

## A Study of Power Sector in Rajasthan: Constraints and Prospects

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### Abstract

Electricity is a vital input for industries for production. The working mills and factories are impossible without electricity. If there is electric failure, machines stop and due to this production suffers much and the resultant loss is heavy. Electricity has helped in bringing about revolutionary changes and progress in the field of medical sciences. Most of medical surgery is successfully made by the aid of electricity. It has been playing a vital role in the field of transport and communication. Among the numerous discoveries and inventions, electricity holds the most significant place in the modern world. Having occupied a vital factor in the production and consumption of each and every activity the generation and distribution of electric power is not even in all the states in India. Rajasthan has to depend upon its central sector projects for its electricity power needs. Apart from the uncertainty of the quantum of power to be received it also results in transmission loss. Though the Electricity board of Rajasthan is a major organization in receiving and pooling the electricity both from inside and outside state sources, the Corporation is the sole authority worthy which is in charge of distributing the power to the various sectors.

**Keywords:** Electricity board, Rajasthan

### Introduction

Rajasthan is largest state of the Republic of India by area. A large quantity of agriculture land, climate diversity, museum of minerals, 8<sup>th</sup> most populated state of our country. Rajasthan has a big scope in Agriculture processing industry and mineral and tourism industry but all these regions need elementary infrastructure. We can achieve development goals in agriculture, industry and in mineral industry their infrastructure, with this approach we can get our goals of well-developed state and remove the banner of BEMARU State with rapid and steady progress in infrastructure.

No doubt the economic development of the state largely depends on its infrastructure and in the pace of rapid economic development, supply of adequate power is considered to be a most important component of infrastructure. Rajasthan, the largest state of the nation is located in the North western region of India with Aravali on one side and sand dunes of Great Indian Desert on the other side. The State is not only rich in natural resources but also endowed with tradition, heritage, culture and beauty. During last two decades the state has shown a very healthy path of development and it is one of the fastest growing states in the country during 2005-2012 (Rajasthan State Profile). Rajasthan ranks 12th in terms of investment, infrastructure, agriculture and education in the country. Infrastructural developments are inevitable for any nation to attain rapid economic development and among all the components of infrastructure electricity in the modern era are considered as one of the

critical inputs for economic development and the per capita consumption of power is considered as an effective indicator of growth and development. Since the entire development process of the economy is totally dependent on the power, the power sector development was conceived through by the government. Rajasthan as a state was formed in the year 1949 with the total installed capacity of 13.27 MW but the supply of electricity was restricted only to few cities. Realizing the importance of power RSEB (Rajasthan State Electricity Board) was formed on 1st of July 1957 and in order to strengthen the power sector around 28-30% of its plan outlay was spend towards the growth of power sector. The service area of RSEB was 4,32,000 sq km which was geographically very large. Around 66% of the area was desert with a very low density of population. RESB has grown considerably in terms of all the aspects related to installed capacity energy supplied, number of consumers, transmission and distribution network. The state power sector has witnessed rapid growth of around 9% per year and the sale of power has increased at an annual average rate of 11% (Rajasthan Power Sector Vision 2020)

### Power Sector in Rajasthan

In Rajasthan, RSEB used to be the primary agency for generation, which was later restructured into 5 different entities to strengthen the sector and separate the functions of generation. The key institutions of Rajasthan Power Sector are listed below:

### Institutions of Rajasthan Power Sector

Ministry/Organisation	Functions
Energy Ministry, Government of Rajasthan	Policies, rules, managing companies, providing budget support
Rajasthan Electricity Regulatory Commission	Decide tariffs, oversee the functioning of all generation, T&D companies, approve all

	important decisions such as power purchase, capital expenditure, operation norms, etc
Rajasthan Rajya Vidyut Utpadan Nigam Limited	Operate and maintain the existing state-owned power stations
Rajasthan Rajya Vidyut Prasaran Nigam Limited	Sets up and manages transmission lines and substations for the supply of electricity in Rajasthan
Rajasthan Urja Vikas Nigam Limited	Carries out the power trading business of state power Discoms
<b>Discoms</b>	
1. Jaipur Vidyut Vitran Nigam Limited 2. Ajmer Vidyut Vitran Nigam Limited 3. Jodhpur Vidyut Vitran Nigam Limited	Sets up and manages a distribution network. Is responsible for supplying certain defined quality and for metering and billing
Rajasthan Renewable Energy Corporation Limited	Responsible for promoting renewable energy and energy efficiency
State Load Dispatch Centre	Grid operation decides when and which generators should generate power, manages load shedding
<b>Private Companies</b>	
Discoms, franchisees: CSES, Tata Power	Run and manage a distribution network. Franchisees have a contract with a distribution company to manage distribution in a smaller defined area
Generating companies	Generates power and sells to Discoms

### Review of Literature

Maurya [nagendra](#) (2020) <sup>[1]</sup>. The paper provides an overview of the impact of power sector reforms on the operational and financial performance of the power sector utilities of Uttar Pradesh. Utilising the data obtained from the Uttar Pradesh Power Corporation Ltd. and the Bureau of Public Enterprises, Uttar Pradesh, the paper highlights the status of transmission and distribution losses, aggregate technical and commercial losses, plant load factor, operating and financial performance of the state power utilities of Uttar Pradesh between 2002-2003 and 2015-2016 (the latest point of time for which data is available). In addition to other financial indicators, liquidity, asset management, leverage and profitability ratios have been calculated to analyse the financial performance. The paper concludes that the state power-utilities are yet to cover a long distance to become financially and commercially viable. However, the positive impact of the reform measures has been abundantly visible since the financial year 2012-2013.

Ann Josey *et al.* (2019) <sup>[2]</sup> stated that the DISCOM (Distribution Company) of the future will be mostly a supplier to LT consumers and a wire utility for HT and LT consumers. Such a transition demands a major shift away from the manner in which DISCOM have been planning and operating in the past. Markets and competition will have a substantial role to play in their transition. Unless guided by conscious policy decisions, these changes will unfold chaotically, leaving the DISCOM stranded with excess capacity and huge losses and the sufferers of such a fall out will be mostly small and rural consumers with serious implications for state level politics. To avoid such consequences, it is extremely important to intervene now and to guide the inevitable transition in a manner that enables DISCOM, to adapt to the fast changing realities of the sector. This paper highlights such key challenges before the sector and potential approaches to overcoming them.

Saini Sunita (2018) <sup>[3]</sup> stated a glance into power sector in India. The power sector was earlier before independence in the hands of private players but after independence the power sector in the country came into the hands of public sector by establishing SEB's. Later after the implementation of Electricity Act 2003 again it is unbundled and private companies took over SEBS in many states.

Mukherjee Shilpi *et al.* (2017) <sup>[4]</sup> have undertaken a systematic literature review to find the status of review of the promising Act 2003. More than a decade has passed since its enactment and amendments are due with the legislative body

of India, but none of the literature reviewed gives a comprehensive view encompassing all the objectives of the Act 2003.

Ahuja Rajnish (2016) <sup>[5]</sup> suggested that a single window clearance system for power projects and removal of redundant forms would expedite the setting up of new coal power plants. Allowance of multiple suppliers for power distribution is yet another reform that has been supported. He suggested to increase the renewable share in the energy mix so that the focus should be given to increase solar installations through introduction of policy mandates for roof tops and commercial buildings as government of India plans for 100GW by 2019. All this should result in not only cleaner power but also cheaper which will help make our economy more competitive.

**As per the latest Report of the Expert Group on, "175 GW RE by 2022" in 2015** it is clearly stated that in India RE project developers are often seen struggling for financing and even if it is available its cost is often high. For meeting that Target of RE, financing is certainly a challenge. Since RE technology have high capital cost and less operating cost as compared to conventional power projects, cost of capital here is one of the most significant cost in the delivery of clean energy. Cost of debt in India ranges between 12-14% (in developed country the range is 3-7%) and cost of equity is even higher. RE tariff which has 70% of financing cost will reduce if they get loan at reduced interest rates. Report states that de-risking of the sector is needed for procuring finance at market-based risk-free rate.

### Importance of Proposed Research Work

Power sector is at a crucial juncture of its evolution from a controlled environment to a competitive, market driven regime which endeavors to provide affordable, reliable and quality power at reasonable prices to all sectors of the economy. The Gross Domestic Product (GDP) of our country has been growing at the rate of about 8% for several years. The liberalization of the economy is leading to an increased tempo in industrial and commercial activities and this, coupled with penetration of technology and I.T. in the day-to-day life of the common man, is expected to result in a high growth in power demand. It is accordingly that development of the power sector shall be commensurate with overall economic growth of the nation.

The Indian Power Sector is one of the most diversified in the world. Sources for power generation range from commercial sources like coal, lignite, natural gas, oil, hydro and hydro and nuclear power to other viable non-conventional sources like wind, solar and agriculture and domestic waste. The demand for electricity in the country has been growing at a rapid rate and is expected to grow further in the years to come. In order to meet the measuring requirement of electricity, massive addition to the installed generating capacity in the country is required. While planning the capacity addition programme, the overall objective of sustainable development has been kept in mind.

The power sector endeavoring to meet the challenge of providing adequate power needed to fuel the growing economy of the country. However, this growth of power sector has to be within the realms of the principles of sustainable development. A low carbon growth strategy has been adopted in our planning process and highest priority is accorded to development to generation based on renewable energy sources. Thrust is also accorded to maximizing efficiency in the entire electricity chain, which has the dual advantage of conserving scarce resources and minimizing the effect on the environment. It is in this context that this study has drawn up the plus for development of the power sector during the 12<sup>th</sup> plan.

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**Objectives of the Survey**

The survey was conducted with the following main objectives:

- Analyzing consumer perception of Rajasthan energy cutting details.
- Measure the diversity of the Rajasthan energy sector distribution service.

**Data Analysis**

**Empirical Results**

**Table 1:** Estimated Results of Power Cut Information with Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-square	.819 <sup>a</sup>	1	.366		
Continuity Correction <sup>b</sup>	.581	1	.445		
Likelihood Ratio	.821	1	.366		
Fisher's Exact Test				.390	.223
Linear-by-Linear Association	.816	1	.366		
N of Valid Cases <sup>b</sup>	210				

Source: Compiled from Primary Data.

**Note:**

- a) 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 37.14.

b) Computed only for a 2x2 table

**Table 1(a):** Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.060	.360
	Cramer's V	.060	.360
N of Valid Cases		210	

Source: Compiled from Table 1

The table above measures the effectiveness of the changes in the electricity sector in terms of power outages. Tables 1 and 1(a) show that the changes did not play a significant role in providing consumer awareness information. Power outages are common in Rajasthan and have not improved even after changes in the electricity sector. It was revealed that the calculated value of Chi-square (0.820) was not important at 0.05 percent in degree 1. It accepted the insignificant view and concluded that the two variables are independent, i.e., the X1 variable (power cuts Details) does not make the Y behavior variable (efficiency of transformation in the energy sector). However, the Phi value (0.06) indicates that there is a low correlation between the two variables. The details of the power cut do not affect and do not play a significant role in the effectiveness of the changes in the energy sector. The people of Rajasthan do not receive advance notice of the power cut.

**Table 2:** Estimated Result of Distribution Service Efficiency with Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-square	25.061 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	23.683	1	.000		
Likelihood Ratio	25.621	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	24.942	1	.000		
N of Valid Cases <sup>b</sup>	210				

Source: Compiled from primary data.

**Note:**

- a) 0 cells (.0 per cent) have expected count less than 5. The minimum expected count is 44.08.  
 b) Computed only for a 2x2 table

**Table 2(a):** Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.345	.000
	Cramer's V	.345	.000
N of Valid Cases		210	

Source: Compiled from table 6.6

Table 2, shows that the calculated value of Chi-square (25.061) is important at 0.05 percent of the level of freedom 1. distribution of the distribution resource) significantly affects the performance of the Y variant (the efficiency of

changes in the energy sector). In addition, Phi-value (0.345) indicates that there is a high correlation between DSE and EPSR. Distribution service is a highly efficient flexibility in the transformation of the energy sector. The integration of distribution lines has improved. Distribution losses are reduced. Discoms have played a key role in improving energy efficiency.

### Conclusion

It is very essential that consumers are well aware of their rights and responsibilities. They should be wide awake about the role of the regulatory bodies and the platforms where they can interact with the authorities and what the state of electricity sector is and how much gap between demand and supply exist. Only then can consumers have meaningful engagement. If consumers are ignorant about how regulatory decisions, including pricing, contribute to improving the quality and reliability of services provided, regulatory decisions are generally criticised opposed. Such awareness or understanding would also enable consumers to make valuable suggestions concerning the welfare of consumers.

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