## A STUDY OF GOVERNMENT POLICIES IN FINANCING SOLAR PROJECTS IN RURAL AREAS OF WESTERN VIDARBHA

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#### Abstract

This research evaluates the efficiency of government policies in financing solar projects in rural Western Vidarbha. Despite huge solar potential, the adoption is restricted because of financial, technical, and social constraints. On the basis of surveys, interviews, and focus group discussions, the study pinpoints the problem of bureaucratic delay, financial illiteracy, and poor awareness of incentives available such as subsidies and concessional loans. Although successful projects have enhanced agricultural productivity and living standards, challenges such as maintenance challenges and social resistance remain. The research suggests increased policy implementation, awareness among communities, and technical assistance to increase solar adoption and optimize socio-economic benefits.

**Keywords:** Solar energy, Rural Vidarbha, Government policies, Solar project financing, Renewable energy adoption, Socio-economic impact, Policy implementation, Solar incentives, Rural electrification, Solar energy challenges.

## Introduction

Solar energy has emerged as a crucial renewable energy source that contributes to mitigating climate change and enhancing energy security. India, being one of the fastest-growing solar energy markets, has made significant progress through policies like the National Solar Mission. However, rural regions such as Western Vidarbha still face challenges in adopting solar projects despite abundant sunlight. This paper aims to study the effectiveness of government policies in financing solar energy projects in these rural areas while identifying barriers and socio-economic impacts.

The Vidarbha region of Maharashtra has immense potential for harnessing solar energy due to its high solar insolation levels. Despite this potential, rural adoption of solar projects remains limited because of challenges related to financing, policy implementation, and technical expertise. Government initiatives such as the Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM-KUSUM) and capital subsidies aim to promote solar adoption, but practical challenges persist in reaching rural beneficiaries..

## Government Funding for Access to Solar Projects

Access to government funds and financial advantages has been the biggest hurdle toward the development of solar energy in rural areas. As much as policy frameworks may be entrenched on paper, it is undoubtedly obvious in their inefficiencies, low outreach and awareness, and bureaucratic red tape in their application processes. Overall attractiveness of rural communities of Vidarbha West to such projects will be affected because of the length reach of remote areas where formal banking channels may not be available, lengthy administrative

procedures one has to go through for gaining access to available schemes, and people may not have enough information about the monetary and fiscal policies.

The same study would, therefore, try to examine the access of government funding for the solar projects conducted in the rural areas of Vidarbha West, considering the perception and involvement of the local stakeholders towards the financial incentives. Are the rural communities at all aware of the available schemes under the government? Is the process easy for them to apply for funding and funds are dispersals effective? This will ensure that at all times, there will be nothing but the technical challenges faced in accessing governmental support of solar energy projects in rural communities.

This desertation dive into all the related sucsidies and incentives which are provided by government in financing solar projects in rural areas of western vidharbha.

# Literature Review

1. The incentives have succeeded in debating terms only in the rural areas of Vidarbha. **Chandel et al. (2014)** affirm government incentives but over that their effect is generally negated by administrative delay and lack of awareness among the rural people in terms of the problems of implementing solar projects in the rural Indian setup. They argue that, in many ways, the complexity surrounding the access process of subsidy and grant schemes deters small-scale developers of solar energy and local communities from benefiting adequately from these projects. **Pandey et al. (2019)** validate this fact by suggesting that decentralization is crucial for the implementation of solar energy policy in order to grant direct access and subsequent benefits for rural communities.

2. Even the findings in the research work by Sahoo and Shankar (2017) also indicate that these Vidarbha type areas demand focused policymaking on regional-state-specific parameters of socioeconomic and environmental setups. It further opines that national- level policies are very broad that should be replete with a more specific and customized state-level programs, like Maharashtra Solar Policy, while overcoming specific obstacles in the adoption of solar energy for the rural areas. This implies that although government incentives are desirable in themselves, them will then have to be collaborated with regional efforts to facilitate solar energy resources equally.

3. Access to government funding for the provision of solar energy programs is another determinant that will result in failure or success of solar programs in rural areas. Many studies have focused on issues related to accessing the government's financial aid for the sun initiative at the rural level. **Bhattacharyya and Palit (2016)** stated that in India, there is financial inaccessibility, particularly on the supply side for those focusing on renewable energy. It goes further with limited bank networks and lack of banking services being another challenge beside their limited knowledge about schemes initiated bythe government.

4. Their study also highlights availability of formal financing source through rural banks and cooperative societies as one of the major hindrances for the rural people who want to invest in solar energy.

5. **Mishra et al.** (2018) also find similar results while studying the challenges faced by farmers to access the support from the government

# **Research Methodology**

The research used both qualitative and quantitative methods. The qualitative method assisted in investigating the experiences and perspectives of different stakeholders like policymakers, rural beneficiaries, and financial institutions. The quantitative aspects of the research estimated the effects that government policies had on the adoption level of solar projects, the economy, and the social effect on rural communities. By using a two-pronged strategy, the study captured the

## under Pradhan Mantri

6. evam Utthan Mahabhiyan (PM-KUSUM) scheme for the solar irrigation pumps. They conclude that although the plan grants quite a generous subsidy, many farmers are unable to apply for it or even qualify for it for several reasons such as a lack of documents or financial literacy. In such a regard, several eligible beneficiaries fail to reach the available funds, and, to some extent, benefits to the government programs meant to promote the spread of usage of solar energy in rural areas are reduced.

7. 5. There are others, such as **Chaurey et al.** report on the financing gap for rural solar projects and the role played by NGOs and microfinance institutions. According to them, NGOs and microfinance institutions may fill a niche created by other sources of finances by providing rural populations with alternative financial mechanisms that best suit their needs. Chaurey et al mentioned a need to make funding by the government aware and to build capacity to make access of funds easier for rural solar energy.

6. Though the government can make most of these concerns go away, there are still hindrances towards the adoption of solar energy in the rural parts. For one, financial constraints still wear a huge mask towards investing in solar energy for the rural setting. According to **Ghosh et al. (2019)**, the high upfront costs of solar energy systems alongside poor access to credit prevents many potential adopters from opting for the technology in the rural areas. They observe that long-term financing for a solar project becomes a hard nut to crack in most rural communities due to the shyness of the traditional financial institutions to offer loans for renewable energy projects.

# **Research Objective**

1: Effects of Government Incentives

- 2:Determine Government Funding Accessibility
- 3: Obstacles and Inhibitors

4: Measure the Social and Economic Impact

qualitative responses of the participants as well as objective evidence of how solar energy functioned under specific policies.

The study attained its goals by applying both primary and secondary sources of data.

## **Data Sources**

Primary Data: This source involved data collected directly from the stakeholders in the field through direct interviews, surveys, and focus group discussions. The concerned stakeholders were:

Government officials: To get an insight into solar policy intentionality, implementation challenges,

and effectiveness.

Solar project developers: To determine their experience with government incentives, perceived limitations, and availability of funds.

Farmers and rural households: To determine their knowledge of solar policies, their effect on livelihood by generating solar energy, and limitations to using solar technology.

Financial institutions: To analyze their extent and coverage in offering financial products for undertaking solar energy projects in rural regions.

Secondary Data: It comprised government reports and studies, policy documents, and other research studies that could be accessed from renewable energy organizations. The significant sources were: Policy documents of the Ministry of New and Renewable Energy (MNRE), particularly those related to the National Solar Mission, PM-KUSUM scheme, and the Maharashtra Solar Policy.

#### Sampling

The research used a purposive sampling method when choosing interviewees and participants in focus group discussions.

This allowed the most important key stakeholders involved in solar projects, especially those with previous experience regarding government incentives and funding of solar energy, to be included.

## **Data Collection Methods**

- Surveys
- Interviews

#### **Data Analysis**

Quantitative Data Analysis

The research collected quantitative data with the help of questionnaires and processed it through a statistical package, either SPSS or Excel. The descriptive analysis involved:

Descriptive statistics: Mean, median, and frequency to define household data with regard to solar energy adoption and associated barriers.

Correlation analysis: In order to identify the correlation between the major variables like income levels, solar energy adoption, ease of access to finance, and knowledge of government policy.

Regression analysis: In order to identify whether government incentives facilitated the use of solar energy in rural regions.

The quantitative findings helped answer research questions related to financing and socio-economic effects of the adoption of solar energy projects.

# Qualitative Data Analysis

The research employed thematic analysis to examine qualitative data collected from interviews and focus group discussions. This entailed coding the data into themes in accordance with the research goals. Some of the major themes that emerged were:

Effectiveness of government policies and incentives.

Challenges in accessing government support, whether financial, administrative, or technical.

Advantages and challenges faced by users of solar energy in rural communities.

The thematic analysis yielded a close examination of the experiences of the stakeholders, gaining insights into variables that would promote the success of solar energy initiatives in Vidarbha's countryside.

#### **Research Questions**

- 1. Have government incentives reduced the initial cost of solar installations for your project?
- 2. If you have applied for government funding, how would you rate the transparency of the approval process?
- 3. Do you think current government policies are sufficient to promote solar energy adoption in rural areas?
- 4. How adequate do you find the financial assistance (subsidies, loans, grants) provided by the government for solar energy projects?
- 5. Have you experienced delays in receiving government financial support for solar projects?

## **Result And Discussion**



Positive Contribution: A total of 43.3% (Agree + Strongly Agree) feel that incentives provided by the government have assisted in lowering the upfront expense of solar installations.

Neutral Perspective:The majority (45%) of the respondents are neutral, pointing out that there are some incentives but perhaps not highly effective or made generally available.

Negative Perception: Only 10% disagree and an extremely small percentage strongly disagree, indicating that there is a minority opinion that incentives are ineffective or not enough.

Government incentives have had a moderate positive impact, with 43.3% of respondents acknowledging some cost reduction. However, the large neutral percentage suggests that many participants may not have observed a direct benefit or find the incentives to be neither substantial nor ineffective. Policymakers may need to enhance awareness, accessibility, or effectiveness of these incentives to increase their impact on solar project costs.



Majority are Neutral: The majority (51.7%) is neutral, which means that respondents neither rate the process as entirely transparent nor entirely opaque. This means that the approval process might be irregular or lacks clarity in some places.

MixedPerceptions: Though 21.7% considered it to be good, a high 22-23% (Very Poor + Poor) were dissatisfied. This indicates that although some perceive it to be transparent, others find it difficult.

Low Ratings for Excellence: Very few respondents rated the process as "Excellent," implying that there is room for improvement in making the process more accessible, clear, and efficient.

The government funding approval process has moderate transparency, but there is a lack of strong positive perception. More than half of the respondents remain neutral, suggesting a need for greater clarity and efficiency. Meanwhile, the 22-23% dissatisfaction rate indicates that improvements in communication, documentation clarity, and procedural transparency could enhance user confidence.

Sufficiency of Government Policies for Solar Adoption in Rural Areas



Most are Neutral: Over half of the population (53.3%) is still neutral, being uncertain whether government policies are effective in encouraging solar energy usage.

Positive Attitude: 26.6% (Strongly Agree + Agree) perceive that existing policies are adequate.

There are Concerns: Approximately 15-16% (Disagree + Strongly Disagree) show discontent, implying that the policies can be further improved with regard to accessibility, economic benefits, or publicity.

The response suggests that while some people find government policies effective, a significant proportion remains unconvinced or uncertain about their impact. This indicates a need for better implementation, awareness campaigns, and possibly policy enhancements to increase confidence and adoption rates in rural areas



Mixed Views: Answers are evenly divided between those that are neutral (35%) and those that consider it sufficient (35%). This suggests that financial support is partially effective but maybe not enough for everyone involved.

There Are Concerns: 25% of the people consider that the support is not enough, meaning there are concerns about accessibility, adequacy, or knowledge of sources of finance.

Only Very Few Find It Excellent: Few (~5%) rate financial aid as very sufficient, suggesting there is potential to enhance the financial aid system.

The findings suggest that government financial assistance for solar energy projects is moderately effective but not universally sufficient. Improvements in funding accessibility, awareness campaigns, and possible increases in subsidies or grants could enhance its impact.

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Regular Delays Occur: The majority (41.7%) has had delays "sometimes," with another 16.7% having delays frequently. This would indicate that financial support delays are a widespread problem. Variable Experiences: While 30% have seldom encountered delays, just 11.7% report never having

experienced problems. This would mean that while some beneficiaries

receive prompt support, delays are still a regular occurrence.

Minimal Continuous Delays: Lack of strong responses in the "Always" category indicates that delays are not consistent for all projects but are irregular.

The responses indicate that government financial support for solar projects often faces delays, impacting project timelines. Addressing bureaucratic inefficiencies, streamlining fund disbursement, and improving transparency could enhance the process.

# Suggestions

Justification: In the study, the absence of awareness among rural beneficiaries regarding solar policies and incentives was brought into perspective. Government-led awareness exercises, workshops, and outreach initiatives at the village level can ensure the bridging of this information gap.

Implementation: The government should partner with local NGOs, self-help organizations, and panchayats to make available to rural society details of offered subsidies and modes of financing. Justification: Government procedures were found to be cumbersome by many solar project

developers and rural families, deterring adoption. Implementation: A single-window clearance system, digitalized, and streamlined should be implemented to eliminate red tape and ensure efficient disbursal of subsidy. Increasing Financial Support and Alternative Financing Models

Justification: Financial institutions were found to have limited reachability in providing credit solutions to rural families and small-scale solar developers. Implementation: Low-interest loans, microfinance programs, and risk-sharing schemes can be launched by the government to promote investment in solar energy. Private sector collaborations may further enhance funding prospects.

Fostering Public-Private Partnerships (PPP)

Rationale: The research indicated that policies exist on the government's side but are faced with

execution issues because of the absence of private sector involvement.

Implementation: A PPP model can improve efficiency, investment, and technical assistance for solar energy projects, making the model sustainable in the long term.

Policy Improvements for Improved Incentive Frameworks

Rationale: The study identified that some policies, such as PM-KUSUM, require improvements to enhance their efficiency in rural areas.

Implementation: Updating subsidy frameworks based on actual challenges, including increased initial costs, maintenance assistance, and land availability, would simplify solar adoption.

## Conclusion

This study exhaustively examined the role of government policies in the adoption of solar power in rural regions using both qualitative and quantitative approaches. The research showed that though government schemes such as the National Solar Mission and PM-KUSUM scheme offer a robust policy environment, the efficiency of their implementation is impaired by bureaucratic inefficiencies, funds constraints, and poor awareness among beneficiaries.

Through a combined strategy of primary data collection and secondary research, the study validated that effective policymaking does not only demand financial incentives but also efficient processes, engaged stakeholder involvement, and sound financial models. A major takeaway is that a multi-faceted approach—entailing policy streamlining, financial innovation, and more effective public-private partnerships—can greatly drive solar energy adoption in rural communities.

By overcoming these obstacles and taking advantage of opportunities, India is able to expand rural electrification, ensure sustainability, and provide a model for renewable energy growth that will help the economy as well as society in general.

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