



Leapfrogging

Leapfrogging in Africa's Energy Sector: The Transformative Potential of Renewables

Jakkie Cilliers

Last updated 13 May 2026 using IFs v7.84

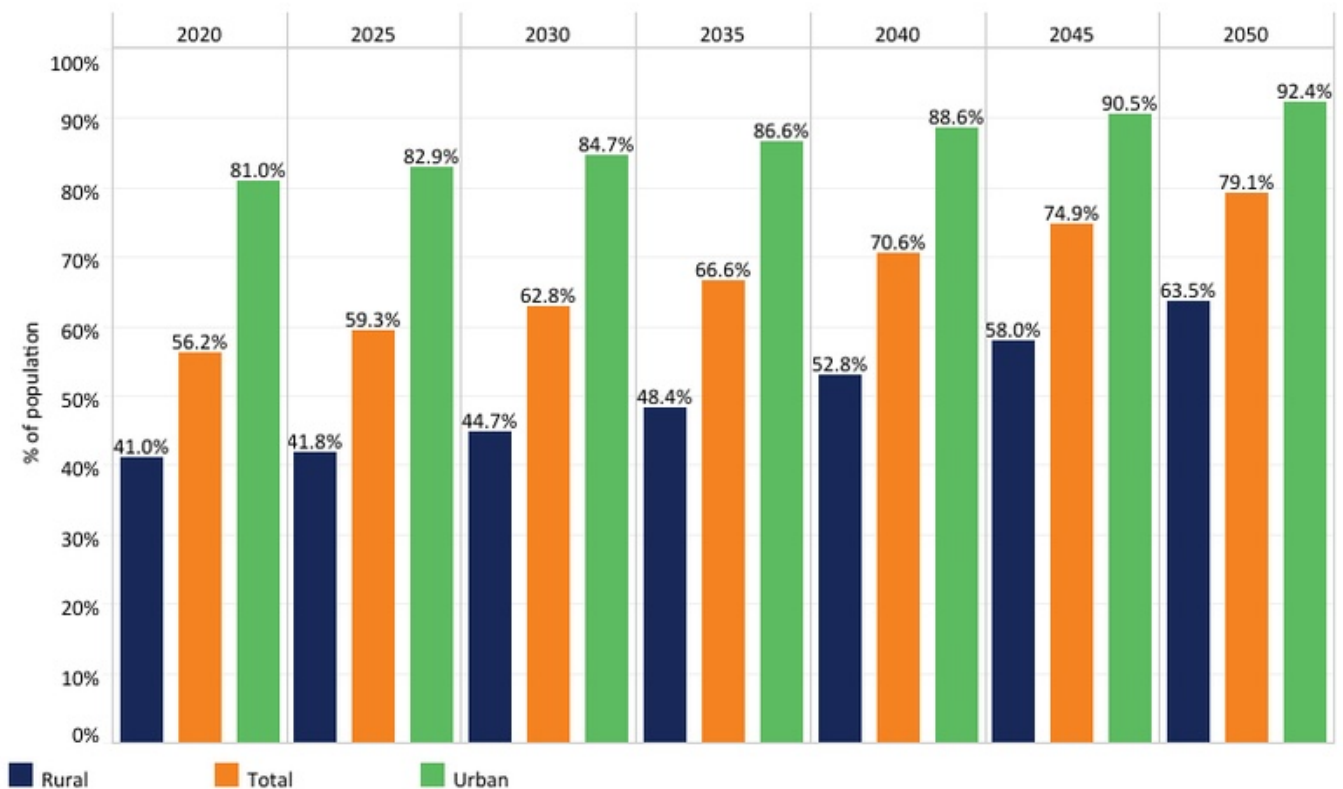
Leapfrogging in Africa's Energy Sector: The Transformative Potential of Renewables

Despite progress, energy access remains a major challenge in Africa. In 2022, only 58.5% of the population had electricity, leaving about 600 million people (41.5%) without power.

Sub-Saharan Africa accounts for most of this deficit. While global electricity access reached 91.3% in 2022, sub-Saharan Africa lagged far behind at 51.5%. Countries such as Nigeria, DR Congo and Ethiopia have the largest numbers of people without access to electricity. In contrast, South Sudan, Burundi and Chad have the highest proportions of their populations without access.

Access is also strongly unequal between urban and rural areas. In 2022, 83% of urban residents had electricity, compared with just 42% in rural areas.

Chart 1: Electricity access in Africa, 2020-2024 with forecast to 2050



Source: IFs 8.50 initialising from WDI data

Even where electricity is available, it is often unreliable and expensive. In many countries, households and businesses rely on costly backup generators, driving up the effective price of electricity and constraining economic activity. Rapid population growth in sub-Saharan Africa is also offsetting gains in electrification, slowing progress.

According to United Nations data, Africa's per capita electricity consumption declined from approximately 660 kilowatt-hours (kWh) in 2015 to just 514.7 kWh in 2022, marking its lowest level in over two decades. This downward trend highlights a critical challenge: while access to electricity has expanded in many countries, actual consumption is not keeping pace. In many cases, households and businesses remain constrained by unreliable supply, high costs and weak grid infrastructure, limiting the amount of electricity they can effectively use.

As a result, electricity consumption across much of the continent remains well below global averages, reflecting both limited access and affordability barriers. This persistent energy gap has significant economic consequences. It constrains industrial development, reduces agricultural productivity, particularly where cold storage and processing are needed, and discourages private investment in sectors that depend on consistent, reliable power.

On the current trajectory, electricity access in Africa will reach 79% of the population by 2050, about 63.5% in rural areas and 92% in urban areas. Traditional grid expansion alone is unlikely to close Africa's energy gap quickly enough, especially given that a large share of the population lives in rural and dispersed communities. Extending centralised grids to these areas is often prohibitively expensive and slow.

Africa's energy challenge presents a unique opportunity to leapfrog traditional fossil fuel-based development and transition directly to cleaner, cheaper, decentralised systems. Renewable energy offers a practical pathway to rapidly expand access to affordable and reliable electricity, particularly in underserved areas. Unlike conventional grid expansion, which is often slow and costly, off-grid and mini-grid solutions, especially solar-based ones, are already delivering power to millions of households more quickly and at lower cost. These systems are central to closing the access gap, with mini-grids providing a scalable, flexible option when extending the national grid is not feasible.

Geospatial [analyses](#) reinforce this conclusion, showing that achieving universal electrification in sub-Saharan Africa by 2030 will require a cost-effective mix of technologies, with solar-based off-grid and mini-grid systems playing a central role. According to World Bank estimates, supplying electricity to 380 million people by 2030 will require more than **160 000** mini-grids at a cost of around US\$ 91 billion. With projected costs as low as US\$0.20 per kWh, mini-grids could become the most affordable solution for over **60%** of the unelectrified population. Yet deployment remains too slow to meet demand. Progress is constrained by rapid population growth, limited access to long-term financing, insufficient concessional funding, poverty, regulatory bottlenecks and information gaps among key stakeholders.

Expanding electricity access would have wide-ranging social and economic benefits. Reliable power reduces reliance on polluting fuels, improves health outcomes, strengthens education and healthcare systems and supports income-generating activities. It also enables digital connectivity, financial inclusion and innovation, key drivers of modern economic development.

Africa is well positioned to lead this transition, with about **60%** of the world's best solar resources and substantial untapped wind, hydro and geothermal potential. Yet the continent attracts only a small share of global clean energy investment. Africa continues to face a persistent shortfall in clean energy financing. Although global investment has rebounded since COVID-19, it remains highly uneven. Between 2021 and 2022, clean energy finance grew by over **100%** in Latin America but only 2.5% in sub-Saharan Africa. Looking ahead, financing prospects are increasingly uncertain. Shifting geopolitical and fiscal priorities, such as the United States' decision to end its Power Africa initiative after more than a decade, together with rising military spending in Europe, may further constrain climate and development finance.

Domestic structural challenges add to the difficulty. High public debt, shallow capital markets and undercapitalised utilities limit the ability to fund large-scale energy projects. Addressing these barriers will require innovative financing mechanisms that reduce risk, attract private investment, and mobilise domestic and regional capital.

At the same time, emerging technologies such as green hydrogen offer new opportunities for industrial development, positioning Africa to meet its own energy needs and to become a global supplier of clean energy. With the right mix of investment, policy support and technological innovation, the continent can bypass outdated energy systems and build a more inclusive, resilient and sustainable energy future.

Donors and sponsors



Reuse our work

- All visualizations, data, and text produced by African Futures are completely open access under the [Creative Commons BY license](#). You have the permission to use, distribute, and reproduce these in any medium, provided the source and authors are credited.
- The data produced by third parties and made available by African Futures is subject to the license terms from the original third-party authors. We will always indicate the original source of the data in our documentation, so you should always check the license of any such third-party data before use and redistribution.
- All of our charts [can be embedded](#) in any site.

Cite this research

Jakkie Cilliers (2026) Africa Leapfrogging Futures. Published online at futures.issafrica.org. Retrieved from <https://futures.issafrica.org/thematic/09-leapfrog/> [Online Resource] Updated 13 May 2026.

About the authors

Dr Jakkie Cilliers is the founder and former executive director of the ISS. He currently serves as chair of the ISS Board of Trustees, head of the African Futures and Innovation (AFI) programme at the Institute's Pretoria office, and an extraordinary professor at the University of Pretoria. His 2017 best-seller [Fate of the Nation](#) addresses South Africa's future from political, economic and social perspectives. His three most recent books, [Africa First! Igniting a Growth Revolution](#) (March 2020), [The Future of Africa: Challenges and Opportunities](#) (April 2021), and [Africa Tomorrow: Pathways to Prosperity](#) (June 2022) offer rigorous analyses of the continent as a whole. From August to December 2025, Cilliers was a Richard von Weizsäcker Fellow at the Robert Bosch Academy in Berlin.

About African Futures & Innovation

Scenarios and forecasting can help Africa identify and respond to opportunities and threats. The work of the African Futures & Innovation (AFI) program at the Institute for Security Studies aims to understand and address a widening gap between indices of wellbeing in Africa and elsewhere in the world. The AFI helps stakeholders understand likely future developments. Research findings and their policy implications are widely disseminated, often in collaboration with in-country partners. Forecasting tools inspire debate and provide insights into possible trajectories that inform planning, prioritisation and effective resource allocation. Africa's future depends on today's choices and actions by governments and their non-governmental and international partners. The AFI provides empirical data that informs short- and medium-term decisions with long-term implications. The AFI enhances Africa's capacity to prepare for and respond to future challenges. The program is headed by Dr Jakkie Cilliers.