

## **Renewable Energy Policies and Their Effectiveness in Promoting Solar Energy Adoption in India**

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### **Abstract**

As the daily energy demand is rising the development and production of renewable energy are getting increasingly difficult. Due to high energy consumption, it has become crucial to convert sustainable and eco-friendly sources of energy. India is the nation with the most amount of sunshine available. In order to capture the energy and reach its goal of having no carbon emissions by the year 2050, the government has put in place a number of renewable energy-related legislation. Since energy plays an influential role in the development of the nation, it is necessary to develop a variety of initiatives to fully utilize energy while keeping in mind the value of the environment. It is clear from the background of solar energy that it has experienced enormous expansion in recent years. This development is due to cost reductions and numerous government initiatives to support renewable energy sources.

**Keywords:** Renewable Energy Policies, Solar Energy Adoption in India, Solar Power Projects, Energy Policies

### **Introduction**

As energy demand rises exponentially, it is essential to contemplate the environmental impact of energy sources when addressing that demand. To this end, it is critical to utilize non-convective energy sources as the majority of energy sources are damaging to the environment. Solar, wind, tidal, and other non-convective energy sources are some examples. The government has put in place a variety of initiatives and legislation to promote renewable energy sources and satisfy the country's expanding energy requirements. The transition to renewable energy sources is primarily motivated by climate change. India introduced the National Climate Change Action Plan in 2008 to decrease the effects of climate change. As a result of this endeavour, eight national missions to combat climate change by reducing greenhouse gas emissions were launched. India is the fourth largest producer of greenhouse gases while having one of the lowest per capita emission rates in the world. One of the largest producers to these emissions, accounting for 58% of them, is the energy industry. (Kumar, Patel, Gupta, 2018 and Goyal, Mishra, & Bhatia, 2017).

Private business owners dominate the Indian renewable energy sector, which is mostly made up of first-generation firms and independent power producers. The passage of enabling legislation and inventive financing techniques which have helped remove barriers and restrictions to the use of renewable and green energy technologies have been instrumental in the success seen in the Indian

industry RE. In India, the government provides grants or subsidies to promote the use of renewable energy. Financial aid reduces the initial investment in a project, which increases its profitability and does not have to be repaid. The Indian government offers subsidies through a number of programmes to encourage the adoption of renewable energy technologies until they are economically viable. Accelerated depreciation is also available as a production tax credit to incentivize investment in renewable projects. The government has also allowed a decrease in taxes on income from renewable energy projects. Infrastructure projects operating in the renewable energy sector will not have to pay taxes for 10 years. However, they are obliged to pay Minimum Alternate Tax and Corporate Income Tax. With government and public participation in promoting renewable energy sources, India can effectively accomplish its clean energy goal. The government has launched a variety of programmes at both the state and national levels to encourage the use of renewable energy. The National Solar Mission, the Solar Park Scheme, the Atal Jyoti Yojana, etc. are some examples (Prasad, Singh, Nagar, 2017 and Faujdar, Tohid, Trivedi, 2014).

### **Literature Review**

Research has established that the reserves of coal, oil, and other traditional energy sources are finite and if continued to be consumed at their current rate, they will soon be depleted. As a result of increasing energy needs, fossil fuel-based power plants are being constructed, which leads to the release of large amounts of greenhouse gases that have an adverse influence on the climate and global warming. Fortunately, humanity has access to solar energy, an inexhaustible, clean, climate-friendly, and abundant energy source. As the cost for solar energy decreases, it is becoming a viable option in new markets. Particularly in India, which is a tropical nation, solar radiation is abundant and averages at 5,000 trillion kWh over 300 days. The solar radiation per square meter varies from 4 to 7 kWh, depending on the location. Solar energy is, without a doubt, the most reliable way to guarantee long-term energy sustainability. It is consistent, dependable, and widely available. Additionally, solar energy reduces the transmission of hazardous gases and minimizes distribution loss. On top of that, it is clean and helps to reduce the impacts of climate change (Kapoor, Pandey, Jain, & Nandan, 2014 Bansal , Srivastava, & Kheraluwala, 2019).

According to a study, The Indian government's ambitious Jawaharlal Nehru National Solar Mission of 2009 and its subsequent inauguration in 2010 provide a promising prospect for solar energy generation in India. This initiative has three components, each with its own objectives, and is aimed at enhancing the use of renewable energy sources and resolving the country's energy security crisis. With the help of advanced technology, increased research and development, as well as public outreach and human resource training, the mission seeks to make India a leader in solar energy production by 2022. In addition to its worldwide contribution to curbing the effects of climate change, the country is well-placed to capitalise on its abundant solar radiation, with approximately 5500 trillion kWh of energy available, leading to the emergence of solar energy as a viable alternative to wind, biomass and hydroelectricity. Consequently, the nation's energy planning process has recognised the value of solar energy, with both rooftop and utility-scale projects forming part of the National Solar Mission (Yadav, Kumar, Yadave, 2015 Akoijam, & Krishna, 2017).

A recent study revealed that the Central Government, in partnership with the Ministry of New and Renewable Energy, launched the SRISTI programme with the intention of providing financial incentives to those who build solar power plants and roof-top projects around the nation. This form

Renewable Energy Policies and Their Effectiveness in Promoting Solar Energy Adoption in India of subsidy scheme is to be executed on a national level and the government has committed to investing around Rs 23,450 crore for its implementation in the forthcoming years. The scheme also encourages citizens to install solar panels as a sustainable energy source on their rooftops. The SRISTI programme is seen as an enhanced version of the original MNRE programme, and to ensure its successful execution, the government has also proposed combining the Discoms. The government is offering financial aid for better rooftop solar panel installation, which will enable residents to produce an inexpensive source of energy and increase their capacity for generating electricity in compliance with local government regulations. The design of the SRISTI programme has taken into consideration the major conclusions from the first phase of JNNSM. The goal is to reduce the difficulties associated with installing rooftop solar systems, so the scheme has suggested making the distribution firms the main agency for execution. The DISCOMs will be responsible for capacity building, awareness campaigns, and other related matters, which will likely incur them a considerable cost. These missions has effectively helped in reducing carbon emission. Today more are more people are adopting and accepting the idea of solar and other renewable energy sources. (Tomar, Gautam, 2015 and Raghuwanshi, & Arya, 2019).

In a study, it was found that in India, several states have opted to meet the burgeoning energy requirements through the utilization of solar power. Tamil Nadu was one of the forerunners in this regard, introducing its Solar Energy Policy in 2012. This was a prudent decision since the state boasts around 300 days of clear, brilliant weather each year, in addition to considerable solar radiation ranging between 5.6 to 6.0 kWh/sqm. Southern Tamil Nadu is particularly suited for the construction of solar power plants, making it an ideal location to generate solar energy. The steadily decreasing cost of solar energy, in combination with the Tamil Nadu government's commitment to the cause, has opened up exceptional prospects in this sector. This could consequently bolster energy security and establish Tamil Nadu as a pioneering figure in the global solar energy industry. As set out in their policy, the target for 2015 was to generate 3000 MW of solar energy. Rajasthan is another state that has embraced solar energy, their Solar Energy Policy came into effect in 2014. This region is endowed with an average solar irradiation of 6 to 7 kWh/m<sup>2</sup>/day on more than 325 sunny days each year, the highest in India. According to the estimations of the National Institute of Solar Energy, Rajasthan has the capacity to produce 142 GW. Their Solar Programme aims to install 25,000 MW by 2024, and as of September 2017, the state has more than 129 MW installed rooftop PV capacity. Gujarat was the progenitor of solar energy policies in India, introducing theirs two years prior to the National Solar Mission. The 2015 version factored in the lessons learnt from the 2009 policy. The Gujarat government, alongside the MNRE, provides subsidies for the construction of grid-connected rooftop PV systems. The benchmark price quoted for installing a 1-kW photovoltaic system is 69,000 rupees, based on the necessary specifications. With the establishment of such policies, the government has successfully endowed the idea of renewable energy which is cost effective and can be implemented easily at the roof top by everyone. (Bardhan, Debnath, & Jana, 2019b and Shashikumar, Jayasubramaniam, 2013).

### **Objective of the Study:**

- To measure the various aspects of Renewable Energy Policies and Their Effectiveness in Promoting Solar Energy Adoption in India in experts' opinion.

## Methodology

This study is descriptive in nature in which data is obtained from 195 respondents who have used renewable energy or solar energy. In the study the focus is given to solar energy. A checklist question was used to analyze and interpret the data. In a checklist question respondents choose “Yes” or “No” for all the questions.

**Table1. Renewable Energy Policies and Their Effectiveness in Promoting Solar Energy Adoption in India**

SL. No.	Renewable Energy Policies and Their Effectiveness in Promoting Solar Energy Adoption in India	Yes	%Yes	No	%No	Total
1	Renewable energy policies helps in reducing carbon emission	172	88.21	23	11.79	195
2	Renewable energy policies reduces the impact of climate change	164	84.10	31	15.90	195
3	Renewable energy policies provides cost effective solution of energy production	158	81.03	37	18.97	195
4	Solar energy do not produces toxic substances in nature	172	88.21	23	11.79	195
5	Solar Energy do not contaminates water bodies and environment	179	91.79	16	8.21	195
6	Solar and other renewable energy sources does not emit green house gases	166	85.13	29	14.87	195
7	Renewable energy policies play an important role in promoting solar energy	157	80.51	38	19.49	195
8	Renewable energy is inexhaustible in nature	180	92.31	15	7.69	195

Table 1 show that 92.31% respondents agree that Renewable energy is inexhaustible in nature while 91.79% respondents agree that Solar Energy do not contaminates water bodies and environment. 88.21% respondents agree that Renewable energy policies helps in reducing carbon emission and Solar energy do not produces toxic substances in nature while 85.13% respondents agree that Solar and other renewable energy sources does not emit green house gases. 84.10% respondents agree that Renewable energy policies reduces the impact of climate change while 81.03% respondents agree that Renewable energy policies provides cost effective solution of energy production. 80.51% respondents agree that Renewable energy policies play an important role in promoting solar energy.

## Conclusion

India is making strides towards achieving its goal of zero carbon emissions as well as meeting the rising demand for energy. Chiefly because of the impacts of climate change, the country has taken initiatives to create a National Climate Change Action Plan in 2008, which has established eight national missions to reduce its effects. The country is still the fourth-largest producer of greenhouse gases while having one of the lowest per capita emission rates in the whole globe. The use of

Renewable Energy Policies and Their Effectiveness in Promoting Solar Energy Adoption in India

renewable and green energy technology is no longer constrained thanks to rules and creative funding. The Jawaharlal Nehru National Solar Mission was also launched by India in 2009 in recognition of the nation's vast potential for solar energy generation. By 2022, the country is predicted to be the top solar energy generator in the world. The National Solar Mission, a significant government programme in India, aims to increase the share of solar energy in the country's overall energy mix. The solar energy policy seeks to reduce the cost of solar energy while the renewable energy policy is focused on increasing the proportion of renewable energy in India's energy mix. The solar rooftop policy aims to promote the construction of rooftop solar systems, while the solar parks programme aims to develop solar parks around the country. The federal government created the SRISTI programme, where participants are given incentives to develop rooftop solar power plants, to encourage green growth and handle its challenges with energy security. State governments, like those in Gujarat, Rajasthan, and Tamil Nadu, have also developed their own solar energy strategies in the meantime. By 2015, the latter has set a target of producing 3000 MW of solar energy. Rajasthan, according to the National Institute of Solar Energy, has the ability to produce 142 GW of solar energy. Overall, India is making notable progress towards its objectives of achieving zero emissions and becoming an energy-secure country.

## References

1. Bansal, N., Srivastava, V. C., & Kheraluwala, J. (2019). Renewable Energy in India: Policies to Reduce Greenhouse Gas Emissions. In *Energy, Environment, and Sustainability*. 161–178. Springer, Singapore.
2. Akoijam, A. B., & Krishna, V. V. (2017). Exploring the Jawaharlal Nehru National Solar Mission (JNNSM): Impact on innovation ecosystem in India. *African Journal of Science, Technology, Innovation and Development*, 9(5), 573–585.
3. Raghuwanshi, S. S., & Arya, R. (2019). Renewable energy potential in India and future agenda of research. *International Journal of Sustainable Engineering*, 12(5), 291–302.
4. Goyal, S., Mishra, S., & Bhatia, A. (2017). A Review on Energy Policies and Scenario in India. *International Journal of Advances in Applied Sciences*, 6(2), 156.
5. Shashikumar, N., Jayasubramaniam, P. (2013). Solar Energy System In India, *Journal of Business and Management*, 7(1), 61-68.
6. Faujdar, P., Tohid, S.M., Trivedi, J. (2014). Solar Energy and Status in India, *International Journal of Latest Technology in Engineering, Management & Applied Science*, 3(8), 4-6.
7. Kumar, A., Patel, N., Gupta, V. (2018). Photovoltaic Power Generation In India Prospective Considering Off Grid and Grid Connected System, *International Journal of Renewable Energy Research*, 8 (4), 1936-1950.
8. Bardhan, R., Debnath, R., & Jana, A. (2019b). Evolution of sustainable energy policies in India since 1947: A review. *Wiley Interdisciplinary Reviews: Energy and Environment*, 8(5).
9. Tomar, A.K.S., Gautam, K.K (2015). A Review of Solar Energy- Challenges, Economies and Policies in India, *International Journal of Science and Research*, 6 (1), 2080-2083.
10. Yadav, H. K., Kumar, V., Yadave, V.K. (2015). Potential of Solar Energy in India, *International Advance Research Journal in Science, Engineering and Technology*, 2(1), 63-66.

11. Prasad, R., Singh, S., Nagar, H. (2017). Importance of Solar Energy Technologies for Development of Rural Area in India, *International Journal of Scientific Research in Science and Technology*, 6 (3) 585-599.
12. Kapoor, K., Pandey, K. M., Jain, A. K., & Nandan, A. (2014). Evolution of solar energy in India: A review. *Renewable & Sustainable Energy Reviews*, 40, 475–487.