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## FINANCIAL STATUS OF ELECTRICITY BOARD OF RAJASTHAN: A *Vis a Vis Study*

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### ABSTRACT

*This paper provides a review of the progress made by Rajasthan in strengthening its power sector and to deal with the problems of village electrification and meeting the demand supply gap. In this paper we have also discussed how Rajasthan has been able to tap its renewable energy resources and the problems that are still unattended in this area. In this paper year wise contribution of various sources in the available installed capacity has been discussed sector wise. Distribution of power sector has been provided for the installed capacity so that the contribution made by state, private and central sectors in various sources can be analyzed.*

**Keywords:** Rajasthan, Electrification, Solar Energy, Power Sector, Installed Capacity.

## 1. INTRODUCTION

Power stands as a cornerstone of critical infrastructure, wielding immense significance for the economic prosperity and well-being of nations. The presence and advancement of robust infrastructure are pivotal for ensuring sustained growth within the Indian economy. India's power sector boasts remarkable diversity on a global scale. It draws from a wide spectrum of power generation sources, encompassing traditional reservoirs like coal, lignite, natural gas, oil, hydro, and nuclear energy, as well as promising non-conventional sources like wind, solar, and the utilization of agricultural and domestic waste.

The burgeoning demand for electricity in India has witnessed rapid escalation and is projected to surge even further in the forthcoming years. To adequately address this surging appetite for electricity across the nation, substantial augmentations in the installed generation capacity become imperative.



In May 2018, India's standing in the Asia Pacific region proved noteworthy, securing the fourth position among 25 nations assessed through a comprehensive power index. India demonstrated a strong presence, ranking fourth in wind power, fifth in solar power, and fifth in installed renewable power capacity, as of 2018. Furthermore, India occupied the sixth position among nations making substantial investments in clean energy, with a noteworthy commitment of USD 90 billion.

The governance of India's power sector primarily falls under the purview of the Ministry of Power. This sector is upheld by three principal pillars: Generation, Transmission, and Distribution. Concerning power generation, it undergoes further classification into three domains, namely the Central Sector, State Sector, and Private Sector.

The power landscape in India, including that of Rajasthan, enjoys a remarkable degree of diversification, unrivaled on a global scale. The sources driving power generation span conventional reservoirs such as coal, lignite, natural gas, oil, hydro, and nuclear energy, as well as the promising non-conventional sources like wind, solar, and the innovative utilization of agricultural and domestic waste.

Notable sources of energy generation within the state of Rajasthan include the Kota, Suratgarh, and Chhabra Thermal projects, the Dholpur Gas Thermal project, Mahi Hydel, Wind farms, Biomass, Captive Power plants, Bhakhra, Vyas, Chambal, Satpura inter-state partnership Projects, and the Rajasthan Atomic Power Project at Singroli. Additionally, the Rihand Dadri Anta, Auriya, Dadri Gas plants, and Unchahar thermal facilities contribute to this diverse energy landscape. Meanwhile, the Tanakpur, Salal, Chamera, and Uri hydal projects fall under the central sector, further augmenting the power generation capabilities of the region

## **2. POWER SCENARIO OF RAJASTHAN**

Since its establishment in 1949, the government of Rajasthan has made concerted efforts, in collaboration with the power sector, to augment the installed power capacity. This endeavor aims to strike a balance between the escalating demand for electricity and its supply, while simultaneously propelling economic development. The impetus for power sector development was firmly championed by the government.

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Back in 1949, when Rajasthan became a state, its total installed power capacity was a modest 13.27 MW, with electricity access limited to a few urban areas. Recognizing the pivotal role of electricity, the Rajasthan State Electricity Board (RSEB) was established on July 1, 1957. To fortify the power sector, a substantial portion, approximately 28-30%, of the annual plan outlay was allocated for its growth.

The service area under RSEB's jurisdiction spanned a vast 4,32,000 square kilometers, encompassing diverse geographic regions. Notably, about 66% of this expanse comprised arid desert landscapes with a sparse population density. Over time, RSEB witnessed significant progress across various dimensions, including increased installed capacity, expanded energy distribution, a growing customer base, and the enhancement of transmission and distribution networks.

The state's power sector has experienced remarkable growth, with an annual growth rate of approximately 9%. Furthermore, the sale of electricity has consistently risen at an average annual rate of 11%, as envisioned in the Rajasthan Power Sector Vision 2020.

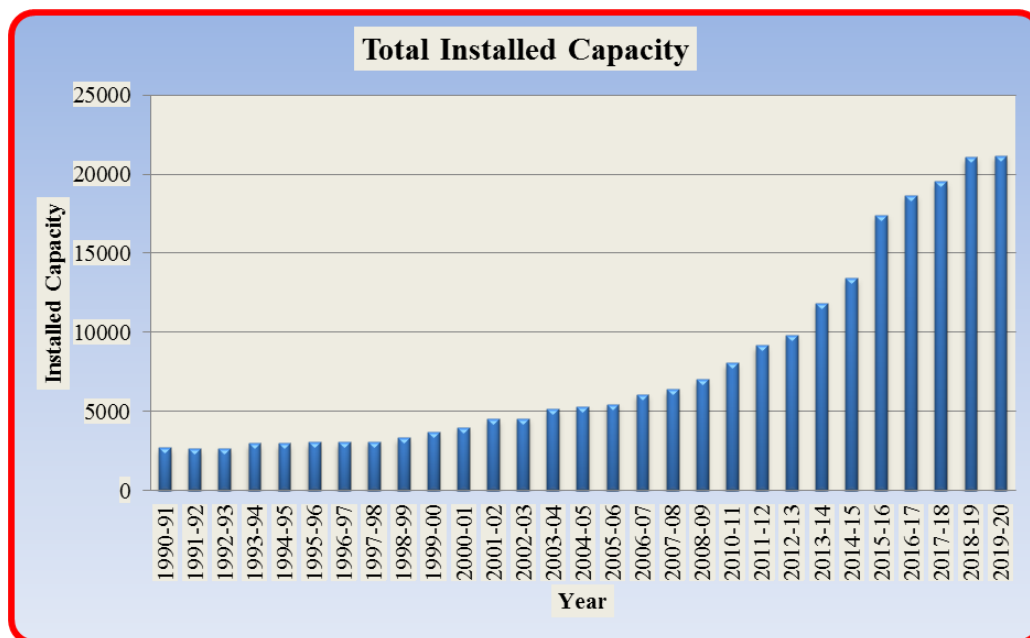
**Rajasthan Power Supply Position Total Installed Capacity of Rajasthan Since 1990**

S. no	Year	Total Installed Capacity
1	1990-91	2720.92
2	1991-92	2652.42
3	1992-93	2690.32
4	1993-94	2984.69
5	1994-95	3009.72
6	1995-96	3049.01
7	1996-97	3082.27
8	1997-98	3097.37
9	1998-99	3355.90
10	1999-00	3689.40
11	2000-01	3998.06
12	2001-02	4516.78
13	2002-03	4547.18
14	2003-04	5167.43
15	2004-05	5296.10
15	2005-06	5453.88
17	2006-07	6089.43
18	2007-08	6420.69



19	2008-09	7019.48
20	2010-11	8076.51
21	2011-12	9188.22
22	2012-13	9860.12
23	2013-14	11850.10
24	2014-15	13432.30
25	2015-16	17439.78
26	2016-17	18677.18
27	2017-18	19552.77
28	2018-19	21077.64
29	2019-20	21175.90

Source: Annual reports of Vidhyut Bhawan, Jaipu



The above table and the figure clearly indicate that the installed capacity of the state has increased manifold i.e. from 13.57 MW in 1950-51 to 21175.90 MW in 2019 -20 which is more than 1565 per cent increase. This tremendous increase in the installed capacity of state has no doubt imposed excessive financial stress on both the government as well as power sector leading to financial deficit. But in spite of increasing the installed capacity manifold the power sector of the state has not been successful in bridging the gap between the growing demand and supply of power or narrow down the gap.

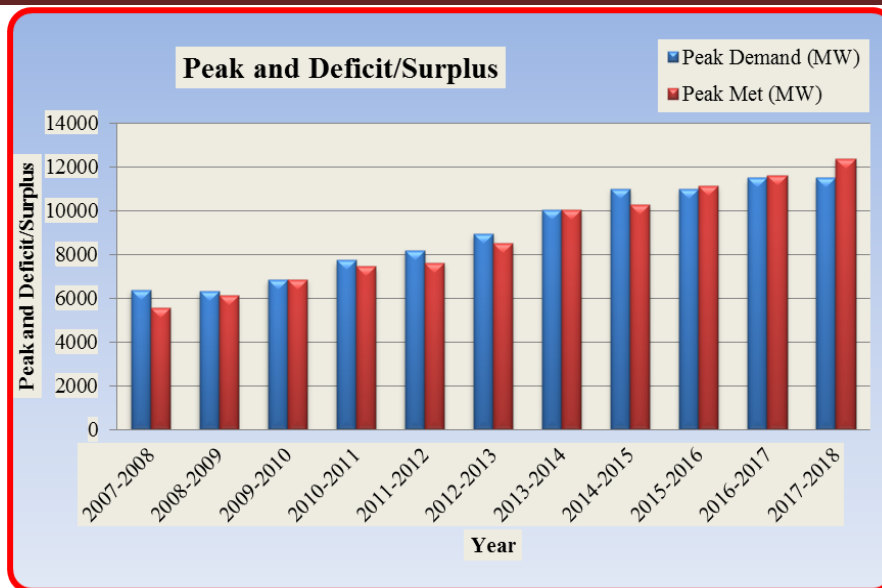


The above figures provides us contribution of various sectors in the available installed capacity of Rajasthan. State sectors share is almost 50% of the total installed capacity of Rajasthan. There has been steady growth in the installed capacity under state sector. There has been a 10% increase in the state sector's installed capacity for year 2017 to 2018. Other than state sector, private players have also shown a remarking progress. The private sector has become six times to that it used to be in 2012, for the year 2018 the share of private sector in the installed capacity of Rajasthan in almost 26%. In last year only the private sector growth rate has been almost 30% other than state and private sector the growth rate in the shared and central sector is very less. The percentage share state sector is 50%, private sector is 26%, central sector is 18% and that of shared sector is 5%.

### **Demand and Supply Position**

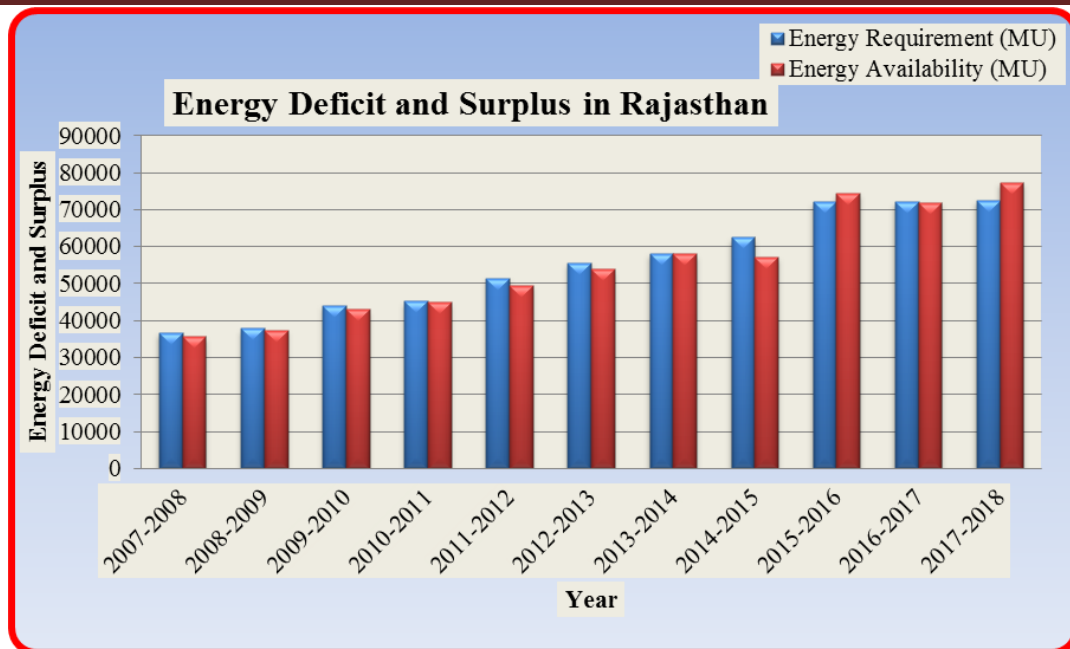
#### **Peak and Deficit/Surplus**

<b>Period</b>	<b>Peak Demand (MW)</b>	<b>Peak Met (MW)</b>	<b>Peak Deficit/ Surplus (MW) (-/+)</b>	<b>Peak Deficit/ Surplus (%) (-/+)</b>
2007-2008	6374	5564	-810	-12.7
2008-2009	6303	6101	-202	-3.2
2009-2010	6859	6859	0	0
2010-2011	7729	7442	-287	-3.7
2011-2012	8188	7605	-583	-7.1
2012-2013	8940	8515	-425	-4.8
2013-2014	10047	10038	-9	-0.1
2014-2015	11000	10272	-729	-6.6
2015-2016	11000	11128	128	1.2
2016-2017	11500	11610	110	1.0
2017-2018	11490	12382	892	7.8



**Energy Deficit and Surplus in Rajasthan**

Period	Energy Requirement (MU)	Energy Availability (MU)	Energy Deficit / Surplus (-/+)	Energy Deficit / Surplus (%) (-/+)
2007-2008	36738	35597	-1141	-3.1
2008-2009	37797	37388	-409	-1.1
2009-2010	44109	43062	-1047	-2.4
2010-2011	45261	44836	-425	-0.9
2011-2012	51474	49491	-1983	-3.9
2012-2013	55538	53864	-1670	-3.0
2013-2014	58202	58042	-160	-0.3
2014-2015	62540	57197	-5343	-8.5
2015-2016	72132	74470	2338	3.2
2016-2017	72070	71900	-170	-0.2
2017-2018	72573	77291	4756	6.6



From the above table we can see that the energy demands of Rajasthan for the period 2007-2017 has been in deficit but with continuous efforts Rajasthan has achieved a surplus 4756 MU in year 2017-2018. Which is almost 6.6% this shows the progress made by Rajasthan to meet the requirement of its users and lower the gap between the energy requirement and energy availability. Also the above table shows the scenario of peak demand (MW) and peak met (MW). From the table we can see that from the year 2015-2016. Rajasthan has been able to meet its demand during the peak durations and is in a strong position in this area too. For the year 2017-2018 a surplus of 892 MW which is almost 7.8% was available.

**3. CONSTRAINTS AND PROSPECTS** The legislative Assembly of Rajasthan approved the Rajasthan Power Sector Reforms Bill (Reform Bill) on September 25, 1999. The Reform Bill received the Presidential Assent on December 28, 1999 and became effective from June 1, 2000. As the first initiative in implementing the reforms program, Government of Rajasthan established Rajasthan Electricity Regulatory Commission (RERC) in January 2000. The vertically integrated monopoly power utility RSEB was unbundled into new entities on 19th July 2000, based on functional specialization.<sup>42</sup>



On 19th July 2000, Government of Rajasthan issued a gazette notification unbundling Rajasthan State Electricity Board into following five different companies so that efficiency is brought in:

- ❧ Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUN), the generation company (GENCO).
- ❧ Rajasthan Rajya Vidyut Prasaran Nigam Limited (RVPN), the transmission company (TRANSCO).
- ❧ Jaipur Vidyut Vitran Nigam Limited, the distribution company (Jaipur DISCOM).
- ❧ Ajmer Vidyut Vitran Nigam Limited, the distribution company (Ajmer DISCOM).
- ❧ Jodhpur Vidyut Vitran Nigam Limited, the distribution company (Jodhpur DISCOM).<sup>43</sup>

After corporatization of RSEB in 2000, the generation function has been taken over by RVUN and was also assigned to operate and maintain the existing State owned power stations. The transmission network has been assigned to RVPN, along with “the function of bulk supplies of electricity in Rajasthan and also owns the rights in shared inter-State partnership projects.” Since Rajasthan was the third largest State in India areawise at that time (presently largest State) and considering that distribution of electricity involves direct selling of power to consumers, it would be cumbersome and lengthy function for single business entity to cater this important function, moreover based on viability and operational ease, the State has been geographically divided into three distribution companies (with headquarters at Jaipur, Jodhpur and Ajmer). The area of the operation of the distribution companies can be looked at with the help of map as under:

#### **4. CONCLUSION**

Energy is vital for development and this means that if India is to move to a higher growth trajectory than is now feasible, it must ensure the reliable availability of energy. The present energy scenario in India is not satisfactory. The power supply position prevailing in the country is characterized by persistent shortages and unreliability and also high prices for industrial consumers. There is also concern about the position regarding petroleum products. India depends to the extent of 70-80 percent on imported oil, and this naturally raises issues

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about energy security. These concerns have been exacerbated by recent movements in international oil prices. Electricity is produced domestically but its supply depends upon the availability of coal, exploitation of hydro power sources and the scope for expanding nuclear power, and there are constraints affecting each source. A vibrant functioning society needs energy as its lifeline and the quantum of its use indicates the quality of life being experienced by its members. There is a great disparity in the energy use amongst different regions of the world and even for countries like India where the rural areas are bereft of the benefits of energy and where obtaining food and shelter is a daily challenge [20]. India needs to bridge this divide as soon as possible and this is of paramount importance for any growth which should include all sections of society.

Energy is central to achieving the interrelated economic, social, and environmental aims of sustainable human development. But if India is to realize this important goal, the kinds of energy India produces and the ways it uses them will have to change. Otherwise, environmental damage will accelerate, inequity will increase, and economic growth will be jeopardized. All energy sources are having advantages as well as certain disadvantages but resources are not an end in themselves, and their attractiveness must be seen in the context of societies' energy service needs, of the technologies that convert resources into energy services, and of the economics associated with their use. These analyses have shown that India will have to plan for the fulfillment of its energy needs based on a judicious mix of the natural resources endowed to it, keeping sustainable development in focus and having a minimum carbon foot print. Developed countries of the world also need to understand that climate change is a phenomenon which has no boundaries and the world is facing this threat because of skewed policies followed by them and they are also duty bound to help India attain the goal of achieving energy security for its population by the transfer of clean [energy] technology and by making available appropriate funding mechanisms.

It is imperative for India to have a consistent energy policy, together with relentless pursuit of energy efficiency and conservation, maximizing coal production and improving the rail and port infrastructure as well as development of alternative infrastructure for coal transportation such as coastal rivers because coal, being the cheapest form of energy, will be the flag bearer of India's energy needs. There is also an urgent need to fully exploit the hydro

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and nuclear potential of the country but here it is important that inhabitants of a particular area are taken into confidence so they do not feel alienated from the project. India needs to vigorously raise the level of international diplomacy to gain a foot hold in the exploration of oil, coal and other hydrocarbon resources at a global level. India needs to step up its effort in the direction of coal gasification, carbon sequestration and undertaking projects for bio fuels. As per my analysis it is not possible for India to achieve energy security by concentrating on non-renewable sources like coal and oil as the world does not have enough of such resources to meet demands which are continually increasing. India needs to look increasingly towards renewable energy for attaining energy security by 2050 and India's target of getting around 15.9% of total energy need from renewable sources by 2022 is too modest. India being endowed with year-round solar radiation must exploit this source to the fullest extent as it is abundant and will remain as long as Earth is in existence irrespective of the cost involved today. As rightly said by a renowned nuclear scientist in India, expensive energy is still better than having no energy. Further, India needs to fully exploit the potential of other renewable energy sources like bio fuels, wind, hydro and even nuclear energy, as projections of energy requirements indicate an approximately three times increase from around 620 Mtoe in 2008 to 2043 Mtoe by 2031-32. It means that India needs to increase the share of renewable energy substantially as nonrenewable sources of energy are just not available and India will risk losing growth momentum leading to wide spread inequalities which can have serious social and political ramifications. The world community also needs to understand the challenges being faced by India and help by putting in place innovative financial instruments for financing the energy needs of India and lifting of technical barriers. Finally, India needs to wake up and respond by improving efficiency, boosting infrastructure development and promoting private equity participation as the government cannot raise capital on its own for this purpose.

India needs to realize the vast potential of renewable energy and need to step up effort for attaining the goal of "20 11 20 20" by 2020 i.e. 20% reduction in GHG, 11% reduction in consumption of energy by bringing about attitudinal changes, 20% share of renewable energy and 20% conservation of energy from the year 2011 till 2020. These targets are attainable and not only provide cleaner energy but also open a new field for providing employment

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opportunities to millions of people who are unemployed or disguised employment. This momentum then needs to be maintained so that India attains a target of having 70% renewable energy use by 2050.

If we see the overall power sector scenario of Rajasthan, then we can conclude that Rajasthan has been able to develop in all perspectives to strengthen its power sector. It is through the continuous growth that Rajasthan has almost doubled. It's installed capacity from year 2012 to 2018. The state and private sectors whose share is almost 50% and 25% respectively are the foundation of the growth shown. Also, renewable energy has played a vital role in the growth of Rajasthan power sector with a share of almost 30%. But there is strong need to emphasis on the effective maintenance and skill development so that maximum efficiency can be achieved from it. Rajasthan has been able to fill the gap of its energy requirement and availability and now produces 6.6% surplus. Rajasthan has achieved 100% electrification of villages under the Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY). Now, it is necessary to develop a proper distribution network in order to reduce Transmission and distribution losses and also reducing theft. It is also necessary to promote usage of off grid, rooftop and grid connected installations of solar for better results.

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