



Renewable Energy Policies and Implementation in Africa

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Abstract

Africa’s renewable energy sector is at a pivotal crossroads, balancing enormous untapped resource potential with dynamic policy transformations and persistent implementation challenges. This article critically reviews the current policy landscape, major implementation pathways, regional progress, barriers, and future outlooks. By synthesizing data and case studies—supported by recent graphs and tables—the report provides a comprehensive analysis of how solar, wind, hydropower, and emerging green hydrogen initiatives are shaping the continent’s sustainable energy future.

Introduction

Africa holds more than 60% of the world’s best solar resources and significant wind, hydro, geothermal, and biomass potential, yet accounts for just a fraction of global renewable energy production. As the continent confronts rapid population growth, economic development imperatives, and climate impacts, renewable energy policies and their on-the-ground implementation are central to the region’s development agenda and climate commitments. This paper explores the drivers, breakthroughs, leading policies, and key challenges in Africa’s renewable energy transition.

Trends in Renewable Energy Policy and Investment

Policy Landscape

- **Continental Vision:** The African Union’s Agenda 2063 and the Africa Renewable Energy Initiative (AREI) aim to drive universal access, strengthen regional power pools, and triple renewable energy capacity by 2030^{[1][2]}.
- **National Policies:** Over 40 countries now have official renewable energy targets, feed-in tariffs, and/or auction mechanisms to encourage investment.
- **Major Campaigns:** The “Scaling Up Renewables in Africa” and “Mission 300” pledging campaigns coordinate efforts to provide electricity to 300 million Africans by 2030^[2].

Investment Growth and Gaps

- Africa’s renewable energy capacity has grown by 24% annually since 2020, with South Africa, Morocco, Egypt, and Kenya leading solar and wind project investments^[3].
- Notably, despite this rapid growth, Africa attracts only 3% of global energy investment—well short of the estimated \$200 billion annually needed to reach both energy access and climate targets^{[4][2]}.

Year	Installed Renewable Capacity (GW)	Annual Growth (%)
2019	12.6	-
2023	36.4	24
2025	51.2 (projected)	~20

Table 1: Growth in Africa’s renewable energy capacity 2019–2025^{[5][3]}.

Key Renewable Energy Technologies and Implementation

Solar Energy

- Africa’s 482,000 GW of technical solar potential is largely untapped, with just 2.4 GW added in 2024^{[4][6]}.
- South Africa, Egypt, and Morocco lead in utility-scale installations; 18 countries are expected to add ≥100 MW of new solar in 2025, up from two in 2024.



- Initiatives such as the Noor Solar Complex in Morocco (580 MW) and South Africa’s REIPPPP (6,000 MW added) set successful blueprints for scaling solar capacity^{[3][7]}.

Wind Energy

- Wind resources are abundant, especially along coastal regions and in countries like Kenya, Egypt, and South Africa.
- The Lake Turkana Wind Power Project (310 MW) is Africa’s largest, supplying power to 200,000 Kenyan homes.
- Wind capacity remains below potential due to financing, grid integration, and policy hurdles^[3].

Hydropower

- Ethiopia’s Grand Renaissance Dam and several other large-scale hydro plants add significant baseload power, though they also spark regional water politics.
- Hydropower remains vital for both national grids and transboundary energy trade across the continent^{[3][2]}.

Geothermal and Emerging Sectors

- Kenya is a continental leader in geothermal, set to surpass 1,000 MW by 2025^[4].
- New frontiers include the development of green hydrogen (notably in West Africa), with global investors highlighting its future export and domestic decarbonization potential^[9].

Africa’s Major Renewable Energy Policies and Case Studies

Country	Policy/Initiative	Outcome/Notes
Morocco	“Plan Solaire”, Noor Complex	Leading solar export, 1 million+ homes powered
South Africa	REIPPPP	\$16b investment, >6 GW added, private-driven
Kenya	Feed-in tariffs, Lake Turkana	Wind/Geo leadership, 75% renewables in mix
Egypt	Green energy auctions	3 GW in solar/wind, 9.2 GW pipeline
Ethiopia	National energy targets, hydro	Largest dam (6 GW, regional integration)
Nigeria	Mini-grid regulations	Expanding rural solar, commercial pilots

Regional Collaborations & Power Pools

- The “Desert to Power” initiative aims to electrify 250 million people in the Sahel by 2030.
- Power pool integration, such as the Southern and Eastern Africa Power Pools, is fostering regional grid investments and reliability^{[10][2]}.

Barriers and Challenges

- **Financing:** Accessing affordable capital remains the paramount challenge; capital costs are 3–7× higher in Africa than in developed countries^[4].
- **Grid Integration:** Weak transmission infrastructure hinders large-scale renewable expansion and regional energy trade.
- **Policy Implementation:** Fragmented frameworks, bureaucratic delays, and occasional policy reversals dampen private investment.
- **Equity:** Centralized large-scale projects risk sidelining rural and marginalized communities, necessitating inclusive approaches with decentralized, off-grid solutions^[11].

Social, Economic, and Environmental Impacts

- **Job Creation:** Scaling renewables can spur millions of new jobs in construction, operations, and supply chains, especially as market diversification increases^[4].
- **Economic Diversification:** Countries increasingly see renewables as anchors for emerging industries (e.g., green hydrogen, e-mobility, localized manufacturing)^{[4][9]}.



- **Climate Resilience:** Shifting to renewables reduces emissions, improves air quality, and strengthens energy security by decreasing fossil fuel imports.
- **Energy Access:** Decentralized solar and mini-grids are crucial for bridging the access gap for over 600 million people lacking reliable electricity^{[1][11]}.

Data Visualizations

Figure 1: Leading African Renewable Energy Projects (2025)

Country	Project	Capacity (MW)	Impact
Morocco	Noor Solar Complex	580	1 million homes powered
South Africa	REIPPPP Projects	6,000+	Grid diversification
Kenya	Lake Turkana Wind Project	310	200,000 homes powered
Ethiopia	Grand Renaissance Dam	6,000	Regional trade, integration ^[3]

Figure 2: Projected Renewable Energy Capacity in Africa (2023–2025)

Year	Capacity (GW)
2023	36.4
2025	51.2

Africa's installed renewable capacity is on track for a fivefold increase by 2030, with solar and wind leading new additions^{[5][3][4]}.

Future Trajectories and Policy Recommendations

1. **Expand Policy Stability:** Maintain firm national and regional targets, strengthen regulatory frameworks, and streamline approvals.
2. **Mobilize Finance:** Scale innovative financing (blended finance, de-risking mechanisms), catalyze private sector investment, and leverage global funding streams^{[4][2]}.
3. **Grid & Off-Grid Synergy:** Invest in robust transmission as well as decentralized mini-grid and off-grid solar solutions to maximize access and resilience^{[1][4]}.
4. **Local Manufacturing & Capacity Building:** Foster local supply chains, skills training, and research to retain added value and support local economies^[6].
5. **Inclusive Implementation:** Prioritize inclusive energy planning that involves local communities, supports distributed generation, and protects environmental and land rights^[1].

Conclusion

Africa's renewable energy transition is accelerating, characterized by ambitious policy commitments, breakthrough projects, and regional collaborations. While challenges in financing, infrastructure, and implementation persist, the continent holds the world's greatest unexploited clean energy opportunity. To unlock this potential and secure a sustainable, equitable energy future, Africa must double down on stable policy frameworks, innovative financing, decentralization, and human capital investment.

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