

Africa's Energy Transition & Critical Minerals

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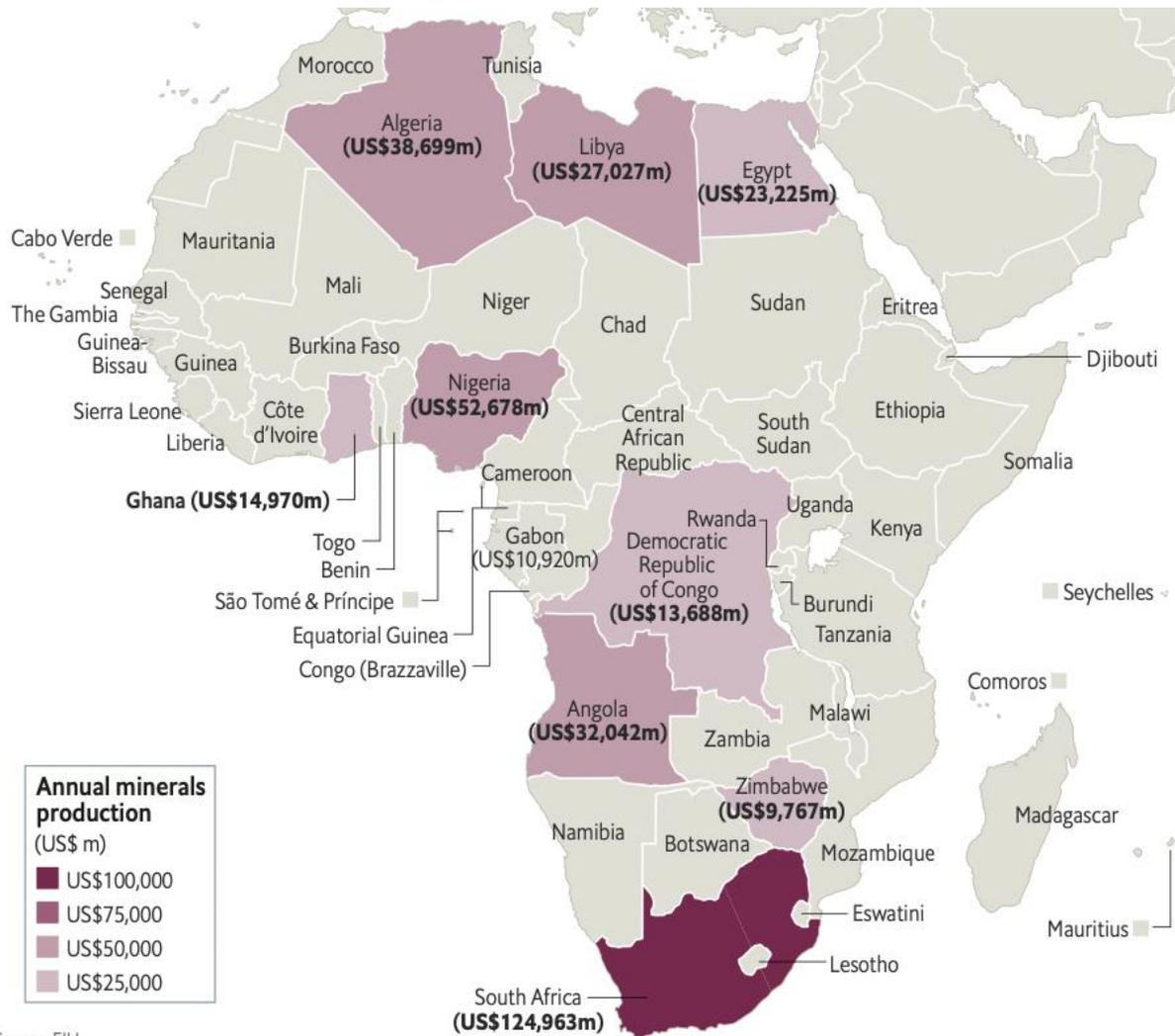
1. Introduction

As the energy crisis perseveres and governments around the world attempt to meet net zero emission timelines, there are many eyes on Africa's natural resource supply. Africa is resource rich. The continent is endowed with significant [hydrocarbon reserves](#) and [critical minerals](#) required for low-carbon technologies. As political and environmental developments around the world seek to decarbonize supply chains, pivoting investments over time towards critical minerals in Africa can help and bridge the gap between emerging/developing economies and energy security.

2. Africa's Critical Minerals

Africa's land is host to many critical mineral reserves. Nearly [50 percent](#) of the countries in the region contain substantial amounts of one or more critical minerals required for the energy transition, with South Africa, Nigeria, Algeria, Angola and Libya producing more than [two-thirds](#) of Africa's mineral wealth. Data from the Economist Intelligence Unit (EIU) (2022), presented in Figure 1, reports the top mineral producing countries in Africa and their associated annual production worth.

Figure 1: Africa's Top Mineral Producers



This figure includes some top producers, such as Algeria, Egypt and Libya that largely export natural gas and petroleum. To view the *critical* minerals extracted in Africa by country, see Table 1.

Table 1: Critical Minerals by Country

| Top Green Mineral Country | Main Critical Mineral(s) Extracted |
|------------------------------|------------------------------------|
| Democratic Republic of Congo | Lithium, Cobalt, Copper |
| Botswana | Copper, Nickel |
| Gabon | Manganese |
| Ghana | Bauxite, Manganese, Lithium |
| Guinea | Bauxite |
| Madagascar | Nickel |
| Mali | Lithium |
| Morocco | Cobalt |
| Namibia | Lithium |
| Nigeria | Lithium, Cobalt |
| South Africa | Copper, Nickel, Manganese |
| Zambia | Cobalt, Copper |
| Zimbabwe | Lithium |

Sources: Mining Digital Magazine, Supply Chain Operations (2022); Statistica, Mineral Production in Africa (2022)

While Africa has an abundance of critical mineral supply, industrialization has been limited due to lack of investment in technology innovation and infrastructure in place. The continent is competitive in terms of attracting exploration and mining of critical minerals, but lacks the capacity for processing/refining operations, manufacturing and industrialization. As a result, minerals mined are exported in unprocessed form or, at best, concentrates for value addition elsewhere beyond the continent. This poses challenges to the region in terms of economic [scarcity](#) and ability to advance supply chain efficiencies.

3. Critical Mineral Supply Chains in Africa

Economic, environmental, and political developments can (and will) impact the region's mineral industrialization. As it stands now, rising commodity prices continue to fuel an export boom of raw critical minerals across the continent, but high prices and demand for minerals such as copper, iron ore, and aluminum will likely stoke value chain investments and help reduce external imbalances in production.

Potential revenues from clean energy investments have elevated expectations given the diversity and magnitude of critical minerals in Africa, some with urgent supply issues. [Manganese](#), for example (used in the steel industry and for battery chemistries), is a rare mineral resource largely sourced in Africa and processed in China. Creating more efficient supply chains from exploration to a mineral's end-use would lower costs of end-products, ensure faster market response time, create jobs, and foster Africa's economic and social development for the long-run.

As part of a [wider product industrial development strategy](#), the Democratic Republic of Congo (DRC) - [the world's largest producer of cobalt \(about 70 percent\)](#) - and Zambia (part of the mineral-rich [Copper Belt region](#)) have begun efforts to restrict the export of some critical minerals in raw form. This directly impacts the need for companies to set up local processing plants within these countries. Governments in both areas are now pushing investors to consider the efficiency additional value added to raw materials by producing in-country. Operations currently export [95 percent](#) of extracted minerals in raw form, blocking significant revenues to these economies.

Trade tensions with China and Russia's ongoing war in the Ukraine have triggered western countries to turn to Africa for investment opportunities in 2022. In the third quarter of this year, [Minerals Security Partnership](#) countries (including the U.S., Australia, Canada, Finland, France, Germany, Japan, South Korea, Sweden, the U.K. and the European Commission) began conversations around the benefits of clean energy investments in areas that already possess the skills and experience to process rare earths domestically. This led to partnership discussions involving African regions.

International investors expect partnerships to diversify and bolster critical mineral supply chains while lowering trade reliance with China and Russia. For Africa, this would provide development opportunities through higher profits from all stages of the value chain as well as energy security in a traditionally [energy poor](#) area of the world. [Five](#) African countries came to September's UN General Assembly conference to initiate these conversations, including: the DRC, Mozambique, Namibia, Tanzania and Zambia.

Looking forward through Africa's lens, Western powers have ensured critical minerals in this region will be [mined and processed](#) in ways that promote high environmental, social and governance standards.

4. Conclusion

Investors around the world have a historic opportunity to utilize Africa's abundant green minerals to their advantage. With the continent set to remain one of the major suppliers of critical minerals for clean energy, the ease and pace of investment inflows will largely hinge on the restructuring of domestic governance and policy changes. If done correctly, investment impacts would bolster the region's social climate, boost energy efficiencies, and develop a robust talent pipeline in the workforce.

At present, the continent can only harness benefits from exploration/extraction of its critical mineral supply, but potential revenues in critical mineral production have positive prospects for the continent's resource-based industrialization. Incremental changes over time in funding away from hydrocarbon developments towards infrastructure to process critical minerals could be a long-term solution to enhance African economies and ease the global energy transition. This transformation needs to be more of a balancing act, as many African countries have long relied on fossil fuel production as an economic breadwinner.

Still, how quickly Western countries can provide investment allocations and international trade alternatives with Africa will be a critical component of the countries resilient critical mineral supply chains coming to fruition. The world looks ahead to this December's [U.S.-Africa Leaders' Summit](#) to see what progress advances.

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Caitlin recently completed her PhD in Economics from the University of Stirling and is a postdoctoral fellow at the Payne Institute. Prior to her doctorate, she received an M.A. in applied economics from the University of Colorado, Denver, and an M.S. in mineral and energy economics from Colorado School of Mines. Caitlin comes to Payne after five years of working for the State of Colorado in numerous roles, across several agencies and executive leadership teams. She brings extensive experience in public policy and economics to this position in a manner that is outcome-focused and quantitatively driven. Her empirical research at Payne focuses largely on sustainability, energy consumption, and mineral markets at state, national, and global levels. While a research fellow at the Payne Institute, she intends to apply her unique skillset and curious mindset towards helping the world become a more equitable, viable, and environmentally sustainable place to live – one of which never loses its intrinsic value.

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Hassan Al Hassan is presently the Mineral Titles Manager in the Policy Planning and Mineral Titles Division of the Minerals Commission of Ghana, superintending the processing of mineral right applications for the various minerals and help maintain a secure and comprehensive mineral title database, public policy formulation, development of strategies for mineral exploration and geo-data management.

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Hassan has been working in the minerals and mining industry for the past 20 years both in the private and public sectors in areas of mineral exploration, geology, geophysics, geochemistry, engineering geology, environmental geology, mining geology, geological mapping, mineral resource estimation and reserve economic evaluation, mineral resource development, risk management, project management, infrastructure development, management of social issues in mining, policy planning and fiscal analysis. He is presently a PhD Candidate studying Mineral and Energy Economics at the Economic and Business Department of the Colorado School of Mines, in Golden, Colorado.

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Mama Nissi Abanga Abugnaba works for the Ghana's Minerals Commission as a Policy Planning Officer. The Minerals Commission is a public institution responsible for the regulation and management of the utilization of the mineral resources in Ghana and the coordination of policies in relation to them. She is responsible for reviewing support services applications, monthly and annual reports, staffing and localization plans of mining corporations. Information's and data from these reviews aid in planning and formulation of policies for the Minerals Commission.

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In her spare time, Mama Nissi enjoys reading, watching, movies, travelling and sightseeing.

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