AFREC

African Energy Commission

SECURING AFRICA'S ENERGY FUTURE

AFRICA SUSTAINABLE DEVELOPMENT GOAL 7

2025 REPORT

African Union

www.au-afrec.org

ACKNOWLEDGEMENT

The 2025 Africa Sustainable Development Goal 7 Report presents a comprehensive assessment of Africa's progress toward ensuring access to affordable, reliable, sustainable, and modern energy for all by 2030. The report covers the period from 2017 to 2023 and highlights notable achievements, persistent challenges, and critical opportunities for the continent's energy future. Although Africa has made significant strides, particularly in expanding electricity access and initiating the renewable energy transition, progress remains insufficient to meet the SDG7 targets within the established timeframe.

The report was prepared under the leadership of Rashid Ali Abdallah, Executive Director at the African Energy Commission (AFREC), with overall coordination led by Samson Nougbodohoue, head of the Energy Information Systems and Statistics Division (EISS). The technical development of the report was led by Gbaty Tiadja, while Abdoulaye Oueddo, Salome Maheya, George Sichinga, Awa Cheikh and Beza Syum provided continuous support to Member States and stakeholders throughout the process.

This report was made possible with the support of AFREC focal points from Ministries of Energy and National Statistics Offices of the 55 African Union Member States. AFREC would like to express its deep gratitude to the focal points who spared no effort in providing data to AFREC to produce this report. Lastly, AFREC would like to acknowledge the dedication of Sharmila Bellur, Senior consultant who supported the delivery of technical objectives and ensured that the report reflects African realities of implementation of SDG7.

FOREWORD

The need for Africa to accelerate progress toward Sustainable Development Goal 7 (SDG 7) " by ensuring access to affordable, reliable, sustainable, and modern energy for all" has never been more urgent. SDG 7 is a cornerstone for achieving the broader 2030 Agenda for Sustainable Development and the Agenda 2063 targets for Africa.

Africa is endowed with abundant energy resources but over 500 million people still lack access to electricity, and nearly 900 million rely on polluting traditional biomass for cooking. As the continent experiences rapid population growth and urbanization, the demand for energy is rising sharply. This energy poverty stifles education, healthcare, livelihoods, and gender equality fuelling cycles of inequality and poses significant barriers to economic progress, social development, and environmental sustainability. Africa has immense potential to leapfrog outdated energy systems and transition to a future powered by clean, inclusive, and innovative solutions that align with global climate commitments.

This publication presents an in-depth assessment of Africa's progress toward SDG 7 from 2017 to 2023 and highlights achievements, challenges, and opportunities for the continent's energy future highlighting success stories, persistent gaps, and the innovative approaches being adopted by member states' governments, the private sector, and communities. It underscores the critical role of partnerships, investment, and policy coherence in scaling up renewable energy, improving energy efficiency, and expanding access to modern and affordable energy services across the continent, which is the backbone of thriving industries, resilient agriculture, and digital transformation. It empowers women and girls by reducing time spent on fuel collection, improves health outcomes by replacing harmful cooking fuels, and unlocks opportunities for youth in green jobs and entrepreneurship.

Achieving SDG 7 in Africa demands bold collaboration. Governments must prioritize energy in national agendas, fostering policies that attract investment and incentivize decentralized solutions. The private sector must scale innovation, from mini-grids to pay-as-you-go solar systems, while development partners and multilateral institutions should align financing with Africa's unique needs. Critically, communities must remain at the heart of this transition, ensuring that solutions are culturally relevant, equitable, and sustainable.

As Commissioner for Infrastructure and Energy, I am inspired by the resilience and ingenuity of Africa's people. This continent, rich in potential and driven by a youthful population, can lead the world by demonstrating that sustainable energy is not a distant dream but an achievable reality.

RASHID ALI ABDALLAH (MR.)
Executive Director
African Energy Commission (AFREC)

EXECUTIVE SUMMARY

The Africa Sustainable Development Goal 7 Report (2025), prepared by the African Energy Commission (AFREC), presents a comprehensive assessment of Africa's progress toward ensuring access to affordable, reliable, sustainable, and modern energy for all by 2030. The report covers the period from 2017 to 2023 and highlights notable achievements, persistent challenges, and critical opportunities for the continent's energy future. Although Africa has made significant strides, particularly in expanding electricity access and initiating the renewable energy transition, progress remains insufficient to meet the SDG7 targets within the established timeframe. Persistent gaps in clean cooking access, slow advances in energy efficiency, and major financing shortfalls continue to impede the realization of universal, sustainable energy across the continent.

Electricity access across Africa has improved markedly, with the electrification rate reaching 61 percent in 2023, up from 51 percent in 2017. Despite this achievement, approximately 563 million Africans — primarily in rural and peri-urban areas — remain without electricity. Northern Africa has attained near-universal access, achieving a 98 percent connection rate, while Eastern and Western Africa have demonstrated encouraging progress. However, Central Africa continues to lag significantly, with only 28 percent of its population having access to electricity. The continent's rapid population growth, especially in countries such as Nigeria and the Democratic Republic of Congo, risks undermining gains in electrification, as demographic pressures frequently outpace infrastructure development efforts.

Access to clean cooking technologies remains a critical challenge. By 2023, only 35 percent of Africa's population had access to clean cooking solutions, leaving more than 940 million people reliant on polluting fuels such as wood, charcoal, and kerosene. This reliance results in devastating health consequences, contributing to nearly 500,000 premature deaths each year, disproportionately affecting women and children. While Northern Africa has achieved near-universal access to clean cooking through strong policy measures and LPG adoption, progress in sub-Saharan Africa remains painfully slow. Urban-rural disparities are particularly severe, and without urgent intervention, it is projected that over one billion Africans could remain without access to clean cooking by 2030.

Renewable energy development presents both achievements and concerns. While renewable energy accounts for 69 percent of total final energy consumption in Africa, this figure is heavily skewed by the widespread use of traditional biomass rather than modern renewables. Modern renewable energy sources — such as solar, wind, hydropower, and geothermal — constitute only 2 to 3 percent of total consumption. Notable successes in expanding modern renewables have occurred in countries such as Namibia, Morocco, and Angola. However, broader progress across the continent remains constrained by weak investment flows, policy barriers, and underdeveloped energy infrastructure.

Energy efficiency represents an area of vast but underexploited potential. Africa's average energy intensity fell from 11.93 MJ/USD in 2010 to 11.58 MJ/USD in 2022, a modest 0.35 MJ drop over 12 years. This less than 0.5% annual decline is far below the 2–3% needed to meet SDG 7.3 targets, highlighting the need for stronger policy action and investment. Across Africa, improvements in energy efficiency have been fragmented and insufficient, hindered by limited policy enforcement, lack of incentives, and weak institutional capacity. Significant opportunities exist to reduce energy consumption, lower costs, and decrease greenhouse gas emissions, but realizing these benefits will require comprehensive strategies and strong political commitment.

Financing the transition to universal energy access and clean energy remains a fundamental challenge. An estimated 50 billion US dollars in annual investment is needed to achieve universal electricity access by 2030, alongside an additional 4 billion US dollars annually for universal clean cooking access. Current financial flows are markedly insufficient, and while innovative financing models such as blended finance, concessional loans, Pay-As-You-Go systems, and climate bonds are emerging, they remain limited in scale and reach. Particularly alarming is the chronic underfunding of clean cooking initiatives relative to electricity projects.

Accurate and comprehensive data remains a critical enabler of SDG7 progress. Significant data gaps hinder effective planning, monitoring, and policy formulation. Strengthening national energy data

systems, investing in capacity building, and leveraging new technologies such as GIS and AI-driven analytics are vital to close these gaps and support evidence-based decision-making across the continent.

To accelerate progress, the report emphasizes several strategic priorities. Scaling decentralized renewable energy solutions — such as mini-grids and off-grid solar systems — is essential to extend electricity access to underserved rural communities. Clean cooking must be elevated as a political and financial priority equal to electricity access, requiring targeted investments, innovative delivery models, and behavior change initiatives. Mobilizing large-scale investments, particularly through blended finance and strong public-private partnerships, is crucial to bridge the financing gap. Regional energy integration, demographic-responsive planning, climate resilience strategies, and enhanced data systems must be integral components of national and continental energy strategies. Furthermore, fostering robust partnerships among governments, development partners, the private sector, and civil society is essential to catalyze inclusive and sustainable energy transitions.

Africa's energy transition is at a pivotal moment. While substantial progress has been made, it remains fragile and uneven. Without urgent, ambitious, and coordinated action, millions will remain trapped in energy poverty, undermining the continent's broader development aspirations. Nevertheless, Africa also possesses immense opportunities: abundant renewable resources, a young and dynamic population, and increasing political momentum for sustainable development. By embracing bold leadership, scaling investments, and adopting innovative, inclusive solutions, Africa can achieve universal energy access, drive economic growth, enhance human development, and establish itself as a global leader in clean and sustainable energy.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

SDG	Sustainable Development Goal
AFREC	African Energy Commission
AU	African Union
BRT	Bus Rapid Transit
COPD	Chronic Obstructive Pulmonary Disease
DRE	Decentralised Renewable Energy
EE	Energy Efficiency
ECOWAS	Economic Community of West African States
ESCO	Energy Service Company
CAGR	Compound Annual Growth Rates
GIS	Geographic Information System
GW	Gigawatt
IRENA	International Renewable Energy Agency
IEA	International Energy Agency
LPG	Liquefied Petroleum Gases
MJ	Megajoule
NGOs	Non-Governmental Organizations
OGS	Off-Grid Solar
PAYGO	Pay-As-You-Go
PPPs	Public-Private Partnerships
PV	Photovoltaic
RE	Renewable Energy
SADC	Southern African Development Community
TFEC	Total Final Energy Consumption
W	Watt
WHO	World Health Organization

LIST OF TABLES / FIGURES

1 INTRODUCTION

INTRODUCTION

Sustainable Development Goal 7 (SDG 7) is a pivotal component of the United Nations' 2030 Agenda for Sustainable Development. Its aim is to ensure access to affordable, reliable, sustainable, and modern energy for all. SDG 7 is structured around three core targets: ensuring universal access to modern energy, increasing the share of renewable energy in the global energy mix, and improving energy efficiency. These targets reflect the global commitment to addressing energy poverty while transitioning to sustainable energy systems. For Africa, where energy deficits are among the highest globally, achieving SDG 7 is critical for unlocking the continent's vast economic and social potential.

Energy access is intrinsically linked to development outcomes.

For example:

- **Education**: Electricity in schools facilitates digital learning, extended study hours, and access to online resources. Studies show that electrified schools improve student performance and teacher retention rates.

- **Healthcare:** Reliable energy is essential for powering medical equipment, maintaining cold chains for vaccines, and providing lighting for nighttime healthcare services. Clinics without reliable electricity supply are often unable to deliver adequate care, particularly in rural areas.

- **Economic Growth**: Electricity is a major driver for economic activities, ranging from industrial process and commercial activities to enabling productive uses such as irrigation, refrigeration in rural and peri-urban areas. Small and medium enterprises (SMEs) rely on energy to scale operations, create jobs, and contribute to economic development.

- **Gender Equality:** Women and girls disproportionately bear the burden of energy poverty, spending hours collecting firewood or cooking with polluting fuels. Modern energy access reduces these burdens, enabling women to pursue education, employment, and entrepreneurship.

- **Environmental Sustainability:** The transition to renewable energy reduces reliance on fossil fuels, lowering greenhouse gas emissions and mitigating climate change. Clean cooking solutions also reduce deforestation and indoor air pollution.

- **Energy Efficiency & Urban Sustainability**: Energy-efficient infrastructure, smart grids, and reliable public transportation systems not only optimize energy usage but also enhance urban sustainability. These improvements reduce overall energy consumption and emissions, contributing to healthier, more resilient cities.

Africa's energy challenges are unique yet surmountable. The continent is home to abundant natural resources, including significant solar, wind, hydropower, and geothermal potential. However, these resources remain underutilized, and energy poverty persists with a significant proportion of the population without access. Despite this resource richness, many African countries face severe energy deficits, heavily reliant on imported fossil fuels and traditional biomass, a situation that exposes inefficiencies and inequities in energy distribution. The achievement of SDG 7 in Africa is thus not only about bridging energy gaps but also about fostering inclusive and sustainable development.

1.1 OVERVIEW OF SDG 7 TARGETS

SDG 7 embodies universal energy access, renewable energy adoption, and energy efficiency improvement, serving as a critical pillar in the global sustainable development agenda. For Africa, where energy poverty remains a pressing challenge, SDG7 represents both an opportunity and a call to action. Its successful implementation addresses the continent's unique energy access gaps, supports its growing demand for reliable power, and catalyzes development across multiple sectors, making it indispensable for achieving broader socio-economic progress.

PRIMARY TARGETS

1. **Universal Access to Energy:**
   - o Ensuring universal access to modern energy services is the cornerstone of SDG 7. This target focuses on closing disparities in electricity access and clean cooking solutions, with an emphasis on reaching rural and marginalized populations.
2. **Increase in Renewable Energy:**
   - o Enhancing the share of renewables in the energy mix is critical for addressing climate change and reducing dependence on fossil fuels. This target prioritizes the deployment of solar, wind, hydropower, and geothermal energy systems.
3. **Improvement in Energy Efficiency:**
   - o Doubling the rate of improvement in energy efficiency is essential for optimizing energy use, reducing costs, and minimizing environmental impacts. This includes innovations in industrial processes, building standards, and appliance design.

The primary targets are especially important for Africa due to the continent's unique challenges, such as limited access to modern energy in rural areas, high dependency on traditional biomass for cooking, and significant infrastructure gaps. Universal access to energy is essential to alleviate energy poverty in remote regions. Increasing renewable energy adoption is vital to leverage Africa's abundant natural resources while mitigating climate change. Improving energy efficiency is crucial in Africa's fast-growing urban centers and industries, where energy demand is rising rapidly.

KEY INDICATORS

1. **Access to Electricity:**
   - o Measured as the percentage of the population with reliable electricity, this indicator tracks progress in addressing energy poverty and fostering inclusive growth.
2. **Access to Clean Cooking Solutions:**
   - o Measured as the percentage of population that has adopted modern cooking technologies that reduce health risks and environmental degradation associated with traditional biomass use.
3. **Renewable Energy Share:**
   - o Measured as the proportion of renewables in total energy consumption reflects the transition to sustainable energy systems and climate resilience.
4. **Energy Efficiency Improvement Rate:**
   - o Measured as improvements in primary energy intensity across sectors to highlight advancements in resource use and sustainability.
5. **Financial Flows for Clean Energy:**
   - o Measured as investments in clean energy projects to provide insights into the financial commitments required to achieve SDG 7.
6. **Installed Renewable Energy Capacity per Capita:**
   - o This indicator measures the average renewable energy capacity available per person.

1.2 INTERLINKAGES WITH OTHER SDGS

SDG7's achievement is fundamental to advancing SDG1 (No Poverty) by supporting income generation; SDG2 (Zero Hunger) through energy-enabled food production and storage; SDG3 (Good Health and Well-being) via electrified health facilities and reduced indoor air pollution; SDG4 (Quality Education) through electrified schools and digital learning; and SDG5 (Gender Equality) by empowering women through access to clean energy. It also propels SDG8 (Decent Work and Economic Growth), SDG9 (Industry, Innovation, and Infrastructure), SDG11 (Sustainable Cities), and SDG13 (Climate Action), underscoring its cross-cutting importance. SDG7 interlinks with African development projects and policies, such as off-grid solar initiatives in rural regions, national electrification plans, and regional clean energy partnerships. These applications demonstrate how energy interventions influence education, healthcare, and economic empowerment. For example, off-grid solar programs in Kenya have expanded education by powering schools[1], electrification plans in Rwanda have improved healthcare delivery by providing reliable electricity to clinics[2], and regional partnerships like the West Africa Power Pool[3] have facilitated economic growth by ensuring energy trade and grid stability.

By providing a detailed analysis of these targets and indicators, the report aims to equip stakeholders with the knowledge and tools necessary to accelerate Africa's progress toward achieving SDG7. It encourages stakeholders to invest in sustainable energy solutions, strengthen policy frameworks, and foster regional collaborations to address challenges and seize opportunities in Africa's energy landscape.

Figure 1: Visualization map of the interlinkages between SDG 7 and other SDGs

Source: United Nations Economic and Social Commission for Asia and the Pacific. (n.d.). Visualisation of interlinkages for SDG 7[4].

1 - REREC. (n.d.). Electrification of primary schools. Retrieved from https://www.rerec.co.ke/electrification-primary-schools.php

2 - Sustainable Energy for All. (n.d.). Powering healthcare in Rwanda: Market assessment and roadmap for healthcare facilities. Retrieved from https://www.seforall.org/publications/powering-healthcare-in-rwanda-market-assessment-and-roadmap-for-healthcare-facilities

3 - World Bank. (2025, February 6). Powering Africa: The transformational impact of regional energy projects in West Africa. Retrieved from https://www.worldbank.org/en/results/2025/02/06/powering-africa-the-transformational-impact-of-regional-energy-projects-in-west-africa

4 - Retrieved from https://www.unescap.org/sites/default/files/Visualisation%20of%20interlinkages%20for%20SDG%207.pdf

2 REPORT OBJECTIVES AND METHODOLOGY

2.1 OBJECTIVES

This report seeks to amplify the African narrative by presenting an African perspective on energy access and progress toward achieving SDG7. Drawing from data provided by national statistics offices, energy ministries, and utilities across Africa, the report analyzes key trends, identifies prevailing challenges, and highlights progress using robust quantitative data. . It evaluates progress made in electricity access, clean cooking solutions, renewable energy penetration, and energy efficiency improvement, thereby bridging data gaps by providing comprehensive and inclusive datasets across the continent. This analysis serves to inform tailored recommendations specifically aimed at supporting Africa's energy future based on statistical evidence. Through evidence-based insights, the report guides policymakers, development partners, and private sector actors in scaling sustainable energy solutions effectively.

2.2 METHODOLOGY

The methodology adopted for this report differentiates itself from other SDG assessments by leveraging an extensive and collaborative approach. It encompasses a robust data collection process involving multiple data sources. Primary foundational data were sourced directly from the African Union country focal points, including national household surveys, energy ministry reports, and utility records, providing authenticity and alignment with country-specific realities. Additionally, comprehensive energy balance datasets were obtained from the African Energy Commission (AFREC). Data is reported from 2017 – 2023 to ensure up to date reporting as well as to present a picture on the trends on SDG 7 indicators. For contextual benchmarking and international comparability, supplementary data from the International Energy Agency (IEA), World Bank, and various United Nations databases were utilized. This approach was enriched through stakeholder engagement with energy statisticians from government agencies across Africa, ensuring relevance, accuracy, and representation of on-the-ground conditions.

METHODOLOGY FOR ESTIMATING VALUES FOR MISSING DATA

The report draws upon data submissions directly received from African countries on key SDG7 indicators: 42 countries provided data on electricity access (7.1.1), 34 countries on clean cooking access (7.1.2), 54 countries each on renewable energy share (7.2.1) and energy efficiency improvement (7.3.1), 23 countries on financial flows (7.A.1), and 42 countries on installed renewable energy capacity (7.B.1). This robust country-level participation underscores the authenticity and regional relevance of the report.

A central aspect of this methodology was addressing data gaps prevalent in SDG 7 reporting. To ensure reliability, collected data underwent rigorous integration, standardization, and cleaning procedures to maintain consistency. Outliers and incomplete data points were meticulously reviewed and adjusted or excluded when necessary. To accurately reflect diverse regional dynamics, data were grouped by region and income-level classifications. Missing electricity access rates were systematically estimated using robust imputation techniques informed by regional trends, average income levels, urbanization rates, and GDP per capita. Additionally, growth rates in electricity access were projected using historical data coupled with socioeconomic indicators such as public investment levels and urbanization trends. These imputed and modeled datasets were subsequently validated through comprehensive cross-checking processes involving existing records, iterative stakeholder consultations, and expert peer reviews, thus ensuring the accuracy and credibility of the data.

Key methodological challenges encountered included incomplete or missing data from some countries and rapidly evolving energy landscapes across the continent. These challenges were mitigated by employing advanced imputation methods, leveraging regional averages for missing values, and incorporating real-time data sources and flexible modeling techniques to capture ongoing developments.

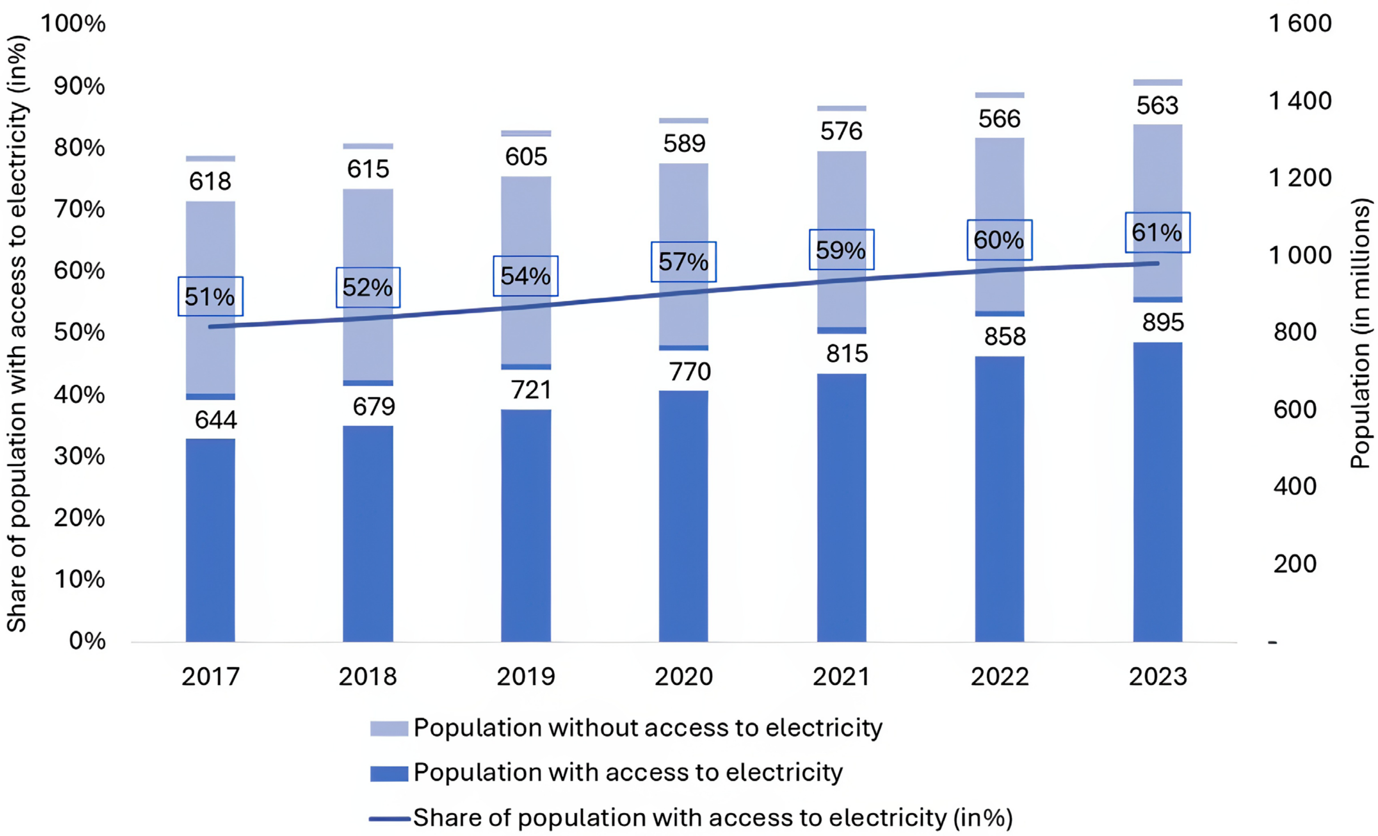
Future iterations of the report will enhance data granularity, specifically targeting detailed sectoral energy consumption patterns and household demographic breakdowns. Strengthening regional collaborations with national agencies and regional organizations will further improve data quality and availability. Additionally, the report will leverage emerging technologies, such as machine learning and AI-driven analytics, to achieve more precise modeling and comprehensive data analysis. Through these enhancements, subsequent reports will continue to provide robust evidence to support policymaking, strategic planning, and investment decisions toward achieving sustainable energy access across Africa.

3 ACCESS TO ELECTRICITY IN AFRICA

3.1 OVERVIEW OF ELECTRICITY ACCESS IN AFRICA: PROGRESS AND DISPARITIES

Access to electricity is not only a fundamental human need but also a critical enabler of sustainable development, economic growth, and improved quality of life. As of 2023, Africa's electrification rate[5] reached 61%, leaving approximately 563 million people without access (Figure 2). Since 2017, Africa has made commendable progress in expanding access, growing by over 10 percentage points. Eastern and Western Africa[6] each account for around 178 million and 175 million of the unconnected population, respectively, while Central Africa and Southern Africa are home to 128 million people and 78 million people without access, respectively. In contrast, Northern Africa's unconnected population is just below 4 million.

Figure 2: SDG 7.1.1. Share of population with access to electricity (2017-2023)

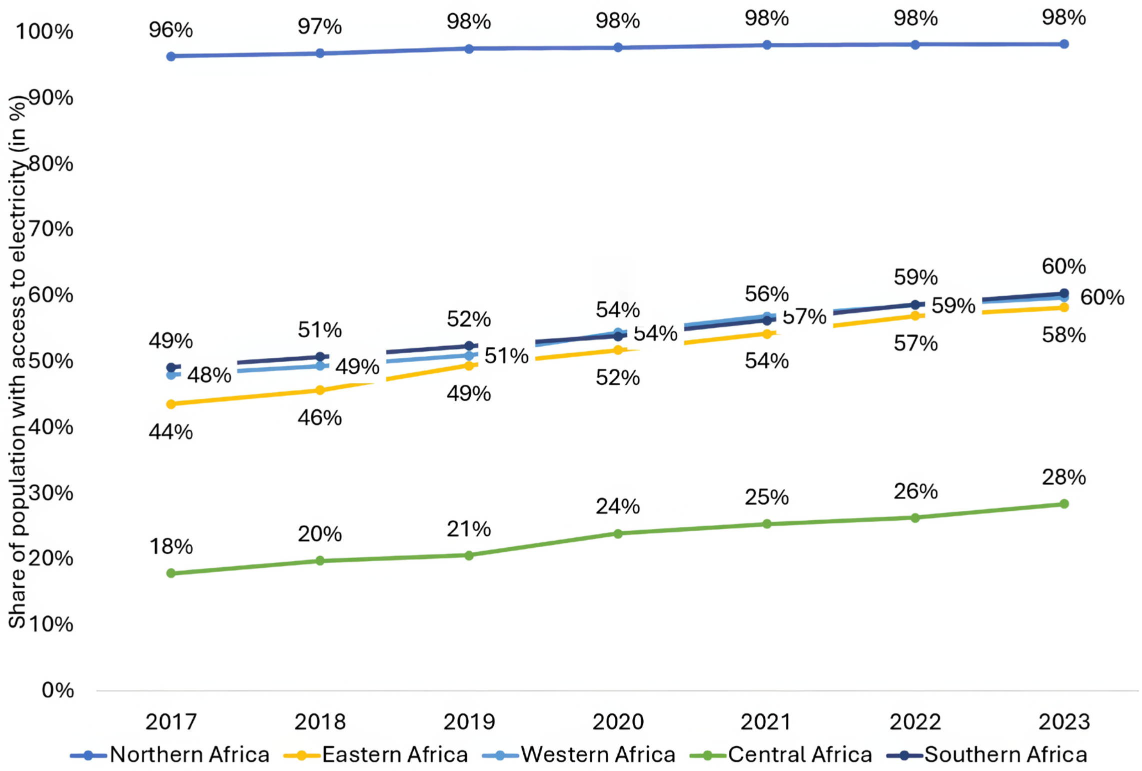


Source: AFREC SDG7 Database 2025

The stark between regions and countries, is shaped by differences in infrastructure, governance, and economic priorities (Figure 3).

5- Share of population with access = Σ(Population with access in each country) / Σ(Total population in each country)
6- Breakdown of the regions is provided in Annex 1.

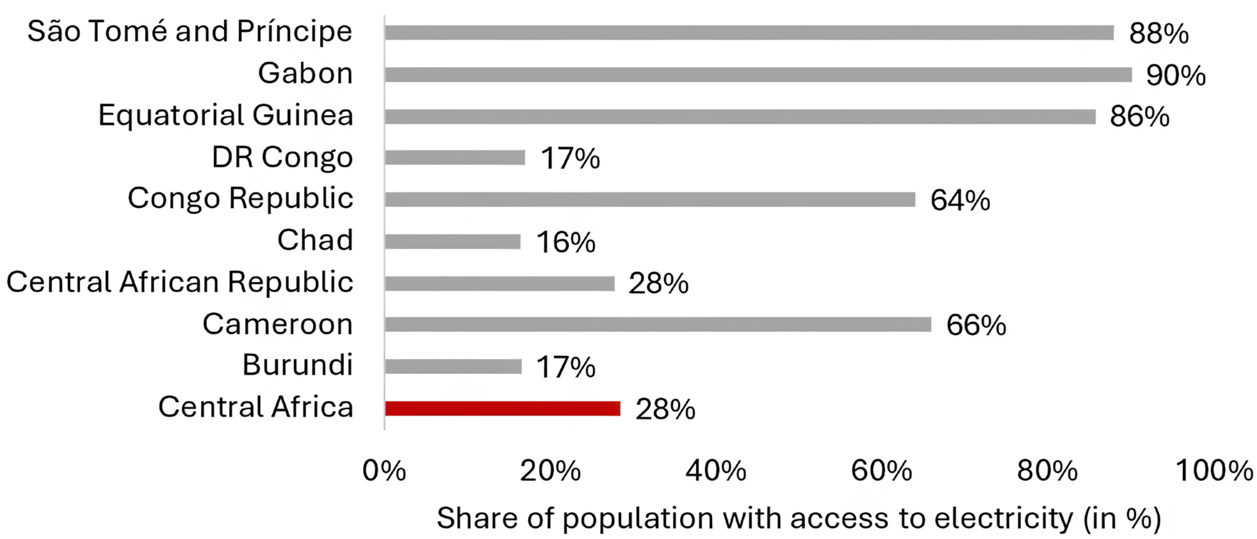
Figure 3: SDG 7.1.1. Share of population with access to electricity (2017-2023), major sub-regions



Source: AFREC SDG7 Database 2025

- **Central Africa** (Figure 4), despite a 10-percentage point increase (from 18% to 28%), remains the most challenged region due to political instability, inadequate infrastructure, and limited investments, with countries like Chad (16%), DRC (17%) and CAR (28%) showing critical deficits.

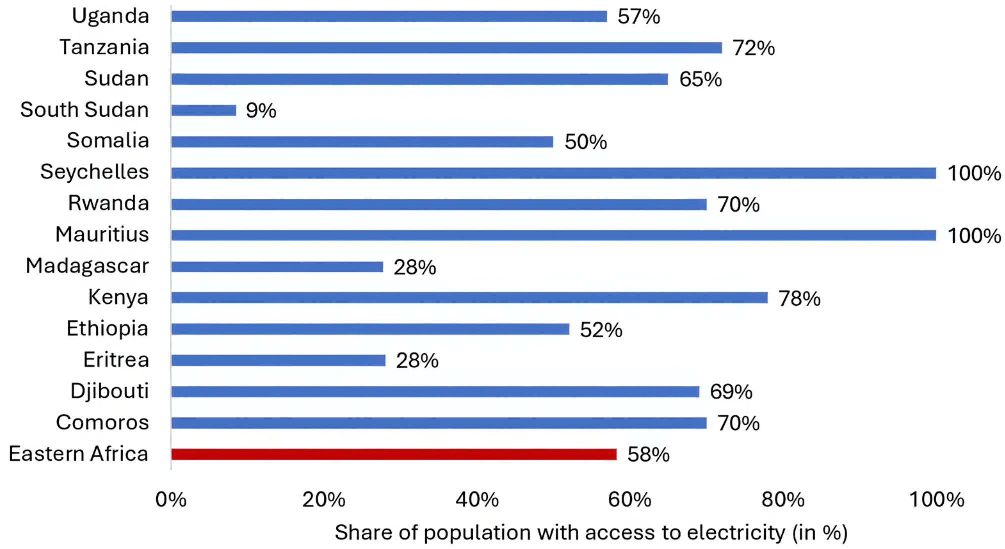
Figure 4: Central Africa: Access to electricity, by country, in 2023



Source: AFREC SDG7 Database 2025

- **Eastern Africa** (Figure 5) achieved a 14-percentage point growth (from 44% in 2017 to 58% in 2023), leveraging decentralized renewable energy (DRE) solutions and innovative financing models, with Kenya (78%), Uganda (57%), and Rwanda (70%) as leading examples.

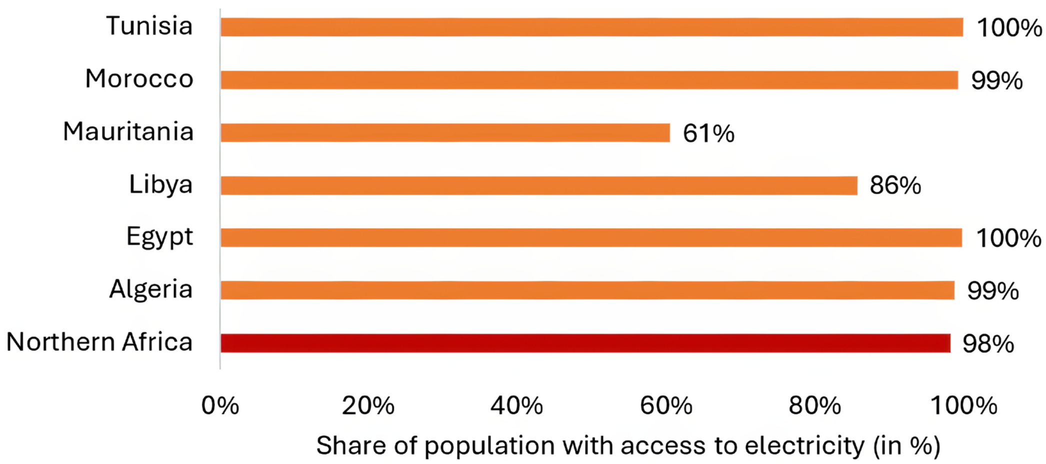
Figure 5: Eastern Africa: Access to electricity, by country, in 2023



Source: AFREC SDG7 Database 2025

- **Northern Africa** (Figure 6) maintained near-universal access at 98%, with minimal growth (1%) due to its already high baseline.

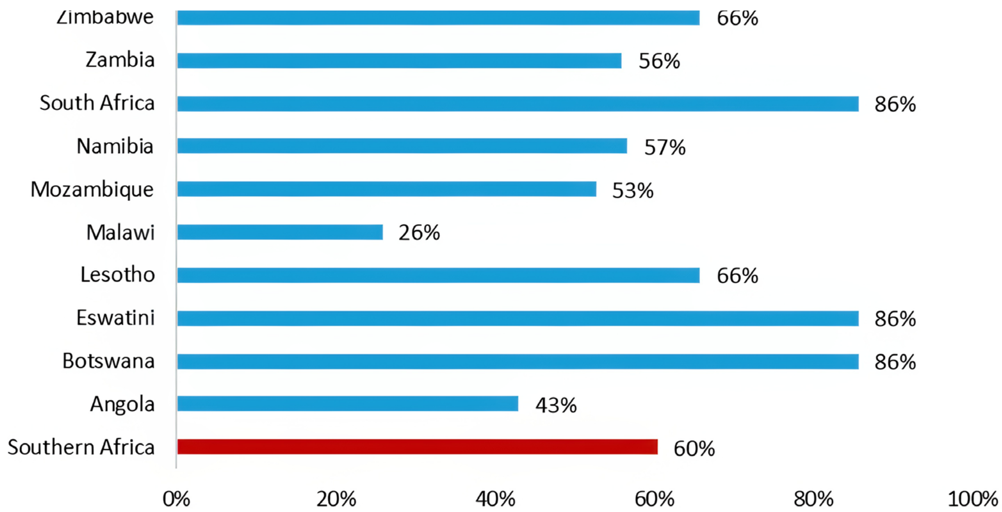
Figure 6: Northern Africa: Access to electricity, by country, in 2023



Source: AFREC SDG7 Database 2025
Note: Sahrawi Republic data in not available

- **Southern Africa** (Figure 7) achieved 60%, reflecting both progress in countries like South Africa (86%), Botswana (86%) and Eswatini (86%), and challenges in nations such as Malawi (26%) and Mozambique (53%) where economic and logistical barriers persist.

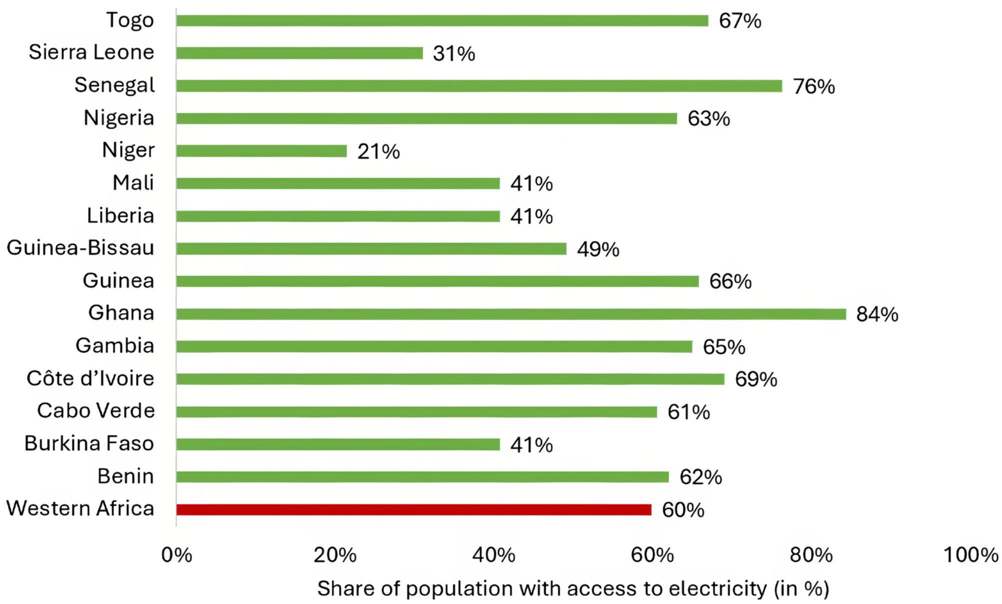
Figure 7: Southern Africa: Access to electricity, by country, in 2023



Source: AFREC SDG7 Database 2025

- **Western Africa** (Figure 8) has an access rate of 60%, driven by coordinated regional initiatives, increased investment in off-grid solutions, and supportive policy frameworks. For example, Ghana (84% access in 2023), Senegal (76%), and Côte d'Ivoire (69%) have made remarkable progress.

Figure 8: Western Africa: Access to electricity, by country, in 2023

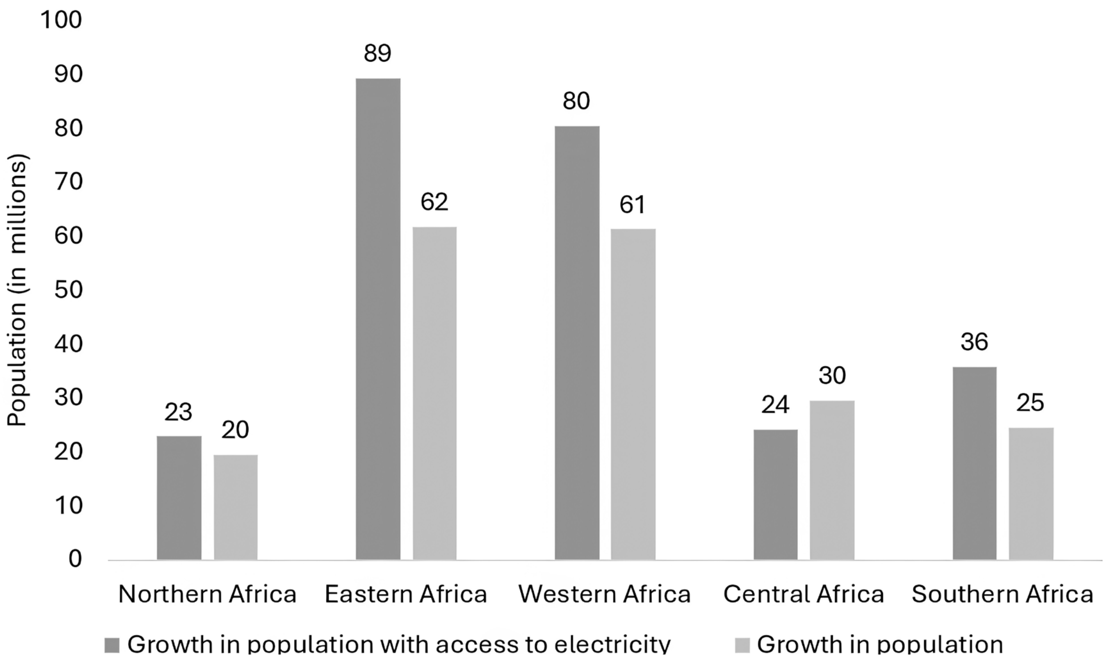


Source: AFREC SDG7 Database 2025

3.2 ELECTRICITY ACCESS AND POPULATION GROWTH: ANALYZING THE DEMOGRAPHIC IMPACT

Africa's population growth—projected to double by 2050[7]—presents both a challenge and an opportunity for electrification efforts. As the fastest-growing continent, the interplay between population dynamics and electricity access is profound, creating a dual reality where progress in connections is often overshadowed by the sheer scale of growth (Figure 9).

Figure 9: Growth in population v. growth in population with access to electricity (2017-2023)



Source: AFREC SDG7 Database 2025

Between 2017 and 2023, electrification efforts in Eastern, Central and Western Africa grew at an annual rate of over 2 percentage points, primarily through decentralized solutions. However, population growth in high-density countries has partially offset these gains, emphasizing the need for accelerated infrastructure development and innovative approaches to scale access.

In Western Africa, where electrification rates have steadily risen, countries like Ghana and Senegal have significantly reduced their energy access deficits. However, in populous countries such as Nigeria, where the population has grown by over 30 million during the same period, the number of people without electricity remains above 82 million, demonstrating how demographic trends can dilute the impact of electrification programs.

Central Africa faces an even steeper challenge. With countries like DR Congo experiencing high birth rates and limited infrastructure expansion, the electrification deficit remains one of the largest globally, with close to 85 million people still lacking access. The demographic pressure not only increases the demand for new connections but also amplifies the need for investments in resilient and scalable energy infrastructure.

In Eastern Africa, high access deficit countries like Ethiopia and Tanzania are trying to outrun population growth. While they are providing large populations with electricity access each year, and advances is just about keeping pace with population growth. In Southern Africa, Mozambique and Zambia provided twice as many people with access as its population growth and was able to make a significant dent in its access rate.

7- United Nations Economic Commission for Africa, "(Blog) As Africa's Population Crosses 1.5 Billion, The Demographic Window Is Opening; Getting The Dividend Requires More Time And Stronger Effort," July 12, 2024, https://www.uneca.org/stories/(blog)-as-africa's-population-crosses-1.5-billion,-the-demographic-window-is-opening-getting.

In Northern Africa, slower population growth has allowed countries like Egypt and Algeria to maintain universal or near-universal access. By aligning energy strategies with demographic realities, these countries have optimized resource allocation and ensured sustainable progress. Their models highlight the importance of integrating population trends into national electrification strategies.

The population growth also compounds the complexity of achieving universal access. The financial, technical, and logistical requirements grow exponentially as countries must not only bridge existing gaps but also accommodate millions of new households annually. For example, extending grid connections to rural and peri-urban areas—where population growth is most pronounced—requires significant investments in infrastructure, capacity building, and operational efficiency.

Despite these challenges, Africa's youthful population presents an opportunity. A well-educated and skilled workforce can drive innovation in energy solutions, from the deployment of decentralized systems to advancements in renewable energy technologies. Furthermore, population-driven demand for electricity creates a strong case for investments in energy infrastructure, as expanded access directly contributes to economic growth, industrialization, and improved social outcomes.

Addressing the dual challenge of population growth and electrification requires bold and adaptive strategies. Governments and development partners must prioritize high-impact interventions, such as scaling decentralized energy solutions, leveraging technology for efficient grid planning, and fostering regional collaborations to share resources and expertise. Only by integrating demographic realities into energy planning can Africa make meaningful strides toward achieving universal electricity access by 2030.

3.3 URBAN-RURAL DIVIDE IN ELECTRICITY ACCESS

Disparities in electricity access across urban and rural areas reveal some of the most entrenched challenges facing Africa's energy landscape. Urban electricity access in Africa typically involves connecting households and businesses within cities and towns to centralized grid networks, while rural access often relies on decentralized solutions like mini-grids or off-grid solar systems due to geographic remoteness and infrastructure limitations. In 2023, the urban electrification rate across Africa averaged 82% (Figure 10), compared to a significantly lower rural electrification rate of 44% (Figure 11). This divide underscores deep socio-economic inequalities and the logistical challenges of extending energy infrastructure to remote areas.

Figure 10: Urban population with access to electricity, 2023

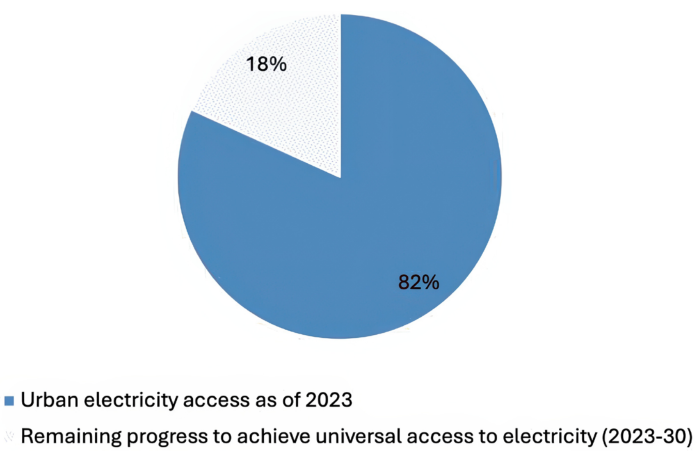
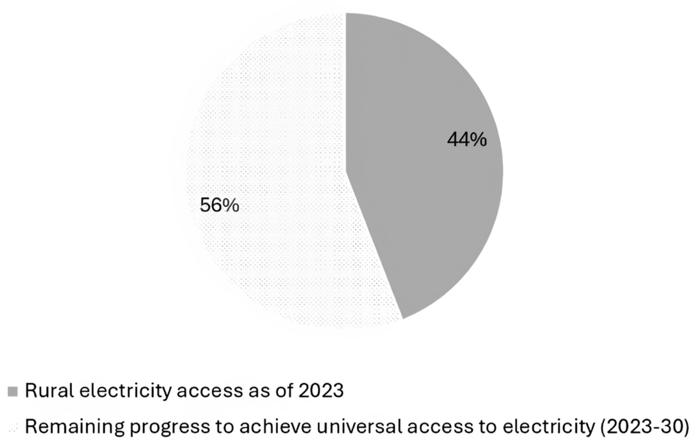


Figure 11: Rural population with access to electricity, 2023



Source: AFREC SDG7 Database 2025

Urban areas generally benefit from centralized grids, concentrated populations, and higher economic activity, enabling easier infrastructure development and maintenance. Rural areas, by contrast, are often characterized by dispersed settlements, lower income levels, and difficult terrain, all of which increase the cost and complexity of electrification projects.

For example, in Gambia, urban electrification reaches approximately 83%, while rural areas lag behind at 35%. Similarly, in Nigeria, urban access exceeds 85%, but rural access remains below 36%. These gaps reflect not just infrastructural limitations but also policy and financing challenges.

The urban-rural divide has profound implications for social and economic development. Rural communities without reliable electricity face limitations in education, healthcare, and economic opportunities. Lack of electricity in rural schools hinders digital learning and access to educational resources, while rural clinics often operate without refrigeration for vaccines or reliable lighting for nighttime procedures. Small businesses in rural areas struggle to expand without access to electricity for machinery, irrigation, or storage.

Bridging this divide requires a multi-faceted approach that combines technological innovation, targeted investments, and supportive policies. Off-grid technologies such as solar home systems and mini-grids can provide immediate relief to rural communities. For example, in Kenya, Rwanda, Senegal and Uganda, Pay-As-You-Go (PAYGO) solar systems have connected millions of rural households. Subsidies, micro-leasing, and concessional financing can make rural electrification projects financially viable. Public-private partnerships (PPPs) can drive rural electrification by leveraging private sector efficiency and public sector oversight. Technological advancements in energy storage, low-cost distribution networks, and renewable energy integration can reduce costs and improve service delivery.

Addressing the urban-rural divide is essential for achieving universal electricity access and unlocking Africa's development potential. By prioritizing equitable electrification and leveraging both local and global resources, Africa can ensure that rural communities are not left behind. Integrating rural access goals into national development strategies, fostering regional collaborations, and embracing innovative solutions will be key to bridging this gap and fostering inclusive growth.

3.4 OFF-GRID AND DECENTRALIZED SOLUTIONS: A CATALYST FOR RURAL ELECTRIFICATION

Decentralized Renewable Energy (DRE) systems, including off-grid solar (OGS) and mini-grids, are essential in bridging Africa's electricity access gap[8]. These solutions are projected to account for nearly half of the connections needed to achieve universal access by 2030, particularly in rural and peri-urban areas where grid expansion is economically or logistically challenging.

Between 2015 and 2023, decentralized systems accounted for significant new electricity connections in East and West Africa. For instance, in **Ethiopia and Rwanda**, off-grid solar systems contributed **17% and 24%** of new connections in 2023, respectively underscoring their transformative role in addressing energy poverty. Mini grids, which provide higher tiers of energy service, are vital for enabling productive uses such as powering small businesses, irrigation systems, and healthcare facilities. Solar home systems, while often limited to basic lighting and device charging, immediately replace kerosene lamps, reducing household energy costs and improving air quality.

Key Success Stories:

- **Ethiopia**: With off-grid solar systems connecting approximately 31% households, Ethiopia has become a leader in leveraging innovative financing models to expand access.
- **Cote d'Ivoire**: A sustainable and scalable off-grid electrification market to meet the electrification needs of unserved populations has allowed Cote d'Ivoire to connect 26% of its population with off-grid solar solutions.
- **Rwanda**: Supported by strong policy frameworks, off-grid solar in Rwanda has delivered electricity to 24% of the population, most of whom reside in remote communities, facilitating economic activities and improving livelihoods.
- **Nigeria**: Geospatial mapping tools have enabled the efficient deployment of mini grids in underserved areas, contributing to 10% of connections.

8- Alliance for Rural Electrification, "Discover DRE", https://www.ruralelec.org/discover-dre/.

Addressing Challenges and Unlocking Potential:

Despite their promise, DRE systems face challenges, including high upfront costs, fragmented regulatory frameworks, and inconsistent quality standards.

To overcome these barriers:

1. **Expand Financing Mechanisms:** Subsidies, concessional financing, and PAYGO models are critical to reducing affordability barriers. For example, initiatives like the Energy Access Relief Fund[9] have successfully de-risked private investments.
2. **Strengthen Regulatory Frameworks:** Streamlined licensing processes, as implemented in Nigeria and Zambia, encourage private sector participation and expedite project timelines.
3. **Ensure Quality Assurance:** Certification programs and robust performance standards safeguard system reliability and consumer confidence, ensuring sustainable adoption.
4. **Leverage Local Supply Chains:** Investments in local manufacturing and distribution networks can lower costs, create jobs, and enhance supply chain resilience.
5. **Adopt Advanced Technologies:** AI-driven geospatial analytics and remote monitoring systems optimize deployment strategies and ensure the efficient use of resources.

By integrating these systems into national electrification strategies, African countries can accelerate progress toward universal access, transform rural economies, and improve the quality of life for millions.

3.5 FINANCIAL AND POLICY PATHWAYS TO UNIVERSAL ELECTRICITY ACCESS

Achieving universal electricity access by 2030 will require an estimated annual investment of $50 billion[10]. Mobilizing these resources and ensuring their effective deployment necessitates financial innovation coupled with targeted policy interventions. Several strategic approaches have emerged as transformative, each complementing the others to collectively address diverse financing needs and barriers.

Blended financing models, which combine public funds with private investments, have been instrumental in mitigating risks associated with high-stakes energy projects. For instance, the Africa GreenCo initiative has successfully attracted private capital into renewable energy markets by offering guarantees and financial structures that reduce investor uncertainty, notably in Southern and Eastern Africa. This blending of public and private funds can unlock additional financial resources and amplify project scale.

Building upon these financial innovations, innovative tariffs and payment models, particularly Pay-As-You-Go (PAYGO) systems, have significantly improved affordability by enabling households to purchase electricity in manageable increments. Countries like Togo, Sierra Leone, and Zambia have experienced reduced financial barriers and enhanced electricity access within low-income communities due to these flexible payment approaches. Additionally, implementing tiered tariffs reflecting actual usage levels can further improve affordability and ensure sustainability for electricity providers.

Complementing these affordability-focused approaches, concessional financing and grants have proven essential, particularly for electrification projects in high-risk regions like Central Africa. Initiatives such as the Scaling Solar program[11], which offers technical assistance alongside favorable financial terms, have effectively supported large-scale solar investments in countries including Senegal and Zambia. Concessional financing thus bridges funding gaps in regions where commercial capital remains scarce or prohibitively costly.

9- SIMA Funds, "Energy Access Relief Fund", https://simafunds.com/energy-access-relief-fund/.
10- Carnegie Endowment for International Peace, "Who Finances Energy Projects in Africa?," November 2023, https://carnegieendowment.org/research/2023/11/who-finances-energy-projects-in-africa?lang=en.
11 - World Bank Group, «Scaling Solar», https://www.scalingsolar.org/.

To optimize investment efficiency, geospatial electrification planning has enhanced decision-making by accurately identifying priority areas for energy projects. In Nigeria, Geographic Information System (GIS) mapping has helped target underserved communities, ensuring effective resource allocation and maximizing the impact of mini-grid deployments.

Further expanding available financing instruments, green bonds and climate finance are increasingly utilized across Africa, notably in Northern African countries such as Morocco and Egypt, to fund substantial renewable energy developments. Morocco's Noor Ouarzazate Solar Complex[12], the world's largest concentrated solar power plant, exemplifies the significant potential of climate-aligned financial instruments to attract global investments in renewable energy.

Lastly, public-private partnerships (PPPs) offer a robust framework for collaboration, accelerating rural electrification. Ghana's Renewable Energy Program exemplifies how engaging private sector expertise and capital can expand solar energy deployment in underserved regions, effectively alleviating financial constraints on public resources.

By strategically aligning these interconnected financial innovations with supportive and tailored policy frameworks, Africa can effectively mobilize the necessary investments to achieve universal electricity access. Adapting these strategies to specific regional and national contexts will ensure they directly address existing barriers while maximizing their collective transformative potential.

3.6 OUTLOOK AND STRATEGIC RECOMMENDATIONS

Africa's electrification journey is at a pivotal stage. While significant progress has been made, the path to universal electricity access requires intensified efforts, innovation, and collaboration. The following strategic priorities provide a roadmap for impactful change:

- **Establishing Coherent National Energy Policies:** Each African country must develop and implement a clear, coherent national energy policy explicitly focused on achieving universal electricity access. This foundational step will guide strategic investments, facilitate resource mobilization, and create a conducive environment for innovation and partnerships.

- **Scaling Decentralized Solutions**: DRE systems must be expanded to meet the needs of underserved communities. This requires fostering public-private partnerships, enhancing financing mechanisms, and scaling models like PAYG solar and micro-leasing. For example, in Uganda, the SolarNow program has enabled rural households to access higher-tier energy services through affordable solar loans.

- **Strengthening Regional Collaboration**: Regional initiatives, such as the Southern African Power Pool and the African Union's Agenda 2063[13], offer frameworks for cross-border energy trade and shared infrastructure investments. Collaborative approaches ensure resource efficiency and enhance grid stability across borders.

- **Leveraging Data and Technology**: Advanced tools like AI, geospatial analytics, and real-time monitoring systems are critical for optimizing investment planning. In Ethiopia, for instance, satellite-integrated electrification models have improved grid extension strategies, ensuring that resources are directed to high-impact areas[14].

- **Building Institutional Capacity**: Establishing Coherent National Energy Policies: Each African country must develop and implement a clear, coherent national energy policy explicitly focused on achieving universal electricity access. This foundational step will guide strategic investments, facilitate resource mobilization, and create a conducive environment for innovation and partnerships.

---

12 - World Bank, «World's Largest Concentrated Solar Plant Opened in Morocco,» February 4, 2016, https://www.worldbank.org/en/news/press-release/2016/02/04/worlds-largest-concentrated-solar-plant-opened-in-morocco.
13 - African Union, "Agenda 2063: Overview", https://au.int/en/agenda2063/overview.
14 - World Bank, "Ethiopia's Transformational Approach to Universal Electrification," March 8, 2018, https://www.worldbank.org/en/news/feature/2018/03/08/ethiopias-transformational-approach-to-universal-electrification.

- **Incorporating Climate Resilience:** Electrification strategies must address climate risks, particularly in regions vulnerable to extreme weather. Flood-prone areas in East Africa, for example, require resilient grid designs and off-grid systems capable of withstanding environmental shocks.

- **Fostering International Partnerships:** Stronger collaboration with global stakeholders, including development banks and private investors, is essential for mobilizing the required resources. The Desert to Power initiative, led by the African Development Bank, exemplifies how international partnerships can support large-scale renewable energy projects in the Sahel region[15].

By embracing these strategies, Africa can overcome the barriers to universal electricity access and unlock its vast potential for sustainable development. Achieving this goal will not only transform lives but also position the continent as a global leader in renewable energy innovation and climate resilience.

15- African Development Bank Group, "Desert to Power Initiative", https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/desert-power-initiative.

Country	Region
Algeria	Northern Africa
Angola	Southern Africa
Benin	Western Africa
Botswana	Southern Africa
Burkina Faso	Western Africa
Burundi	Central Africa
Cabo Verde	Western Africa
Cameroon	Central Africa
Central African Republic	Central Africa
Chad	Central Africa
Comoros	Eastern Africa
Congo Republic	Central Africa
Côte d'Ivoire	Western Africa
Djibouti	Eastern Africa
DR Congo	Central Africa
Egypt	Northern Africa
Equatorial Guinea	Central Africa
Eritrea	Eastern Africa
Eswatini	Southern Africa
Ethiopia	Eastern Africa
Gabon	Central Africa
Gambia	Western Africa
Ghana	Western Africa
Guinea	Western Africa
Guinea-Bissau	Western Africa
Kenya	Eastern Africa
Lesotho	Southern Africa
Liberia	Western Africa
Libya	Northern Africa
Madagascar	Eastern Africa
Malawi	Southern Africa
Mali	Western Africa

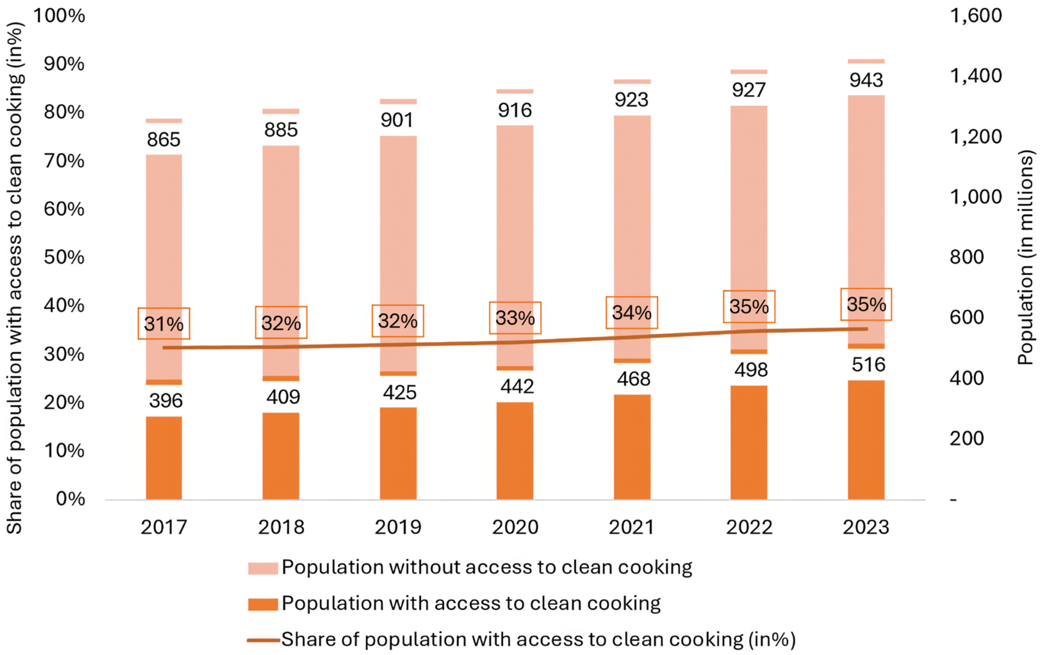
Country	Region
Mauritania	Northern Africa
Mauritius	Eastern Africa
Morocco	Northern Africa
Mozambique	Southern Africa
Namibia	Southern Africa
Niger	Western Africa
Nigeria	Western Africa
Rwanda	Eastern Africa
Sahrawi Republic	Northern Africa
São Tomé and Príncipe	Central Africa
Senegal	Western Africa
Seychelles	Eastern Africa
Sierra Leone	Western Africa
Somalia	Eastern Africa
South Africa	Southern Africa
South Sudan	Eastern Africa
Sudan	Eastern Africa
Tanzania	Eastern Africa
Togo	Western Africa
Tunisia	Northern Africa
Uganda	Eastern Africa
Zambia	Southern Africa
Zimbabwe	Southern Africa

4 ACCESS TO CLEAN COOKING IN AFRICA

4.1. OVERVIEW OF CLEAN COOKING ACCESS IN AFRICA: PROGRESS AND DISPARITIES

Access to clean cooking[16] is a critical component of achieving Sustainable Development Goal 7 (SDG7), which aims for universal access to affordable, reliable, sustainable, and modern energy by 2030. Despite growing recognition of the importance of clean cooking solutions, Africa remains the most energy-impoverished continent in this regard. More than 940 million Africans still rely on polluting cooking fuels such as wood, charcoal, dung, and kerosene, making Africa home to the largest clean cooking access deficit globally (Figure 12).

Figure 12: SDG 7.1.2. Share of population with access to clean cooking (2017-2023)



Source: AFREC SDG7 Database 2025

The use of traditional biomass for cooking has widespread health, economic, gender, and environmental implications. Exposure to household air pollution from inefficient cooking methods leads to an estimated 500,000 premature deaths annually across the continent, disproportionately affecting women and children[17]. Furthermore, the continued reliance on biomass fuels accelerates deforestation and contributes to climate change through carbon emissions.

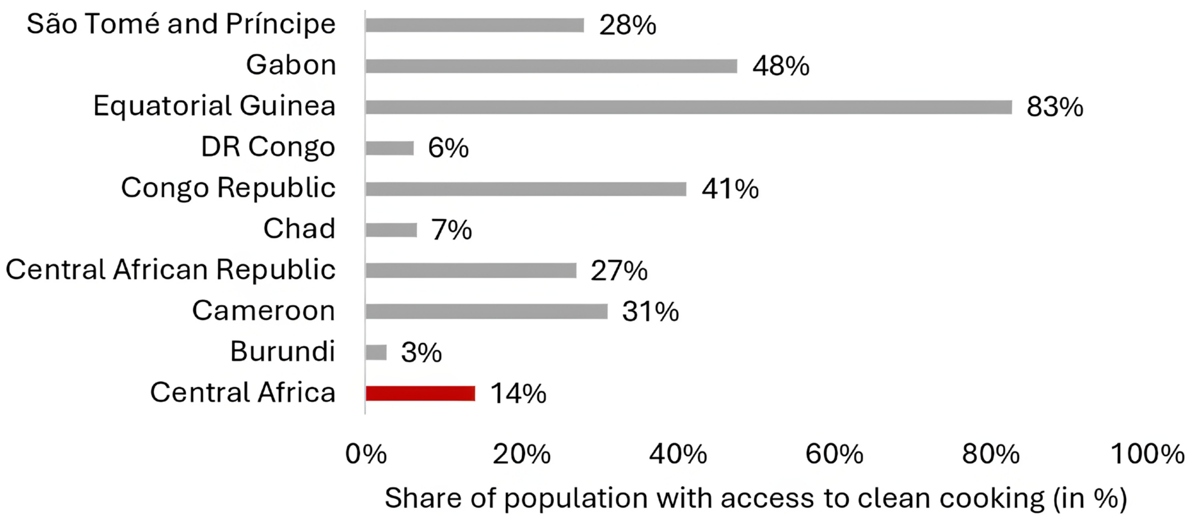
Despite years of international and national-level interventions, progress in clean cooking access has been painfully slow. Between 2017 and 2023, access to clean cooking increased marginally from 31% to 35%, a mere 4 percentage point improvement over six years. This growth is significantly slower than population expansion, meaning that the absolute number of people without access has continued to rise.

Like access to electricity, access to clean cooking is beset with inter and intra-regional disparities:

- **Central Africa:** Cameroon stands at 31% due to urban LPG adoption, while the Democratic Republic of Congo remains at 6% due to low income, and lack of clean cooking value chain. (Figure 13).

16- Clean fuels and technologies encompass stoves utilizing electricity, LPG, natural gas, biogas, solar energy, and alcohol-based fuels.
17- African Development Bank Group. "Paris Summit Aims to Secure Commitments Toward $4B Needed to Close Clean Cooking Funding Gap for African Women." 10 May 2024, https://www.afdb.org/en/news-and-events/press-releases/paris-summit-aims-secure-commitments-toward-4b-needed-close-clean-cooking-funding-gap-african-women-70647.

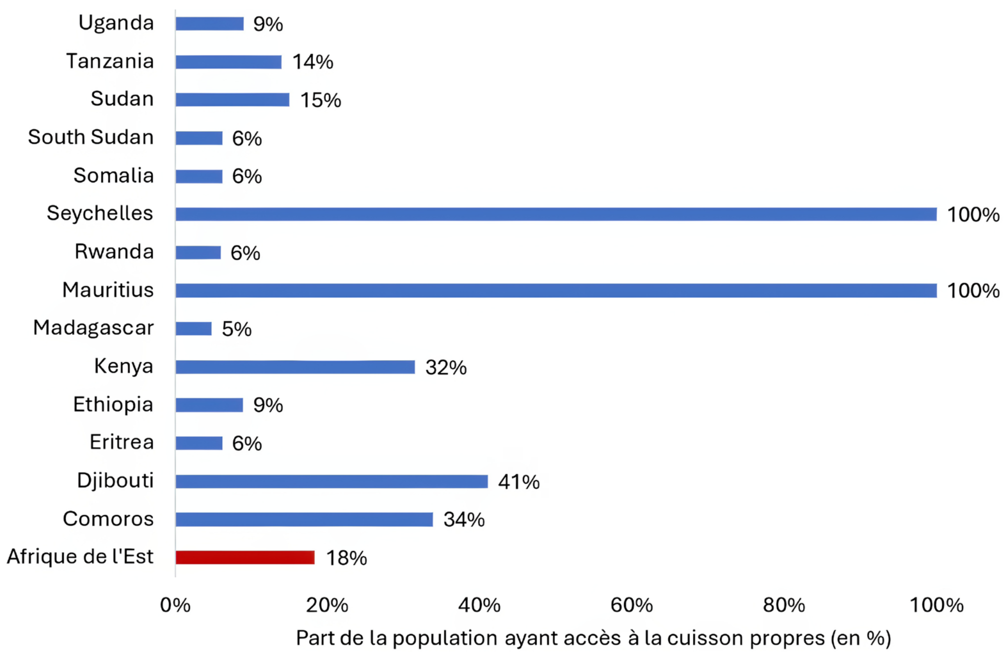
Figure 13: Central Africa: Access to clean cooking, by country, in 2023



Source: AFREC SDG7 Database 2025

- **Eastern Africa:** Kenya's access grew from 16% to 32%, thanks to microfinance for LPG and clean stoves[18]. Ethiopia remains low at 9%, with rural areas facing fuel supply challenges and financial barriers (Figure 14).

Figure 14: Eastern Africa: Access to clean cooking, by country, in 2023

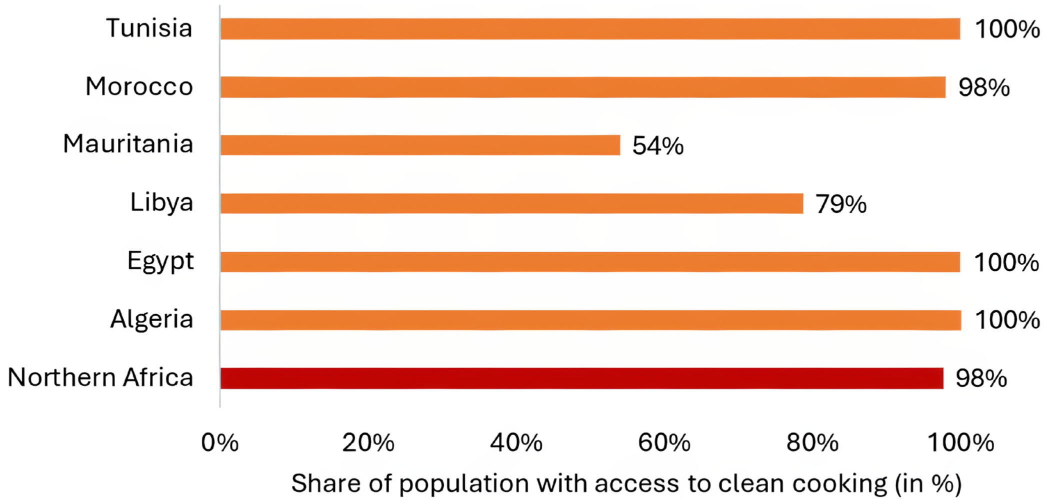


Source: AFREC SDG7 Database 2025

- **Northern Africa:** Algeria, Tunisia, and Egypt achieved nearly 100% access from 2017 to 2023, driven by strong government policies, urbanization, and subsidized LPG distribution. Libya, however, lags behind at around 79%, affected by political instability and infrastructure challenges, while Mauritania is at 54% because of low income. (Figure 15).

18- International Growth Centre. "Microfinance for Clean Cooking with LPG in Kenya: An Evaluation of a Pilot Experiment and Implications for Future Program Roll-out." https://www.theigc.org/collections/microfinance-clean-cooking-lpg-kenya-evaluation-pilot-experiment-and-implications.

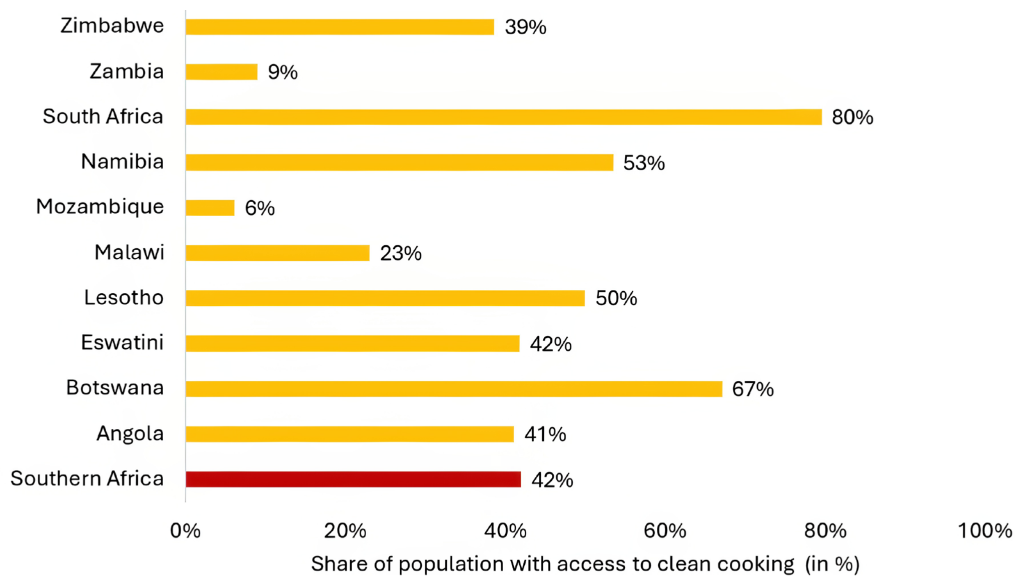
Figure 15: Northern Africa: Access to clean cooking, by country, in 2023



Source: AFREC SDG7 Database 2025

- **Southern Africa**: Botswana maintains around 67% access with urban LPG usage, while Mozambique struggles at 6%, hindered by economic challenges and reliance on traditional biomass (Figure 16).

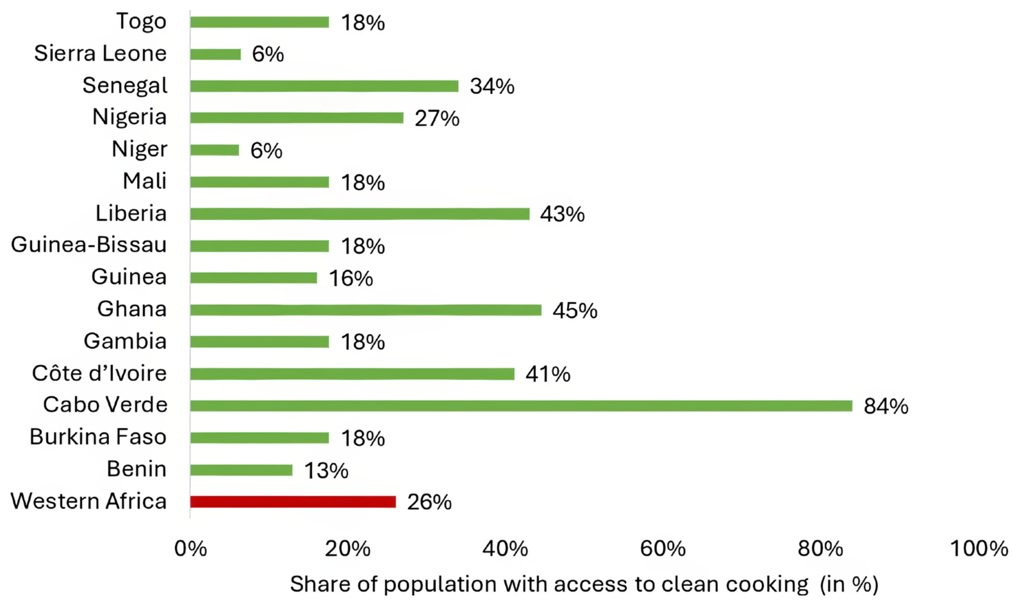
Figure 16: Southern Africa: Access to clean cooking, by country, in 2023



Source: AFREC SDG7 Database 2025

- **Western Africa**: Ghana leads with 45% access due to government-backed LPG programs and public awareness campaigns. Burkina Faso improved from 9% to 18% with donor-funded clean cooking initiatives, while Niger remains below 10% due to limited infrastructure and high poverty rates. Island nations like Cabo Verde that have developed clean cooking supply chain are able to achieve high levels of access (Figure 17).

Figure 17: Western Africa: Access to clean cooking, by country, in 2023



Source: AFREC SDG7 Database 2025

Key factors influencing these disparities include government policy strength, urbanization rates, infrastructure quality, availability of clean fuel, and financial barriers. Northern Africa's success stems from stable policies and infrastructure, while many sub-Saharan countries face challenges related to poverty, conflict, and underdeveloped markets. Expanding access requires targeted policy interventions, financial mechanisms, and international support.

4.2. THE CRITICAL ROLE OF CLEAN COOKING: HEALTH, GENDER AND ENVIRONMENT

HEALTH IMPACTS OF TRADITIONAL COOKING FUELS

The continued reliance on polluting fuels and inefficient cookstoves is a major driver of respiratory diseases and other health conditions in Africa. Women and children, who spend the most time near household cooking areas, are at greater risk of chronic respiratory illnesses, lung infections, cardiovascular diseases, and eye conditions due to prolonged exposure to toxic smoke. The World Health Organization (WHO) estimates that exposure to household air pollution is linked to more deaths than malaria and tuberculosis combined[19].

Among the primary health concerns are:

- **Acute respiratory infections in children**, including pneumonia, which is the leading cause of death in children under five.
- **Chronic Obstructive Pulmonary Disease (COPD)** in adults, especially women exposed to years of smoke inhalation.
- **Increased risk of lung cancer** due to prolonged exposure to wood and charcoal fumes.

GENDER EQUITY AND ECONOMIC PRODUCTIVITY

Beyond health impacts, lack of clean cooking solutions disproportionately affects women and girls by reinforcing existing gender inequalities. In many parts of Africa, the responsibility of collecting firewood and preparing meals falls on women and girls, limiting their time for education, employment, and personal development.

On average, women and girls in rural Africa spend between 1.5 to 5 hours daily gathering firewood[20].

19- World Health Organization. (2022, March). Household air pollution and health. https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

20- International Energy Agency (IEA). Africa Energy Outlook 2022. Paris: IEA, 2022. Available at: https://www.iea.org/reports/africa-energy-outlook-2022.

This labor-intensive and time-consuming task reduces economic productivity and perpetuates cycles of poverty. The introduction of clean cooking solutions can significantly reduce the burden on women, allowing them to engage in income-generating activities, entrepreneurship, and education.

ENVIRONMENT

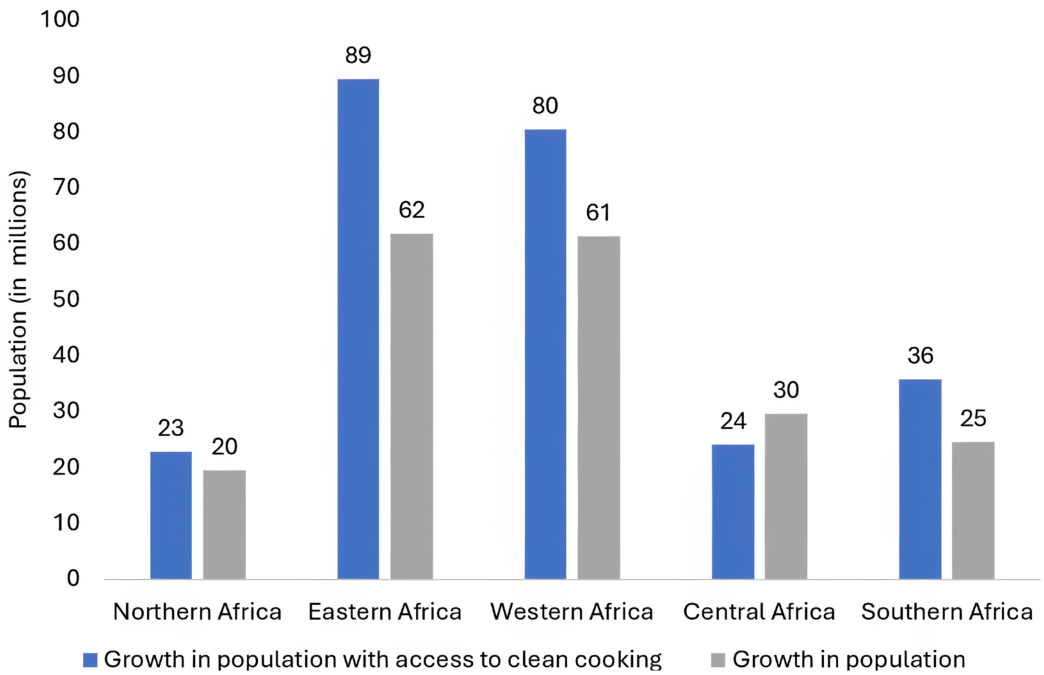
Environmental impacts of the lack of clean cooking in Africa are severe and multifaceted. Widespread deforestation due to fuelwood and charcoal collection leads to biodiversity loss, soil degradation, and disruption of local ecosystems. In regions like East and Southern Africa, deforestation accelerates climate change by increasing greenhouse gas emissions.

Malawi, Tanzania, and Kenya have experienced significant forest cover loss due to reliance on biomass for cooking. The depletion of forests also affects rainfall patterns, agricultural productivity, and water resources, exacerbating food insecurity. Additionally, the carbon emissions from burning biomass contribute to global warming. Addressing clean cooking access is essential not only for environmental preservation but also for ensuring sustainable livelihoods, climate resilience, and ecological balance across the continent.

4.3. CLEAN COOKING AND POPULATION GROWTH: THE DEMOGRAPHIC CHALLENGE

Africa's population is projected to double by 2050, and this population growth represents one of the most formidable obstacles to achieving universal clean cooking access in Africa. While absolute numbers of people using modern fuels continue to climb, the pace of household formation often outstrips these improvements—keeping the total population without access stubbornly high. If current trends persist, the number of people relying on polluting fuels will continue to rise despite percentage improvements in access (Figure 18).

Figure 18: Growth in population v. growth in population with access to clean cooking (2017-2023)



Source: AFREC SDG7 Database 2025

RISING POPULATIONS VS. GAINS IN CLEAN COOKING

Between 2017 and 2023, Africa added nearly 197 million people, reflecting a 16% increase in total population. In the same period, the number of people with access to clean cooking rose by 30%, or roughly 120 million more individuals. Although this growth in access is notable, it still lags behind the overall demographic surge. The result: tens of millions more people continue to rely on polluting fuels even as the share of households using modern energy sources ticks upward.

Northern Africa's population grew from 201 million in 2017 to nearly 221 million by 2023, marking a 10% increase. Access to clean cooking rose at a comparable rate, effectively keeping pace with population growth. High urbanization and near-universal urban coverage allowed most new households to adopt clean fuels rapidly. Algeria maintained a 100% coverage rate despite population growth, due primarily to its established energy infrastructure and sustained government subsidies. Algeria's well-developed LPG supply chain and governmental commitment ensured new households seamlessly integrated into modern energy systems.

In **Western Africa**, the population rose by about 61 million (16%), and clean cooking access increased significantly, from 66 million to 113 million—a 70% rise. However, these strong gains are somewhat diluted by the continuous formation of new households. Nigeria exemplifies the challenge posed by rapid population growth: despite clean cooking coverage rising from 19% to 27%, its population increased by more than 30 million, leaving millions still reliant on polluting fuels. Ghana stands out as a regional success story, nearly doubling clean cooking coverage through proactive policies promoting LPG and improved biomass stoves. Nevertheless, the addition of nearly 4 million new residents highlights the critical importance of maintaining progress to keep pace with ongoing demographic growth.

Southern Africa saw its population increase by 25 million people (14%) from 2017 to 2023. Clean cooking access grew by 15 million users (up 22%), marking a relatively smaller improvement compared to other regions. Varied economic and policy conditions across different countries resulted in uneven progress, especially noticeable in rural areas. Angola exhibited significant improvement, with nearly a ten-percentage-point increase in clean cooking access, despite adding more than 6 million new residents. The nation's strong oil sector offers potential for expanded LPG adoption, contingent on improvements in distribution networks and affordability.

Central Africa experienced the fastest regional population growth in Africa between 2017 and 2023, rising by 28 million people, an increase of about 20%. Despite clean cooking access improving for 7 million people—representing a 41% increase—this has not significantly addressed the region's extensive unserved population. Infrastructure deficits and economic constraints have exacerbated the challenges associated with rapid demographic growth. Specifically, in the Democratic Republic of Congo, even though the population increased by nearly 18 million, the clean cooking coverage rate remains at approximately 6%, reflecting only a marginal increase in absolute user numbers. Persistent infrastructural limitations, economic hardships, and ongoing conflicts pose severe obstacles to expanding clean fuel use in the country. In Cameroon, coverage improved modestly by nine percentage points; however, the population also increased by over 4 million. Distribution networks continue to be concentrated in urban areas, leaving rural regions facing significant logistical barriers.

In **Eastern Africa**, the population expanded substantially, adding approximately 64 million people from 2017 to 2023, a 17% growth. Clean cooking access increased notably by 31 million people, from around 50 million to 81 million, marking a robust 62% increase in clean cooking users. Despite this progress, the number of people dependent on polluting fuels remains high due to rapid population expansion. Ethiopia alone saw an addition of over 18 million people during this period, and although the proportion of households using clean cooking nearly doubled, the low baseline means the vast majority continue to rely on traditional biomass. Kenya experienced a doubling of its clean cooking rate in six years, driven largely by expanding LPG distribution and innovative cookstove initiatives. Nevertheless, Kenya's population growth of more than 6 million has kept the absolute number of people without access considerable.

Rapid population growth significantly influences the progress toward universal clean cooking access across Africa. Millions of young Africans establish new households each year, all of which require affordable and modern cooking solutions. Without ready access to clean fuels and improved stoves, these households inevitably rely on traditional biomass sources such as wood and charcoal. As populations continue to expand, particularly in urban outskirts and rural regions, existing distribution networks for LPG, electricity, and improved biomass stoves become increasingly strained. Scaling up infrastructure swiftly enough to meet the needs of both existing and newly formed households poses a major challenge. Financial and policy constraints further complicate matters, as many governments find it difficult to fund and implement large-scale clean cooking initiatives at a pace that matches demographic growth.

Effective subsidy schemes, awareness campaigns, and robust private-sector partnerships must expand even more rapidly to prevent a growing backlog of unserved households. Additionally, the rural-urban differential adds another layer of complexity: while high urbanization can facilitate the distribution of cleaner fuels, the swift growth of peri-urban and informal settlements, alongside persistently high rural fertility rates, frequently outpace policy implementation, complicating efforts to achieve equitable clean cooking access.

4.4. URBAN-RURAL DISPARITIES IN CLEAN COOKING ACCESS

Marked disparities persist between urban and rural populations, particularly in regions with constrained resources and infrastructure. While some areas—such as Northern Africa—have made commendable progress, vast portions of Central, Eastern, Southern and Western Africa lag significantly behind. Understanding these urban-rural disparities helps illuminate how policies, infrastructure, affordability, and demographics impact access to clean cooking (Figure 19 - Figure 24).

Figure 19: Urban clean cooking access in Africa

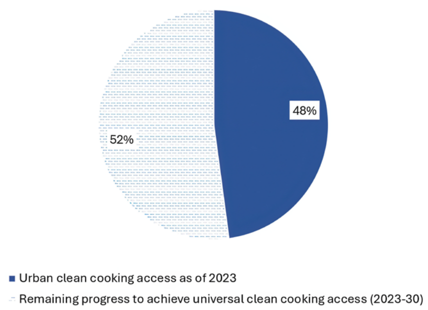


Figure 20: Rural clean cooking access in Africa

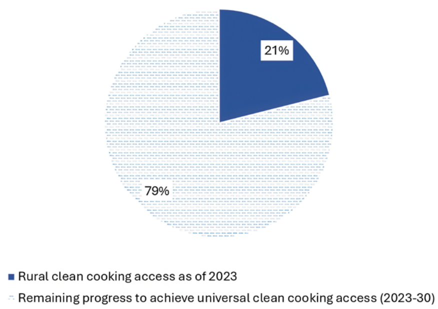


Figure 21: Urban clean cooking access in Central, Eastern, Southern & Western Africa

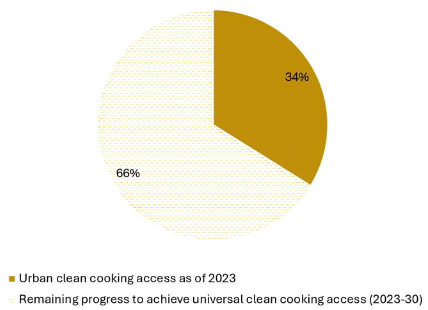


Figure 22: Rural clean cooking access in Central, Eastern, Southern & Western Africa

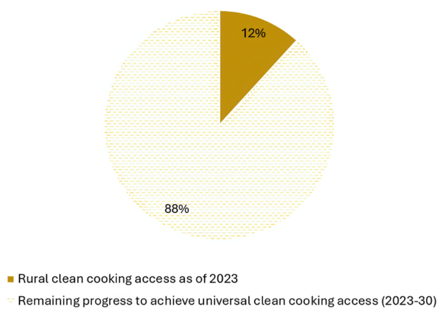


Figure 23: Urban clean cooking access in Northern Africa

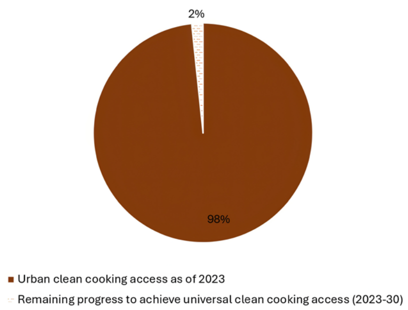
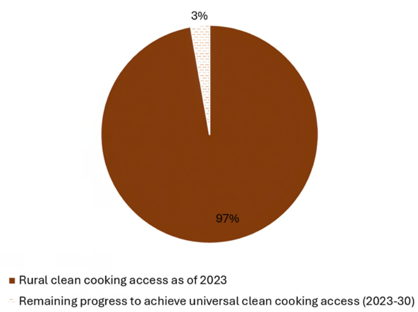


Figure 24: Rural clean cooking access in Northern Africa



Source: AFREC SDG7 Database 2025

DEVELOPED REGIONS:
NEAR-UNIVERSAL ACCESS IN NORTHERN AFRICA

Northern Africa offers a strong example of near-universal access to clean cooking, with coverage reaching 98% in 2023. This achievement results from several interrelated factors. Effective government policies and subsidies have significantly promoted Liquid Petroleum Gas (LPG) through carefully structured subsidy programs, reducing costs for consumers and facilitating the transition from biomass fuels. Furthermore, proactive policy frameworks have ensured this shift is both feasible and attractive for households.

The region benefits considerably from well-established energy distribution networks. Urban areas, in particular, enjoy robust infrastructure including reliable fuel and electricity distribution systems. Additionally, collaborations between the private and public sectors have significantly improved last-mile delivery, enabling even households in smaller towns to access modern fuels. Urban infrastructure advantages, such as dense population centers, also play a crucial role by enabling cost-effective supply chains for LPG, electricity, and other clean cooking technologies. Higher average incomes and greater formal employment in urban areas further enhance the affordability and accessibility of modern energy solutions. Nevertheless, rural populations in Northern Africa continue to face challenges, although these are substantially less severe compared to other regions on the continent. The success in Northern Africa underscores the critical importance of targeted subsidies, urbanization, and robust supply chains in achieving high clean cooking adoption rates.

LESS-DEVELOPED REGIONS:
LIMITED ACCESS AND HEAVY RELIANCE ON POLLUTING FUELS

In stark contrast to Northern Africa's success, regions such as Central, Eastern, Southern, and Western Africa grapple with limited access to clean cooking and persistent reliance on traditional biomass fuels, including wood, charcoal, and crop residue. While urban areas within these regions generally have somewhat better access compared to rural villages, significant gaps persist.

In Eastern Africa, urban and rural realities differ markedly. Cities like Nairobi and Addis Ababa have seen some households transition to charcoal briquettes or LPG, yet rural and peri-urban regions face severe affordability issues due to transport and distribution bottlenecks. Although government-led LPG subsidy programs and private-sector initiatives are present, they frequently lack adequate financial backing or reach to effect significant change in rural communities.

Western Africa similarly illustrates this divide. Major cities, such as Lagos, Accra, and Abidjan, function as crucial distribution hubs for fuels and improved cookstoves. Urban demand for cleaner fuels can drive economies of scale and gradually lower prices in surrounding areas. However, rural areas continue to lag significantly behind, primarily due to weaker infrastructure and limited market access.

Central Africa faces pronounced urban-rural disparities as well. While cities like Kinshasa and Yaoundé have modestly adopted LPG and improved biomass stoves, rural regions typically have minimal to no access. These areas suffer from logistical challenges and insufficient policy support, combined with high poverty rates, limited government initiatives, and inefficient supply chains, perpetuating widespread dependence on biomass fuels that are often cheaper in the short term but costlier to health and the environment.

Southern Africa highlights a substantial urban-rural access gap, with urban clean cooking access standing at 59% compared to only 23% in rural areas. Economic differences contribute significantly to this disparity, as higher urban incomes and employment opportunities make modern cooking fuels and appliances more accessible in cities. Additionally, urban centers benefit from proximity to fuel depots, electricity grids, and retail outlets. In contrast, rural regions frequently lack reliable LPG supply chains or efficient cookstoves. Moreover, policy and subsidy programs in countries such as South Africa, Botswana, and Namibia often fail to adequately extend into rural areas, where logistical costs are higher and administrative capacities more limited.

4.5. FUEL TYPES AND TECHNOLOGY ADOPTION: TRANSITIONING FROM POLLUTING TO CLEAN SOLUTIONS

Clean cooking access across Africa remains a substantial challenge, with wide disparities by region and between urban and rural areas. Despite incremental gains in recent years, the majority of households in Central, Eastern, Southern, and Western Africa still rely on polluting fuels—biomass (wood, charcoal), kerosene, or coal—for their daily cooking needs. In contrast, Northern Africa has achieved near-universal adoption of cleaner fuels like LPG (liquefied petroleum gas) and, in urban areas, electricity. Understanding the current fuel mix and the pathway to transition is critical for meeting public health goals, mitigating environmental degradation, and achieving the region's clean cooking targets by 2030.

Prevalence of Polluting Fuels

- **Traditional Biomass Fuels:** Wood, charcoal, and agricultural residues remain the most common cooking fuels in Central, Eastern, Southern, and Western Africa, particularly in rural areas where up to 90% of households are dependent on these polluting sources.
- **Kerosene and Coal**: While less widespread than wood or charcoal, kerosene and coal are used by certain low- and middle-income households, primarily in urban settings. They contribute significantly to indoor air pollution and carry distinct safety risks (e.g., burns, explosions).

Modern Fuels and Technologies

- **LPG (Liquefied Petroleum Gas)**
  - o **Northern Africa**: In countries like Algeria, Morocco, and Tunisia, LPG covers over 90% of household cooking needs, owing to established subsidy programs and robust distribution infrastructure.
  - o **Rest of Africa**: Adoption is rising in cities such as Lagos (Nigeria), Accra (Ghana), and Nairobi (Kenya), but rural uptake remains limited by cost and logistical challenges.
- **Electricity and E-cooking**
  - o **Urban Hubs**: Households in more affluent or well-grid-connected areas increasingly use electric hobs, induction cookers, or electric pressure cookers (EPCs).
  - o **Mini-Grids and Off-Grid Solutions**: Solar mini-grids and battery-supported systems are slowly emerging in remote areas, yet high initial capital costs and unreliable supply often impede adoption.
- **Ethanol and Biogas**
  - o **Emerging Alternatives**: Some regions (e.g., parts of Ethiopia and Kenya) are testing ethanol stoves, while small-scale biogas digesters show promise in specific agro-based communities. However, these fuels remain niche relative to LPG or electricity.

Fuel Stacking and Partial Transitions

Despite the rising availability of cleaner cooking solutions, many households continue to use a mix of both clean and polluting fuels—a practice commonly referred to as fuel stacking. While this phenomenon is sometimes viewed simply as a transitional phase, fuel stacking can be more deeply rooted in households' cultural, practical, and economic realities[21].

For many families, the decision to maintain access to traditional cooking fuels is shaped by concerns around the reliability and affordability of modern alternatives. The supply of clean fuels such as liquefied petroleum gas (LPG) or electricity can be unpredictable, and households may keep a wood or charcoal stove on standby to buffer against price hikes, LPG cylinder shortages, or power outages. Budget constraints also play a significant role. For low-income families, the upfront cost of a full LPG cylinder can be prohibitive. In contrast, biomass fuels such as charcoal or firewood can often be purchased in smaller, more manageable quantities, making them a practical choice when finances are tight.

21 - April Warren and Colm Fay, "Uncovering Fuel Stacking Behaviors and Preferences: A Survey Tool for Clean Cooking Enterprises," Clean Cooking Alliance, September 16, 2024. https://cleancooking.org/news/uncovering-fuel-stacking-behaviors-and-preferences-a-survey-tool-for-clean-cooking-enterprises/.

Cultural traditions and culinary preferences also sustain the use of polluting fuels. Certain dishes are believed to taste better when cooked slowly over a wood or charcoal fire, and biomass fuels are often reserved for special occasions or elaborate meals. Traditional stoves are frequently seen as more suitable for long simmering or communal cooking, with modern fuels viewed not as replacements, but as complements to time-honored practices.

The structure and dynamics within households further influence fuel choices. Women are often the primary cooks but may not have control over household spending decisions. This can limit consistent access to clean fuels, even when modern appliances are available. Additionally, the practical benefits of fuel stacking cannot be overlooked—especially in households managing multiple cooking needs. For instance, a family may use an LPG stove for quick, everyday meals while relying on a charcoal stove for staples that require longer cooking times.

To effectively promote exclusive use of clean fuels, interventions must go beyond health messaging. Programs that highlight cultural fit, long-term cost savings, and reliability are more likely to gain traction. Innovations in product design—such as appliances tailored to traditional cooking methods—can facilitate smoother adoption. Similarly, flexible financing models like Pay-As-You-Go (PAYG) and microfinance can help households overcome financial barriers to sustained use of clean fuels.

Finally, ongoing data collection and behavioral monitoring are crucial. Survey tools developed by organizations like the Clean Cooking Alliance[22] can help enterprises and policymakers track evolving household preferences, ensuring that clean cooking interventions remain responsive, targeted, and impactful.

Policy and Investment Pathways for a Sustainable Clean Cooking Transition

Accelerating the transition to clean cooking requires a combination of short-term solutions and long-term structural reforms. From a policy and investment standpoint, an integrated approach must be adopted—one that simultaneously addresses infrastructure, affordability, behavioral shifts, and innovation.

Foundational to the clean cooking transition is robust infrastructure. Expanding storage and distribution systems for clean fuels, such as investing in LPG import terminals, cylinder filling stations, and rural distribution networks, can mitigate supply constraints and improve accessibility. At the same time, scaling up electricity access—particularly through grid expansion and decentralized solutions like mini-grids—is critical to unlocking the potential of electric cooking, especially in peri-urban and rural areas where reliability remains a concern.

Affordability continues to be a barrier for many households, making strategic financing solutions indispensable. Targeted subsidies for LPG or partial financing of e-cooking appliances can bring the cost of clean fuels in line with or even below that of polluting options like charcoal. In parallel, innovative financial models—such as microfinancing and Pay-As-You-Go (PAYG)—have shown promising results in countries like Uganda and Kenya. These mechanisms allow households to adopt cleaner technologies without the burden of high upfront costs, instead spreading payments over time in manageable increments.

Technology and access alone are insufficient unless they are matched by consumer acceptance and behavior change. Community demonstrations, training initiatives, and locally tailored media campaigns play a key role in addressing skepticism, raising awareness of health impacts, and highlighting time-saving benefits. To reinforce this shift, governments and development actors must also focus on establishing and enforcing quality standards for stoves and appliances. Quality assurance not only protects consumers from low-performing products but also builds long-term trust in clean cooking technologies.

Ongoing innovation is essential to meeting the diverse needs of households and broadening the fuel landscape. Promoting alternative fuels such as ethanol, biogas, and briquettes derived from agricultural

---

22 - Clean Cooking Alliance, "Reducing Fuel Stacking – A Survey Tool for the Clean Cooking Industry," September 16, 2024, https://cleancooking.org/reports-and-tools/reducing-fuel-stacking-a-survey-tool-for-the-clean-cooking-industry/.

waste can provide locally appropriate, sustainable options. In contexts where immediate fuel switching is not viable, improved biomass stoves offer a meaningful interim solution. These advanced stoves reduce fuel consumption and significantly lower harmful emissions, offering households a cleaner alternative while laying the groundwork for a future shift to modern energy.

4.6. FINANCING AND POLICY PATHWAYS TO UNIVERSAL CLEAN COOKING ACCESS

Achieving universal clean cooking access in Africa requires an estimated $4 billion annually. Innovative financing mechanisms and policy interventions are essential to bridge this gap[23]. This shortfall underscores the need for innovative financing mechanisms and policy interventions tailored to the diverse contexts across the continent. Northern Africa's near-universal coverage contrasts sharply with the rest of Africa, where affordability and infrastructure gaps persist. Below are the key strategies and illustrative country examples.

Blended Finance and Targeted Subsidies

Blended finance combines public, private, and philanthropic capital to expand the resource pool for clean cooking initiatives. Targeted subsidies, especially for LPG and electric cooking solutions, can bridge affordability gaps for low-income populations.

1.Morocco: Large-Scale Butane (LPG) Subsidies

- **Policy Context:** Morocco's butane subsidy program, in place for decades, stabilizes LPG prices and keeps them affordable[24].
- **Key Lesson:** Predictable subsidy mechanisms encourage private-sector investment in storage and distribution infrastructure.

2.Ghana: National LPG Promotion Policy

- **Policy Context:** Ghana's Rural LPG Promotion Program (RLPGPP) set out to increase LPG coverage[25]. The government uses partial subsidies and tax incentives for LPG importers and distributors; private firms also receive concessional loans from development banks to expand retail networks.
- **Key Lesson:** Well-structured public support can catalyze private-sector involvement and rapidly scale up LPG usage.

Public-Private Partnerships (PPPs) for Clean Cooking

PPPs mobilize resources, distribute risk, and bring expertise from both the public and private sectors. In SSA, risk-sharing models offered by entities like the African Development Bank (AfDB) and the World Bank can attract private capital to typically underserved markets.

1.Kenya: Clean Cookstove Manufacturing & Distribution

- **PPP Approach:** The Kenyan government partnered with international NGOs and private manufacturers (e.g., Burn Manufacturing) to develop high-efficiency biomass stoves[26].
- **Key Lesson:** By mitigating investment risk through partial guarantees and market development grants, PPPs can spur local manufacturing and create sustainable supply chains.

23- African Development Bank Group, "COP29: Lack of Clean Cooking Access Poses Deadly Risks for Millions in Africa, Leaders Urge Action," November 13, 2024. https://www.afdb.org/en/news-and-events/press-releases/cop29-lack-clean-cooking-access-poses-deadly-risks-millions-africa-leaders-urge-action-78534
24- Kanyako, F., Lamontagne, J., Baker, E., Turner, S., & Wild, T. (2023). Seasonality and trade in hydro-heavy electricity markets: A case study with the West Africa Power Pool (WAPP). Applied Energy, 329, 120214.
25- Adjei-Mantey, K., Takeuchi, K., & Quartey, P. (2021). Impact of LPG promotion program in Ghana: The role of distance to refill. Energy Policy, 158, 112578.
26- Climate Impact Partners. (n.d.). Burn Efficient Cookstoves, Kenya, https://www.climateimpact.com/global-projects/burn-efficient-cookstoves-kenya/.

2.Rwanda: Partnerships for Transition to Modern Energy Cooking

- o **PPP Approach:** As part of its broader transition away from biomass, the Government of Rwanda collaborates with development partners (e.g., GIZ), philanthropic organizations, and private firms to pilot and scale electric cooking (e-cooking) solutions[27].
- o **Key Lesson:** Risk-sharing and technical assistance under PPPs can spur market demand for new cooking technologies. Rwanda's multi-stakeholder approach—combining government leadership, donor funding, and private distribution networks—helps build consumer awareness and lower the cost of advanced cooking devices over time.

Innovative Tariff Models and Microfinancing

High upfront costs often deter low-income households from adopting clean cooking technologies. Pay-As-You-Go (PAYG) schemes, microloans, and tiered tariffs can make cookstoves, LPG cylinders, and electric cooking solutions more affordable.

1.Tanzania: KopaGas

- o **Financing Model:** KopaGas introduced a PAYG solution that uses smart meters fitted to LPG cylinders, enabling households to purchase cooking fuel in small, affordable increments (e.g., per day or per meal).
- o **Key Lesson:** By allowing small, flexible payments, the PAYG model significantly lowers the financial barrier to switching from charcoal or firewood to LPG. This approach can rapidly increase adoption in low-income, urban, and peri-urban areas.

2.Ethiopia: Microcredit for Improved Biomass Stoves

- o **Financing Model:** Ethiopia's National Improved Cookstoves Program partners with microfinance institutions to provide small loans for stove purchases[28].
- o **Key Lesson:** Even simple improved biomass stoves can gain traction when short-term loans or installment options are available to low-income households.

Geospatially Targeted Programs

Strategic use of GIS mapping and socio-economic data allows governments and donor agencies to channel resources where they are most needed—rural pockets with little infrastructure or rapidly growing peri-urban settlements.

1.Nigeria: LPG Rollout in Underserved Regions

- o **Geospatial Approach:** The National LPG Expansion Plan combines population density maps with fuel distribution data to prioritize states with low access[29].
- o **Key Lesson:** Data-driven planning optimizes investment in cylinder distribution centers and transport corridors.

2.Mozambique: Electrification & Clean Cooking Pilot

- o **Geospatial Approach:** Mozambique's Energy Fund (Funae) deploys solar mini-grids in remote provinces, enabling limited but growing e-cooking trials[30].
- o **Key Lesson:** Layering electrification data with socio-economic indicators helps pinpoint where e-cooking can be tested and scaled.

27- Ntivunwa, S. D. (2022). Plan of Action: Rwanda's transition to modern energy cooking. Modern Energy Cooking Services (MECS). https://mecs.org.uk/wp-content/uploads/2023/01/Plan-of-Action-Rwandas-transition-to-modern-energy-cooking.pdf.

28- Ministry of Water and Energy of Ethiopia, National Improved Cookstoves Program (NICSP), Clean Cooking Alliance, accessed March 30, 2025. https://cleancooking.org/sector-directory/ministry-of-water-and-energy-of-ethiopia-national-improved-cookstoves-program-nicsp/.

29 - International Energy Agency (IEA), Framework for the Implementation of Intervention Facility for the National Gas Expansion Programme, accessed March 30, 2025. https://www.iea.org/policies/13420-framework-for-the-implementation-of-intervention-facility-for-the-national-gas-expansion-programme.

30 - Carlos Sakyi-Nyarko et al., Mozambique eCooking Market Assessment, Modern Energy Cooking Services (MECS) and Energising Development (EnDev), February 2022. https://mecs.org.uk/wp-content/uploads/2022/02/MECS-EnDev-Mozambique-eCooking-Market-Assessment.pdf.

Region-Specific Considerations

1.Northern Africa

- o **High Coverage Maintenance:** Countries like Algeria, Egypt, and Tunisia already boast near 100% coverage. Policymakers now focus on maintaining subsidies and modernizing distribution networks.
- o **Diversification**: As part of broader energy transitions, North African governments explore diversification toward greener LPG alternatives (e.g., bio-LPG) and electric cooking with time-of-use tariffs to stabilize grid demand.

2.Rest of Africa

- o **Concessional Funding & Grants:** Higher poverty levels and infrastructure deficits require stronger concessional finance from entities like the AfDB, World Bank, and bilateral donors.
- o **Localized Supply Chains:** Encouraging local manufacturing (e.g., of improved biomass or electric stoves) is crucial to reduce costs and build an ecosystem resilient to international market fluctuations.

4.7. CONCLUSION:
THE URGENT NEED FOR ACTION

Without immediate, coordinated intervention, more than 1 billion Africans will still rely on polluting fuels by 2030[31]. Such a scenario poses dire risks to public health, gender equality, and the environment. Clean cooking access is not merely an energy concern—it is also a public health imperative, a development catalyst, and a critical factor in achieving climate and environmental objectives.

The cost of inaction is dire. Household air pollution from biomass, charcoal, and kerosene is a leading cause of respiratory illness, disproportionately affecting women and children who spend more time around household stoves. The time and labor required to collect fuel further hinder educational attainment, reduce productivity, and compromise opportunities for economic advancement—particularly for women. Meanwhile, unsustainable biomass harvesting accelerates deforestation, contributes to land degradation, and undermines climate resilience, exacerbating already fragile ecosystems.

While Northern Africa has made significant strides—achieving near-universal access to LPG and electricity—this progress offers only a partial picture. The rest of the continent faces significant and varied challenges. Central, Eastern, Southern, and Western Africa continue to grapple with deep infrastructure gaps, affordability constraints, and population growth that threatens to outpace current access gains. These regional nuances demand tailored, locally relevant solutions, underpinned by cross-country collaboration and political will.

In this landscape, the African Union (AU) Champion on “Access to Clean Cooking” has a vital role to play. As a unifying voice and political advocate, the Champion can galvanize high-level leadership, shape continental priorities, and coordinate regional and international partnerships to accelerate progress. By championing clean cooking as a core development and climate issue, this role can bring visibility, resources, and urgency to an area long relegated to the periphery of energy discussions.

31 - International Renewable Energy Agency (IRENA), Clean Cooking in NDCs Offer Opportunities to Reach SDG7 and Climate Goals, January 2025. https://www.irena.org/News/expertinsights/2025/Jan/Clean-Cooking-in-NDCs-Offer-Opportunities-to-Reach-SDG7-and-Climate-Goals.

RECOMMENDATIONS FOR ACCELERATED ACTION

1. **Prioritize Clean Cooking on Par With Electricity:** Governments and policymakers must recognize clean cooking as a core component of national energy strategies. Allocating resources for stove distribution, fuel supply chains, and supportive policies is essential to achieving universal coverage alongside broader electrification goals.

2. **Increase International and Private-Sector Investment:** Development partners and private investors should significantly scale funding for clean cooking. Blended financing models, risk-sharing mechanisms, and robust PPPs can unlock the capital required for infrastructure expansion, stove innovation, and last-mile distribution.

3. **Leverage Targeted Subsidies and Innovative Financing:** Direct subsidies, microfinancing, and Pay-As-You-Go (PAYG) models are crucial for making modern cooking fuels affordable to low-income households. Targeted approaches—especially in remote or peri-urban areas—can ease the financial burden on families, while ensuring that subsidies reach those who need them most.

4. **Embrace Decentralized Solutions:** Off-grid and decentralized technologies (e.g., solar cookstoves, mini-grids for electric cooking, biogas digesters) are critical for remote rural populations. By tailoring solutions to local contexts and harnessing community engagement, decentralization can close access gaps more rapidly than centralized approaches alone.

5. **Promote Regional and International Collaboration:** Joint efforts through the African Union (AU) and partnerships with global organizations can pool resources, harmonize standards, and share best practices. North Africa can continue refining LPG and electricity-based clean cooking models, while the rest of Africa can adapt these lessons to local contexts.

6. **Adopt Data-Driven Planning and Monitoring:** Advanced data analytics, including GIS mapping, should inform where and how to deploy resources for maximum impact. North African countries can use data to optimize LPG and electricity distribution, while Central, Eastern, Southern, and Western Africa should focus on high-deficit, high-population areas.

7. **Build Capacity and Raise Awareness:** Skill-building initiatives for stove manufacturers, technicians, and policymakers bolster local clean cooking markets. Public awareness campaigns can address cultural preferences and explain the long-term health and economic benefits of transitioning away from polluting fuels.

LOOKING AHEAD

The vision for universal clean cooking access by 2030 is ambitious—but within reach. Achieving it will require bold leadership, targeted investments, and policies that are attuned to regional differences and local realities. With Northern Africa offering lessons in infrastructure and policy design, and the rest of the continent innovating through community-led and decentralized approaches, Africa can create a shared, scalable model for clean cooking transformation.

The African Union Champion on Clean Cooking stands at the helm of this effort—mobilizing resources, aligning strategies, and giving voice to one of the continent's most pressing but overlooked challenges.

Time is of the essence. If momentum stalls, over a billion people across Africa will remain reliant on biomass, charcoal, and kerosene—at enormous cost to health, equity, and the environment. But with decisive, coordinated action—anchored by data, financing, and political will—Africa can bridge the clean cooking gap. Doing so will save lives, empower women, stimulate economic growth, and protect the planet for generations to come.

5 RENEWABLE ENERGY IN AFRICA

5.1 INTRODUCTION

The African continent stands at a pivotal moment in its efforts to achieve SDG7. Despite having plentiful solar, wind, hydro, and geothermal resources, Africa's energy landscape is heavily characterized by low electrification rates in certain regions and a persistent reliance on traditional biomass.

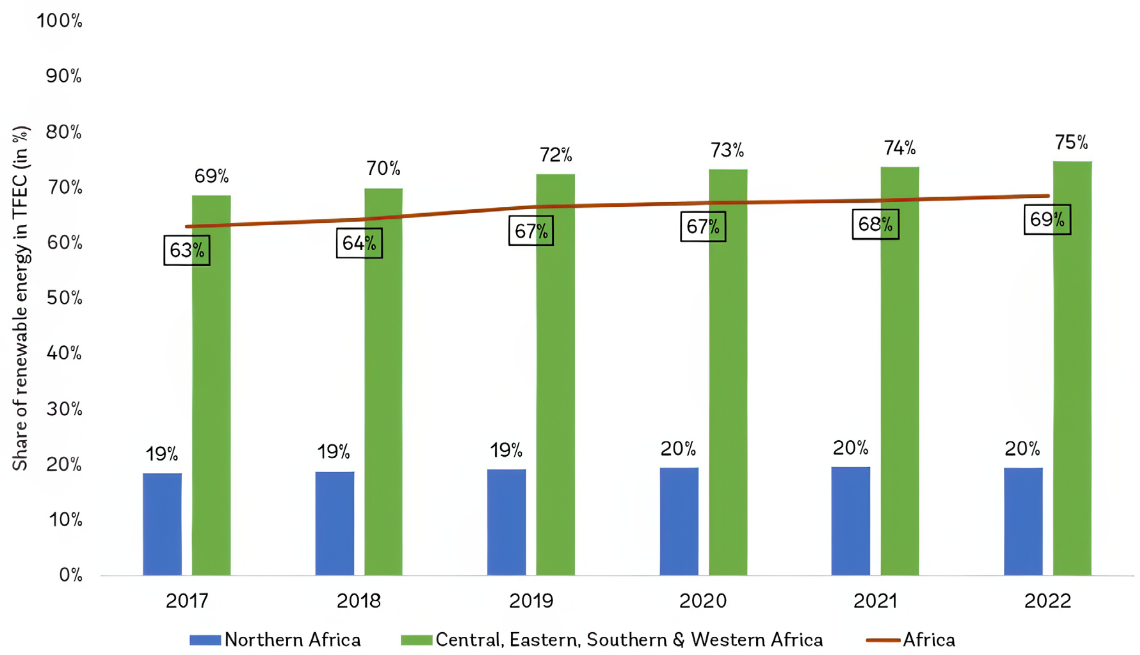
This reliance inflates nominal "renewable" energy figures but yields minimal progress in combating air pollution, deforestation, and poverty. Shifting from traditional, inefficient biomass usage to modern renewables such as hydro, solar, geothermal, and sustainable bioenergy is therefore critical not only for environmental and health benefits but also for long-term economic development.

Against this backdrop, the share of renewable energy in total final energy consumption (TFEC) varies significantly across African countries. Many regions report relatively high percentages—on paper—because of biomass consumption, while modern renewables remain scarce. To illustrate these disparities and highlight pathways for improvement, this chapter presents both a continental overview and an in-depth look at five African sub-regions. Drawing on the latest available data, we assess the extent to which individual countries and regions are modernizing their energy mix, emphasizing electricity generation (i.e., renewable energy in power consumption), modern renewable energy's share in TFEC, and the emerging role of renewables in heating, cooling, and transport.

5.2 OVERVIEW OF RENEWABLE ENERGY ADOPTION IN AFRICA

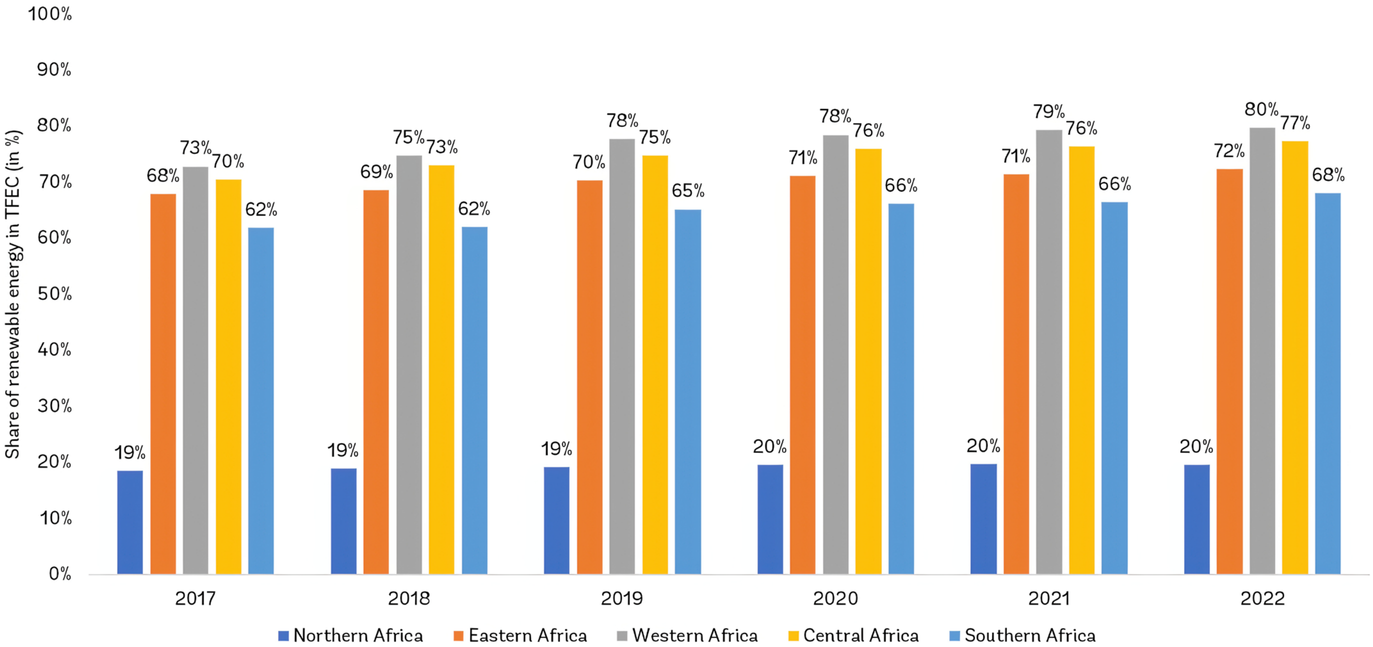
From 2017 to 2022, Africa's overall renewable share in total final energy consumption (TFEC) rose moderately, moving from 63% to 69% (Figure 25). Although this upward trend reflects growing interest in renewable energy technologies and policy measures across the continent, it does not necessarily indicate a broad-based shift toward modern renewables. Much of this share still comprises traditional biomass (e.g., wood, charcoal), which, while technically "renewable," often exacerbates environmental and public health challenges. Regional comparisons reveal stark variations in both initial levels and rates of change (Figure 26).

Figure 25: SDG 7.2.1. Share of renewables in Total Final Energy Consumption, 2017 – 2022



Source: AFREC SDG7 Database 2025

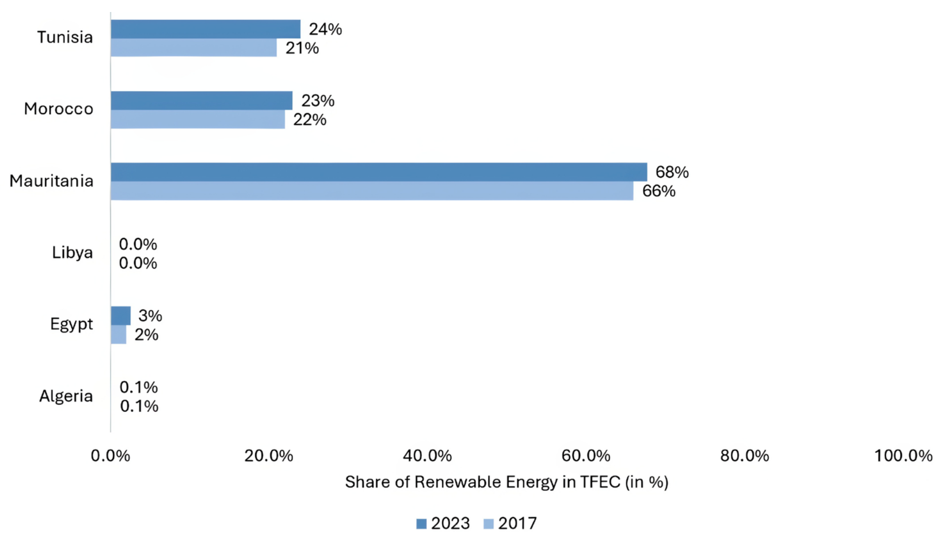
Figure 26: SDG 7.2.1. Share of renewables in Total Final Energy Consumption, by sub-region, 2017 – 2022



Source: AFREC SDG7 Database 2025

- **Northern Africa**: Hovering around **20%** renewable share through this period, Northern Africa consistently lags behind other regions that benefit from extensive biomass usage. Despite strong solar and wind potential, the sub-region's heavy reliance on fossil fuels—combined with significant subsidies—limits faster growth in modern renewables. However, incremental policy reforms in countries such as Morocco and Egypt have begun to attract international investment in large-scale solar and wind projects (Figure 27).

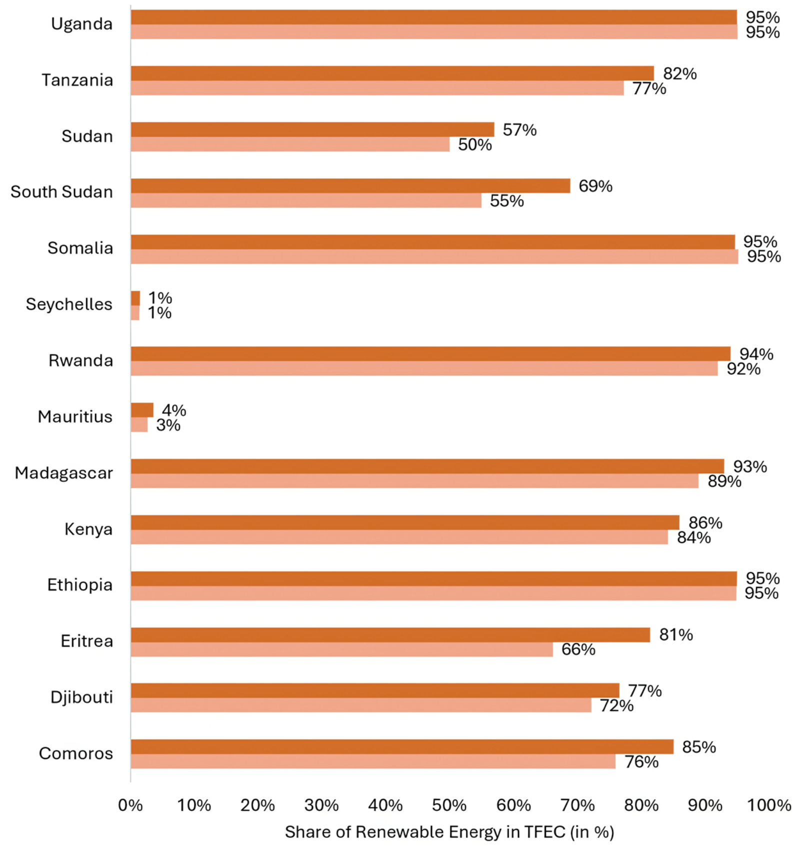
Figure 27: Share of renewables in Total Final Energy Consumption, by country, in Northern Africa, 2017 – 2022



Source: AFREC SDG7 Database 2025

- **Eastern Africa**: Starting at **68%** in 2017 and reaching **72%** in 2022, Eastern Africa demonstrates a relatively high renewable share, largely underpinned by hydropower and geothermal. Kenya, Rwanda, and Uganda benefit from abundant natural resources, helping drive strong renewable penetration in electricity generation (Figure 28). Nonetheless, reliance on traditional biomass for cooking remains substantial, and achieving further progress requires scaling up modern renewable technologies—particularly off-grid solar and improved biomass solutions.

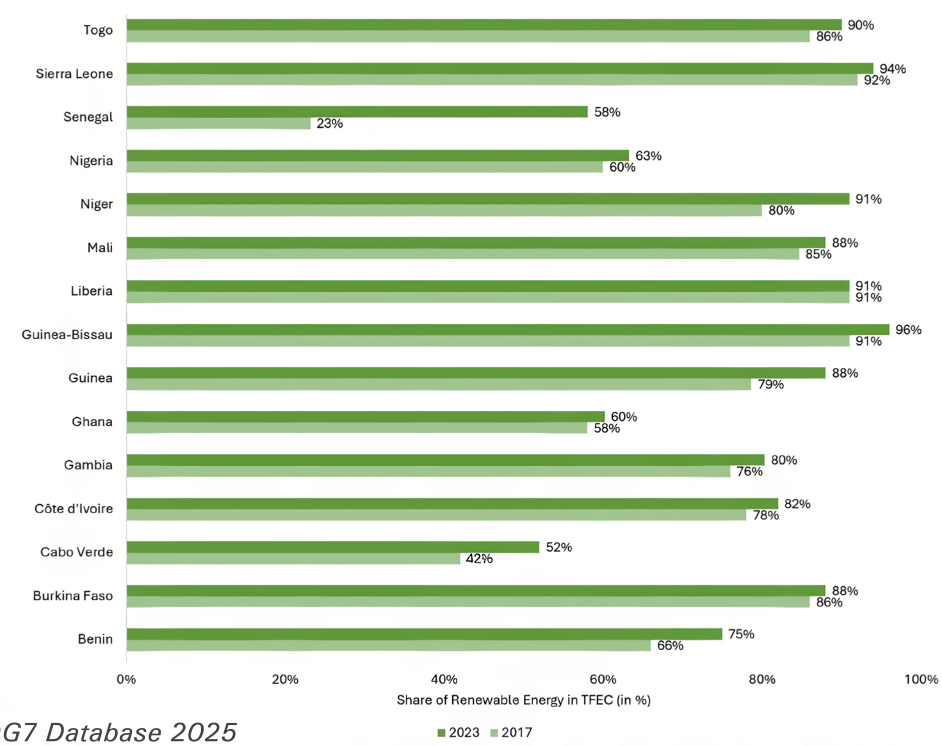
Figure 28: Share of renewables in Total Final Energy Consumption, by country, in Eastern Africa, 2017 – 2022



Source: AFREC SDG7 Database 2025

- **Western Africa:** Rising from **73%** to **80%**, Western Africa exhibits some of the highest renewable shares on the continent, but the dominant factor continues to be traditional biomass rather than modern technologies. While countries like Nigeria have gradually increased grid-based renewables (hydropower and small-scale solar), limited rural electrification and ongoing dependence on firewood and charcoal create significant health and environmental challenges (Figure 29). The region's modest upward shift nonetheless hints at potential for further gains if supportive policies and investments align.

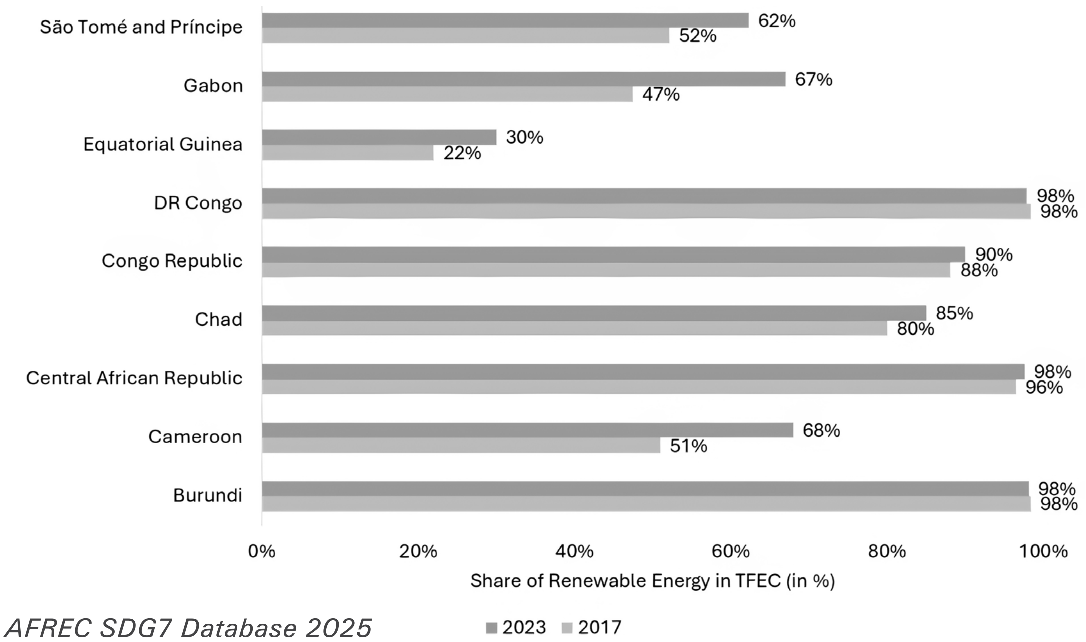
Figure 29: Share of renewables in Total Final Energy Consumption, by country, in Western Africa, 2017 – 2022



Source: AFREC SDG7 Database 2025

- **Central Africa:** Increasing from 70% to 77%, Central Africa displays a similar reliance on biomass for cooking and heating. Countries such as the Burundi, Democratic Republic of the Congo and Cameroon benefit from substantial hydropower, yet electrification rates remain low, and distribution infrastructures are weak (Figure 30). The gradual growth in overall renewables often masks the need for modern energy solutions in remote communities.

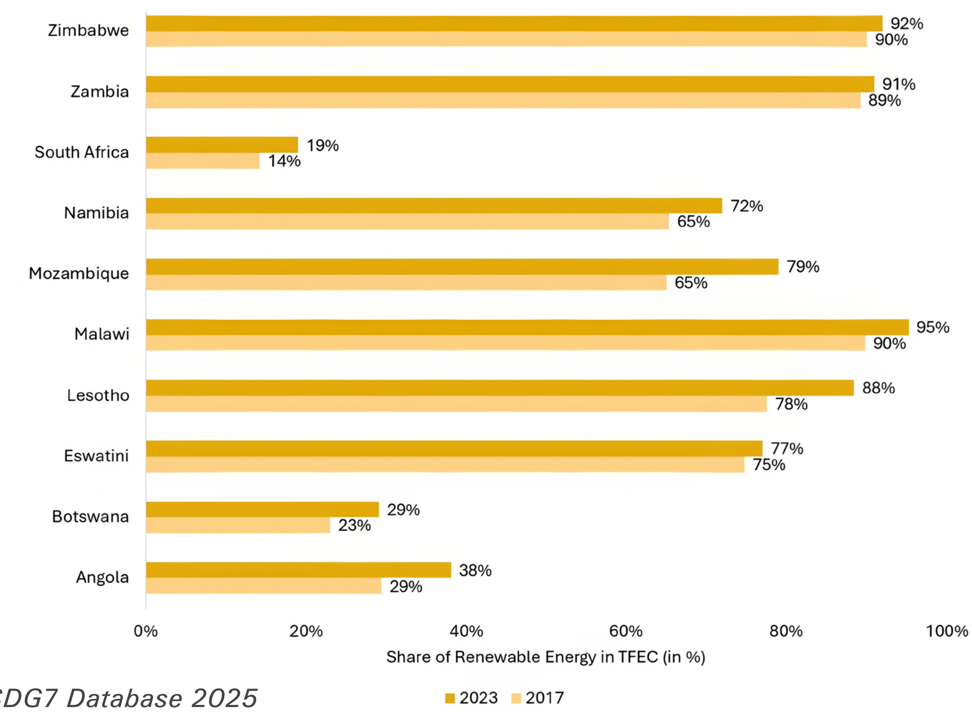
Figure 30: Share of renewables in Total Final Energy Consumption, by country, in Central Africa, 2017 – 2022



Source: AFREC SDG7 Database 2025

- **Southern Africa:** Moving from **62%** to **68%**, Southern Africa reports the lowest initial share and a modest rate of progress. Heavy dependence on coal in South Africa and Zimbabwe, paired with widespread use of traditional biomass elsewhere, constrains the region's renewable transition. Notable exceptions include Namibia's high hydropower imports and Angola's expansion of large-scale hydro (Figure 31). Gains in solar and wind through procurement programs in South Africa showcase how targeted policies can increase modern renewable adoption, even in regions historically reliant on fossil fuels.

Figure 31: Share of renewables in Total Final Energy Consumption, by country, in Southern Africa, 2017 – 2022



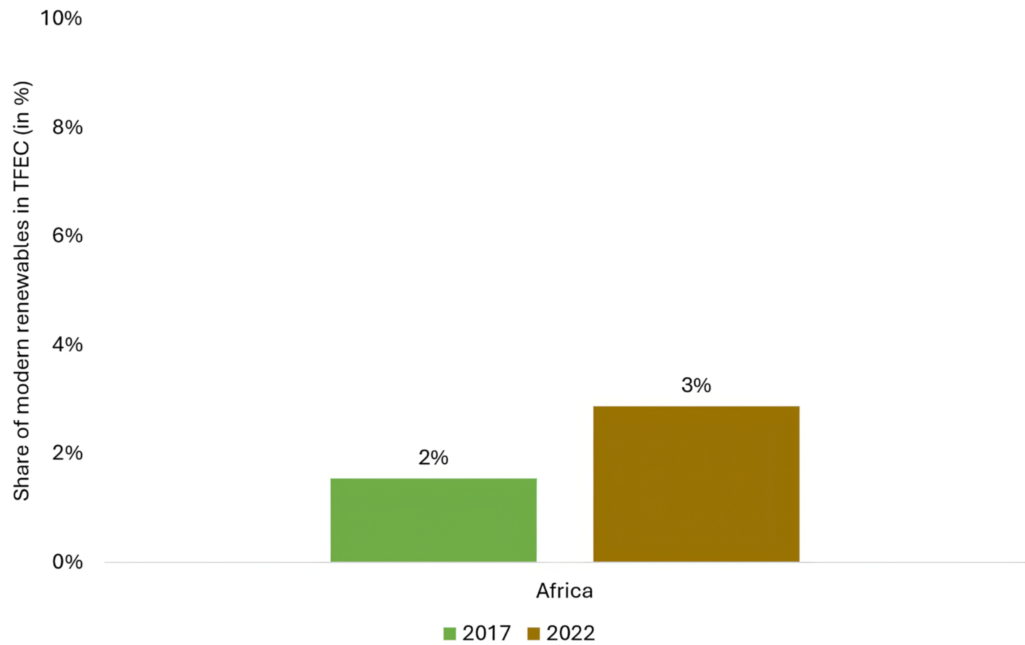
Source: AFREC SDG7 Database 2025

Overall, the rise in Africa's aggregate renewable share points to gradual policy improvements, modest technology uptake, and some additional hydropower and off-grid systems coming online. However, the continued dominance of traditional biomass in many regions underscores the urgency of making modern renewable options—such as solar PV, wind, sustainable bioenergy, and geothermal—more accessible and affordable. Achieving meaningful, long-term progress will require systematic efforts to strengthen institutions, improve infrastructure, and attract investment into modern energy solutions, particularly in rural and peri-urban areas where reliance on traditional biomass remains high.

5.3 MODERN RENEWABLE ENERGY IN TOTAL FINAL ENERGY CONSUMPTION (TFEC)

Recent data on modern renewable energy's share in total final energy consumption (TFEC) illustrate Africa's ongoing struggle to shift away from traditional biomass and toward cleaner, technology-based renewables such as solar PV, wind, geothermal, and sustainable bioenergy. At the continental level, modern renewables constitute only 2–3% of TFEC between 2017 and 2022, underscoring how most "renewable" use remains tied to firewood, charcoal, and other inefficient biomass fuels (Figure 32). This reliance not only inflates nominal renewable energy statistics but also perpetuates health and environmental issues.

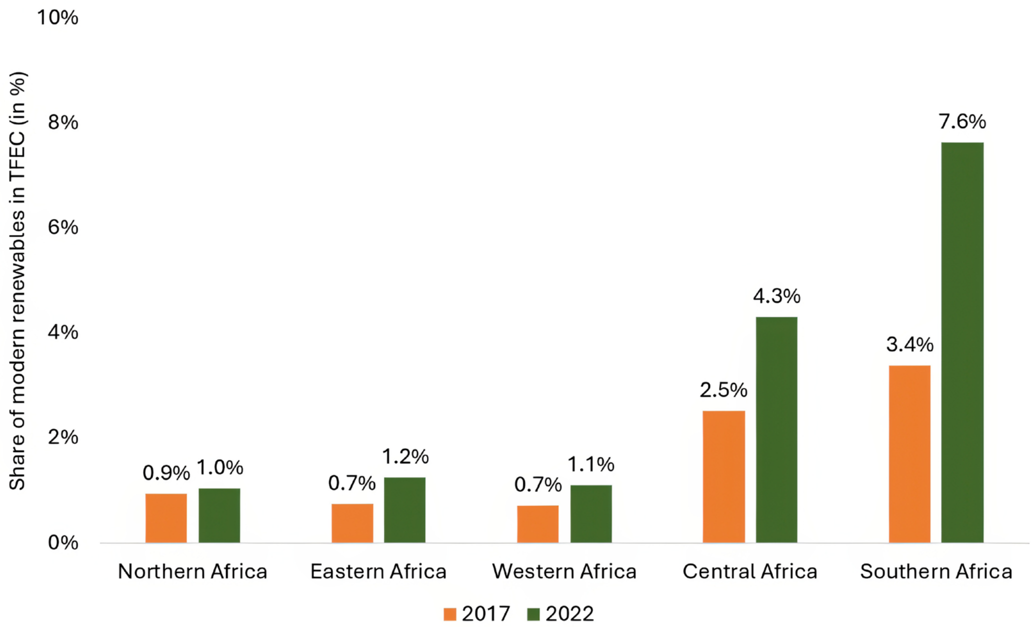
Figure 32: Share of modern renewable energy in total final energy consumption (TFEC), Africa, 2017 – 2022



Source: AFREC SDG7 Database 2025

Sub-regional figures reveal low but varied progress. Northern Africa, Eastern Africa, and Western Africa hover around 1% modern renewable in TFEC throughout the period, reflecting the persistent role of traditional biomass and the relatively slow uptake of modern options (Error! Not a valid bookmark self-reference.). By contrast, Central Africa rises from 3% to 4%, benefiting in part from investments in hydropower, while Southern Africa shows the largest increase—from 3% in 2017 to 8% in 2022—driven by a handful of countries expanding modern hydropower, solar, or wind capacity. Nevertheless, even in Southern Africa, coal-rich nations like South Africa retain a large fossil footprint, indicating that modern renewables are still a minor component of the broader energy mix.

Figure 33: Share of modern renewable energy in total final energy consumption (TFEC), sub-regions, 2017 – 2022



Source: AFREC SDG7 Database 2025

Beneath these regional averages lie notable country-level discrepancies. **Namibia** stands out with a leap from **7%** modern renewables in 2017 to **21%** by 2022, propelled by new wind and solar projects, as well as hydropower imports[32]. **Angola** makes steady progress, climbing from **8%** to **16%** during the same period, helped by investments in modern bioenergy and the electrification of urban centers via hydropower[33]. Equatorial **Guinea**, though starting at **9%** in 2017, reaches **20%** in 2022—albeit from a relatively low base of total consumption—suggesting that with continued policy support, small countries can rapidly scale modern renewables.

Other nations make more modest gains. **Lesotho** experiences a marked jump from **3%** to **18%**, likely tied to mini-hydropower and potential improvements in rural electrification infrastructure[34]. **Cameroon** inches up from **6%** to **7%**, indicating incremental progress in modern biomass and hydro-based electrification[35]. **Zambia's** energy mix is increasingly incorporating modern renewables—especially solar, small-scale hydro, and biomass—to complement traditional large hydropower and support the nation's sustainable development goals[36]. However, in many countries—**Algeria**, **Benin**, **Botswana**, **Burundi**, **Libya**, **Chad**, **Somalia**, **and others**—modern renewable shares stay effectively at **0%** or **1%** throughout 2017–2022, highlighting a heavy reliance on fossil fuels or traditional biomass and minimal investment in new renewable technologies.

Overall, the low levels of modern renewable energy across Africa point to a critical gap in financing, policy support, and infrastructure development. While a few bright spots exist—Namibia, Angola, Equatorial Guinea—most countries have yet to meaningfully replace polluting biomass with modern renewables. Accelerating this transition will require coordinated efforts to reform subsidies, enhance grid systems, expand off-grid solutions, and enact strong policy incentives that reduce upfront technology costs. Only by boosting the share of solar, wind, geothermal, and other sustainable energy sources can African countries fully harness their immense renewable potential and achieve a more equitable, low-carbon future.

32 - World Economic Forum, Namibia is Positioned to Become the Renewable Energy Hub of Africa, October 2021. https://www.weforum.org/stories/2021/10/namibia-is-positioned-to-become-the-renewable-energy-hub-of-africa.

33 - U.S. Department of Commerce, Angola - Energy, International Trade Administration, accessed March 2025. https://www.trade.gov/country-commercial-guides/angola-energy.

34 - Lesotho Electricity Company (LEC), Generation, accessed March 2025. https://lec.co.ls/generation/.

35 - Dintchev, Ognian et al., "Renewable Energy for Electrification in Sub-Saharan Africa," Renewable Energy and Environmental Sustainability, vol. 6, 2021. https://www.rees-journal.org/articles/rees/full_html/2021/01/rees200017/rees200017.html.

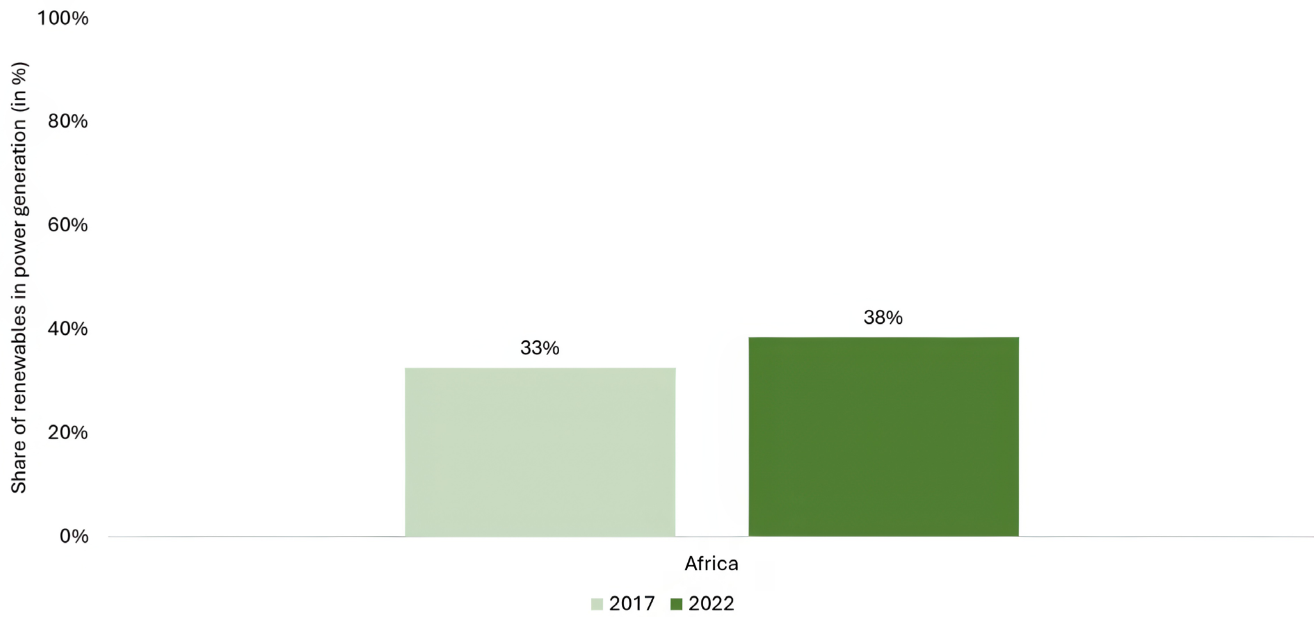
36 - UNFCCC, Momentum for Change: Renewable Energy for Sustainable Development in Zambia, https://unfccc.int/climate-action/momentum-for-change/activity-database/momentum-for-change-renewable-energy-for-sustainable-development-in-zambia.

5.4 RENEWABLE ENERGY IN THE POWER SECTOR

RENEWABLE ENERGY IN POWER GENERATION:
CONTINENTAL AND SUB-REGIONAL TRENDS (2017–2022)

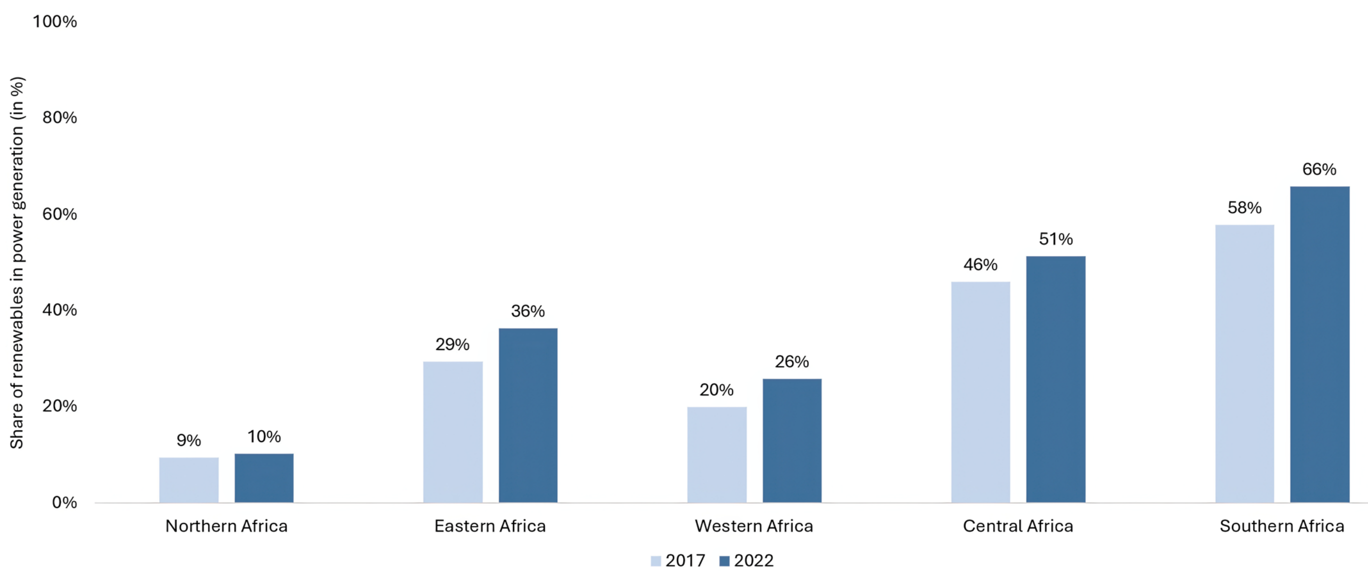
Recent data show that Africa's **renewable energy share in power generation** has been on a modest but steady climb, rising from **33%** in 2017 to **38%** in 2022 at the continental level (Figure 34). This upward trend reflects incremental policy improvements, ongoing expansions of hydropower in several countries, and a slow but discernible uptake of newer technologies such as solar and wind. However, these averages obscure large variations across sub-regions and individual nations (Figure 35).

Figure 34: Share of renewable energy in power generation, 2017 v. 2022



Source: AFREC SDG7 Database 2025

Figure 35: Share of renewable energy in power generation, in sub-regions, 2017 v. 2022



Source: AFREC SDG7 Database 2025

Northern Africa presents the lowest regional share, holding around 9–10% throughout the period. Despite strong hydro, solar and wind potential in countries like Egypt and Morocco, reliance on fossil fuels—often encouraged by subsidies—continues to hinder large-scale renewables in the power mix. Algeria, for instance, reports just 1% renewable power year after year, underscoring the challenges of translating abundant solar resources into actual capacity.

In **Western Africa**, the renewable share in power generation increased from 20% to 26%, but this sub-region's gains are uneven. Nigeria made notable progress, rising from 12% to 25% by adding more hydropower and some solar to its grid, whereas Benin remains at around 1–2% despite its growing electricity needs. Sierra Leone, at 55–76%, highlights how smaller nations can tap into hydropower, but most West African countries still need stronger policies and more investment to fully exploit renewable resources.

Central Africa shows consistently high shares, inching up from 46% to 51%. The Democratic Republic of the Congo leads Africa with a near-total reliance on hydropower, reaching 100% renewable electricity, although distribution remains sparse, and many communities still lack access. Cameroon and Gabon also rely heavily on hydropower, leading to renewable shares of over 50% by 2022, but both countries face infrastructural barriers to meeting demand beyond urban centers.

In **Eastern Africa**, the share grew from 29% to 36% over the five-year span, buoyed by Ethiopia and Lesotho, both essentially at 100% renewable power, and by Kenya, which rose to 50% through a combination of geothermal and wind developments. Countries like Uganda and Malawi also stand out with more than 90% renewable power, largely sourced from hydro. Nonetheless, grid limitations and climate variability—affecting hydro—pose risks for sustained expansion.

By contrast, **Southern Africa** leads the continent, moving from 58% to 66% by 2022. This relatively high level of renewable penetration is partly attributable to substantial hydropower resources in nations such as Mozambique and Zambia, where renewable shares exceed 80–85%. Angola's jump from 56% in 2017 to 80% by 2019 indicates the impact of ramping up large-scale hydropower, while South Africa, although still dominated by coal, has increased its renewable share from 4% to 9% through competitive procurement programs.

Overall, Africa's transition toward cleaner electricity is driven largely by hydropower, which, for better or worse, underpins the high shares observed in countries like DR Congo and Ethiopia. While solar and wind continue to expand—particularly in places like Kenya, Morocco, and South Africa—their contribution remains relatively small in many other nations. Strengthening regulatory frameworks, diversifying resource use (especially in hydro-dependent regions), and improving transmission networks will be critical to ensure a more resilient, low-carbon power sector across Africa.

5.5 RENEWABLE ENERGY IN HEATING AND COOLING

Despite accounting for a significant portion of Africa's total energy demand, heating and cooling remain underdeveloped segments for modern renewables. Current usage often relies on inefficient biomass in households—leading to indoor air pollution—and on fossil fuels in industrial processes. Yet there are promising developments. Countries with large agricultural and agro-processing sectors, such as Nigeria, Rwanda, and Kenya, are gradually adopting modern biomass and biogas for tasks like drying, milling, and cold storage[37]. These projects displace diesel or kerosene, cut greenhouse gas emissions, and improve air quality.

In more urbanized or higher-income areas of Northern and Southern Africa, solar thermal systems for water heating are emerging in hotels, hospitals, and some residential buildings. Although the up-front costs can be a barrier, targeted subsidies and public-awareness campaigns have helped lower adoption hurdles. In countries like Namibia—where modern renewables in TFEC are steadily expanding—small-

37 - Carbon Trust, Promising Bioenergy Pathways for Sub-Saharan Africa: Technological, Commercial and Policy Opportunities, Transforming Energy Access (TEA) Programme, February 2021. https://tea.carbontrust.com/wp-content/uploads/2021/02/Promising-bioenergy-pathways-report.pdf.

scale solar thermal systems are increasingly considered for industrial heat applications as well.

Geothermal is another promising avenue in regions with significant resources, notably the Rift Valley in Eastern Africa. Kenya has already used geothermal power extensively for electricity generation; going forward, direct-use geothermal could support industries like horticulture or dairy processing, thereby reducing reliance on diesel boilers[38]. On the residential side, clean cooking solutions—electric induction stoves, LPG (derived from renewable sources), or advanced biomass cookstoves—remain essential to stem the health and environmental costs of traditional fuels. Scaling these technologies will require financial incentives, robust supply chains, and heightened consumer awareness, particularly in rural areas where firewood and charcoal are still dominant.

5.6 RENEWABLE ENERGY IN TRANSPORT: NASCENT OPPORTUNITIES

Transport in Africa remains heavily dominated by gasoline, diesel, and other petroleum products, a reflection of limited refinery capacity for alternatives, sparse infrastructure, and the relatively high cost of vehicles that run on renewable fuels. Biofuels represent one potential avenue for diversification, with countries such as Ghana and South Africa experimenting with ethanol or biodiesel blends tied to local agricultural production[39]. However, feedstock availability, policy uncertainties, and fluctuating oil prices continue to hamper large-scale commercialization.

Several African countries, including Cape Verde, Rwanda, Zimbabwe, South Africa, Egypt, Ghana, and Kenya, have shown their dedication to expanding EV use by setting goals and offering various incentives. In Kenya's case, the government lowered the excise duty on EV imports from 20% to 10%, with the ambition of raising the share of electric vehicles to 5% of total vehicle imports by 2025.[40] Electric mobility is only beginning to take hold. South Africa[41] and Kenya[42], for example, are piloting electric buses, leveraging their growing base of renewable electricity (9% and 50% of power generation, respectively). Meanwhile, private entrepreneurs in solar-rich regions are testing solar-powered EV charging stations to address both energy and grid reliability challenges. Still, the high cost of electric vehicles—even in smaller segments like motorcycles or three-wheelers—remains a barrier for widespread adoption. Reducing import tariffs, encouraging local assembly, and fostering innovative financing (e.g., pay-as-you-drive schemes) could gradually accelerate electric mobility in urban centers, improving air quality and lowering transport-related emissions.

5.7 DRIVERS AND BARRIERS TO RENEWABLE ENERGY SCALE-UP

Several overarching factors shape the speed and depth of Africa's renewable energy transition. Policy and regulation top the list. Nations with transparent procurement processes or feed-in tariffs—such as Morocco's solar tendering[43] or South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)[44]—have attracted substantial private investment. In contrast, many other countries face regulatory bottlenecks, fossil fuel subsidies, or policy uncertainty, discouraging investors.

Financing remains another pressing challenge. Large hydropower or wind farms require considerable up-front capital, while smaller off-grid solutions still need instruments like microloans, pay-as-you-go models, or blended finance. Although North African nations (e.g., Egypt) and some rapidly modernizing economies (e.g., Angola) can more easily attract international funding, much of Sub-Saharan Africa

38 - International Monetary Fund (IMF), Kenya Taps the Earth's Heat, Finance & Development, December 2022. https://www.imf.org/en/Publications/fandd/issues/2022/12/country-case-kenya-taps-the-earth-heat.

39 - World Bank, Energy Access, Efficiency, and Poverty: How Many Households Are Electrified?, Africa Infrastructure Country Diagnostic (AICD), 2010. https://documents1.worldbank.org/curated/es/617361468201837240/pdf/584380PUB0ID181Africa09780821385166.pdf.

40 - Kamerlin, Shina C.L. et al., "Africa's Leap Toward E-Mobility: Insights from National Policies and Trends," Scientific Reports, 14, Article 75039 (2024). https://www.nature.com/articles/s41598-024-75039-3.

41 - BYD Company, South Africa: Electric Bus Deal. https://www.byd.com/za/news-list/south-africa-electric-bus-deal.

42 - CleanTechnica, 200 More Electric Buses For Kenya, April 28, 2024. https://cleantechnica.com/2024/04/28/200-more-electric-buses-for-kenya.

43 - Gwénaëlle Deboutte, «Morocco Reveals Bidders for 400 MW/400 MWh Solar-Plus-Storage Tender,» PV Magazine, December 18, 2023. https://www.pv-magazine.com/2023/12/18/morocco-reveals-bidders-for-400-mw-400-mwh-solar-plus-storage-tender/.

44 - NDC Partnership, «South Africa's Renewable Energy Independent Power Producer Procurement Programme,» accessed March 30, 2025. https://ndcpartnership.org/knowledge-portal/good-practice-database/south-africas-renewable-energy-independent-power-producer-procurement-programme.

still relies on concessional lending or donor grants. Weak or fragmented grid infrastructures further undermine utility-scale renewables, particularly in remote areas.

Additionally, limited technical capacity slows progress at multiple stages—feasibility studies, project construction, and long-term maintenance. This gap is especially pronounced for more specialized technologies like geothermal or solar thermal for industrial heat. Finally, public awareness influences the acceptance of new energy solutions. Households may be slow to adopt solar home systems or improved cookstoves if they are unfamiliar with the benefits or wary of costs, reinforcing the need for robust education and outreach campaigns.

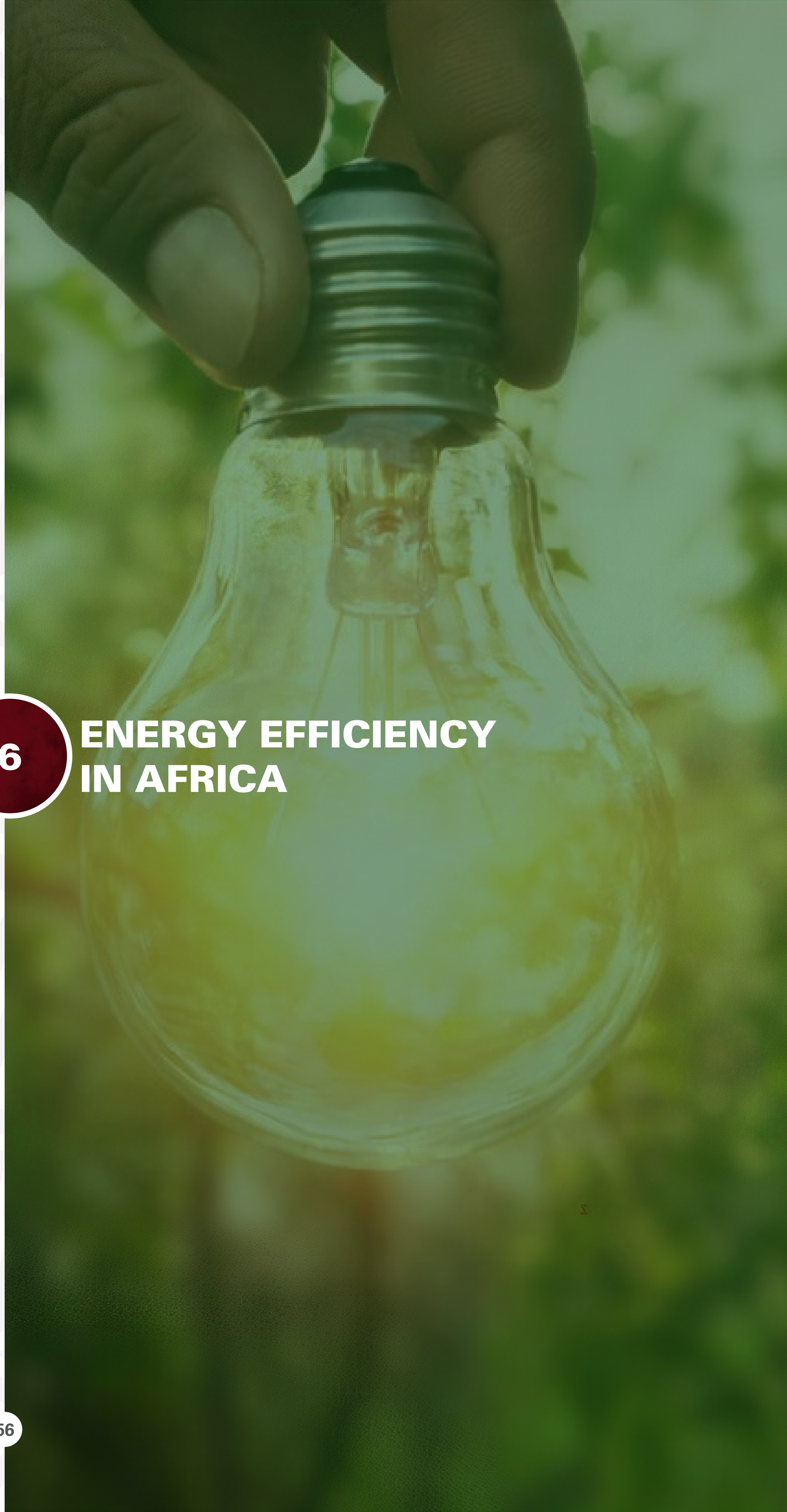
5.8 STRATEGIC RECOMMENDATIONS FOR ACCELERATING RENEWABLE ENERGY

1. **Strengthen Policy and Regulatory Frameworks:** Building on successes such as Morocco's Noor solar projects or South Africa's REIPPPP can guide other African governments in designing clear, competitive procurement mechanisms. Reducing fossil fuel subsidies and introducing feed-in tariffs or tax incentives for renewables can further encourage private-sector participation.
2. **Expand Off-Grid and Mini-Grid Solutions:** Rural electrification in regions like Central Africa or Somalia faces high grid-extension costs. Solar mini-grids, supported by pay-as-you-go financing, can rapidly scale access to electricity while spurring local economic development.
3. **Prioritize Modern Biomass and Clean Cooking:** Replacing traditional biomass with modern bioenergy, LPG from renewable sources, or electric cooking systems is critical for reducing indoor air pollution and deforestation. Governments should consider targeted subsidies, appliance-financing programs, and awareness campaigns to bolster adoption, especially for low-income households.
4. **Develop Sustainable Heating, Cooling, and Transport:** Industrial heating using solar thermal, geothermal, or modern biomass can help countries shift away from diesel or coal boilers. Likewise, pilot programs for biofuels and electric buses can catalyze a larger transition in transport, provided there is a supportive policy environment and investment in necessary infrastructure.
5. **Mobilize Diverse Financing Options:** Green bonds, blended finance, and risk mitigation tools (e.g., partial risk guarantees) can de-risk renewable energy investments. Ensuring effective public-private partnerships will help scale up capital-intensive projects—whether a large hydropower dam or a national electric-bus rollout plan.
6. **Invest in Capacity-Building:** Developing local expertise—from planning to operational maintenance—ensures that projects remain viable over the long run. Training programs, regional knowledge-sharing platforms, and university partnerships can cultivate a skilled workforce that sustains Africa's emerging clean energy sector.

5.9 CONCLUSION AND OUTLOOK

Across Africa, a number of countries are making strides in renewable electricity, especially those endowed with substantial hydropower resources. Others, such as Kenya, Morocco, and South Africa, show that a combination of policy-driven incentives, competitive procurement, and international investment can stimulate growth in solar, wind, and geothermal. Nevertheless, modern renewable energy in heating, cooling, and transportation remains underdeveloped, constrained by high costs, weaker policy frameworks, and infrastructural gaps.

To achieve SDG 7 and pave the way for a sustainable energy future, African governments, regional institutions, and development partners must address both the reliance on traditional biomass and the fundamental barriers to modern renewable energy uptake. Strengthening regulatory environments, expanding off-grid solutions, improving access to capital, and enhancing technical capacity are all essential components of success. Although uneven progress persists, the continent stands at a critical juncture. With sustained political commitment and targeted investment, Africa can transition away from traditional, polluting energy sources and toward a resilient, low-carbon energy system that fosters economic growth and environmental stewardship for all.



6 ENERGY EFFICIENCY IN AFRICA

6.1 INTRODUCTION

Energy efficiency is a cornerstone of SDG 7, which seeks to ensure universal access to affordable, reliable, sustainable, and modern energy. In Africa, this emphasis on efficiency must be understood in the context of already low per capita consumption and the large number of people who currently lack electricity or clean cooking solutions. The goal, therefore, is not to reduce total energy use, but to maximize the impact of each unit of energy as countries work to expand access and support economic growth.

By lowering the energy required per unit of economic output, efficiency measures help African nations accommodate rapidly growing demand driven by population increases, urbanization, and industrial expansion. At the same time, they reduce greenhouse gas emissions, alleviate pressure on power grids, and cut costs for consumers and businesses. Against this backdrop, improved energy efficiency becomes a strategy to both address pressing needs for broader energy access and ensure the sustainability of future consumption.

This chapter examines recent efficiency trends, highlights major drivers in various sectors, and discusses the obstacles and opportunities involved in enhancing energy efficiency across the continent.

6.2 OVERVIEW OF AFRICA'S ENERGY EFFICIENCY

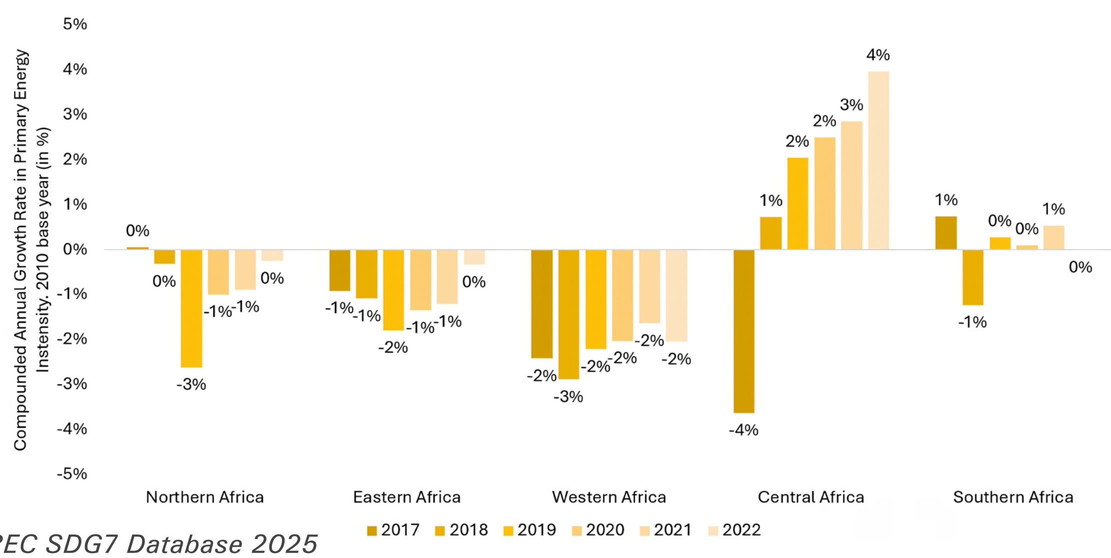
Continental Average and Overall Trends

The continent-wide figures suggest that Africa's average energy intensity[45] hovered around 11.93 MJ/USD in 2010 and 11.58 MJ/USD in 2022, amounting to a total reduction of roughly 0.35 MJ over 12 years. Although this indicates some improvement, the annual rate of change is well below the 2–3% range that global experts commonly cite as necessary to meet SDG 7.3 targets. In fact, it corresponds to less than 0.5% per year on average, leaving ample room for more decisive policy actions and investments.

Subregional Variations

When viewed at the continent-wide level, Africa's energy-intensity reductions appear modest, and progress stalls in some recent years. However, examining the data by subregion reveals a more nuanced story: while several areas show consistent improvements over time, others experience volatile or even reversed trends. This section interprets the compound annual growth rates (CAGR) for Northern, Eastern, Western, Central, and Southern Africa (Figure 36).

Figure 36: Compounded annual growth rate (CAGR) in primary energy intensity, 2010 base year



Source: AFREC SDG7 Database 2025

45 - Energy intensity is the amount of energy used to produce one unit of gross domestic product (GDP). It is typically expressed as megajoules (MJ) or kilograms of oil equivalent (kgoe) per dollar of GDP (often using purchasing power parity, PPP).

Leading Countries with Above-Average Gains

A closer look at individual entries reveals that certain countries have cut energy intensity significantly between 2010 and 2022.

- **Burkina Faso**: Dropped from 19 MJ in 2010 to 12 MJ in 2022, reflecting a decrease of roughly 7 MJ (about 35% lower). This equates to an approximate 3% annual reduction.
- **Mauritania**: Moved from 7 MJ to 6 MJ, marking a moderate yet steady gain of around 16% overall.
- **Algeria**: Declined from 5 MJ to 4 MJ, achieving nearly 20% improvement—a compound annual growth rate of about 2%.

Countries with Minimal or Negative Changes

Not all nations reduced intensity (. Several saw only marginal improvements or even increases over the same period.

- **Angola**: Rose from 2 MJ to 2 MJ (from 1.63 to 1.81 MJ, rounded), suggesting that economic factors or limited efficiency measures pushed up energy use per unit GDP.
- **Burundi**: Increased from 23 MJ to 28 MJ, reinforcing its status as one of Africa's highest-intensity users.
- **Democratic Republic of Congo (DRC)**: While dropping slightly from 34 MJ to 32 MJ, the DRC still has the continent's highest intensity level, underscoring persistent challenges in modernizing infrastructure and consumption patterns.
- **Morocco**: Shifted from 3 MJ to 3 MJ (from 2.64 to 3.26 MJ, rounded), reversing what had been a low baseline. Potential drivers could include energy-intensive projects, evolving industrial mixes, or policy realignments.

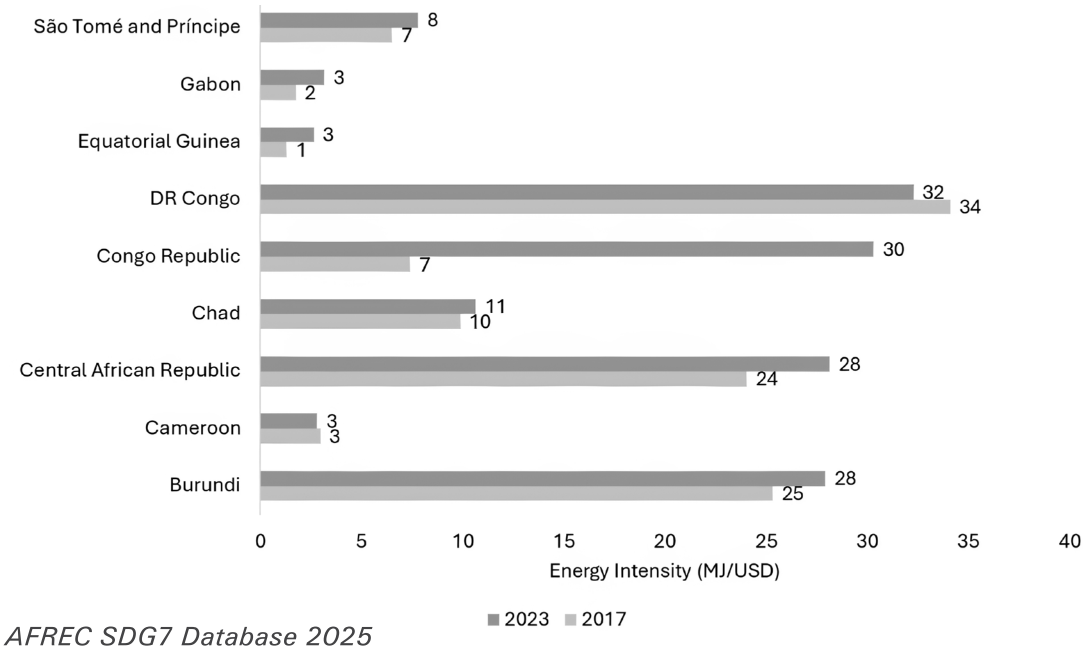
Such stagnation or regress is often tied to outdated infrastructure, weaker policy enforcement, or reliance on older technologies—underscoring the complexity of sustaining efficiency gains.

Central Africa: A Rapid Reversal

Central Africa experiences a marked shift from an initial strongly negative CAGR—indicating a decline in energy intensity—to positive values, signifying that intensity has risen in subsequent years. Such a swing may stem from expanded energy-intensive industries, the abandonment of previous energy-efficiency measures, or higher reliance on older technologies. It could also reflect a rebound in economic activity that led to heightened energy consumption without commensurate efficiency practices.

Key Insight: Central Africa's upward trend serves as a reminder that apparent gains (negative CAGR) in earlier years might have been tied to dampened economic output, rather than concerted efficiency policies. When economic growth resumes, energy intensity can climb again unless a robust policy framework is in place to guide industrial or infrastructural development. The region's experience thus underscores the need for stable, well-financed strategies that persist even as economic cycles fluctuate.

Figure 37: Energy intensity in countries in Central Africa



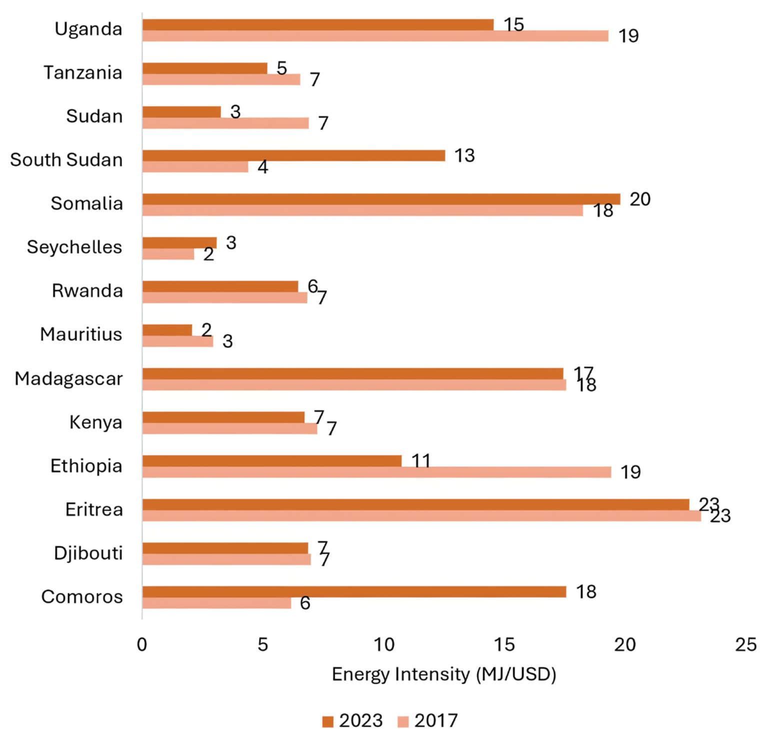
Source: AFREC SDG7 Database 2025

Eastern Africa: A Steady (But Slowing) Decline

Eastern Africa generally exhibits a gradual, year-over-year decline in energy intensity through most of the observed period, hovering around –1% to –2% in its CAGR. However, the rate flattens to zero in the latest data point. This suggests that while efficiency measures—or the gradual introduction of renewables—were steadily lowering energy intensity, the recent stall implies that existing approaches may have reached their limits or require reinvigoration to keep reducing intensity further.

Key Insight: Eastern Africa's pattern of moderate improvements followed by a stall emphasizes the need for scaling up interventions—such as deeper industrial retrofits or more comprehensive building codes—that can drive efficiency to a new level and avert stagnation.

Figure 38: Energy intensity in countries in Eastern Africa



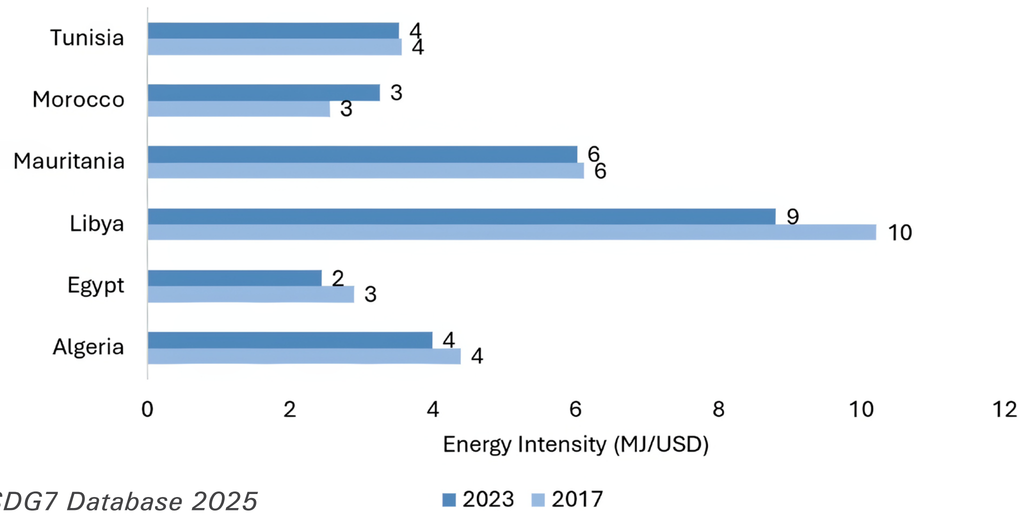
Source: AFREC SDG7 Database 2025

Northern Africa: An Intermittent Pattern

Northern Africa's CAGR begins close to zero, drops meaningfully one year, and then flattens out more recently. This fluctuating path suggests that certain policies or economic shifts likely improved efficiency for a stretch—indicated by a notable negative CAGR—but lost momentum in subsequent periods, resulting in zero change. External factors, such as regional market conditions or policy transitions, may underlie the shift from annual efficiency gains to a plateau.

Key Insight: Northern Africa's intermittent gains show that even comparatively advanced power grids and industrial sectors must maintain consistent policy efforts to ensure sustained efficiency progress.

Figure 39: Energy intensity in countries in Northern Africa



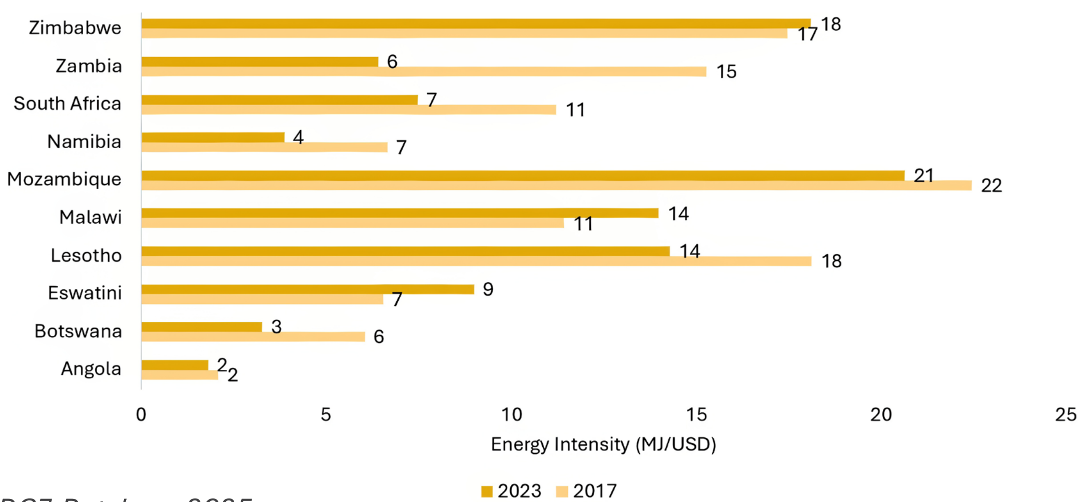
Source: AFREC SDG7 Database 2025

Southern Africa: Oscillation Around Zero

Southern Africa's CAGR oscillates between small positive and negative percentages, culminating in relatively minimal net change over the observed period. This neutral or near-zero net effect could reflect contrasting trends within the subregion—for instance, efficiency advances in certain economies balancing out stagnation or reversals in others. Large contributors like South Africa (with historically coal-heavy industries) may heavily influence the region's overall average.

Key Insight: Southern Africa's back-and-forth data points to varying national contexts within the subregion. Achieving a more pronounced reduction in intensity may require a coordinated approach, addressing both older infrastructure and the gradual diversification of industrial and energy systems.

Figure 40: Energy intensity in countries in Southern Africa



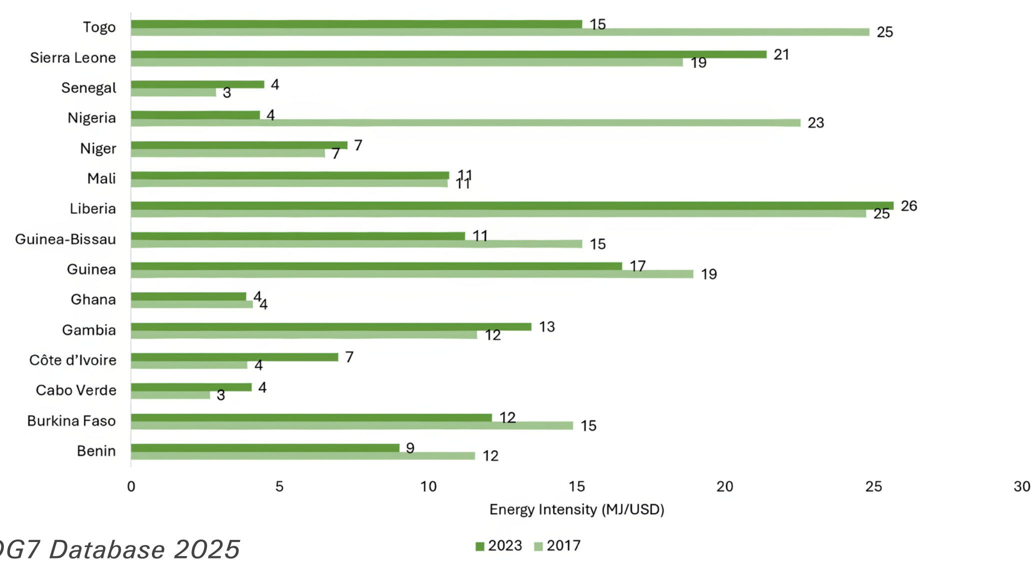
Source: AFREC SDG7 Database 2025

Western Africa: Consistent Negative CAGR

Western Africa stands out for its stable negative CAGR of around –2% to –3% over multiple years. On the surface, this ongoing downward trend suggests sustained reductions in energy intensity, which can be driven by efficiency policies, wider access to modern technologies, or structural shifts favoring lower-intensity sectors. However, it is also possible that part of this decline arises from an economic slowdown in certain areas, where fewer industrial activities or reduced consumer spending naturally suppress energy demand.

Key Insight: Western Africa's data may appear to represent strong efficiency improvements, yet policymakers should verify whether these negative CAGR values signal genuine efficiency gains—involving technologies and policies that optimize energy use—or a contraction in economic activity that simply depresses overall consumption. Understanding the underlying drivers is crucial for determining whether the subregion's trajectory reflects a healthy, sustainable transition or an unintended artifact of economic stagnation.

Figure 41: Energy intensity in countries in Western Africa



Source: AFREC SDG7 Database 2025

6.3 SECTORAL PERSPECTIVES ON ENERGY EFFICIENCY

Buildings and Households[46]

Building energy use—encompassing both residential and commercial structures—often constitutes a major component of overall electricity demand, especially in fast-urbanizing regions. As cities grow, new construction can dramatically increase electricity loads for air conditioning, lighting, and appliances. Enforcing building codes that incorporate climate-sensitive designs, insulation standards, and efficient HVAC systems can significantly slow this rise. Even basic interventions such as promoting LED lighting, implementing passive cooling techniques, or installing solar water heaters—reduce building-related consumption and alleviate pressure on power grids.

Uptake of energy-efficient household appliances is equally crucial. When governments offer tax incentives or labeling programs for refrigerators, air conditioners, or cookstoves, consumers gain clearer information on long-term cost savings. However, in many African countries, high upfront prices for efficient appliances can discourage adoption, emphasizing the need for microfinance, pay-as-you-go models, or subsidy schemes to make these products more accessible.

Beyond policy, practical enforcement remains a challenge. Building projects may sidestep regulations if local authorities lack capacity for inspections. Similarly, the market still sees a flood of cheaper, less efficient appliances. Strengthening local manufacturing capacity for energy-efficient products and

46 - International Energy Agency (IEA), GlobalABC Regional Roadmap for Buildings and Construction in Africa 2020-2050, August 2020. https://www.iea.org/reports/globalabc-regional-roadmap-for-buildings-and-construction-in-africa-2020-2050.

training urban planners, architects, and municipal inspectors can help normalize efficiency measures in housing and commercial real estate. Over time, these combined efforts can curb per-household consumption growth, ultimately contributing to a lower overall energy intensity at the national level.

Industry and Manufacturing[47]

Industrial processes are often among the most energy-intensive activities in any economy, particularly in countries with strong resource extraction or manufacturing sectors. Here, improvements in efficiency can yield large dividends. Energy audits—which systematically identify inefficiencies in equipment, process flows, and facility operations—are a core tool. Once audits are complete, retrofits can include upgrading motors, introducing automated controls, switching to cleaner fuels, or recovering heat from industrial processes.

However, several constraints can slow progress. Older machinery may not integrate well with modern automation, and the capital costs for installing new equipment or re-engineering processes can be steep. In addition, industries that operate on tight profit margins may consider energy-efficiency projects risky or less urgent than short-term production concerns. This is where concessional loans, green credit lines, or energy service company (ESCO) models can bridge the gap—allowing firms to implement upgrades and repay through realized savings.

Governments can also foster industrial efficiency by setting and enforcing standards for key sectors (e.g., minimum performance standards in cement or steel) and offering tax breaks or rebates for high-impact retrofits. In the long run, more efficient industries not only reduce national energy intensity but also become more competitive, potentially contributing to job creation, exports, and stable economic growth.

Transport[48]

Transport is another critical pillar influencing energy consumption, although it often appears in national statistics as part of total final consumption rather than as a stand-alone measure. Many African cities rely on an aging vehicle fleet and informal transit systems, leading to high fuel consumption and traffic congestion. As car ownership expands—often at rates of 5–6% annually—urban areas see an uptick in gasoline or diesel demand. Without targeted interventions, this growth can offset gains made in other sectors.

Potential efficiency gains in transport typically involve:

- **Fleet Modernization:** Phasing out very old or inefficient vehicles and introducing higher fuel-economy standards.
- **Improved Public Transit:** From bus rapid transit (BRT) corridors to commuter rail systems, dedicated investment in mass transit can sharply reduce per capita energy use.
- **Fuel Switches:** Encouraging cleaner fuels (e.g., CNG or electricity) in public and commercial fleets.
- **Urban Planning:** Designing walkable cities and mixed-use zoning to minimize lengthy commutes.

Implementing such measures requires coordination between multiple stakeholders (transport authorities, urban planners, finance ministries, etc.) and consistent policy follow-through. Yet successful examples—like comprehensive BRT networks or e-bus programs—underscore how transport efficiency can lower national energy intensity while also improving air quality and urban livability.

47 - International Energy Agency (IEA), Africa Energy Outlook 2022, June 2022. https://www.iea.org/reports/africa-energy-outlook-2022.
48 - Rockson Sai, Hongping Yuan, Ebenezer Kwabena Takyi, Hermas Abudu, and Stephen Agyeman, «Evaluation of Transport Carbon Efficiency, Reduction Potential, and Influencing Factors in Africa,» Transport Policy, vol. 162, March 2025, pp. 65–83. https://doi.org/10.1016/j.tranpol.2024.11.021.

Agriculture and Food Systems[49]

Agriculture's share of energy consumption varies widely across African economies, shaped by differences in irrigation intensity, processing, and mechanization levels. In more subsistence-oriented contexts, energy use per hectare can be relatively modest, yet productivity remains low. By contrast, regions employing mechanized irrigation, extensive processing, and cold chains can consume far more energy. Upgrading these systems to be more efficient—such as switching diesel pumps for solar or electric alternatives—can dramatically reduce fuel inputs and operational costs.

Cold chains, which include refrigerated transport and storage, are vital for preserving perishables but can be energy-intensive if reliant on outdated cooling technologies. Modern, efficient refrigeration systems not only save energy but also reduce post-harvest losses, improving food availability and producer incomes. However, initial purchase costs and the reliability of power supplies remain barriers in rural areas, making it essential to combine technical improvements with financing and policy frameworks that address grid expansion or mini-grid deployment. Over time, advances in agricultural efficiency can help stabilize food supply, raise rural incomes, and indirectly reflect in lower national energy intensity as inefficient processes phase out.

6.4 BARRIERS TO FASTER EFFICIENCY GAINS

Financing Constraints

High up-front costs for energy-efficient technologies and systems remain a significant deterrent to adoption across both industrial and residential sectors. In many African countries, interest rates or lending terms are restrictive, making capital-intensive efficiency improvements less feasible for smaller businesses and low-income households. Commercial banks often consider efficiency projects riskier than conventional lending opportunities, in part because the return on investment may be less straightforward to measure. As a result, industrial retrofits, building upgrades, and appliance replacements that could substantially reduce long-term energy consumption may not move forward. Governments seeking to reduce such constraints frequently rely on concessional lending programs, partial risk guarantees, or other specialized mechanisms that lower the perceived investment risk and open up credit lines for energy-efficiency projects.

Data and Capacity

A core challenge to formulating effective energy-efficiency policies is the absence of robust, consistent data. Many African national statistical offices and energy ministries do not track consumption patterns at the sectoral level in a timely manner, which makes it difficult to identify where the largest inefficiencies lie—be it in buildings, transport, agriculture, or heavy industry. Without reliable data, policy interventions risk being either misaligned or too broad. Furthermore, limited human capacity within ministries or utilities—due to budget constraints or a shortage of specialized training—can stall efforts to deploy advanced monitoring tools, conduct regular audits, or analyze trends properly. International partnerships, along with capacity-building initiatives, can help address these gaps by providing the technical assistance needed to design, implement, and maintain more refined data-collection systems.

Policy and Enforcement Gaps

Numerous African countries already have national strategies or regulations aimed at promoting energy efficiency, such as minimum energy-performance standards for appliances or building codes requiring insulation and efficient lighting. However, the strength of these policies on paper does not always translate into real-world effectiveness. Enforcement frequently suffers from limited budgets for inspections, unclear legal mandates for relevant agencies, or inconsistent penalties for noncompliance. As a result, substandard products continue to flow into local markets, and building codes can be overlooked during fast-paced urban development. Addressing this gap often requires clearly defined institutional roles, improved coordination among government agencies, and stable funding to ensure that policies are systematically applied and monitored.

49 - Food and Agriculture Organization (FAO), «Chapter 4. Scenarios of Energy and Agriculture in Africa,» in Energy and Agriculture: Their Interacting Futures https://www.fao.org/4/v9766E/v9766e05.htm.

Infrastructure Challenges

Finally, underlying infrastructure constraints pose a serious obstacle to reaping the benefits of energy-efficiency measures. Many electrical grids in Africa were built decades ago, focusing on delivering basic power rather than integrating modern, efficient technologies or accommodating distributed renewable generation. In rural areas, limited or unreliable electrification can discourage investments in equipment that depends on stable grid connections, such as higher-efficiency electric pumps or industrial machinery. Upgrades to grid infrastructure—ranging from new substations to advanced metering systems—are often expensive and time-consuming, but they are essential for enabling end-users to adopt the full range of efficient tools and appliances.

6.5 OPPORTUNITIES AND EMERGING STRATEGIES

Strengthening Regulatory Frameworks

Countries that actively enforce appliance standards and labeling programs have seen residential electricity consumption fall by an average of 5–7% within three to five years. Similarly, well implemented vehicle emission standards have led to a 5–10% reduction in transport energy intensity over comparable periods. These outcomes demonstrate that robust policymaking, coupled with effective enforcement, can deliver measurable short-term energy efficiency gains.

When governments commit to strong regulatory frameworks, they incentivize innovation, drive compliance, and pave the way for a more sustainable, energy-efficient future. However, the success of such measures hinges not just on legislation, but also on the strength of enforcement mechanisms, monitoring systems, and public awareness campaigns that foster adherence.

Beyond these near-term benefits, reinforcing regulatory frameworks builds long-term economic and environmental resilience. Countries that prioritize energy efficiency and emissions reduction position themselves as sustainability leaders, attract green investments, and stimulate job creation in emerging sectors. As international climate commitments tighten, those with well-established regulatory systems will be better equipped to meet future targets and avoid economic shocks.

To sustain and amplify impact, policymakers must adopt a dynamic approach—continually updating regulations in line with technological progress and shifting energy landscapes. Collaboration among governments, industry stakeholders, and consumers is critical to keeping regulatory frameworks effective and responsive. By embedding these efforts within broader sustainability strategies, countries can drive enduring reductions in energy use and environmental harm.

Innovative Financing

Green bonds, blended finance, and on-bill financing are increasingly used to address the high initial costs of energy-efficient technologies. Nations issuing green bonds have attracted investor interest that helps fund building retrofits, industrial upgrades, and other energy-efficiency initiatives. Energy service company (ESCO) models also enable firms to repay equipment loans through accrued energy savings, mitigating the need for large up-front capital outlays.

Technology Transfer and Capacity Building

South–South collaborations and partnerships with international agencies help accelerate the adoption of high-efficiency technology. Some African countries, such as Morocco, South Africa, and Rwanda, have adopted building certification frameworks, leading to measurable energy savings within two years. For example, Morocco introduced energy-efficient building standards aligned with international best practices, while South Africa implemented labeling and certification systems to promote green buildings. Training local engineers, auditors, and technicians is essential to ensure the optimal installation and maintenance of these technologies, thereby maximizing efficiency gains.

Technology transfer and capacity building are strategic levers for economic development and technological empowerment. A coordinated approach involving governments, academic institutions, and the private sector is necessary to maximize their impact and ensure sustainable and inclusive development.

Integrated Urban Planning[50]

Urban areas account for 60–70% of final energy consumption in some countries, making them central to efficiency efforts. Compact-city designs, expanded public transit, and improved street lighting can reduce urban energy demand. Cities that allocate at least 25% of infrastructure budgets to sustainable transit and district-level energy solutions often see a sharper decline in energy intensity—up to 15% more than peers without such commitments.

6.6 CONCLUSION AND RECOMMENDATIONS

Energy efficiency occupies a pivotal position in Africa's sustainable development narrative. Although the continent as a whole has recorded only modest improvements in energy-intensity metrics, the experiences of certain countries show that stronger gains are achievable when supportive policies, accessible financing, and robust data collection mechanisms converge. By reducing wasteful consumption, freeing up generation capacity, and mitigating emissions, energy-efficiency investments benefit not just the economy, but also communities, health systems, and the environment.

Moving forward, four high-level recommendations stand out:

Scale Up Enforcement of Efficiency Standards: Appliance labeling, building codes, and industrial audits require well-resourced monitoring, stable legal frameworks, and consistent penalties to ensure actual compliance on the ground.

Expand Affordable Financing: Green bonds, ESCO models, and concessional loans can break the logjam of high initial costs, allowing both large industries and low-income households to invest in efficiency improvements.

Improve Statistical Systems: Detailed, timely energy-use data supports evidence-based policymaking. Sector-specific consumption metrics, alongside national energy-intensity figures, enable more targeted interventions and robust impact assessments.

Foster Regional Collaboration: Shared platforms—ranging from cross-border power pools to joint procurement programs—help reduce unit costs, unify standards, and streamline technology transfer. By pooling expertise and leveraging economies of scale, African nations can more rapidly advance toward global SDG 7.3 benchmarks.

Such an integrated approach can accelerate Africa's progress in energy efficiency, yielding tangible benefits across economies, societies, and ecosystems. Through concerted effort at both national and regional levels, energy efficiency can evolve from a peripheral concept into a central driver of sustainable development across the continent.

50 - Energy Sector Management Assistance Program (ESMAP), Planning Energy Efficient and Livable Cities, Mayoral Guidance Note #6, November 2014. https://www.esmap.org/sites/esmap.org/files/DocumentLibrary/ESMAP_CEETI_MayoralNote_6_PlanningEE%20Livable%20Cities_optimized.pdf

7 TRACKING INTERNATIONAL FINANCIAL FLOWS FOR CLEAN ENERGY (SDG 7.A.1)

7.1 INTRODUCTION

Sustainable Development Goal (SDG) 7.a.1 focuses on enhancing international financial flows to support clean energy research, development, and deployment in developing countries. This sub-target is a critical component of the broader SDG 7 agenda, as it aims to mobilize public and private resources for expanding energy infrastructure and encouraging the uptake of modern, low-carbon technologies. In practical terms, SDG 7.a.1 seeks to track and increase the volume of commitments and disbursements—often in the form of grants, loans, or equity investments—to help countries address persistent financing gaps in the renewable energy sector.

However, reliable, comprehensive data on these financial flows can be challenging to obtain. Only a handful of African countries systematically report on international funding dedicated to clean energy, and existing figures may underrepresent the true scope of energy-related finance. In this chapter, we summarize the limited data available from ten African countries, cautioning readers that the numbers presented do not necessarily reflect the continent's full financing landscape. Despite these limitations, the data help illustrate emerging trends in energy investment and underscore the importance of enhanced tracking and transparency.

7.2 OVERVIEW OF INTERNATIONAL CLEAN ENERGY FINANCE IN AFRICA

The aggregated information from the ten reporting countries suggests international financial flows for clean energy have risen gradually since 2017, albeit from a low base. The total volume of reported financing across these countries climbed from an estimated USD 2.4 billion in 2017 to approximately USD 4.9 billion in 2023. While this is a positive trajectory, two critical caveats must be emphasized:

1. **Incomplete Coverage:** These ten countries do not represent Africa's full portfolio of energy investments, and many deals—especially private or smaller-scale ones—may go unreported. As a result, the actual volume of clean energy financing could be substantially higher than these official figures suggest.

2. **Data Gaps and Potential Underreporting:** Even among the ten countries, data collection processes and definitions vary. Some may capture only grant-based financing, while others may include loans or investments from private institutions. Additionally, some development finance institutions do not systematically disclose detailed energy funding, further complicating efforts to produce accurate totals.

Nevertheless, the modest but consistent upward trend—from 2.4 billion (2017) to 4.9 billion (2023)—demonstrates growing international interest in Africa's renewable and low-carbon energy sector. This corresponds loosely with the continent's broader move to expand utility-scale solar, wind, and hydropower, as well as greater interest in off-grid and mini-grid solutions. Yet the levels remain insufficient to achieve the full scope of SDG 7 targets by 2030, given the massive capital needs for grid expansion, clean cooking solutions, and industrial decarbonization.

7.3 FACTORS INFLUENCING CLEAN ENERGY FINANCING

A variety of factors affect the volume and impact of international financing for clean energy projects in Africa:

1. **Policy and Regulatory Environment:** Countries with well-defined renewable energy strategies, transparent procurement processes, and investor-friendly regulations—such as feed-in tariffs or auctions—tend to attract more consistent flows of capital. In contrast, policy uncertainty or extensive fossil fuel subsidies can deter investors.

2. **Macroeconomic and Political Stability:** Investors often require stable political environments, robust legal systems, and predictable currency regimes. Nations experiencing conflict or high macroeconomic volatility see fewer large-scale energy investments.

3. **Project Preparation and Bankability:** Comprehensive feasibility studies, risk mitigation tools (e.g., guarantees), and well-structured off-take agreements are crucial for lowering perceived risks and securing funding. Where these elements are absent, projects may fail to reach financial close or can experience higher borrowing costs.

4. **Public and Private Partnership Models:** Governments alone cannot shoulder the capital requirements for Africa's energy transition. Engaging private investors through concessions, independent power producers (IPPs), and public-private partnerships (PPPs) is vital. Adequate de-risking measures, such as credit guarantees or political risk insurance, can help crowd in private capital.

7.4 CURRENT LIMITATIONS AND THE NEED FOR BETTER DATA

Although the increase in international clean energy finance from USD 2.4 to 4.9 billion between 2017 and 2023 indicates growing global interest, these figures should be interpreted with caution. Aside from the fact that only ten countries have reported data, other limitations arise:

- **Definitions and Scope:** Some nations track only "clean" or "renewable" energy investments, while others also include energy efficiency, transmission infrastructure, or fossil fuel projects that feature limited emissions improvements.
- **Consistency in Time-Series Data:** Year-on-year fluctuations may reflect sporadic reporting, currency exchange effects, or one-off large projects rather than sustained multi-year investments.
- **Attribution of Funding:** Distinguishing between new versus ongoing funding commitments, or grants versus loans, remains complicated without standardized frameworks for reporting.

Addressing these data challenges is crucial for effective planning and policy-making. Reliable tracking systems—potentially integrated into broader national statistical platforms—would allow governments, development partners, and private sector actors to identify gaps, prioritize interventions, and measure progress more accurately.

7.5 RECOMMENDATIONS AND OUTLOOK

To maximize the impact of international finance on Africa's energy transition, the following strategic steps are advised:

1. **Enhance Transparency and Reporting:** Developing standardized metrics for energy financing—covering both public and private flows—will help reduce gaps and inconsistencies. African governments could coordinate with entities like the International Renewable Energy Agency (IRENA) or the Sustainable Energy for All (SEforALL) to streamline data collection.

2. **Scale Up Blended Finance Mechanisms:** Combining grants, concessional lending, and commercial loans can mitigate investor risk and lower capital costs. Expanding facilities like Green Climate Fund programs or Africa-based green bond markets could attract more private investment.

3. **Target Underserved Sectors:** While large hydropower and utility-scale solar projects often receive much attention, smaller off-grid or decentralized solutions can significantly boost rural electrification. Dedicated funding channels for mini-grids, solar home systems, and clean cooking solutions are critical to ensuring inclusive energy access.

4. **Leverage Regional Cooperation:** Working through regional economic communities (e.g., ECOWAS, SADC) can facilitate cross-border clean energy trade and broaden financing opportunities. Shared infrastructure—such as transmission lines or gas pipelines for producing hydrogen—can reduce costs and spread risk among multiple stakeholders.

5. **Bolster Local Capacity:** Training and capacity-building in project design, management, and financial structuring can reduce reliance on external consultants and speed up project pipelines. Strengthening local institutions also fosters greater ownership and accountability.

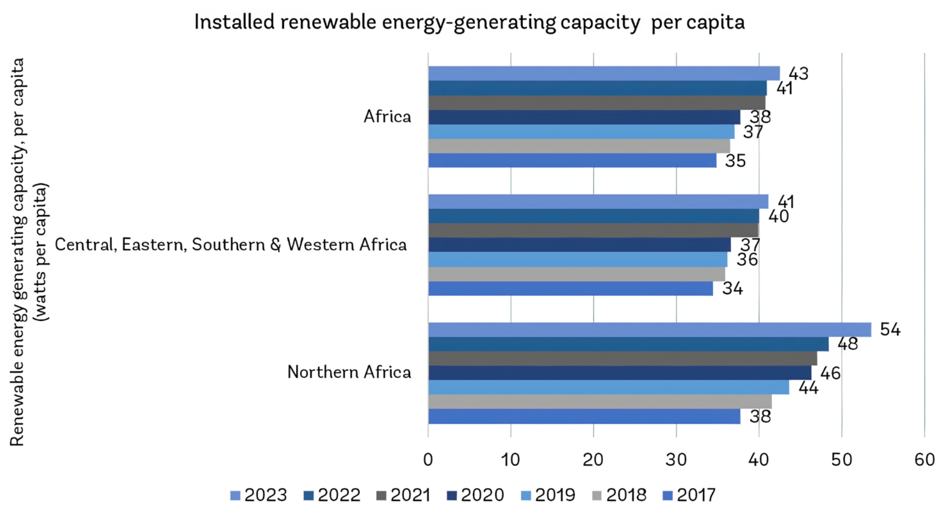
Looking ahead, achieving SDG 7.a.1 will require both higher volumes and improved quality of clean energy finance. If African governments and international partners collaborate effectively on data transparency, risk reduction, and policy innovation, the continent can position itself to leverage even more significant capital inflows—especially as global investors seek climate-friendly opportunities. In turn, these investments will be indispensable for building a robust, low-carbon energy system that advances economic growth, energy access, and environmental sustainability across Africa.

8 INSTALLED RENEWABLE ENERGY CAPACITY

8.1 INTRODUCTION

Installed renewable energy capacity—tracked in watts per capita (W/capita)—directly reflects a country's commitment and ability to shift away from conventional fossil fuels toward cleaner, more sustainable sources. This metric is central to assessing progress toward SDG 7.1.B, which emphasizes increasing the share of renewables and ensuring modern energy access across Africa (Figure 42).

Figure 42: Installed renewable energy capacity per capita, 2017 – 2023



Source: AFREC SDG7 Database 2025

8.2 OVERVIEW OF RENEWABLE ENERGY CAPACITY IN AFRICA

Current Status and Trends

Current data shows a wide spread of installed renewable energy capacity across African nations. A select group of leaders (e.g., Morocco and Zambia) surpass 50 W/capita, reflecting significant renewable energy capacity, robust policy frameworks, stronger grids, and international financing partnerships. In Morocco's case, capacity stands at 110 W/capita driven by the country's solar mega-projects and consistent policy incentives[51].

On the opposite end, countries such as Chad and Somalia remain under 10 W/capita. Their low metrics underscore deep-rooted barriers: weak electric grids, high capital costs for renewable projects, and ongoing reliance on biomass for most energy needs. Other countries, including Eswatini and some island states like Seychelles and Mauritius, occupy a middle tier or have even surpassed the regional average, leveraging smaller populations, targeted international aid, or strategic policy initiatives to grow capacity faster than their larger neighbors[52].

Collectively, these variations suggest that Africa's progress toward SDG 7.1.B is less a single, uniform story and more a collection of distinct national trajectories—some of which are surging ahead while others fall behind. As the data reveals, each country's policy environment, infrastructure readiness, and financing landscape heavily determine its success.

---

51 - NDC Partnership, Morocco Solar Program, Good Practice Database, accessed March 2025. https://ndcpartnership.org/knowledge-portal/good-practice-database/morocco-solar-program.

52 - Joint SDG Fund, «Accelerating the Transition to Green Energy Using Blue Resources in Mauritius and Seychelles,» January 30, 2024, https://jointsdgfund.org/article/accelerating-transition-green-energy-using-blue-resources-mauritius-and-seychelles.

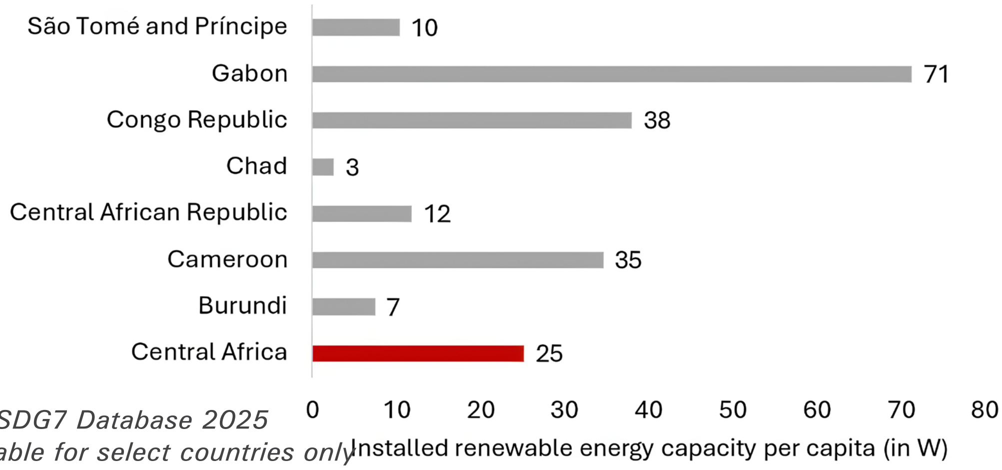
8.3 REGIONAL PROGRESS AND DISPARITIES

Central Africa

Despite abundant hydro and solar potential, Central African countries underperform in installed renewable capacity. Political instability and limited financing hamper large-scale projects, even in resource-rich nations such as the Democratic Republic of Congo, where only a fraction of available hydro has been tapped. Small pilot projects—like micro-hydro setups or community-based solar mini-grids—show some promise, but the regional average remains comparatively low.

Grid expansion is another key constraint, as many Central African networks cannot reliably integrate variable renewables. Strengthening energy sector governance and mobilizing concessional financing could unlock more of the region's latent capacity, but such changes have been slow to materialize.

Figure 43: Renewable energy capacity per capita, 2023, countries in Central Africa



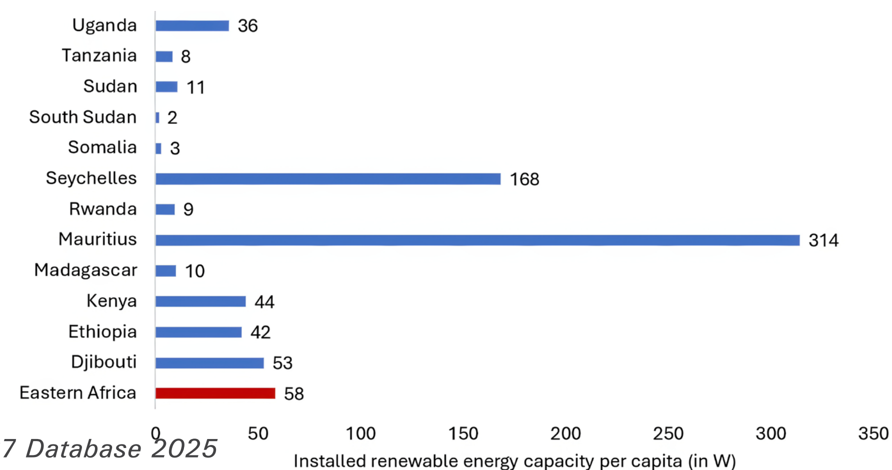
Source: AFREC SDG7 Database 2025
Note: Data available for select countries only

Eastern Africa

Countries in East Africa show mixed results. Kenya and Rwanda have harnessed geothermal, wind, and solar options to lift their per capita capacities, though to a lesser degree than Morocco or Egypt (Figure 44). Kenya's Lake Turkana Wind Project and Olkaria Geothermal Complex have positioned it as a regional energy innovator[53], yet infrastructure gaps persist in rural districts. Rwanda pursues smaller-scale solar farms and off-grid solutions that incrementally boost per capita figures.

At the lower end, Somalia falls below 10 W/capita due to security constraints, limited national budgets, and underdeveloped policy frameworks that struggle to attract large-scale investment. Ethiopia, with vast hydro and wind prospects, also faces grid and financial hurdles that slow the translation of resource potential into real capacity gains.

Figure 44: Renewable energy capacity per capita, 2023, countries in Eastern Africa



Source: AFREC SDG7 Database 2025
Note: Data available for select countries only

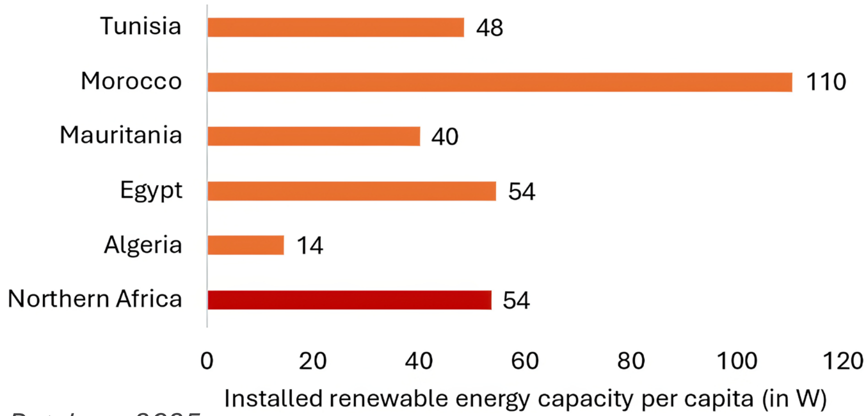
53 - The Impact of Renewable Energy Projects on Indigenous Communities in Kenya: The Cases of the Lake Turkana Wind Power Project and the Olkaria Geothermal Power Plants, International Work Group for Indigenous Affairs (IWGIA), December 2019. https://iwgia.org/images/publications/new-publications/IWGIA_report_28_The_impact_of_renewable_energy_projects_on_Indigenous_communities_in_Kenya_Dec_2019.pdf.

Northern Africa

Northern Africa leads much of the continent in installed renewable capacity, with Morocco (110.36 W/capita) and Egypt serving as standout examples (Figure 45). Morocco's capacity growth (up from 82.98 W/capita in 2017) is powered by large-scale solar complexes and harnesses substantial support from international lenders. Egypt likewise advances with solar farms around Benban and wind installations along the Red Sea coast[54]. Both countries have benefited from relatively modern transmission grids, stable policies, and high investor confidence.

Challenges remain in ensuring that expanding solar and wind capacity effectively integrates with national grids, which often require upgrades to manage intermittent power. Continued policy consistency and private-sector engagement will be crucial to maintaining momentum and, potentially, inspiring similar projects elsewhere in Africa.

Figure 45: Renewable energy capacity per capita, 2023, countries in Northern Africa



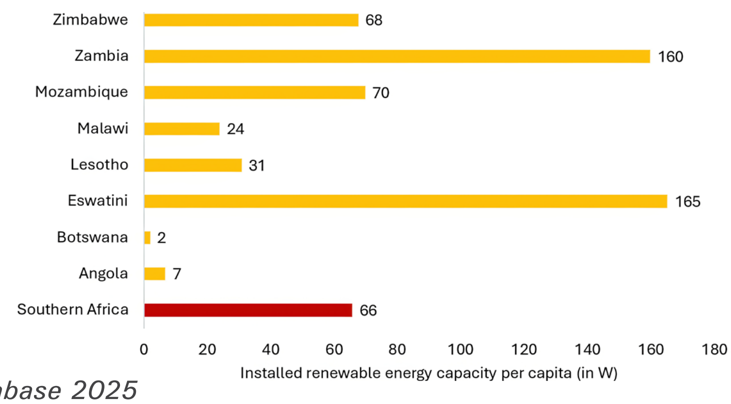
Source: AFREC SDG7 Database 2025
Note: Data available for select countries only

Southern Africa

Southern Africa's performance in installed renewable capacity is diverse. South Africa carries a substantial total capacity thanks to its large population and historically coal-heavy grid now pivoting toward renewables (Figure 46). The country's figures, however, remain hindered by ongoing reliability issues and the gradual pace of coal-to-clean transitions. Meanwhile, smaller states such as Eswatini, Mauritius, and Seychelles are emerging as relative high-achievers in W/capita terms by capitalizing on targeted programs, donor assistance, and narrower geographies that reduce the logistical barriers to adopting renewables.

At the same time, countries like Malawi and Mozambique fall well below the regional average, often below 30 W/capita. Their rural populations frequently rely on biomass, and their national grids and finance sectors remain too weak to accommodate large-scale renewable expansions at present.

Figure 46: Renewable energy capacity per capita, 2023, countries in Southern Africa



Source: AFREC SDG7 Database 2025
Note: Data available for select countries only

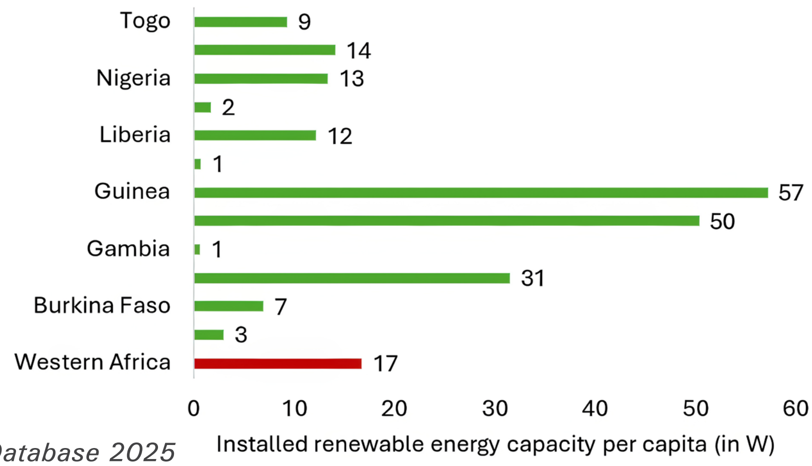
54 - Sean Fleming, «Egypt is Building One of the World's Largest Solar Parks,» World Economic Forum, January 25, 2019. https://www.weforum.org/stories/2019/01/egypt-is-building-one-of-the-worlds-largest-solar-parks/.

Western Africa

Ghana, Senegal, and Côte d'Ivoire illustrate modest but tangible progress in West Africa, leveraging frameworks like the West Africa Power Pool to explore cross-border electricity trading[55]. However, the region also contains some of Africa's largest capacity deficits. Chad, with figures under 10 W/capita, epitomizes the severe infrastructure, financing, and policy obstacles that stifle renewable energy deployment. Niger faces similar challenges, including a heavy reliance on traditional fuels and insufficient grid expansion outside urban cores.

Overall, West Africa's evolution in installed capacity mirrors broader dynamics: where strong institutional backing, private-sector interest, and external financing converge, incremental improvements materialize. Without such alignment, capacity tends to stagnate or climb very slowly.

Figure 47: Renewable energy capacity per capita, 2023, countries in Western Africa



Source: AFREC SDG7 Database 2025
Note: Data available for select countries only

8.4 SECTORAL INSIGHTS AND KEY PROJECTS

Utility-Scale Developments: Large, centralized renewable installations are crucial for nations able to support them. Morocco's Noor Ouarzazate Solar Complex highlights the powerful synergy between strong policy commitments and concessional financing, while Egypt's Benban Solar Park demonstrates how competitive tenders and straightforward procurement processes can attract ample private investment. By injecting significant new capacity into national grids, these flagship projects elevate each country's renewable energy profile and serve as models for similar efforts across Africa.

Off-Grid and Decentralized Solutions: Off-grid projects, often small in scale but numerous in number, form a vital complement to utility-scale initiatives. PAYG solar home systems and mini-grids have expanded rapidly in parts of Kenya, Rwanda, and Nigeria, tapping private sector interest and leveraging mobile money platforms to reach underserved communities. Although individual installations may be modest, in aggregate they strengthen capacity figures and can stimulate local economies by enabling basic appliance use and small-scale productive activities.

Hybrid Systems: Hybrid systems that blend solar, diesel generators, and battery storage have also begun to appear, particularly in areas with unreliable or nonexistent grid connections. These configurations reduce diesel consumption and air pollution, while helping to stabilize power for households, hospitals, and remote operations such as mining. Although still emerging, hybrid systems underscore the adaptability of renewable technologies and their potential to address energy poverty in challenging settings.

55 - Franklyn Kanyako, Jonathan Lamontagne, Erin Baker, Sean Turner, and Thomas Wild, «Seasonality and Trade in Hydro-Heavy Electricity Markets: A Case Study with the West Africa Power Pool (WAPP),» Applied Energy, vol. 329, January 1, 2023, article 120214. https://doi.org/10.1016/j.apenergy.2022.120214.

8.5 CHALLENGES AND BARRIERS

Progress in installed renewable capacity continues to be uneven due to a host of intertwined obstacles. Many grids in Africa, built decades ago, are poorly equipped to integrate intermittent solar and wind power. As a result, even nations eager to scale up renewables often face technical limits on how much intermittent capacity existing lines can handle without upgrades.

Financing poses another major challenge. Large solar and wind farms require significant upfront capital, yet many African countries carry high risk profiles that raise the cost of loans. Limited local financial sectors and currency fluctuations can further discourage domestic and international investors.

Equally important are policy and regulatory obstacles. In several countries, ad hoc or unclear renewable energy strategies undermine investor confidence. Instances where feed-in tariffs or other incentives are offered inconsistently, or rescinded partway through project development, have had ripple effects across the market.

Finally, the absence of robust data hinders accurate assessment of both on- and off-grid capacity. In many contexts, decentralized systems go unregistered or untracked, so policy decisions and funding allocations cannot fully reflect the continent's real progress and needs.

8.6 OPPORTUNITIES FOR GROWTH

Despite these barriers, abundant natural resources—including solar irradiance, wind corridors, and hydropower potential—present significant promise for Africa's energy transformation. Many African governments are now exploring or issuing green bonds, enabling large-scale, climate-aligned investments that can lower financing costs for renewables. Relatedly, new financing instruments from development banks and philanthropic funds are emerging, specifically targeting energy-poor regions to foster solar mini-grids and micro-hydro projects.

Innovations at the community level further underscore the continent's capacity for leapfrogging fossil-based grids. Solar kit distributors have introduced novel strategies such as Pay-As-You-Go, expanding access among lower-income households and building consumer familiarity with modern energy services. Regional power pools also offer a chance to smooth out fluctuations in intermittent supply, leveraging cross-border trade and shared infrastructure.

8.7 STRATEGIC RECOMMENDATIONS

Elevating Africa's installed renewable capacity, in line with SDG 7.1.B, calls for integrated measures across policy, finance, and infrastructure. Governments can strengthen regulatory frameworks by setting clear and consistent renewable energy targets, while also streamlining procurement processes to invite investors. Upgrading or expanding transmission systems is essential, particularly in countries aiming for utility-scale solar and wind. For areas off the main grid, further scaling of decentralized solutions—backed by robust training for local technicians and targeted financial incentives—can help maintain reliable operation.

Blended finance mechanisms, which combine public grants or concessional loans with private capital, are likely to remain a cornerstone of funding for both large and small projects. Risk-sharing instruments, such as guarantees, can reduce perceived market volatility and bring in commercial investors. Meanwhile, better data collection, facilitated through digital platforms and remote monitoring technologies, can support evidence-based planning and ensure that national statistics capture the actual scope of off-grid contributions.

Taken together, these recommendations underscore the need to strengthen coordination among policymakers, public-sector utilities, private developers, and international donors. Collaboration, fueled by well-designed projects and transparent policies, can accelerate the flow of capital to viable renewable ventures, thus raising watt-per-capita figures even in historically underperforming countries.

8.8 CONCLUSION

Installing renewable capacity at scale is a key enabler of Africa's broader efforts to provide affordable, reliable, and sustainable energy for all. Although a number of countries—particularly in North Africa—are making substantial progress, others remain far behind, hindered by entrenched infrastructure shortfalls and limited financing. A balanced approach that includes both large-scale energy parks and decentralized off-grid solutions offers the best path forward, provided policies and funding evolve in tandem.

Africa's vast solar, wind, and hydropower resources represent a major asset, positioning the continent to leapfrog conventional power systems and transition to cleaner, more resilient grids. By modernizing infrastructure, introducing stable regulatory structures, and promoting innovative financial instruments, African nations can raise their installed renewable capacity to levels that truly reflect this potential. Such achievements would not only fulfill SDG 7.1.B but also set the foundation for broader socio-economic gains—ushering in new economic opportunities, improved public health, and meaningful advances in energy equity across the continent.

9 DATA CHALLENGES FOR TRACKING SDG7 IN AFRICA

Tracking progress toward this goal in Africa requires robust, timely, and disaggregated data across multiple sectors. However, collecting and harmonizing these data can be challenging due to structural, financial, and technological barriers. This chapter examines the specific data requirements and obstacles associated with each SDG 7 target and indicator, highlighting current gaps and proposing potential solutions.

9.1 INTRODUCTION

Reliable energy statistics form the cornerstone of informed policy-making and effective investment strategies. Governments, development partners, and private-sector actors all rely on accurate data to identify where energy access is lacking, measure the uptake of clean cooking solutions, and monitor shifts in renewable energy (RE) and energy-efficiency (EE) indicators. In Africa, where many countries are experiencing rapid population growth and evolving energy markets, consistent data collection is both essential and challenging.

Factors such as limited funding for statistical agencies, fragmented supply chains for energy technologies, and the high cost of conducting nationwide surveys all contribute to data gaps. Furthermore, the presence of both public and private players in energy service delivery makes coordination a daunting task. Despite these challenges, several innovative approaches—such as advanced digital metering, community-level monitoring programs, and collaborative initiatives among governments, academic institutions, and development organizations—are helping to close the data gap.

9.2 DATA REQUIREMENTS FOR SDG 7.1.1: ELECTRICITY ACCESS

Indicator 7.1.1 measures the proportion of the population with access to electricity. In Africa, this data can be particularly difficult to gather because of both formal (public utility) connections and a growing number of private or off-grid solutions.

1. **Public and private sector involvement**: Electricity access is now delivered through a diverse mix of actors—including national utilities, independent power producers, and off-grid or mini-grid enterprises. Capturing a comprehensive picture requires government-led coordination to systematically integrate data from all these sources.

2. **Consumer-side data collection:** Actual household-level access and use can only be confirmed through surveys or advanced metering infrastructure. However, traditional surveys are expensive, time-consuming, and often conducted infrequently, making it difficult to track yearly progress.

3. **Need for better survey methods:** More cost-effective and frequent surveys—potentially leveraging mobile phones, remote sensing, and community-level enumerations—could fill data gaps. Integrating these new methods with conventional survey techniques would improve reliability and timeliness.

4. **Data coordination among providers**: Collaboration is vital. If public utilities, private off-grid companies, and governmental agencies share their connection records in a standardized format, progress can be tracked more accurately. Centralizing this information in a national or regional database would help policymakers identify remaining gaps in electricity coverage.

9.3 DATA REQUIREMENTS FOR SDG 7.1.2: ACCESS TO CLEAN COOKING

Indicator 7.1.2 measures the proportion of the population with primary reliance on clean fuels and technology for cooking. Africa's clean cooking landscape is complex due to a wide range of stoves and fuels available.

1. **Variety of clean cooking solutions**: From LPG to improved biomass stoves to solar cookers, each technology poses different monitoring challenges. Traditional data collection methods may not accurately capture the extent of usage if multiple fuel types are used concurrently.

2. **Fuel stacking:** In many African households, clean cooking fuels are not used exclusively; people often stack multiple fuels (e.g., charcoal, wood, and LPG) for different cooking needs. This complexity makes it harder to track the actual transition to clean cooking solutions.

3. **Need for continuous monitoring:** Usage patterns, rather than mere ownership, best reflect the effectiveness of a clean cooking solution. Longitudinal studies and monitoring through devices that measure stove use (e.g., temperature sensors) could provide insights into sustained adoption.

4. **Supplier- and consumer-side data:** Surveys measuring household fuel use (consumer side) need to be complemented by distribution and sales figures (supplier side). This two-pronged approach helps cross-verify adoption rates and establish a clearer picture of market penetration.

9.4 DATA REQUIREMENTS FOR SDG 7.2.1 AND 7.3.1: RENEWABLE ENERGY AND ENERGY EFFICIENCY

Indicators 7.2.1 (Renewable energy share in total final energy consumption) and 7.3.1 (Energy intensity measured in terms of primary energy and GDP) both require granular data across multiple economic sectors.

1. **Relatively robust national and regional statistics:** Many African countries already collect data on electricity generation and consumption through their national statistical offices. Regional organizations (e.g., the African Union, regional power pools) also compile energy balance statistics, offering a starting point for RE share and energy-intensity calculations.

2. **Gaps in transport, heating, and cooling:** While electricity data may be relatively comprehensive, information on transport fuels, heating solutions, and cooling technologies is more sporadic. These gaps make it challenging to accurately calculate the share of renewables or measure efficiency improvements in these subsectors.

3. **Growing consumption and the need for better efficiency metrics:** As populations and economies grow, understanding energy use patterns is critical for planning interventions. Tracking building efficiency, transport efficiency, and industrial energy intensity requires disaggregated data by end-use sector. Harmonized data collection methodologies, shared across borders, can enhance reliability and comparability.

4. **Additional challenges**

   - **Institutional capacity:** National statistical offices may lack the technical expertise or funding to capture complex end-use data.
   - **Private sector data:** Many efficiency measures are implemented by private companies that do not always report data publicly.
   - **Technological limitations:** Few standardized protocols exist for measuring efficiency in informal economic activities, which remain prevalent in Africa.

9.5 DATA REQUIREMENTS FOR SDG 7.A.1: INTERNATIONAL FINANCIAL FLOWS FOR RENEWABLE ENERGY

Indicator 7.A.1 focuses on tracking the mobilization of funds toward research, development, and renewable energy solutions in developing countries. This is particularly difficult in Africa for several reasons:

1. **Poor data quality:** Financing for renewable energy often comes from a range of international donors, private investors, philanthropic organizations, and multilateral banks. Reports on these flows can be incomplete or inconsistent, undermining efforts to measure overall investment.

2. **Piecemeal nature of funding:** Funds can be channeled to national governments, sub-national authorities, or project-based organizations. Many projects also receive blended finance from multiple sources, making it hard to isolate specific contributions to renewable energy.

3. **Lack of centralized data collection:** There is no single body responsible for consolidating and verifying financial data flows. Even within governments, responsibilities may be split between multiple ministries (energy, finance, environment).

4. **Proposed solutions**
   - **Centralized tracking platforms:** Establish a national or regional database where donors and investors are required—or strongly encouraged—to report contributions.
   - **Harmonized reporting standards:** Standardized templates and indicators would reduce ambiguity and make cross-country comparisons easier.
   - **Capacity building:** Strengthen the ability of local institutions to collect and analyze financial data, ensuring greater transparency and accountability.

9.6 DATA REQUIREMENTS FOR SDG 7.B.1: INSTALLED RENEWABLE ENERGY CAPACITY PER CAPITA

Indicator 7.B.1 looks at the installed renewable energy capacity per capita. Compared to other indicators, data on renewable power capacity tends to be more readily available.

1. **Relatively good data availability:** National utilities, regulatory agencies, and regional power pools often track installed generation capacity, including renewables. This information can be aggregated to estimate the capacity per capita.

2. **Remaining obstacles:** While centralized grid-connected renewable systems are generally well-documented, off-grid and small-scale renewable installations are less systematically monitored. Encouraging local authorities and mini-grid operators to submit regular data can help fill these gaps.

9.7 CONCLUSION

Reliable, comprehensive data is the linchpin for achieving SDG 7 in Africa. While progress in national and regional energy statistics has been made, significant gaps remain—especially in understanding off-grid electricity access, complex clean cooking behaviors, detailed sectoral energy use, and fragmented international financial flows. Addressing these data challenges will require:

- **Innovative Survey and Monitoring Techniques:** Employing technology-driven solutions (smart meters, mobile-based surveys) and cost-effective methods for more frequent and reliable data collection.
- **Robust Institutional Frameworks**: Strengthening national statistical agencies and promoting inter-agency coordination to ensure consistent and standardized reporting.
- **Adequate Financing Resources**: Ensuring that institutions tasked with data collection and analysis have sufficient financial support to build capacity, deploy technologies, and maintain high-quality data systems.
- **Private Sector Engagement**: Encouraging private companies to share data and adopt harmonized reporting standards.
- **Regional Collaboration**: Aligning methodologies and data-sharing protocols across

By overcoming these data challenges, African governments and their partners can better identify gaps in energy access, track the adoption of clean cooking solutions, measure renewable energy penetration, and allocate financial and technical resources more effectively. Ultimately, a data-driven approach will accelerate the continent's transition to a sustainable energy future, ensuring no one is left behind.

10 DATA


Factory A
Factory B
Factory C
2007
2008
2009
2010
2011
2012
2005
Factory
November
Bullish
2010
2011
2012
2.5
3.5
4.5
4.4
4
5
7
9
15

Table 1: Proportion of population with access to electricity, by country, 2017 - 2023

Country	2017	2018	2019	2020	2021	2022	2023
Algeria	99	99	99	99	99	99	99
Angola	50	51	52	56	59	60	61
Benin	48	50	52	54	59	60	62
Botswana	83	84	84	85	85	85	86
Burkina Faso	21	24	27	30	34	37	41
Burundi	8	10	10	14	17	17	17
Cabo Verde	50	51	56	58	59	60	61
Cameroon	48	50	52	54	58	62	66
Central African Republic	8	14	18	20	24	24	28
Chad	6	7	7	10	12	14	16
Comoros	57	60	60	61	62	66	70
Congo Republic	50	51	56	60	60	63	64
Côte d'Ivoire	62	64	64	67	67	68	69
Djibouti	62	64	65	65	67	68	69
DR Congo	8	10	10	15	15	15	17
Egypt	98	98	99	99	100	100	100
Equatorial Guinea	83	84	84	84	85	85	86
Eritrea	14	16	17	20	24	25	28
Eswatini	63	67	72	78	80	85	86
Ethiopia	44	45	48	51	52	52	52
Gabon	83	86	86	86	90	90	90
Gambia	55	58	61	62	64	64	65
Ghana	68	70	76	76	78	81	84
Guinea	35	38	41	46	54	63	66
Guinea-Bissau	28	32	38	43	46	46	49
Kenya	56	61	70	72	77	77	78
Lesotho	48	50	52	52	59	63	66
Liberia	21	23	24	30	34	37	41
Libya	77	83	84	84	85	85	86

Country	2017	2018	2019	2020	2021	2022	2023
Madagascar	14	16	17	20	24	26	28
Malawi	14	16	18	18	22	24	26
Mali	21	23	24	30	34	37	41
Mauritania	50	51	56	59	59	60	61
Mauritius	100	100	100	100	100	100	100
Morocco	98	98	99	99	99	99	99
Mozambique	27	31	33	37	42	48	53
Namibia	49	53	53	54	55	55	57
Niger	12	13	14	16	18	20	21
Nigeria	54	55	56	60	62	63	63
Rwanda	34	41	48	49	55	67	70
Sahrawi Republic	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
São Tomé and Príncipe	72	79	80	85	87	87	88
Senegal	67	68	71	72	73	74	76
Seychelles	100	100	100	100	100	100	100
Sierra Leone	21	24	27	27	30	31	31
Somalia	35	37	39	41	43	48	50
South Africa	83	84	84	84	85	85	86
South Sudan	4	6	7	7	8	8	9
Sudan	53	55	58	60	62	64	65
Tanzania	68	68	70	70	70	72	72
Togo	39	45	47	52	58	65	67
Tunisia	100	100	100	100	100	100	100
Uganda	20	24	28	34	40	51	57
Zambia	34	34	38	40	45	53	56
Zimbabwe	48	50	52	53	59	63	66
Northern Africa	96	97	98	98	98	98	98
Eastern Africa	44	46	49	52	54	57	58
Western Africa	48	49	51	54	57	59	60
Central Africa	18	20	21	24	25	26	28
Southern Africa	52	53	55	56	59	62	64
Africa	51	53	55	57	59	61	62

Table 2: Proportion of population with access to clean cooking, by country, 2017 - 2023

Country	2017	2018	2019	2020	2021	2022	2023
Algeria	100	100	100	100	100	100	100
Angola	31	31	33	34	38	40	41
Benin	11	11	12	12	12	13	13
Botswana	66	66	66	66	66	66	67
Burkina Faso	9	9	10	10	11	12	18
Burundi	3	3	3	3	3	3	3
Cabo Verde	80	81	81	82	82	83	84
Cameroon	22	24	27	29	30	30	31
Central African Republic	27	27	27	27	27	27	27
Chad	7	7	7	7	7	7	7
Comoros	25	26	27	32	31	33	34
Congo Republic	31	31	33	34	38	40	41
Côte d'Ivoire	31	31	33	34	38	40	41
Djibouti	31	31	33	34	38	40	41
DR Congo	6	6	6	6	6	6	6
Egypt	100	100	100	100	100	100	100
Equatorial Guinea	79	79	79	80	81	81	83
Eritrea	6	6	6	6	6	6	6
Eswatini	36	38	38	38	40	40	42
Ethiopia	5	6	7	7	8	8	9
Gabon	39	40	40	42	43	46	48
Gambia	9	9	10	10	11	12	18
Ghana	25	25	25	26	37	41	45
Guinea	9	9	10	13	14	15	16
Guinea-Bissau	9	9	10	10	11	12	18
Kenya	16	17	20	22	25	32	32
Lesotho	45	45	45	45	50	50	50
Liberia	40	40	40	41	41	42	43
Libya	78	78	78	79	79	79	79

Country	2017	2018	2019	2020	2021	2022	2023
Madagascar	5	5	5	5	5	5	5
Malawi	15	16	18	20	21	22	23
Mali	9	9	10	10	11	12	18
Mauritania	31	34	38	40	45	47	54
Mauritius	100	100	100	100	100	100	100
Morocco	98	98	98	98	98	98	98
Mozambique	6	6	6	6	6	6	6
Namibia	47	48	49	50	51	52	53
Niger	6	6	6	6	6	6	6
Nigeria	19	19	19	21	23	27	27
Rwanda	2	2	3	4	4	5	6
Sahrawi Republic	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
São Tomé and Príncipe	22	22	22	27	28	28	28
Senegal	22	22	27	29	31	33	34
Seychelles	100	100	100	100	100	100	100
Sierra Leone	6	6	6	6	6	6	6
Somalia	6	6	6	6	6	6	6
South Africa	78	78	79	80	80	80	80
South Sudan	6	6	6	6	6	6	6
Sudan	56	58	59	61	63	65	65
Tanzania	13	13	13	13	13	14	14
Togo	9	9	10	10	11	12	18
Tunisia	100	100	100	100	100	100	100
Uganda	3	4	4	4	5	7	9
Zambia	8	8	8	8	9	9	9
Zimbabwe	30	30	30	31	31	39	39
Northern Africa	97	97	97	97	97	98	98
Eastern Africa	13	14	15	15	16	18	18
Western Africa	18	18	18	20	22	25	26
Central Africa	12	12	13	13	14	14	14
Southern Africa	97	97	97	97	97	98	98
Africa	31	32	32	33	34	35	35

Table 3: Proportion of population with access to clean cooking, by country, 2017 - 2022

Country	2017	2018	2019	2020	2021	2022
Algeria	0	0	0	0	0	0
Angola	29	29	34	34	35	38
Benin	66	67	68	69	73	75
Botswana	23	24	24	26	27	29
Burkina Faso	86	87	88	88	88	88
Burundi	98	98	98	98	98	98
Cabo Verde	42	43	49	51	52	52
Cameroon	51	57	60	64	67	68
Central African Republic	96	97	97	97	97	98
Chad	80	82	82	83	84	85
Comoros	76	82	83	83	83	85
Congo Republic	88	88	90	90	90	90
Côte d'Ivoire	78	79	79	80	81	82
Djibouti	72	72	77	77	77	77
DR Congo	98	98	98	98	98	98
Egypt	2	2	3	3	3	3
Equatorial Guinea	22	23	23	27	26	30
Eritrea	66	68	78	79	80	81
Eswatini	75	75	76	76	76	77
Ethiopia	95	95	95	95	95	95
Gabon	47	54	64	67	67	67
Gambia	76	76	77	79	80	80
Ghana	58	58	58	60	60	60
Guinea	79	86	87	87	87	88
Guinea-Bissau	91	94	95	94	96	96
Kenya	84	84	84	84	85	86
Lesotho	78	78	85	86	88	88
Liberia	91	91	91	91	91	91
Libya	0	0	0	0	0	0

Country	2017	2018	2019	2020	2021	2022
Madagascar	89	89	91	93	93	93
Malawi	90	90	95	95	95	95
Mali	85	85	87	87	87	88
Mauritania	66	67	67	67	68	68
Mauritius	3	3	3	4	4	4
Morocco	22	22	22	23	23	23
Mozambique	65	66	70	72	72	79
Namibia	65	65	69	71	71	72
Niger	80	85	91	91	91	91
Nigeria	60	60	61	61	62	63
Rwanda	92	92	93	94	94	94
Sahrawi Republic	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
São Tomé and Príncipe	52	60	61	61	62	62
Senegal	23	32	56	56	58	58
Seychelles	1	1	1	1	1	1
Sierra Leone	92	92	92	93	94	94
Somalia	95	95	95	95	95	95
South Africa	14	14	16	18	18	19
South Sudan	55	57	58	60	61	69
Sudan	50	51	53	55	55	57
Tanzania	77	77	79	79	82	82
Togo	86	87	89	90	90	90
Tunisia	21	22	23	24	24	24
Uganda	95	95	95	95	95	95
Zambia	89	89	91	91	91	91
Zimbabwe	90	90	90	92	92	92
Northern Africa	19	19	19	20	20	20
Eastern Africa	68	69	70	71	71	72
Western Africa	73	75	78	78	79	80
Central Africa	70	73	75	76	76	77
Southern Africa	62	62	65	66	66	68
Africa	63	64	67	67	68	69

Table 4: Annual change in energy intensity, by country, 2017 - 2022

Country	2017	2018	2019	2020	2021	2022
Algeria	-2	-1	-3	-3	-2	-2
Angola	4	0	-1	1	2	1
Benin	0	-1	-2	-1	-2	-2
Botswana	8	-1	0	0	-1	-1
Burkina Faso	-3	-4	-4	-5	-4	-3
Burundi	1	1	1	1	1	2
Cabo Verde	1	2	2	5	4	4
Cameroon	-2	-3	-3	-1	0	-2
Central African Republic	-33	4	3	3	3	4
Chad	-5	-4	-4	-3	-2	-2
Comoros	-3	-3	8	7	7	7
Congo Republic	6	5	5	6	6	16
Côte d'Ivoire	-7	-7	-1	-1	1	1
Djibouti	-5	-4	-5	-4	-4	-3
DR Congo	0	0	-1	-1	0	0
Egypt	0	0	-2	-3	-2	-1
Equatorial Guinea	10	6	16	14	13	12
Eritrea	-2	-2	-4	-4	-4	-1
Eswatini	0	0	22	19	17	18
Ethiopia	-4	-5	-5	-4	-4	-7
Gabon	-2	2	3	4	4	4
Gambia	1	-1	6	0	-1	2
Ghana	-5	-6	-5	-4	-4	-4
Guinea	4	0	-2	-2	-2	1
Guinea-Bissau	-4	-3	-7	-6	-5	-4
Kenya	-2	-2	-3	-2	-2	-2
Lesotho	0	-5	-19	-21	-17	-2
Liberia	-1	-4	-3	-1	-2	0
Libya	6	2	-2	0	-1	2

Country	2017	2018	2019	2020	2021	2022
Madagascar	-1	0	-2	-1	-1	0
Malawi	-1	-2	3	2	2	1
Mali	0	0	3	3	3	0
Mauritania	-2	-3	-3	-2	-2	-1
Mauritius	2	2	-2	-2	-2	-2
Morocco	0	2	-3	2	2	2
Mozambique	0	-1	1	1	2	-1
Namibia	6	5	4	4	4	-1
Niger	-8	-7	-5	-5	-4	-4
Nigeria	2	1	-4	-3	-2	-12
Rwanda	-6	-6	-5	-4	-4	-4
Sahrawi Republic	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
São Tomé and Príncipe	-3	-3	-3	-2	-1	0
Senegal	-12	-9	-5	-4	-4	-4
Seychelles	-6	-3	-2	-1	-1	-1
Sierra Leone	-1	-2	-1	-2	0	0
Somalia	-6	-6	-6	-4	-4	-3
South Africa	-2	-1	-2	-3	-2	-4
South Sudan	8	7	5	5	4	14
Sudan	4	4	-6	-6	-5	-4
Tanzania	0	-1	-2	-2	-2	-2
Togo	-1	-4	-5	-4	-3	-5
Tunisia	-1	-1	-2	-1	-1	-1
Uganda	5	2	2	2	2	0
Zambia	-2	-3	-1	0	1	-8
Zimbabwe	-4	-4	-3	-2	-2	-2
Northern Africa	0	0	-3	-1	-1	0
Eastern Africa	-1	-1	-2	-2	-1	0
Western Africa	-2	-3	-2	-2	-2	-2
Central Africa	-3	1	2	2	3	4
Southern Africa	1	-1	0	0	1	0
Africa	-1	-1	-1	-1	0	0

Table 5: International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems, 2017 - 2023

Country	2017	2018	2019	2020	2021	2022	2023
Algeria	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Angola	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Benin	0.5	1.0	1.0	1.0	10.4	11.4	68.9
Botswana	2.6	Data NA	Data NA	Data NA	Data NA	Data NA	3.5
Burkina Faso	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Burundi	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Cabo Verde	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Cameroon	106.0	Data NA	145.0	Data NA	Data NA	Data NA	59.8
Central African Republic	Data NA	10	17.3	60.0	Data NA	Data NA	131.0
Chad	Data NA	Data NA	Data NA	Data NA	51.7	134.7	59.3
Comoros	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Congo Republic	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Côte d’Ivoire	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Djibouti	51.7	93.3	29.4	6.4	5.3	57.6	Data NA
DR Congo	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Egypt	Data NA	Data NA	52.3	Data NA	254.0	Data NA	Data NA
Equatorial Guinea	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Eritrea	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Eswatini	2.8	3.9	Data NA	Data NA	Data NA	1.3	Data NA
Ethiopia	1,945.0	2,476.0	1,870.0	3,290.0	3,612.0	4,000.0	4,358.0
Gabon	188.8	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Gambia	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Ghana	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Guinea	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Guinea-Bissau	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Kenya	81.5	130.7	28.3	Data NA	0.3	52.9	5.5
Lesotho	28.3	Data NA	0.3	52.9	5.5	10.7	100
Liberia	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Libya	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA

Country	2017	2018	2019	2020	2021	2022	2023
Madagascar	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Malawi	Data NA	Data NA	150	5.0	3.7	Data NA	Data NA
Mali	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Mauritania	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Mauritius	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Morocco	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Mozambique	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Namibia	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Niger	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Nigeria	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Rwanda	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Sahrawi Republic	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
São Tomé and Príncipe	15.0	15.0	15.0	15.0	15.0	16.0	18.0
Senegal	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Seychelles	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Sierra Leone	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Somalia	18.0	22.0	27.0	32.0	36.0	40.0	46.0
South Africa	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
South Sudan	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Sudan	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Tanzania	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Togo	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Tunisia	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Uganda	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Zambia	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Zimbabwe	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Northern Africa	0.0	0.0	52.3	0.0	254.1	0.0	0.0
Eastern Africa	2096.2	2722.1	1954.8	3328.5	3653.7	4150.5	4409.5
Western Africa	0.5	1.0	1.0	1.0	10.4	11.4	68.9
Central Africa	309.8	25.0	177.3	75.0	66.7	150.7	268.2
Southern Africa	33.7	4.0	150.3	57.9	9.2	12.0	103.5
Africa	2440.3	2752.0	2335.7	3462.3	3994.1	4324.6	4850.1

SDG 7.B.1:
INSTALLED RENEWABLE ENERGY GENERATING CAPACITY PER CAPITA

Table 6: Installed renewable energy-generating capacity in developing and developed countries (in watts per capita), 2017 - 2023

Country	2017	2018	2019	2020	2021	2022	2023
Algeria	17.8	15.1	14.8	14.6	14.6	14.7	14.5
Angola	6.2	6.2	6.2	6.2	6.2	6.2	6.7
Benin	0.5	0.5	0.6	0.8	1.0	3.0	3.0
Botswana	0.5	0.5	0.5	0.5	0.5	0.5	2.0
Burkina Faso	1.8	1.7	1.7	1.6	1.6	2.9	6.9
Burundi	5.8	5.6	5.4	5.3	5.7	5.6	7.5
Cabo Verde	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Cameroon	30.6	30.5	37.9	37.3	36.4	35.5	34.6
Central African Republic	3.6	3.5	3.5	5.2	5.1	7.7	11.8
Chad	0.1	2.5	2.5	2.5	2.5	2.5	2.5
Comoros	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Congo Republic	43.7	41.0	41.7	39.1	39.8	38.9	38.0
Côte d’Ivoire	35.4	34.5	33.6	32.8	32.0	31.2	31.5
Djibouti	52.8	52.8	52.8	52.8	52.8	52.8	52.8
DR Congo	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Egypt	36.2	38.5	48.1	54.4	53.5	54.9	54.5
Equatorial Guinea	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Eritrea	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Eswatini	146.4	145.3	144.2	142.8	163.9	165.0	165.2
Ethiopia	39.1	38.0	37.0	36.1	37.0	42.6	42.0
Gabon	79.9	78.3	76.5	75.1	73.8	72.6	71.3
Gambia	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Ghana	53.0	53.0	51.9	51.4	51.9	50.8	50.4
Guinea	37.2	36.2	35.3	44.5	60.0	58.6	57.2
Guinea-Bissau	0.3	0.3	0.3	0.3	0.3	0.4	0.7
Kenya	31.3	38.1	40.6	40.2	43.6	45.2	44.1
Lesotho	33.2	32.8	32.3	31.9	31.6	31.2	30.9
Liberia	18.3	18.0	17.7	13.0	12.7	12.4	12.2
Libya	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA

Country	2017	2018	2019	2020	2021	2022	2023
Madagascar	6.5	7.2	7.0	8.2	7.2	10.2	10.0
Malawi	20.8	20.6	20.1	19.6	23.1	17.2	24.0
Mali	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Mauritania	22.8	22.2	21.7	21.1	20.6	20.1	40.1
Mauritius	253.2	283.2	282.8	296.4	297.7	301.6	313.9
Morocco	83.0	102.5	101.4	107.1	109.2	110.4	110.4
Mozambique	79.3	77.0	76.2	74.1	72.5	71.8	69.9
Namibia	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Niger	0.3	0.6	0.6	0.6	0.6	0.6	1.6
Nigeria	11.1	10.8	10.6	10.7	10.5	10.4	13.3
Rwanda	8.2	8.4	9.3	10.0	9.7	9.5	9.5
Sahrawi Republic	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
São Tomé and Príncipe	9.1	9.0	8.9	8.7	8.5	8.4	10.4
Senegal	10.2	10.2	10.2	10.0	13.4	13.1	14.1
Seychelles	90.0	102.3	106.3	118.4	184.8	159.1	168.3
Sierra Leone	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
Somalia	0.9	0.9	0.9	1.5	1.6	2.4	3.0
South Africa	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA	Data NA
South Sudan	0.1	0.1	0.1	0.1	0.1	1.8	1.8
Sudan	9.6	9.6	9.8	10.3	10.0	10.9	10.6
Tanzania	8.5	8.5	8.5	8.5	8.5	8.5	8.4
Togo	4.3	4.3	4.1	4.1	9.7	9.5	9.3
Tunisia	28.9	29.5	32.1	34.3	37.2	41.9	48.4
Uganda	20.0	21.3	26.8	26.3	27.5	27.6	36.0
Zambia	138.7	134.5	135.3	131.4	143.5	162.3	159.8
Zimbabwe	52.8	72.0	70.6	69.5	69.4	68.5	67.7
Northern Africa	37.7	41.6	43.6	46.3	47.0	48.4	53.6
Eastern Africa	43.4	47.5	48.5	50.7	56.7	56.0	58.4
Western Africa	14.4	14.2	13.9	14.2	16.2	16.1	16.7
Central Africa	24.7	24.4	25.2	24.8	24.6	24.5	25.2
Southern Africa	59.7	61.1	60.7	59.5	63.8	65.3	65.8
Africa	34.8	36.6	37.0	37.7	40.7	40.9	42.5

The African Energy Commission (AFREC) is a specialised energy agency of the African Union (AU), mandated to develop the African energy sector by coordinating, harmonising, protecting, conserving, developing, and promoting rational exploitation, commercialisation, and integration of energy resources in Africa. AFREC works closely with partners and experts from all AU Member States and regional bodies to ensure all energy initiatives across the AU respond to the future development of the African energy sector, in accordance with the AU's Agenda 2063 and the pursuit of building The Africa We Want.

AFREC
African Energy Commission

African Union

02 Chenoua street , PO791, Hydra, 16035
Algiers, Algeria

Tel: +213 23 45 9198
Fax: +213 23 45 9200

Afrec@africa-union.org
www.au-afrec.org