

The background of the cover is a photograph of a wind farm. A large white wind turbine with three blades is the central focus, set against a cloudy, grey sky. In the foreground, the rows of solar panels on a metal structure are visible, extending from the bottom left towards the right. The overall scene is a mix of natural and industrial elements.

Africa Energy Review 2024

Driving energy access through collaboration

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Executive summary

The global energy landscape has shifted dramatically due to the post-pandemic recovery, geopolitical tensions, and climate challenges. COP28 saw major advancements like the Battery Energy Storage Systems Consortium and the UAE Hydrogen Declaration of Intent, aiming to boost renewable energy. A \$4.5 billion fund for African renewable projects and the Declaration to Triple Nuclear Energy by 2050 show a global push for sustainability. Technological advances like more affordable solar cells and AI-driven energy management promise to transform Africa's energy future, paving the way for resilience and sustainability.

Africa contributes to the global need for energy while addressing its own energy needs. North Africa's energy landscape is evolving with a strong oil & gas sector alongside a growing emphasis on renewable energy sources, including wind, solar, and green hydrogen. Key players like Egypt, Algeria, and Morocco are using their resource wealth to transition towards renewables while maintaining their positions as natural gas exporters. Egypt aims to produce 42% of its electricity from renewables by 2035, driven by significant investments in solar projects like the Benban Solar Park. Morocco targets over 52% renewable generation by 2030, focusing on large-scale solar and wind projects. While reliant on gas, Algeria plans for 22% renewable energy by 2025, and Libya is seeing a rebound in oil production despite political challenges.

In East Africa, countries such as Kenya, Ethiopia, and Tanzania are making strides in expanding renewable energy and improving rural electrification. With major projects like the Lake Turkana Wind Farm, Kenya has achieved over 75% electricity access and aims for 100% renewable generation by 2030. Ethiopia's Grand Ethiopian Renaissance Dam is expected to enhance regional energy exports. Meanwhile, Southern Africa is a leader in renewable energy development, particularly in solar and wind, with South Africa dominating the region's investments. Namibia is focusing on renewable buildout to support green hydrogen production, capitalising on its abundant solar and wind resources. Its oil and gas finds, complementing its renewable resources, will likely make it a new regional energy hub. Despite significant advancements across these regions, challenges remain in infrastructure and financing, underscoring the need for continued investment and collaboration to meet growing energy demands and transition to sustainable energy systems.

Western and Central Africa are making significant strides in energy development through natural gas, renewable energy, and green hydrogen. Nigeria leads Western Africa with a \$585 billion net-zero plan by 2050, while Senegal and Ghana focus on solar and waste-to-energy projects. Despite only 57% electricity access, the region is shifting towards decentralized renewable solutions. In Central Africa, countries like the DRC and Cameroon are investing in hydropower and solar energy, with international support and regional collaboration through Economic Community of Central African States (ECCAS) to overcome financing and infrastructure challenges and enhance energy security.

Africa's energy sector is driving a Just Energy Transition, focusing on equitable access and the synergy between natural gas and renewables like solar and wind. Key stakeholders highlight the need for investment in infrastructure and technology to enhance grid efficiency, energy storage, and resilience. Collaboration across borders, public-private partnerships, and regulatory reforms are crucial for attracting investment and fostering innovation.

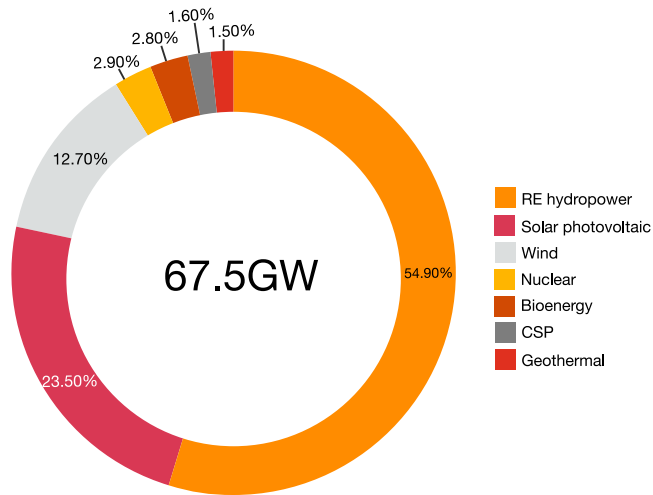
Countries are increasingly embracing electricity liberalisation, opening the sector to private investment, participation and collaboration between government and the private sector. This shift aims to drive renewable energy growth by using private capital and innovation, enabling large-scale projects like Morocco's Noor Solar Complex and fostering energy security through competitive markets. In Kenya, independent power producers (IPPs) have boosted renewable capacity, improving energy stability. Other nations like Nigeria, South Africa, and Zambia have enacted reforms to decentralise control, encourage IPPs, and promote competition. At the same time, countries like Ethiopia and Zimbabwe still rely on monopolistic state utilities.

Africa's evolving energy landscape, with growing interest in renewables while maximising value from fossil fuels, faces challenges like regulatory uncertainty and financing needs but presents significant economic growth and energy security opportunities.

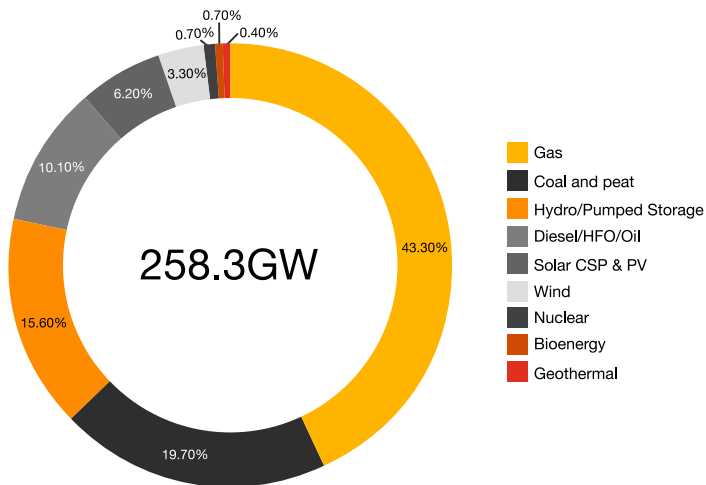


Energy snapshots

Africa: Clean energy generating capacity, 2023



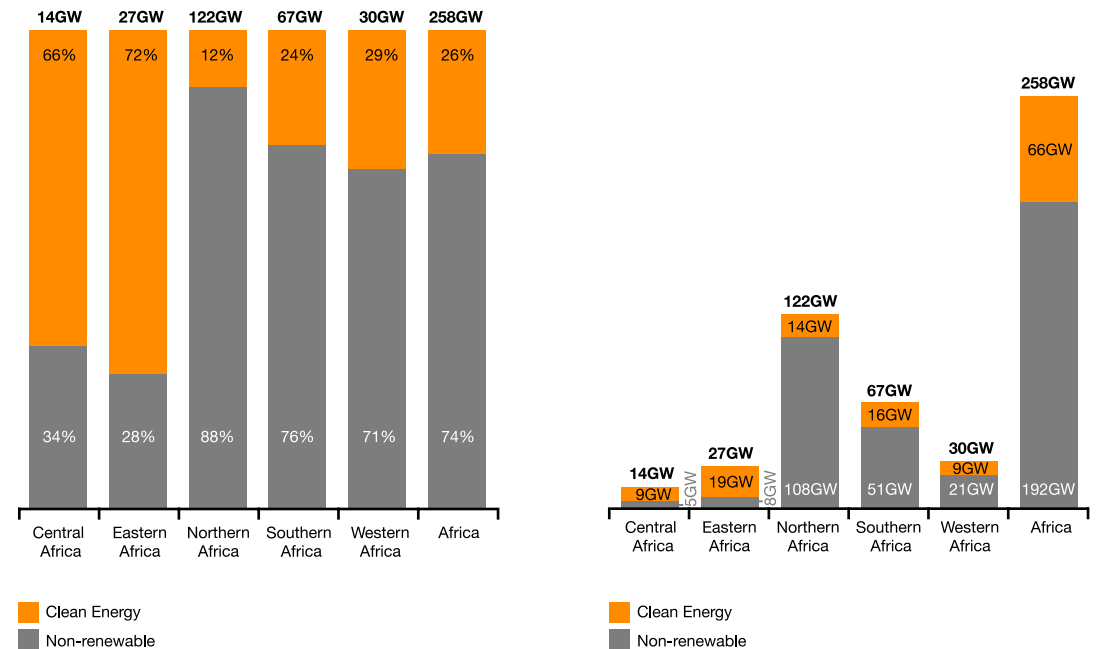
Africa: Total nameplate generating capacity, 2023



Clean energy includes nuclear and bioenergy but excludes pumped storage, which is used only during peak periods. Although the water is not discharged and is kept in the system and reused, it requires water to be pumped back to the top dam, mainly using electric power produced from hydrocarbons.

In 2023, clean generation capacity increased by 7.1%, fossil fuel generation by 0.1% and total generation by 1.8%. Central and East Africa's increase in clean energy generation capacity lagged the rest of Africa. South Africa's capacity was driven by both on-grid and off-grid connected power.

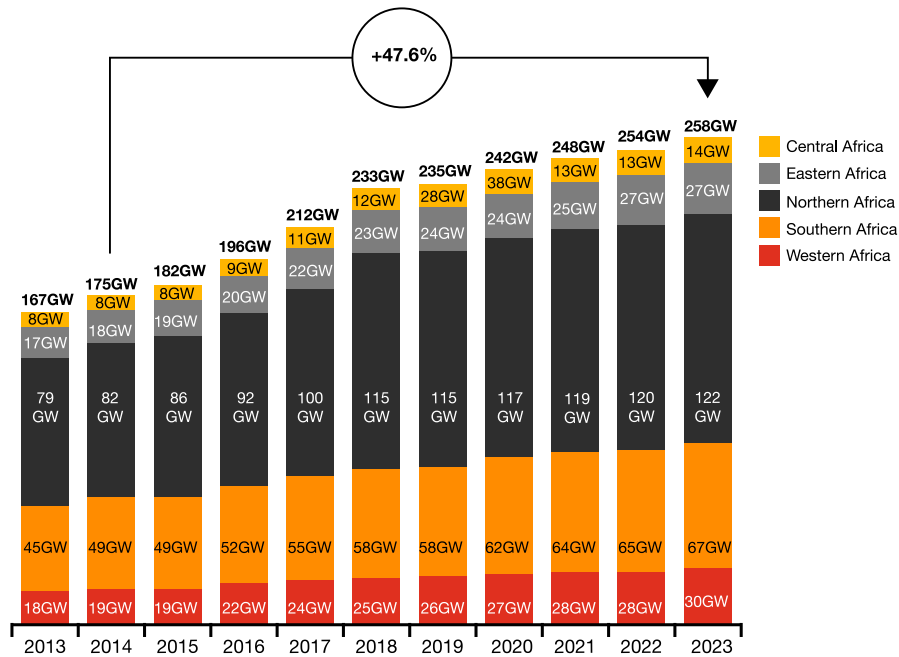
Africa: Clean and non-renewable generating capacity, 2023



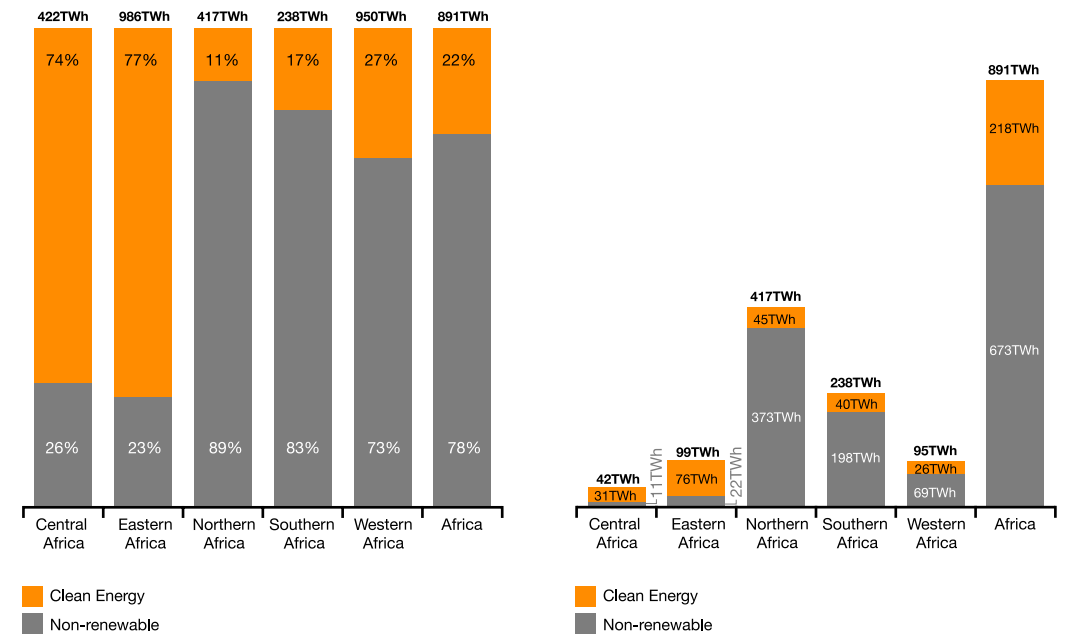
Clean energy generating capacity increased in Africa, with North Africa lagging as gas power continues to dominate. Both West Africa and Southern Africa significantly improved clean energy capacity, with the possibility that Southern Africa's clean generating capacity will account for more than 25% over overall generation capacity in 2025.

Africa's generation capacity (the maximum amount of electricity that a generator can produce when operating at its highest possible output) has increased by almost 48% in the last decade, with most of the growth coming from wind and solar, as clean energy capacity has increased by 82% over the same period. (Solar by 850% and wind by 263%).

Africa: Energy generating capacity, 2013 to 2023



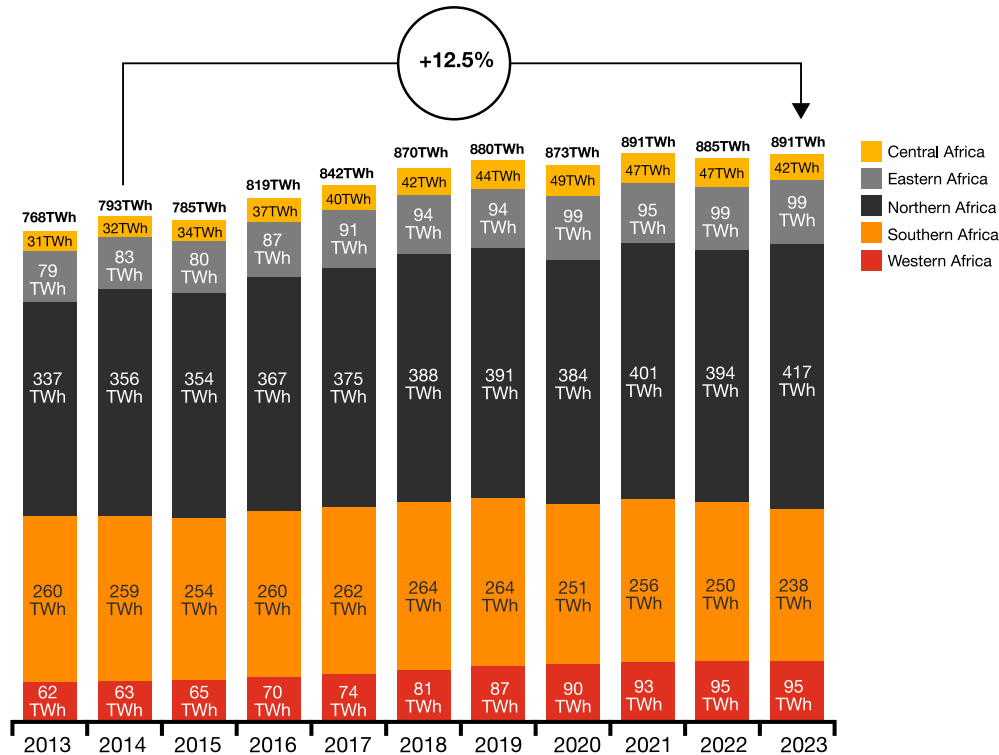
Africa: Clean and non-renewable power generated, 2023



Clean power generated in Africa will increase to 25% by 2025 as growth in solar and wind capacity and generated power continues to grow.

In January 2024, South Africa's state-owned energy utility Eskom indicated that private companies and households had installed over 2,400 MW of rooftop solar¹ in 2023 as businesses and households tried to reduce the impact of load-shedding, utilise clean energy and take advantage of the declining cost of solar PV panels and inverters. This rooftop solar¹ trend will continue and gain greater traction in the rest of Africa.

Africa: Power generated, 2013 to 2023



Source PwC analysis, Ember², Energy Institute³, IRENASTAT⁴

Africa's power generated in 2023 increased by less than 1% from the previous year. Power generated over the last decade has increased by 12.5%, which is four times less than the increased capacity, which is due to ageing fossil fuel plants, particularly coal-fired power stations with declining availability factors and weather-dependent non-dispatchable solar PV and wind replacing that demand with lower efficiency factors.

North Africa increased its electricity generated by 5.8% in 2023, yet it was the only region where clean energy generated decreased. Even though Morocco's electricity from coal decreased by 1.7 TWh, Egypt offset this with an increase of 9.3 TWh from gas.

East and West Africa generation remained similar to the prior year, although there was a 2.0% increase in clean energy generation.

Central and Southern Africa decreased generation by 9.8% and 4.8%, respectively. Central Africa's leading contributor to this decrease was lower oil generation in Angola, while in Southern Africa, it was lower coal generation in South Africa. Although South Africa's generation decrease was due to load-shedding from coal-fired plants, its effect was offset by an increase in wind and solar generation of 6.2%. South Africa's emissions decreased to their lowest level for more than two decades, with an annual decrease of 12.6 MtCO₂. Renewable energy alone would have resulted in a reduction of 5.6 MtCO₂ if it had replaced coal generation.



¹ Rooftop solar refers to solar panels mounted on the roofs of residential or commercial buildings or structures and excludes big industrial installations.
² Ember. Yearly Electricity Data (2024). <https://ember-climate.org/data-catalogue/yearly-electricity-data/>
³ Energy Institute. Statistical Review of World Energy (2023). <https://www.energy-inst.org/statistical-review/>
⁴ IRENASTAT. Online Data Query Tool (2024). <https://www.irena.org/Data/Downloads/IRENASTAT>

Global energy dynamics

The global energy landscape has undergone significant shifts over the past year, driven by the post-pandemic recovery, geopolitical tensions, climate-related challenges, and policy changes aimed at energy transition. These dynamics reflect the intricate balance between energy security, sustainability, and economic recovery.

The ongoing conflict in Ukraine has disrupted global energy markets, leading to a reassessment of energy security policies. The disruption of gas exports from Russia to Europe prompted European Nations to diversify and secure their energy supplies — including increasing liquefied natural gas (LNG) imports. This situation highlights Africa's energy poverty and the need for similar urgency and resources to address energy insecurity on the continent. Oil prices in Africa followed global trends of an increase in 2022, followed by a decrease in 2023 of approximately 18% from \$101 to \$83 per barrel.⁵ This was driven by global market adjustments and concerns about economic slowdowns. While oil-exporting nations in Africa, like Nigeria and Angola, saw reduced revenues from the price drop, net importers experienced some relief in fuel costs. The Ukraine conflict has also reshaped global energy alliances, with Russia increasingly turning to Africa for energy partnerships. The Russia-Africa Summit in July 2023 underscored this shift, with discussions on enhancing cooperation in energy sectors such as oil & gas potentially impacting Africa's energy strategies and infrastructure development.

Nuclear power generation saw growth of 2.6% from 2022 to 2023, continuing to generate approximately 10% of the world's electricity⁶. Significant interest is being shown in small modular reactors and advanced reactor designs, which are seen as vital for future energy security and decarbonisation efforts. These goals have also prompted countries to extend the life of their existing reactors and to start new construction projects. At the UN Climate Change Conference (COP28), more than 20 countries pledged to triple global nuclear capacity by 2050 as part of broader efforts to reach net-zero emissions, as nuclear is increasingly recognised as a key part of achieving climate goals. Among the signatories are African countries such as Ghana and Morocco, reflecting their commitment to incorporating nuclear energy as an element of their long-term energy strategies.

During COP28, significant advancements were also announced in the global effort to enhance renewable energy and storage solutions, with substantial implications for Africa's energy landscape. The Battery Energy Storage Systems (BESS) Consortium was launched with an ambitious goal to secure 5 GW of energy storage solutions by the end of 2024. This initiative aims to provide a robust roadmap for deploying 400 GW of renewable energy by 2030. Several African nations, including Egypt, Ghana, Kenya, Malawi, Mauritania, Mozambique, Nigeria, and Togo, have committed to the consortium. The BESS Consortium is expected to develop advanced energy storage technologies, which will significantly improve grid reliability and support the continent's transition to renewable energy sources.

The UAE Hydrogen Declaration of Intent, unveiled during COP28, emphasises the expansion of renewable and low-carbon hydrogen and its derivatives. With 35 signatories from around the world — eight from African countries and ten from Europe — this declaration underscores the growing recognition of clean hydrogen's potential for decarbonising industries and transportation, offering a promising avenue for sustainable energy solutions. Furthermore, the COP28 president announced a landmark \$4.5 billion fund to support renewable energy projects across Africa. Backed by the UAE, the fund aims to attract private capital and mitigate risks, ensuring the security of investments in renewable energy projects. The fund, projected to reach \$25 billion in the next three years, is poised to help address Africa's expanding energy needs and stimulate significant economic development across the continent.

Technological advances in tandem solar cells that combine perovskite with silicon to achieve higher efficiencies reaching 34.6%, represent a significant breakthrough in solar technology, providing a cost-effective and efficient alternative to traditional silicon-based cells. The commercialisation advancements in investment and manufacturing of the cells hold great promise for expanding solar energy access across Africa, potentially transforming the renewable energy landscape and alleviating power supply challenges. Additionally, using artificial intelligence (AI) to optimise solar energy systems is a pioneering advancement to enhance energy management. AI algorithms can analyse

vast amounts of data to predict energy production and consumption patterns with high precision, considering factors such as historical usage trends, weather patterns and grid demands. This predictive capability allows energy systems to optimise how and when energy is produced, stored, and consumed — ensuring more efficient use of resources while increasing reliability. Additionally, AI enhances the seamless integration of solar power with the existing grid by managing fluctuations in demand and supply to reduce reliance on non-renewable backup sources. In Ghana, for example, AI is being integrated into energy planning to predict solar generation and consumption more accurately, enabling the efficient distribution of solar power across the different regions, where the majority of the solar potential lies in the Northern part of the country, while most of the population lives in the South.

The evolving energy landscape, characterised by geopolitical shifts and technological advancements, presents both challenges and opportunities for Africa. By harnessing innovative solutions like advanced solar technologies and energy storage systems, the continent can enhance its energy security, drive sustainable development, and effectively incorporate renewable sources with reduced variability risk. The collective efforts from global initiatives, coupled with Africa's rich natural resources, pave the way for a brighter and more resilient energy future.



⁵ EIA, "Brent crude oil prices averaged \$19 per barrel less in 2023 than 2022." <https://www.eia.gov/todayinenergy/detail.php?id=61142>

⁶ IAEA, "IAEA Releases Nuclear Power Data and Operating Experience for 2023." <https://www.iaea.org/newscenter/news/iaea-releases-nuclear-power-data-and-operating-experience-for-2023#:~:text=2023%20Nuclear%20Power%20Development%20and%20Operating%20Experience%20Highlights&text=As%20of%20the%20end%20of,electricity%20production%20to%20the%20IAEA.>

Developments in Africa

Senegal/Mauritania

Phase 1 of the Greater Tortue Ahmeyim (GTA) Project, an LNG project, is set to begin operation at the end of 2024, with the project expected to produce 2.5 million tons annually from 15 trillion cubic feet of gas reserves.

Senegal

Yakaar-Teranga Gas Project, a major LNG initiative targeting 20 trillion cubic feet of gas reserves with facilities for local petrochemical processing, is in its front-end engineering and design phase. First production is expected later in 2024.

Namibia

Significant oil and natural gas discoveries and government advancement of its \$10 billion Green Hydrogen Initiative are positioning Namibia as a key player in Africa's energy transition.

South Africa

South Africa has made considerable progress toward liberalising its energy sector, with a major update being the signing of the Electricity Regulation Amendment Act in August 2024. This act introduces sweeping reforms designed to create a competitive electricity market and modernise the sector, aligning with the country's goals to end load-shedding and secure long-term energy stability.

Egypt

Progress continues in constructing the 4.8GW El Dabaa Nuclear Power Plant, the country's first nuclear plant.

Uganda

Construction progresses on the East African Crude Oil Pipeline (EACOP), a 1,443km pipeline transporting crude oil to Tanzania, with the entire operation expected in 2025, boosting regional energy security and economic growth. Lake Albert Refinery, a \$4 billion facility processing 60,000 barrels of crude oil daily, advances with Alpha MBM Investments LLC selected as the preferred investor.

Mozambique

Mphanda Nkuwa Hydropower Project, a \$5 billion initiative generating 1,500 MW of hydroelectric power for clean and affordable electricity, is set to begin construction by the end of 2024.



North Africa: Bridging tradition and innovation in energy

North Africa's energy landscape is characterised by a strong oil & gas sector alongside an increasing emphasis on renewable energy sources, particularly wind, solar, and green hydrogen projects. Countries such as Algeria, Libya and Egypt are using their strategic positions as key exporters of natural gas and having abundant natural resources to enhance their energy sectors while facilitating the transition towards renewables. Over the past year, the energy landscape in North Africa has experienced both steady and dynamic changes, influenced by geopolitical factors, resource wealth, and significant renewable energy potential.

Egypt is one of the most critical players in the region's energy sector, with a total installed electricity generation capacity of over 64 GW.⁷ This capacity is derived primarily from fossil fuels, although the country has made significant investments in renewables, notably solar and wind power. Egypt's Benban Solar Park, one of the world's largest, continues to be a central part of its strategy to produce 42% of electricity from renewables by 2035.⁸ Furthermore, Egypt has committed to decommissioning 5 GW of inefficient fossil fuel capacity under the Nexus of Water, Food, and Energy (NWFE) Programme, with an additional 10 GW of renewable energy capacity slated for development.⁹ Egypt continues to be a leader in renewable energy development, with significant investments in solar and wind projects to reduce reliance on gas.¹⁰ Egypt's renewable energy expansion aligns with its goal of increasing energy independence while also creating new job opportunities in the green energy sector.

Morocco, another regional leader, has seen a remarkable rise in the use of renewable energy. The country has set an ambitious target to generate more than 52% of its electricity from renewables by 2030.¹¹ The Noor Solar Power Plant, one

of the world's largest concentrated solar power (CSP) plants, is playing a pivotal role in this transition. Additionally, Morocco has seen growing investments in wind energy, notably with the Tarfaya Wind Farm, one of the largest in Africa. Morocco has also pursued agreements for LNG supply to support its decarbonisation goals and mitigate the cessation of gas imports from Algeria. Morocco has focused on positioning itself as a regional energy hub, particularly through gas imports and trading strategies. With limited domestic oil and gas reserves, Morocco's energy sector depends heavily on imported hydrocarbons, importing approximately 90% of its energy needs¹² from neighbouring countries like Algeria while also expanding its solar energy capacity to meet local demand.

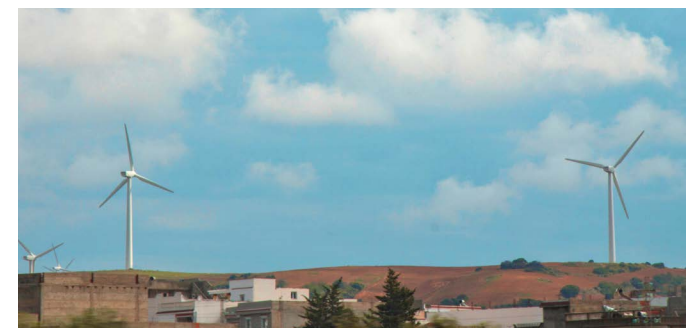
While Algeria is still heavily dependent on its vast natural gas reserves for electricity generation, it is also making strides toward renewable energy adoption. Algeria's energy transition is being bolstered by renewable projects to meet rising electricity demand, which grew by 5% in 2023¹³. The government has also begun significant water desalination projects, supported by renewable energy, which are expected to increase electricity demand further. With new gas export strategies in place, the country aims to increase exports to Europe by 50%, investing in infrastructure like pipelines and LNG plants. Algeria is also targeting 22% renewable energy generation by 2025, a critical step in reducing its carbon footprint and attracting investments in wind and solar power.¹⁴

Despite ongoing political instability, Libya is seeing a strong recovery in its oil production, reaching 1.2 million barrels per day.¹⁵ New agreements with international energy majors like Eni and Equinor are contributing to this recovery by focusing

on rebuilding infrastructure and enhancing production capabilities.

Across North Africa, foreign investment, mainly from Europe, has played a vital role in fostering renewable energy projects. This has increased energy security, reduced dependence on fossil fuels, and encouraged a stronger commitment to climate goals. These changes reflect the region's evolving energy strategy, focusing on sustainable development and reducing emissions while meeting growing electricity demand.

In addition to hydrocarbon projects, green hydrogen production is emerging as a strategic priority, with countries like Morocco and Algeria exploring pilot projects to export hydrogen to Europe. Northern Africa's proximity to European markets and its renewable energy potential make it an ideal candidate for hydrogen production and export. Overall, North Africa's energy sector is characterised by a balance between traditional oil and gas activities and a forward-looking approach to renewable energy and decarbonisation. The region's vast renewable potential, strategic location and industrial development, position North Africa to be a critical player in both Africa's energy transition and the global energy market.



⁷ Sub-Saharan Africa Policies and Finance for Renewable Energy Deployment, IRENA, 2024

⁸ Sub-Saharan Africa Policies and Finance for Renewable Energy Deployment, IRENA, 2024

⁹ Electricity 2024 Analysis and Forecast to 2026, International Energy Agency, 2024

¹⁰ North Africa's Renewable Potential and Strategic Location Reinforce Its Role in Energy Transition, IRENA, 26/02/2024, <https://www.irena.org/News/articles/2024/Feb/North-Africa-Renewable-Potential-and-Strategic-Location-Reinforce-Its-Role-in-Energy-Transition>

¹¹ Electricity 2024 Analysis and Forecast to 2026, International Energy Agency, 2024

¹² International Trade Administration, Morocco - Country Commercial Guide, <https://www.trade.gov/country-commercial-guides/morocco-energy>

¹³ Electricity 2024 Analysis and Forecast to 2026, International Energy Agency, 2024

¹⁴ North Africa's Renewable Potential and Strategic Location Reinforce Its Role in Energy Transition, IRENA, 26/02/2024, <https://www.irena.org/News/articles/2024/Feb/North-Africa-Renewable-Potential-and-Strategic-Location-Reinforce-Its-Role-in-Energy-Transition>

¹⁵ North Africa's Oil and Gas Industry: A Bright Future in 2024, The Energy Circle, <https://www.energycircle.org/articles/north-africas-oil-and-gas-industry-a-bright-future-in-2024>

East Africa: Expanding energy access through sustainable solutions

East Africa continues to focus on expanding its renewable energy capabilities and improving energy access for rural communities. Countries like Kenya, Ethiopia, and Tanzania are leading in solar, wind, and geothermal development while integrating off-grid solutions to enhance rural electrification. These countries are increasingly investing in diverse energy sources, including geothermal, wind, and hydropower, to strengthen energy security, reduce carbon emissions, and improve electricity access.

As of 2023, more than 75% of Kenya's population had access to electricity, a significant increase from 47% in 2015.¹⁶ Rural electrification initiatives, such as those led by the Rural Electrification and Renewable Energy Corporation (REREC), are expanding access in remote areas, particularly through mini-grid solar projects. These efforts, alongside cross-border electricity trade facilitated by the Eastern Africa Power Pool (EAPP), have bolstered Kenya's position as a regional renewable energy hub¹⁷. The country has a total installed electricity capacity of 3.3 GW, with over 90% generated from renewable sources, primarily geothermal, hydropower, and wind¹⁸. The Lake Turkana Wind Farm, Africa's largest wind project, is pivotal to this success, with 365 turbines generating 310 MW.¹⁹ Kenya's government aims to generate 100% of its electricity from renewables by 2030.²⁰ In addition, the Kenyan grid has been connected with Ethiopia's since 2023, a development expected to enhance regional energy cooperation. Kenya is progressing with its energy transition, particularly when considering its geothermal energy, which contributes roughly two-thirds of the country's total energy mix.²¹

Ethiopia has also made notable strides in expanding its renewable energy capacity. Once fully operational, the Grand Ethiopian Renaissance Dam (GERD) is expected to generate around 6.45 GW of electricity, making it one of the largest hydropower plants in Africa.²² Ethiopia's investments in hydropower align with its goal of becoming a major renewable energy exporter in the region, with plans to supply electricity to neighbouring countries such as Kenya, Sudan, and Djibouti. This shift to hydropower, coupled with the country's significant solar potential, will enable Ethiopia to reduce its reliance on fossil fuels. Off-grid solar solutions have further expanded electricity access in rural areas, helping Ethiopia increase its electrification rate. Despite these developments, Ethiopia still faces challenges connecting remote populations to the grid, making further investments in infrastructure crucial for future progress.



¹⁶ Sub-Saharan Africa Policies and Finance for Renewable Energy Deployment, IRENA, 2024

¹⁷ Business Daily Africa, <https://www.businessdailyafrica.com/bd/opinion-analysis/columnists/eastern-africa-power-pool-is-a-pathway-to-reliable-energy--4592618>

¹⁸ Electricity 2024 Analysis and Forecast to 2026, International Energy Agency, 2024

¹⁹ Res4Africa, <https://res4africa.org/news/2024/untapping-east-africas-renewable-energy-potential-is-key-to-unlock-a-brighter-future/>

²⁰ Energy Capital and Power, <https://energycapitalpower.com/7-key-developments-shaping-kenya-energy/>

²¹ Energy Capital and Power, <https://energycapitalpower.com/7-key-developments-shaping-kenya-energy/>

²² Sub-Saharan Africa Policies and Finance for Renewable Energy Deployment, IRENA, 2024



Uganda has increased its focus on renewable energy with substantial investments in hydropower. As of 2023, Uganda had an installed electricity capacity of approximately 1.5 GW, with over 80% of this capacity generated from hydropower plants.²³ The country's Karuma Hydroelectric Power Station, set to produce 600 MW, will further enhance its renewable energy capacity, supporting Uganda's efforts to increase electricity access to its population.²⁴ Despite these advancements, challenges remain regarding expanding grid access to remote areas, where off-grid solar solutions are seen as a potential remedy. Like Kenya and Ethiopia, Uganda has also benefited from cross-border electricity trade through the EAPP, which enhances regional connectivity and energy security.

Despite these positive developments, the region still faces significant challenges. Only 44% of the population in Tanzania has access to electricity, and other countries, such as Burundi and South Sudan, continue to struggle with extremely low electrification rates of less than 10%.²⁵ In response, governments and international partners are increasingly investing in off-grid solutions to reach underserved areas. The EAPP is also expected to go live with power auctions by the end of 2024, further integrating the region's energy markets and boosting access to clean energy.

East Africa's progress in renewable energy has been bolstered by international investment and cooperation. For instance, Kenya's collaboration with Germany to explore green hydrogen solutions underscores the region's growing interest in cutting-edge renewable technologies. Similarly, Ethiopia has received substantial international support for its hydropower projects, which are crucial for domestic electricity generation and regional energy exports.

These trends show that while Eastern Africa has made considerable progress in expanding access to renewable energy, further investments, and collaborations, particularly in infrastructure and policy harmonisation, are essential to meet the region's unserved and growing energy needs.

²³ Electricity 2024. (n.d.). IEA. <https://www.iea.org/reports/electricity-2024>

²⁴ Sub-Saharan Africa: Policies and finance for renewable energy deployment. (n.d.). IRENA – International Renewable Energy Agency. <https://www.irena.org/Publications/2024/Jul/Sub-Saharan-Africa-Policies-and-finance-for-renewable-energy-deployment>

²⁵ Energizing Ethiopia: New World bank program expands access to electricity. (2024, April 3). World Bank. <https://www.worldbank.org/en/news/press-release/2024/04/03/energizing-afe-ethiopia-new-world-bank-program-expands-access-to-electricity>

West Africa: Blending natural gas with renewable ambitions



West Africa has been at the forefront of energy developments, focusing on expanding natural gas production, and some countries are now exploring opportunities for green hydrogen. Countries like Nigeria, Senegal, and Ghana have leveraged their natural gas reserves while increasing investments in renewable energy, which has seen substantial investment growth over the past year. Mauritania's Nour Project plans to install up to 10 GW of electrolysis capacity, aiming to become one of the largest green hydrogen producers in the world.²⁶ Meanwhile, Ghana has initiated a green hydrogen pilot project in Gyankobaa, and Togo is an active participant in the ECOWAS green hydrogen initiative.

Nigeria, Africa's largest oil producer, has embraced a multifaceted energy transition strategy. The country's Federal Government announced investment opportunities totalling \$585 billion to support its net-zero goals by 2050. This investment includes \$272 billion for renewable power production and infrastructure.²⁷ Nigeria is also prioritising methane reduction and the development of carbon capture technologies as part of its medium- to long-term strategy. While significant investments are aimed at modernising oil and gas infrastructure, renewables, particularly solar energy, are being integrated to meet growing demand. Much of this capital has been channelled into off-grid solar energy projects to expand electricity access to underserved rural communities. The government's electrification programme, which focuses on off-grid solutions and developing renewable energy frameworks, has played a pivotal role in these developments.²⁸ The Dangote Oil Refinery is set to process approximately 400,000 barrels of Nigerian crude daily as the country seeks to become a net exporter of refined petroleum products. It is already exporting to various international markets. While Africa produces approximately 3.4 million barrels of crude oil per day, it imports 3 million barrels of petroleum products daily.²⁹ Local oil refining has the advantages of oil and its petroleum products travelling shorter distances to reduce logistics. At the same time, the local economy is developed by the market being served by the country itself. The Federal Government and Dangote Refinery have also agreed to pay for crude oil supplied to the facility in the local currency. Plans are to ramp up production to meet Nigeria's need for petrol, with the refinery already producing diesel and jet fuel.

In Senegal, the renewable energy sector has also seen substantial growth, particularly in solar energy. By 2023, renewables accounted for 30% of the country's installed power capacity, with the government's target to increase this share to 40% by 2030.³⁰ As part of this transition,

Senegal is preparing to ramp up oil and gas production from the Sangomar and Greater Tortue Ahmeyim projects while also expanding renewable energy capacity.³¹ Senegal remains a frontier energy market in West Africa, with a growing focus on its gas-to-power strategy, which seeks to transition from heavy fuel oil to natural gas, complementing its renewable energy ambitions. The country has received significant international support through partnerships like the Just Energy Transition Partnership (JETP) with countries like France and Germany to develop a low-carbon energy matrix, which is expected to mobilise EUR 2.5 billion for renewable energy projects.³² Senegal's focus on solar energy is evident in its commitment to expanding solar PV capacity and introducing innovative financing mechanisms for rural electrification projects.

Ghana is another important player in West Africa's renewable energy landscape. Ghana's installed renewable energy capacity is dominated by solar PV, which accounts for over 60% of the country's renewable investments.³³ The government has implemented policies to incentivise private-sector investment in renewable energy, particularly in developing solar mini-grids and off-grid systems. Ghana is also working to expand its wind energy sector, with several projects in the pipeline aimed at increasing the share of wind power in the national energy mix.³⁴

Ghana has unveiled an ambitious energy transition framework, with \$550 billion in potential investment opportunities to drive the transition to a low-carbon energy system.³⁵ Ghana's focus is on deploying renewable energy and carbon capture technologies, with the government supporting various solar, hydro, and biogas projects. One notable example is developing a hybrid waste-to-energy plant to produce green hydrogen. Ghana is also working on pilot projects, such as wave energy in the Gulf of Guinea, which could generate significant energy and investment opportunities.

Despite these advancements, challenges remain regarding electricity access across the region. Only around 57% of the population in West Africa has access to electricity, with significant disparities between urban and rural areas.³⁶ To address this, countries like Nigeria, Ghana, and Senegal increasingly rely on decentralised renewable energy solutions, which offer more sustainable and scalable approaches to rural electrification.³⁷ The region's energy landscape is shaped by a mix of oil, gas, and renewable energy efforts to improve energy access and sustainability.

²⁶ Project Nour, Mauritania, Creamer Media's Engineering News, <https://www.engineeringnews.co.za/print-version/project-nour-mauritania-2024-05-24-1>

²⁷ Ventures Africa, <https://venturesafrica.com/apostories/west-africas-energy-transition-offers-1t-in-investment-opportunities/>

²⁸ Electricity 2024 Analysis and Forecast to 2026, International Energy Agency, 2024

²⁹ Vanguard, Nigeria can become refining hub — Dangote, https://www.vanguardngr.com/2024/10/nigeria-can-become-refining-hub-dangote/#google_vignette

³⁰ Electricity 2024. (n.d.). IEA. <https://www.iea.org/reports/electricity-2024>

³¹ RES4Africa, <https://res4africa.org/news/2023/untapping-west-africas-renewable-energy-potential-through-regional-integration/>

³² Electricity 2024. (n.d.). IEA. <https://www.iea.org/reports/electricity-2024>

³³ Electricity 2024. (n.d.). IEA. <https://www.iea.org/reports/electricity-2024>

³⁴ Electricity 2024. (n.d.). IEA. <https://www.iea.org/reports/electricity-2024>

³⁵ Ventures Africa, <https://venturesafrica.com/apostories/west-africas-energy-transition-offers-1t-in-investment-opportunities/>

³⁶ Sub-Saharan Africa: Policies and finance for renewable energy deployment. (n.d.). IRENA – International Renewable Energy Agency. <https://www.irena.org/Publications/2024/Jul/Sub-Saharan-Africa-Policies-and-finance-for-renewable-energy-deployment>

³⁷ Electricity 2024. (n.d.). IEA. <https://www.iea.org/reports/electricity-2024>

Central Africa: Unlocking the energy future through renewables

Central Africa is one of the regions with the lowest levels of electrification on the continent, but efforts are being made to address these challenges through renewable energy investments. The region is home to abundant renewable energy resources, particularly hydropower, which is the dominant source of electricity in the region. Countries like the Democratic Republic of Congo (DRC), Cameroon, and Gabon are investing in both hydropower and emerging solar energy projects to meet growing energy demand.

The DRC continues to rely heavily on hydropower for electricity generation, with the Inga Dam providing a sizeable portion of its power supply. However, much of the population still lacks access to electricity, with only 17% connected.³⁸ The DRC has ambitious plans to expand its renewable energy capacity, particularly by developing off-grid solar solutions to serve remote communities. The World Bank and other international partners have supported several initiatives to improve the country's energy infrastructure, including investments in small hydropower plants and solar mini-grids. Through initiatives such as Power Africa, the DRC has received \$15.5 million in investments to enhance sustainable electricity access.

In Cameroon, hydropower is also the dominant source of electricity, accounting for over 70% of the country's installed capacity. However, the government actively seeks to diversify its energy mix by investing in solar and wind power.³⁹ Several solar projects are under development, particularly in rural areas, where grid expansion is not feasible. The country's National Renewable Energy Plan, which aims to increase the share of renewables in the energy mix to 25% by 2035, is a critical driver of this transition.⁴⁰ Cameroon is emerging as a key player in Central Africa's renewable energy transition, with plans to develop up to 4 GW of renewable energy capacity by 2035.⁴¹ This effort, supported by a partnership between Egypt's Infinity Power and Masdar, includes solar, wind, and battery storage

projects. The initiative aligns with Cameroon's broader goals of reducing its reliance on thermal power and meeting growing electricity demand.

Central Africa's renewable energy potential is vast, with an estimated capacity of 234 MW for biomass, 1,989 MW for solar PV, and 771 MW for wind.⁴² However, challenges remain, particularly in financing and infrastructure development. To overcome these hurdles, experts recommend focusing on small- and medium-sized projects, which can be more easily financed and scaled to meet local needs. The region is also looking to strengthen cross-border energy trade and collaboration through the Economic Community of Central African States (ECCAS), which has been instrumental in developing regional energy policies. This collaborative approach is expected to enhance energy security and accelerate the deployment of renewable energy technologies across the region.

Overall, Central Africa continues to lag other regions in renewable energy deployment, largely due to a lack of infrastructure and investment. However, the region's significant hydropower potential and growing interest in solar energy offer promising opportunities for future growth. Central Africa's focus on unlocking its renewable energy potential, particularly through hydropower and solar projects, is vital to addressing the region's energy deficit and ensuring sustainable economic development.



³⁸ Power Africa Coordinator Visits DRC to Advance Sustainable Energy Initiatives, USAID, <https://www.usaid.gov/democratic-republic-congo/press-release/aug-15-2024-power-africa-coordinator-visits-drc-advance-sustainable-energy-initiatives>

³⁹ Renewable Energy Statistics 2024, IRENA, 2024

⁴⁰ Sub-Saharan Africa: Policies and finance for renewable energy deployment. (n.d.). IRENA – International Renewable Energy Agency. <https://www.irena.org/Publications/2024/Jul/Sub-Saharan-Africa-Policies-and-finance-for-renewable-energy-deployment>

⁴¹ Infinity Power to build 4GW of renewable energy in Cameroon, Energy Live News, <https://www.energylivenews.com/2024/06/28/infinity-power-to-build-4gw-of-renewable-energy-in-cameroon/>

⁴² Central Africa adopts pathway to develop renewable energy solutions to fuel its economic diversification, UNECA, <https://www.uneca.org/stories/central-africa-adopts-pathway-to-develop-renewable-energy-solutions-to-fuel-its-economic>

Southern Africa: The path to renewable energy leadership

Southern Africa is a leader in renewable energy development, particularly in solar and wind power. Countries like South Africa, Namibia, and Angola are at the forefront of energy transition efforts, focusing on large-scale renewable energy projects and green hydrogen production to reduce their reliance on fossil fuels and meet growing energy demand.

South Africa is the dominant player in the region, accounting for nearly 90% of all renewable energy investments in Southern Africa.⁴³ Its Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) continues to drive the deployment of solar and wind energy, with the private sector making significant contributions to increasing the country's renewable energy generation capacity. The need for independent generation has fuelled this surge as load-shedding intensified and solar systems became increasingly affordable. Key projects like the Garbo and Karusa wind farms, which each generate over 140 MW, are vital to the country's renewable energy expansion.⁴⁴

In addition, regulations have been relaxed to facilitate significant private-sector renewables investment led by the mining industry. Since the removal of the threshold that requires generation plants to register with the National Energy Regulator of South Africa (NERSA), there has been a surge in registrations of new power plants, with NERSA reporting that 105 generation facilities were registered during the March 2024 quarter. This resulted in a further buildout of solar and wind capacity.

Transmission network constraints have limited the country's ability to maximise the renewable potential from the Northern Cape. However, the announcement of an ambitious \$6.3 billion Transmission Development Programme to roll out 14,000km of transmission lines is planned to bring nearly 30,000 MW of utility-scale renewable energy online within the next five years, significantly advancing South Africa's clean

energy goals. Despite these advances, South Africa's reliance on coal remains significant, contributing 80% of the country's electricity generation in 2023.⁴⁵

Mozambique is also making headway in its renewable energy sector, mainly by expanding off-grid solar solutions. The government aims to achieve 50% off-grid electrification by 2030, supported by international financing and initiatives like the BRILHO programme.⁴⁶ The country also has considerable hydropower potential, and efforts are underway to develop this resource further to support domestic energy needs and export opportunities. Investments in solar home systems and mini-grids are helping to expand electricity access in remote areas where grid extension is not viable. Mozambique continues to make significant gas discoveries, particularly in the Rovuma Basin. These discoveries are expected to bolster the country's position as a major player in the global natural gas market. TotalEnergies is set to restart its \$25 billion LNG project in Mozambique's Cabo Delgado province by the end of 2024.

Namibia's oil and gas discoveries in the Orange Basin make it one of the new oil and gas frontiers, with companies like TotalEnergies, Shell, and Galp Energia leading exploration efforts. Since the start of 2022, wells drilled have hit oil around 80% of the time — a nearly unprecedented success rate. The National Petroleum Corporation of Namibia (NAMCOR) has highlighted that these discoveries could double Namibia's economy within 15 years.⁴⁷ Coupled with its wind and solar renewable potential, Namibia has the potential to become a regional energy hub. It is also focusing heavily on green hydrogen production, with multiple large-scale projects in the pipeline. The country's abundant solar and wind resources make it an ideal location for green hydrogen production, which Namibia plans to export hydrogen to international markets. This strategic move is expected to attract significant

international investment, positioning Namibia as a critical player in the global energy transition. Namibia needs to move quickly on its oil and gas discoveries to leverage demand for hydrocarbons amid the decarbonisation efforts being undertaken as part of the energy transition.

Overall, Southern Africa is well-positioned to continue its energy transition, driven by robust policy frameworks, international investment, and regional cooperation. However, infrastructure development and financing challenges remain obstacles to fully unlocking the region's renewable energy potential.



⁴³ Sub-Saharan Africa: Policies and finance for renewable energy deployment. (n.d.). IRENA – International Renewable Energy Agency. <https://www.irena.org/Publications/2024/Jul/Sub-Saharan-Africa-Policies-and-finance-for-renewable-energy-deployment>

⁴⁴ Renewable energy statistics 2024. (n.d.). IRENA – International Renewable Energy Agency. <https://www.irena.org/Publications/2024/Jul/Renewable-energy-statistics-2024>

⁴⁵ Renewable energy statistics 2024. (n.d.). IRENA – International Renewable Energy Agency. <https://www.irena.org/Publications/2024/Jul/Renewable-energy-statistics-2024>

⁴⁶ Sub-Saharan Africa: Policies and finance for renewable energy deployment. (n.d.). IRENA – International Renewable Energy Agency. <https://www.irena.org/Publications/2024/Jul/Sub-Saharan-Africa-Policies-and-finance-for-renewable-energy-deployment>

⁴⁷ Editor. (2024, August 21). Namibia discovered oil after 38 dry wells, N\$20bn investment. The Brief. <https://thebrief.com/na/2024/08/namibia-discovered-oil-after-38-dry-wells-n20bn-investment/>

Energy stakeholders' perspectives: Shaping the future of power

Key messages from stakeholders in Africa's energy sector underscore the continent's vast potential to shape a sustainable and secure energy future. Several emerging trends and opportunities have become priorities, driven by discussions among governments, international organisations, private-sector leaders, investors, and civil society. A central theme is the urgent need for a **just energy transition**, ensuring that the shift to cleaner energy is equitable and benefits all, especially vulnerable communities. Stakeholders also highlight the importance of using the **synergy between natural gas and renewables**, where gas serves as a bridge fuel while facilitating and accelerating the deployment of solar, wind, and hydropower. **Investments in infrastructure and technology** are seen as essential for building robust, climate-resilient energy systems. Furthermore, there is a strong call for **collaboration** across sectors and regions to foster innovation, particularly in energy storage and grid modernisation, to ensure a successful transition across Africa.

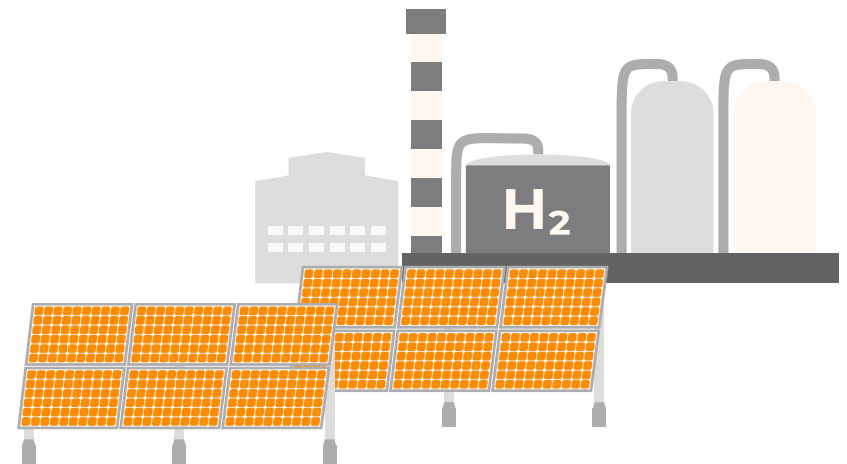
Just energy transition

Africa is emerging as a key player in the global energy transition, not only by providing fossil fuels to the world but also driven by the need for decarbonisation, decentralisation, and digitalisation to ensure a sustainable energy future. With its vast natural resources, the continent has immense potential for renewable energy development, particularly solar, wind, and hydropower. Decarbonisation is essential to reducing the region's reliance on fossil fuels, which currently dominate the energy mix. Decentralisation through off-grid and mini-grid solutions enables rural and underserved communities to access clean energy. Digitalisation is streamlining energy management, optimising renewable energy development, and enhancing grid efficiency. This transition not only mitigates the effects of climate change, but also creates economic opportunities that promote energy access and job creation across the continent. According to the International Renewable Energy Agency (IRENA), Africa could meet nearly a quarter of its energy needs through renewables by 2030, underscoring the continent's pivotal role in the global energy landscape.



Gas and renewables synergy

Stakeholders in Africa increasingly view natural gas as a critical bridge fuel in the continent's transition towards a low-carbon economy. This approach acknowledges the need for a reliable, lower-emission energy source to complement the growth of renewables like wind and solar. Natural gas, particularly through LNG projects, is gaining momentum across Africa with significant investments in countries like Mozambique, Nigeria, and Senegal. These projects are considered essential for energy security, not only for Africa but also for Europe, which seeks to diversify its energy sources amid geopolitical tensions. LNG offers Africa the potential to monetise its vast gas reserves while supporting economic growth, job creation, and improved energy access. However, stakeholders emphasise that natural gas should only serve as a temporary solution, bridging the gap between fossil fuels and renewable energy in the long run.



Investment in infrastructure and technology

Developing energy infrastructure such as transmission lines, pipelines, LNG terminals, and renewable energy grids is critical to unlocking Africa's vast energy potential. However, building such robust energy infrastructure requires significant capital and technical expertise, making foreign investment and partnerships vital to this transformation. International collaborations with entities from countries in Europe, China, and the United States have already begun to play a role in financing and developing Africa's energy infrastructure. By fostering these partnerships, African nations can accelerate the deployment of modern energy systems, enhance energy security, and support economic growth while advancing their climate goals. Increased investment in green technologies and supportive policies, including incentives for renewable projects and regulatory reforms, are essential for driving this shift.

As Africa rapidly expands its renewable energy capacity, there is a growing need to invest in energy storage solutions and grid stability technologies to ensure a reliable and consistent energy supply. Additionally, efforts to modernise energy grids are essential to accommodate the integration of renewable energy sources and improve overall grid efficiency. These investments are essential to creating a resilient, renewable-energy-powered future for Africa, ensuring that clean energy is accessible and dependable for all.



Collaboration and innovation

Mobilising private-sector investment and fostering financing mechanisms are essential to addressing Africa's significant financing gap. To fund large-scale energy projects there is a growing emphasis on adopting blended finance models, public-private partnerships (PPPs) and attracting foreign investment. These financing approaches combine public and private resources, helping scale investment in renewable energy and infrastructure. However, for these initiatives to succeed, African governments must set up favourable regulatory frameworks that enable private-sector involvement, mitigate investment risks, and streamline bureaucratic processes. By doing so, governments can reduce the perceived risks for investors, encouraging greater participation from the private sector and international financial institutions, thereby securing the capital needed to advance the continent's energy transition.

Developing transnational energy infrastructure, such as interconnected power grids and gas pipelines, would allow African countries to share energy resources, balance supply and demand, and optimise energy production. This cooperation would enable countries with abundant renewable resources, such as solar in North Africa or hydropower in Central Africa, to export surplus energy to neighbouring nations, thus improving overall energy access. Additionally, joint projects like gas pipelines can reduce reliance on external energy imports and help stabilise regional energy markets. By fostering cross-border energy trade and collaboration, African countries can create more resilient energy systems, reduce costs, and collectively move towards a sustainable and secure energy future.

Lastly, developing local energy expertise, creating job opportunities in clean energy, and fostering innovation among young entrepreneurs are crucial for developing Africa's renewable energy sector. Education and training programmes that focus on renewable energy skills — such as solar panel installation, wind turbine maintenance, energy storage systems, and grid modernisation — are essential to achieve this. By equipping the workforce with the necessary skills, African countries can build a solid foundation for a green economy and reduce reliance on foreign expertise.



The changing landscape of South Africa's energy sector: Key insights from industry players

The South African energy sector is undergoing momentous change, driven by shifts in project structures, market dynamics, and the regulatory environment. Based on recent interviews with key stakeholders, several important trends and challenges have emerged that are shaping the future of energy projects.

The emergence of a secondary market, with the buying and selling of Independent Power Producer (IPP) exits, signals a maturing market where assets are increasingly traded. This trend is expected to continue as more projects reach operational stages and investors look to exit. Concurrently, entities are consolidating, particularly those that previously used special purpose vehicles to hold individual projects.

Smaller South African companies face increased financial pressure due to rising requirements such as high connection bonds. We see a shift towards commercial and industrial projects, with banks funding companies directly rather than individual projects. However, the sector faces challenges, including longer lead times for renewable energy projects, increased complexity in government projects, and ongoing regulatory uncertainty. As margins tighten, companies must find new ways to stay profitable, and the need for a clear regulatory framework and innovative financing models will be critical for future growth and sustainability.

“The grid's functionality hinges on substantial investment in both infrastructure and transmission and distribution systems. Blended finance and various models, like PPPs, are crucial. Smart metres and tariff incentives are essential for efficient distribution.



“Natural gas plays a crucial role in supporting energy and addressing intermittency issues. Developing natural gas resources is vital for economic growth, energy security, and achieving Africa's electrification and industrialisation goals.

The emergence of aggregators and, eventually, traders will change the market landscape, with significant supply and demand necessitating a central clearing house. Investment in both grid infrastructure and distribution systems is essential for the grid to function effectively. There is growing uncertainty around tariffs and pricing as early-stage projects are flipped and restructured. This uncertainty is compounded by the transition from a bilateral to a liberalised energy market, with the rise of aggregators and traders.

Namibia is leading from a regional perspective with green hydrogen. However, South Africa's green hydrogen potential is gaining attention. With its abundant renewable energy sources, the country has the capacity to produce green hydrogen at scale, serving both domestic needs and international export markets. Strategic investments in hydrogen infrastructure and partnerships with international stakeholders could enable South Africa and Namibia to form a regional hub for green hydrogen production and export, capitalising on the growing global demand for clean energy alternatives.

Regarding gas, there were mixed views among the stakeholders we interviewed. Some indicated that the costs and timelines were too long to align with financial institutions' expectations, and concerns about infrastructure were also raised. However, natural gas is crucial, and its broader role in the industrial, transportation, and residential sectors is key. Africa holds over 7% of the world's natural gas reserves, with notable growth expected in Namibia, Mozambique, and Tanzania.

Eskom's projects, such as the 3,000 MW combined cycle gas turbine (CCGT) power plant in Richards Bay and converting from diesel to gas, underscore the importance of gas in supporting renewable energy and addressing intermittency issues. Despite challenges like obtaining commercial off take agreements and infrastructure needs, developing natural gas resources is essential for economic growth, energy security, and meeting the continent's electrification and industrialisation goals. As Europe seeks alternatives to Russian gas, Africa's LNG projects offer a strategic opportunity, positioning the continent as a critical player in the global energy market.



Empowering Africa: The shift towards electricity liberalisation

African countries increasingly recognise the potential of private-sector participation to advance their renewable energy goals. By inviting private investments and expertise into the energy sector, nations can accelerate the development and deployment of renewable energy technologies such as solar, wind, and hydropower. The involvement of private players often brings in much-needed capital and technological innovation, facilitating large-scale projects that might otherwise be out of reach for state-owned utilities alone. For instance, Morocco has successfully attracted significant private-sector investment into its Noor Solar Complex, one of the world's largest solar power plants, which is a key part of the country's strategy to meet its renewable energy targets.

Liberalisation of the energy sector is also seen as a crucial step towards enhancing energy security. By fostering a competitive market environment, liberalisation helps to break up monopolies and encourages a diverse mix of energy sources, reducing dependency on any single provider. This not only improves the efficiency and reliability of the energy supply but also builds resilience against disruptions. An example is Kenya, where the introduction of independent power producers has increased the country's capacity to generate renewable energy, contributing to a more secure and stable energy supply. This approach not only supports energy security but also helps meet the country's growing energy demands sustainably.

Below is a breakdown of African nations based on their progress towards market liberalisation:

Liberalised markets (Full private-sector participation)

These markets have opened to significant private-sector participation, especially in generation, and may also allow private involvement in distribution and transmission.

• Nigeria

In 2024, Nigeria's energy sector continues to undergo significant liberalisation efforts, with critical updates focused on enhancing the electricity market and attracting investment. The Electricity Act of 2023, which replaced the 2005 Electric Power Sector Reform Act, has been central to these reforms. The Act allows Nigerian states to set up their own electricity markets, shifting from federal to decentralised control.

• Morocco

Law 82-21 on the self-production of electricity was enacted in December 2022. This legislation allows individuals, companies, and communities to generate their own electricity for self-consumption and sell any surplus back to the national grid. It aims to support renewable energy initiatives and decentralise energy production by encouraging private-sector participation, particularly in solar and wind projects.



Hybrid markets (Public and private-sector participation)

These countries have introduced partial private-sector participation, often allowing independent power producers while keeping state-owned utilities for specific key roles like transmission or major generation.

• South Africa

South Africa has made considerable progress toward liberalising its energy sector, with a major update being the signing of the Electricity Regulation Amendment Act in August 2024. This act introduces sweeping reforms designed to create a competitive electricity market and modernise the sector, aligning with the country's goals to end load-shedding and secure long-term energy stability.

• Kenya

One of the major updates in the Energy (Amendment) Bill 2024 was the lifting of the power purchase agreement (PPA) moratorium in March 2023. This moratorium was imposed in 2021 following a task force review to reduce electricity costs by renegotiating PPAs with independent power producers (IPPs). The moratorium's end signalled a shift toward a new framework for IPP engagement, notably moving away from the Feed-in Tariff (FIT) system toward a Renewable Energy Auction Policy (REAP), which is yet to be fully implemented.

• Uganda

Amendments to the Electricity Act of 1999, formalised in the Electricity (Amendment) Act of 2022, included significant proposals aimed at reducing the monopoly held by the Uganda Electricity Transmission Company Limited and Uganda Electricity Distribution Company Limited. These amendments opened the way for independent power producers to sell electricity directly to distribution companies and consumers, promoting competition in the sector.

• Ghana

Recent reforms have focused on streamlining customs procedures and reducing tariffs associated with natural gas trade to enhance market efficiency. This includes initiatives to simplify the regulatory process and make it more conducive for LNG importation.

• Zambia

Zambia enacted the Electricity (Open Access) Regulations 2024 to address its current energy challenges and the urgent need for investment in the sector. The primary goal of the open access regime, anchored in the Electricity Act of 2019, is to empower independent power producers to generate and sell electricity directly to consumers, bypassing the Zambia Electricity Supply Corporation. This is expected to foster a competitive environment, attract private investment, enhance efficiency, and improve electricity supply.

• Tanzania

The Public Private Partnership (Amendment) Act No. 4 of 2023 and the accompanying PPP Amendment Regulations were introduced to streamline processes and encourage private-sector investment in infrastructure projects, including energy. These amendments clarify definitions, reduce upfront costs for unsolicited proposals, and emphasise climate responsiveness in project evaluations.

• Rwanda

The government retains control through the Energy Development Corporation, but there are IPPs, especially in hydropower and renewable energy.

• Senegal

Senelec is the state-owned power utility, but the government has welcomed IPPs, particularly in solar energy.

• Côte d'Ivoire

The state dominates the electricity market, but IPPs are allowed. It was one of the first countries in West Africa to liberalise generation with private-sector participation.

• Egypt

The government maintains a strong presence, but there are private-sector investments in generation, especially in renewables.

• Tunisia

The state-owned Société Tunisienne de l'Electricité et du Gaz dominates, but there has been growing private-sector participation in generation, particularly renewables.



Monopolistic markets (Public-sector-only generation)

In these countries, the electricity sector is largely monopolised by state-owned utilities with little or no private-sector involvement.

• Ethiopia

The Ethiopian Electric Power Corporation, which maintains a monopoly-like structure, continues to dominate electricity generation, transmission, and distribution.

• Algeria

State-owned company Sonelgaz dominates the country's electricity and gas sectors. Sonelgaz is responsible for generating, transmitting, and distributing electricity, and it also has a monopoly over gas supply and distribution.

• Sudan

Although some attempts have been made to liberalise the sector and encourage private investment, its overall structure remains largely monopolistic, with the Sudanese Electricity Distribution Company and the Sudan Electric Transmission Company maintaining control.

• Angola

The Angolan government maintains significant control over the sector, with the state-owned company Empresa Nacional de Distribuição de Electricidade managing electricity distribution in the country, while Companhia Nacional de Electricidade handles generation and transmission.

• Zimbabwe

The state-owned Zimbabwe Electricity Supply Authority is the primary player in the sector, responsible for generating, transmitting, and distributing electricity through its subsidiaries.

• Botswana

The Botswana Power Corporation, a state-owned enterprise, dominates the generation, transmission, and distribution of electricity in the country.

• Mozambique

Electricidade de Moçambique controls the generation, transmission, and distribution sectors with minimal private-sector participation.

• Malawi

The Electricity Supply Corporation of Malawi holds a monopoly, though reforms have been initiated to attract private investment.

• Lesotho

The Lesotho Electricity Company dominates generation, transmission, and distribution.

• Eswatini (Swaziland)

The Swaziland Electricity Company is state-owned and controls the market, though some IPP projects have been considered.

• Namibia

NamPower is a state-owned utility, and private-sector participation is very limited.

• Libya

The General Electricity Company of Libya controls the electricity market without significant private-sector involvement.

• Mauritania

The state-owned utility SOMELEC controls the electricity market, with little private-sector participation.

• Burundi

Regideso, a state-owned utility, dominates the electricity market with little private involvement.

• Sierra Leone

Electricity is managed by the National Power Authority with very limited private involvement.

• Central African Republic

State-run Enerca manages generation and distribution with no significant private-sector participation.



Mixed or emerging markets

These countries may have elements of privatisation or reforms underway, but their electricity markets are still in transition.

• Benin

State-controlled, but ongoing reforms are allowing more private-sector involvement in generation and distribution.

• Burkina Faso

The national utility, SONABEL, controls the sector, but the country has begun allowing private-sector investment, particularly in renewables.

• Guinea

The market is state controlled through Électricité de Guinée, but there are efforts to attract private investment.

• Madagascar

The public utility JIRAMA dominates the market, but reforms are being discussed to introduce IPPs and private-sector investments.

• Togo

The Compagnie Energie Electrique du Togo is a state-run utility, but the government is promoting IPPs to improve electricity supply.

• Liberia

The Liberia Electricity Corporation is the main utility, but there is an increasing interest in private investments.

• Gambia

The National Water and Electricity Company is state-owned, though there is growing interest in IPPs.

• Chad

State-run Société Nationale d'Electricité controls the market with limited private involvement.

• Niger

The Société Nigérienne d'Electricité runs the market, with ongoing discussions to involve the private sector.



Collaboration as a path to energy security at best cost

The capital investment required to address the South African energy challenge of trillions of Rand requires significant collaboration between the public and private sector to provide generation, grid and gas infrastructure. No one entity has the resources, funding or execution capability to do this on its own. The collective strengths of the public and private sector through collaboration are essential to effectively deliver energy infrastructure to achieve energy security at best cost. Such a collaboration will provide the necessary momentum to support energy market liberalisation.

Effective public-private collaboration and integrated planning is achievable through the establishment of a national Energy Users Association (EUA). This non-profit special purpose vehicle, underpinned by strong governance and skills, would focus primarily on the following:

- 1. Infrastructure funding and delivery** – This will derisk capital projects through appropriate strategic planning, commercial structuring and by ensuring competition for project execution. The aggregation of credible energy demand and the facilitation of competitive generation supply to match this demand will be an important role for the EUA's to play. The EUA will similarly seek to support the development of grid and gas infrastructure based on aggregation and appropriate models and tariff structures. Risk for key stakeholders will be managed through structured contracting with effective use of templating to accelerate implementation. The opportunity also exists for supply chain benefits to be realised including the optimisation of costs given the scale of the infrastructure spend. The use of pilots could be used to refine the execution model.
- 2. Strategic resource and capacity development** – To ensure best cost it is important to consider the full spectrum of opportunities offered through regional collaboration with respect to resources and shared capacity development. Examples to consider include unlocking the full strategic potential of the Northern Cape / Southern Namibia (Kharas Province) for energy development. This relates to the region's excellent renewable energy endowment and additional promising Oil & Gas exploration potential along the West Coast. Regional collaboration should also strive to support selective industrialisation of the wider regional economies (e.g. critical minerals, green hydrogen, agriculture and food processing, etc.)
- 3. Integrated regional energy planning** – To ensure maximization of regional opportunities it will require strategic level collaboration between regional and foreign governments as well as the private sector. There is a clear need for Governments to update and finalise their Integrated Resource Plans (IRPs) and these should take account of not only the significant energy demand in the region, particularly in South Africa, but also the strategic resource development opportunities.

The Lebalelo Water User Association

The Lebalelo Water User Association (LWUA) is a public-private collaboration set up in South Africa to address water infrastructure challenges in the water-scarce region of Limpopo. It was initially established in 1998 to provide water to the mining industry and local municipalities from the Olifants River. Over time, the LWUA has expanded its mandate to include broader collaboration between the private sector, government, and local communities to enhance water security, improve infrastructure, and support economic development. The collaboration focuses on:

- **Water security:** Ensuring a stable water supply for Limpopo's industries, communities, and agriculture.
- **Infrastructure development:** Building and upgrading water infrastructure, such as pipelines and reservoirs, to meet the growing demand for water in both industrial and domestic sectors.
- **Community development:** Supporting local municipalities in providing water services to underserved communities, contributing to regional social and economic development.
- **Environmental sustainability:** Promoting responsible water usage and environmental conservation to ensure the long-term sustainability of water resources.

The model has been praised for its success in driving infrastructure development. Its replication in the energy sector is currently being promoted to help facilitate South Africa's just energy transition.



Replicating the Lebalelo Water User Association collaboration model for energy infrastructure development in South Africa offers several benefits:

- **Shared investment and risk:** Like the water sector, a fair funding model between the government and private sector can distribute financial burdens and risks, making large-scale energy projects more feasible.
- **Enhanced efficiency and innovation:** Private-sector involvement can introduce innovative technologies and efficient management practices, accelerating the development and deployment of transmission and distribution infrastructure as well as renewable energy projects.
- **Improved accountability and governance:** The collaborative structures, underpinned by sound governance principles, ensure that decision-making responsibilities are shared, enhancing transparency and accountability.
- **Synergistic development:** By aligning the interests of various stakeholders, such a model can foster a synergistic approach to infrastructure development, ensuring that projects meet both commercial and community needs.
- **Sustainable growth:** Using the strengths of both sectors can drive sustainable energy development, reducing reliance on fossil fuels and promoting renewable energy sources.
- **Economic and social benefits:** The collaboration can create job opportunities, boost local economies, and improve energy access, contributing to broader socio-economic development.



Key takeaways

Maximising the value of fossil fuels

While the world will need fossil fuels during the energy transition, Africa needs to maximise its value from fossil fuels. The recent gas and oil discoveries in Namibia and Mozambique are poised to boost economic growth by creating jobs, enhancing energy security, and attracting foreign investment.

Renewables revolution

Africa is making significant strides in renewable energy, with countries like Kenya, Egypt, and Morocco leading in solar, wind, and geothermal projects. The continent's vast natural resources present immense potential for renewable energy development, which is crucial for reducing reliance on fossil fuels and promoting sustainable growth.

Global partnerships powering progress

International investments and collaborations are pivotal in advancing Africa's energy infrastructure. Initiatives like the Battery Energy Storage Systems Consortium and the UAE Hydrogen Declaration of Intent highlight the global commitment to supporting Africa's renewable energy projects, ensuring energy security, and fostering economic development.

Technological transformation

Technological advancements, such as more affordable solar cells and AI-driven energy management, are transforming Africa's energy landscape. These innovations promise to enhance energy efficiency, reliability, and access, paving the way for a resilient and sustainable energy future.

Lighting up lives

Efforts to improve energy access and electrification are yielding positive results, particularly in East Africa. Countries like Kenya and Ethiopia have significantly increased electricity access through initiatives like mini-grid solar projects and cross-border electricity trade, showing a solid commitment to reducing energy poverty.

Geopolitical game changers

The global energy landscape is influenced by geopolitical tensions, such as conflicts in Ukraine and the Middle East, which have reshaped energy security policies and alliances. Africa's energy strategies are adapting to these changes, with an increased focus on diversifying energy sources and enhancing regional cooperation.

Collaborative power plays

Public-private partnerships are essential for driving energy-sector reforms and infrastructure development. Examples from South Africa and Nigeria show how collaboration between the public and private sectors can enhance energy security, attract investment, and support the transition to a competitive and sustainable energy market.

Gas: The bridge to a greener future

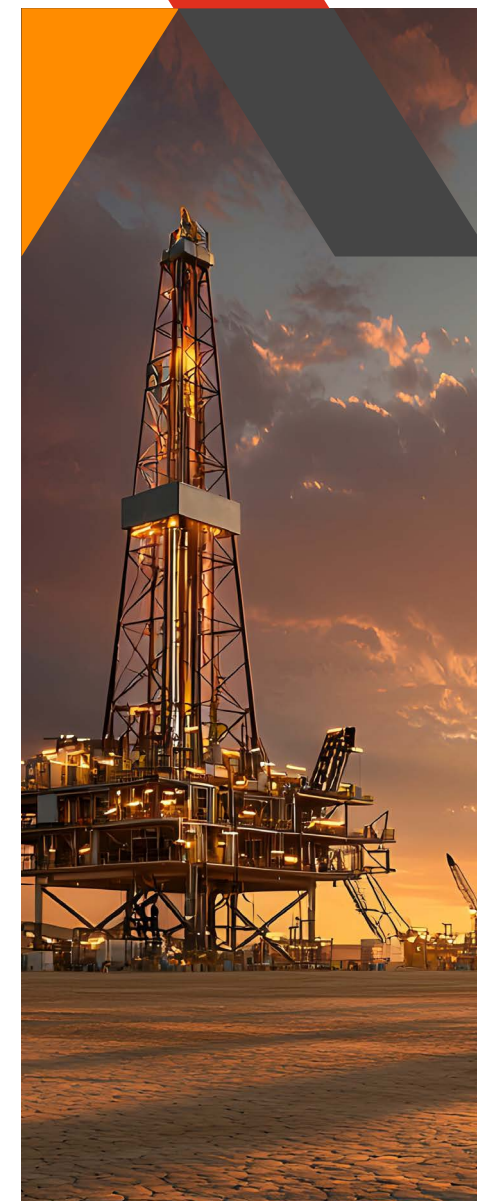
Natural gas, particularly through LNG projects, is critical as a 'bridge fuel' in Africa's energy transition. Major investments in LNG projects in countries like Mozambique, Nigeria, and Senegal are essential for energy security, economic growth, and job creation. LNG projects can help monetise Africa's vast gas reserves while supporting the continent's shift towards renewable energy by providing a reliable, lower-emission energy source.

These takeaways underscore the dynamic and evolving nature of Africa's energy sector, highlighting the continent's potential to lead in renewable energy development, use natural gas for energy security, and achieve sustainable economic growth.

Abbreviations

AI	Artificial intelligence
BESS	Battery Energy Storage Systems
CCGT	Combined-cycle gas turbine
COP	Conference of the Parties
CO ₂	Carbon dioxide
CSIR	Council for Scientific and Industrial Research
CSP	Concentrated solar power
DRC	Democratic Republic of Congo
EACOP	East African Crude Oil Pipeline
EAPP	Eastern Africa Power Pool
ECOWAS	Economic Community of West African States
FiT	Feed-in Tariff
GERD	Grand Ethiopian Renaissance Dam
GHG	Greenhouse gases
GTA	Greater Tortue Ahmeyim
GW	Gigawatt
IPP	Independent power producer(s)
IRENA	International Renewable Energy Agency
JETP	Just Energy Transition Partnership

LWUA	Lebalelo Water Users Association
MtCO ₂	Metric tons of carbon dioxide
MtCO ₂ e	Metric tons of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt-hour
NERSA	National Energy Regulator of South Africa
NWFE	Nexus of Water, Food, and Energy
PPA	Power purchase agreement
PPPs	Public-private partnerships
PV	Photovoltaics
PwC	PricewaterhouseCoopers
RE	Renewable energy
REREC	Rural Electrification and Renewable Energy Corporation
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
TSO	Transmission System Operator
TWh	Terawatt-hour
UAE	United Arab Emirates
UN	United Nations



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