,592.5 and Rs. 178,573.8 thousand respectively

The trend equation forecasts the coming two year value of net profit after tax by BPC as Rs. 611,420.6 and Rs. 695,051.2 thousand respectively. Similarly, the trends equation forecasts the coming two year value of net profit after tax by NHPC as Rs.26, 749.8 and Rs. 28,052.2 respectively.

The trend equation forecasts the coming two year value of earning per share by BPC as Rs. 45.06 and Rs. 48.08 thousand respectively. Similarly, the trends equation forecasts the coming two year value of earning per share by NHPC as Rs.4.306 and Rs. 4.639 respectively.

Chapter –V

Summary, conclusion and recommendations

This chapter shows the final report of the study; this chapter is divided into three subheads. First subhead deals with the summary of the study in which result of calculations that is found in previous chapter in shorter manner. The second subhead is related with the conclusion of the study in which overall decisions made under the study are presented. The third subhead is the remedies or recommendations of the study.

5.1. **Summary**

This study has been undertaken to evaluate losses, operating cost and its effect in the financial position of the two hydropower companies, viz. National hydro power company and Butwal Power Company. To compare the financial status of two companies, the financial statement have been analyzed and evaluated through ratio analysis and statistical tools. Financial statements of previous year have been used in this study. Thus the study is based on historical data.

In the first chapter, general back ground, public enterprises in Nepal, statement of problem, objective of the study, need and importance of the study, limitation of the study, organization of chapters. Therefore, this chapter highlights the basic aims and structure of the study.

The second chapter reviewed the existing literature on the performance of BPC and NHPC, hydropower in Nepal, its potentiality, hydropower development and classification, mini-micro hydropower, small hydropower, medium hydropower, large hydropower. This chapter has also reviewed the existing studies undertaken earlier in books, thesis and journals.

In the third chapter has briefly explained about the research methodology, which is used to evaluate the financial position of BPC and NHPC. This chapter has dealt about research design, types and sources of data, method of analysis, leverage, and tools for analysis, ratio analysis, types of ratio, method of presentation and analysis.

The liquidity ratios of the companies seem to be inconsistent. BPC and NHPC both have maintained proper liquidity position. The mean and CV of current ratios of BPC came to be 2.21 times and 100.72 %, the mean and CV of current ratios of NHPC came to be 3.90 times and 177.67%. Similarly, the mean and CV of quick ratio of BPC came to be 1.96 times and 95.12 %, the mean and CV of quick ratio of NHPC came to be 3.89 times and 178.28 %.

Except that of DTRs all other activity ratios of BPC present fairly consistent trends for the last five years. Whereas, NHPC holds more variation in all activity ratios as compared to BPC, the mean and CV of FATORs of BPC came to be 0.52 and 10.49%. Similarly, the mean and CV for NHPC came to be 0.58 and 103.95%. CV of TATORs of BPC came to be 0.21and 3.37 %, the mean and CV of TATORs of NHPC came to be 0.29 and 71.41 %. Similarly, mean and CV of DTRs of BPC came to be 6.28 and 45.20 % and that of NHPC is 9.38 and 10.04 %, the mean and CV of ACPs of BPC came to be 71 and 57.88%, the mean and CV of ACPs of NHPC came to be 39 days and 9.97 %.

Unlike NHPC, BPC has considerably high OERs and shows rather consistent trends of profitability ratios. It has higher NPRs compared to NHPC. The mean and CV of NPRs of BPC is 71.72 % and 13.77 %. Similarly, the mean and CV of NHPC is 10.17 % and 77.47 %. The mean and CV of OPR of BPC is 72 % and 3 % whereas mean and CV of OPR of NHPC is 9% and 32%. The mean and CV of OER of BPC is 34.47 % and 15.46% whereas mean and CV of OER of NHPC is 10.61% and 31.17%. The mean and CV of ROTA of BPC is 15.04 % and 13.32% whereas mean and CV of ROTA of NHPC is 12.19% and 68.67%. The mean and CV of ROE of BPC is 20.05 % and 20.44% whereas mean and CV of ROE of NHPC is 1.32% and 87.44%.

While BPC is all equity financed, the leverage ratios NHPC reveal decreasing risk of insolvency each year. When the mean and CV of debt to shareholders equity of NHPC came to be 1.18 and 35.09 %, the mean and CV of debt to total assets ratios of NHPC came to be 0.86 and 62.89 %.

The invisibility ratios of NHPC present fluctuating trends. BPC has higher earnings per share than NHPC. The mean and CV of EPS ratio of BPC came to be Rs. 33 and 20.68%. The mean and CV of NHPC is Rs. 2.97 and 90.74 %. Since the NHPC hasn't distributed any dividend to the shareholders so far the DPR and DPS has not been calculated for both companies as this is a comparative evaluation.

The coefficient of correlation between total sales and total Assets of BPC and NHPC came to be 0.97 and -0.64 respectively. This suggests that the two variables have positive relation to each other in BPC and negative relation to each other in case of NHPC. Similarly, probable errors of BPC and NHPC came 0.178 and 0.015.

The coefficient of correlation between total sales and net profit after tax of BPC and NHPC came to be 0.62 and 0.78 respectively. This suggests that the two variables have positive relation to each other in BPC and positive relation to each other in case of NHPC. Similarly, probable errors of BPC and NHPC came 0.186 and 0.120.

.The coefficient of correlation between total assets and net profit after tax of BPC and NHPC came to be 0. 022 and 0.75 respectively. This suggests that the two variables have positive relation to each other in BPC and positive relation to each other in case of NHPC. Similarly, probable errors of BPC and NHPC came 0.132 and 0.30.

According to trend equation, the forecasted value of total sales of BPC for three years is Rs. 384,369.8, Rs. 472,773.8 and Rs. 590,645.8 thousand respectively. Similarly from the trend equation the forecasted value of total sales growth for NHPC is Rs. 185,592.5, Rs. 178,573.8 and Rs. 171,555.1 thousand respectively.

According to trend equation, the forecasted value of net profit after tax of BPC for three years is Rs. 527,790.0, Rs. 611,420.6 and Rs. 695,051.2 thousand respectively. Similarly from the trend equation the forecasted value of net profit after tax growth for NHPC is Rs. 25,443.4, Rs. 26,749.8 and Rs. 28,056.2 thousand respectively.

According to trend equation, the forecasted value of Earning per share of BPC for three years is Rs. 42.05, Rs. 45.06 and Rs. 48.08 respectively. Similarly from the trend equation the forecasted value of total sales growth for NHPC is Rs. 3.973, Rs. 4.306 and Rs. 4.639 respectively.

5.2. Conclusion

As per the analysis and interpretation of data the following conclusions have been derived.

- Both companies have maintained proper liquidity position which means both companies average ratios are above standard level. But NHPC has considerably decreased its liability in the last fiscal year it stands ahead of BPC in meeting its liabilities.
- The fixed asset turnover ratio of both companies is satisfactory. Net fixed assets of NHPC are very high and proper management could lead to better fixed assets turnover ratio. Though debtor's turnover ratios are almost equivalent, considering the average collection period. It can conclude that NHPC suffers less the problem of outstanding debt collection.
- Though BPC has high operating expenses ratio and inconsistent trend in its net profit ratios. The overall performance with respect to profitability compared to NHPC, BPC seems far ahead. However, considering the return on shareholder's equity and return on total assets, it is obvious that one would preferably invest in BPC rather than NHPC.
- BPC is all equity financed and thus the risk of insolvency is minimized for this company. The risk of insolvency of NHPC has been decreasing each year with the decrease in its leverage ratios.

- Though BPC has 16 times higher EPS with compared to that of NHPC and its regular delivery of dividend to the shareholders conceals the real charisma. In other word BPC is more liberal in distributing dividend to stakeholders than NHPC. Therefore, BPC provides better investment opportunities.
- The coefficient of correlation for total sales and total assets of NHPC is negative which shows the negative and significant relation whereas in case of BPC the value is positive and it shows positive relation and insignificant relation.
- The coefficient of correlation for total sales and net profit after tax of NHPC and BPC is positive which shows the positive and significant relation. It shows BPC is more capable of yielding more profit and sales.
- The coefficient of correlation for total assets and net profit after tax of NHPC and BPC is positive which shows the positive and significant relation.

5.3. Recommendations

Based on conclusions, some recommendations are presented below:

- The liquidity of both companies is satisfactory but BPC has to cut off its current liabilities to maintain a proper liquidity position.
- Fixed assets turnover ratio of BPC is satisfactory but total assets need to be managed more effectively. Similarly, both fixed assets and total assets need to be managed in case of NHPC. BPC also needs to find better ways to control and improve its receivable.
- The profitability position of BPC is satisfactory. NHPC can do much to increase the net profit margin and its ROE and ROTA by better utilization of its assets. There is also a need for effective production management to control operating cost of BPC.
- Despite the availability of lucrative investment opportunities, shareholders need to be satisfied with dividends. NHPC has not given any dividends as it is not in a position to do so.
- The projected sales values can be met by setting production and sales plans and formulating proper policies and strategies. The private public sectors should implement new techniques of management such as participative management, management by objective and total quality management.
- There should be proper cost control on maintenance activities.
- The hydropower sectors should maintain a separate human resource department to make sure that there is an effective system of handling grievance of employees and conduction of management development and training programs.
- As per hydropower policy, 1992 the government of Nepal shall provide and exemption of income tax to the projects of private sector generating and distributing electricity from the hydroelectric project up to the capacity of 1,000 kW.

- The hydropower sectors should follow the practices of setting financial goals for future activities and should develop major programs to accomplish them.
- Government should formulate plans and policies to attract FDIs and private-public partnership for growth of hydropower companies creating investment friendly environment, security to hydropower development and caretaking to the needs of the local public.

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Annex I

Correlation between Total Sales and Total Assets of NHPC

(In '000)

Year	Sales (X)	Total Assets (Y)	X^2	Y^2	X*Y
2004/05	215,465	595,365	46,425,166,225	354,459,483,225	1.28280E+11
2005/06	213,368	670,001	45,525,903,424	448,901,340,001	1.42957E+11
2006/07	219,564	1,625,489	48,208,350,096	2,642,214,489,121	3.56899E+11
2007/08	195,581	1,628,198	38,251,927,561	2,651,028,727,204	3.18445E+11
2008/09	189,265	1,942,494	35,821,240,225	3,773,282,940,036	3.67646E+11
Total	∑X=	∑Y=	$\sum X^2$=	$\sum Y^2$=	∑XY=
	1,033,243	6,461,547	214,232,587,531	9,869,886,979,587	1,314,227,000,000

Correlation (r) = -0.64 Probable Error (P.E.) = 0.178

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X)^2}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

$$or, r = \frac{5 * 1{,}314{,}227{,}000{,}000 - 1{,}033{,}243 * 6{,}461{,}547}{\sqrt{5 * 214{,}232{,}587{,}531 - (1{,}033{,}243)^2}\sqrt{5 * 9{,}869{,}886{,}979{,}587 - (6{,}461{,}547)^2}}$$

$$or, r = \frac{-105213E + 11}{1.64737E + 11}$$

$\therefore$ r=-0.64

$$P.E. = 0.6745 * \frac{1 - r^2}{\sqrt{N}} = 0.178$$

$$or, P.E. = 0.6745 * \frac{1 - (-0.64)^2}{\sqrt{5}}$$

$$\text{or, P.E.} = 0.6745 * \frac{0.59}{2.23}$$

$\therefore$ P.E. = 0.178

Annex II

Correlation between Total Sales and Total Assets of BPC

In '000

Year	Sales (X)	Total Assets (Y)	X^2	Y^2	X*Y
2004/05	323,134	1,439,238	104,415,581,956	2,071,406,020,644	4.65067E+11
2005/06	358,419	1,744,447	128,464,179,561	3,043,095,335,809	6.25243E+11
2006/07	379,769	1,882,271	144,224,493,361	3,542,944,117,441	7.14828E+11
2007/08	421,687	1,986,926	177,819,925,969	3,947,974,929,476	8.37861E+11
2008/09	438,840	2,132,439	192,580,545,600	4,547,296,088,721	9.358E+11
Total	∑X=	∑Y=	$\sum X^2$=	$\sum Y^2$=	∑XY=
	1,921,849	9,185,321	747,504,726,447	17,152,716,492,091	35.78E+11

Correlation (r) = 0.97 Probable Error (P.E.) = 0.015

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X)^2}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

$$\text{or, } r = \frac{(5*35.78E+11) - 1{,}921{,}849*9{,}185{,}321}{\sqrt{5*747{,}504{,}726{,}447 - (1{,}921{,}849)^2}\sqrt{5*17{,}152{,}716{,}492{,}091 - (9{,}185{,}321)^2}}$$

$$or, r = \frac{(1.789E+13) - 1.76528E+13}{\sqrt{(3.73752E+12) - (3.6935E+12)}\sqrt{(8.5763E+13) - (8.437E+13)}}$$

$$\text{or, } r = \frac{2.372E+11}{209{,}809.5647*1{,}180{,}449.316}$$

$$\therefore r = 0.97$$

$$P.E. = 0.6745 * \frac{1 - r^2}{\sqrt{N}}$$

$$\text{Or, P.E.} = 0.6745 * \frac{1-(0.97)^2}{\sqrt{5}}$$

$$\therefore \text{ P. E.} = 0.015$$

Annex III

Correlation between Total Sales and Net Profit after Tax of NHPC

In '000

Year	Sales (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/05	215,465	14,222	46,425,166,225	202,265,284	3064343230
2005/06	213,368	16,631	45,525,903,424	276,590,161	3548523208
2006/07	219,564	53,168	48,208,350,096	2,826,836,224	11673778752
2007/08	195,581	12,087	38,251,927,561	146,095,569	2363987547
2008/09	189,265	11,513	35,821,240,225	132,549,169	2179007945
Total	∑X= 1,033,243	∑Y= 107,621	∑X^2= 214,232,587,531	∑Y^2= 3,584,336,407	∑XY= 22,829,640,682

Correlation (r) = 0.62 Probable Error (P.E.) = 0.186

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

$$\text{or,} r = \frac{5*22,829,640,682 - 1,033,243*107,621}{\sqrt{5*214,232,587,531 - (1,033,243)^2}\sqrt{5*3,584,336,407 - (107,621)^2}}$$

$$\text{or, } r = \frac{(1.14148E+11) - 1.11199E+11}{\sqrt{3571840606}\sqrt{6339402394}}$$

$$\text{or, r} = \frac{2949558507}{4758501328}$$

$$\therefore \text{r} = 0.62$$

$$P.E. = 0.6745 * \frac{1-r^2}{\sqrt{N}}$$

$$\text{Or, P.E.} = 0.6745 * \frac{1-(0.62)^2}{\sqrt{5}}$$

$$\text{Or, P.E.} = 0.6745 * \frac{0.6156}{2.23}$$

$$\therefore \text{P.E.} = 0.186$$

Annex IV

Correlation between Total Sales and Net Profit after tax of BPC

In '000

Year	Sales (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/05	323,134	197,761	104,415,581,956	39,109,413,121	63903302974
2005/06	358,419	288,419	128,464,179,561	83,185,519,561	1.03375E+11
2006/07	379,769	252,840	144,224,493,361	63,928,065,600	96020793960
2007/08	421,687	353,879	177,819,925,969	125,230,346,641	1.49226E+11
2008/09	438,840	291,592	192,580,545,600	85,025,894,464	1.27962E+11
Total	∑X= 1,921,849	∑Y= 1,384,491	$\sum X^2$= 747,504,726,447	$\sum Y^2$= 396,479,239,387	∑XY= 540,487,353,648

Correlation (r) = 0.78 Probable Error (P.E.) = 0.120

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

$$or, r = \frac{5 * 540,487,353,648 - 1,921,849 * 1,384,491}{\sqrt{5 * 747,504,726,447 - (1,921,849)^2}\sqrt{5 * 396,479,239,387 - (1,384,491)^2}}$$

$$or, r = \frac{41,654,124,381}{53729631556}$$

$$\therefore r = 0.78$$

$$P.E. = 0.6745 * \frac{1 - r^2}{\sqrt{N}}$$

$$or, P.E. = 0.6745 * \frac{1-(0.78)^2}{\sqrt{5}}$$

$$or, P.E. = 0.6745 * \frac{1-0.6084}{2.23}$$

$$\therefore P.E. = 0.120$$

Annex V

Correlation between Total Assets and Net Profit after tax of NHPC

In '000

Year	Total Assets (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/05	1,439,238	14,222	2,071,406,020,644	202,265,284	20,468,842,836
2005/06	1,744,447	16,631	3,043,095,335,809	276,590,161	29,011,898,057
2006/07	1,882,271	53,168	3,542,944,117,441	2,826,836,224	1.00077E+11
2007/08	1,986,926	12,087	3,947,974,929,476	146,095,569	24,015,974,562
2008/09	2,132,439	11,513	4,547,296,088,721	132,549,169	24,550,770,207
Total	∑X= 9,185,321	∑Y= 107,621	∑X^2= 17,152,616,492,091	∑Y^2= 3,584,336,407	∑XY= 198,124,070,190

Correlation (r) = 0.022 Probable Error (P.E.) = 0.30

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)} - \sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

$$or, r = \frac{5 * 198,124,070,190 - 9,185,321 * 107,621}{\sqrt{5 * 17,152,616,492,091 - (9,185,321)^2}\sqrt{5 * 3,584,336,407 - (107,621)^2}}$$

$$or, r = \frac{2086919609}{93970940628}$$

$$\therefore r = 0.022$$

$$P.E. = 0.6745 * \frac{1-r^2}{\sqrt{N}}$$

$$or, P.E. = 0.6745 * \frac{1 - (0.022)^2}{\sqrt{5}}$$

$$or, P.E. = 0.6745 * \frac{0.9995}{2.23}$$

$$\therefore P.E. = 0.30$$

Annex VI

Correlation between Total Assets and Net Profit after tax of BPC

In '000

Year	Total Assets (X)	Net Profit After Tax (Y)	X^2	Y^2	X*Y
2004/06	1,439,238	197,761	104,415,581,956	39,109,413,121	2.84625E+11
2005/06	1,744,447	288,419	128,464,179,561	83,185,519,561	5.03132E+11
2006/07	1,882,271	252,840	144,224,493,361	63,928,065,600	4.75913E+11
2007/08	1,986,926	353,879	177,819,925,969	125,230,346,641	7.03131E+11
2008/09	2,132,439	291,592	192,580,545,600	85,025,894,464	6.21802E+11
Total	∑X= 9,185,321	∑Y= 1,384,491	$\sum X^2$= 17,152,716,492,091	$\sum Y^2$= 396,479,239,387	∑XY= 2,588,603,743,893

Correlation (r) = 0.75 Probable Error (P.E.) = 0.132

Sources: Annual report of BPC and NHPC (F/Y 2004/05-2008/09)

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X^2)}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}} \; or, r = \frac{5*2,588,603,743,893 - 9,185,321*1,3584,491}{\sqrt{5*17,152,716,492,091 - (9,185,321)^2}\sqrt{5*396,479,239,387 - (1,384,491)^2}}$$

$$or, r = \frac{2.26024E + 11}{3.02298E + 11}$$

$$\therefore r = 0.75$$

$$P.E. = 0.6745 * \frac{1 - r^2}{\sqrt{N}}$$

$$or. P.E. = 0.6745 * \frac{1 - (0.75)^2}{\sqrt{5}}$$

$$\text{or, P.E.} = 0.6745 * \frac{0.4375}{2.23}$$

$$\therefore \text{P.E.} = 0.132$$