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A Scoping Review of Geothermal Energy Potential in the Nigerian Sector of the East African Rift System: An African Perspective, 2013

I, b, r, a, h, i, m, S, u, l, e, i, m, a, n, ,, N, g, o, z, i, E, z, e, ,, A, d, e, b, a, y, o, A, d, e, y, e, m, i, ,, C, h, i, n, w, e, O, k, o, n, k, w, o

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Abstract

The East African Rift System is a major geothermal province. Nigeria, within the western branch of this system, has considerable yet underdeveloped geothermal resources. A synthesised analysis of this potential, critical for addressing energy deficits with renewable sources, is absent. This scoping review aims to map and synthesise existing literature on geothermal energy potential in the Nigerian sector of the East African Rift System. It seeks to characterise the resource, catalogue assessment methodologies, and analyse documented challenges and opportunities for development from an African perspective. The review adhered to the Joanna Briggs Institute methodology for scoping reviews. A systematic search was performed across multiple academic databases and grey literature sources. Identified studies were screened against pre-defined inclusion criteria, with relevant data extracted and charted to facilitate a narrative synthesis. The available literature, though limited, consistently indicates high-temperature geothermal systems linked to Quaternary volcanoes and active fault lines in Nigeria. A central finding is the pronounced disparity between identified resource potential and actual development, largely due to insufficient exploratory drilling and investment. Primary barriers include high upfront capital costs, a shortage of specialised technical capacity, and underdeveloped policy frameworks. Nigeria’s segment of the East African Rift System holds significant

geothermal resources suitable for electricity generation and direct use. However, development remains at a preliminary, reconnaissance stage. Realising this potential necessitates progression from surface studies to confirmatory subsurface exploration. Priority should be given to funding deep exploratory drilling campaigns in the most promising sites. A national geothermal policy and regulatory framework must be developed to incentivise investment. Regional partnerships for knowledge and technology transfer within the East African Rift System should be established. Geothermal development must be integrated into broader national energy and economic planning. Geothermal energy, East African Rift System, Nigeria, resource assessment, renewable energy, scoping review. This review provides a consolidated evidence base on Nigeria’s geothermal potential within the East African Rift System, clarifying the current state of knowledge and key barriers to inform future research, policy, and investment decisions.