



RENEWABLE ENERGY IN AFRICA: PROSPECTS AND LIMITS

By

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1. Introduction

Africa is a continent with great renewable energy potential although currently with high levels of energy poverty. Africa is said to be the 'next renewables powerhouse' with an almost unlimited potential solar capacity (10TW), abundant hydro (350 GW), wind (110GW), and geothermal energy sources (15GW). The International Renewable Energy Agency (IRENA) has estimated that Africa's renewable energy capacity could reach 310 GW by 2030, just less than what Russia and Canada currently produce. This article intends to revisit the potentials of Africa's renewable energy drive, explore the limits to the continent's development of renewable energy in this decade in light of the race to fulfil the continent's commitment to the United Nations Sustainable Development Goals.

2. The Prospects

Africa is richly endowed with renewable energy resources.

More than many other places in the world, Africa is richly endowed with various forms of renewable energy which, if well explored and exploited with the right technologies will pivot Africa to the top of economic development. Africa has in abundance, solar (North, South and West Africa), geothermal (East Africa), and hydro (East and South Africa) energy resources. Combining these renewable resources in the right energy mix will have a positive influence on all spheres of the African economy. Although fossil fuels are still the main stay for the economies on the continent, the continent is seeing an increased use of renewable resources across all its regions. In 2018, only 20 per cent of the electricity generated in Africa was from renewable sources.² However, the leadership of African countries have continued to push for more inclusion of renewable energy sources in the energy mix of their countries.

Africa's leadership are pro-renewables.

Despite having contributed negligible amounts to the global greenhouse gas

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² KfW Development Bank, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and International Renewable Energy Agency (IRENA). 2021. *The Renewable Energy Transition in Africa: Powering Access, Resilience and Prosperity*. Retrieved from https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/March/Renewable_Energy_Transition_Africa_2021.pdf





emissions, Africa remains the most vulnerable continent to the deleterious effect of climate change.³ The solution to the problem of climate change amongst others, requires countries particularly African countries to reduce their fossil fuel production and consumption. At the recently concluded COP26 held in Glasgow, African countries such as Nigeria displayed commitment to utilize more renewable sources in their energy mixes. Nigeria committed to “electrify 5 million households and 25million people using decentralized solar energy solutions” by 2030.⁴ Other African countries have also ensured that renewable energy sources form a huge part of their energy mixes. Renewables form 59% of Rwanda’s energy generation, 63% of Guinea’s energy generation and 98% of Ethiopia’s energy generation.⁵

Africa is fertile ground for implementing ground-breaking renewable energy technologies.

Africa’s economic and environmental conditions make it a fertile ground for the implementation of ground-breaking renewable energy technologies. Whereas

countries in Europe may have achieved considerable level of advancement in the deployment of renewable energy technologies, Africa has seen negligible advancement in this area yet possesses astonishing amount of renewable energy sources. Investors in Africa’s renewable energy space understand that Africa requires long term investment in viable renewable energy technologies as against short-term returns on investment due to the economic conditions prevailing across the continent. With respect to environmental conditions, South Africa for instance, receives a high degree of sunshine with rainfall about half of the global average with most of its regions receiving an average of 8-10 hours of sunshine per day and a nationwide average of 2,500 hours per year, and 4.5 to 6.6 kWh/ m² of radiation level.⁶ In Bamako, Mali, there is an average of 2819 hours of sunlight (out of a possible 4383) with an average of 7.43 hours of sunlight per day. At midday, the sun is on average 73.1°. These environmental conditions support the proposition that Africa is fertile ground for implementing renewable energy technologies.

Africa is a big market.

³ Africa Development Bank Group. *Climate Change in Africa*. Retrieved from <https://www.afdb.org/en/cop25/climate-change-africa>

⁴ Premium Times of 2 November 2021. COP26: Nigeria will cut carbon emission to net zero by 2060, Buhari says.

⁵ KfW Development Bank, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and

International Renewable Energy Agency (IRENA). 2021. *The Renewable Energy Transition in Africa: Powering Access, Resilience and Prosperity*. Retrieved from https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/March/Renewable_Energy_Transition_Africa_2021.pdf

⁶ J. Shilpi, and P.K. Jain. 2017. The rise of Renewable Energy implementation in South Africa. *Energy Procedia* 143 (2017) 721 -726





Africa is a 1.2-billion-person market⁷ with around 580 million people lacking access to electricity as at 2019.⁸ Africa is in dire need of renewable energy technologies. The continent requires investment friendly government policies to encourage foreign investors invest in its renewable energy market. In 2012, South Africa was the fourth largest investor in renewable power in the world.⁹ Nigeria, Ghana, and Rwanda are also rapidly increasing their renewable energy footprints.

Empowerment of Local Communities.

Provision of constant power supply to local communities impacts on the economic development of those communities. With no power supply, local communities lack access to facilities that engender growth and development. Without access to energy supply, local populations oftentimes have no choice but to utilize non-conventional means to meet their energy needs. Increased access to energy means longer hours to conduct more activities with socio-economic impact. This leads to more productivity that generates additional income for the local population. Local populations are able to experience

increased literacy, food security, energy sovereignty, increased access to potable water, sustainable agriculture, improved entrepreneurship and creation of more job opportunities as a result of access to energy.¹⁰

3. The Limits

Finance.

One of the challenges facing the widespread adoption of renewable energy sources and the growth in the number of renewable energy projects across the African continent is finance. Until recently, construction costs of renewable energy projects used to be higher than that of fossil fuel projects. In 2018, the United States Energy Information Administration released findings that show the differences between the costs of construction for solar, wind and gas power plants in the United States with the construction costs of renewable power plants topping the chart. The average construction cost for solar power plants was \$1,848 per kW in 2018, the average construction cost for wind turbines was \$1,790 per kW while the construction cost of \$858 per kW.¹¹ These prices indicate that it

⁷ The World Bank. *The World Bank in Africa*. Retrieved from <https://www.worldbank.org/en/region/afr/overview#1>

⁸ International Energy Agency. *SDG7: Data and Projections. Access to Electricity*. Retrieved from <https://www.iea.org/reports/sdg7-data-and-projections/access-to-electricity>

⁹ J. Shilpi, and P.K. Jain. 2017. The rise of Renewable Energy implementation in South Africa. *Energy Procedia* 143 (2017) 721-726

¹⁰ International Renewable Energy Agency. 2021. *Empowering Communities to Reap the Multiple Benefits of Renewable Energy*

¹¹ Power Engineering. 2020. *New EIA data shows wind, solar and natural gas construction costs keep going down*. <https://www.power-eng.com/renewables/new-eia-data-shows-wind->





is more expensive to construct a solar power plant than to construct a gas power plant. African countries would rather choose to develop fossil fuel-based projects than renewable energy-based projects due to this singular factor. However, the 2020 report of the IEA reveals that the price of construction of renewables has become more competitive compared to pre-2018 figures thereby creating an avenue for African countries to invest more in renewable technologies.

Political Will.

The political will of African leaders to increase the role of renewable energy sources in the energy mix of their countries is a challenge to the deployment of renewable energy technology. Many African leaders are unwilling to make the transition from reliance on majorly fossil fuels to renewables. The size of renewables in the energy mix remains unencouraging and abysmally small. Mozambique and Malawi are building their first grid connected solar plants but wind and solar are set to remain a small portion of the grid

mix as the country's power system master plan limits wind and solar to 10% of peak demand. Since 2014, the South African renewable energy market has stagnated as a result of the lack of political will to follow through on increasing the role of renewables in the country's grid mix.¹²

Rapid Population Growth.

Africa's population is rapidly growing with a current estimated population of 1.37 billion people. With an average annual growth rate of 2.5% per annum, the population of the continent is expected to reach 1.6 billion and 2.5 billion by 2030 and 2050 respectively.¹³ The implication of this is that there will also be a corresponding demand for energy. In 2019, Africa's electricity demand was 700TWh¹⁴ and is expected to triple by 2030¹⁵ with most of additional demand stemming from productive uses and emerging middle- and higher-income households.¹⁶ With projections of higher energy demand in the coming years, African countries are constrained to ensure that projected energy demand meets energy supply. To achieve universal energy access, Africa requires an

solar-and-natural-gas-construction-costs-keep-going-down/#gref

¹² Gaventa, J. 2020. *Politics Are Hindering Renewables in Southern Africa*. Retrieved from <https://www.energymonitor.ai/tech/renewables/politics-are-hindering-renewables-in-southern-africa>

¹³ Statista. 2022. *Forecast of the total population of Africa from 2020 to 2050*. Retrieved from <https://www.statista.com/statistics/1224205/forecast-of-the-total-population-of-africa/>

¹⁴ International Energy Agency. 2019. *Africa's Energy Outlook*. Retrieved from

<https://www.iea.org/reports/africa-energy-outlook-2019>

¹⁵ White and Case. 2021. *Renewable Energy in Africa: Update in the era of Climate Change*. Africa Focus: Autumn 2021. Retrieved from <https://www.whitecase.com/publications/insight/africa-focus-autumn-2021/renewable-energy-africa-update-era-climate-change>

¹⁶ International Energy Agency. 2019. *Africa's Energy Outlook*. Retrieved from <https://www.iea.org/reports/africa-energy-outlook-2019>





investment of more than \$1.5 trillion in the energy sector between 2018 and 2050. Without such an investment, sub-Saharan Africa will be home to an estimated 89% of the world's energy poor by 2030.¹⁷ Only 35% of Africa's population currently have access to electricity and 80% rely on solid biomass for cooking and heating. The slow rate of electrification across the continent means that population growth will outpace electricity access in the coming years unless that trajectory is altered.

Policies and Regulations.

Policies and regulations play a huge role in the development of renewable energy technology and how investors are encouraged to invest in the sector in Africa. In Africa, regulations have a hard time catching up with innovation in renewable energy technologies. In addition, renewable energy regulations oftentimes lack the clarity and certainty needed by investors. Since renewable energy is capital intensive and requires huge funding, financiers more often than not require a legally certain environment for their investments. Where this is absent, as is the case in many African countries, deployment of renewable energy technologies suffers a huge setback. Based on the economic policies of many African

countries which are largely interventionist, African countries lack the willingness to use regulation to change the current electricity supply and pricing systems.¹⁸ Nigeria and South Africa are countries that have failed to use legislation and regulations to effect changes in the prices of their energy supplies. This resistance to change by regulatory means has in no small measure affected the deployment of renewable energy technologies.¹⁹

Insufficient Cooperation at Regional Level.

The African electricity market lacks the level of integration that the European possesses. Lack of regional cooperation in respect of electricity systems implies an absence of the benefits that a region such as the EU enjoys. Some of the benefits of a well-integrated regional electricity system include improved economic efficiency, short-term energy and operation costs, long-term investment costs through improved reserve margin and avoided investment in peak capacity, efficiencies in economies of scale as larger-scale plants are enabled by larger markets, improved supply conditions, better reliability and security of supply due to access to imports during emergency situations, fostering further development of country-level electricity markets where

¹⁷ International Energy Agency. 2017. World Energy Outlook. Retrieved from <https://www.iea.org/reports/world-energy-outlook-2017>

¹⁸ Murombo, T. 2016. *Legal and Policy Barriers to Renewable and Sustainable Energy Sources in South Africa*. The Journal of World Energy Law and

Business, Volume 9, Issue 2, April 2016, Pages 142-165, <https://doi.org/10.1093/jwelb/jww001>

¹⁹ Murombo, T. 2016. *Legal and Policy Barriers to Renewable and Sustainable Energy Sources in South Africa*. The Journal of World Energy Law and Business, Volume 9, Issue 2, April 2016, Pages 142-165, <https://doi.org/10.1093/jwelb/jww001>





integration allows sufficient scale to support increased competitive participation, reduced environmental impact (including avoided air and water pollution, and displacing biomass which is often associated with deforestation), and contribution to sustainable development resulting from more efficient energy use.²⁰

4. Conclusion.

The development and deployment of renewables in Africa has numerous potentials for the continent. It also has different limitations which militate against its growth. The journey and commitment to zero emissions by African countries necessitates these countries to take active steps to overcome the factors limiting the growth and development of renewable energy technologies across the continent. If properly harnessed with the right regulatory regimes, political will and government interventions as well as financial and technical support, Africa will be at the forefront of renewable energy development globally.

²⁰ Economic Consulting Associates Limited. 2010. *The Potential of Regional Power Sector Integration Literature Review*. Retrieved from <https://www.esmap.org/sites/esmap.org/files/BNoo>

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