Darpan International Research Analysis

ISSN: 2321-3094 | Vol. 13 | Issue 1 | Jan - Mar 2025
Peer Reviewed & Refereed

An Analytical Study of Hydroelectric Power Projects in the Region of Shimla Hills of Himachal Pradesh

Dr. Purshotam Singh,

Assistant Professor, Department of History,
Govt. Nehru Skt. College Phagli, Shimla-4,
H.P. 171004, India

Doi: https://doi.org/10.36676/dira.v13.i1.160

Published: 15/03/2025

Abstract: There are various sources of energy, which can be obtained viz., burning coal, gas, oil, wood waste and nuclear materials. Electricity, a major source of energy, is regarded as an important factor for bringing about radical change in the socio-economic life of a community. India is the 7th largest hydroelectricity producer country in the world and Himachal Pradesh has ranked in 5th place in the country. Himachal Pradesh has a vast hydro-electric potential and through preliminary hydrological, topographical, and geological investigations, it has been identified 21,244 MW of hydro-electric power can be generated in the state. In the Region of Shimla Hills has also vast hydel potential. It has been identified 10,930 MW of hydro-electric power can be generated in the region of Shimla Hills, by constructing various major, medium, small and mini/ micro hydro projects on the two River basins. These two Rivers are namely Sutlej and Yamuna. Presently, in the region of Shimla hills 1,652 MW hydel power has exploited by various agencies and 3,664 MW hydel power is under execution. However, the adverse environmental and social consequences resulting through some hydroelectric power projects in the region. The mega hydroelectric power projects are destroying ecological and climatical balance of the region of Shimla Hills and making very negative impact on the environment. Before starting development projects, the feeling of insecurity among the local people of being disturb by any developmental activities should be solved on priority.

Keywords: Shimla Hills, Development, Hydroelectric Power, Project, Environment, Adverse Impacts, Government.

1. INTRODUCTION

Power sector play a most significant role in the development process of any economy. The development of agriculture, infrastructure and industries cannot be accomplished without using energy as an input. Throughout the history of human race, major advances in civilization have accompanied by an increased consumption of energy. Because of multifarious uses of electricity, such as for lighting and as a source of motive power, its introduction does not merely facilitate provision of better amenities but augments productive capacity in different sectors of the economy through its wide range of applications. However, the most vital source of energy, which man found, is the power of water when it falls from a height. There are many advantages of hydroelectric power. First and foremost is that hydroelectric power is the cheapest

of all the other source of producing power. Earlier time hydropower has utilized by man conservatively in the form of water mills for grinding cereals stuffs.

Himachal Pradesh has a vast hydro-electric potential and through preliminary hydrological, topographical, and geological investigations, it has been identified 21,244 MW of hydro-electric power can be generated by constructing various major, medium, small, and mini/ micro hydro projects on the five river basins. Out of the total hydroelectric power generation potential in the country, Himachal Pradesh possesses 25.25 per cent according the statistics of 2001. Out of the total available hydroelectric power potential in the Himachal Pradesh only 3,965 MW has exploited by various agencies the statistics of 2001 and 6,501 MW is under the execution.

In the Region of Shimla Hills has also vast hydel potential. The region of Shimla Hills is a part of Himachal Pradesh in North India. The Western Himalayan tract lying between Tons River, a tributary of Yamuna River and Uttarakhand State in the East, Bilaspur district of Himachal Pradesh and Sutlej River in the West, Kullu and Lahal & Spiti districts of Himachal Pradesh and Tibet autonomous region in the north, Sirmour district of Himachal Pradesh, Punjab State and Haryana State in the South. Shimla Hills region is almost wholly mountainous with altitudes ranging from 350 metres to 7,000 metres above the mean sea level. It has been identified 10,930 MW of hydro-electric power can be generated in the region of Shimla Hills, by constructing various major, medium, small, and mini/ micro hydro projects on the two River basins. These two Rivers are namely Sutlej and Yamuna.

Table No. 1

Total Hydro power potential in Himachal Pradesh.

River Basin	**Total identified Potential (MW)**	**Potential already tapped (MW)**	**Percentage**	**Under execution (MW)**	**Percentage**
Beas	4,398	1,550	35.243	2,567	58.367
Chenab	3,301	5	0.151	0	0.000
Ravi	2,315	738	31.879	239	10.324
Sutlej	9,657	1,327	13.741	3,599	37.268
Yamuna	1,073	315	29.357	40	3.728
Mini/ Micro project	500	30	6	56	11.200
Total	**21,244**	**3,965**	**18.664**	**6,501**	**30.602**

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Source: Data collected from Himachal Pradesh State Electricity Board. See also Yogesh Khanna**,** *Economic growth of Himachal Pradesh,* Department of Economics & Statistics, Government of Himachal Pradesh, Shimla, 1998.

2. History of the growth of hydroelectric power in the State

After the Independence, the Government of India had started taking priority to generation of power. The few dams that were made in the 1950 s and 1960 s by Union Government in the country. Slowly the state governments also started taking interest in their own natural resources for best utilization. Himachal Pradesh had started to use hydroelectric power from the very beginning. The history of hydroelectric power generation in Himachal Pradesh can be divided into three stages. First phase covers ruling period of colonial rule, the second phase covers ruling period of Union Government and the third phase covers ruling period of State Government.

During the first phase, the history of hydroelectric power generation in Himachal Pradesh started first built of mini-hydroelectric power generation unit named Bhuri Singh Power House at Chamba on Sal Khad in the year 1908. Its capacity was 35 KM and the project provided electricity only to the capital town of Chamba State. The second mini hydroelectric powerhouse had built in the year 1912, at Chaba near Shimla town on Nauti Khad with power generation capacity of 1750 KW. This project provided electricity to the Capital town Shimla. The third mini hydroelectric powerhouse had built in the year 1922, by the ruler of Jubbal princely State on the Gunta Khad with the power generation capacity of 50 KW. This powerhouse provided electricity only to the place of ruler. In the year 1925, work started on the Shanan powerhouse at Jogindar Nagar on Lambadug Khad. It had made operational in the year 1932, with power generation capacity of 48 MW. It was the first major hydroelectric power generation unit in the State.

During the second phase, Himachal Pradesh had integrated and became union territory. In the year 1948, facility of generation of electricity was almost non-existent, except in a few princely state headquarters such as Chamba, Shimla, Mandi and Jubbal. In the First Five Year Plan, Government estimated expenditure of 33.11 lakhs rupees for the development of power in the State. During the Plan period, 28 villages were electrified in the State. Union Government started work on the Bhakra Dam at Bilaspur on the Sutlej River in the year 1948. It had made operational in the year 1961 with the power generation capacity of 1,325 MW. This project provided electricity for North India. In the year 1964, the electricity department had separated from Public Works Department.

During the third phase, Himachal Pradesh had gained statehood on 25th January, 1971. In the year 1971, Himachal Pradesh State Electricity Board was created for the generation and distribution of electricity. HPSEB provided subsidy scheme for electrification of villages. Hydroelectric power generation in the Himachal Pradesh has given top priority from Sixth Plan to onwards.[1] In the Sixth Five Year Plan, State Government Had invested 27.34 per cent of total investment for the development of power in the State. The real growth of hydropower in State has started after took State Government initiatives to involve private companies in construction of hydroelectric projects. The State had achieved hundred percent rural electrification targets of all census villages during 1988-89. Since then, the attention has been giving to improvement in the distribution system and intensive electrification.

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3. Hydroelectric Power in the Region of Shimla Hills

The area of our study (Kinnaur, Shimla and Solan districts) has vast hydel potential and through preliminary hydrological, topographical, and geological investigations, it has been identified 10,930 MW of hydro-electric power can be generated in the study area, by constructing various major, medium, small, and mini/ micro hydro projects on the two river basins. These two Rivers are namely Sutlej and Yamuna. The Sutlej River enters the region of Shimla Hills at 'Shipki' (altitude 6,608 meters) and flows in the west-southerly direction through Kinnaur, Shimla and Solan districts of the study area and the Yamuna River flows in the northeasterly direction through the all three districts of the area of our study. Presently, in the study area 1,652 MW hydel power has exploited by various agencies and 3,664 MW hydel power is under execution. In the Kinnaur, Shimla and Solan districts has taken up following major projects i.e., Giri (60 MW), Ganwi (22.5 MW), Gumma (3.00 MW), Nathapa-Jhakari (1500 MW), Luhari (750 MW), Baspa (300 MW), Dhamwari-Sundha (70 MW), Tangnu-Ramai (50 MW), Rauda (8 MW), Sorang (100 MW), Tinder (100 MW), Karcham-wangtoo (1000 MW) etc. by State, Central and private agencies.

Table No. 2

Total Hydropower potential in the Region of Shimla Hills (Kinnaur, Shimla and Solan districts).

River Basin	Total identified Potential (MW)	Potential already tapped (MW)	Percentage	Under execution (MW)	Percentage
Sutlej	9,657	1,327	13.741	3,599	37.268
Yamuna	1,073	315	29.357	40	3.728
Mini/ Micro project	200	10	5.00	25	12.5
Total	**10,930**	**1,652**	**15.114**	**3,664**	**33.522**

Source: Data collected and complied from Himachal Pradesh State Electricity Board.

4. State Government's Policy on hydropower projects development and income generation

Himachal Pradesh State Government has started supporting policy for the development of hydropower projects in the State. Himachal Pradesh Government has simplified procedures for transfer of clearness related hydropower projects. The State Government is taking survey and investigations on an advanced

scientific basis for the development of hydro potential and created new hydro sites. The State Government has also given financial support for renovation, modernization and updating of old hydro power plants.

The private sector plays a big role in hydropower development. The State Government has involved private sector in the year 1991, for investment in the hydropower generation field. Private hydropower projects in the State are allotted by the Government for an initial period of 40 years to private companies / firms / individuals and extension for further period can be given on the terms and conditions to be decided mutually. Small hydropower projects up to 2 MW are exclusively reserved for the native of state and 5 to 100 MW are to be allotted through memorandum of understanding giving preference to state native.

From every private hydropower project, State Government will get 18 per cent royalty at generation cost from project and 12 per cent free power of total potential. Project developers will spend 1.5 per cent royalty of the total capital cost on resettlement scheme and catchment area treatment. The State government has decided that all private project developers generating hydropower 5 to 100 MW will have to spend 3 per cent of the income generated from the project to the local Gram Panchayat for the first twelve years and 6 per cent thereafter. After completion of forty years period, project will come under the State Government. Thereafter, State Government sells this hydroelectricity to the other states and earns big income. Hydropower projects are the major source of State Government's income and the commissioning of hydroelectric power generation projects in this State has started an era of economic prosperity.

5. Employment Generated by Hydel generation Projects

These mega, medium, small, and mini / micro hydropower projects generate employment for the local people. About 75 per cent of the class, three and four employees of the hydropower project would be recruited from within the state. In the remote areas, local people had employed gainfully as skilled and unskilled workers in these hydropower projects. The State Government has made compulsion for private firms and companies to provide minimum 25 per cent employment of executives and engineers of the State. These projects are also generating doorstep job opportunities for local technical hand workers. Therefore, some local people are encouraging to send their children for technical courses in the various types of institutions such as industrial training institutions, polytechnic institutions, engineering institutions etc. They are employing immediately after completing their technical courses and earning handsome income at his doorstep.

Hydropower projects developers pay ample compensation to those whose land will be acquired for the project and, also provided employment for one member from each displaced family. These hydropower projects are giving employment to the rural and remote areas unemployed youth and generated doorstep jobs for remote areas people. Due to hydropower generation projects, new colonies and township have established in the project's areas. The establishment of townships and new colonies in the around project areas, have affected the social, cultural and economic environment. New colonies and township have provided commercial opportunities for local people. Some of local people have established shops and commercial units in the projects areas and improving their economic status by commercial activities. The townships around the project's areas, have also affected social-cultural status of the region. For the employment, opportunities and the commercial activities outsider started live in these areas. The involving of different types people affected social-cultural ethos of the society.

6. Impacts of the Hydropower Projects

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The hydropower generation projects have seen large environmental impacts by changing ecology of the State. The Himachal Pradesh and, also the region of Shimla Hills has made remarkable achievements in the field of electrification. Before the availability of electricity in the rural areas, the only wood was available for using as fuel. The people of the region were cutting large-scale forests for burnt as fuel. Electrification of the State especially in the rural areas of the Shimla Hills region has markedly eased the pressure on forests and improving the environment in both urban and rural areas. Electrification has also promoted industrialization in the Shimla Hills region and, also throughout the State. After the electrification many different sizes industrial production units have established in the industrial estates of Shimla Hills region at Reckong Peo, Shoghi, Gumma, Parmanu, Solan, Kandaghat, Darlaghat, Baddi, Nalagarh and Barotiwala. These units manufacture different kinds of consumer items, such as microscopes, cement, electric equipments, textile items, electronic instruments, medical equipments, televisions, footwear, etc. The availability of electricity has now started the mechanization of these activities in the villages, such as grinding machines (chakki), cotton carding machines, paddy-shelling machines, oil milling machines, grass cutting machine, agriculture spray machines, etc. Therefore, the burden of hard daily work of the people has reduced. This has shown the brighter side of the picture of the hydropower projects. The smaller hydropower generation projects have brought prosperity to the people of the region without creating significant adverse effects on environment.

The access to easy money due to projects job opportunities in the locality has affected very negatively on the younger generation and traditional values have destroyed very rapidly. The crime rate has risen in the region. Unwillingness to live in the village is increasing amongst the youth. Urbanization has increased rapidly and rural life style in the region is undergoing revolutionary change within migration to the urban areas. This is very negative effects on the society of the region. The mega hydel projects have also inflicted a big lasting damage on the environment as long term. In fact, the ecological damage is bigger comparison to economic benefits to the people of projects areas. Landslides and flash floods have destroyed many villages and people died. On the night of 11th august 1997, flash food had destroyed more than hundreds of homes and more than 300 people died in Chirgaon village lies in Chirgaon tehsil of Shimla district.[2] Flood washed away the whole village. Similar accidents had occurred in Kinnaur district and Rampur areas in the year 1997, a huge landslide near the Nathpa-Jhakhi dam site blocked the Satluj river formed a lake. Many villages had declared unsafe and thousands of people shifted to other places permanently. The mega hydel projects may not apparently be responsible for these damages, but it is certainly that the heavy blasting of the mountains has severely disturbed the stability of their geological formation. These mega hydel projects are destroying ecological balance of the region and making very negative impact on the environment

7. CONCLUSION

Hydroelectric power is a mature technology that harnesses the energy of water without causing its depletion. Renewable energy sources are very less in the earth and it has little greenhouse gas emissions. However, the adverse environmental and social consequences resulting through some hydroelectric power projects in the region. The mega hydroelectric power projects are destroying ecological and climatical balance of the region of Shimla Hills and making very negative impact on the environment. So, we need to think again on

the policies, which has been made for the hills, because all the existing policies for the development of the hilly areas are full of conflicts. Among the development and native society. Government should think and make polices by taking local circumstances into consideration. Through, policies this conflict can be resolved and the true fruits of development can be enjoyed. Before starting development projects, the feeling of insecurity among the local people of being disturb by any developmental activities should be solved on priority. All the stakeholders, policy makers, government officials, Non-Government Organizations, civic body, and social workers should strategically plan and design the framework for ensuring sustainable livelihood of hydroelectric projects affected people on the basis of their old and traditional occupations.

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