ESTIMATED HYDRO POWER POTENTIAL AND ITS STATUS OF DEVELOPMENT IN JAMMU AND KASHMIR

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ABSTRACT

Power or electricity is the essential source of commercial energy, which is a vital component for sustained Economic Growth and Development of an economy. Hydroelectricity exists as one option to meet the growing demand for energy and is discussed in this paper. The J & K State is endowed with huge and vast water resources in the form of permanent glaciers & ice bodies, inland water bodies viz. lakes & river systems. These are being utilized for water resource development projects. To tap water resources for hydropower development, the capacity that can be developed on the major river systems and its tributaries has been estimated as about 20000 MW. The hydropower scenario has been examined based on latest information of protects implemented, proposed and under construction in the UT. Based on these studies it is established that numerous consideration factors exist when building hydropower plants, whether the concerns are global or local. The gradual increase of demand of power means the economy is growing and is leading to modernization, industrialization and improvement in basic amenities culminating into better quality life of the people. Power Development in Jammu and Kashmir has a long and distinguished history. 9MW Mohra Hydro-electric Plant, among the first of its kind in the subcontinent, was developed, as early as, 1905.

Key Words: *State Sector, Central Sector, Installed Capacity, Demand and availability, Transmission and Distribution, Trading and Banking, Power Losses, Per Capita consumption of Energy.*

1. INTRODUCTION

The estimated hydro power potential of the state (Now UT) is 20,000 Megawatts (MW), of which about 16475 MW have been identified. This comprises 11283 MW in Chenab basin, 3084 MW in Jhelum basin 500 MW in Ravi Basin & 1608 MW in Indus basin. Out of the identified potential only3549MW i.e. 21.54% (of identified potential) has been exploited until now which comprises 1540 MW in State Sector, 2009 MW in Central Sector and 42.5 MW in private sector. In order to meet the demand of energy the state PDD is committed to exploit the available hydel potential to an optimum level to provide impetus to the growth of the economy of the state (UT) in the years to come. Various reforms are underway at the level of the State Government and the Central Government for making the power sector more efficient and more competitive. While there is some progress but the power shortage continues to haunt the State and is a major constraint for the development of the industry. The biggest problem is on the distributional front as Aggregate Technical & Commercial (AT&C) losses of the State are on the higher side. The main reasons for such high losses are technical as well as commercial. To minimize losses, the system needs up-gradation and improvements

especially in existing outdated distribution network. However with the efforts of the government the AT&C losses which were estimated at 61.30% in 2014-15 were reduced to 58.82% in 2015-16. This has been posing a major challenge to the fiscal health of the State. Some projects under Central Sector and State Sector have materialized which is going to further increase the generation capacity. Further Transmission and Distribution network is being augmented as well as strengthened and various measures are underway to overcome the AT&C losses through implementation of the various Central schemes like R-APDRP, IPDS etc. The reforms under Power Sector also include creation of new Transmission Corridors on fast track basis, creation of Smart Grid infrastructure and promotion of Joint Ventures under participatory mode etc.

2 STATE SECTOR PROJECTS IN OPERATION ALONG WITH INSTALLED CAPACITY

During past five decades considerable work has been done in Power Sector. The installed capacity in the State, Thermal as well as Hydel, is 1748 MW (208 MW Thermal + 1540MW Hydel). The prestigious Baglihar Hydro Electric Project, stage- I was commissioned during 2008-09 and Stage-ll was commissioned in 2015-16. Energy generation in 2014-15,2015-16, and 2016-17 has been recorded as 39887.17 MU's, 40302.88 MU's and 48662.06 MU's respectively, recording an increase by 21.99% from 2014-15 to 2016-17. Detailed installed capacities are given below.

S. No	*Name of project*	*Installed Capacity (MWs)*	*River*	*Year of Commissioning*
01	Lower Jhelum	105	Jhelum	1978-79
02	Upper Sindh -II	105	Jhelum	2002-03
03	Baglihar-l	450	Chenab	2008-09
04	Baglihar-ll	450	Chenab	2015
05	Kishanganga	330	Jhelum	2018
06	Upper Sindh -I	22.00	Jhelum	1973-74
07	Chenani-l	23.30	Chenab	1971-72
08	Ganderbal	15.00	Jhelum	1955-56
09	Sewa-III	9.00	Ravi	2002-03
10	Chenani-lll	7.50	Chenab	2001-02
11	Stakna	4.00	Indus	1988
12	Iqbal	3.75	Indus	1995-96
13	Pahalgam	3.00	Jhelum	2006
14	Igo-Mercellong	3.00	Indus	2005
15	Chenani-ll	2.00	Chenab	1995-96
16	Karnah	2.00	Jhelum	1990-91
17	Sanjak	1.26	Ravi	2011

18	Bhaderwah	1.50	Chenab	2005
19	Haftal	1.00	Indus	2006
20	Marpachoo	0.75	Indus	2006
21	Hunder	0.40	Indus	1994-95
22	Bazgoo	0.30	Indus	1994-95
23	Sumoor	0.10	Indus	1994-95
Total		**1540**		

3 CENTRAL SECTOR PROJECTS ALONG WITH INSTALLED CAPACITY

In the Central sector, during the first year of 11th Five Year Plan i.e. 2007-08, Dulhasti Power Project, Kishtwar with the capacity of 390 MW and 120 MW Sewa-II were commissioned which increased the power generation in central sector from 1170 MW to1680 MW. Further during 2013-14 , 45 MW Nimo Bazgo, 44 MW Chutak & 240 MW Uri-II were commissioned which increased the installed capacity of Central Sector Projects to 2009 MW. This capacity stabilizes the State Power situation as State has entitlement of 12 percent free power from these projects.

S. No	*Name of Project*	*Installed Capacity (MWs)*	*River*	*Year of Commissioning*
01	Salal-I & II	690.00	Chenab	1987-1995
02	Uri-I	480.00	Jhelum	1996-97
03	Dulhasti	390.00	Chenab	2007
04	Sewa-ll	120.00	Ravi	2010-11
05	Chutak	44.00	Suru	2012-13
06	Uri-II	240.00	Jhelum	2013-14
07	NimmoBazgo	45.00	Indus	2013
Total		**2009**		

H.E. Schemes Under Construction:

S. No	*Name of Project*	*Agency*	*Installed Capacity (MWs)*	*Likely to be Commissioning*
01	Ratle	(RHEPPL)	850.00	2023-24
02	Parani	JKSPDC	37.5	2021-22
03	Lower Kalnai	JKSPDC	48.00	2022-23
04	PakalDul	NHPC	1000	2023-24

H.E. Projects Cleared/Appraised:

S. No	*Name of project*	*Agency*	*I.C (MWs)*	*Date of CEA Concurrence*	*Status*
01	New Ganderbal	JKSPC	93.00	10.06.14	EC obtained on 27.9.13 and FC obtained on 02.04.2012
02	Kiru	CVPPL	624.00	13.06.16	EC accorded on 24.06.2016 & FC accorded on 19.05.2016. Tendering for all the packages issued and packages will be awarded after PIB approval. PIB circulated by MoP on 8.05.2018. PIB at updated PL circulated by MoP on 11.06.2018.
03	Kwar	CVPP	540.00	23.02.17	EC accorded on 10.04.17. FC accorded on 08.08.14. Tenders for Civil, HM and E&M packages issued. Works will be awarded after investment approval by Government. PIB circulated by MoP on 10.05.2018. PIB at updated PL circulated by MoP on 22.06.2018.
04	Kirthai-II	JKSPDC	930.00	27.12.16	EC & FC awaited
05	Sawalkot	JKSPDC	1856.00	18.04.18	EC was recommended on 31.01.2017 & FC awaited. Joint survey under process.
	Total		**4043.00**		

Hydro Schemes Under Examination in CEA

S. No	*Name of Scheme*	*Sector*	*I.C. (MW)*	*Agency*	*Month of receipt*
01	Kirthai -I	State	390.00	JKSPDC	07/17
	Total		**390.00**		

H.E. schemes allotted for development on which Survey & Investigation is held up/ yet to be taken up:

S.No	*Name of Scheme*	*I.C (MWs)*	*Agency*	*Date of Allotment MoA*	*Status*
01	Shamnot	370.00	NHPC	……..	S&I held up as the project Will submerge National Highway
Total		**370.00**			

H. E. Projects yet to be allotted for development

S.No	*Name of Scheme*	*River*	*Type*	*Probable I.C(MWs)*
01	Shuas	Chenab	R	505.00
02	Berinaum	Chenab	R	435.00
03	Naga	KalNai	R	29.00
04	Kiwa	KalNai	R	37.00
05	Tipri	KalNai	R	36.00
06	Kairi	Indus	R	28.00
07	Parfila	Zaskar	S	45.00
08	Paidar	Zaskar	R	46.00
09	Tillarchu	Zaskar	R	39.00
10	Nurla	Indus	R	65.00
11	Khalsi	Indus	R	170.00
12	Takmaching	Indus	R	75.00
13	Dumkar	Indus	R	130.00
14	Achinthang	Indus	R	140.00
15	Kanyunche	Indus	R	105.00
16	Batalik	Indus	R	235.00
17	Parkhachik	Suru	R	110.00
18	Thambas	Suru	R	29.00
19	Dandal	Drass	R	26.00
20	Khahru	Drass	R	30.00
21	Tahanus	Shingo	R	120.00
22	Karkit	Shingo	R	190.00
23	Gunderman	Suru	R	120.00
24	Chalunka	Shyok	R	45.00
25	Chechesna	Suru	R	47.00
26	Leh	Indus	R	29.00
	Total			**2866**

The numbers and capacity yet to be allotted for development is different from the potential accessed due to change in capacity of the schemes, addition/deletion of the schemes and merger of two schemes into one etc.

STATUS OF POWER TRANSMISSION

The Transmission and Distribution of power is looked after by Power Development Department in the State of J&K. Effective and efficient Transmission and Distribution is as vital as the generation of power. The need of power in the State is growing, so does the generation. In order to transfer the Power from point of generation to point of consumption effectively, the Transmission and Distribution infrastructure needs development. The infrastructure of Transmission and Distribution serving the State consists of four transformation capacities of different voltage levels i.e. 220/132 KV level, 132/66-33 KV level, 66-33/11 KV level and 11/0.04 KV level.3730.00 MVA transformation capacity was available at 220 kV level and 4283.00 MVA at 132 kV level by the end of year 2016-17. The infrastructure available to meet the transmission of estimated demand at the end of 12th plan is not adequate enough in the State. Hence there is an urgent need to upgrade the Transmission and Distribution infrastructure so that future needs of T&D can be fulfilled effectively. In the wake of thrust on Generation of more and more power in the State by undertaking the fresh projects, the need for such T&D network needs immediate attention. The infrastructure capacity required at 220/132 kV level to meet the anticipated peak demand is 5160 MVA ending 2017-18, there will be a gap of 1430 MVA at the end of 12th five year plan. Likewise the estimated requirement of transformation capacity at 132/66-33kV level at the end of 12th plan will be 6192.00 MVA leaving a gap of 1909.00 MVA and at 66-33/11 kV level will be 6939.95 MVA leaving a gap of 1260.4 MVA and at 11-6.6/0.4 kV will be 8142.15 MVA leaving a gap of 117.35 MVA which is to be provided in phased manner during the 12th plan. Around 9000 MW capacity generation is under execution under state sector, central sector, IPP mode and Joint Venture out of which around 2100 MW is scheduled to come up by the end of 12th five year plan. The state has to prepare evacuation system for this generation during 12th plan period which is scheduled to come by the end of 12th plan.

POWER ITS DEMAND AND AVAILABILITY

The energy demand has gradually increased by about 2 to 3% annually up to FY 2015-16. During the FY 2016-17 the energy demand has increased by 1.6% over the previous year I,e.2015-16. However, against the energy requirement of 18487.59 MUs, State has met a restricted energy demand of 15667.449 MUs thereby reducing the energy deficit from 21.83% in 2015-16 to 15.25% during FY 2016-17 to bridge the widened gap between demand and supply, the department has enforced the power cuts. These cuts are of the order of 8 hours in summer and 10 hours in winter. Even after the cuts, the restricted demand was 15667.449 MUs in 2016-17, which necessitated banking of power during summer with other state utilities and using of the same during winter. Haryana, Chhattisgarh, and also arranges Power from Power Trading Corporation (PTC), NTPC Vidhyut Viyapar Nigam Ltd. (NVVN), besides, over drawls from Northern Grid. Over drawls are not an assured source of supply and restrictions are imposed depending upon the overall frequency position of the Grid. So over drawls are being avoided to the extent possible. Accordingly the department has encouraged banking of power from 180.69 MU in the year 2014-15 to 286.066 during 2016-17. During the year 2016-17 the department supplied 9% more energy as compared to previous year.

TRADING AND BANKING ARRANGEMENTS

To meet the restricted requirement of energy during winters when there is drastic reduction in river discharge, the state goes for banking arrangements with NVVN, Punjab, Haryana and Chandigarh where the power is banked during summers and received back during winters. In addition the state receives 683 MW of power from the unallocated quota as well during peak requirement. For the year 2016-17, 180 MU have been banked by the department.

POWER LOSES

The Transmission and Distribution losses in the State are very high. The main reasons for such losses are technical as well as commercial. The high technical losses are due to existing outdated system. To minimize such losses, the system needs improvements and up-gradation for which various approved flagships schemes are being implemented. Commercial losses include theft, unaccounted and uncontrolled consumption of power beyond agreement load, unregistered consumers which let a bad impact on revenue of the concerned department.

PER CAPITA CONSUMPTION OF ENERGY

The per capita consumption of energy in J&K has shown steady growth and is presently around 1089.41 units, which is nearly at par with national average for the year 2016-17.

DEMAND AND SUPPLY MANAGEMENT OF POWER

As said above , the state's peak demand for power has grown by 9.09% from 2011 to 2016-17 and peak deficit has decreased from 28.75% to 22.18% during 2012-13 to 2016-17. It needs to placed on record that the losses in the Power sector in the State is on account of difference in the cost of purchase of power and sale price realized from different consumers, besides inefficiency of revenue realization on part of the department besides hidden subsidy. Revenue realization is directly correlated with the tariff rates fixed by the State Electricity Regulatory Commission (SERC) on year on year basis.

4. CONCLUSION

With an intend to invite investment to newly formed Union Territory of Jammu and Kashmir after abrogation of Article 370 and 35A, dated 5th of august 2019 which banned outsiders from owing land and business in Jammu and Kashmir could only be a success story in curbing the unemployment and generating an industrialist U.T if there is sufficient availability of electricity which is a prime need to sustain business. As we know that the state has little potential for the development of thermal and nuclear power, while the U.T is endowed with huge and vast water resources in the form of permanent glaciers, ice bodies, inland water bodies viz. lakes and river system, these have the potential to produce 20000Mws of electricity but we just produce 18% of our Potential. Hope in the future there will be no under utilization of these resources and the below mentioned steps would be helpful i.e., Establishment of new generation capacity in the State in a time bound manner, Provisioning of long term finance arrangements, Exploitation of available hydro and solar potential, Creation of inter and intra state transmission system for evacuation of power, Efficient use consumer awareness, to devise investor friendly investment policy for public investment in PPP Mode, Implementation of UDAY scheme along with establishment of sustainable energy audit mechanism of consumers, De-subsidization of tariff on yearly basis for different consumers; and Segregation of feeders for domestic and commercial power supply and convergence with smart grids in next two years along with e-metering.

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