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Renewable Energy Investment Trends in Emerging Markets: 2015–2025

Harshvardhan Sanjay Nikam[1,2*]; Aniket Suresh Nikam[2,3]; Avinash Somatkar[1,2]

[1]Mechanical Engineering, Vishwakarma Institute of Information Technology, Kondhwa Bk., Street, Pune, 411048, Maharashtra, India
[2]Electrical Engineering, Dr. D. Y. Patil Institute of Engineering Technology, Street, Pune, Maharashtra, India

Corresponding Author Harshvardhan Sanjay Nikam

These Authors Contributed Equally to this Work

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Abstract: The global transition to renewable energy has gained significant momentum over the past decade, particularly in emerging markets. Between 2015 and 2025, renewable energy investments in these regions have surged, driven by falling tech- nology costs, international climate commitments, and increasing energy demand. This paper examines investment trends in key emerging economies—including India, Brazil, Vietnam, South Africa, and Kenya—across solar, wind, hydro, and bioenergy sectors. Using data from IRENA, Bloomberg NEF, and the IEA, we analyze growth trajectories, financing sources, policy impacts, and technological preferences. Challenges such as political instability, grid constraints, and financ- ing risks are also explored. The paper concludes with insights into the post-2025 investment outlook and strategic recommendations to enhance capital flow and project deployment in developing regions.

Keywords: *Energy, Solar.*

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I. INTRODUCTION

Renewable energy is increasingly recognized as a cornerstone for sustainable economic growth and climate resilience, particularly in emerging economies facing both energy shortages and environmental challenges. Emerging markets accounted for over half of global renewable energy investment in recent years, with strong activity in Asia, Africa, and Latin America. This paper analyzes trends in renewable energy investment from 2015 to 2025, focusing on market dynamics, capital sources, technology adoption, and policy frameworks across selected emerging economies. By understanding these patterns, stakeholders can identify successful models and critical barriers to further progress.

II. METHODOLOGY

➢ *This Study is Based on Secondary Data Collected from:*

- IRENA (International Renewable Energy Agency)
- Bloomberg New Energy Finance (BNEF)
- World Bank and IFC reports
- IEA World Energy Outlook

Data were reviewed across a 10-year window (2015–2025), categorized by country, tech- nology, and investment type (public, private, or multilateral). Qualitative insights from peer-reviewed articles and government publications supplement quantitative analysis.

➢ *Investment Trends Overview (2015–2025)*

- *Global and Emerging Market Investment Growth*

From $260 billion in 2015, global renewable energy investments reached over $500 billion in 2023. Emerging markets contributed nearly 55% of total renewable energy capacity additions by 2022. Major contributors include:

✓ India: Rapid solar deployment under the National Solar Mission.
✓ Brazil: Wind and hydro investments led by local and foreign investors.
✓ Vietnam: Surging solar installations due to favorable FITs.
✓ South Africa & Kenya: Leadership in wind and solar

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backed by IPPs and donor funding.

- *Technology-Specific Investments*

✓ Solar PV: Most funded, especially in India, Vietnam, and Brazil.
✓ Wind: Growth in Brazil, South Africa, and Turkey.
✓ Bioenergy: Dominant in Indonesia and Brazil, leveraging agricultural residues.
✓ Hydropower: Continued relevance in Africa (Ethiopia, Zambia).

➢ *Sources of Investment and Finance*

- *Private Sector*

Private capital dominates in large-scale utility projects. Domestic conglomerates (e.g., Adani in India) and foreign direct investment (FDI) have been critical.

- *Multilateral & Development Finance*

Institutions like the World Bank, IFC, and ADB provided concessional loans and guarantees to de-risk projects.

- *Green Bonds*

Green bond issuance in emerging markets rose from $6 billion in 2016 to $40 billion in 2022, led by India, Chile, and South Africa.

- *Public Investment*

Government-backed initiatives like India's SECI, Vietnam's MoIT subsidies, and Brazil's PROINFA program supported early-stage project deployment.

➢ *Policy Enablers and Challenges*

- *Key Policy Drivers*

✓ Feed-in Tariffs (FiTs): Attracted private investors in Vietnam and Thailand.
✓ Renewable Energy Auctions: Lowered costs in India, Brazil, and South Africa.
✓ Tax Incentives and Subsidies: Boosted manufacturing and deployment.
✓ International Climate Commitments: NDCs under the Paris Agreement acted as investment signals.

- *Challenges*

✓ Political instability and policy uncertainty.
✓ Currency fluctuations and high cost of capital.
✓ Limited grid infrastructure and interconnection delays.
✓ Regulatory bottlenecks and land acquisition issues.

➢ *Regional Analysis*

- *Asia (India, Vietnam, Philippines)*

✓ India added over 120 GW of RE from 2015–2023.
✓ Vietnam experienced a solar boom (13 GW in 2 years) driven by aggressive FiTs.

- *Africa (Kenya, South Africa, Egypt)*

✓ Kenya's Lake Turkana Wind Farm (310 MW) is Africa's largest.
✓ South Africa's REIPPPP attracted over $20 billion in private capital.

- *Latin America (Brazil, Chile, Argentina)*

✓ Brazil's wind auctions yielded some of the lowest global tariffs.
✓ Chile's liberalized market attracted international green bond investors.

➢ *Post-2025 Outlook*

- *Key Future Trends Include:*

✓ Rise of green hydrogen in Africa, MENA, and India.
✓ Growth in decentralized energy systems (mini-grids, rooftop solar).
✓ Increased use of AI for grid forecasting and demand optimization.
✓ Expansion of climate finance and blended capital instruments.

III. CONCLUSION

Emerging markets are playing a transformative role in the global energy transition. Investment trends from 2015 to 2025 show significant progress but also expose systemic challenges. Addressing financing barriers, improving grid infrastructure, and ensuring policy consistency will be critical. Future growth will depend on innovative business models, international collaboration, and climate-aligned financial instruments.

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