

Accelerating Africa's Transition to Net-Zero Emissions: Leveraging Renewable Energy, Energy Storage, and Sustainable Development

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ABSTRACT

Achieving net-zero carbon emissions and sustainable energy in Africa by 2050 is a pressing concern. Despite abundant renewable energy sources, Africa relies heavily on fossil fuels, posing environmental and economic risks. This conference paper at the 2022 International Conference and Exhibition on Social Entrepreneurship, Energy and Climate Change in Lagos presented solutions leveraging emerging technologies, energy storage, and sustainable development. It highlights Nigeria's potential in solar energy, hydropower, and lithium-ion battery production and urges African leaders to aggressively pursue energy-mix approaches, liberalise the mining and energy sectors, and establish "green energy banks" to access affordable loans. The paper emphasises the need for a coordinated effort to achieve a net-zero emission economy and meet global climate change commitments.

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1. Introduction and Objectives

Africa is facing a significant energy crisis, with a projected energy deficit of 250 gigawatts by 2030. (1) Currently, there are strong indications that Africa will not meet its target for access to affordable, clean, and sustainable energy and net-zero carbon emissions by the year 2050. (2) Greenhouse gas emissions, the depletion of the ozone layer, climate change, and environmental degradation are all consequences of the overreliance on fossil fuels. (3). The energy sector is responsible for around 70% of global greenhouse gas emissions, with fossil fuels being the primary source. (1)

2. Energy in Africa

Most African countries rely heavily on fossil fuels as a major source of revenue and power generation, and Nigeria is no exception. Despite numerous sources of alternative energy, many African countries lack access to clean and affordable energy (4).

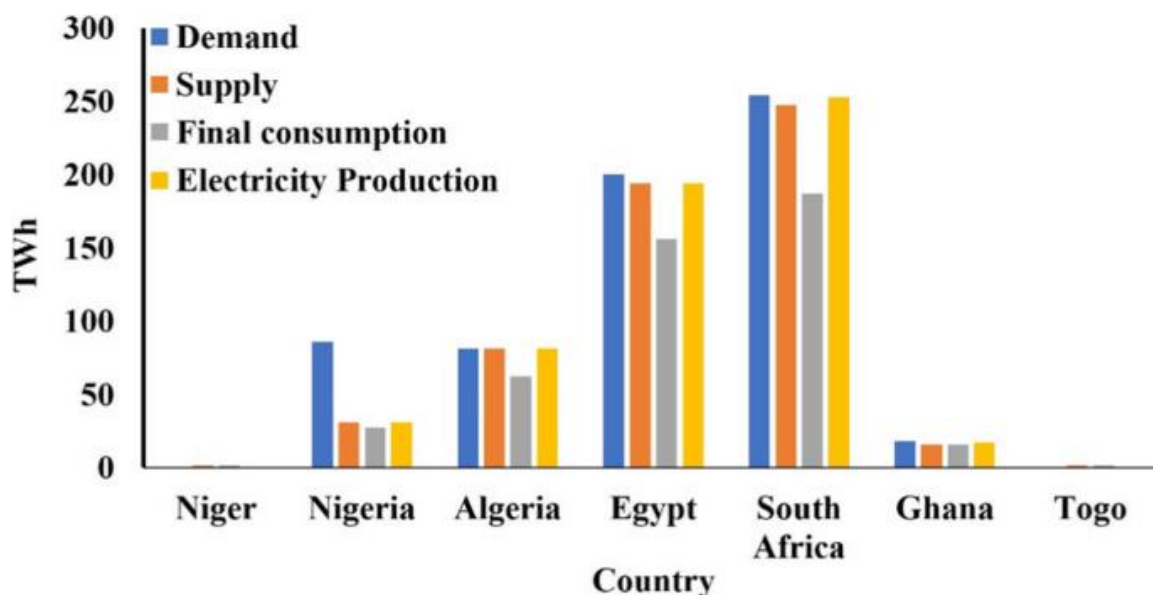


Figure 1: Variation of electricity production, demand, supply, and final consumption across the sub-Saharan African region (5)

3. Prospects for Africa

In Nigeria, for example, the average solar radiation is about 12.6 MJ/m² per day at the southern coastal latitudes and about 25.2 MJ/m² per day in the far northern part of the country, or an average of 18.9 MJ/m² per day. This shows that the continent has the potential to overcome its energy challenges if it can unleash and tap into its solar energy potential. (5) Nigeria also has the exploitable potential of about 15,000 MW from large hydro plants to small, mini, and micro dams across the country. (6)

Africa also has significant reserves of the other minerals necessary for lithium-ion battery production as graphite, cobalt, and manganese. (7) This means it stands a better chance of securing high market share in a global lithium-ion battery market projected by Grand View Research to reach USD 182.5 billion by 2030. (8)

4. Conclusion

It is crystal clear from the foregoing that energy-mix or hybrid power systems, which combine renewables and natural gas, are the way forward for Nigeria and Africa at large to access clean and affordable energy. African policymakers must liberalise the mining and energy sectors to attract investors and entities with the capacity to mine, set up factories, produce batteries, generate electricity, and sell to consumers.

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