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POWER SECTOR SCENARIO IN RAJASTHAN AFTER REFORMS

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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*.

Introduction

Power is among the most critical component of infrastructure, crucial for the economic growth and welfare of nations. The existence and development of adequate infrastructure is essential for sustained growth of the Indian economy. India's power sector is one of the most diversified in the world. Sources of power generation range from conventional sources such as coal, lignite, natural gas, oil, hydro and nuclear power to viable non-conventional sources such as wind, solar, and agricultural and domestic waste. Electricity demand in the country has increased rapidly and is expected to rise further in the years to come. In order to meet the increasing demand for electricity in the country, massive addition to the installed generating capacity is required.

In May 2018, India ranked fourth in the Asia Pacific region out of 25 nations on an index that measured their overall power. India was ranked fourth in wind power, fifth in solar power and fifth in renewable power installed capacity as of 2018. India ranked sixth in the list of countries to make significant investments in clean energy at US$ 90 billion.

The power sector in India is mainly governed by the Ministry of Power. There are three major pillars of power sector these are Generation, Transmission, and Distribution. As far as generation is concerned it is mainly divided into three sectors these are Central Sector, State Sector, and Private Sector.

Power sector of India as also of Rajasthan is one of the most diversified systems in the world. Source of power generation range from conventional sources such as coal,lignite, natural gas,oil,hydro,and nuclear power to viable non-conventional sources, such as wind ,solar and agriculture & domestic waste.

The main source of energy generation in the state are Kota, suratgarh and Chhabra Thermal project, Dholpur Gas Thermal project, Mahi Hydel, Wind farms, Biomass, Captive Power plants, Bhakhra, Vyas, Chambal, Satpura inter-state partnership Projects and Rajasthan Atomic power Project Singroli, Rihand Dadri Anta, Auriya, Dadri Gas plants, Unchahar thermal while Tanakpur, Salal,Chamera and Uri hydral projects are from central sector.

Power Scenario of Rajasthan

Since the formation of the state in 1949 government of Rajasthan and power sector together have taken serious efforts to increase the installed capacity of the power in order to bring a balance between the growing demand and supply of power and also drive the economy on the path of development. The power sector development was convinced through by the government. Rajasthan as a state was formed in the year 1949 with the total installed capacity of 13.27 MW but supply of electricity was restricted only to few cities. Realizing the importance of power RSEB (Rajasthan state electricity

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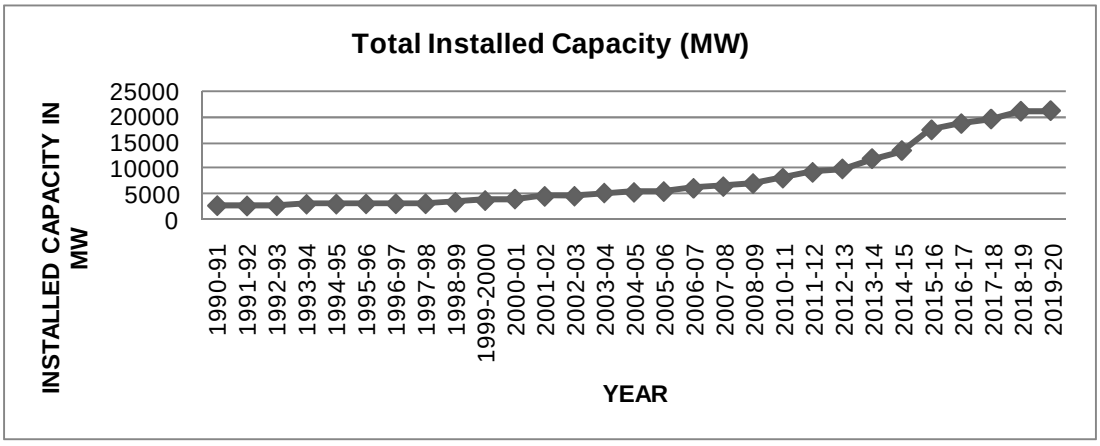
board) was formed on 1st July 1957 and in order to strengthen the power sector around 28-30% of its plan outlay was spend towards the growth of power sector. The service area of RSEB was 4,32,000 sq km which was geographically very large. Around 66% of the area was desert with a very low density of population. 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 of11% (Rajasthan Power Sector Vision 2020).

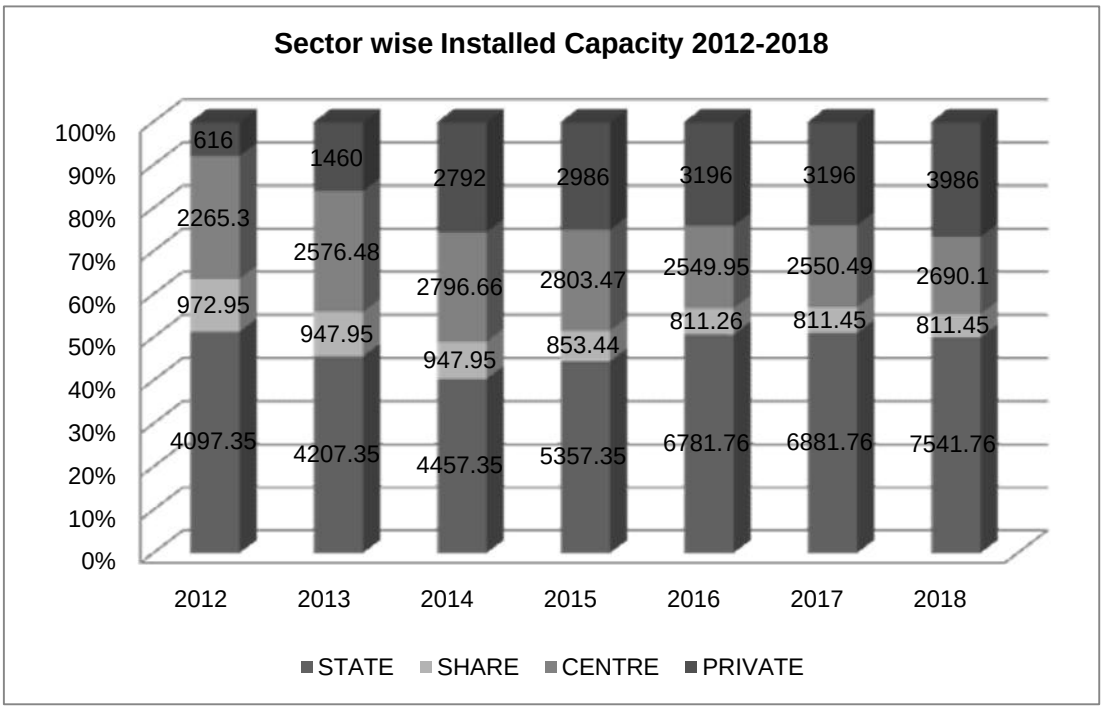
Rajasthan Power Supply Position Total Installed Capacity of Rajasthan Since 1990

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, Jaipur



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.

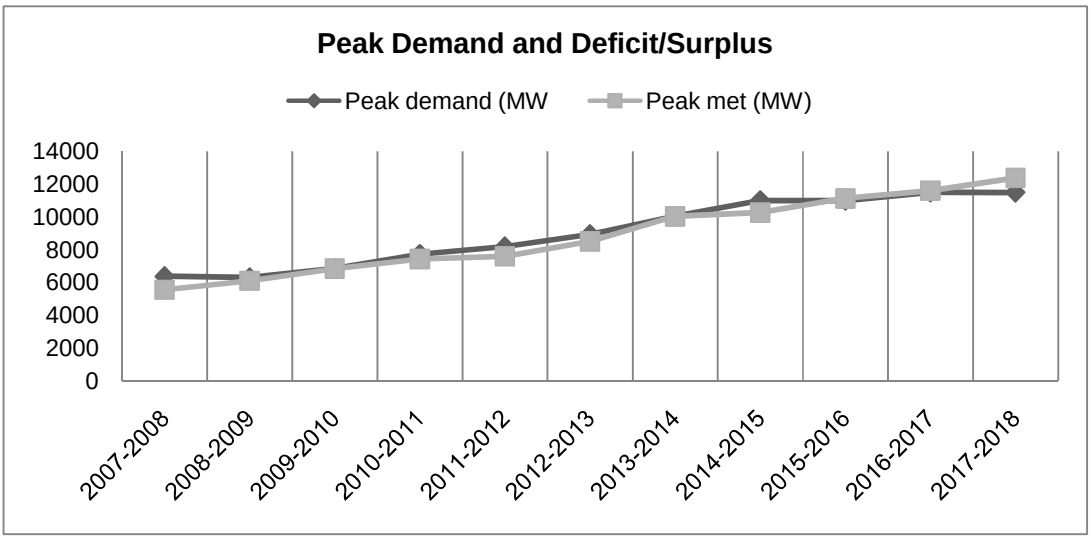


The above bar diagram provides us contribution of various sectors in the available installed capacity of Rajasthan. State sectors share is almost 50% of the total installed capacity of Rajasthan. There has been steady growth in the installed capacity under state sector. There has been a 10% increase 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 almost30% 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

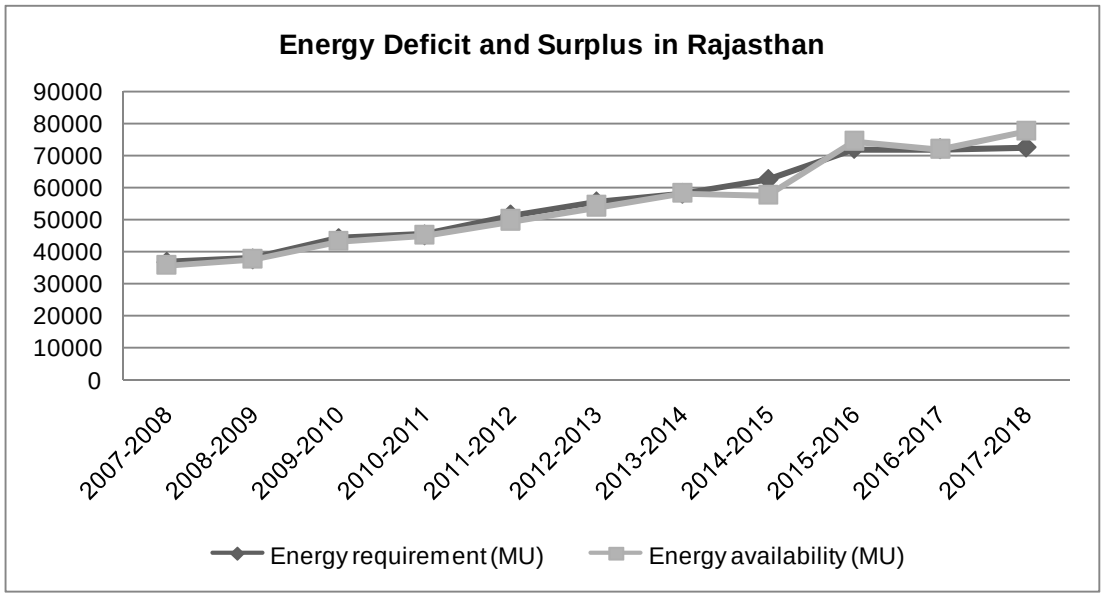
Peak and Deficit/Surplus

Period	Peak Demand (MW	Peak Met (MW)	Peak Deficit/ Surplus (MW) (-/+)	Peak Deficit/ Surplus (%)(-/+)
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	1110	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 year2017-2018 a surplus of 892 MW which is almost 7.8% was available.

Constraints and Prospects

With the increasing population and rise in demand of technology it has become necessary to keep up with growth of the power sector. It is not only the growth of power sector which is necessary we should also emphasis on the usage of energy efficient equipment's that will allow bring the growth rate. Bringing our requirement down can help us in mending the huge gap of our future requirements and availability. It is also necessary for us to target renewable energy sources. For Rajasthan has shown a tremendous growth in its renewable sector, still there is an abundant of these resources available to Rajasthan. Rajasthan can provide a benchmark for energy efficiency model to all the other states. Rajasthan has been able to electrify all of it in habitant villages, a target which was achieved in the November of 2017. State government has shown a consistency in the growth rate of installed capacity of power sector and it is only through these efforts that Rajasthan's power sector has strengthened. It is also necessary that local skill is developed for proper repair and maintenance of the system for an efficient running.

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 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 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 non-renewable 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 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 rate 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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