

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The home of mountains, sheltering the world biggest mountain “Mount Everest”, with birthplace of “Lord Buddha” is a typical introduction to Nepal. It is land-locked country located between longitudes 80⁰4' to 88⁰12' east and latitudes 26⁰22' to 30⁰27' north. It lies between two most economically powerful countries of the world; India in the east, south and west and China in the north. Nepal is mostly mountainous country having the area 147,181 sq km and population 264,945,04 (CBS, 2012). Geographically, it is divided in three regions; the Mountain region, the Hilly region and the Terai region. Politically it is divided into 5 development regions, 14 zones, 75 districts, 191 municipalities and 3276 VDCs (MoFALD, 2071).

Nepal is one of the richest countries in water resources. Though Nepal has huge potential of constructing large hydropower plants, the country is not able to mitigate the problem of energy crisis. Some studies have revealed that Nepal has higher economical potential in hydropower exploitation, which accounts almost 42000 MW of which only 758MW is harnessed (NPC, 2070). The electricity so far generated is far less than the demand of the country resulting large power crisis in country. Currently, Nepal is having the load shedding problem of up to 12 hours in a day. Less than 40% of the populations have access to electricity (IPPAN, 2013). This shows that much more energy have to be generated in the country to remove the energy crisis. Therefore, the major challenge is to distribute electricity to the remaining 60% of the population. Because of the lack of technological advancements, lack of skilled

workforce and lack of bigger investors in the country the desired level of demand has not been fulfilled yet. The need for large foreign investors has been realized to generate additional electricity.

Promoting hydroelectricity not only helps to fulfill the market demand of the electricity in the country but also helps the economic development and growth. The present issue is that the storage of other energy sources like oil and gas is declining and normally price is rising day by day because of excessive exploitation. In this situation, if the country cannot use the water resources available inside the territory and if it has to be dependent upon other countries, then it will create great problem in economic development and economic stability. Many people in Nepal are using kerosene for lighting lamps; many companies are using diesel generators to produce the electricity needed for them so that the country has to be dependent more on oil which is expensive. To remove this problem, production of hydroelectricity is only the solution. For this, we have to attract foreign investors to invest in large scale hydropower plant.

1.2 Economic Liberalization

A program of change in the direction of moving towards a free market economy. This normally includes the reduction of direct control on both internal and international transaction (Oxford Dictionary, 2003).

Economic liberalization is the process of facilitating cross-border flow of goods and services without barriers, promoting private investment, reducing role of state, removing subsidies and price control by state and eliminating legal restriction in the economy and plays the vital role to promote private sector in economic development.

Nepal began to implement structural adjustment program of the IMF and the World Bank since the mid-1980s and liberalization policy in 1990s, with a hope of accelerating economic development and growth after facing a continuous balance of payments (BOP) problem. To promote investment, the government introduced market-oriented new policies and acts such as Industrial Policy 1992, Industrial Enterprises Act 1992, Foreign Investment and One-window Policy 1992, and the Foreign Investment and Technology Transfer Act 1992 under the economic liberalization. These policies have given a priority to investment promotion in Nepal by providing incentives (Khanal and Shrestha, 2008).

1.3 Role of Economic Liberalization

Economic liberalization enhances the role of private sector in economic activity and infrastructure development. It transforms role of the government from ruler to facilitator in order to involve market forces in resource allocation. It refers to the opposite of economic regulation by the state and includes deregulation of markets, deregulation of prices, privatization of PEs, delicensing and removal of quota system in foreign trade. It works as a base of free-market economy whether all the economic activities are under the self mechanism and the government policies facilitate them. It is an instrument for domestic and foreign investors which creates investment friendly environment inside the country.

1.4 Statement of the Problem

Nepal depends upon mostly on traditional fuel resources. A well known fact is that the modern economic development can't accelerate without developing electric energy. The electric energy can be achieved also from alternative resources. But the alternative resources are limited in scale in their commercial use. So increasing demand of electricity cannot be

achieved without developing hydroelectric projects. Nepal has been spending large amount of foreign reserve in importing petroleum product, it causes unfavorable BOP situation. So considering available water resources and geological feature energy consumption pattern could change in the form of hydroelectricity.

Nepal has huge potentials of hydroelectricity but the country could not meet its domestic demand for electricity due to the lack of hydro-power generation. Although hydropower generations received priority in every five-year national plan from six and half decades, the plan were weakly implemented. Lack of electricity remains a major constraint to economic development and growth.

Lack of investment is a major problem of hydropower project. The countries its own resources both public and private sectors cannot meet the financial investment need for hydropower generation. After the end of Second World War, most developed countries assist to fewer developing countries for their aggregate economic development. After the economic liberalization, they were against the assistance but were on favor of trade. Nepalese economy was also dependent on foreign assistance before 1990s. Nowadays, most developed countries change their concept and say that "Not aid but trade". In this global scenario, Nepal has introduced new source of investment that may be foreign direct investment which can be the best alternative sources of hydropower production to fulfill the lack of capital investment and to mitigate the problem of energy crisis.

Although there are alternative resources for traditional fuel resources but only one prospect is development of hydro plants, which can be defined as sustainable energy source. Using large volume of traditional resources has brought serious environmental problems. Hydro electricity development in Nepal is in developing stage. Power has a great

significance for the overall development of a country from household uses to industrial uses.

Although Nepal introduced economic liberalization in 1980, facts show that country is unable to attract foreign investment in hydropower projects because of instability and unrest in the country. So to utilize the water resource for economic development of the country for strong economic state, it is necessary to invest in hydro energy sector. How energy requirement is fulfilled by hydro electric energy and how useful is foreign investment in hydro electric energy generation for the economic development and to beat the present energy crisis.

1.5 Objectives of the Study

The main objective of this study is to promote the foreign investment opportunities in Nepal, especially in the hydropower sector. This study not only gives the information about the investment possibilities in the country but also examines the opportunities and challenges for the investment.

The Specific objectives of the study are as follows:

-) To describe the development of hydroelectricity in Nepal,
-) To examine the consumption pattern of hydroelectricity in Nepal,
-) To analyze the existing FDI in the hydropower of Nepal,
-) To clarify the obstacles for foreign hydropower investors to invest in Nepal and suggest mitigating measures,

1.6 Significance of the Study

Hydro electricity development in Nepal is in developing stage due to lack of capital and technological factor. The socio-economic and political backgrounds are not favorable for developing this sector. The supply of hydro energy is always less than its demand. The state is facing huge energy crisis, Nepal could harness its 42,000 MW of hydroelectricity potential it needs atleast US\$ 100 billion in investments which the government cannot make its own resources both public and private (IPPAN, 2005). So, there is no alternative to attracting private sources of investment, especially FDI.

Even though Nepal has adopted the liberalization policy the foreign investors are not convinced. Foreign investors are not being attracted or assured because of instability and unrest thus foreign investment is not attracted as desired. So, the study with the new dimensions for the hydropower projects is necessary.

The constructions of hydropower projects not only enhance the economic development of a country but also promote environmental cleanliness and social development. Establishment of such projects provokes local peoples to have access to development of infrastructure. They can have some good opportunities of job and also they can invest some percentage of shares in hydropower projects. In the long run, it will help to improve their living standard.

Hydroelectricity refers to the clean energy. As a result, it reduces the green house gas emission and thus protects environment and always behaves as 1 long term source of alternative energy. Nepal has been facing the problem of energy crisis due to the lack of capital investment in hydropower. To mitigate this problem, it is necessary to attract foreign direct investment in hydropower sector. I hope this study will provide

some encouragement for the foreign investors to invest for the development of the hydropower generation. Later, it will obviously eradicate the current problem of energy crisis that the county is facing.

1.7 Research Methodology

1.7.1 Research Design

The research objectives and data sources create specific situation to apply research methodology. Current research is stood for foreign investment situation after adopting liberalization policy in hydropower of Nepal.

1.7.2 Nature and Sources of Data

This study report is descriptive as well as analytical in nature. Primarily, it is based on secondary data obtained from various reports and relevant literatures are also used as required. There are different types of data along with other information that has been collected to analyze the present situation of FDI in hydropower of Nepal. It is macro level study and only secondary data have been used for finding actual status of FDI in hydropower of Nepal.

1.7.3 Data Collection

The required data are mainly from secondary sources. There include various published and unpublished sources. Necessary data and information are collected from Nepal Electricity Authority (NEA), Water and Energy Commission Secretariat (WECS), Independent Power Producer Association Nepal (IPPAN) Department of Electricity Development (DOED), Ministry of Finance (MOF), Central Bureau of Statistics(CBS), Department of Industry (DOI) and various other national and international journals.

1.7.4 Analytical Tools and Presentation

The quantitative data presented in tabular form. Different statistical tools ratio percentage used for analyze the presented data in tabular form. Other data presenting techniques like pie-chart, bar-diagram and flow chart used as required in analysis.

1.8 Limitations of the Study

The study has been carried out in macro level and it is an academic research. The main limitation of the study is that it is based on secondary data and information from 2004 to 2013. This study covered only hydroelectricity among the other sources of energy.

1.9 Organization of Study

The study is divided into five chapters. The first chapter is introduction part. This consists of problem, objectives, research methodology, significance and limitation. The second chapter integrates the review of literature. The third chapter deals with hydro power development and consumption pattern including pros, cons and SWOT analysis of FDI hydropower. The fourth chapter covers FDI of hydropower in Nepal with consists of FDI over view, FDI in hydropower generation, industries approved for foreign investment, trends of FDI, important aspect of hydropower policy, barrier and risks of FDI on hydropower. The last chapter is for summary, conclusion and recommendation of the study.

CHAPTER – TWO

REVIEW OF LITERATURE

2.1 Foreign Direct Investment

Normally investment is regarded as imperative factors of aggregate demand, which eventually affects the level of aggregate supply in the economy. An investment is usually done to accelerate the available resources aiming a future returns.

Foreign direct investment (FDI) is a direct investment into production or business in a country by an individual or company of another country, either by buying a company in the target country or by expanding operations of an existing business in that country. Foreign direct investment is in contrast portfolio investment which is a passive investment in the securities of another country such as stock and bonds(Wikipedia).

The acquisition by resident of a country of real assets abroad. This may be done by remitting money abroad to be spent on acquiring land, constructing building, mines or machinery, or buying existing foreign business. Inward foreign direct investment similarly is acquisition by non-residents of real assets within the country, once a country has real assets abroad if the market profit which is ploughed back into expending enterprises thus should ideally be shown in the balance of payment as receipts on current account balanced by an outflow on capital account. In fact balance of payments accounts often shows only net remittances of profits as a currents accounts item, ignoring profits earned abroad and ploughed back on both current and capital account (Oxford Dictionary, 2003).

Foreign investments are classified in the form of either foreign portfolio investment or a direct investment. Foreign portfolio investment or the indirect investment is a mere investment in equity of enterprises, which eliminates management practices. On the other hand, Foreign Direct Investment (FDI) is a direct investment in an economy where the investors practices management skills along with the inclusion of technology, resources and skilled work force (Gillespie, 2007).

2.2 Hydropower

Many important and useful literatures are available for Nepalese water resource and hydropower sector. National and international expertise has been interested for their expertise in this sector. Some notable literatures on water resource and hydropower sector are reviewed here.

The power sector "Master Plan, JICA" (1974:35) states that the power market in India is large and growing at an annual rate of more than 10 percent, which may be mainly consumed by northern and eastern regional of India alone. As the report further state that Nepal has a lot possibility in hydropower, if this power can be produced in Nepal at a competitive cost compared to India, Nepal will have access to huge Indian market along the border areas. It cites the example of Bhutan which has become richer than Nepal by selling hydroelectricity to India from "Chukha" hydro project.

This report analyzes only energy market of Nepal but not mention to inflow of FDI in hydropower sector would be key factor to study.

Pokhrel (2001) in his article analyzed the importance of hydropower for sustainable development to mitigate energy crises and to reduce import of petroleum product. He says, during the period of 1990-2000 government spent more than 40 percent of export earning on petroleum product which

clearly denote energy demand and supply gap in Nepal; this gap can be reduced by investing in hydropower development. He further says that, the availability of large volume of water combined with steep slopes offers the potential to develop mere hydroelectricity which is not only becomes capable to meet its own domestic demands of electricity but also export to other countries.

He suggests that the need of policy interventions to promote hydropower development but not suggests financial sources for hydropower.

Dhungel(2002) in his article explained that energy is not only used to meet the basic need of households but also in transportation, industries, agriculture, service and commercial sector. Unavailability of adequate energy to fulfill the need of these sectors will paralyze our economy. Nepal is rich in water resources and hydro-electricity is the only endogenous sources of commercial energy. To meet the increasing demand for energy Nepal has been spending large amount of foreign currency to import fossil fuel which is one of adverse BOP. So Nepal should generate substantial amount of hydroelectricity from abundant water resources and sell to other countries that can be generate foreign currency in order to solve the unfavorable BOP.

He explains only the role of hydroelectricity to fulfill energy demand and to generate foreign currency but not mentions about foreign investment to generate hydro-electricity may be the sources of study.

Gurung (2003) in his research focused into the conditions of Nepalese water resources regarding to the energy sector expenditures with respect to time in the past, at present and future some of his recommendations based on this study are:

We should utilize the water resources at first water and energy are most obvious factor to be developed in proper resources case. Civilization, industrialization and development are only possible when these are sufficient energy and water. By developing the energy we can maintain the income generating industries so far which in turn provide funds for investment in other resources so that all resources are supported to act as cycle.

Establishment of research institutions on this type of water resources based issues is prime need. Environment friendly projects in this pollution suffered world are hot cake for investors. They are waiting for favorable environment for their investment. International lending institutions are eager to provide their influences by following their funds in water resources sector in Nepal.

Holding billion dollars in investment they can set up a sole research body where young enthusiastic researchers can get research aid to study the various sectors of water, energy environment, potential etc.

Energy use in mining exploration and construction process it needed deep drilling activities in the possible regions. Deep drilling can be easily done through electricity surplus utilization which accounts the exploration cost cheap for mining activities.

Likewise construction activities to be performed in the established of various infrastructures in the countries regular and continuous development activities excess surplus of hydroelectricity may be the best suited energy input so as to proportionate the cost of projects and resources optimization.

He explains only the important of water resources and hydroelectricity and foreign aid invested only hydro research programme but not focus on

financial sources to generate hydroelectricity which is available inside the country.

Bhattarai(2004) in his book estimated the financial resources for the development of hydropower in Nepal for the next 30 years and conception patter of energy.

According to him, electricity generated by different sources is mainly consumed by domestic sector, so we should concentrate our effort to use electricity in the small and large industries so that it can accelerate development pace; per capita electricity consumption has been growing significantly. So in order to meet the domestic demand, Nepal should increase investment in hydropower but reality is that we cannot manage that much of finance from our internal source. Because of such situation foreign aid plays an important role in harnessing hydropower potentiality. On the basis of his study he recommends small, medium and micro hydropower should be constructed. He further states that preference should be given to mobilize domestic financial resources by encouraging private sector investment in hydropower project but not emphasis on mobilization of FDI.

WECS (1995) in its publication prepared by water and energy commission secretariat has the only objective to prepare a joint perspective energy plan for the country which can survive the vigor, of public debate and thus from a consensus for energy planning while entering into 21st century. The book was the technical background document prepared towards the preparation of a perspective energy plan for Nepal to explore the issues and options for a long term energy development strategy.

In this context the book has discussed the different sources of energy in Nepal, their present status, potentiality and how the different energy sources can be prominent in Nepal.

As the discussion on different sources of energy in Nepal, Hydropower is the prominent source of energy having a lot of potentiality but not reaped properly. The book highlights that it is the tragedy of our country that the contribution of hydroelectricity in the overall energy consumption of Nepal is low although its share has been increasing. Regarding hydropower as a source of energy the book mentions "Nepal's steep topography copied with the favorable hydrology and dense river network, provides great opportunities for the development of hydropower plants of any capacity"but it is not mention about financial sources to produce hydroelectricity.

Adhikari (2006) in his article highlighted the prospects and challenges of hydropower. As the country has abundant water resource she has a lot of prosperity but there are challenges too.

) Producing hydropower in sufficient quantity and quality to meet the requirement is a challenge out due to financing and cost considerations.

) To maintain the regional balance in production and distribution capacity.

He concludes hydropower potential of Nepal is huge and sustainable hydropower development becomes the key to make Nepal's economic growth scenario brighter, gaining deep inroads into the national goal and priority of poverty reducing.

Tourism, hydropower, infrastructure, construction, information and communication, agro-processing, health etc. are the major investment

sectors in Nepal. Most of the investors are more concentrated in the manufacturing sectors. According to UNCTAD, manufacturing sector accounted for 50% of approved foreign direct investment (FDI) projects, over 40% of foreign investment and 65% of total employment in 2001. Among the total investment approved in the country, food and beverages and tobacco industry accounts for 25% and the amount of FDI in this sector is 24% whereas the textile and garment industry accounts for 24% of total FDI Projects. Beside these two fields, hydropower is also the next point of attraction for FDI. (Investment Policy Review, 2003)

Nepal's own resources cannot meet the financial investment needed for the large scale hydropower development. Today, it is not easy to obtain assistance from the international financial institutions for the hydropower development. A major reason for this is environmental and social impacts linked to the development of hydropower projects. Often environmental issues are misrepresented and this delays, or in some cases stops, the development of hydropower project. The World Bank had withdrawn from the Arun III Project in 1995 in Nepal (WCD, 2000). Together with environmental and social impacts of this project and the government instability might be the reason behind it.

The report clearly mentions that FDI cannot exist in hydropower due to socio-economic and environmental problem and political instability.

Shrestha (1991) has examined the concept and planning of hydropower development in Nepal on the basis past experience and present trends. He has stressed on the need for planning process not only contributing to the development of the vast hydro-electric potential but also long-term economic and environmental benefit to Nepal. According to him an alternative strategy for hydropower development in Nepal would be open for private investor which increased competition and decrease of

bureaucratic control over the system would lead to more efficient production.

He focused only alternative strategy and involvement of private sector for hydropower development but not focused on foreign financial sources for this.

Baral (2004) in his research has analyzed the problems of financing institutions hydropower developers and government agencies in financing hydropower projects in the context of Nepal. His research concludes that majority of the local financing institutions are interested to finance hydropower project but due to lack of experience in this sector they cannot invest. Many local financing institutions want to wait and see or learn little more before they invest in hydropower.

He recommended to financial institutions necessary to establishment of power development fund to invest in hydropower projects for long term lenders like power development fund (PDF) and clean energy banks (CEB) should established. The need to long term funding agencies like PDF and CEB has been increase day by day. If we are seriously thinking of power project financing, the concept is already started but it should be expedited and the capital base and lending procedure requirement must be learnt from experienced nations.

He analyzes the important of financial institution to invest in hydropower sector but cannot mention about FDI which is the basic tools of hydropower development in Nepal.

An investment guide to Nepal (2003) states that India is the major sources of FDI in Nepal so far followed by the USA, China ,Norway, Japan, The Republic of Korea, Canada, and Honkong also in terms of approved FDI. This report shows that the major area of FDI has been manufacturing and

service sector; recently there has been significant FDI in hydropower taking advantage of further policy liberalization in this sector. Nepal introduces economic liberalization a decade ago and committed to achieving high economic growth through the active participation of private sector. The government also committed to promoting Nepal as a location for FDI.

An investment guide to Nepal (2003) further explains about electricity market of India, particularly in its northern part of bordering Nepal is facing perpetually power shortages there are good prospects for power exports from Nepal to India, there is one obstacle here has been the non-ratification of an India- Nepal agreements on power trade signed in 1996, by Nepali parliament (parliamentary ratification is not required in India). The reason would appear to be concerns over the sharing of spin-off benefit of major hydropower project in Nepal. The issue may be resolved over the next year or two, given the recent improvements in diplomatic relation between two countries. The power trade agreement serves as the basis on which private sector firm in the two countries can enter into power-purchase agreements. Taking advantage of new policy of welcoming FDI in hydropower sector two joint-venture companies has already been generation and selling hydropower on a build-operate-transfer (BOT) basis. The Panda Energy Corporation of the United States has invested in the 36 MW Upper BhotheKoshi project in a joint venture with the Solti Group of Nepal, while Narway's Statekraft has invested in the 60 MW Khimti project.

The above study signifies that the trend of FDI In hydropower is positive but distribution of electricity is still the monopoly of government owned Nepal Electricity Authority (NEA), FDI cannot come only generation.

Investors need to finalize a power purchase agreements with NEA. It is the obstacle for foreign investor to invest in hydropower.

Rijal (2014) in his article has showed that it is more useful material for review. He state that our domestic saving is very low and nearly three-fourth of all development expenditure is met by foreign aid. Therefore, to harness 42000MW of technically and economically feasible hydropower which requires billions of dollars, there is no alternative but mobilize FDI. However except for Khimti and BhoteKoshi there has been no major investment due to political instability bureaucratic hassles and labor strike, which frighten investor. He explains about the important and obstacle of FDI in hydropower but not mention to attract FDI.

Shrestha (2007) in his article states that during past one decade domestic investor have invested US \$73.5 million and foreign investors \$233.6 million in the electricity generation in Nepal. Similarly, \$13.5 million was invested in buying shares in Butwal Power Company (BPC) held by government of Nepal. Thus in a span of one decade the private sector has succeeded in mobilizing \$322.6million to the power sector. According to him, trend of FDI is slowly increasing hydropower sector.

Majagaya (2009) examined the challenge of FDI in Nepal hydropower sector focus on selling electricity not on the water sharing. He says Nepal has abundant potential in hydropower but it is not properly utilized. To developed hydropower sector, we need FDI because Nepal's own resources both in the public and private sector cannot meet the financial investment. For this propose large investment is required from foreign development agencies and private sector enterprises. However, FDI itself is not a development but may act as a catalyst for the needed progress in this sector.

CHAPTER THREE
HYDROPOWER DEVELOPMENT AND CONSUMPTION
PATTERN IN NEPAL

3.1 History of Hydropower in Global Context

The evolution of the modern hydropower technology was coined first in the mid-1750s when a French hydraulic and military engineer, Bernard Forest de Belidor wrote “Architecture Hydraulique” by describing the vertical versus horizontal axis of machines. The development of turbines has continued after that also. In 1800, a brush dynamo driven by a water turbine was used to provide theatre and storefront lighting in Grand Rapids, Michigan and in 1881, a brush dynamo connected to a turbine in a flour mill provided street lighting at Niagara Falls, New York. Both of those projects used direct-current technology. But the first hydropower plant was developed on the Fox River in Appleton, Wisconsin in 1882 (NEEDP, 2012).

Hydropower is derived from generators turned by the force of falling water most other electric energy is obtained from generators driven by steam produced either by a nuclear reactor or by burning fossil fuel namely coal, gas and oil. In the initial stage, hydropower plants played a vital role in world, yet hydropower plants are estimated to provide only about 2 percent of the world energy requirement (Encyclopedia Britannica, 2013)

3.1.1 Pros and Cons of Hydropower

Although hydropower is a source of clean energy, reduce emission of greenhouse gas and accelerator of economic growth through industrialization (providing electricity for industrial development) it has some pros and cons which are as follows:

Pros of Hydropower

-) Hydropower reduces the air pollution and is based on green technology.
-) Water is free gift of nature, though it has not any cost but it involves only construction and the maintenance cost.
-) Hydropower has long life compare with other source of electricity but needed minimum maintenance for sustainable.
-) Hydropower is a flexible source of energy can be control easily.
-) It can be used as multipurpose project, such as irrigation, flood control etc.

Cons of Hydropower

-) Hydropower can produce electricity when there is enough water flow, during the dry season it will create crises.
-) Construction cost of hydropower is very high, so it needs huge investment.
-) Construction of dam for hydropower is very risky, even small mistakes in the construction process creates big problem and loss of investment.
-) Hydropower dams' drastically change in ecosystem, Creating natural disorder and inhabitants of wild life, endangered species resettlement of people affected by project.

3.1.2 SWOT Analysis of FDI in Hydropower Sector of Nepal

Energy plays the vital role of economic development and the cheapest sources of energy are hydropower, but its cost of construction is very high. In the contest of Nepal its own financial resources cannot meet the

target, for this propose we have to attract foreign investor in this sector. Due to huge internal and external demand of electricity, foreign investor desire to invest in hydropower. Here, it has attempted to analyze SWOT analysis of FDI in Hydropower of Nepal as follows:

Strengths of FDI in Hydropower

-) There is huge hydropower potentiality due to available of abundant water resources.
-) Implementation of new hydropower policy and appropriate geographic conditions for construction of hydropower projects are key factor for investor.
-) Foreign investment policy and hydropower policy allowed 100% FDI in Hydropower sector.
-) Availability of labor resources with low wage rate which is necessary for construction.

Weakness of FDI in Hydropower

-) There is arising great problem of power distribution due to lack of transmission lines.
-) Lack of political stability and policy inconsistencies create the problem of hydropower development.
-) PPA rates offered by NEA are very low.
-) Monopoly of NEA in electricity market, transmission lines and PPA rate.
-) There is no power trading mechanism with other countries especially with India.
-) Not to mention foreign exchange risk in PPA.

-) Unnecessary demand of local People is another problem faced by investor.

Opportunities of FDI in Hydropower

-) Government adopted new hydropower development policy under economic liberalization.
-) Huge energy demand and supply gap in Nepal and India.
-) Recently held in PTA between Nepal and India clearly solve the problem of electricity market.

Threats of FDI in Hydropower

-) Lack of political stability, good governance and maintain law and order are major issues.
-) Excessive unnecessary demands raise by local people at construction sites cannot be fulfill.
-) Climate change may affect the availability of water resources. In dry session water flow is very low.
-) How to create a more hospitable environment to attract foreign investor and investment from NRN.

3.2 History of Hydropower Development in Nepal

The history of power development in Nepal is not old. The first Hydropower development in Nepal started with the constriction of Pharping Power Plant with a capacity of 500 KW in 1911A.D. The second hydropower plant was established in 1934 with an installed capacity of 640KW at Sundarijal. Third hydropower plant with capacity of 1600 KW was constructed in 1942 at Chisang Khola (Morang) in private sector by Morang Hydro electric Company. It later was damaged due to several landslides (Pradhan, 2006).

During the Rana regime there was not any policy in hydropower development, after 1956 Nepal started periodic plan and gives more priority in hydropower development. Even Nepal has already passed almost a century in hydropower development, still the achievement in power generation is only 719.6MW where as electricity demand is 1094.62MW (NEA, 2013).

3.2.1 Theoretical, Technical and Economical Potentiality of Major Rivers in Nepal

The theoretical, technical and economical potentiality of main river system has been estimated 83.28, 45.61 and 42.133 million kw respectively. Table 3.1 has presented potentiality of major rivers as follows:

Table 3.1: Major River and Hydro Potentiality

(in million Kw)

River basin	Theoretical potential	Technical potential	Economic potential
Saptakoshi	22.35	11.40	10.860
Sapta Gandaki	20.65	6.66	5.270
Karnali Mahakali	36.18	26.57	25.125
Southern rivers	4.11	0.98	0.878
Country's total potentiality	83.29	45.61	42.133

Source: Energy synopsis report WECS, (2010).

3.3 Decade-wise Development of Hydropower

Our power development history begins from 1911A.D.and Nepal passed ten decade in hydroelectricity generation. The trend of power

development status in different decades has been shown in table 4.1 below. The highest growth of hydropower took place during 2001-2010 where in 328.96 MW (47.67 percent of the total) was produced followed by the decades of 1981-1990 and 1991-2000 decades which saw the production of 180.3 MW (26.11 percent of the total) and 125.9 MW (18.14 percent of the total) respectively. The period since 1981 produced 635.16 MW (91.99 percent of the total), implying that only 55.3 MW (8.01 percent of the total) was produced during the entire period of 1911-1980.

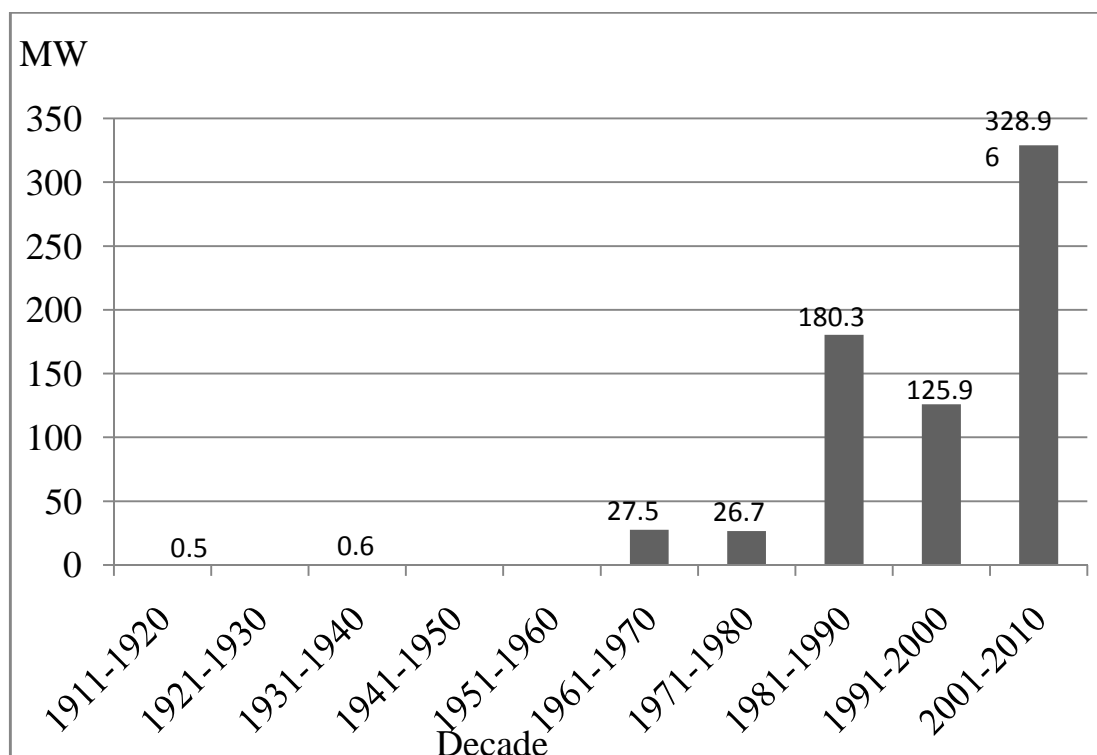
Table 3.2: Decade-wise Development of Hydropower

Decade	Generation (in MW)	Generation (in %)
1911-1920	0.5	0.072
1921-1930	0.0	0
1931-1940	0.6	0.087
1941-1950	0.0	0
1951-1960	0.0	0
1961-1970	27.5	3.98
1971-1980	26.7	3.87
1981-1990	180.3	26.11
1991-2000	125.9	18.14
2001-2010	328.96	47.65
Total	690.40	100

Source: Statistical Pocket Book Nepal, 2010, CBS, Ramshahpath.

Nepal has passed a century and more three years in hydropower development sector but it has achieved only 719.6MW till 2013. Since last three years (2010-2013) Nepal has produced only 29.2MW.

Figure 3.1: Decade-wise Development of Hydropower Generation (MW)



3.4 Acts, Regulations and Policies on Hydropower Sector in Nepal

Recent acts, regulations and policies related to the promotion of hydroelectricity are as follows:

3.4.1 Water Resources Act 1992

This act has been enacted to address the need to make arrangements for national utilization, conservation, management of water resources in Nepal and to make timely legal arrangements for determining beneficial uses of water resources, preventing environmental and other hazardous effects and also for keeping water resources free from pollution.

This act prioritizes the water use as drinking water, irrigation, other agricultural use, hydropower, industrial uses, navigation, recreational uses and other uses. This act introduces the concepts of licensing, water use associations and water quality.

3.4.2 Water Resources Regulations 1993

These regulations are developed to exercise the power conferred by the water resources act, 1992. These regulations provide detailed guidelines as to the formation of consumers association for water use, provisions relating to the use of water resources inquiry relating to the dispute regarding water resources, provision relating to service charges, and provisions relating to acquisition of house and land compensation.

3.4.3 Hydropower Development Policy 1992

This policy has been issued to attract individuals and corporate body for the development of hydropower to meet interim and long-term electricity demand in the country. The other objective of the policy is to motivate national and foreign private sector investment for hydropower.

A separate electricity tariff commission has been constituted to fix the selling price of electricity to the consumers.

3.4.4 Electricity Regulations 1993

These regulations are developed to enforce the activities in pursuance to the electricity act, 1992. It deals with the provisions relating to license, matters to follow by the distributor and consumers, voltage, frequency and power factor of electricity, safety measures regarding electric devices, safety provisions relating to the electrical works and provision relating to inspection and investigations.

3.4.5 Hydropower Development Policy 2001

This policy has been developed to meet the energy need of country as well as to export the hydro energy and make an investment friendly, clear, simple and transparent policy to develop hydropower sector. The objectives of this policy are to generate electricity at low cost, expand reliable and qualitative electric service and accelerate economic development of electrification in the country, emphasizes on rural electrification and export electric energy.

3.5 Institutions for Hydropower Development in Nepal

A. WECS: The Water and Energy Commission Secretariat gives suggestions to the concerned agencies of the government on formulation of policies and project implementation for appropriate use, control, protection, management and development of water resources and energy.

B. Department of Electricity Development: The department of electricity development will be basically developed as a study and promoter institution for carrying out studies on hydropower projects including multipurpose projects and attracting to encourage the private sector in the development of hydropower.

C. Nepal Electricity Authority: Nepal Electricity Authority is primarily responsible for planning, construction and operations for electric supply. Presently there are various Independent Power Producers (IPPs), who generate electricity and under the Power Purchase Agreement (PPA) with NEA and sell the bulk power to NEA.

D. National Planning Commission: NPC works as a line agency of the government. NPC is responsible for the national planning and coordination of all sectors. It has great authority to formulate the hydropower development plan under the periodic plan.

3.6 Hydroelectricity Consumption Pattern in Nepal

3.6.1 Electricity Consuming Sectors of Nepal

Major electricity consuming sectors of Nepal are domestic, industrial, commercial, agriculture, transport, and other sector. Mainly electricity is used in industrial sector.

A. Domestic sector: In the domestic sector hydroelectricity is used mainly for different end uses such as cooking, heating, animal feed, lighting, etc. The electricity used in the domestic sector was 670.78 GWh in 2004 and reached 1392.44 GWh in 2013. NEA sold 37.35% of electricity for the domestic sector in 2004 and 44.05% in 2013. The domestic sector consumes more electricity in 2013 compared to 2004.

B. Industrial sector: The industrial sector hydroelectricity consumption is 689.80 GWh (38.42%) of the total electricity consumption in 2004 and it reaches 1167.97 GWh (36.94%) of total electricity in 2013. The pattern of electricity consumption has been increasing marginally during the last few years since 2004.

C. Commercial sector: Another electricity consumption sector of Nepal is the commercial sector. The electricity consumption trend of the commercial sector is far less than the domestic sector and industrial sector. It is consuming 108.12 GWh (6.02%) in 2004 and 250.17 GWh (7.91%) in 2013.

D. Other sector: Other sectors mainly include non-commercial, water supply, irrigation, transport and export to India. These sectors hydroelectricity consumptions are 185.29 GWh (18.18%) of total power consumption in 2004 and 347.08 GWh (11.09%) in 2013.

3.6.2 Sectoral Hydroelectricity Consumption Pattern

The domestic, industrial, commercial and other sectors (transport, agriculture, non-commercial) are the major sectors consuming electricity in Nepal. Sectoral hydroelectricity consumption pattern from 2004 to 2013 is presented in table 3.3:

Table3.3: Sectoral Hydroelectricity Consumption Pattern in Nepal

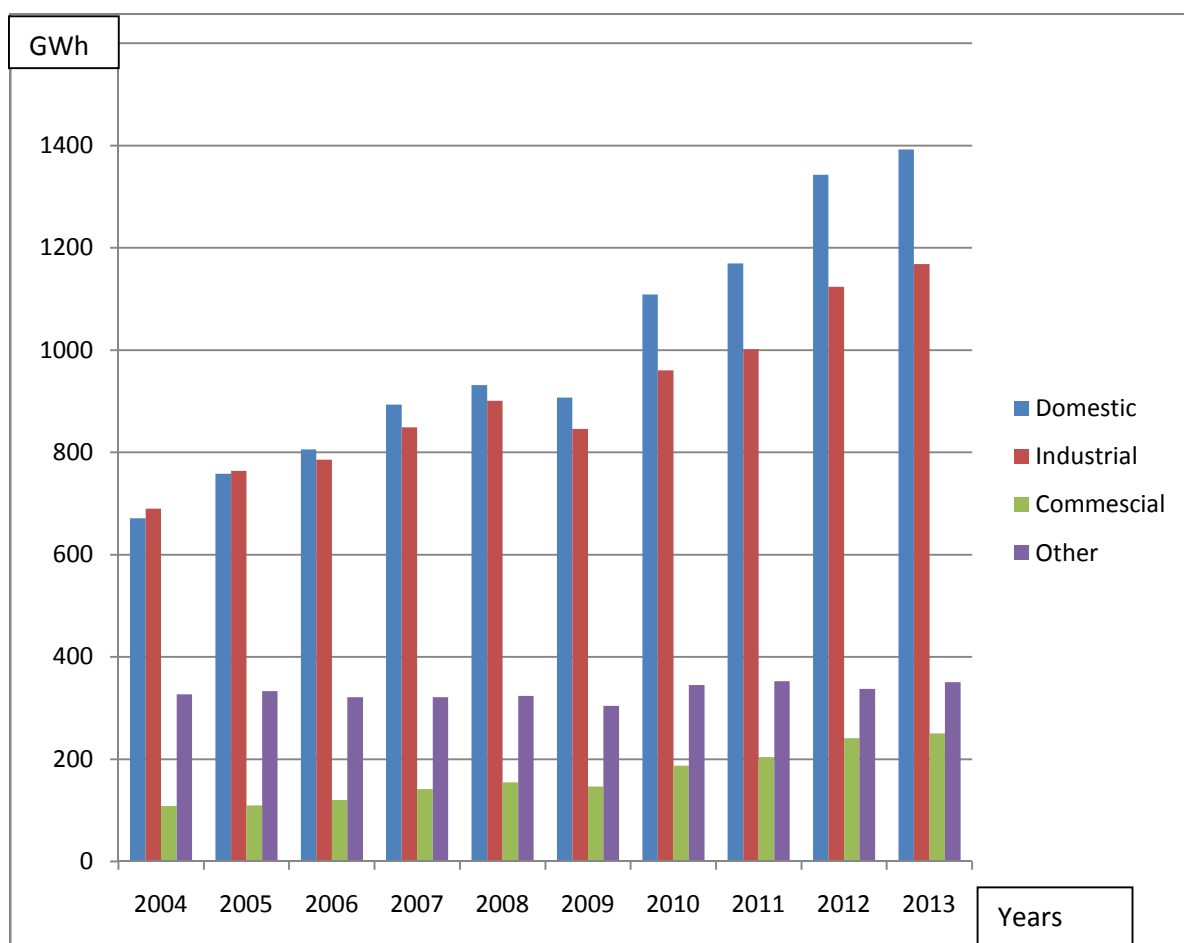
(In GWh)

Year Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Domestic	670.78	758.19	805.72	893.27	931.35	906.87	1108.87	1169.31	1342.67	1392.44
Commercial	108.12	109.31	120.30	141.69	154.38	146.29	187.12	204.03	240.74	250.17
Industrial	689.80	764.00	785.55	849.13	901.09	845.68	960.43	1001.73	1123.94	1167.98
Other	326.52	332.88	321.05	321.11	323.50	303.95	345.11	352.55	337.61	350.80

Source: Annex A

Table 3.3 has shown that domestic sector consumes highest electricity 1392.44 GWh and commercial sector consumes lowest electric energy then other sector. It is accounted 250.17 GWh in the year 2013. It has been also presented by following figure:

Figure 3.2: Sectoral Hydroelectricity Consumption Pattern in Nepal



The above figure presented sectoral hydroelectricity consumption in Nepal and sells of NEA.

3.6.3 Growth of Hydroelectricity Consumer in Nepal

The growth of hydroelectricity consumers in Nepal as presented by following table 3.4:

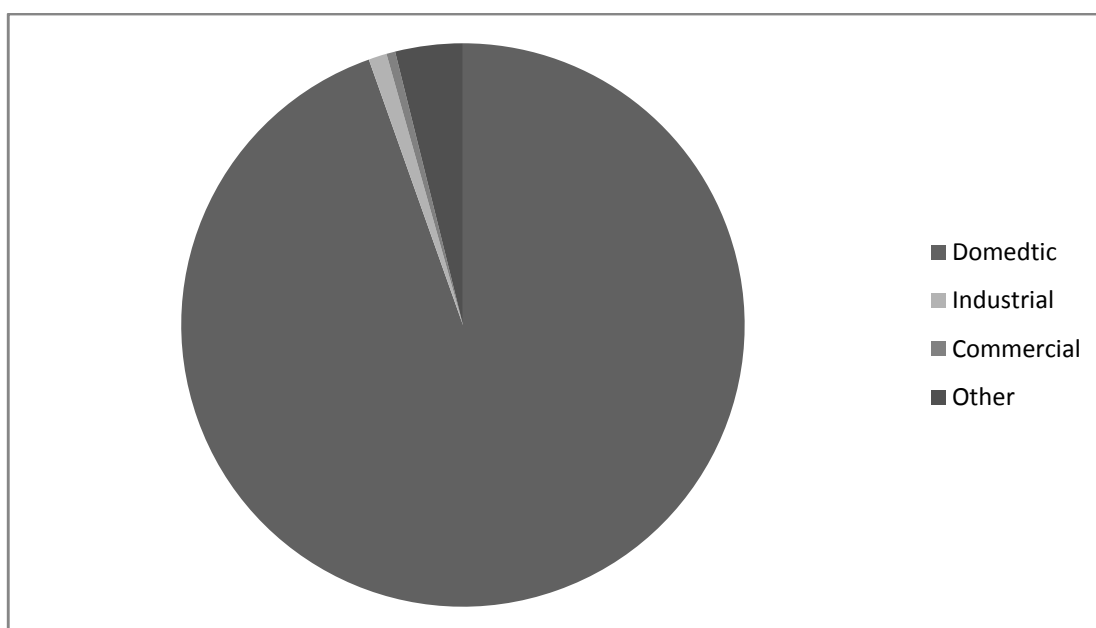
Table3.4: Growth of Hydroelectricity Consumers in Nepal

Years Category	Consumers in 2004	Consumers in 2013	Growth of Consumers (2004-2013)	Growth of Consumers (in %)
Domestic	1,010,719	2,472,270	1,461,551	94.58
Industrial	21,374	37,498	16,124	1.04
Commercial	5,454	13,096	7,642	0.50
Other	16,388	76,298	59,910	3.88
Total	1,053,935	2,599,125	1,545,227	100

Source: Annex C

Table 3.4 has shown that domestic consumers are highly increased in 2013 with compare to 2004. The growth of domestic, Industrial, commercial and other hydroelectricity consumers are 94.58%, 1.04%, 0.50% and 3.88%. The highest growth rate of consumers in domestic as 94.58% and lowest growth rate of consumers are commercial 0.50% then other. It has been also presented in figure.

Figure3.3: Growth of Hydroelectricity Consumers in Nepal



3.7 Electricity Import and Export

The agreement between Nepal and India indicates both the countries exchange electricity as per the need. The exchange points are located at various places in the border line.

The electricity imported from India along the points of exchange for the year 2013 is about 778 GWh whereas export to India is about 3 GWh. The table 3.5 below shows the quantity exchanged between the two countries since 2004. It can be seen that Nepal is the net importer of electricity.

Table 3.5: Exchange of Electricity between Nepal and India

(inGWh)

Year \ Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Export to India	141.2 3	110.7	96.55	76.87	60.1	46.38	75.07	31.10	4.12	3.72
Import from India	186.6 8	241.3 9	266.2 3	328.2 3	425.2 2	356.4 6	638.68	694.0 5	746.0 7	792.5 2
Net import/export	45.45	130.6 9	169.6 8	251.3 6	365.1 2	310.0 8	563.39	622.9 5	741.9 5	788.8 0

Source: NEA 2013.

3.8 Demand and Supply Situation of Electricity in Nepal

The annual peak power demand of the Integrated Nepal Power System (INPS) FY 2012/2013 is estimated to be 1094.62 MW. Out of 1094.62 MW of peak demand only, 719.6 MW could be supplied 335 MW was

shed. Out of 719.6 MW supplied. 433 MW was contributing by NEA hydro, 10 MW by NEA thermal, 174.1 MW by IPP hydro and 102.5 MW by import. The growth rate of annual peak power demand is 9% with compared to preceding year.

The energy demand of INPS in FY 2012/13 is estimated at 5446.285 GWh, out of which only 4218.135 GWh (77.45%) could be supplied and rest of 1228.15 GWh (22.55%) resorted to load shedding. The total supplies energy volume, 3467.93 GWh (82.56%) was contributed by domestic generation and 792.52 GWh (17.44%) by import from India. Domestic supply included 1755.97 GWh (34%) from IPPs and 2291.96 GWh from NEA owned power station including 18.12 GWh from thermal. The growth of energy demand in FY2012/13 is 7.70% with compared to preceding year.

Total energy sales including export to India increased by 3.89% and reach 3161.39 GWh in FY 2012/13; however energy sales to India decline and reach 3.72 GWh.

3.9 Hydroelectricity and Economy

Capital, labour, land and organization are the factors of production, among them electricity is also major factor that contribute economic growth in any country in the world. Capital is the equipment, machinery, manufacturing plants and office buildings that are necessary to produce goods and services. Labour is the viability of the workforce to participate in the production of goods and services. Electricity is the power necessary to produce goods and services and transport to their destinations. These components are used to increase a country's gross domestic product (GDP), the total of all output produced in the country. Without these inputs to production, business and industry would not be able to transform raw materials into goods and services. Electricity is the power

that derives the economy towards the industrialization. Most of the equipment, machinery, manufacturing plants and office building could not operate without availability of electricity. It is important component to manufacturing and production of goods and services that it's direct impact on GDP and the overall economic health. (WECS, 2006)

CHAPTER FOUR

FOREIGN DIRECT INVESTMENT OF HYDROPOWER IN NEPAL

4.1 A Brief Overview on FDI in Nepal

The government of Nepal's steps to promote and facilitate Foreign Direct Investment (FDI) by introducing appropriate policies and legal arrangements to create an enabling environment for investors is also a step in the right direction. During the pre-democratic period the investment system was not in vogue as today. Investors had difficulties in getting a government permit before undertaking any economic activity. Foreign Direct Investment was nominal in this period. In the 1990's, foreign direct investment grew strongly with the wave of liberalization and globalization. In 1990s multiparty democracy restored to Nepal with a long period peaceful revolution. Nepal adopted various liberalization policies, to invite foreign investment in the country. These included opening of a new policy on Foreign Direct Investment and "one window system" in 1992, Industrial Enterprise act in 1992, Foreign Investment and Technology Transfer Act 1992 and Industrial Policy 2010 provisions international rule of 'No work No pay' for the overall development of the industrial sector (Jabara 2010).

The status of Foreign Direct Investment (up to 2013) in Nepal has altogether only 2652 industries, of which 845 are in service, 714 in tourism, 827 in manufacturing, 57 in energy based, 48 in mineral, 43 in construction sectors and 118 in agro and forestry base. According to 2012-13 data, Department of Industries (DOI) granted permission to 2652 industries. These industries together have a foreign investment of Rs 95086.20 million. The major area of FDI has been in manufacturing,

followed by services and tourism. At the present there has been considerable investment in hydropower (DOI, 2013).

4.2 FDI in Hydropower Generation

There is no long history of FDI in hydropower generation in Nepal. Prior to 1960s all the hydropower stations were constructed through grant aid from friendly countries like the USSR (Panauti-2.4MW), India (Trisuli-18 MW, Devighat- 14.1 MW, Gandak- 15 MW, Surajpura-Kosi-20MW) and China (Sunkoshi-10MW). Since 1970, hydropower development took a new turn with bilateral and multilateral funding. The major donor countries in the period were Japan, Norway, Germany and South Korea including Canada, Finland, Denmark, Sweden and USA. The lending agencies were the World Bank, Asian Development Bank (ADB), Japan Bank for Industrial Corporation (JBIC) former Overseas Economic Co-operative Fund (OECF), Saudi Fund for Development, Kuwait Fund and others. From the 1990's subsequence to the adoption of the policy of economic liberalization, hydropower development took a new turn with the private sector entering the arena (MOWR, 2004). New government policy of welcoming FDI in hydropower sector two joint-venture companies has already been generation and selling hydropower on a build-operate-transfer (BOT) basis. The Panda Energy Corporation of the United States has invested in the 36 MW Upper Bhotekoshi project in a joint venture with the Solti Group of Nepal, while Norway's Statekraft has invested in the 60 MW Khimti project. Recently, government of Nepal signed in PDA of Uper Karnali (900MW) and Arun-III (900MW) with GMR and Satlaj Company of India. Also, government of Nepal and India jointly commissioned Pancheshwor Authority for Mahakali hydropower. FDI is necessary for hydropower generation in Nepal but it

is far less than expected due to various reasons, political instability is the main reason among them.

Table 4.1 Status of Foreign Direct Investment in Hydropower Projects in Operation

Project	Capacity in MW	Foreign investment (in million \$)
Khimti	60	134.9
Bhotekoshi	36	97.5
Indrawati	7.5	1.2
Total	103.5	233.6

Source: Shrestha 2007

The above table shows that foreign investors invested in 233.6 million dollar in hydropower since past one decade and produced 103.5 MW.

4.3 Industries Approved For Foreign Investment

Government of Nepal approved foreign investment in different industries is as shown by table 4.1:

Table 4.2 Industries Approved for Foreign Investment**(Rs.in million)**

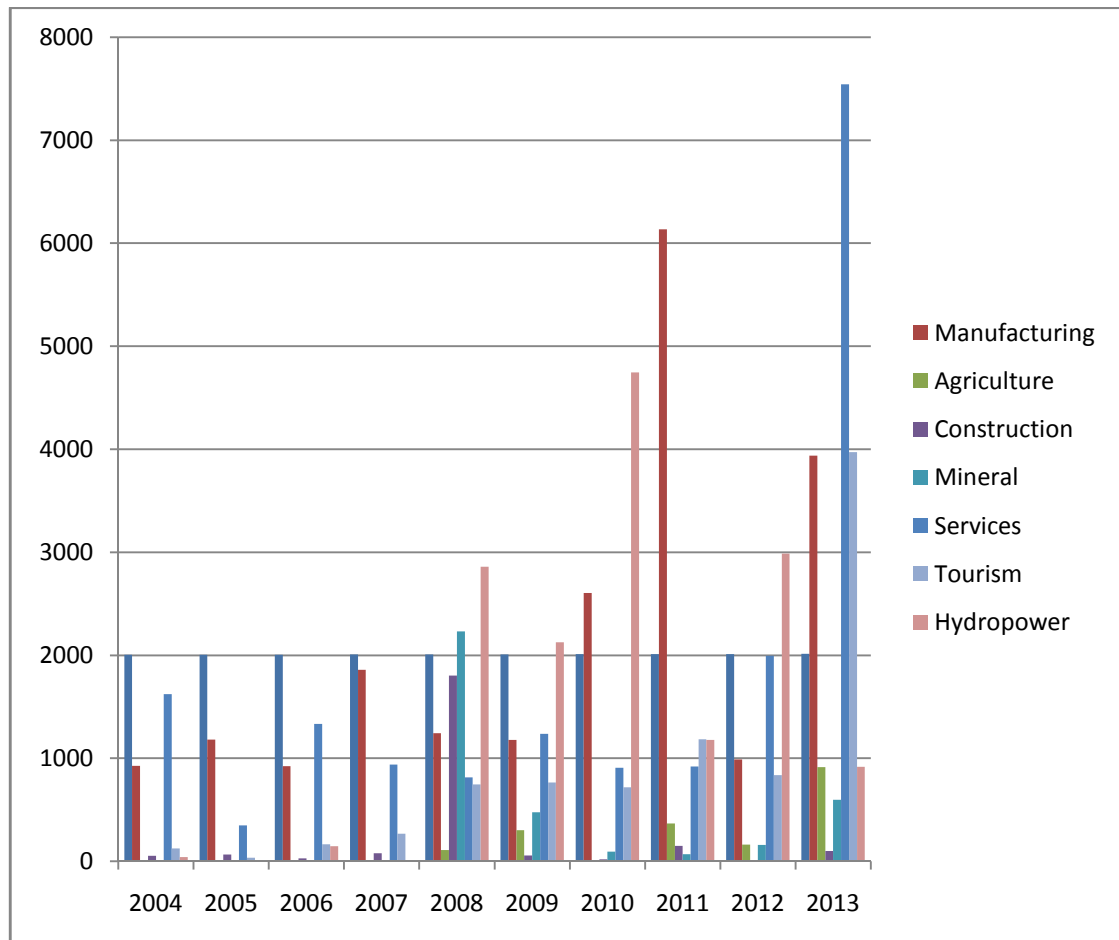
Year Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Manufacturing	925.05	1181.98	924.47	1857.14	1244.06	1178.06	2605.35	6135.92	988.51	3936.68
Agriculture	0.00	7.38	0.00	5.00	107.35	302.07	10.00	367.12	162.20	913.61
Construction	53.88	63.95	28.23	78.22	1803.71	56.97	20.00	150.00	0.00	100.00
Mineral	0.00	0.00	0.00	10.00	1596.00	474.00	94.00	67.54	157.70	596.00
Services	1622.35	348.93	1332.93	938.20	814.39	1235.97	906.11	921.31	1994.95	7544.49
Tourism	122.90	33.53	164.68	267.12	744.99	763.11	717.53	1184.33	837.45	3972.76
Hydropower	41.43	0.00	146.00	0.00	2859.60	2124.72	4747.00	1179.00	2988.00	971.20
Total	2765.61	1635.77	2596.31	3155.68	8425.11	6134.90	9099.99	10005.22	7128.81	18034.74

Source: Industrial Statistics (2004-2013)

In above table Nepal government has approved FDI in manufacturing, agriculture, construction, mineral, services, tourisms and hydropower sector. The total FDI approved by government in 2004 is Rs.2765.61 million and it reaches Rs.18034.71 in 2013. The highest FDI approved in

2004 is service sector Rs.1622.35 million and lowest is in hydropower sector Rs.41.41 million. As the same way, in 2013 highest is in service Rs.7544.49 million and lowest in mineral sector Rs.596 million. During the decade FDI gives more priority to hydropower sector Rs.4747 million in 2010. It can be presented as following figure 4.1:

Figure 4.1: Industries Approved for Foreign Investment



The above figure 4.1 illustrate that the industries approved for foreign investment in Nepal. During the period in 2004 and 2013 service sectors are more attractive for foreign investment. Then manufacturing and hydropower sector are also preferred by foreigners Investor.

4.4 Trends of FDI on Hydropower in Nepal

The approved FDI in hydropower of Nepal is positive but not satisfactory under economic liberalization policy. Recently, foreign investors are

preferred to invest this sector. The trends of approved FDI on hydropower have shown by table 4.2.

Table 4.3 Trends of FDI on Hydropower in Nepal

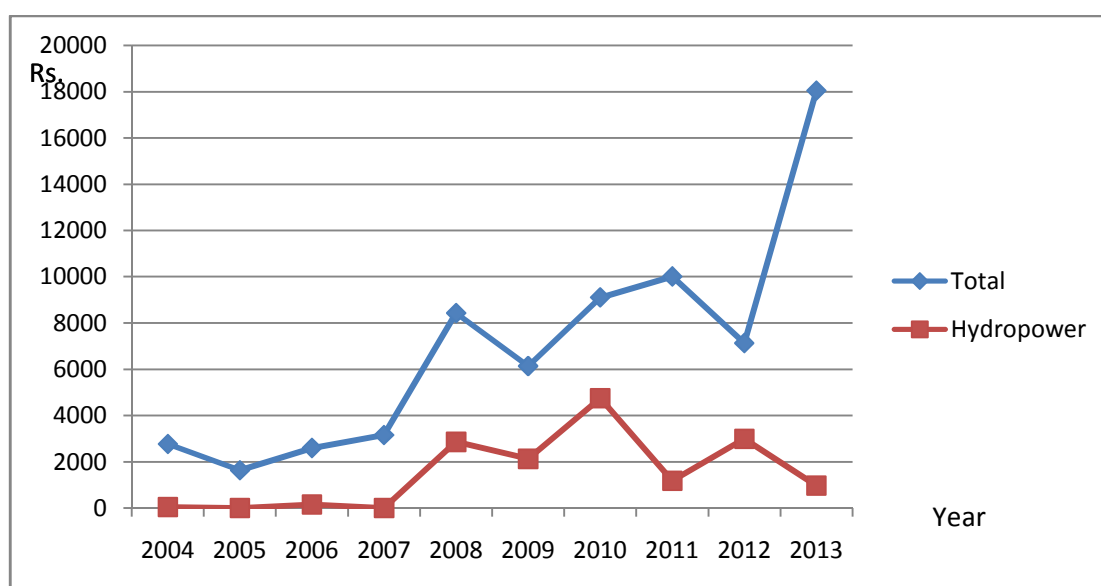
(Rs. in million)

Year \ Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	2765.61	1635.77	2596.31	3155.68	8425.11	6134.90	9099.99	10005.22	7128.81	18034.74
Hydropower	41.43	0.00	146.00	0.00	2859.60	2124.72	4747.00	1179.00	2988.00	971.20

Source: Annex D

Trends of approved FDI on hydropower is increasing since 2004 to 2013 with respect to total approved total FDI in Nepal, but there is fluctuating situation. There is no FDI approved in 2005 and 2007 means foreign investors are not interesting to invest in hydropower these year. The lowest approved FDI in 2004 is Rs.41.43 million and highest FDI in 2010 is Rs.4747 million. It can be illustrated by following trend line:

Figure 4.2 Trends of FDI on Hydropower in Nepal



The above figure shows the trend line between total FDI and FDI on hydropower.

4.5 Important Aspects of Hydropower Policy 2001 for Foreign Investors

Government announced new hydropower policy to attract foreign investment in hydropower generation, transmission and distribution projects through sole or Joint Venture Company of private and public sector. The policy encouraged foreign investors to make joint investment with Nepalese investors by providing incentive through transparent process. The policy provides following facilities for foreign investor.

4.5.1 Visa Agreement

Non-tourist visa and work permit will provide to hydropower investors, his/her authorized representative and necessary foreign experts, skilled manpower and their families, as provided for in the agreement until the construction and operation of the project.

4.5.2 Exchange Facilities

Exchange facilities provided to foreign investors making investment for hydropower development. If the electricity has been sold within the country, the amount earned as profit or dividend in lieu of foreign investment. And other facilities provided to foreign investor of hydropower as provided by Foreign Investment and Technology Transfer Act (FITTA).

4.5.3 Management of Investment Risk

The policy has provided compensation to investor during the investment period by the provision of hydrological risk, dispute settlement, reducing additional tax.

4.5.4 Taxation Policies for Hydropower Investment

The investors of hydropower generator have to pay royalty to the government of Nepal and the royalties depend on the producing capacity of electricity. Also the rate royalty is determined by aim of producing electricity, for internal consumption and for export oriented projects whereas the policy rebate on royalty, license and corporate income tax required for production of small hydropower projects up to 3MW. The royalty has been shown by following table:

Table 4.4 Royalty for Internal Consumption Project

	Electricity capacity	Up to 15 years		After 15 years*	
		Annual capacity royalty, per Kw.	Energy royalty, per KWh.	Annual capacity royalty, per Kw.	Energy royalty, per KWh.
1	Up to 1 MW	-	-	-	-
2	1 to 10 MW	Rs.100/-	1.75%	Rs.1000/-	10%
3	1 to 100 MW	Rs.150/-	1.85%	Rs.1200/-	10%
4	Above 100 MW	Rs.200/-	2.00%	Rs.1500/-	10%
5	For captive use	Rs.1500/-	-	Rs.3000/-	-

Source: Hydropower policy 2001

* After 15 years from the date of commercial operation.

Table 4.3 shows the royalty for internal consumption project. The royalty need not to pay for up to 1 MW project and the other royalty rate depends on the capacity of the project. There is also the time frame for the payment of royalty for first 15 years and after 15 years.

Table 4.5 Royalty for International Consumption Project

	Type	Up to 15 years		After 15 years*	
		Annual capacity royalty, per Kw.	Energy royalty, per KWh.	Annual capacity royalty, per Kw.	Energy royalty, per KWh.
1	Exported oriented RoR project	Rs.400/-	7.5%	Rs.1800/-	12%
2	Exported oriented Storage project	Rs.500/-	10%	Rs.2000/-	15%

Source: Hydropower policy 2001

* After 15 years from the date of commercial operation.

Table 4.4 shows the royalty for export oriented projects. Royalty for export oriented projects are in two time frames 15 years and after 15 years. The rate of royalty is different with run of river type projects and storage type projects. The run of river type projects should pay NRs. 400 per kW and energy royalty of 7.5% per kW for the first 15 years and after 15 years NRs. 1800 per kW annual royalty and 12% of energy royalty.

4.5.5 Power Purchase Agreement (PPA)

PPA rates are not same as summer and winter. Government of Nepal raised the PPA rate by 20 percent under the new PPA rates the projects will get Rs. 8.4 and Rs. 4.8 per unit in winter and summer respectively (Rijal, 2014).

4.6 Other Provision for Foreign Investors

4.6.1 Bilateral Investment Promotion and Protection Agreement (BIPPA)

Government of Nepal has approved Bilateral Investment Promotion and Protection Agreement (BIPPA) with some countries which provide confidence for foreign investors to invest in Nepal. Nepal has signed BIPPA agreement with 6 countries including Finland, France, Germany, India, Mauritius and United Kingdom. So investor will take direct benefit from those countries in terms of rights of foreign investors, fair treatment, and security of the investment and from other disputes. (Foreign Investment Policy)

4.6.2 Double Taxation Avoidance Agreement (DATTA)

Nepal has already entered into the Double Taxation Avoidance Agreement with ten countries to avoid double taxation. This agreement avoids levying of tax by two or more jurisdictions on the same income or assets. Nepal has DTAA with India, Qatar, China, Austria, Norway, Republic of South Korea, Mauritius, Pakistan, Sri Lanka, and Thailand and recently held with Bangladesh which encourages foreign investor to invest in Nepal (IRD).

4.6.3 Investment Board

Investment board has been formed under the chairmanship of Prime Minister to facilitate foreign investors to make large scale investments safely into the country.

4.6.4 Power Trade Agreement between Nepal and India

Government of Nepal and India has signed a power trade agreement for their mutual benefit and paving the way of power trade. Recently held in

PTA between Nepal and India has successively expand the energy market which solve the problem of hydropower investor for power trade.

4.7 Barriers of FDI on Hydropower Development in Nepal

Nepal has many potentialities for foreign investors to invest in hydropower generation but there are certain barriers which are discussed as following

4.7.1 Infrastructure Barriers

Government has not provided the infrastructure for foreign investor. They are facing the infrastructure bottleneck for investment. The supply of power and water is insufficient where as the facilities of roads are not good which makes costly transportation. Became a landlocked county Nepal is fully depends on India. After all Nepal used to Indian port for transportation.

4.7.2 Government Procedures

Working procedure of government is not satisfactory as the investor needed. Investors have to wait for a long time to get service from government. The corrupted working culture of bureaucracy has raised the risk of investment in Nepal. The visa procedure for investor is not sufficient that is made by government of Nepal.

4.7.3 Political Situation

There is a strong and positive association between economic growth and political stability. Political stability plays a vital role in development of infrastructure. The county is continuously facing the problem of political instability after restoration of democracy there are changes in two governments within a year. The policy adopted by one government immediately changed by another there is policy inconsistency which makes the risk for foreign investor to invest in Nepal.

4.7.4 Dispute Settlement

The major obstacles for hydropower investor are to settle dispute which arises in investment period. Now, government of Nepal settled dispute under foreign investment policy and hydropower policy which is insufficient for dispute settlement and makes it very hard and more costly. It is very important for government to create national regulatory framework and authority, that they deal with investment related matters to providing incentives for investors and to solve dispute through legal provision.

4.7.5 Monopoly of NEA

Foreign investors think that the major obstacles for investment in Nepal are state owned company NEA. NEA has monopoly in energy sector. It has all right to buy and distribute electricity without any competition. It makes difficulties for investor to invest in hydropower.

4.7.6 Policy Inconsistency

There is an inconsistency among various hydropower policies. For instance, the Electricity Act 1992 provides a generation license period of 50 years, whereas the Hydropower Development Policy 2001 suggests only 35 years (Dhungel and Rijal 2012). Besides these inconsistencies, hydropower sector has also become victim of political instability. The new Electricity Act Bill was kept pending similarly, there are various impractical environmental and forest guidelines which hinder construction of transmission lines.

4.7.7 Transmission Line Constraints

Currently, lack of adequate transmission lines and insufficient capacity of existing and planned cross-border transmission lines are a major

constraint in evacuation of generated power. Therefore, the foreign investors are not motivated to invest in hydropower.

4.8 Risks in the Investment of Hydropower in Nepal

Although there is more demand of FDI in the country, investors have to face certain kinds of risks when they are investing in hydropower sectors of Nepal. Shretha (2007) some of them pointed out as:

4.8.1 Foreign Exchange Risk

Foreign exchange risk arises when changing in the value of the original investment due to the change in currency exchange rate. In case of Nepal, if the investor has borrowed money from a foreign lender then this kind of risk will occur if the value of Nepalese rupees is weaker than the foreign currency so investor will face the problem when they have to pay back the loan to the foreign lender in different period.

4.8.2 Interest Rate Risk

The risk which changes the rate of investor's securities portfolio is known as interest rate risks. Generally, investors are offered two kinds of interest rate which are floating rate and fixed rate. Floating rate changes with the market trend with uncertainty for the borrower and usually bank prefer to offer this rate. Fixed rate is the rate where the rate does not fluctuate with the market trend which is more risk free for borrower. Here, lender provide loan with floating interest rate but investor needs fixed interest rate fund for investment.

4.8.3 Inflation Risk

The value of money tends to be changing with the changes of time and economy. Inflation will depreciate the real value of currency. This risk could undermine the performance of investor's investment. Hydropower

is considered a long term investment so the inflation risk is considerably high.

4.8.4 Legislative Change Risk

Legislative change risk is the changes in the country's rules and regulation which will enforce to increase the rate of taxes and other liabilities by reducing the project revenues. It will affect the viability of a project. Sometimes it will be in favor of the projects and sometimes against the project.

4.8.5 Market Risk

For the development of energy the market is crucial and is always certain and limited due to its constraints with regard primarily to storage and transmission. This kind of problem can be overcome by making long term power purchasing agreement with the distributors.

4.8.6 Revenue Risk

For the developers especially in case of run-off-river projects due to the lack of storage, the long-term PPA may not ensure the plant factor if the utility accepts delivery of energy at its pleasure. It means that the investors may not be able to generate enough revenue in order to fulfill the financial obligations with regard to operation, maintenances, repair and debt servicing.

4.8.7 Construction Risk

The main construction risks are to cope with planned time and planned money. Time overrun risks results in loss of revenue and raise the cost due to inflation. Penalties because of not being able to provide the energy in time whereas the interest costs are other result of not being able to move with planned time. Other risk includes social, economic,

environmental, and geological risks, performance and design risks etc. Some of the risks can be covered by insurance coverage.

4.8.8 Hydrological Risk

Take or pay nature of the PPA will ensure that the energy available with the producer will generate cash. But incase if there is not enough water to generate electricity due to the change in waterfall, climatic change or change in hydrology of the watershed area, then the projects are on their own risks. So to mitigate hydrological risks, the proper way of engineering is essential. One of the best solutions is to collect the hydrological data for certain years in the past and design the project accordingly.

CHAPTER -FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

Nepal has its unique identity situated between two giant nations India and China. Nepal is one of the richest country in water resources though it has huge potential of constructing large hydropower plant, the country is not able to mitigate the problem of energy crisis. Some studies have revealed that Nepal has higher economic potential in hydropower exploitation which accounts almost 42000MW of which only 758MW is harnessed, because of lack of skilled workforce and lack of bigger investor in the country. Some findings are as follows:

) Nepal depends upon mostly on traditional fuel resources and spending large amount of foreign reserve in responding petroleum product casus unfavorable BOP situation. To remove these problems it is necessary to utilize the water resources in form of hydroelectricity. But Nepal its own resources can not meet the target to achieve hydroelectricity for this the country realized FDI in hydropower sector. Although Nepal introduced economic liberalization in 1980s fact shows that the country is unable to attract foreign investor in hydropower project because of instability and unrest in country. Some findings, are as follows:

) Modern hydropower development was possible when Bernard Forest De Belidor wrote 'Architechure Hydrolique' in mid-1753. But the first hydropower plant was developed on the Fox River in Appelton, Wisconsin in 1882. The first hydropower plant in Nepal was installed in 1911 at Pharping. Nepal has already passed a

century in hydropower development still the achievement in hydropower generation is only 719.6MW whereas electricity demand 1094.62MW. The government tries to improve Act, Regulation and policies related to hydropower sector to attract private (domestic and foreign) investor and established some institution like WECS, DOED, NEA and HIDCL for hydropower generation and distribution.

-) The major hydroelectricity consuming sectors of Nepal are domestic, industrial, commercial and other sector. Mainly electricity used in domestic sector, it used 1392.44GWh (37.35%) of total electricity in 2013. India is only one country of electricity trading to Nepal. But electricity trading situation is not satisfactory. Net power export is not favor of Nepal. There is imbalance between power demand and supply. The annual peak power of INPS in FY 2012/13 is estimated as 1094.62MW where as only 719.6MW could be supplied and 335MW was shed.
-) The government of Nepal steps to promote and facilitate FDI by introducing appropriate policies and legal provision to create enabling environment for investor. In 1990s FDI grew strongly with the wave of liberalization and globalization.
-) There is no long history of FDI in hydropower generation in Nepal. Prior to 1960s all hydropower stations were constructed through grant aid from friendly countries. After 1990s hydropower took a new turn with the private sector entering the arena. Now the government policy of welcoming FDI in hydropower sector two joint –venture companies has already been generation and selling hydropower on a BOT basis. The USA has invested in 36MW Upper Bhotekoshi and Norway's Statekraft has invested in

60MWKhimti project. Now the government of Nepal approved FDI in different sectors and the trend of approved FDI on hydropower increasing since 2004 but it is fluctuating situation.

) Hydropower policy 2001 provides some incentives for private (domestic as well as foreign) investor. The provisions of important aspect of hydropower policy 2001 for foreign investor are visa agreements, exchange facilities, management of investment risk and taxation policy (Royalty). Even though government provide some incentives to hydropower investor there are some barriers and risk which makes investment more risky. The government should take new turn to remove up these challenges which is arising in hydropower sector.

5.2 Conclusion

Nepal has got long experience in hydroelectricity generation and its utilization. Even it has passed a century of hydropower development; Nepal is still in infant stage. All the documents show that the current power shortages in Nepal however there are many opportunities for development of hydropower project; a single large scale hydropower plant has not been installed in the country. The country is facing extremely power crisis due to the lack of proper planning, proper implementation of those plans which are already formulated, misunderstanding between investors and local people and wrong process of analyzing project the development of hydroelectricity generation is not fast as required.

Lack of capital is another problem that the country is facing now. The unsecure environment of investment in Nepal cannot able to attract foreign investors. In recent decade foreign investors are playing important role for hydropower generation which is shown by Upper

Bhotekoshi(36MW) and Khimti (60MW) project and approved FDI hydropower sector is positively increasing. It proved that if investor found that the government provides them more secure environment they are highly encouraged to invest in hydropower. Foreign investors are not satisfied with the working procedure of government they have to wait for a long time to get service and corrupted working culture of bureaucracy raise more risk for investment. So, government should pay attention toward these factors.

Foreign investors are mainly afraid from dispute which arises in investment period mostly in hydropower sector, the debate between project affected areas people and investors cannot be solve easily which is discouraging foreign investors. Monopoly of NEA is another problem of hydropower sector. NEA has sole authority in energy sector to buy and distribute electricity without any competition. Lack of high voltage transmission line is also another problem of this sector. NEA has full authority to developed transmission line but it is not able to built high voltage transmission line. So, to solve these problems government should formulated a dispute settlement mechanism and the responsibility of NEA should be divided in to three parts (generation, distribution and transmission) separately.

The huge gap between electricity demand and supply within the country enforce for foreign investor to invest in hydropower generation. Nepal has already been engaged in power trade especially with India. Recently both countries have signed in PTA which creates more opportunity of power export to India. Bangladesh may be another partner of power trade because it is also interesting in hydropower sector of Nepal. So, there is huge national and international market opportunity helps to promote

foreign investors and inflow of FDI will strongly increase in hydropower development.

Some previous studies revealed to hydropower shows that the rate of return of hydropower is higher than other sectors. To achieve this high rate of return investor should bear some risk also. Some of them certain kinds of risks investors can solve themselves by provision of dispute settlement and insurance of project. But the foreign investors are found that the political risk is the biggest risk to investment in Nepal because of political instability (from a few years, the political situation of Nepal is very worse. The economy of country is suffering from daily strike. There is changes in more than two governments within a year and the policy formulated by one government cannot followed by another) which makes investment more risky. If the country maintain stable political situation there is a big opportunity of inflow of foreign capital in hydropower sector. The data related to approved FDI shows that foreign investors are waiting for better political situation in Nepal.

Today's national interest has increased in development of hydroelectricity by reducing foreign aid and loan. To achieve this goal government should promote FDI by creating environment of investment for foreign investors. It is found that excluding the political risk, the opportunities for foreign investors are highly assured in Nepal.

5.3 Recommendations

After the deep study of relevant document and available data by different resources the researcher realized that the development of hydropower is not possible without cooperation of foreign as well as private investment to remove present energy crisis. For attracting FDI in hydropower sector, the following suggestion should be followed;

- i) **Improvement of act, regulations and laws:** Government should correction of act, regulations and laws directly related to investment policies which are not relevant in present global context and making investment friendly environment.
- ii) **Maintain policy consistency:** Government should maintain policy consistency directly related to hydropower sector. (For example Electricity Act 1992 provides a generation license period of 50years, whereas the Hydropower Development Policy 2001 suggests only 35 years). This type of inconsistency creates dilemma in investment. It should be improved.
- iii) **Provision of dispute settlement mechanism:** The government should the formulated the national level dispute settlement regulatory framework and authority, that they deal with investment related matters to providing incentives for investors and to solve dispute through legal provision.
- iv) **Road map of long term hydropower development strategy:** Government should formulate the road map of long term hydropower development strategy more than 30 years period by clearly determining the role of stake holder, formulate code of conduct for foreign investor who wants to invest in hydropower sector and clearly mention those facilities provided by government for foreign investors.

It is suggest that not only for the government of Nepal but also for those all stake holders, mainly focused on all political leaders who drives the country toward civil war and advocates against of FDI, creating dispute and unsecure environment for investment in the country immediately stop those dispute and violence, if they want aggregate development of country.

Last but not least if the country creates better political situation with stable government to assure long term political stability, then the country will be found many foreign investors investing in Nepal's hydropower and to remove up present energy crisis situation by generating more electricity and plays the vital role for aggregate development of country by creating employment opportunity and export electricity.

REFERENCES

- Adhakari, D. (2006). Hydropower development in Nepal. *Economic Review*, 18. Kathmandu: Nepal RasrtaBank.
- Baral, R.N. (2004). *Financing in hydropower project*. Kathmandu.
- Bhattarai, N.P. (2004). *Financial resources for the development of hydropower in Nepal*. (Unpublished Doctoral Dissertation), CDECON. Tribhuwan University.
- Black, J. (2003). *Oxford dictionary of economics*. New Delhi: Oxford University Press.
- CBS (Central Bureau of Statistics). (2012). *Population census 2011: National report*. Kathmandu: Central Bureau of Statistics.
- Dhungel, K. R. (2002). Trend and pattern of energy consumption of Nepal. *The Economics Journal of Nepal*, 25(3), 25-29.
- Dhungel, K.R., & Rijal, P. (2012). *Investment prospect and challenge for hydropower development in Nepal*. Kathmandu: Samriddhi, The Prosperity Foundation.
- DOI (Department of Industry). (2013). *Industrial statistics 2013*. Kathmandu: Department of Industry.
- Gillespie, A. (2007). *Foundation of economics*. Great Clarendon Street Oxford 26: Oxford University Press.
- Gurung, D.B. (2003). *Water resource in Nepal: An investment in energy prospect*. (Unpublished Master Thesis), CDECON, T.U
- IPPAN (Independent Power Producers Association Nepal). (2005). *Opportunities and Challenges for Hydropower Investment in Nepal*. Kathmandu: Independent Power Producers Association Nepal.

- IPPAN (Independent Power Producers Association Nepal). (2013). Retrieved from <http://www.ippan.org.np/news>
- Jabara, A.S. (2010 Nov.14).Foreign Direct Investment in Nepal.*The Himalayan Times*.Kathmandu.
- Khanal, D. R. &Shrestha, P. K. (2008). Trade and investment linkages and coordination in Nepal: Impact on productivity and exports and business perceptions.*ART Networking Paper Series*, (52).
- Majagaiya, K. P. (2009). *FDI in Nepal's Hydropower Sector: A Focus on the Product*.Access on October 19, 2014, from <http://www.nepalmonitor.com>
- MOFALD (Ministry of Federal Affairs and Local Development). (2071). Retrieved from <http://www.mofald.gov.np/news>
- MOI (Ministry of Industry).(1992). *Foreign Investment Policy1992*.Kathmandu.
- MOWR (Ministry of Water Resources). (2004). *Working paper on Nepal development Forum 2004 on Water Resource Development sector*. Nepal: Ministry of Water Resources.
- NEA (Nepal electricity authority).(2013).*Fiscal Year 2013 - A Year in Review*.Kathmandu: Nepal Electricity Authority.
- NPC (National Planning Commission). (2070).*The three Year Plan (2070-2073)*.Kathmandu.
- Pokhrel, S. (2001).Hydropower for energy in Nepal.*Mountain Research and Development*, 21(1).
- Rijal, P. (2014, May 14). Public private partnership model of investment in hydropower.*The Himalayan Times*, p.3

- Shrestha, A. P. (1991). *Hydropower in Nepal: Issue and concept of development*.
- Shrestha, R.S. (2007). Investment in hydropower sector: opportunity and risk. *Hydro Nepal*, 1(5).
- UNCTAD (United Nations Conference on Trade and Development). (2003). *Investment Policy Review-Nepal*. Kathmandu: United Nations Conference on Trade and Development
- United Nations (UN). (2003). *Investment guide to Nepal opportunity and condition*. New York: United Nations.
- WECS (Water and Energy Commission Secretariat). (1995). *Energy resources base of Nepal*. Kathmandu: Water and Energy Commission Secretariat.
- WECS (Water and Energy Commission Secretariat). (2010). *Energy Sector Synopsis Report 2010*. Kathmandu: Water and Energy Commission Secretariat.
- World Commission on Dams (WCD). (2000). *Dam and development, a new framework for decision making*. Nairobi: World Commission on Dam.

Annex-A

Electricity Sales in different years by NEA

In GWH

Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Domestic	670.78	758.19	893.27	893.27	931.35	906.87	1108.87	1169.31	1342.67	1392.44
Non-Commercial	83.01	100.54	95.29	100.52	109.93	98.89	103.47	109.49	115.68	120.21
Commercial	108.12	109.31	120.30	141.69	154.38	146.29	187.12	204.03	240.74	250.17
Industrial	689.80	764.00	785.55	849.13	901.09	845.68	960.43	1001.73	1123.94	1167.98
Water Supply & Irrigation	31.67	49.98	45.50	47.96	46.86	48.14	55.98	82.80	64.59	67.12
Street Light	55.20	54.86	63.24	67.90	70.26	67.51	65.58	67.21	72.06	74.86
Temporary Supply	0.25	0.39	0.87	1.26	0.70	1.04	1.00	1.00	1.20	1.26
Transport	5.47	5.80	5.65	6.31	5.88	5.22	5.42	5.54	6.72	7.79
Temple	4.11	4.58	4.77	4.78	5.12	4.76	3.64	3.46	3.95	4.11
Community Sales	5.58	6.03	9.18	15.51	24.65	32.01	34.95	51.95	69.29	71.73
Total (Internal Sales)	1653.99	1853.8	1936.07	2127.33	2250.22	2158.21	2526.46	2696.52	3040.57	3157.67
Bulk Supply (India)	141.23	110.70	96.55	76.87	76.87	46.38	75.07	31.10	4.12	3.72
Grand Total	1795.22	1964.38	2032.62	2204.20	2310.32	2204.59	2601.53	2727.62	3044.69	3161.39

* Provisional figures; subject to final audit.

Source: NEA, Fiscal year 2013.

Annex-B

Total Energy Available and Peak Demand

Particular	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*
Peak Demand(MW)	515.24	557.53	603.28	648.39	721.73	812.50	885.28	946.10	1026.65	1094.62
NEA Hydro Generation	1345.46	1522.90	1568.55	1747.42	1793.14	1839.93	2108.65	2122.08	2357.43	2273.14
NEA Thermal Generation	9.92	13.67	16.10	13.31	9.17	9.06	13.01	3.40	1.56	18.12
NEA Generation Total(GWh)	1355.38	1536.57	1584.65	1760.73	1802.31	1848.59	2125.66	2125.48	2358.99	2291.96
Power Purchase from India	186.68	241.39	266.23	328.23	425.22	356.46	638.68	694.05	746.07	792.52
Power Purchase from IPPs	838.84	864.80	930.04	962.26	958.42	925.74	951.43	1038.84	1073.57	1175.97
Power Purchase Total(GWh)	1025.52	1106.16	1196.27	1291.09	1383.64	1282.20	1230.11	1732.89	1819.64	1968.49
Available Energy(GWh)	2380.90	2642.75	2780.92	3051.82	3185.95	3130.79	3351.77	3858.37	4178.63	4260.45

Note:- Peak demand is for all areas covered by integrated system including supply to India

*provisional figure

Annex-C

Growth of Electricity consumer in Nepal from 2004 to 2013

Particulars	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*
Domestic	1,010,719	1,113,740	1,227,295	1,339,253	1,450,254	1,595,015	1,775,571	1,949,530	2,198,680	2,472,260
Non-Commercial	9,865	9,950	10,010	10,215	10,556	10,518	10,952	12,520	14,055	15,179
Commercial	5,454	6,000	6,170	6,000	6,052	7,305	8,919	10,802	13,297	13,096
Industrial	21,374	22,500	23,020	24,089	25,548	28,559	29,410	33,030	36,409	37,498
Water Supply	352	370	380	414	434	584	609	688	860	834
Irrigation	2,557	3,400	6,450	13,183	18,614	22,335	32,089	42,494	53,165	51,520
Street Light	1,437	1,500	1,550	1,608	1,961	2,339	2,214	2,374	2,590	2,878
Tremporary supply	150	155	165	210	300	403	522	634	619	768
Transport	48	50	54	39	38	42	41	42	44	51
temple	1,959	2,150	2290	2,628	2,746	2,911	2,941	3,181	3,529	3,857
Community Sales	15	35	58	169	375	594	795	995	1,161	1,207
Total(Internal)	1,053,930	1,159,850	1,277,442	1,397,808	1,516,878	1,670,605	1,864,063	2,056,290	2,324,409	2,599,148
Bulk Supply(India)	5	5	5	5	5	5	4	2	5	4
Grand total	1,053,935	1,159,855	1,277,447	1,397,813	1,516,883	1,670.610	1,864,067	2,056,292	2,324,414	2,599,125

* Provisional figures; subject to final audit.

Source: NEA, Fiscal year 2013.

Annex-D

Industries Approved for Foreign Investment from 2004 to 2013

in million

Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Manufacturing	925.05	1181.98	924.47	1857.14	1244.06	1178.06	2605,35	6135.92	988.51	3936.68
Agriculture	0.00	7.38	0.00	5.00	107.35	302.07	10.00	367.12	162.20	913.61
Construction	53.88	63.95	28.23	78.22	1803.71	56.97	20.00	150.00	0.00	100.00
Mineral	0.00	0.00	0.00	10.00	1596.00	474.00	94.00	67.54	157.70	596.00
Services	1622.35	348.93	1332.93	938.20	814.39	1235.97	906.11	921.31	1994.95	7544.49
Tourism	122.90	33.53	164.68	267.12	744,99	763.11	717.53	1184.33	837.45	3972.76
Energy	41.43	0.00	156.00	30,30	2867.60	2244.72	4747.00	1227.00	2997.50	2755.20

Source : Industrial Statistics (2004-2013)

Annex- E

Hydropower Generating Stations by Types

Hydropower Generating Stations by Types Installed Capacity and Year of Commissioning

S.N.	Name of station	Installed capacity (kw)	Year of commissioning
1	Sundarijal	640	1935
2	Panauti	2400	1965
3	Trisuli	21000	1967
4	Pokhara	1088	1967
5	Sunkoshi	10050	1972
6	Gandaki	15000	1979
7	Kulekhani-I	60000	1982
8	Devighat	14100	1983
9	Dhankuta	240	1971
10	Tinau (Butwal)	1024	1978
11	Surkhet (Jhupra)	345	1977
12	Gajuri	25	1978
13	Thansing	20	1979
14	Baglung	175	1981
15	Doti	200	1981
16	Phidim**	240	1981

17	Gorkhe	64	1982
18	Jomsom**	2401	1983
19	Jumla**	200	1983
20	Dhading	32	1983
21	Syangja	80	1984
22	Pokhara (Seti)	1500	1985
23	Helumbu	50	1985
24	Godawri (HMG)	30	-
25	Kulekhani II	3200	1986
26	Darchula (I &II)**	300	1987
27	Salleri (SCECO)*	400	1986
28	Chame	45	1987
29	Manang	80	1988
30	Marsyangdi	69000	1989
31	Adhikhola (BPC)	5100	1991
32	Arughat (Gorkha)	150	1990
33	Bajhang	200	1989
34	Bajura	200	1990
35	Bhojpur**	250	1989
36	Chaurjhari**	150	1989
37	Khandbari**	250	1989

38	Okhaldhunga**	125	1990
39	Ramechhap	150	1989
40	Rupalgadh	100	1991
41	Syarpudaha**	200	1989
42	Taplejung	1258	1988
43	TatopaniMyagdi I	1000	1991
44	Terhathum**	100	1988
45	Surnayoad**	200	1991
46	TatopaniMyagdi II	1000	1995
47	Achham	400	1995
48	Namche II*	600	1994
49	Pharping***	500	1911
50	Jimruk (Pyauthan)	12300	1995
51	Kalikot	500	1999
52	Dolpa	200	1999
53	PuwaKhola	6200	2000
54	KhimtiKhola (HPL)	60000	2000
55	ModiKhola	14800	2001

56	BhoteKoshi (BKPC)	36000	2002
57	Indrawoti (NHPC)	7500	2003
58	SangiKhola (Sange HP)	183	2003
59	Chilime	20000	2003
60	Kali Gandaki 'A'	144000	2003
61	Chatra	3200	-
62	Kali Gandaki 'A'	144000	2003
63	Middle Marsyangadi	70000	-
64	Indrawati - iii	7500	-
65	Chatra	3200	-
66	PiluwaKhola*	3000	-
67	RairangKhola	500	-

* Private, ** Leased, *** Not in normal operation

Source: Statistical Pocket Book Nepal, 2010, CBS, Ramshahpath.