

Vishwang Desai: Top Challenges to India's Solar and Wind Power Projects

Vishwang Desai: Land acquisition, grid issues, and policy shifts are key hurdles to India's solar & wind projects. Overcoming them is vital for clean energy growth.

Mumbai, Maharashtra Feb 16, 2025 ([IssueWire.com](https://www.issuewire.com)) - Vishwang Desai: Top Challenges to India's Solar and Wind Power Projects

India's ambitious renewable energy targets have propelled the country to the forefront of the global clean energy transition. However, as the nation strives to achieve 500 GW of non-fossil fuel capacity by 2030, the solar and wind power sectors face a complex web of challenges that threaten to impede this monumental undertaking.

1) Land Acquisition: A Thorny Path

The quest for suitable land remains a paramount obstacle for both solar and wind projects. In a country with high population density and competing land uses, securing large contiguous parcels is increasingly difficult. Solar projects, requiring 4-5 acres per MW, face particularly acute challenges in identifying flat terrain with high solar irradiance. Wind projects, necessitating specific topographical features, encounter similar hurdles.

The legal framework surrounding land acquisition further complicates matters. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR Act), while well-intentioned, has introduced additional layers of complexity. The Act's provisions for social impact assessments and consent requirements, though crucial for protecting landowner rights, often result in protracted negotiations and inflated costs.

Moreover, the fragmented nature of land ownership in India necessitates dealing with multiple stakeholders, each with their own set of demands and expectations. This not only increases transaction costs but also introduces significant delays in project timelines. The situation is further exacerbated by unclear land titles and ongoing disputes, which can mire projects in lengthy legal battles.

2) Grid Integration: A Balancing Act

The intermittent nature of solar and wind power poses significant challenges for grid stability and management. India's aging grid infrastructure, designed primarily for conventional power sources, struggles to accommodate the variable output of renewable energy sources. This leads to issues such as voltage fluctuations, frequency deviations, and reactive power management problems.

The technical challenges are compounded by regulatory and operational hurdles. The lack of accurate forecasting and scheduling systems often results in grid operators resorting to curtailment, leading to significant revenue losses for project developers. The absence of a robust ancillary services market further hampers the grid's ability to manage the variability of renewable sources.

Moreover, the mismatch between renewable resource-rich areas and load centers necessitates substantial investments in transmission infrastructure. The Green Energy Corridors project, while a step in the right direction, has faced its own set of implementation challenges and delays.

3) Financial Constraints: The Capital Conundrum

Despite the falling costs of solar and wind technologies, financing remains a significant hurdle for many projects. The high upfront capital requirements, coupled with the perceived risks associated with renewable projects, often result in higher costs of debt compared to conventional power projects.

The financial health of distribution companies (DISCOMs) adds another layer of complexity. Many DISCOMs, burdened by legacy debts and inefficiencies, struggle to meet their payment obligations to renewable energy generators. This payment uncertainty increases the risk perception among lenders and investors, leading to higher financing costs and, in some cases, making projects unviable.

The sector also grapples with the challenge of long-term financing. While renewable projects typically have a lifespan of 25-30 years, most financial institutions in India are reluctant to provide loans beyond 10-15 years. This mismatch in tenure creates refinancing risks and impacts the overall project economics.

4) Policy Uncertainty: Navigating Shifting Sands

The renewable energy sector in India has been subject to frequent policy changes and regulatory flip-flops, creating an environment of uncertainty for developers and investors. The sudden imposition of safeguard duties on imported solar modules, changes in net metering policies, and attempts by some states to renegotiate signed Power Purchase Agreements (PPAs) have eroded investor confidence.

The lack of a comprehensive renewable energy law at the national level has resulted in a patchwork of regulations across states, creating additional complexities for developers operating in multiple jurisdictions. The overlapping and sometimes conflicting mandates of central and state agencies further complicate the regulatory landscape.

5) Manufacturing and Supply Chain Challenges

India's heavy reliance on imported solar modules and wind turbine components exposes the sector to supply chain vulnerabilities and geopolitical risks. The government's push for domestic manufacturing through initiatives like the Production Linked Incentive (PLI) scheme, while laudable, faces its own set of challenges.

The domestic manufacturing ecosystem for critical components such as solar cells, wafers, and wind turbine blades remains underdeveloped. The lack of scale, coupled with higher input costs and lower technological capabilities, makes it difficult for Indian manufacturers to compete with global players, particularly those from China.

6) Environmental and Social Concerns

As renewable energy projects expand into new territories, they increasingly face environmental and social challenges. Large-scale solar projects in ecologically sensitive areas have raised concerns about habitat destruction and biodiversity loss. Wind farms, particularly in coastal areas, face opposition due to their potential impact on bird migration routes and local ecosystems.

The Supreme Court's directive on undergrounding transmission lines in certain areas to protect the Great Indian Bustard highlights the growing tension between renewable energy development and conservation efforts. Balancing these competing priorities will require nuanced policy-making and

innovative technological solutions.

In conclusion, while India's renewable energy journey has been impressive, the path ahead is fraught with challenges. Addressing these multifaceted issues will require a coordinated effort from policymakers, regulators, industry players, and financial institutions. As the sector matures, it must evolve from a subsidy-driven model to one that is economically viable and environmentally sustainable in the long term. Only then can India truly harness its vast renewable potential and lead the global transition to a clean energy future.

To explore more insights on India's renewable energy challenges, click here:
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