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The Role of Small Modular Reactors (SMRs) in Mitigating Climate Change and Promoting Economic Growth in Africa –A Case Study of Nigeria

Small Modular Reactors (SMRs) are increasingly viewed as a promising solution to meet the rising energy needs in Africa. They offer cost-effective, financially feasible, and quicker completion options compared to traditional methods. Furthermore, SMRs hold the potential to address critical challenges such as fostering economic development and mitigating climate change. This study investigates the role of SMRs in electricity generation, combat climate change, their potential to spur economic growth. The focus is specifically on Nigeria, serving as a case study.

In 2019, Africa accounted for around 4% of global CO₂ emissions, with the largest contributors being South Africa, Nigeria, and Egypt due to their significant industrial and energy sectors. Achieving the pace of CO₂ emissions reductions in line with the Paris agreement requires large increases in efficiency and renewable investment. Investments in SMRs will contribute to climate change mitigation by reducing reliance on fossil fuels and lowering greenhouse gas emissions associated with electricity generation.

SMRs present numerous advantages over conventional large-scale nuclear reactors. These include lower initial costs, improved safety features, and scalability, which are especially beneficial for addressing the challenges posed by poor and inadequate grid systems in Africa. Consequently, by offering a reliable and sustainable source of electricity and will help countries in Africa meet their climate targets under international agreements while promoting the transition to a low-carbon economy. .

Using Nigeria as a case study, this paper analyzes the potential benefits and addresses challenges of developing and deploying SMRs in the energy mix in Africa. It provides insights into policy implications, financing, operation, and maintenance, as well as recommendations for maximizing the socio-economic and environmental benefits of SMRs in the region. Overall, SMRs offer a promising pathway towards sustainable development in Africa, with significant implications for energy security, economic prosperity, and environmental sustainability to achieve Net Zero.

Country OR International Organization

Nigerian Nuclear Regulatory Authority

Email address

ibrahimabdulmajeed@gmail.com

Confirm that the work is original and has not been published anywhere else

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Authors: Mr IBRAHIM, Abdulmajeed (Nigerian Nuclear Regulatory Authority); Dr IDRIS, Yau

Presenter: Mr IBRAHIM, Abdulmajeed (Nigerian Nuclear Regulatory Authority)

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