

Shaping Rural Energy Futures: The Role of Global Institutions in Clean Energy Adoption in India

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<https://doi.org/10.55041/ijstmt.v2i3.398>

Cite this Article: Chourasiya, R. (2026). Shaping Rural Energy Futures: The Role of Global Institutions in Clean Energy Adoption in India. *International Journal of Science, Strategic Management and Technology*, 02(03). <https://doi.org/10.55041/ijstmt.v2i3.398>

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Abstract

The global transition toward clean energy is increasingly shaped by international institutions such as the World Economic Forum, which influence policy narratives, investment priorities, and governance frameworks. This paper examines how such global institutions shape clean energy adoption in rural India using recent data (2024–2026) and an econometric approach.

India has witnessed rapid growth in renewable energy capacity, particularly solar, yet rural adoption remains uneven. The study finds that while global institutions play a critical role in agenda-setting and mobilizing finance, the effectiveness of clean energy adoption in rural areas is mediated by local institutional capacity, socio-economic constraints, and political incentives.

An econometric model is developed to analyze the determinants of rural clean energy adoption, incorporating variables such as income, subsidies, infrastructure, and policy influence. The results reveal that income levels, government subsidies, and institutional effectiveness significantly affect adoption rates. The paper concludes that bridging the gap between global narratives and rural realities requires localized policy interventions and strengthened governance.

Keywords: Clean Energy; Rural India; Political Economy; Global Institutions; Solar Energy; World Economic Forum;

Introduction

The global energy landscape is undergoing a transformative shift from fossil fuel-based systems to renewable and sustainable energy sources. This transition is largely driven by international commitments to combat climate change and achieve sustainable development goals. Global institutions such as the World Economic Forum, the World Bank, and the International Energy Agency have played a crucial role in shaping the discourse around clean energy transitions (Stauffer, 2020).

In developing countries like India, rural areas represent both a challenge and an opportunity in this transition. Despite achieving near-universal electrification, the quality, reliability, and sustainability of energy access remain critical concerns. Rural India still faces issues such as intermittent power supply, dependence on traditional biomass, and limited access to modern energy technologies (Nirmala, 2026).

Global institutions influence national energy policies through knowledge dissemination, financial support, and policy advocacy. However, the translation of these global narratives into local realities is neither straightforward nor uniform. The effectiveness of such policies depends on domestic political economy factors, including governance structures, institutional capacity, and socio-economic conditions (Malaviya, 2025).

This paper seeks to analyze the role of global institutions in shaping clean energy adoption in rural India. It adopts a political economy perspective to understand how power relations, incentives, and institutional frameworks influence the implementation of clean energy initiatives at the grassroots level.

The global push for clean energy has intensified due to climate commitments and sustainability goals. Institutions such as the World Economic Forum play a significant role in shaping discourse through policy advocacy and global cooperation platforms.

India has emerged as a key player in renewable energy. As of 2026:

- Total renewable energy capacity reached ~267 GW, with solar contributing 144 GW
- Solar capacity increased dramatically from 3 GW in 2014 to ~140 GW in 2026
- Renewable energy now accounts for over 26% of total power generation (MNRE, 2026)

Despite this progress, rural India still faces challenges such as unreliable electricity, dependence on biomass, and affordability constraints.

Programs like rooftop solar schemes have expanded access:

- 24 lakh households adopted rooftop solar by 2025
- PM Surya Ghar Yojana Drives Energy Transition: 9.56 GW Rooftop Solar Capacity Added till March 2026
- Off-grid solar market expected to grow at 10.7% CAGR (2025–2033) (MNRE, 2026)

This paper explores how global clean energy narratives translate into rural adoption outcomes through a political economy lens.

Review of Literature

2.1 Global Institutions and Policy Influence

Global institutions act as key drivers of policy diffusion by promoting norms, standards, and best practices. The World Economic Forum has emerged as a major platform for public-private collaboration, emphasizing clean energy investments and sustainable development. Studies suggest that such institutions influence national policies by shaping agendas and providing financial and technical support (Ganeshan & Bhattacharjya, 2022).

2.2 Political Economy of Energy Transition

Energy transitions are inherently political processes involving multiple stakeholders with competing interests. Scholars argue that policy outcomes are shaped by power dynamics, institutional arrangements, and economic incentives. Governments often face trade-offs between economic growth, environmental sustainability, and political considerations (Jaspal, 2023) (Nagoji, 2025).

2.3 Clean Energy in Rural India

Research on rural energy systems highlights the importance of decentralized renewable energy solutions such as solar microgrids and rooftop solar systems. While these technologies have the potential to improve energy access, their adoption is constrained by factors such as affordability, lack of awareness, and inadequate infrastructure (Pandey, Ghosh, Das, Mandol, & Upadhyay, 2026).

2.4 Research Gap

Although existing literature examines global institutions and rural energy separately, there is limited integration of these perspectives. This study addresses this gap by analyzing how global clean energy narratives interact with local socio-economic and political realities in rural India.

Objectives of the Study

1. To analyze the role of global institutions in shaping clean energy narratives.
2. To assess the effectiveness of clean energy adoption in rural areas.
3. To identify political, economic, and institutional barriers to implementation.
4. To suggest policy measures for improving clean energy outcomes in rural India

Methodology

4.1 Research Design

This study adopts a mixed-method research design combining both qualitative and quantitative approaches to comprehensively analyze the role of global institutions in shaping clean energy adoption in rural India.

4.2 Data Sources

The qualitative component is based on policy analysis, involving a systematic review of government documents, policy frameworks, and reports issued by national agencies as well as global institutions such as the World Economic Forum and the World Bank. This helps in understanding how global clean energy narratives are formulated and incorporated into India's policy environment. In addition, a case study approach is employed, with particular reference to Madhya Pradesh, to capture regional variations and ground-level implementation challenges. The quantitative component relies on secondary data collected from government sources such as MNRE and PIB, along with international datasets.

4.3 Econometric Model Specification

To empirically examine the determinants of clean energy adoption in rural areas, the study employs an econometric approach using a multiple regression model. In this model, clean energy adoption is treated as the dependent variable, while key independent variables include rural household income, government subsidies, infrastructure availability, institutional effectiveness, and awareness levels. The functional form of the model is expressed as:

The study uses a multiple regression model:

$$CEA_i = \beta_0 + \beta_1 INC_i + \beta_2 SUB_i + \beta_3 INF_i + \beta_4 INST_i + \beta_5 AWARE_i + \varepsilon_i$$

where CEA represents clean energy adoption, INC denotes income, SUB refers to subsidies, INF indicates infrastructure, INST captures institutional quality, AWARE reflects awareness levels, and ε is the error term. The model is estimated using standard regression techniques to identify the magnitude and significance of each factor (Berry & Feldman, 2011).

Overall, the methodology is grounded in a political economy framework, enabling the study to integrate institutional analysis with empirical evidence, thereby providing a holistic understanding of how global narratives translate into local outcomes in rural India.

4.4 Variable Description

Table 1- Variable Description.

Variable	Description
CEA	Clean Energy Adoption (households using solar/renewables)
INC	Rural household income
SUB	Government subsidy
INF	Infrastructure availability
INST	Institutional effectiveness
AWARE	Awareness level

Source: By Author.

4.5 Expected Signs

B1 > 0 (Income increases adoption)

B2 > 0 (Subsidy increases adoption)

B3 > 0 (Infrastructure improves access)

B4 > 0 (Better governance → higher adoption)

B5 > 0 (Awareness increases usage)

Results and Discussion

5.1 Role of Global Institutions

Global institutions play a crucial role in shaping clean energy narratives by promoting sustainability and climate action. The World Economic Forum, for instance, emphasizes the importance of renewable energy investments and public-private partnerships. These narratives influence national governments to adopt ambitious clean energy targets and policies.

5.2 Influence on National Policies

India's energy policies reflect global commitments, including increased investment in solar and wind energy. Government initiatives such as rural electrification and renewable energy promotion align with global sustainability goals. However, the adoption of these policies is influenced by domestic political priorities, including electoral considerations and economic constraints.

5.3 Rural Implementation Challenges

Despite policy support, rural implementation faces several challenges:

- Inadequate infrastructure
- High initial costs of renewable technologies
- Limited access to finance
- Lack of technical expertise
- Low awareness among rural households

5.4 Political Economy Constraints

The study finds that political economy factors significantly influence outcomes:

- Resource allocation often favors urban areas
- Subsidies may be unevenly distributed
- Local governance institutions may lack capacity

These factors create disparities in clean energy adoption across regions.

5.5 Gap Between Narratives and Reality

A key finding is the disconnect between global clean energy narratives and ground-level realities. While global institutions advocate inclusive and sustainable development, rural areas often struggle with basic implementation challenges. This gap highlights the need for context-specific policies that consider local socio-economic conditions.

5.6 Empirical Trends

- Renewable capacity grew rapidly, reaching 250+ GW by 2025
- Solar dominates with over 50% of renewable capacity
- Rural adoption rising due to government schemes and subsidies

5.7 Econometric Findings (Interpretation)

Figure 1- Determinants of Clean Energy Transition.



Source: By Author.

The regression results indicate:

1. Income (INC): Positive and significant - Wealthier households adopt solar faster
2. Subsidy (SUB): Strong positive effect - Government schemes crucial for rural adoption
3. Infrastructure (INF): Significant - Grid connectivity + storage improve adoption
4. Institutional Quality (INST): Highly significant- Local governance capacity is critical
5. Awareness (AWARE): Moderate effect - Awareness campaigns increase adoption

5.7 Political Economy Insights

- Policy benefits often captured by better-off regions
- Rural areas face credit constraints and information gaps
- Elite capture and administrative inefficiency affect implementation

Conclusion

This study demonstrates that global institutions such as the World Economic Forum play a vital role in shaping clean energy narratives and influencing national policy frameworks. However, the translation of these narratives into rural outcomes depends heavily on domestic political economy conditions.

Recent data shows that India has made remarkable progress in renewable energy capacity, especially solar. However, rural adoption remains uneven due to structural constraints.

The econometric analysis confirms that income, subsidies, infrastructure, and institutional quality are key determinants of clean energy adoption. Among these, subsidies and institutional effectiveness emerge as the most critical factors.

Policy Recommendations

- Strengthen rural institutions and governance
- Expand targeted subsidies for low-income households
- Promote decentralized renewable systems (solar microgrids)
- Increase awareness and technical training

- Improve rural infrastructure and financing access

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