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CHARTING AFRICA'S PATH TO INDUSTRY-LED GROWTH

Made in Africa

ESSAY

VIEWPOINTS

UNLOCKING AFRICA'S CRITICAL MINERALS FOR BROAD-BASED PROSPERITY AND GLOBAL COMPETITIVENESS

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Introduction

The race for critical minerals is on.[1] The demand is high and growing: By 2040, 4.5 times as much lithium and 2.3 times as much graphite will be needed.[2] But mining and processing are highly concentrated: For most critical minerals, the top three global producers account for more than 50% of output.[3] Of these top producers, China is responsible for 60% of global mining output and 91% of global production such as separation and refining.[4] The world depends on China's processed minerals for a wide range of industries at the core of the global economy and technology, such as magnets used in cars, data centers, defense technologies, industrial motors, and other applications in energy and AI.[5] However, the lessons from the COVID-19 pandemic and the changing geopolitical winds call for greater supply chain resilience and a more diverse set of trusted suppliers.

1 This essay builds from a publication co-authored by Ede Ijjasz-Vasquez, Landry Signé, and Vera Songwe, "Leveraging US-Africa Critical Mineral Opportunities: Strategies for Success," *Brookings Institution*, September 29, 2025.

2 IEA, "Global Critical Minerals Outlook 2025," IEA, May 21, 2025.

3 IEA, "Global Critical Minerals Outlook 2025."

4 Tae-Yoon Kim et al., "With New Export Controls on Critical Minerals, Supply Concentration Risks Become Reality," IEA, October 23, 2025.

5 Tae-Yoon Kim et al., "With New Export Controls on Critical Minerals, Supply Concentration Risks Become Reality."

In Africa, extraction plays a large role (accounting for 76% of global manganese and 69% of cobalt) but refining is much more limited (9% for copper, <5% for other key minerals).[6] Despite accounting for less than 1% of the global value from clean energy technologies and components manufacturing,[7] Africa is well-positioned to become one of these trusted partners to the world—but the continent needs to jump on the opportunity quickly.

Despite accounting for less than 1% of the global value from clean energy technologies and components manufacturing, Africa is well-positioned to become one of these trusted partners to the world—but the continent needs to jump on the opportunity quickly.

However, Africa should not rush blindly into the critical minerals race. The continent can draw on its many lessons and experiences to make this opportunity work for its citizens, the environment, and future generations. For this essay, rather than focus on the actions needed to make the mining of critical minerals a success (these are covered in detail in our recent paper "Leveraging US-Africa critical mineral opportunities")[8], we instead focus on the opportunities the region has to leverage this juncture to create more high-quality jobs, develop a vibrant ecosystem of businesses in the mining value chain, and close the infrastructure gap to serve the mining sector and beyond.

Critical minerals as a catalyst for prosperity

Infrastructure services can be designed for and beyond the mine simultaneously. Mining requires lots of energy and well-functioning connectivity infrastructure from mines to ports. For example, the rail and port financing needs for the Simandou mine in Guinea are estimated to be at least $6 billion,[9] while the Lobito corridor for exporting minerals from the DRC may require up to $2.4 billion for completion.[10] The Program for Infrastructure Development in Africa's (PIDA's) regional infrastructure projects (many of which are related to exports of minerals) are estimated to cost $360 billion by 2040.[11] While the need is great, these types of investment are extremely attractive to the private sector and can be transformational for the countries they inhabit.

However, a narrow view of these infrastructure projects, designed solely for mining products, is expensive, unambitious, inefficient, and can undermine opportunities for economic development. Countries along the mining corridors can invest in complementary infrastructure (secondary roads, special economic and industrial zones, and urban infrastructure for cities along the corridor). These additional, complementary investments are the key to unleashing economic development along the transportation and energy corridor, unlocking new business opportunities, and creating high-quality jobs. For example, the development of the Tanger Med port in Morocco was accompanied by a supportive program to develop industrial zones which are now home to 1,200 companies, 110,00 jobs, and exports of $15 billion a year.[12] The success of the port was not due only to its own development, but also to the complementary infrastructure and the enabling environment for business creation and growth.

Most jobs are outside the mine. Based on our calculations, the projected number of additional formal jobs in copper, cobalt, nickel, and lithium mines may be around 286,000 by 2040.[13] Boston Consulting Group estimates the broader impacts, finding that a $1 billion investment in mining and processing can create 3,000-6,000 direct jobs, contribute $210-$280 million to GDP in steady state, increase annual incremental government revenue by $70-$100 million in steady state, and lead to $100 million spent on regional infrastructure.[14] Policymakers should therefore be thinking of how to support and maximize these secondary impacts.

6 *Stepping Up the Value Chain in Africa* (IEA, 2025).

7 *Stepping Up the Value Chain in Africa* (IEA, 2025).

8 Ede Ijjasz-Vasquez et al., "Leveraging US-Africa Critical Mineral Opportunities: Strategies for Success," *Brookings Institution*, September 29, 2025.

9 "Simandou Iron Ore Project Update," *RioTinto*, December 6, 2023.

10 Isabelle King, "Refining the Lobito Corridor: The Future of Cobalt in Sub-Saharan Africa," *Harvard International Review*, August 22, 2024.

11 Programme for Infrastructure Development in Africa (PIDA): First 10-Year Implementation Report, "Programme for Infrastructure Development in Africa (PIDA): First 10-Year Implementation Report," 2023.

12 Ahmed Eljechtimi, "Morocco's Tanger Med Port Expects to Exceed Nominal Container Capacity," Reuters, June 10, 2024.

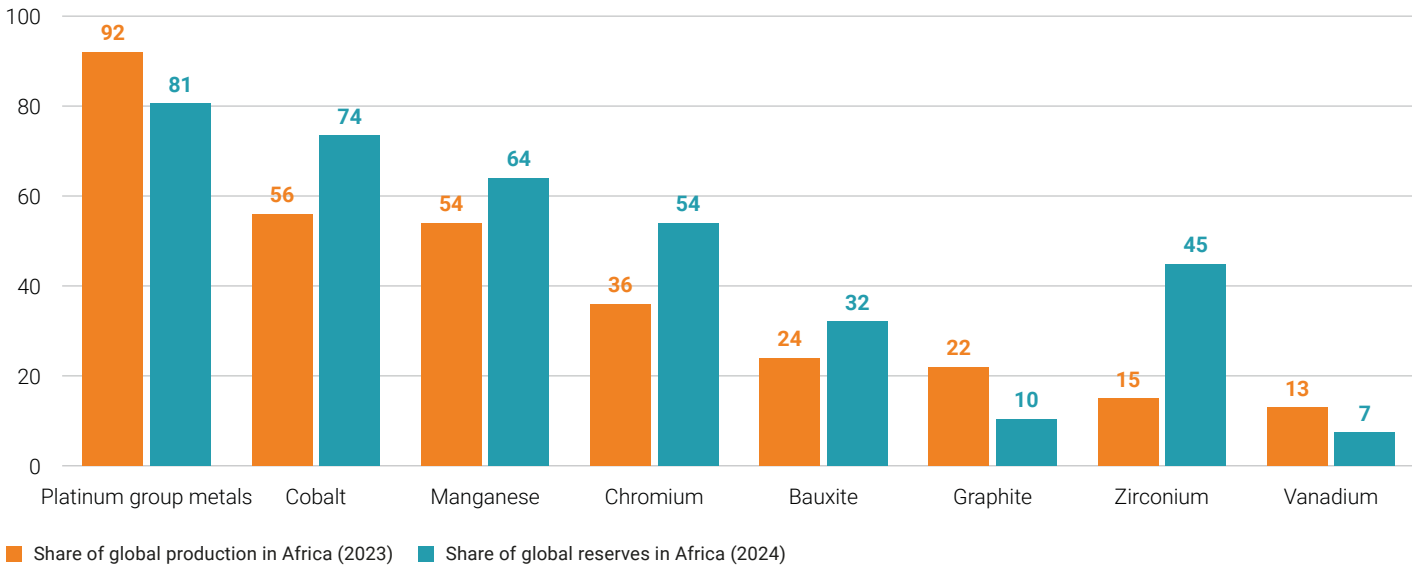
13 Ede Ijjasz-Vasquez et al., "Leveraging US-Africa Critical Mineral Opportunities: Strategies for Success," *Brookings Institution*, September 29, 2025.

14 Peter Clearkin et al., *Africa Unleashed: Harnessing Africa's Critical Mineral Opportunity* (Boston Consulting Group, 2025).

FIGURE 11

Concentration of selected critical mineral resources in Africa

Africa's share of critical mineral reserves (teal) compared to its share of critical mineral production (orange)



Note: There are six critical minerals for which Africa supplies more than 20% of global production and four for which it supplies more than 50%.
Source: Zero Carbon Analytics 2024; Austria Federal Ministry of Finance 2023

The way forward

African countries can leverage the expansion of critical minerals in five manifold ways.

First, local mining suppliers can be, with adequate support, an important source of employment. While many countries have local content regulations, they have not yielded the intended results due to insufficient monitoring and the insufficient ability of local suppliers to meet the specific requirements of international mining companies. Examples include Ghana, where local procurement of goods and services by mines reached $2.67 billion (a little over half of mining revenues) in 2020.[15] Local suppliers face significant challenges, such as: (i) capital constraints (that can be resolved with supplier development funds like the Zimele enterprise development program in South Africa[16]), (ii) insufficient know-how (a barrier that can be gradually resolved through joint ventures with international suppliers, with examples in Burkina Faso[17] or Tanzania[18]), or (iii) scale (which can be addressed by leveraging the African Continental Free Trade Agreement[19]).

Second, African countries can gradually move up the value chain of processed metals and precursors. The African Development Bank, in its analysis of potential value chains in Africa, indicates that local investors can begin to engage in the processing of rare earth elements into concentrates and gradually move up to more complex processing steps like smelting, processing, and refining.[20] If African countries could successfully do so, the IEA estimates that by 2040, the market value for minerals on the continent would increase by almost three-quarters compared to today's $120 billion.[21] To get there,

15 A. Atta-Quayson, "Local Procurement in the Mining Sector: Is Ghana Swimming with the Tide?," *Journal of the Southern African Institute of Mining and Metallurgy* 122, no. 2 (2022): 1–13.

16 "Zimele – Anglo American South Africa," AngloAmerican, accessed November 20, 2025.

17 "Perenti Awarded A$1.1bn Contract at Endeavour's Mana Mine," Miner Weekly, June 2, 2025.

18 Daniel Brightmore, "AngloGold Ashanti Establishes BG Umoja JV in Tanzania," Mining Digital, April 19, 2021,.

19 Papa Daouda Diene et al., "Triple Win: How Mining Can Benefit Africa's Citizens, Their Environment and the Energy Transition," Natural Resource Governance Institute, November 2, 2025.

20 African Natural Resources Centre (ANRC)., *Rare Earth Elements (REE) - Value Chain Analysis for Mineral Based Industrialization in Africa* (African Development Bank, 2021).

21 *Stepping Up the Value Chain in Africa* (IEA, 2025).

a commitment to upskilling workers, improving transport infrastructure, and managing political and currency risk will be critical.[22] Some examples demonstrating these commitments include a plant about to enter into operation for the processing of lithium sulfate in Zimbabwe[23] and the production of nickel-manganese-cobalt precursor cathode active materials in Morocco.[24]

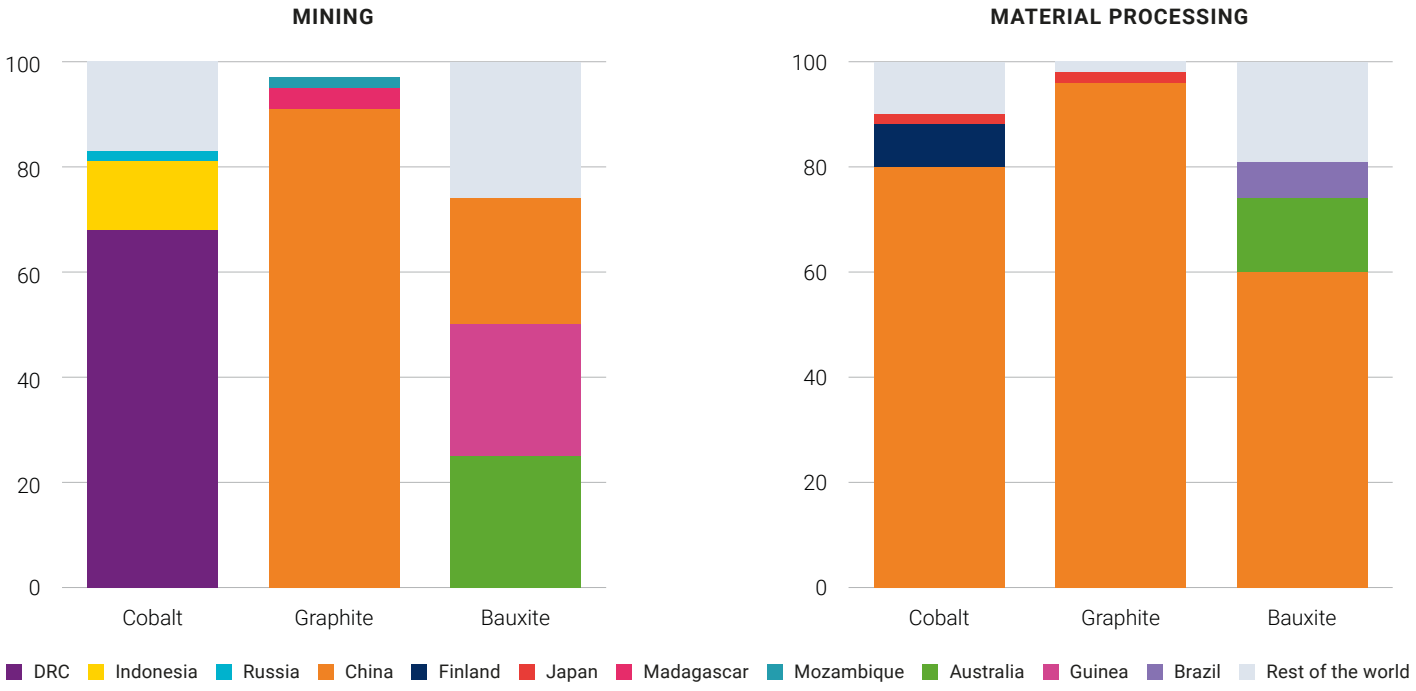
Third, supporting the development of industries in special economic zones (SEZs) and cities along transportation and energy corridors serving the mines can leverage the infrastructure investments required for the export of mining products. For example, the Kigali Special Economic Zone (KSEZ) currently hosts 243 firms across several sectors and has generated over 16,000 jobs.[25] The success factors of KSEZ, such as a strong institutional framework and incentives, an export orientation, reliable infrastructure services, and stable governance, should be at the core of SEZs along development corridors linked to mines.

Fourth, upgraded infrastructure must address issues of food resilience and food security. Almost 40% of all locally produced agricultural commodities in Africa are lost in transportation.[26] The same transportation infrastructure that supports mining—ports, roads and railways—can also serve to reduce lead times, costs, and uncertainty in the transport of food across the continent. Considering that half the labor force in the average African country is employed in agriculture, investments in these areas also have tremendous potential for job creation.[27] At the same time, opportunities for structural transformation in the export and processing of critical minerals can blunt the

FIGURE 12

Mining and processing of selected critical minerals

Top producers and refiners of three minerals (cobalt, graphite, and bauxite) for which African countries are significant producers



Source: International Energy Agency. 2024. Global Critical Minerals Outlook 2024; World Population Review. 2025. "Bauxite Production by Country 2025"

22 *Stepping Up the Value Chain in Africa* (IEA, 2025).
23 Obert Bore, "China Tests Zimbabwe's Lithium Ambitions With $400 Million Huayou Cobalt Plant," *The China-Global South Project*, September 25, 2025.
24 Ahmed Eljechtimi, "Sino-Moroccan COBCO Begins Producing EV Battery Materials," Africa, *Reuters*, June 25, 2025.
25 Rwanda Development Board, *Annual Report 2023: Building Resilience for Sustained Economic Growth* (2023).
26 Charles Kunaka et al. *Transport Connectivity for Food Security in Africa: Strengthening Supply Chains.* (World Bank, 2025).
27 Olivier Monnier. "Getting to the Root of Africa's Food Challenges." *International Finance Corporation*, December 8, 2020.

impact of adverse shocks in agriculture, as happened in the case of Zambia.[28]

Fifth, without strong coordination across government agencies, the full potential of mining cannot be achieved. In our paper, we recommend that African countries consider a single, high-level national coordinator, or "czar," to implement "a whole-of-government approach for the critical minerals, infrastructure, energy, and value chain sectors."[29] A strong position in the global competitive landscape for critical minerals requires strong coordination across ministries and agencies (within and beyond the mining sector). A platform that seamlessly integrates project negotiations, permitting, land acquisition, and approval processes will make African nations more attractive. This czar should have the authority to engage with other countries on regional infrastructure projects and to leverage AfCFTA's potential. The high-level national coordinator can be most effective leading an inter-ministerial commission with a clear mandate and ability to mobilize resources.

The critical minerals race is a unique opportunity to promote Africa as a reliable partner to countries that need these resources. The past mistakes of resource extraction without sustainable development, untransparent arrangements, and missed opportunities must not be repeated. The region's political commitment, as reflected in the Africa Union's Green Mineral Strategy,[30] offers a platform for transformation. TAfrica must now work together to move toward implementation to reap the benefits of this unprecedented opportunity for growth and prosperity.

28 World Bank. *Zambia Economic Update: Leveraging Energy Transition Minerals for Economic Transformation* (World Bank, 2025).

29 Ede Ijjasz-Vasquez et al., "Leveraging US-Africa Critical Mineral Opportunities: Strategies for Success," *Brookings Institution*, September 29, 2025.

30 *Africa's Green Minerals Strategy* (African Minerals Development Centre, 2024).

Harnessing the blue economy for growth and prosperity: The Cabo Verde experience

JOSÉ ULISSES CORREIA E SILVA, Prime Minister of the Republic of Cabo Verde

As a small island nation surrounded by the Atlantic ocean, Cabo Verde has long understood that our ocean is not just a geographical reality—it is our greatest opportunity. The sea that once symbolized isolation now represents connection, resilience, and prosperity. Harnessing the blue economy (i.e., economic activities taking place below, on, or adjacent to the ocean)[1] for sustainable development is central to Cabo Verde's vision for the future and integral to the broader African agenda for inclusive, climate-resilient growth. For Cabo Verde, embracing the potential of the blue economy is not just an innovative development concept but a core national strategy. Our ocean covers an area over 200 times larger than our land mass, and it holds vast potential for renewable energy, sustainable fisheries, maritime transport, tourism, and innovation.[2] Seizing this potential demands intentional, responsible stewardship and the steadfast commitment to long-term investment in our marine resources.[3]

Our ocean is not just a geographical reality—it is our greatest opportunity.

Sustainability—in all its forms—is at the heart of our blue economy focus. Cabo Verde is investing in marine spatial planning, protecting biodiversity, and strengthening climate adaptation across coastal communities. Our approach seeks to balance economic use with environmental protection, ensuring our precious ocean resources can continue to support livelihoods and resilience for generations to come.

In this context, the innovative debt-for-climate-and-environment swap between Portugal and Cabo Verde stands as a landmark achievement.[4] Thanks to this innovation, part of Cabo Verde's bilateral debt to Portugal has been converted into a climate and environmental fund to support renewable energy, marine conservation,

1 U. Rashid Sumaila, "Africa's Blue Economy Can Continue to Deliver Huge Benefits to the Continent," in *Foresight Africa: Top Priorities for the Continent in 2023* (The Brookings Institution, 2023).

2 Isaac Trindade Santos et al., "Reconstruction of Marine Fisheries Catches for the Republic of Cape Verde, 1950-2010," in *Marine Fisheries Catches in West Africa*, 1950-2010, Part I, Fisheries Centre Research Reports 2 (Fisheries Centre, University of British Columbia, 2013); "Catches by Taxon in the Waters of Cape Verde," SeaAroundUs, University of British Columbia, 2022.

3 U. Rashid Sumaila et al., "Financing a Sustainable Ocean Economy," *Nature Communications* 12, no. 1 (2021): 3259.

4 Sergio Goncalves, "Portugal to Swap $153 Million Cape Verde Debt for Nature Investments," *Reuters*, June 20, 2023.

and climate adaptation projects. This mechanism demonstrates how creative financial instruments can simultaneously strengthen fiscal sustainability and accelerate investment in the blue economy. It also reflects the spirit of partnership and solidarity that underpins Cabo Verde's relationship with Portugal—a partnership that is political, economic, cultural, and deeply human.

As this new agreement indicates, success is not built in isolation. Cabo Verde's progress has been possible thanks to partnerships with international institutions and stakeholders, including the World Bank, the African Development Bank, the European Union, the United Nations, and bilateral partners. Together, we are working to mobilize financing, strengthen capacity, and share knowledge for sustainable ocean management. We also engage actively in regional and global forums, because small island states must not stand on the sidelines of global ocean governance: We must be at its center.

The blue economy is also about economic diversification and job creation. For Cabo Verde, it represents a pathway to reduce dependence on tourism and imports while expanding opportunities in new sectors such as sustainable and regenerative aquaculture, maritime logistics, renewable energy, and digital services. The development of sustainable ports, green shipping, and digital connectivity are key priorities. We are hopeful that these investments will create decent jobs, especially for youth and women, and build resilience against external shocks.[5]

Looking ahead, Cabo Verde's vision is to become a true "Ocean Corridor"—a hub that connects Africa, Europe, and the Americas through the Atlantic. Our geographic location gives us a natural comparative advantage for air and maritime connectivity, data and communication cables, and renewable energy networks. We aim to transform Cabo Verde into a logistics and digital hub, a bridge between continents, and a center for knowledge and innovation in the blue economy.The boldness of this vision requires continued commitment to good governance, private sector engagement, and regional cooperation. It also demands that we see the ocean not as a frontier to exploit but as a system to protect and sustain. Ocean sustainability is not an environmental luxury; it is an economic necessity and a moral obligation. As we look to 2026 and beyond, Cabo Verde remains committed to deepening its role in advancing the African blue economy agenda. We will continue to promote innovative financing, inclusive governance, and responsible ocean stewardship.

Throughout history, the sea has been a great connector of people, culture, and commerce. As we advance into the 21st century, we are further recognizing its incredible power as an engine of shared prosperity, global sustainability, and peace. Cabo Verde's journey—including its recent graduation to upper-middle-income status[6]—offers a message of optimism for other African small island and coastal states: Even with limited natural resources, it is possible to build a resilient and dynamic economy by investing in people, institutions, and partnerships while aligning and reconciling growth with sustainability.

5 Marco António Medina Silva, "Cabo Verde's Sustainable Growth Relies on Economic Diversification and Resilience to External Shocks," *The World Bank*, July 14, 2023.

6 Eric Metreu et al., "Understanding Country Income: World Bank Group Income Classifications for FY26 (July 1, 2025–June, 2026)," *Data Blog*, July 1, 2025.

Africa's new economic transformation: More than manufacturing

RICHARD NEWFARMER, Country Director, Rwanda and Uganda, International Growth Centre

Every year some 15 million young Africans will enter the region's labor force.[1] The vast majority will find work of some kind. But will their new jobs be productive work and can this youthful wave power rapid economic growth?

The development literature of a decade ago painted a pessimistic outlook for Africa because, unlike fast-growing East Asia, the region was not creating manufacturing jobs as workers moved out of agriculture.[2] Indeed, in the last decade, manufacturing's share of African GDP has languished at about 11%, less than half the share of that in East Asia.[3] This conventional avenue of structural transformation appeared closed. Since then, however, an emerging literature has identified several productivity-increasing transformations: from rural to urban, from home to market, from informal to formal, and from self-employment to wage work.[4]

A new study from the Brookings Institution, "New Pathways to Job Creation and Development in Africa: the Promise of Industries without Smokestacks," looked in depth at employment in eight African countries.[5] It focused on activities that possess many of the key characteristics of manufacturing: that they are tradable across borders, employ workers with moderate skill levels, generate higher-than-average productivity, and demonstrate capacity for technological advancement and scale. The study centered on tourism, business services, agro-processing, horticulture and export agriculture, information technology services, and modern transport and logistics, what the authors called "industries without smokestacks."

1 Athene Laws et al., "The Clock Is Ticking on Sub-Saharan Africa's Urgent Job Creation Challenge," *IMF Blog*, November 12, 2024.

2 Dani Rodrik, *An African Growth Miracle?*, no. w20188 (National Bureau of Economic Research, 2014), w20188.

3 Chris Heitzig et al., "From Deindustrialization to Job Creation: New Perspectives on African Growth," in *New Pathways to Job Creation and Development in Africa: The Promise of Industries Without Smokestacks*, 1st ed, ed. Haroon Bhorat et al. (Bloomsbury Publishing USA, 2025).

4 For a comprehensive literature review, see D. Golin and J.P. Kobaski "New views of structural transformation: insights from recent literature" Oxford Development Studies 2023 Vol. 51 No. 4 pp. 339-361.

5 H. Borat, B. Coulibaly, R. Newfarmer and J. Page, eds., *New Pathways to Job Creation and Development in Africa: The Promise of Industries Without Smokestacks*, 1st ed (Bloomsbury Publishing USA, 2025).

These "industries without smokestacks" were found to be already reshaping Africa's economic landscape. For example, in the fast-growing East African countries of Ethiopia and Rwanda, tourism makes up a larger share of employment than manufacturing, and in Rwanda, industries without smokestacks collectively employ more than four times as many workers. In South Africa, too, these industries account for four times the workers as traditional manufacturing, with financial and business services leading in employment.[6] Across East and West Africa, agro-processing has begun to link smallholder farmers with expanding urban markets and international buyers, lifting incomes and boosting rural employment. Meanwhile, the rapid rise of information and communication technology hubs in cities such as Accra, Cape Town, and Nairobi showcase the continent's ability to leapfrog into high-value services, nurturing a new generation of entrepreneurs and innovators.[7]

Perhaps most encouraging was the potential for these emerging sectors to enhance productivity, create jobs, and grow exports. Research shows that these activities collectively have an average productivity several multiples of traditional agriculture and have an estimated average employment elasticity of 1.2—higher than both the overall economy and manufacturing.[8] And consider exports: Between 2005 and 2022, Africa's services exports grew more than 1.5 times faster than merchandise exports. Already, services exports alone make up about one-quarter of Africa's export earnings.[9] Countries across the continent are discovering that their competitive advantages lie in leveraging their unique endowments—from wildlife and landscapes for tourism to agricultural resources for processing and export.

Countries across the continent are discovering that their competitive advantages lie in leveraging their unique endowments.

Yet realizing the full potential of these sectors requires deliberate policy action. The same infrastructure constraints that limit traditional manufacturing—unreliable electricity, poor transport networks, inadequate digital connectivity—also constrain these emerging sectors. This means investing in reliable power and internet connectivity, improving transport networks and logistics, developing relevant skills training programs, and creating regulatory environments that encourage innovation and competition. It also means better statistical systems to track these industries' contributions.

Moreover, in an era of unprecedented technological change—exemplified by the AI revolution—policy also must focus on improving educational access and quality. Only by continually creating opportunities for workers to upgrade their skills can these new technologies create productive jobs.

High-income countries can help. High on the priority list is keeping global markets open, free of border barriers, and reinvigorating the multilateral trading system;

6 Heitzig et al., "From Deindustrialization to Job Creation: New Perspectives on African Growth."

7 Besides the respective chapters for Ghana, Kenya and South Africa in Bhorat et al 2025, see also GSMA. *The Mobile Economy: Sub-Saharan Africa 2023*. London: GSMA Intelligence, October 2023; and Google & International Finance Corporation (IFC). *e-Conomy Africa 2020: Africa's $180 Billion Internet Economy Future*. Washington, DC: IFC, November 2020; and Nayyar, Gaurav; Hallward-Dreimeier, Mary; and Davies, Elwyn. *At Your Service?: The Promise of Services-Led Development*. Washington, DC: World Bank Group, 2021.

8 Bhorat et al., *New Pathways to Job Creation and Development in Africa*, 25, 30.

9 Richard Newfarmer et al., "Promoting Services-Led Transformation and Exports in Africa," in *LDC Trade Priorities - Looking Forward* (World Trade Organization, 2024).

depoliticizing development assistance and integrating it into country-owned strategies; spurring technological advances to limit carbon emissions and joining international efforts to address climate change.

The lesson? Structural transformation to accelerate growth is more than manufacturing. Enacting a comprehensive development strategy holds the promise of harnessing the power of coming generations to drive sustained growth and rising incomes in Africa.

Structural transformation to accelerate growth is more than manufacturing.

Powering Africa's industries: Should the region leapfrog the use of fossil fuels?

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How can African nations rethink their energy needs for industrial progress and economic prosperity without further spiraling up their levels of gas emissions?

In a world increasingly shaped by economic volatility and environmental challenges, the issue of industrialization in Africa presents both great opportunity and great risk. Reversing the continent's premature deindustrialization[1] offers the chance for large-scale job creation—an urgent necessity given the region's demographic bulge, weak economic outcomes, and rising poverty. At the same time, reducing global gas emissions is a necessary requirement for mitigating climate change. We therefore are facing a reality in which decarbonization is shaping investment patterns while significantly reducing opportunities for developing countries to tap their fossil fuel resources. Against this backdrop, how can African nations rethink their energy needs for industrial progress and economic prosperity without further spiraling up their levels of gas emissions?

First and foremost, we know that access to affordable and reliable energy is a key binding constraint for long-term, industry-led growth, and that nearly 600 million people[2] in sub-Saharan Africa still do not have access to electricity (over 80% of the global electricity deficit).[3] With the African population expected to surpass 2.5 billion by 2050,[4] the demand for energy and food is expected to continue to soar.

On the other hand, the continent faces a disproportionate burden to decarbonize, even though it contributes a tiny proportion (less than 4%) of global greenhouse gas emissions.[5] The goal of net-zero is a global one and does not necessarily have to be

1 Rodrik, D. (2016). Premature deindustrialization. *Journal of Economic Growth*, 21(1), 1–33.

2 Ramstein, C., & Hallegatte, S. (2025, 21 mars). *Connecting 300 million people to electricity and building a resilient future in Africa*. World Bank Blogs

3 International Energy Agency (IEA). (2024). Electricity access continues to improve in 2024 – after first global setback in decades. *IEA Commentary*.

4 United Nations Department of Economic and Social Affairs, Population Division. (2022). *World Population Prospects 2022*. New York: United Nations.

5 African Development Bank. (2024). *Focus on Africa – COP29*.

achieved by each country or on the same timeline.

Accordingly, calls for Africa to accelerate its decarbonization efforts are in effect penalizing the region for the historical emissions of much more advanced countries.

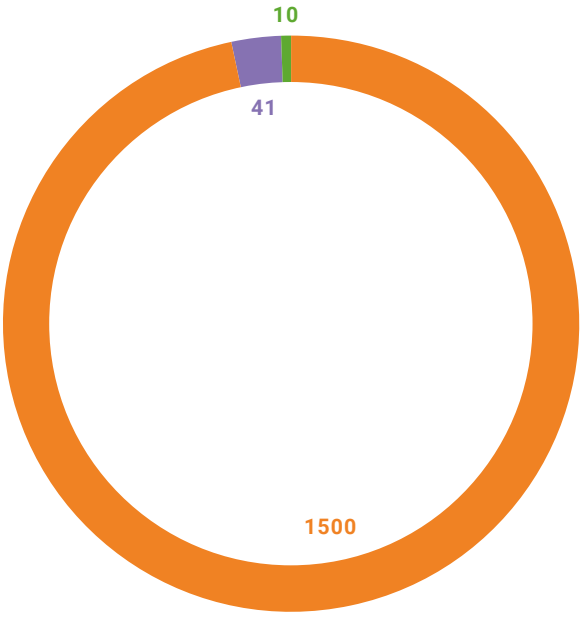
Crucially, most of the net-zero modeling for Africa is based on projections that do not align with the region's own development ambitions or aspirations for industry-led growth.[6] Even for the few models that include growth or poverty metrics, assumptions for future energy consumption are extremely modest. According to a 2023 Energy for Growth Hub paper, the most optimistic forecast for sub-Saharan Africa's per-capita electricity consumption is 1500 kWh by 2050—less than half the global average in 2017 and far below U.S. consumption levels (12,573 kWh).[7] These projections, which inform policy as well as investment and financing decisions, are inconsistent with Africa's rapidly growing population, its accelerated regional integration efforts, and its desire to industrialize. They could lock Africa into a perpetual cycle of low energy access.

The dilemma the continent therefore faces is meeting its growing energy needs to spur development while avoiding the same dependence pattern on fossil fuels that characterized the development model of advanced countries. This is further compounded by the rising need to adapt to the staggering effects of climate change on its economies. Indeed, some estimates suggest that Africa could see a decrease

FIGURE 13

Africa's share of global CO_2 emissions (measured in gigatons)

Cumulative energy-related CO_2 emissions and CO_2 emissions from using gas from Africa's discovered, not yet approved fields



Source: International Energy Agency, Africa Energy Outlook 2022

6 Yacob Mulugetta et al., "Africa Needs Context-Relevant Evidence to Shape Its Clean Energy Future," Nature Energy 7, no. 11 (November 1, 2022): 1015–22.

7 Moussa P Blimpo et al., "Climate Change and Economic Development in Africa: A Systematic Review of Energy Transition Modeling Research," Energy Policy 187 (April 1, 2024): 114044–44.

of up to 30% of its GDP by 2050 due to climate change alone.[8]

Addressing this dilemma and finding the right balance between energy access and climate sustainability should depend on a diversified energy mix—where a balanced mix of fossil fuel, natural gas, and renewables become Africa's bridge toward a cleaner and more stable energy future. As an example, some resource-rich African countries (for instance Burkina Faso) possess sizeable, low-cost reserves of fossil fuel and yet face low renewable energy readiness due to high costs of capital, limited access to finance, or complex policy challenges such as the high political-economy trade-offs associated with transition (e.g. compensation of firms and workers dependant on non-renewables). For these countries, the pathway that optimizes development outcomes such as jobs, value addition, and energy access should involve fossil fuels in the short term.[9]

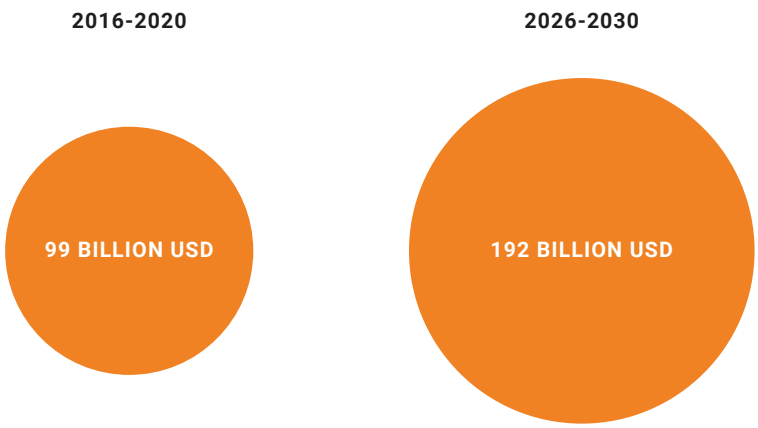
Addressing this dilemma and finding the right balance between energy access and climate sustainability should depend on a diversified energy mix.

Other African countries are at the opposite end of the spectrum: They possess little/no fossil fuel reserves, yet their renewable potential is immense. For such countries, scaling low-cost renewable energy is favorable both in the short and long term. The Sahel region, for example, receives more than 2,000 kilowatt-hours per square meter of solar radiation each year.[10] Other countries have high capacity for geothermal and hydroelectric power.[11] Together, these resources could sustain new industrial zones powered by hybrid systems—where gas provides reliability and renewables drive long-term growth. Morocco's Noor solar complex,[12] Ethiopia's hydroelectric

FIGURE 14

Needed investments for renewable energy transition in Africa

Annual investments in African energy need to double from recent trends for the continent to meet both its energy access and climate pledges by 2030



Source: International Energy Agency, Africa Energy Outlook 2022

8 Marshall Burke et al., "Global Non-Linear Effect of Temperature on Economic Production," *Nature 527*, no. 7577 (2015): 235–39.

9 Yacob Mulugetta et al., "Africa Needs Context-Relevant Evidence to Shape Its Clean Energy Future," Nature Energy 7, no. 11 (November 1, 2022): 1015–22.

10 World Bank Group, ESMAP. (2024). *Global Solar Atlas.*

11 "Picking up Steam: Africa Will Overtake Europe in Geothermal Capacity by 2030, $35 Billion Investments by 2050," Rystad Energy, November 2023; "Hydropower in Africa," *International Hydropower Association*, n.d.

12 Thomas Finighan, "Morocco's Noor Solar Project: Redefining Renewable Growth," *The Borgen Project,* August 6, 2025.

expansion,[13] and Kenya's geothermal projects are cases in point. In fact, about 90% of Kenya's currently generated electricity comes from renewable sources.[14]

Gas, often described as a "transition fuel," emits less carbon than coal or oil and already holds a central place in several national strategies. The continent now holds around 7% of the world's known natural gas reserves,[15] from Senegal and Mauritania's Grand Tortue Ahmeyim field to Mozambique's Rovuma basin and Egypt's vast Zohr deposits—these discoveries promise not only greater energy autonomy, but also new revenue streams to finance a green transition.

To diversify its production base, gain international market shares, create productive jobs, and reduce poverty, the continent will also need to tap the huge opportunities emerging from technological progress and a fast-changing energy system. Solar panels, batteries, electric vehicles, and smart grids are all becoming increasingly important aspects of industrial energy sourcing. Yet without adequate financing, these factors remain inaccessible.

In summary, Africa must prioritize meeting its immediate and present-day energy demands through available resources (including fossil fuels), rather than pursuing a one-size fits all, "leapfrogging" scenario that current economic realities cannot sustain. Africa's natural gas reserves, over 620 trillion lcubic feet[16] across Grand Tortue Ahmeyim, Rovuma basin, and Zohr fields, offer immediate, affordable baseload capacity that industrialization demands. Moreover, short-term fossil fuel development offers Africa the opportunity to support economic growth and development and in turn bolster domestic revenue. With a commitment to reinvest part of these revenues in renewable technology and energy, Africa can accelerate a balanced green transition that also allows for development.

13 Saleem H. Ali, "Ethiopia's Hydropower Success Exemplifies 'Convergent Governance,'" *Forbes,* October 7, 2025.

14 Climate Investment Funds. (2024, 5 septembre). *Project Spotlight: In the final stretch to 100 % clean power, Kenya leads, learns, and clears a few hurdles*. CIF News.

15 BP. (2021). *Statistical Review of World Energy 2021* (70th edition). London: BP p.l.c.

16 BP (2023). *Statistical Review of World Energy 2023.* London: BP plc. "Natural gas: Proved reserves by region"

The economic potential of hydropower in Africa: Lessons from the Grand Inga Dam

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The "Grand Inga" project is undoubtedly Africa's greatest untapped economic engine. It constitutes the single largest opportunity to end energy poverty on our continent and power a new era of inclusive growth. The possibility of generating over 40,000 megawatts[1] of clean, reliable, and affordable hydropower through a single site on the Congo River, just about 150km from the Atlantic Ocean, has created a myth around the name since the 1950s. Yet this is not a dream; it is a resource that the Democratic Republic of the Congo (DRC) and the continent already possess.

The common idea that Inga is an elusive dream and nothing has happened since the 50's cannot be further from reality. "Grand Inga" is being implemented in phases, and the full potential will be met when all eight power stations (Inga 1-8) are constructed. It often escapes public attention that the government of the DRC (then-Zaire) built and commissioned Inga 1 (351MGW) in 1972 and Inga 2 (1424MGW) in 1982.[2] It is the energy from these dams that today supplies most of the electricity to people and firms in the DRC.[3] Hydroelectricity from Inga 2 also drives economic growth: Despite the war in North and South Kivu,[4] the country has one of the fastest-growing economies in the world, with an average GDP growth of around 6% for the last 5 years.[5] Additionally, without Inga 1 and 2, the DRC would not be the world's top exporter of cobalt, and among the world's leading producers of other critical minerals.[6]

1 "The Grand Inga Hydropower Project," *African Union Development Agency (AUDA-NEPAD)*, n.d.

2 "Factsheet on World Bank Support for the Democratic Republic of Congo's Inga Project," *World Bank Group*, June 3, 2025.

3 "Congo Democratic Republic," Africa Energy Portal.

4 DRC land mass is equivalent to the entire western Europe. The country has 26 provinces and the distance between Goma in the east and Kinshasa is around 2000KM.

5 World Bank, "GDP Growth (Annual %) - Congo, Dem. Rep.," 2024.

6 "Democratic Republic of Congo," *The Observatory of Economic Complexity*, 2023.

A new approach to Inga

The next obvious step in the Inga 8-act play is Inga 3. While there have been several failed attempts to build Inga 3 since 1982,[7] the stars are aligning for it to happen now. First, the global energy transition is boosting demand for critical minerals. Cust and Zeufack suggest that, by 2050, the transition from fossil fuels to clean energy may create demand for 3 billion tons of minerals and metals that are needed to deploy solar, wind, and geothermal energy.[8] Second, the imperative of job creation in developing countries has led to increased calls and legislation requiring value-addition to minerals in Africa before export.[9] The resulting combination of booming production and downstream transformation will generate a massive increase in the demand for clean energy. Achieving success in Inga 3 and the subsequent phases is therefore an absolute necessity for the DRC and Africa's industrialization and job creation; for the viability of the Lobito Corridor, whose cargo will depend on access to base-load electricity; and for the global energy transition. Moreover, electricity from Inga 3 has potential to reduce the demand for charcoal, thereby releasing significant pressure on the Congo Basin's forests.[10]

Change in political leadership in the DRC in 2018 also brought on a paradigm shift regarding Inga. The long-held view of Inga as a hydro-project for export, or as a natural resource to be sold to potential developers, has evolved into a narrative of Inga as a platform for economic transformation and job creation.[11] Inga is no longer seen merely as a dam or an infrastructure project, but as a development program on a spatial corridor that spans from the port of Banana on the Atlantic Ocean to Kolwezi through Kinshasa. This new view presents significant opportunities for private investment in roads, rail, cement, urbanization, manufacturing, mining, and data centers, which will create demand for electricity and contribute to economic diversification and job creation. Most importantly, by providing population beneficiation through skills provision and tackling environmental and social safeguards up front, Inga will prepare the DRC's youth for jobs in construction, hydroelectricity, manufacturing, and local development programs. The Inga 3 Development Program is preparing the country for Inga 3—while preparing the Inga project for the country.[12]

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In parallel, sectoral reforms (under implementation as part of the energy sector compact to realize Mission 300[13]) and budget support programs aim to improve the financial viability and corporate governance of Société Nationale d'Electricité, the

7 Peter Fabricius, "Inga Dream Again Deferred," *ISS Today*, August 10, 2016.

8 James Cust & Albert G. Zeufack, 2023. "Africa's Resource Future: Harnessing Natural Resources for Economic Transformation during the Low-Carbon Transition" Africa Development Forum-Books, The World Bank Group, number 39599.

9 Thomas Reilly, "African Raw Material Export Bans: Protectionism or Self-Determination?," *Covington*, May 21, 2024.

10 "Factsheet on World Bank Support for the Democratic Republic of Congo's Inga Project," *World Bank Group*, June 3, 2025.

11 International Trade Administration, *Congo, the Democratic Republic of the Country Commercial Guide,* Country Commercial Guides (U.S. Department of Commerce, n.d.).

12 "New Inga 3 Development Program to Start with Investments in Local Congolese Communities," *World Bank Group*, June 3, 2025.

13 Mission 300 refers to the World Bank and African Development Bank's ambitious program to deliver electricity to 300 million people in Africa by 2030.

national utility company. It is this new vision that the World Bank embraced when its board approved a $1 billion in financing for Inga 3 in June.[14]

The novel approach to Inga, which I have had the honor and privilege to lead in the past three years from the World Bank side, is innovative and powerful. The World Bank's own experience in Dasu, Pakistan, and Naem Tung, Lao PDR shows that with proper integration of infrastructure, urbanization, and human capital investments, large-scale hydropower projects can power industries, create jobs, and drive inclusive growth by boosting the incomes of the population. Without a people-first approach, research suggests that large dams are only marginally cost-effective and can impose significant distributional costs—benefiting downstream regions while harming upstream communities.[15]

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A people-first approach to Inga's future

Starting in 2026, the population of the province of Kongo Central will begin feeling the benefits of the Inga development program even before construction work on the dam itself commences. The local development program will build schools, train teachers, and create the Inga Academy, while leveraging vocational centers for construction and maintenance jobs, equipping every young person within 50 kilometers of the Inga site with a skill needed for construction, operation, and maintenance of this large-scale infrastructure by 2030. We have held multiple town halls with customary chiefs, women's groups, and youth councils in the Inga area: What they want is development, not handouts. They want jobs and the basic amenities we all enjoy and take for granted: electricity, water, education, and healthcare.

Inga 3 is no longer a pipe dream: I expect it to be completed in the next 10 years and deliver between 2,000 and 11,000 megawatts for an approximate cost between $10 and 30 billion. The government of the DRC has drafted an Inga Law that sets the conditions for a Public-Private Partnership and creates the right environment for private capital mobilization.[16] Work will continue on environmental and social safeguard studies, finalizing dam safety designs, and securing demand and power purchase agreements. In parallel, the World Bank is investing in a robust regional transmission backbone—high-voltage lines that will connect the southern, eastern, and central African power pools.

Over the next decade, I envision millions of jobs being created in the DRC along the Inga growth corridor. I see data centers powered by Inga's flow, cooled by the same river, connected by fiber—meeting global AI demand with African ingenuity. I imagine electricity from Inga 3 and subsequent phases of its development powering the boom in production, processing, and local transformation of critical minerals into higher-value products. I envision clean and affordable electricity from Inga replacing charcoal as a cooking fuel in Kinshasa, thereby saving millions of hectares of the

Over the next decade, I envision millions of jobs being created in the DRC along the Inga growth corridor.

14 "New Inga 3 Development Program to Start with Investments in Local Congolese Communities."

15 World Bank. 2025. *Enhancing the Safety and Resilience of Dams in the Context of Climate Change and Extreme Hydrological Events: Technical Note*. Safety of Dams and Downstream Communities Series.

16 Michael J. Kavanaugh and Matthew Hill, "Congo Says World's Biggest Hydro Site Can Power AI Data Centers," *Financial Post*, October 16, 2025.

Congo-Basin Forest that are cleared every year for firewood. I see Inga powering a new wave of African exports, including through the Lobito Corridor, which complements Inga by providing a modern logistical backbone for exports, linking energy and transport infrastructure into a unified platform for diversification and regional industrialization. This is how we convert natural capital into human capital and anchor prosperity within our borders.

Africa's untapped hydropower potential exceeds 1,100 gigawatts. We currently use just 11%. This gap is not a statistic; it is a moral failure. I have studied resource-rich nations across the globe; those that succeed do not squander either the resources or the rents they generate—they invest. Grand Inga is our life's work because it is Africa's destiny. We do not need permission to harness it. We need ambition, courage, and the determination to invest in it transparently. In 2026, let us start investing in Inga, building not just a dam, but a future for Africa.

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