

THE STATUS OF POWER IN RAJASTHAN

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ABSTRACT

In the post-economic liberalization period from July, 1991, there has been a lot of emphasis on the growth of installed capacity of power in different states and for this purpose private investment is being promoted from domestic as well as foreign sources. To facilitate the setting up of power projects by foreign companies, the centre adopted the policy of providing guarantee for a rate of return of 16% on equity and counter guarantee in case payment for the purchase of power by the concerned state electricity board is not made to the company in selected cases. Recently there is a greater emphasis on open global tender system in preference to bilateral negotiations under which memorandum of understanding agreements are directly signed after negotiating with the foreign companies as in the case of Dhabhol Power Project of Maharashtra with the Enron Company of U.S.A. The demand for power is increasing faster than its supply in different states, therefore, it is absolutely essential to increase the supply without undue delay so that the development process is not help up for a longer period.

KEYWORDS: *Post-Economic Liberalization, Rate of Return, Open Global Tender System, Development.*

Introduction

The development of power occupies a central place in process of economic development. The regular availability of electricity in sufficient quantity and at reasonable rates affects the growth of agriculture and industry. Electricity enjoys the highest place in infrastructural development. There is of course a need for full transparency in power agreement and national interest should never be compromised in any way. The development of power is a pre-condition for speedy and sustainable industrial and agricultural development of a region.

Objectives of the Paper

The paper seeks to provide more information about:

- Knowing various sources of power
- Status of power production in the state of Rajasthan
- Consumption pattern of power in Rajasthan
- Electrification of villages in Rajasthan

Research Methodology

The present paper is based on secondary data. The results have been derived from average, percentage, time series and correlation methods. There are two types of source of power:

- **Conventional Sources:** The conventional sources of energy include thermal power (generated from coal, gas and oil), Hydel power (generated from water) and Nuclear power.
- **Non – conventional Sources:** The non – conventional sources of energy include power generated from bio – gas, solar energy, wood, wind power etc.

Conventional Sources of Energy in Rajasthan

Rajasthan Rajya Vidyut Prasaran Nigam Ltd. (RRVPL) is the state power transmission utility. Power distribution is done by three regional distribution companies, namely, Jaipur Vidyut Vitran Nigam

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Ltd., Jodhpur Vidyut Vitran Nigam Ltd and Ajmer Vidyut Vitran Nigam Ltd. Rajasthan's main sources of energy generation are Kota and Suratgarh Thermal Projects, Mahi Hydel, Dholpur Gas Thermal Project, Chambal Project, Wind farms, Bhakra – Nangal Project, Biomass, Captive Power Plants, Vyas, Satpura Thermal Power Project, Inter – state Partnership Projects and Rajasthan Atomic Power Project, Singroli, Rihand Super – Thermal Power Project, Dadri, Anta gas power station, Auraiya gas project, Dadri gas plants, Unchahar thermal, and Tankapur, Salal, Chamera and Uri Hydel Projects from Central sector. The installed capacity of the state was just 1328 MW in 1981-82 which has gone up nearly 13 times with 15907.81 MW as on March 2015 which further increased to 17281 MW in December 2015. This shows that there was 1373.29 MW increase in the total installed capacity of the state in the year 2015-16. The energy availability of the state had increased to 7108.31 crore units upto March 2015 from 4813.82 crore units up to March 2011 which shows an increase of 47.66% of energy availability from 2010-11 to 2014-15. As of May 2015, the capacity owned by state utilities comprised 75% of coal based power plants, 9.7% of gas based power plants, 15.9% of hydropower plants and 0.4% of renewable resources. The private sector controlled capacity accounted for 57.7% and 42.2% of the total capacity based on renewable energy and coal based power plants respectively. The installed capacity of power has increased in Rajasthan. The Govt. has made several efforts in the past years. The total installed capacity of power generation was 9188.22 MW in 2010-11, which has reached to 17281.10 MW in 2015-16. The main sources of power in Rajasthan are the state owned projects, allocation by the centre sector to the state and the private sectors. The installed capacity of state owned projects was 6810.79 MW in 2015-16. Out of this 5190 MW will be generated by thermal projects, 1017.29 MW by hydel projects and 603.50 MW by Gas projects. The central sector projects have allotted 2894.31 MW to the state in 2015-16. The power installed capacity of other sources was 7576 MW in 2015-16. The following table shows all the picture of installed power capacity of different sources and different means.

Table 1: Year-wise Installed Capacity (MW)

Particulars	2010-11	2013-14	2014-15	2015-16
(1)State Owned projects/Share Projects				
Thermal	3615.00	3840.00	4590.00	5190.00
Hydel	1011.80	1011.80	1017.29	1017.29
Gas	443.50	553.50	603.50	603.50
Total (1)	5070.30	5405.30	6210.79	6810.79
(2)Allocation to state from Central Sector Projects				
Thermal	983.88	1404.41	1379.41	1384.41
Hydel	478.50	614.41	646.22	732.06
Gas	221.10	221.10	221.10	221.10
Atomic	556.74	556.74	556.74	556.74
Total (2)	2240.22	2796.66	2803.47	2894.31
(3)RREC, RSMML and Private Sector Wind/Biomass/Solar Projects				
Wind	1521.40	2797.85	3032.95	3552.15
Biomass	81.30	99.30	97.00	97.00
Solar	5.0	480.50	603.60	766.85
Thermal	270.22	2792.00	3160.00	3160.00
Total (3)	1877.70	6169.65	6893.55	7576.00
Total (1+2+3)	9188.22	14371.61	15907.81	17281.10
% increase	13.76	17.07	10.69	8.63

Source: Economic Review 2015-16, P.84, Directorate of Economics and Statistics, Rajasthan, Jaipur

Non-Conventional Source of Energy in Rajasthan

The state actively promotes the sources of renewable energy such as solar energy, bio – gas and wind energy. Rajasthan Renewable Energy Corporation Ltd. (RREC) is the nodal agency for the development of energy from renewable energy sources in the state.

Solar Energy: Rajasthan can become a leader in the solar energy generation as it receives the solar radiation intensity of about 6-7 kwh/m²/day with maximum sunny days (more than 325) in the country in a year. In Rajasthan the solar power capacity up to 31st March 2015 was 603.60 MW. The RREC aims to promote Solar Photovoltaic (SPV) technology in rural and remote areas. With the help of subsidy from various government agencies, it is installing solar pump sets, domestic lighting system and street lighting systems. In the state as on Dec 2014, a total of 150872 domestic lighting systems have

been installed. The development of solar energy would definitely result in savings in gas and fuel. Even in airports solar power will be used to generate energy. At Jaipur airport, a solar plant with the capacity of 100 kw was initially set up on the roof top and another plant with the capacity of 1800 kw would come up on the ground, beyond safety area and close to boundary wall, and a 100 kw solar plant has been set up at Jodhpur airport and efforts are underway to provide solar power facility in Jaisalmer and Bikaner.

Wind Energy: In Rajasthan the potential of wind energy is estimated at 5400 MW with a velocity of wind which ranges between 20-40 km/h. In Indira Gandhi Nahar Project 10 wind – mills were installed with simple and low cost equipment for the development of grazing grounds and production of fodder. The ministry of new renewable energy (MNRE) has installed 3 wind farm projects in Jaisalmer, Phalodi and Devgarh with a total capacity of 6.35 MW. Up to Dec 2015, 3866.345 MW capacity of wind power has been installed in the state.

Bio–mass Energy: Bio–gas is a clean source of energy and is being widely used in the villages of Rajasthan. Bio – gas plants play an important role in reducing the consumption of kerosene oil and fuel wood. The main sources of bio – gas energy in the state are mustard stalk rice husk and Julie flora. During the year 2014-15 eleven bio – gas plants were set up with a generation capacity of 114.3 MW in the state up to Dec 2015. To enhance the growth and maintenance of these plants various incentives are being offered by the government such as accelerated depreciation, concessional duties and tax holidays.

Private Enterprises: Private sector is also contributing actively in energy generation and supply in the state. In Barmer district Raj West Power Ltd., a wholly – owned subsidiary of JSW Energy Limited, has set up as 1080 MW lignite based pit head power plant. In February 2015, Essel Group signed a MoU with the state government to set up 5000 villages have received electricity, accounting for 90.4% of the total villages in Rajasthan. In the same month, Adani Enterprises signed a contract with Rajasthan government to develop the country's largest solar park, with 10000 MW capacity over the next 10 years.

State Owned Power Houses in Rajasthan

The state owned power houses in Rajasthan may be seen from the following table 2.

Table 2: State Owned Power Houses in Rajasthan

Name of Power Houses	No. of Power Houses	Installed capacity (in KW)	Derated Capacity (in KW)
Kota Thermal Power House, Kota	1	1240000	1240000
Mahi Hydel Project, Banswara	2	140000	140000
RMC – I, Mahi, Banswara	1	800	800
RMC – II, Mahi, Banswara	1	165	165
Anoopgarh Hydel Station, Sriganganagar	2	9000	9000
Suratgarh mini hydel power house, Sriganganagar	1	4000	4000
Mangrol Hydel Project, Baran	1	6000	6000
Pugal Mini Hydel Project –I, Bikaner	1	1500	1500
Pugal Mini Hydel Project –II, Bikaner	1	650	650
Charanwala Hydel Station, Bikaner	1	1200	1200
Ramgarh Gas project, Jaisalmer	1	38500	38500
Ramgarh Gas (Extension) project, Jaisalmer	1	75000	75000
Suratgarh Thermal Power Station, Suratgarh	1	1500000	1500000
Birsalpur Hydel Power House, Bikaner	1	535	535
Wind Project (Operated by RREC)	9	51750	51750
Wind Project (Operated by RSMM)	11	106300	106300
Wind Project (Operated by REIL)	1	1200	1200
Giral Lignite Project, Barmer	1	250000	250000
Dholpur Gas Power Project, Dholpur	1	330000	330000
Chhabra Thermal Power Station, Baran	1	500000	500000
Total	40	4256600	4256600

Source: Rajasthan Rajya Vidyut Prasaran Nigam Ltd., Jaipur

As seen from the above table, Thermal power houses occupy a major share in the distribution pattern of state owned power houses across Rajasthan. The leader amongst all these power houses is Suratgarh thermal power station and is closely followed by Kota thermal power house and Chhabra thermal power station, Baran.

Consumption of Electricity in Rajasthan: The consumption pattern of Electricity in Rajasthan is vividly illustrated through the following table which depicts the consumption pattern across sectors and districts and is followed by the pie diagram which specifies this pattern across various sectors in percentage numbers.

Table 3: Consumption of Electricity in Rajasthan (in Lakh units)

Distt.	Domes-tic	Comm-ercial	Agri. & Irrigation	Small Ind.	Medium Ind.	Large Ind.	Street Light	Water Works	Others	Total
Ajmer	3669	965	605	585	1762	3637	88	795	629	12738
Banswara	879	124	278	71	77	994	16	56	95	2593
Bhilwara	2174	499	1328	227	832	7035	78	240	255	12672
Chittorgarh	1578	289	4521	213	168	3126	43	240	328	10510
Dungarpur	801	106	514	64	74	506	13	57	86	2224
Jhunjhunu	2023	326	7224	146	71	722	35	524	309	11384
Nagaur	1732	296	10228	435	530	656	40	660	291	14872
Rajsamand	930	223	318	162	1211	3282	23	110	94	6356
Sikar	2250	411	9169	215	219	1355	36	500	279	14438
Udaipur	2887	1174	711	208	703	3331	92	360	506	9976
Barmer	1173	530	6113	225	434	595	49	916	968	11008
Bikaner	2094	542	12643	221	700	419	226	964	870	18683
Churu	1755	269	4992	157	149	130	42	924	294	8708
Hanumangarh	2173	286	2508	146	171	345	36	249	180	6188
Jalore	723	188	7884	143	745	80	26	472	169	10435
Jodhpur	4329	1525	16430	528	1198	2875	648	2483	1493	31514
Pali	2808	709	2677	376	727	5174	97	377	463	13412
Ganganagar	3051	515	927	240	213	1153	38	228	887	7254
Alwar	2972	740	8927	380	1228	18724	51	296	419	33741
Bharatpur	2137	356	2832	291	504	1115	64	233	710	8246
Dausa	1209	282	6042	145	157	89	20	271	579	8797
Jaipur	14534	6583	13841	2223	1415	11311	502	1567	2465	54444
Jhalawar	2148	526	4474	285	280	698	47	192	222	8875
Kota	5340	1121	4811	311	1447	2708	187	516	2059	18504
S.Madhopur	1976	351	2062	152	156	550	41	473	1138	6903

Source: Jaipur, Jodhpur, Ajmer Vidyut Vitran Nigam Ltd., Rajasthan

The above table presents that Jaipur district has the highest consumption of electricity amongst all districts and is closely followed by Alwar and Jodhpur respectively.

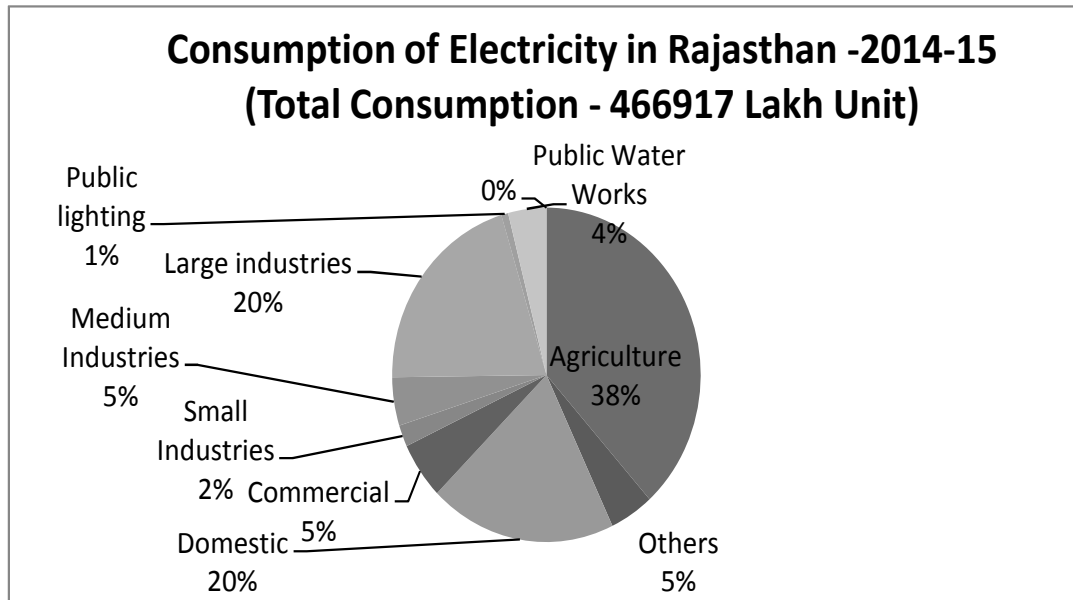
Table 4: Villages Electrified (2014-15)

District	Villages Electrified	Total no. of Villages	% of Electrified Villages to Total Villages
Ajmer	1038	1111	0.934293
Banswara	1284	1513	0.848645
Bhilwara	1745	1834	0.951472
Chittorgarh	2284	2733	0.835712
Dungarpur	858	976	0.879098
Jhunjhunu	859	927	0.926645
Nagaur	1401	1589	0.881687
Rajsamand	987	1050	0.940000
Sikar	992	1167	0.850043
Udaipur	2204	2479	0.889068
Barmer	1476	2460	0.600000
Bikaner	682	919	0.742111
Churu	947	997	0.949850
Hanumangarh	1803	1907	0.945464
Jalore	706	801	0.881398
Jodhpur	1062	1838	0.577802
Jaisalmer	562	799	0.703379
Pali	943	1030	0.915534
Sirohi	462	477	0.968553
Ganganagar	2927	3018	0.969848
Alwar	1960	2054	0.954236
Baran	1098	1221	0.899263
Bharatpur	1410	1524	0.925197

Bundi	828	873	0.948454
Dausa	1051	1109	0.947701
Dholpur	704	819	0.859585
Jaipur	2118	2180	0.971560
Jhalawar	1521	1606	0.947073
Karauli	742	888	0.835586
Kota	841	874	0.962243
S. Madhopur	735	814	0.902948
Tonk	1057	1183	0.893491
TOTAL	39385	44672	0.881648

Source: Some Facts about Rajasthan, 2015 and Statistical Abstract, Directorate of Economics and Statistics, Department of Planning, Rajasthan, Jaipur

Here, the Green coloured cells indicate values above State Average and Red cells indicate values below it. The above table shows that 39385 out of total 44672 villages in Rajasthan are electrified and rest 5287 villages are yet to be electrified, although the power consumption in the state is higher than the national average.



The pie diagram clearly shows that the maximum usage of electricity in the consumption pattern emerges from the Agriculture sector and the next top two usages come from Domestic and Large Industries respectively.

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