



**ORIGINAL RESEARCH PAPER**

**Commerce**

**AN ASSESSMENT OF HYDROPOWER INSTALLED CAPACITY GROWTH IN INDIA**

**KEY WORDS:** Hydropower, Growth, Electricity Generation, Installed Capacity (MW)

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**ABSTRACT**

Hydro power because of its large quantity availability is the superior choice of many developing and developed economy round the globe. Hydro water is one of the cores and globally harnessed renewable sources. Hydropower is the world's largest source of renewable electricity generation. Generally, the water covers two-thirds of the earth; therefore, water demonstrates the largest source of energy. In this paper attempt has been made to study the Hydropower Installed Capacity (MW) Region Wise and Hydropower Installed Capacity Growth in India. The present Study deals with analysis and interpretation of the data collected from secondary sources i.e. internet websites, Magazines, Newspaper, and Annual Reports. Finally the result shows that Hydropower is necessary, and it is conclusively be at the heart of the renewable energy technology in India.

**1. INTRODUCTION**

Hydro Power is one of the most significant inputs for economic development. In addition to its extensively recognized role as a catalyst to economic movement in different sectors of economy, the power sector marks a straight and extensive contribution to economy in terms of income generation, employment opportunities and enhancing the quality of life. The increasing global demand for energy combined with the uncompleted mission for clean, renewable energy has been a topic of perceived interest amongst countries of developed and developing position worldwide. Some renewable energy sources like hydroelectric, wind, solar, and biomass can be used for generation of electricity and for meeting our daily energy demands. It has been one of the sources of energy harnessed for centuries in different parts of the world. India has accomplished extraordinary progress in the field of power development since independence in 1947. The rate of growth of installed capacity, though impressive, has not been able to keep pace with the increase in power demand and as a result the country is presently facing peak power shortages of varying degree in various regions of the country.

**1.1 Hydropower Generation in India**

Energy is the greatest fundamental sector for the progress of a nation. It is predictable for continued existence and necessary for developmental activities to promote education, health, transportation and infrastructure for achieving a reasonable standard of living and is also a critical factor for economic development and employment. Around 4800 large dams have been constructed in the country. Hydro generating unit sizes has increased from 22 MW (from the independence) to 250 MW till today. At the time of independence the installed capacity of hydroelectric power was only 508MW and then the number of units operating were only 51. Indian government invests in large amount for the development of hydroelectric power. Building of hydroelectric plant and its commissioning take near about 8-10 years. Thus building a hydro plant requires pre planning. Soon after the independence in the year 1948 the construction of Bhakra and Hirakund dam started. The construction of Bhakra dam completed in 1963 and the construction of Hirakud dam completed in 1957. In 1955 the construction of Nagarjuna dam started on the river Krishna and the construction was completed in 1967. Another large magnitude dam is Indira sagar dam on Narmada River. The construction of the dam was started in 1984 and it was commissioned in 2005. With the passage of time many large dams are built across the nation. Hydroelectric power stations are built across these dams and thus they help in production of large hydroelectric power.

**2. Review of literature**

**Ahlers R. (2015)** reviewed the construction and operation existing hydro geological processes and ecosystems as well as its impacts on the livelihoods of diverse groups of people that depended on the project. The study concludes that hydropower development in the region has inherent contentions and uncertainties and refuting the idea that dams constitute development projects whose impacts can be simply predicted, controlled and mitigated. Authors have suggested outline the characteristics of the Himalayan region and discuss the scale of planned hydropower development. **Krishnan (2015)** evaluates government policy and development related to hydropower sector. The author explained India was able to use all the exploitative hydroelectric power in the region including the Himalayas in co-operation with its neighbouring countries. The study suggests that there should be renewable energy projects to meet the future demand of power in the country by which the object of power to all can be achieved. **Chhabra Neha (2017)** analysed that income in fertility of soil, deforestation, noise pollution and deficiency. Also hydroelectric project development, generate employment and infrastructure through road construction and better drinking water facilities. The main objective of **Akova et al. (2018)** study was to analyses and evaluated the environment impact of small hydropower project. The matrix has been used for the environmental impact assessment. Environmental requirements for construction the negative impact on the environment is minimized in the preparatory phase of the project. They have assessed the impact of the construction on the environment. Finally they revealed that avoiding an increase in costs due to unforeseen impacts during the construction phase. **Oying and Sarsing (2020)** conducted a study on "An Overview of Small Hydro Power Development in India". The authors aim to provide significant information for appropriate policy making in developing small hydropower in India. They found that many potential Small Hydro power sites remain as unused resource in India. Also it is found that the opinion of public and local people is very important for successful functioning and operation of Small Hydro Powers. The study suggested that emphasis may be given to increased participation of the public as well as research, science for developing innovative technologies in order to balance hydropower and river preservation.

**3. Objectives of the Paper**

- To find out the Status of Hydropower Installed Capacity Growth in India.
- To study the Hydropower Installed Capacity (MW) Region Wise in India.

**4. RESULTS AND DISCUSSION**

**4.1 Present position of hydropower plants in India**

India is the fifth largest world hydropower producer. India's electricity demand is expected to double over the next decade due to a population of well over a billion people and a fast growing economy. India is blessed with an immense amount of hydropower potential.

India has hydropower potential assessed to be about 84,000 MW and 1, 48,701 MW installed capacity. Besides, 6780 MW hydel schemes from small, mini and micro have been assessed in terms of installed capacity. Also, 56 sites for pumped storage schemes with an aggregate installed capacity of 94,000 MW have been identified. This is distributed across six major river systems. Probably installed hydropower capacity in these rivers is:

**Table No. 1.1 Probable Installed Hydropower Capacity (MW) in Rivers**

River	Probable Installed Hydropower Capacity (MW)
Indus Basin	33,832
Ganga Basin	20,711
Central Indian River System	4,152
Western Flowing Rivers of Southern India	9,430
Eastern Flowing Rivers of Southern India	14,511
Brahmaputra Basin	66,065
<b>Total</b>	<b>1,48,701</b>

Source: www.nhpcindia.com/scenario

Classified data on the basis of probable hydropower potential (MW) in India has been shown in table no. 1.1. It is observed from the table that maximum assessed hydropower total potential (MW) found in Indus basin i.e. 33,832 and followed by 20,711 MW in Ganga basin, 4,152 MW in central Indian river system, 9,430 MW in Western flowing rivers of Southern India, 14,511 MW in Eastern flowing rivers of southern India and 66,065 hydropower potential (MW) found in Brahmaputra basin. Finally, the study shows that uppermost probable hydropower total potential (MW) found in Indus basin.

**4.2 Hydropower Installed capacity (MW) Region-Wise**

India hydropower system is divided into five major regions namely, the northern region, western region, southern region, eastern region and north-eastern region. It is well-known that each of the regions faces distinct issues. While the eastern and north-eastern (NE) regions are power abundant, the northern and western regions are power deficit essentially due to greater power demands. Table no. 1.2 shows the region-wise installed capacity of hydropower in India.

**Table No. 1.2 Region-Wise Installed Capacity (MW) India**

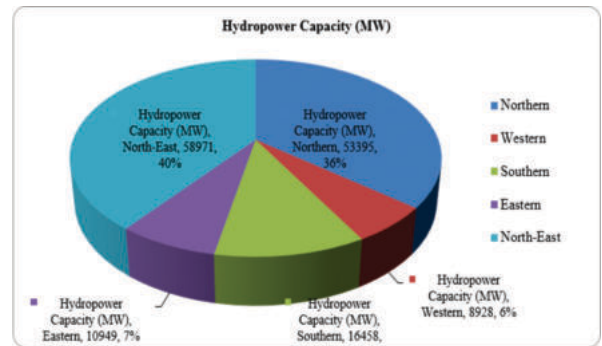
Sr. No.	Region	Hydropower Capacity (MW)
1.	Northern	53395
2.	Western	8928
3.	Southern	16458
4.	Eastern	10949
5.	North-East	58971
All India		148701

Source: CEA monthly report of April 2020

In the table no.1.2.hydropower has been classified five regions namely Northern, Western, Southern, Eastern and North-East.

Where maximum installed capacity found 58,971 MW in northern and lowest installed capacity found 8,928 MW in Western. From the table it is estimated that the highest installed capacity of hydropower is found 58,971 MW in North-East.

**Diagram 1.1 All India Installed Capacity (MW) Region-wise as on 30-04-2020**



**Figure 1.1 All India Hydropower Installed Capacity (MW) Region-wise**

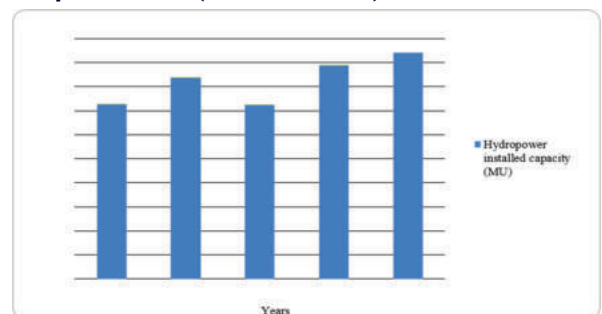
**Table No. 1.3 Hydropower Installed Capacity Growth Last Five Years in India (Millions of Units)**

Sr. No.	Years	Hydropower installed capacity (MU)
1.	March 2016	7260
2.	March 2017	8358
3.	March 2018	7241
4.	March 2019	8873
5.	March 2020	9422

Sources: <https://posoco.in/reports/monthly-reports/> of March 2020

Table no. 1.3 shows the year wise installed hydropower capacity (MU) in India. The table reveals that maximum installed hydropower capacity (MU) in the year, March 2020 (9422 MU) and followed by March 2019 (8873 MU), March 2017 (8358 MU), March 2016 (7260 MU) and March 2018 (7241 MU) in last five years. Finally, the result shows that maximum installed hydropower capacity produce (MU) in the year, March 2020 and minimum installed hydropower capacity produce (MU) in the year march 2018.

**Diagram 1.2 Hydropower installed capacity growth last five years in India (Millions of Units)**



**Figure 1.2 Hydropower installed capacity growth last five years in India (Millions of Units)**

**5. Conclusion and Suggestions**

Hydropower development was the main source of economic growth conditions of any Country. The protests in a number of localities of study area have indicated that these projects are destructive livelihood and environment in different ways. Hydro Power is one of the most remarkable inputs for economic development. In addition to its widely recognized role as a mechanism to economic movement in different sectors of economy, the power sector marks a direct and extensive contribution to economy in terms of income generation, employment opportunities and enhancing the quality of life. It is predictable for survival and necessary for developmental activities to promote education, health, transportation and infrastructure for achieving a reasonable

standard of living and is also a crucial factor for economic development and employment. With a population of well over a billion people a fast increasing economy, India electricity demand is expected to dual over the next decade.

The study concludes that the hydropower total potential (MW) found in Indus basin i.e. 33,832 and followed by 20,711 MW in Ganga basin, 4,152 MW in central Indian river system, 9,430 MW in Western flowing rivers of Southern India, 14,511 MW in Eastern flowing rivers of southern India and 66,065 hydropower potential (MW) found in Brahmaputra basin. Further study shows that maximum installed capacity found 58,971 MW in northern and lowest installed capacity found 8,928 MW in Western. The study also reveals that maximum installed hydropower capacity (MU) in the year, March 2020 (9422 MU) and minimum installed hydropower capacity produce (MU) in the year march 2018. The Development of Hydro Electric Projects requirements sustainable development by maintaining balance between the quantity of development and quality of environment. Sincere efforts are required to ensure that the developments do not disturb the reserved equilibrium of the breakable area.

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