J and K –A Power Potential Source or Power Deficit State

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Abstract **- 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. The estimated hydel potential is about 20,000 MW, out of which projects of about 16,200 MW capacity have already been identified. The State is currently focused on generation through big hydro power project. Potential of micro Hydel power and Solar are increasingly being tapped. Grid electricity penetration in remote hilly areas of J&K is techno-economically unviable by virtue of geographical disadvantages and scattered household pattern. Moreover, the power sector of the State is already facing difficulties like slow rate of capacity addition, poor power evacuation facility, high AT&C losses and mismatch in load profile. Power utilization mix is not commensurate with the State's climatic conditions. Promotion and utilization of renewable energy is the most feasible solution which would also promote low carbon growth and can meet the decentralized energy requirement of the remote locations. The aim of the paper is to identify the power potential of the state and problems associated with it. Also the various schemes operational in power sector are discussed.**

Keywords— Power, Renewable Energy, Losses, Centralization.

I. INTRODUCTION

Energy is a vital component for sustained economic growth and the energy mix is an indicator of sustainable development of a State and the country. Also proportionate growth in power sector is essential to maintain the economic growth. With enhanced modernization, industrialization and change in life style; the energy demand has increased several folds in across the last decade. Energy demand across the country is met primarily through conventional energy resources which not only raises the concern on energy security but also results in increased accumulation of greenhouse gas in the atmosphere. As per IPCC Fifth Assessment Report Green House Gas emissions resulting from provision of energy services have contributed significantly to the phenomenal increase in atmospheric concentration of Green House Gas concentration. Thus, the States with high dependency on conventional energy sources for meeting the energy demand contribute significantly to environmental degradation. Through, the demand for energy to meet economic development exists; a strategy should be developed towards lowering the Green House Gas emissions from the energy system besides satisfying the global demand for energy services. Increasing the share of renewable sources in the existing energy generation mix is assessed as the best possible option towards meeting the global energy supply challenge. The action plan proposed under State energy mission while catering to the objective of national solar mission aimed at enabling communities to understand the uncertainty of future climatic conditions and engage them effectively in a process of developing adaptation and mitigation programmes.

The State is currently focused on generation through big hydro power project. Potential of micro Hydel power and Solar are increasingly being tapped. Grid electricity penetration in remote hilly areas of J&K is techno-economically unviable by virtue of geographical disadvantages and scattered household pattern. Moreover, the power sector of the State is already facing difficulties like slow rate of capacity addition, poor power evacuation facility, high AT&C losses and mismatch in load profile. Power utilization mix is not commensurate with the State's climatic conditions. Promotion and utilization of renewable energy is the most feasible solution which would also promote low carbon growth and can meet the decentralized energy requirement of the remote locations.

The State is largely dependent on the power generated from hydropower projects and thermal power plants besides supplements from DG set. Jammu & Kashmir has a total power generation capacity of 2,648.46 MW under central and State sector. The State is heavily relying on power purchase from the NEWNE grid and thermal power generation units and gas and diesel based power units during winters when its own hydro power generation reduces and power demand rises. The State is facing power crisis owing to untapped renewable energy, high rate of AT&C losses including pilferage.

Out of total power demand of 17,323 million units, power generation from the State owned power houses is only 2,562.723 million units. Bulk of electricity consumption in the State is by the domestic sector. With modernization and increased urbanization, per capita energy consumption of the State has increased from 849.98 kWh in 2010-11 to 882.82 kWh in 2011-12. The energy demand has gradually increased during last five years at an annual rate of 5 to 6%. According to the sixteenth All India Power Survey, the power requirement of the State is expected to reach 19,500 million units during 2020-21.

The primary sources of cooking fuel in rural areas of Jammu & Kashmir are firewood and chips followed by LPG. Urban cooking fuel demand is mainly met through LPG. Electricity

is the main energy source for urban lighting. The scenario is same in the rural areas too; kerosene is being seldom used as an alternative. Although the State is fairly electrified with 97% of villages lit, but providing continuous power at cheaper rate is difficult.

II. ISTALLED CAPACITY

The installed capacity of power stands just at 504.44 Mws in the state of which 308.70 Mws are hydel and 195.74 Mws theral. From the last over four decades, considerable progress has been maed in this behalf, of course, within the limitations imposed by resorces constraint. From a negligible base of 3 to 4 megawatts in 1950-51, the installed capacity of power has risen to 504.44 Mws. most important hydro power projects at lower Jehlum with 105 Mws, Upper Sindh Hydro kangan with 105 Mws, Upper Sindh Sumbal with 22.60 Mws and Chenanie Hydro with 23.30 Mws. In the thermal segment, gasturbone papore has 175 Mws and 20.74 Mws are diesel.The Following is the list list of current installed capacities

Name of Power House	Configuration	Installed Capacity in MW
STATE SECTOR		
Jhelum River Basin		
Lower Jhelum	3 x 35	105
Upper Sindh-I	2x11.3	22.6
Ganderbal	2x3+2x4.5	15
Upper Sindh-II	3x35	105
Pahalgam	2 x 1.5	3
Karnah	2x1	2
Chenab Basin		
Chenani-I	5x4.66	23.30
Chennai-II	2x1	2
Chenani-III	3x2.5	7.50
Bhaderwah	2 x 0.5	1
Baglihar	3x150	450
Ravi Basin		
Sewa-III	3x3	9
Indus Basin		
Iqbal	3x1.25	3.75
Hunder	2x0.20	0.40
Sumoor	2x0.05	0.10
Igo-Mercellong	2x1.50	3
Haftal	2x0.50	1
Marpachoo	3x0.25	0.75
Bazgo	2x0.15	0.30
Stakna	2x2	4
Total		758.70
CENTRAL SECTOR		
Salal HEP	6x115	690
Uri -I	4x120	480
Dul-Hasti	3x130	390
Total		1560

III. CONSUMPTION

Consumption of power increased from 2577.9 MKwH in 1997-98 to 3397.0 MKwH during 2000-01 recording an increase of 31.7 per cent. The domestic sector has been the biggest consumer followed by agriculture and industry. Domestic consumption showed an increase of 65 per cent during the same period, followed by an increase of 13.84 per cent in agriculture and 59.39 per cent in industrial consumption. The state is dependent on external sources to fill the wide gap between the demand and supply of power. The supply of power is measured by its own generation. Gross generation of power in the state is only 8.6 per cent of the total energy available as the latter includes the power purchase from central and other sources. Since the supply of power is usually not metered, consumption figures are only estimates and not actual consumption by the consumer.The consumption statstics are shown in the table below.

S. NO	Customer Category	2009-10		2010-11		2011-12	
		Energy consumption (in MU)	%age	Energy consumption (in MU)	%age	Energy consumption (in MU)	%age
1	Domestic	1380.00	36.00	1255.93	31.08	1431.98	33.56
2	Non-Domestic/ Commercial	295.00	7.70	349.10	8.64	333.26	7.81
3	Industrial	856.00	22.33	816.54	20.21	849.53	19.91
4	Govt.						
4.a	Irrigation/ Agriculture	295.00	7.00	198.10	4.90	140.67	3.30
4.b	Public Lighting	14.00	0.37	29.07	0.72	35.66	0.84
4.c	Public Water works	383.00	9.99	586.04	14.50	636.14	14.91
4.d	State Central Dept.	532.00	13.88	711.20	17.60	695.65	16.30

4. e	**General Purpose bulk supply**	**78.00**	**2. 03**	**95.10**	**2.35**	**144.10**	**3.3 8**
Grand Total		**3833.0 0**	**10 0. 00**	**4041.0 8**	**100.0 0**	**4266.99**	**10 0.0 0**

IV. STATE POLICY FOR DEVELOPMENT OF SHP

As described above J&K has a hydro potential of 20,000 MW and the Govt. of Jammu and Kashmir has decided to encourage generation of power through small hydro power sources of energy and has framed a policy so that the development of this sector serves as an engine to achieve the objective of promoting the all-round development of the region. The objectives of this policy, interalia, are to attract investors for the development of State's water resources in an environmental friendly manner and to generate revenues for the state from development of its hydel resources while ensuring project viability.The salient features of the policy are discussed hereunder :

- J&K Govt invites, Non-Govt Agencies of J&K, termed as IPPs to bid for identified projects.
- Pre-qualification and allotment of projects through competitive bidding.
- Pre-feasibility reports shall be provided by SPDC to the qualified bidders.
- Project will be allotted to bidder making the highest bid for premium payable per MW.
- Projects offered initially for a period of forty years from the date of award.
- IPP can sell power to any consumer within or outside the state including J&K PDD.
- Power Purchase Agreements (PPAs), sales and wheeling agreements to be mutually negotiated.
- No wheeling charges in case of sale by J&KPDD.
- All sales will be approved as required by the Regulator.
- Govt land will be given on Lease to the IPP for a period of 40 years.
- Free transfer of shares will be permitted in the companies allotted projects as per the laid down procedure.
- ¾ No royalty shall be charged for first fifteen years for the projects
- JKPDD will carry out the implementation of evacuation facilities, if requested by IPPs, at charges to be mutually negotiated.
- Developers can avail of the facility of banking of energy with JKPDD
- The infrastructure and facilities of J&KPDD will be made available to all IPPs for wheeling the generated energy.

V. ROLE OF IREDA

Indian Renewable Energy Development Agency (IREDA) In addition to the above, IREDA which is the financial arm of the MNES, Govt. of India established to promote, develop and finance renewable energy technologies and provides funding for development of SHP for setting up commercial SHP projects upto 25 MW station capacity by Private, Joint Sector & others on the following financial terms :

Term Loan

- Upto 75% of project cost (upto 1 MW capacity)
- Upto 70% of project cost (1-25 MW capacity)

Interest Rate

- 11.25% upto 1 MW
- 11.50% above 1 MW upto 5 MW
- 11.75% above 5 MW upto 15 MW
- 12.00% above 15 MW upto 25 MW

VI. SOLAR POWR POLICY OBJECTIVES

The State Government introduces the Solar Power Policy with the following objectives:

- Promoting generation of green and clean power in the State using Solar Energy
- To meet the targets to be achieved countrywide under JNNSM.
- To put in place an appropriate investment climate, that could leverage the Clean Development Mechanism (CDM).
- Productive use of the wastelands, thereby fostering a socio-economic transformation.
- Employment generation and skill enhancement of local youth.
- Promotion of R&D and facilitation of technology transfer
- Establish core technical competence in professionals in the state to initiate and sustain use and effective management of newer energy applications.
- Creation of environmental consciousness among citizens

VII. NEW PROJECTS AND INITIATIVES

Jammu and Kashmir State is all set to get some respite from power crisis with the commissioning and generation of electricity by the 120-MW hydro power project Sewa-II of National Hydro Projects Corporation (NHPC) in the Basholi belt of Jammu and Kashmir. The hydro power project was declared commissioned by Union Power Minister Sushil Kumar Shinde in Jammu & Kashmir in the presence of the state Chief Minister Omar Abdullah on September 29, 2010. The electricity generated from this prestigious project will not only benefit people of the J&K State but its beneficiaries will also be Punjab, Haryana, Uttar Pradesh, Uttarakhand, Delhi, Rajasthan and Chandigarh.

The project is located on river Ravi at Maska (Basholi) bordering Himachal Pradesh and has been constructed by the NHPC at a cost of Rs. 1061 crore and has been completed in seven years by National Hydro Power Corporation. The dam of the Power Project is situated at a village Ghatti about 80 kms from Basohli in Kathua district and 150 kms from Lakhanpur. The Power Station is at village Maksha at the junction of rive Ravi and Sewa tributary. J&K State is getting free 13 per cent power out of the total power generated by Sewa-II Power Station.

J&K State has vast hydropower potential of which major portion is yet to be developed . Out of the total power generation capacity of 20,000 MWs in Jammu and Kashmir, only 2456.20 MWs has been harnessed in the State, Central and Private sector to harness the maximum possible potential for power. NHPC is playing an important role in developing the potential and is associated with the development of hydropower in Jammu & Kashmir. So far NHPC has commissioned four projects with combined capacity of 1,680 MW in the state and four projects with combined capacity of 659 MW are under construction. State Government is also pursuing the construction of 1,020 MW Bursar Project on a priority basis while work on the three projects in the state is to be implemented under joint venture route.

Various power projects with the generation capacity of about 4,000 MWs have been conceived by the State Power Development Corporation and are at various stages of execution at present. In addition to this various projects are underway to utilise the power potential of the State. The Projects include Baglihar-II which has the power generation capacity of 450 MWs. The Project is being executed in State Sector. The Detailed Project Report in the Project has been submitted to Central Electrical Authority (CEA) while the essential works of the Project are under execution.

Sawlakote-I and II Project is being undertaken under State Sector which has the power generation capacity of 1200 MWs. With the power generation capacity of 50 MWs, the Lower Kalnai Project has been undertaken BY Jammu and Kashmir State Power Development Corporation. Rattle Project having the capacity of 690 MWs is being undertaken by and Independent Power Producer (IPP).

The Project awarded to GVK Development Project Limited on BOOT (Build, Own, Operate and Transfer) basis. Special Purpose Vehicle (SPV) for the implementation in Private Public Participation (PPP) mode has been formed and selection of partner through bidding process has been initiated in Kirthai-I Project having the power generation capacity of 240 MWs. Kiru Project and Kawar Project has been undertaken as joint ventures of Jammu and Kashmir State Power Development Corporation (JKSPDC), National Hydel Power Corporation (NHPC) and Power Trading Corporation (PTC) which has the capacity of 600 MW and 520 MWs respectively. Pakaldul Project which has the power generation capacity of 1000 MWs is being taken up as a joint venture of JKSPDC, NHPC and PTC. Projects under progress under Central Sector include Kishenganga(330 MWs), Nimo Bazgo(45 MWs), Chutak(44MWs), Uri – II(240 MWs) and Bursar(1020MWs).

VIII. CONCLUSION

Given the fact that the state has to depend mostly on purchases to meet its demand and the wide gap between the rate of purchase and sale of power, plus the fact that the cost of energy from all future plants being set up under the state, central and private sectors would be higher, it is critical that the state takes steps to reduce T&D losses (technical and non-technical), operational expenditure and ensures proper metering, meter reading, billing of services and revenue collection. As and when all the upcoming projects are commissioned and start power generation, the Jammu and Kashmir State will not only be self-sufficient in meeting the power requirements of people of the State but will be having surplus power which it can sell off to other States. The State will then have no longer to import power from Northern Grid and other States to meet its power requirements. But for that to realise, people of the J&K State may have to wait for the time being.

REFERENCES

[1.] State policy for the development of small hydro power in j&k (government order no: 211 - pdd of 2003 dated 09 - 10 - 2003)
[2.] Shafat Sultan "Development of small hydro power in jammu and kashmir (india") jammu & kashmir energy development agency (jakeda), jammu-180001, j&k, india
[3.] http://en.wikipedia.org/wiki/salal_hydroelectric_power_station
[4.] www.jkspdc.nic.in.
[5.] www.jkpdd.gov.in
[6.] Ali n (2011). j&k vis new delhi, at http//www.himalmag.com/component/.../4560-j-a-k-vsnew-delhi-.html
[7.] Annual Report on the working of SEBs & Electricity Departments, Planning Commission, GOI, 2001.
[8.] http://jammukashmir.nic.in
[9.] http://www.jkserc.nic.in/jkStateElectricityGrid%20Code. Pdf
[10.] http://jkserc.nic.in/TariffOrderFY12-13_BR.pdf