

Energy for Sustainable Development: Role of Power Sector in Rajasthan

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Abstract:

Government of Rajasthan is taking many initiatives to undertake policies related to power and energy sector. The state has introduced many energy and power policies which had the vision to decrease the dependency on non renewable method and promotion and the progress of nontraditional power sources like solar power in the industries. It was stated that the state government has referred the region as a global centre of solar power generation to meet energy needs of Rajasthan in Indian economy. Nontraditional power sources contribute to the security of the state as well as the security of the nation by reduction of carbon emissions. It was suggested that reforms are needed in the power sector of Rajasthan for reduction of dependency on fossil fuels. The generation of power is related to direct indirect employment opportunities in the state. Rajasthan Solar Energy Policy, 2011 had laid importance of solar energy in Indian and Rajasthan economy. It was felt that generation of power from solar energy is very option as it is a pollution free source of power generation. Thus, it becomes all the most important as it reduces environment hazards and reduces emission of green house gases. So, without doubt solar energy is a free and non polluting resource for an economy. Rajasthan's economy is gifted with a lot of potential in this field as it has abundance of solar energy which is very useful. The present research is focused with study of renewable and traditional source of power and energy. Paper also reveals the impact of power sector contribution in socioeconomic growth of Rajasthan state.

Keywords: Power, Energy, Sustainable Development, Traditional Sources of Energy.

Introduction:

Power sector is very important for the progress of other sectors in a nation. Indian Power sector is managed and regulated by Indian Government. The Government of India frames policies regarding power projects, rules and regulations related to transfer of power in the nation. Due to fast economic progress in India, the demand for power supply has increased tremendously. Power sector is a sector engaged and involved

in the processing, distribution and sales of electric power in various forms in order to fulfill the requirement of industries related to power and households. It could be in various forms like wind energy, solar energy, biogas energy, geothermal energy, coal etc.

Types of Power Sources:

The world has varied sources to generate power. All these sources are majorly utilized to generate power round the globe. The list of such different sources of energy is as follows:-

Solar Energy: Solar power is the energy that is generated from sun that is collected through collector panels. This energy is used at households for provision of hot water. The advantages of solar energy are:-

- It is available in plenty
- Involves direct power of sun which is costless
- It is available world wide
- It is available for long hours

Wind Energy: Wind energy is trapped through wind turbines which in turn produces electricity. The merits of wind energy are:-

- Its available in plenty
- It is available world wide
- It is costless which means inexpensive.

Geothermal Energy: Geothermal energy is generated within the earth crust. The advantages of geothermal energy are:-

- It is pollution free
- It is sustainable energy source
- It is eco friendly

Tidal Energy: Tidal energy is trapped from tides to generate power. The merits of Tidal energy are:-

- It is a Renewable source of energy
- Generates huge amount of energy

Wave Energy: Wave energy is generated from the waves seen in the water bodies like oceans. The merits of Wave energy are:-

- Renewable source of energy
- It's environment friendly
- No harm to atmosphere

Hydroelectric Energy: Hydroelectricity is the energy that is generated from water. The merits of hydroelectricity energy are:-

- Its Safe form of energy
- Renewable source of energy
- It is environment friendly

Biomass Energy: Organic material generates Biomass energy. The merits of Biomass energy are:-

- It is a Renewable source of energy
- It is environment friendly

Nuclear Energy: Nuclear energy is generated from nuclear reaction, which is collected and further utilized to generate energy.

Fossil Fuels: Fossil fuels energy is the energy generated from fossil fuels.

Indian power sector showed great progress towards generation and supply of power which was also company with the transmission changes. The total generated capacity of the country was 344 gigawatts on 31st March, 2019.

The main development was in organic forms of energy sources with a capacity of 6902 megawatt which was a growth of 20%. In 2018, the traditional sources of power witnessed more growth by showing more power generation capacity. The energy generation graph showed the growth of 6.1 % by reaching at 1203 BN units which was just 1134 BN units if compared to the past years. Even after more generation and transmission of power, there was deficit situation from 1.6% to 2.0% in 2018. While the energy deficit of the country was at the same level AT 0.7 % in the year 2017 and 2018. The markets showed more liquidity and had more participants then the as compared to the previous years.

The government and other regulatory bodies have continued to bring reforms so bring efficiency in various concepts related to supply of power in the area. The Indian government has launched Pradhan mantri Sahaj Bijli Ghar Yojana which meant to reach at the level of universal electrification of villages of our country.

Another step includes UDAY scheme. The scheme was launched which was meant for giving financial and operational improvement in power sector. Another step taken by the Government of India was launching of

Ministry Of New And Renewable Energy for procurement of power projects.

Other steps initiated included promotion of more transparency in coal allocation. Indian government also focus on transparency by launching various web and mobile applications, did the digitalization of competitive bidding.

Another focus was on Solar Power Plant plants in the fiscal year 2018 which had the capacity of 175 gigawatts of renewable power resources which will make the share of renewable power sources in power sector 40% by the Year 2030. The Tariffs of solar power were more than the tariffs of thermal power plants .due to which this burden the focus is shifted from expensive power sources to cheaper power resources.

Contribution of power sector in Rajasthan has been great and significant. Power sector can also lead to technological developments in the state of Rajasthan and will increase the role of Rajasthan in India's electricity demand. Thus, progress of power segment in the state of Rajasthan will lead of earning of huge revenues and will increase the income levels, growth levels- be it on social or economic grounds and technological levels of the state and the country as well. Rajasthan's economy is gifted with a lot of potential in this field as it has abundance of solar energy which provides energy security and sustainable growth of the state.

Role of power sector in Rajasthan's economy can be summarized as follows:-

- Leads to economic development of India
- Enables to use modern technology, equipments and computers.
- Leads to economic growth of India
- Raises living of standard of the people of the nation.
- Leads to increased revenues of the nation
- Leads to increased income of the people of the nation.
- Leads to increase in GDP of India
- Leads to socio-economic economic development of India

Review of Literature:

According to Ministry of Statistics and Programme Implementation, 2018-19, power sector is the largest sector of our country. Contribution of electricity and power is been estimated to be 18.57 percent in the Indian economy. This includes both the figures and contribution of private and public sector operating in the country all over. Thus, it is clear that power sector generates income for the nation as well as uplifts the living standard of the country's people.

Power sector at a glance: ALL INDIA, 2019. Government of India, Ministry of power. The report showed that total installed capacity of state sector 86597 megawatt while the central sector has a gross total installed capacity of 105.077 and the private sector contributed 165 total installed capacities in Indian economy. So it is clear that private sector is not behind in contributing in the progress of power sector of a nation in the present Times.

Electricity sector in India stated that electricity coverage of India with installed capacity of 3,57,875 gigawatt. In which Fossil energy had 79.8%, share of renewable energy resources was 17.3% in the year 2019. It was clearly stated that the share of private units in generation of power was 44% in 2018 which clearly indicates the importance private sector in power generation and supply of power in Indian economy no doubt that private sector has come forward in development of the country which has lead to the progress of the country.

Lari Shanlang Tiewsoh, Jakub Jirasek, Martin Sivek. April, 2019. Electricity Generation in India: Present state, Future Outlook and Policy implications. The findings revealed that there will be 2234 increase in power demand by the year 2030. But, the main challenge in Indian economy is with its structure. It was found out that the exact use of different energy sources unknown. I t was highlighted that nuclear energy role is insignificant in the economy which otherwise can be a boon for the country. The current problem, it was recommended that nuclear energy should be socially acceptable.

A report on Power sector of India by IBEF in February, 2018 gave an overview of Power Sector of India. The report stated that India is on third position when it comes to the

production of power in the world. Also, Indian nation is on fourth position in relation to consumption of electricity in the world. The installed power capacity of our country was 334.4 GW on January, 2018, this makes India the fifth largest country in the world with this much installed power capacity.

State Renewable Energy Action Plan for Rajasthan, Final Report (2017) showed the total installed capacity of our country, 326 GW is the share from coal, gas, diesel power projects is 67% of the total installed capacity of our country. Out of The total installed capacity of our nation, 57 GW is the share from renewable energy is 18% of the total installed capacity our nation as according to the data in 2017. A total of 13,469 rural areas have been electrified out of 18,452 unelectrified rural areas of our country as in April, 2015 by the Government of India.

Garima Jain (April, 2016) in her paper titled “Biomass Power Generation: A Framework and Study of Current Problems and Future Scope with Special Reference to Kota Region of Rajasthan” threw light on the status of Biomass. The author concluded that the state has very little work done in this field. There are ample of challenges in this field from Biomass in Rajasthan which need solutions like biomass product quality, handling of voluminous materials, weather related variability, localized agricultural capacity and seasonality etc. Adoption of new technologies, provision of financial resources, social help to power generators and new investors and businessmen can be of great help.

Rachit S, Vinod KG (May,2016) discussed in their paper on the topic “Solar Power –Current Status , Challenges and Policies in India that The authors concluded that though the work that is being done in Solar Power Sector is fairly fine but still to explore solar energy to its full potentials , we need to put on efforts for its betterment.

B. Sudhakara Reddy (May, 2016) in his work on “Economic Dynamics and Technology Diffusion in Indian Power Sector” technology features of the several power generating systems is significant in future technological developments. The paper stated coal, gas and wind to be competitive while solar power seems to be expensive. Biomass was taken to be cost effective power generation resources. The present constraints come to end by using renewable energy resources.

Ahindra Chakrabarti (July, 2015) wrote paper on “Overview of Energy Sector in India”. The author stated that looking at the present conditions; it seems that the demand of electricity is rising rapidly in our country. Thus, it is a challenging work to fulfill the future demand of electricity which is expected to rise further in the current times.

A report titled “Rajasthan - The Land of Promise” by Government of India (2015) stated that is Rajasthan is among the largest contributors in our country's renewable capacity expansion program. The state is hub for solar power. Rajasthan has two solar power projects to its credit. The status of the state according to the Government of India in 2015 was that 25% of the state's installed power generation capacity is through renewable energy resources. Rajasthan is at fourth position when it comes to total wind-power capacity, with existing installed capacity of 3695 MegaWatt and potential capacity of 5400 MW. Rajasthan has 114 MW installed capacity of biomass energy.

Research Gap:

After going through the detailed analysis and reviewing the literature of the related studies, works, research papers, surveys , reports , documents, articles, books, government publications etc. It was found that though a lot of studies have been done in the past and even in present times on power sector of India with reference to Rajasthan state also but still not much work is done to show how power sector can boost the social well being of nation. After reviewing the literature it was found that more emphasis is on the contribution of power sector in the economic progress of a state or country only ignoring it's on the contribution of power sector in the social progress of a state or country. Thus, these research gaps could be identified by the researcher during the detailed review.

Research Methodology:

Research is seeking of information in a systematic manner on a particular topic. It is basically an enquiry of truth or specific area. Research methodology is a science that studies how a study needs to be done. It includes examining explaining, predicting of a particular situation. It also involves all the methods and work plan of research. It is

basically a scientific method along with applying of logics. Research methodology encompasses the assumptions and techniques to find solutions. It is the procedure for collecting data and discovering the truth about the assumptions.

The study initially focused on selecting the sampling units, which was decided to be the different cities of Rajasthan. The researcher has chosen Jaipur, Ajmer & Tonk for the study purpose.

Respondents of all ages, races, genders, nationalities and those were having electricity connections for at least six months were included in the study. Sampling design is prepared so as to cover BPL families in the rural area of Rajasthan state.

Sample size consists of the total 300 respondents of all ages, races, genders, nationalities. The simple non probability sampling technique was adopted for collection of the information for the study.

The primary data is gathered from field survey through field in structured questionnaire and direct interview method. This study in preliminary based on empirical investigation. Information was collected from primary source direct contact with the employees of the power sector.

Secondary data is gathered from internet, annual reports of private and public sector undertakings, technical journals, regulatory commission, government of India gazette. This also includes important official publication, financial

institutions, central electricity authority, power Finance Corporation.

The research is constraint with time and sources.

Objectives:

- To study about various sources of energy available in India.
- Review of Powers Sector in Rajasthan State
- To study the impact of power sector on socio economic conditions of Rajasthan.

Data Analysis & Hypothesis Testing

Ho: There is no significant impact of power sector on socio-economic conditions of Rajasthan.

Ha: There is significant impact of power sector on socio-economic conditions of Rajasthan.

To test the above hypothesis the researcher has taken following variables under Socio Economic Impact –

1. Power sector is an agent to bring the social changes in society
2. Change agent for improving the mentality of the people
3. The medium of social awareness
4. Will generate more employment
5. Employment rate in the rural regions as well
6. The economic growth of the society
7. Economic viability of a society

	Change in Society	Mentality of the people	Social awareness	Generate more employment	Employment in the rural areas as well	Economic growth of the society	Economic viability of a society	Mean
Totally Agree	198	200	167	147	219	167	213	190.6667
Can't Say	23	35	25	50	12	25	10	25.83333
Totally Disagree	79	65	108	103	69	108	77	83.5

The table shows the mean score of the various variables to check the social and economic influence of the power sector on the Rajasthan. The mean value of the Totally Agree respondents on various socio- economic variable are (M=190.67), the mean value of the Cant say respondents (M=25.83) and the mea value of the totally disagree Respondents are (M=83.5). It shows that TA-M, 190.67 >, CS-M, 25.83 and TD –M, 83.5). This shows that respondents are in favor that there is significant socio economic impact power sector in Rajasthan, hence the researcher rejects the null hypothesis and has accepted the alternative hypothesis. For further evaluation researcher

has used the one sample t test to test the above hypothesis.

The data shows that p value with df =299 and 5% level of significance is less than 0.05 in all the cases. As the p value < 0.05 at 299 df. So researcher has rejected the null hypothesis and proves that there is substantial socio economic impact power sector in Rajasthan. The interpretation shows that Power sector has a vast effect in Rajasthan in terms of Social economic impact as it power sector brings employment, economic viability in rural and urban region, it brings the social change in the society and also brings the social awareness.

One-Sample Test

	Test Value = 1					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Change in Society	14.825	299	.000	.803	.70	.91
Mentality of the people	11.526	299	.000	.550	.46	.64
Social awareness	11.920	299	.000	.603	.50	.70
Generate more employment	16.377	299	.000	.853	.75	.96
Employment in the rural areas as well	14.938	299	.000	.820	.71	.93
Economic growth of the society	10.261	299	.000	.500	.40	.60
Economic viability of a society	10.903	299	.000	.550	.45	.65

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