

# DISCUSSION ON THE DEVELOPMENT OF SOLAR ENERGY IN RAJASTHAN

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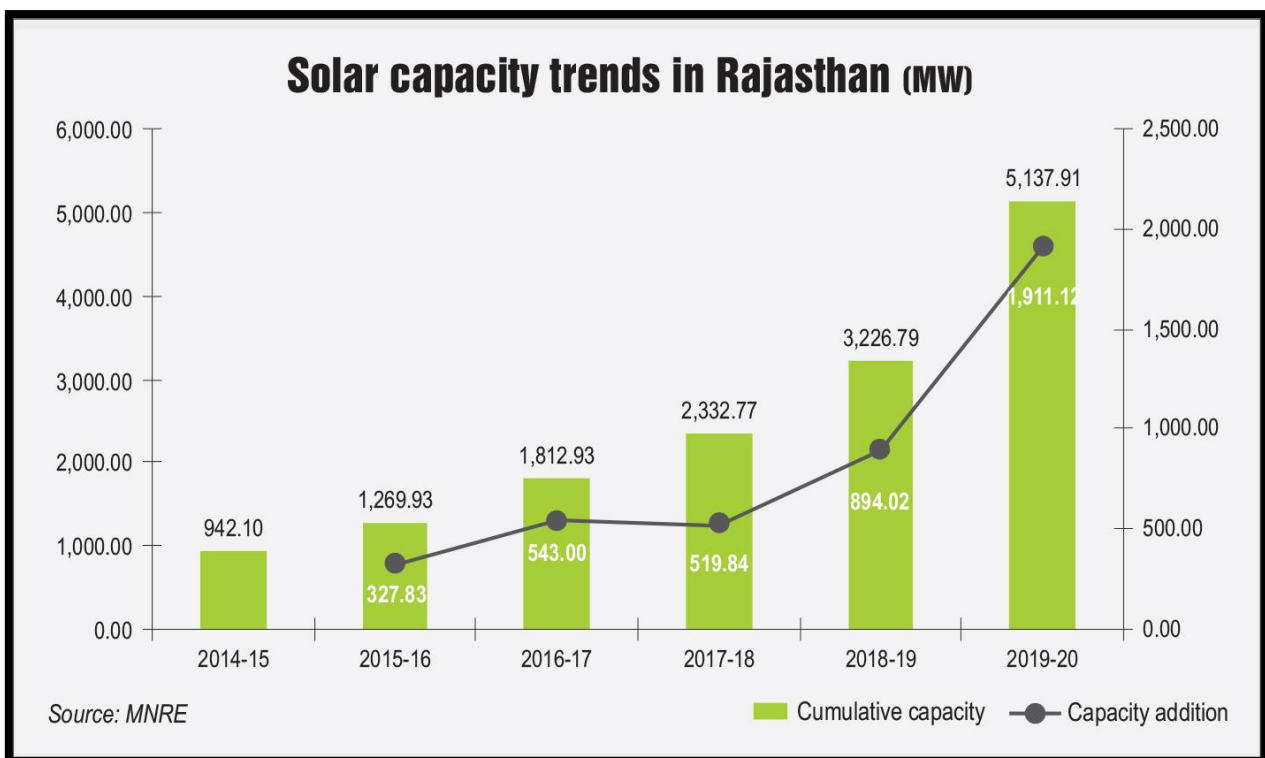
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**Abstract-** Rajasthan is one of the most promising states in India when it comes to solar energy development. With its abundant sunshine and vast, barren deserts, the state has enormous potential for harnessing solar power. In recent years, the Rajasthan government has taken a number of steps to promote solar energy, and as a result, the state has emerged as a leader in the solar energy sector. One of the key initiatives taken by the Rajasthan government to promote solar energy is the establishment of the Rajasthan Solar Policy. The policy aims to achieve a target of 25 GW of solar power capacity by 2025, with 50% of the capacity being installed by rooftop solar projects. The policy offers various incentives and benefits to solar power developers, including subsidies on land lease, exemption from electricity duty, and a single window clearance mechanism for project approvals.

**Keywords:** Solar energy, solar power, Rajasthan, solar power capacity.

## INTRODUCTION

The industry of solar power is now defined as a fast-growing industry not only in India but also in all those developing countries. Former PM Manmohan Singh inaugurated the solar energy power program, thereby he is counted as the father of the solar energy program in India (Raghuwanshi & Arya, 2019). As the growth rate of solar rooftop installment is going as fast as possible, as the preferred data is said, India, in the month of Feb 2023 has successfully installed approximately 8,488 MW, of solar rooftops that can generate sufficient solar energy, whereas the rate in Sept 2022 was 7520MW.



**Figure 1: The government initiatives**  
 (Source: Rajasthan.gov.in, 2023)

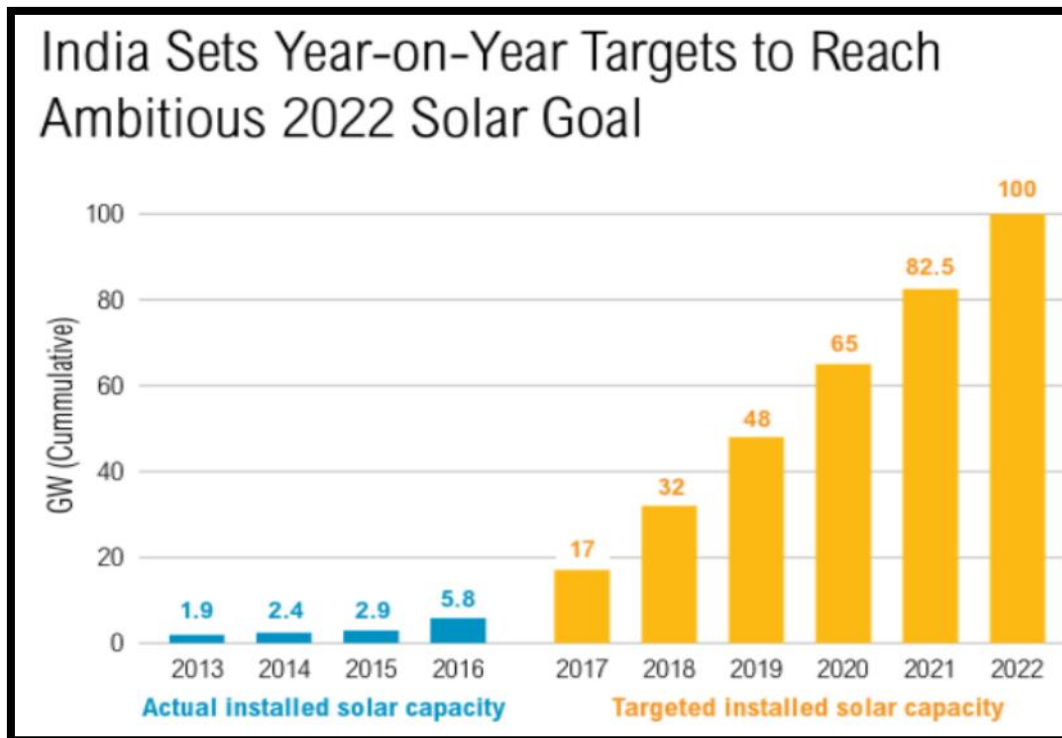
The figure 1 shows both cumulative capacity and capacity addition from 2014 to 2020. In this 5-month ratio, the growth of this industry is quite visible, and it's a growth of almost 1,000MW. India has greatly contributed to the place of solar energy and has incurred all kinds of functional benefits (Rajasthan.gov.in, 2023). The country has got the fifth rank in the development of the solar power industry. Additionally, India has made a milestone of generating solar energy by 2023, amounting to 1000 MW.

## Impact of Rajasthan's geographical area

Between 1961 and 1966, the program of solar panel energy has come into existence. Since then, it has been growing with impressive results and impacts. In Bhadla of Rajasthan, the very first solar panel system was installed; Bhadla solar park is the place where the industry took form. Now, Rajasthan has crossed the milestone of generating 16,000 MW of energy with the solar panel energy system (Mininni, 2020). After Gujarat and Karnataka, Rajasthan is the state in the country to install renewable energy capacity, along with wind and biomass-based plants.

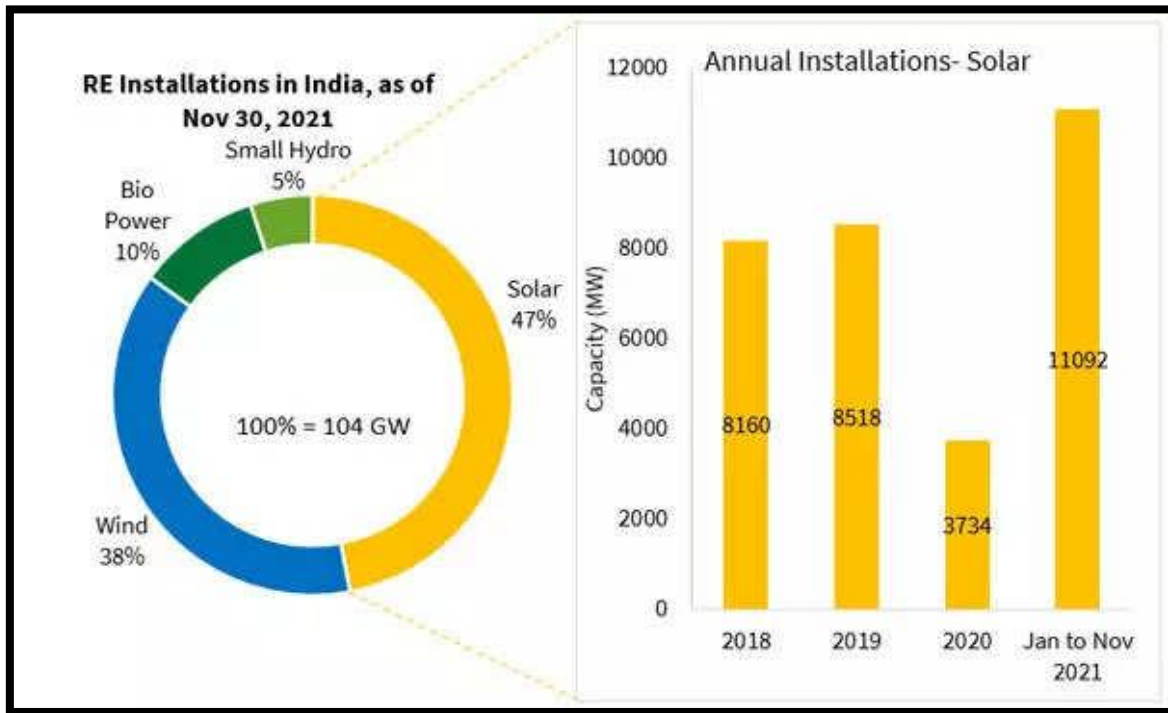
As one of the developing and leading countries, India and the solar industry have gained a place in the global market for generating renewable energy. The eco-friendly project of generating solar energy started for just water heating and to provide electric energy to households (Paliwal& Dave, 2021). But with the understanding of the importance of eco-friendly solar panels, the government has taken the initiative and installed them for various usages (Sareen&Shokrgozar,2022). Nowadays, in the railways, commoners' households, schools' colleges, and even in street lights, solar energy panels are used. With less amount of loss in non-renewable energy, this rooftop solar panel has been a great help in households, in every sector like private and public both.

In the state of Rajasthan, there is a larger part of the solar project has taken a place, like Bhadla Park is the largest area, with the highest rate of generating solar power (Sareen&Shokrgozar, 2022). The potential resource of solar power projects is a growing industry and hope for the state government of Rajasthan. In the western part of India, Rajasthan has tropical weather, and a desert, Thar. Thus, the government of India took the step and tested the future of the solar energy industry in India (Rajasthan.gov.in, 2023). However, the hot desert and topical climate are the key features that suit and define the state of Rajasthan as a proper and just place.



**Figure 2: Finance year with the rate of solar and non-solar percentage**  
(Source: BMC, 2023)

The above figure 2 has depicted the ratio of actual installed solar energy and the targeted capacity of installed solar panels in the recent years. With the hot desert and less than 25% of rainfall, Rajasthan is the most suitable place for solar panel rooftop technology to be tested(BMC, 2023). And the decision made a great success rate with an energy-generating capacity of 16.09 MW.

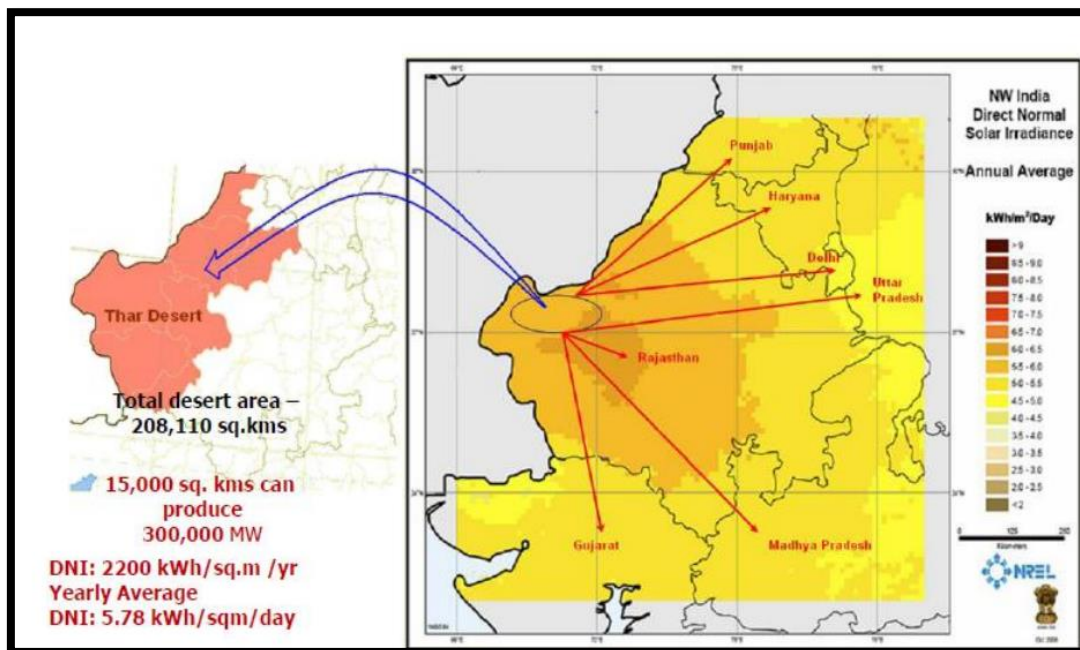


**Figure 3: Solar capacity rate chart in India**  
(Source: MNRE, 2023)

The above figure 3 has depicted the rate of solar capacity in India, the rate of which is more than the other source of energy. The energy of the sun is created as potential energy and with the energy, electricity of various usages can be generated (MNRE, 2023) and to make more and more of the potential energy, the hot health of the desert is needed, thereby government had chosen the state of Rajasthan for this project (Paliwal & Dave, 2021). Not only was the largest area of the deserted area of Rajasthan with an isolated range, but it was also very helpful to create the project. Moreover, because of the desert, the people of Rajasthan suffer from unemployment (Mininni, 2020). As this project would be a great help and would need massive manpower to make the project a success.

**The problem faced by Rajasthan**

As situated in the desert, Rajasthan suffers unemployment, aloofness, and to some extent poverty all because of the hot desert. In the end, it becomes a power of solar energy. The largest solar park situated as of now, 2022, Bhadla Solar Park, is spread across 5,700 hectares. Hence, the aloofness of the land has been used as a project land.



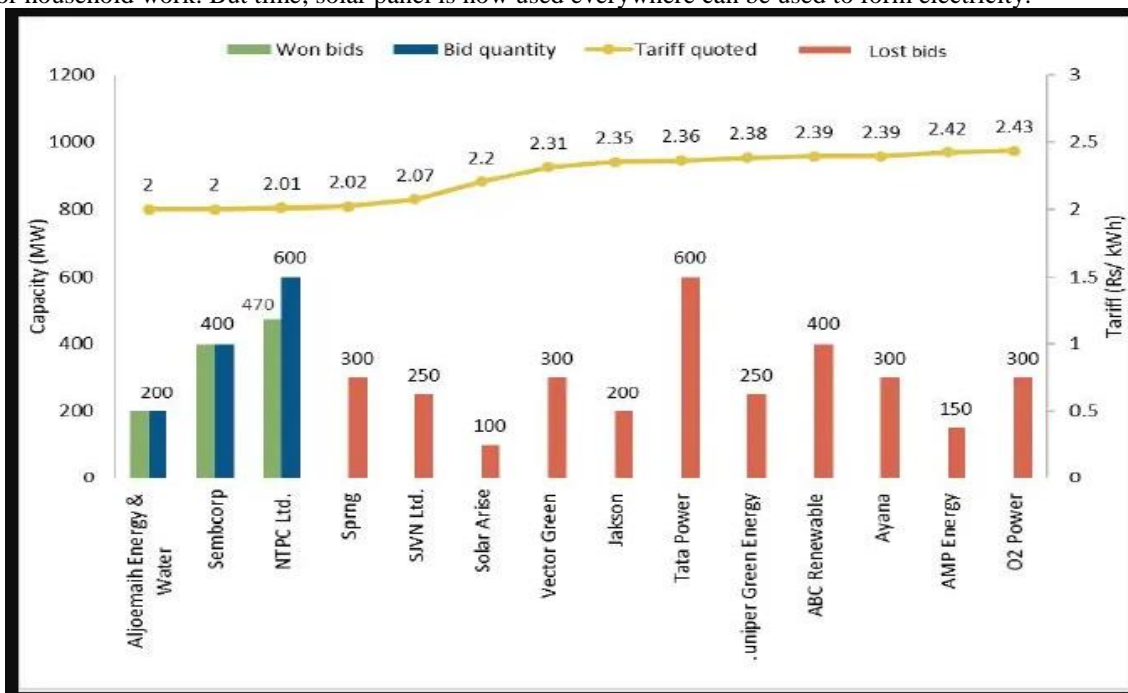
**Figure 4: Solar potential in Rajasthan**  
(Source: BCM, 2023)

The above map (figure 4) depicts the solar potential of different regions of Rajasthan, specially highlighting Thai desert. The water as renewable energy of Rajasthan is not sufficient and has got have enough amounts for the citizens. So, the water can be used to generate electricity (Raghuwanshi & Arya, 2019). The shortage problem and the reason for the solar project to take place in the state of Rajasthan. And the water problem came to meet a way of solution.

The problem of unemployment is a grave problem for the state. The government, since the phase of the first plan year of 1951, has been taking many initiatives to improve all situations. In order to make progress the income rate of the state (Bhati et al., 2022). With the installation of the Solar panel energy system, wind machines, and biomass planets, it is the solar rooftop project created a great result (BCM, 2023). A large number of people as engineers, developers, manufacturers, laborers, workers, and investment companies are now involved in the progress of the solar panel project, which makes it a great and progressive project.

**Role of solar energy in the country's development**

As a developing country, India is living with the growth and advances in technology. Since the country has opened the door to the world of global marketing and trade (Jain et al, 2022). Investing in and featuring new technology of leading the way should be welcomed in the country (Paliwal & Dave, 2021). In the beginning, it was just a step that is to test the ability to make changes. The solar city in the state of Gujarat, the leading power-generating technology in Karnataka, and the 16,000 MW energy-creating solar park in Rajasthan, India have created a new achievement as well in the market of India and in the worldwide global market (Bhati et al., 2019). Eco-friendly ways to preserve and protect the environment are rapidly taking place with the rage of global warming and pollution. A solution to save water, coal, and forest and guarantee energy to commoners and citizens to provide enough electricity for household work. But time, solar panel is now used everywhere can be used to form electricity.



**Figure 5: Growth rate of potential energy**  
(Source: JMK research, 2023)

Different companies who are involved in generating potential solar energy throughout India (as shown in figure 5). In the time of globalization, every country wants to dominate the globe and trading world. Reached that the source of the energy should be vast. As the government is trying to make large number of areas spread in the way to form solar parks and solar cities (Raina & Sinha, 2019).

In every field of business and trade, a sufficient amount of energy source is needed (JMK research, 2023). Thereby, the state and central government stated from then 1961 till the present time take all the policies and acts to pave the way for solar energy to make changes.

**Rajasthan government takes initiatives on solar energy**

Began the first installation of solar panel in Bhadla Park, the government of India and the state government of Rajasthan has taken a bunch of plans and policies to form an eco-friendly power project. An ambitious framework, named *Wind and Hybrid Energy Policy 2019* was enacted, aiming to achieve and generate a total amount of 30,000 MW (Rajasthan.gov.in, 2023). And the solar Energy policy to install more power panels. As the Indian government and state government are involved in the solar power project (Raghuwanshi & Arya, 2019). As proof of the growth rate says that the government has been trying to expand the area of generating the potential power hubs to make a great place in the business.



**Figure 6: Solar policy, 2019 is the gateway for the future of Rajasthan to be sustainable**  
(Source: rajasthan.gov.in, 2023)

The initiatives are taken by the government, the first development of the solar park in every part of the country, but especially in Rajasthan (as shown in figure 6). The development is with solar energy storage in the program (Raina & Sinha, 2019). And in the small application, there are changes like solar pumps, and solar manufacturing labor to learn new methods.

## CONCLUSION

To conclude the entire study, it can be said that the future of India in both of the markets, may it be the global market or Indian market, because of its eco-friendly feature and affordability the rooftop panels are quite famous among the people. For any important project that needs a large amount of electricity, their solar panel system is played and significantly dominant a place to pacify the project. All in all, the solar panel system is a sunrise industry in the near future. With the right policy and initiatives, this program can be proven a great form to save renewable resources and provide sufficient energy to the citizens. In conclusion, the development of solar energy in Rajasthan has been a success story, with the state emerging as a leader in the solar energy sector. The government's initiatives, including the Rajasthan Solar Policy, the establishment of solar parks, and the promotion of solar energy projects, have played a key role in promoting solar energy in the state. The state's abundant sunshine and vast deserts offer immense potential for solar power, and the government's efforts to harness this potential have yielded fruitful results.

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