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Development of Hydropower Projects in Jammu and Kashmir

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Abstract: The topography of Jammu and Kashmir is highly uneven. The state is blessed with lofty mountains, peaks, river valleys and undulating plains. Such physical feature provides prosperous potential for hydropower development. The estimated hydro power potential of the state is 20,000 Megawatts (MW), out of which about 16475 MW have been identified. Out of the identified potential, only 3263.46 MW i.e. approximately 19.80 % (of identified potential) has been exploited so far, consisting of 1211.96 MW in State Sector from 21 power projects, 2009 MW in Central Sector from 7 projects and 42.5 MW in private sector from 4 projects. These projects are techno-economically practicable, moreover being eco-friendly and socially valuable. In order to harness this potential in a sustained manner, the Government of J&K established the Jammu and Kashmir State Power Development Corporation Limited (JKSPDCL) which has been incorporated as Private limited company on 16th February 1995. The Corporation was incorporated to takeover, execute, complete, operate and maintain all power station and power projects of the state.

On the other hand there are a number of problems on the way of tapping this hydropower potential. The state has relatively harsh climate due to these climatic conditions in some areas construction could not become possible during 4 to 5 months of the year. Several impending hydropower projects sites subsist in relatively far-flung locations and as a result the infrastructure outlay allied with their growth is too much high. This unavoidably increases the unit cost of installed capacity. Moreover in spite of these restrictive factors still this region offers incredible potential for hydropower development if reasonably harnessed. Hydropower is known as an inexhaustible source of energy, which is mostly considered to be profitable, less-polluting and environment friendly. Hydropower generation is also measured as a key player in satisfying energy requirements of an individual and a society. It helps in the generation of revenue and promotes an economic development of the region. In today world approximately all the nations are making steady efforts to swing from nonrenewable to renewable sources of energy where hydropower development is getting a pivotal place among others. It is because hydropower projects have the advantage of producing power that is both, renewable and clean.

I. METHODOLOGY

The present study is primarily based on a combination of two types of data i.e. primary and secondary.

1. The primary data including first hand reports both published and unpublished has been collected by visiting various powers projects in Jammu region as well as in Kashmir region through detailed discussions with the officials.

2. The secondary data were collected through various journals, magazines, economic reviews published in Jammu and Kashmir.

The information thus collected from the above sources have been tabulated, analyzed and interpreted in a way to suit the study.

Objectives

Following are the main objectives keeping above issues and problems in mind; the present study is therefore focused to achieve the following objectives:

- To find the total potential of hydropower in Jammu and Kashmir.
- To find the projects installed under sector wise like state sector, central sector and joint venture.
- To find out the projects under construction.
- To study the existing powers projects and their installed capacity in MW.

II. RESULTS

Broad Environmental Impact Assessment (EIA) details are important for obtaining Environmental authorization and clearances of an individual project. EIA aims to accomplish or support the final goals of environmental protection, sustainable development and proposes alleviation of bad impacts. The EIA report is thought to be a suitable means in the consideration and prediction of impacts of an individual project. To overcome this inadequacy, of projects in the catchment area have been the most important means to study the projects in a relative term for assessing these projects in an incorporated manner for sustainable development of a region.

No doubt, the hydropower projects are considered to be clean, eco-friendly and prime sources of energy but necessitate lots of consideration to be taken into account in coming future. Since these projects are taken as an integral part of economic development of a region, this development needs to be intended in such a way as could be the persistent source of energy to call sustainable. Nonetheless, with the incessant increase in their numbers ahead of carrying capacity of a catchment area, these further increase environmental hazards and pollution specifically during construction and post construction phases. In addition, these developmental actions also transform socio-economic, demographic and cultural patterns of a particular mountain region. This varying behavior of present and upcoming hydropower projects has been facing plenty of problems and obstacles on the way of sustainable development and getting the suitable energy without disturbing ecological balance in the region.

III. HYDROELECTRIC POWER PROJECTS IN JAMMU AND KASHMIR

Jammu and Kashmir is known as hill state of India, being hilly terrain it provides water in abundance which flows through the length and breadth of state. It has rich potential for generation of hydroelectricity. With the rapid growth of population, urbanization and industrialization, electricity demand has increased manifold in State. The hydropower resource is a key to meet up the escalating demands and carry economic growth.

In fact, the necessities of power and its accessibility and availability have been acknowledged as the surest manifestation for the State's overall growth and development. Compared to hydropower generation, thermal generation can't be a response to rally the increasing energy requirements of the State. More so state is not rich in the non-renewable energy sources of fossil fuels, which could be used effectively for power generation, but there are enormous renewable sources of energy, particularly water resources that can meet the demand. The three major rivers flowing through Jammu and Kashmir—the Indus, the Jhelum and the Chenab with their tributaries respectively and offer a remarkable scope for generation of hydropower through hydroelectric plants installed at different places which could be a crucial reason in the developmental course of action of the State.

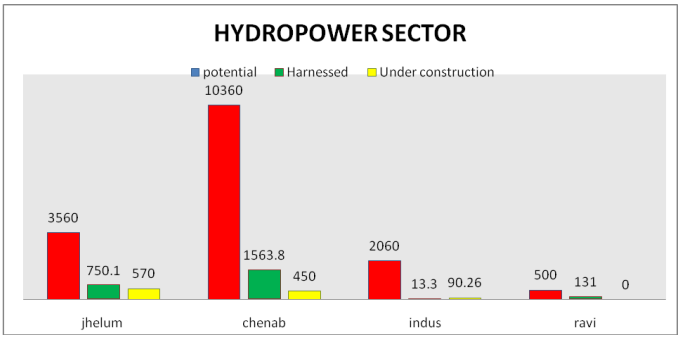
Since hydro-power generation caters strong need for industrialization and urbanization development, if there is an accessibility as well as availability of resources for utilization in the State, it could be utilized for optimal remuneration. Such optimal use of the obtainable assets of the State would cater the State's demand to bang the overall economy growth. In addition, by harnessing the total predictable power potential of the State, it may be attributed as accommodating factor for bringing peace and stability to the crisis-ridden parts of State. In the meantime, experts are of the opinion that power potential of the disputed area could help to transform the valley of death, destruction and devastation to a center of brilliance and hub of manufacturing.

The State has managed to produce about 2500 MW of hydro-power that comes out about 12 percent of the estimated power potential. Despite being rich in water resources the state is unable to harness the hydropower and its rich potential because Indus water treaty which was signed in 1960. The treaty doesn't let the State to build storage reservoirs on the three western rivers except run-of-river projects. The total harnessed power potential is on the basis of "run-of-river" schemes with some small "live storage" capacity on three Western Rivers. These types of projects not only increase the construction cost but also adversely affects the cost-effectiveness of power generation from these projects and generation capacity. Relatively, the run-of-the-river projects using small head-falls are reported to be about 75 percent higher in cost than those hydel projects using high head-falls. These high cost projects generate electricity much below their installed capacity. For instance, run-of the-river Uri Hydel Project, which was built at the cost of more than US $ 800 million, is producing only 200 MW in winter as against the 480 MW installed capacity. Commenting on these situations, the former Managing Director for J&K Power Development Corporation (JKPDC), Javid Shahmiri, stated that "considering that the hydro potential of the State is about 20,000 MW, annual energy loss works out to 60,000 million units valuing Rs. 12,000 Crores."

Flowing through the territory of J&K State, the Chenab River has more power potential than others, but there is no effective storage on the Chenab main up to Kishtwar. Three major projects Salal, Dulhasti and Baglihar along with some other small projects are in operation. But the storage capacity of the Salal hydro-power project on the Chenab River has got reduced due to sedimentation. The other projects, such as Baglihar with storage of 0.3MAF, Dulhasti 0.007 MAF on the Chenab rivers have also limited storage capacities. To meet the criteria of the treaty, projects constructed on the western rivers cannot retain the stored water for more than a week.

IV. BREAKUP OF RIVERS SHOWING THE IDENTIFIED, HARNESSED AND UNDER CONSTRUCTION POWER POTENTIAL OF J&K STATE

Rivers	Jhelum	Chenab	Indus	Ravi
Potential	3560	10360	2060	500
Harnessed	750.1	1563.8	13.3	131
Under construction	570	450	90.26	0



Source: Economic Survey of J&K State (2011)

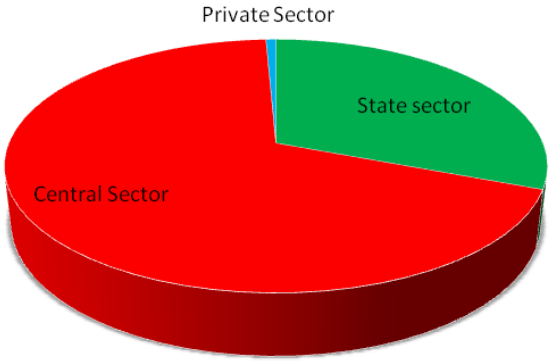
From the above table river Chenab is considered as the mightiest river of the state and has the highest potential to harness the hydroelectricity in the state that is 10360 MW followed by river Jhelum which has 3560 MW, Indus ranked at third position. Instead of higher power generating potential these rivers have low storage capacity due to run of rivers. In such a situation, the State has been able to harness only about 2500 MW,

A. Existing power projects of Jammu and Kashmir

S.NO	PROJECT	BASIN	CAPACITY IN MWS
State sector			
1	LJHP	Jehlum	105.00
2	USHP-II Kangan	Jehlum	105.00
3	USHP-I	Jehlum	22.60
4	Ganderbal	Jehlum	15.00
5	Pahalgam	Jehlum	3.00
6	Karnah	Jehlum	2.00
7	Baglihar-I	Chenab	450.00
8	Chenani-I	Chenab	23.30
9	Chenani-II	Chenab	2.00
10	Chenani-III	Chenab	7.50
11	Bhaderwah	Chenab	1.00
12	Iqbal	Indus	3.75
13	Sumoor	Indus	0.10
14	Hunder	Indus	0.40
15	Bazgo	Indus	0.30
16	Igo- Marcelloung	Indus	3.00
17	Marpacho	Indus	0.75
18	Haftal	Indus	1.00
19	Satakna	Indus	4.00
20	Sewa III	Ravi	9.00
	Sub total		**758.70**
Central Sector			
1	Salal	Chenab	690.00

2	Dulhasti	Chenab	390.00
3	Uri –I	Jhelum	480.00
4	Sewa –II	Ravi	120.00
	Sub total		**1680.00**
Private Sector			
1	Athwatoo	Jhelum	10.00
2	Brenwar	Jhelum	7.50
	Sub total		**17.50**
	GRAND TOTAL		**2456**

SECTOR WISE DISTRIBUTION OF POWER PROJECTS IN JAMMU AND KASHMIR



Source: J&K State Hydroelectric Project Development Policy 2011

The above table reveals that the state has 20,000 MW Power generating potential out of which only 2556 MW is harnessed consisting of 758.70 MW, from 20 power projects from the state sector and 1680 MW of the 4 power projects under Central Sector (NHPC), i.e. 690 MW from Salal Hydel Electric Project, 480 MW from Uri-I Hydel Electric Project, from Dulhasti 390 MW and 120 MW from the Sewa II, only 17.50 MW is harnessed from the private sector consisting of Athwatoo and Brenwar.

CONCLUSION

The ongoing power projects in the State are considered as a core heated discussion between India and Pakistan, in this manner severely affecting the development of the State. Additionally, the harnessed power potential is based on run-of-the river project, which cannot produce optimum generation. These run-of-the-river projects cannot meet the growing power demands of the State, resulting in shortage of power. Due to this there are number of villages in various districts which are still under dark. as a result, the State is forced to purchase power from outside, for which a major part of the State's budget gets exhausted, and therefore, it appears to be a serious obstacle for Jammu and Kashmir's economic independence.

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