

# FROM GREENFIELD PROJECTS TO GREEN SUPPLY CHAINS:

Critical minerals in Africa as an investment challenge

by **Aubrey Hruby**





## AFRICA CENTER

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## PREFACE

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**T**here is an African paradox: While the continent has all the resources (30 percent of the world's critical minerals) necessary to be a powerful response to the global energy crisis and a support for the green transition, its potential is still unrealized. The international community continues to fall short in its financial commitments to climate finance. Countries that are home to immense resources essential for electric vehicles, lithium batteries, cellphones, medical scanners, and military hardware, are facing forgotten wars fueled by resources that are under their feet without any serious international pacification efforts. Instead of investing time, diplomatic energy and money, some major powers—so talkative in the UN climate conferences about the urgency of global warming—do not miss an opportunity to extract these resources (and the jobs that go with them), without worrying about local development, the acquisition of skills or the creation of jobs for local populations.

Responsible investment in critical minerals would not only constitute a major contribution to African development but also a sustainable solution to the challenges of the energy transition for the whole world.

Now a new African generation is emerging and advocating for its national and pan-African sovereignty, the exploitation of African resources is already at the heart of electoral campaigns and political transitions, whether democratic or authoritarian. In this context, it is not certain that the predatory strategies that have prevailed since the colonial period will win in the long term.

Under the pressure of African opinions, there is no doubt that Africa's partners will have to make changes, moving to a more inclusive business and development model if they want to participate in this highly competitive market. Also, the dramatic disruptions in supply and demand for goods caused by the COVID-19 crisis and the war in Ukraine, which drive this new rush to Africa, cannot be a sufficient reason to ignore

African specific needs: Africans, too, should be able to enjoy the latest mobile phones, drive noiseless and environmentally friendly cars, and have medical scanners when they are sick. All these materials are built from strategic minerals provided by them, but they don't have any access to these products reserved for citizens of developed nations.

On their end, Africans are expected to put in place a transparent and effective regulatory frameworks, train engineers capable of negotiating mining contracts, define a road map for meeting their development needs, and craft a strategy for industrial transformation with the support of regional organizations and the African free trade area—which was launched in 2021 and can play a crucial role in the creation of local markets of sufficient size. For their partners, the issue of investment projects, which is the subject of the report by Aubrey Hruby, senior fellow at the Africa Center, is key. However, investments are largely insufficient or when investment projects exist, very few are completed, while global demand has never been so high and emerging green industries are essential to the fight against global warming. This excellent report, the first of an Africa Center special series in partnership with Aiteo Group, analyzes the reasons for chronic underinvestment and the operational responses to be provided by bona fide investors. Because the critical minerals can be found in challenging security environments, it is obvious that none of these policy recommendations can be implemented if peace is not restored in these countries. That is why the peace process should be at the forefront of diplomatic efforts and the energy policies in Africa. While this report addresses the investment angle of the critical minerals industry in Africa, no one can ignore the greater security, social and economic development context. These complex issues will be addressed in future work by the Africa Center.

**Amb. Rama Yade, Senior Director, Africa Center**

# INTRODUCTION

Africa is central to the global energy transition. The necessary resources for a low-carbon economy are abundant in Africa, with the continent possessing 30 percent of the world’s known mineral reserves—many of which are critical for the manufacturing of batteries, solar panels, wind turbines, and other clean energy technologies. Africa’s untapped potential is greater yet, with research suggesting that the continent holds 85 percent of manganese reserves, 80 percent of platinum and chromium reserves, 47 percent of cobalt reserves, and 21 percent of graphite reserves, much of which is unexplored or underexplored.<sup>1</sup> Demand for these resources is also on the rise, expected to more than double between now and 2030—as was recognized globally at the 2023 United Nations COP28 climate talks, which concluded with an unprecedented agreement that countries the world over should “transition away” from fossil fuels.

While Africa is rich in minerals and strategically located, it risks losing out on this historic investment opportunity. The infrastructure investment problems that have hindered non-Chinese capital flows into African markets for decades are front and center as investors and governments assess the strategic role the continent could and should play in the global shift to cleaner energy sources. While infrastructure investment has shown growth in recent decades, a significant financing gap persists, estimated to be around \$100 billion each and every year.<sup>2</sup> Furthermore, the continent struggles to advance greenfield projects to financial close, with roughly 80 percent of infrastructure initiatives faltering during feasibility and business planning due to political, regulatory, financial, and operational risks that cause investors to favor projects in non-African markets. The heavily greenfield nature of African opportunities presents an additional layer of complexity, hindering Africa’s broader structural transformation and integration in global supply chains.

According to the International Energy Agency, between \$180 billion and \$220 billion is expected to be invested in the mining of critical minerals between 2022 and 2030, with Africa attracting about 10 percent of this pie, or \$18 billion to \$22 billion in new investment. That anticipated 10 percent is not even on par with the known level of African reserves. For the continent to capture a transformative share of this historic wave of investment in mining, new policymaking processes and partnership and platform approaches are needed. African nations are in a race against technological innovation and self-sufficiency efforts in North America, China, and Europe. In 2023, global

investment in the low-carbon energy transition increased 17 percent, reaching approximately \$1.77 trillion.<sup>3</sup> Investments are increasingly being directed toward battery innovations aiming to reduce the quantity of minerals required and to make recycling more efficient. Lithium-ion batteries, the current standard, rely heavily on hard-to-source metals, many of which are in abundance across Africa. Emerging alternatives, such as lithium iron phosphate (LFP) and sodium-ion batteries are less reliant, while there also is a notable influx of capital into the rapidly expanding battery-recycling sector, aiming to embed circularity within the supply chain and reduce reliance on new mineral extraction.

The interwoven nature of mining and colonialism in Africa— with its extractive, exploitative, and environmentally damaging legacy—creates a deeply emotional context in which conversations about the future of the industry on the continent take place. But while mining was a part of an ugly past, it is a necessary part of a green future. The rapid expansion of electric vehicles (EVs), mobile telephony, and renewable energy has reminded the world of the interconnections between energy, communications, and mining systems. According to the World Bank, graphite, lithium, and cobalt production alone must escalate to 3.1 billion tons by 2050, up by more than 450 percent from 2019 levels, to curb global heating below 2°C by mid-century and satisfy the rising demand for energy and energy storage technologies.<sup>4</sup> If dramatic changes are not made within the next five-year period by governments, investors, and development partners, African nations risk missing an opportunity to leverage historic levels of demand for critical minerals to fuel industrial growth, foreign-exchange generation, skills acquisition, and job creation.

With this urgency in mind, this report provides a snapshot of Africa’s mineral wealth and the state of mining industries, draws out the similarities between the mining and infrastructure investment attraction challenges, describes the competitive landscape African nations find themselves in, and makes innovative recommendations—namely to the US government—to rapidly accelerate investment in sustainable mining industries in African markets.

1 Gracelin Baskaran, “Prospects for U.S. Minerals Engagement with Africa,” Center for Strategic & International Studies, August 29, 2023, [www.csis.org/analysis/prospects-us-minerals-engagement-africa#:~:text=According%20to%20internal%20calculations%2C%20the](https://www.csis.org/analysis/prospects-us-minerals-engagement-africa#:~:text=According%20to%20internal%20calculations%2C%20the).

2 African Development Bank, “Public-Private Partnerships Needed to Bridge Africa’s Infrastructure Development Gap,” November 17, 2023, <https://www.afdb.org/en/news-and-events/public-private-partnerships-needed-bridge-africas-infrastructure-development-gap-65936#:~:text=He%20noted%20that%20the%20African,been%20primary%20investors%20in%20infrastructure>.

3 “Energy Transition Investment Trends 2021,” BloombergNEF, 2024, <https://about.bnef.com/energy-transition-investment/>.

4 David Thomas, “Mission Critical: How Africa Can Profit from Its Mineral Boom,” *African Business*, January 25, 2023, <https://african.business/2023/01/resources/mission-critical-how-africa-can-profit-from-its-mineral-boom>.

# SECTION 1: SNAPSHOT OF AFRICA'S MINING POTENTIAL AND THE INVESTMENT THAT IS NEEDED

**M**ining has long been an integral part of Africa's social and economic history, and a critical provider of investment, employment, government revenue, and infrastructure on the continent. Revenues from copper and other battery metals extracted in Africa exceeded \$20 billion in 2020, representing about 13 percent of the global market.<sup>5</sup> In

the fifteen most mining-dependent African economies, mining accounts for 8 percent of government revenue.<sup>6</sup> In countries such as the Democratic Republic of the Congo (DRC), however, mining comprises a staggering 95 percent of exports, 47 percent of gross domestic product (GDP), 43 percent of the national budget, and nearly 25 percent of jobs. Similarly,

5 International Energy Agency (IEA), "Africa Energy Outlook 2022," 2022, <https://iea.blob.core.windows.net/assets/220b2862-33a6-47bd-81e9-00e586f4d384/AfricaEnergyOutlook2022.pdf#page=149>.

6 Natural Resource Governance Institute, "Triple Win: How Mining Can Benefit Africa's Citizens, Their Environment and the Energy Transition," 2023, [https://resourcegovernance.org/sites/default/files/documents/triple-win\\_how-mining-can-benefit-africas-citizens-their-environment-the-energy-transition.pdf#page=24](https://resourcegovernance.org/sites/default/files/documents/triple-win_how-mining-can-benefit-africas-citizens-their-environment-the-energy-transition.pdf#page=24).

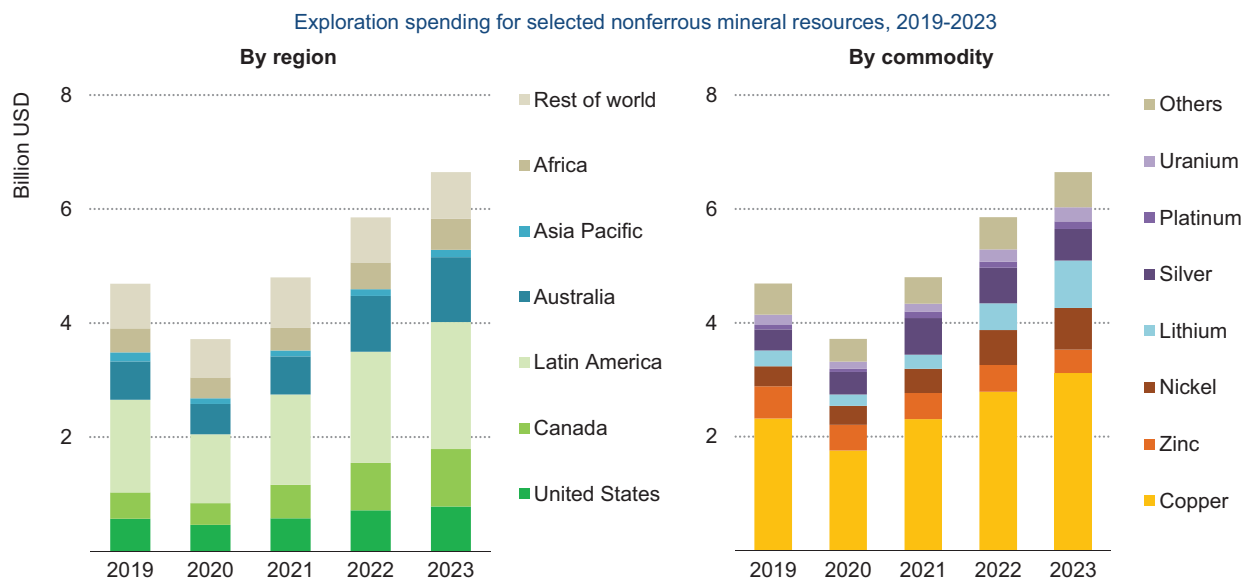
**Figure 1: Africa's share of global reserves of select minerals**

Mineral	Use	Africa's Share of Global Reserves	Countries with significant reserves
Platinum Group	Catalysts; emissions control	92	South Africa, Zimbabwe
Cobalt	Battery technology; superalloys	56	Democratic Republic of the Congo, Zambia, South Africa, Madagascar
Manganese	Battery technology	48	South Africa, Gabon, DRC, Ghana,
Yttrium	High-temperature superconductors	42	South Africa
Chromium	Battery technology, green energy	36	South Africa, Zimbabwe
Bauxite	Aluminum production; energy-efficient windows	22	Guinea, Ghana
Graphite	Battery anodes	22	Mozambique, Madagascar, Tanzania
Tin	Battery technology	20	Democratic Republic of the Congo, Rwanda
Vanadium	Flow batteries, steel production	15	South Africa
Antimony	Battery technology; flame retardants	8	South Africa, Zimbabwe
Zinc	Battery technology	7	South Africa, Namibia
Copper	Energy transmission	6	Democratic Republic of the Congo, Zambia
Lithium	Battery technology	<5	Zimbabwe, Namibia. Democratic Republic of the Congo

Sources: Lithium resources, and their potential to support battery supply chains, in Africa, British Geological Society, Kathryn Goodenough, Eimear Deady and Richard Shaw [https://nora.nerc.ac.uk/id/eprint/530698/1/Lithium\\_in\\_Africa\\_Report.pdf](https://nora.nerc.ac.uk/id/eprint/530698/1/Lithium_in_Africa_Report.pdf)  
[https://unctad.org/system/files/non-official-document/edar2023\\_BP1\\_en.pdf](https://unctad.org/system/files/non-official-document/edar2023_BP1_en.pdf)  
<https://www.sciencedirect.com/science/article/pii/S0169136823001385>

**Figure 2: Africa lags in global exploration spending**

**Exploration spending increased by 15% in 2023, driven by Canada and Australia; despite headwinds from falling prices, lithium exploration spending continued to surge by nearly 80%**



IEA. CC BY 4.0.

Notes: Excludes budgets for iron ore, coal, aluminium, gold and diamonds. Others comprise rare earth elements, potash/phosphate and many other minor metals.  
Sources: IEA analysis based on S&P Global.

in Namibia and Zambia, mining accounts for 11 percent and 17 percent of GDP and almost 50 percent and 70 percent of foreign exchange earnings, respectively. The sector’s importance echoes through policymaking, spurring governments to craft industrial strategies built on the mining sector to drive progression up global value chains while fostering sustainable broader-based local economic development.

The ongoing global rush for critical minerals presents a marked window of opportunity for African nations to attract investment and foster sustainable growth, with almost all countries on the continent positioned to benefit to some extent. From north to south, they include: Morocco, with an impressive 70 percent of the world’s phosphate reserves; the DRC, over 50 percent of global cobalt stores; Gabon, up to 15 percent of the world’s manganese; and South Africa, 91 percent of the world’s platinum, among other significant mineral reserves.<sup>7</sup> Moreover, the broader southern African region harbors vast untapped lithium deposits, crucial for lithium-ion batteries powering electric vehicles and grid-scale storage. Africa’s rich mineral wealth positions it as a pivotal player in the global market, poised to drive both economic prosperity

and sustainable development across the continent—and be a driving force in the global energy transition.

In the face of burgeoning global demand, particularly for graphite, lithium, and cobalt, a seismic increase in production is needed to meet clean energy targets by 2050. Global investment in the mining and processing of critical minerals must triple by 2050 to \$331.5 billion annually to sustain the net-zero pathway.<sup>8</sup> Despite its formidable mineral wealth, however, the continent’s riches remain largely untapped and, in many instances, unknown. Exploration has been underinvested in for decades, with most countries relying on decades-old maps. Currently, Africa accounts for only 10 percent of the global exploration budget, a figure starkly at odds with its potential.<sup>9</sup> (Latin America, by contrast, has long attracted the largest share of the global exploration budget at about 25 percent, while Australia and Canada each account for about 16 percent.)<sup>10</sup> While this figure has been on the rise in recent years, it is actually down from 2012, when the continent accounted for about 18 percent of global exploration spending. This discrepancy between known potential and exploration highlights that critical mineral investment opportunities across the continent

7 Thomas, “Mission Critical.”

8 “Mining in Africa and Its Role in the Global Energy Transition,” Allen Overy LLP, February 6, 2024, <https://www.allenoverly.com/en-gb/global/news-and-insights/publications/mining-in-africa-and-its-role-in-the-global-energy-transition>.

9 Sean DeCoff, “CES 2023—Monetary Tightening Weighs Down Exploration Activity,” S&P Global, November 8, 2023, <https://www.spglobal.com/marketintelligence/en/news-insights/research/ces-2023-monetary-tightening-weighs-down-exploration-activity>.

10 “Interactive Snapshot: Global Mining Exploration Trends 2020,” S&P Global, n.d., [www.austmine.com.au](http://www.austmine.com.au), [https://austmine.com.au/common/Uploaded%20files/International/Export%20Hubs/Victoria%20METS%20Export%20Hub/2020%20global%20exploration%20trends%20PDF%20\(002\).pdf](https://austmine.com.au/common/Uploaded%20files/International/Export%20Hubs/Victoria%20METS%20Export%20Hub/2020%20global%20exploration%20trends%20PDF%20(002).pdf).



are largely greenfield, especially for countries with extensive deposits but relatively low mineral exports.

## The quest for value addition in African markets: An alternative to Chinese dominance in processing

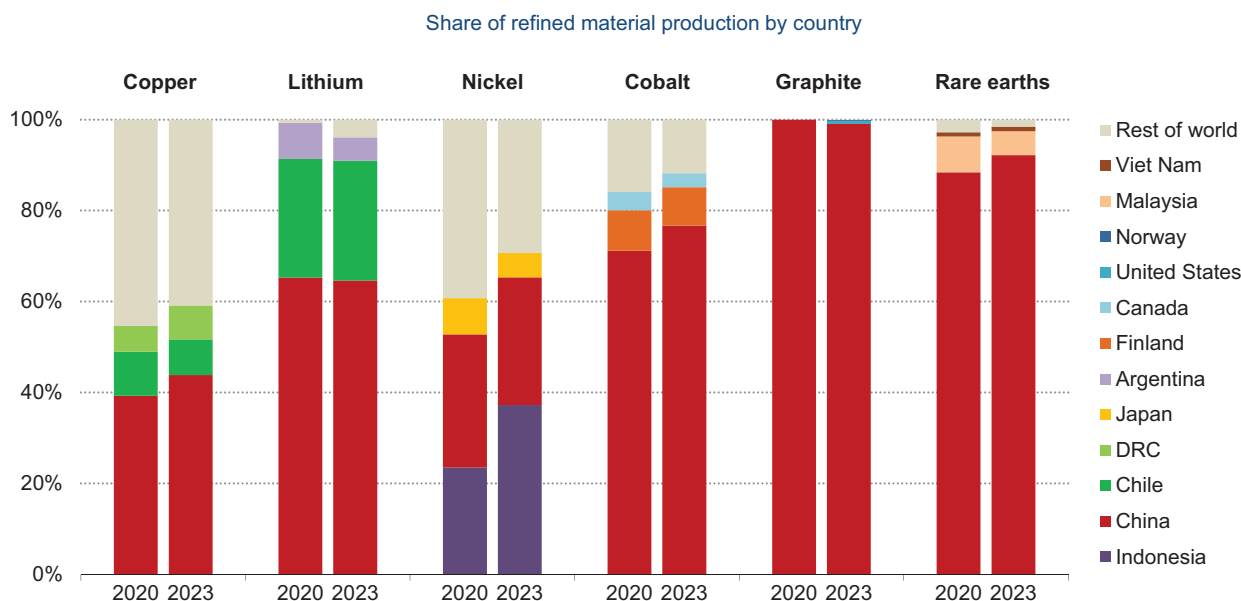
The urgent challenge facing African countries lies not just in its abundant reserves and historical industries but in harnessing and capitalizing on them effectively to deepen economic development. Currently, many African countries operate primarily in the upstream segment, focusing on the extraction and exportation of raw materials with minimal value addition. The following chart shows the geographical concentration for refined products.

Exporting the raw ore limits the continent’s ability to maximize benefits and leverage its bargaining power in the global market. While Chinese mining companies only represent 8 percent of Africa’s upstream mining production, the country overwhelmingly leads in the refining market, boasting an 85 percent share of global processing capacity,<sup>11</sup> exerting control of up to 90 percent of the “midstream” of supply chains, and contributing to 60 percent of critical minerals production.<sup>12</sup>

China is the leading producer for twenty-nine of the fifty minerals on the 2022 US Geological Survey critical minerals list. This dominance was built on a potent mix of government support, strategic investing, and a risk-taking mindset. A decade or more of subsidies running into the hundreds of billions for research and development (R&D), processing infrastructure, export quotas, and direct investments by Chinese companies in African mining to secure long-term supply allowed Chinese companies to scale up rapidly and undercut competitors on price. In contrast to China, the DRC only refines about 7 percent of the copper it produces domestically, while Zambia refines a mere 1.3 percent of its mineral output. However, 90 percent of the DRC’s mining production is exported to China for refining and processing. More than 80 percent of the DRC’s cobalt exports in 2019 were directed to China, highlighting the extent of China’s influence over the existing industry in key African markets.<sup>13</sup>

This dependence on China is a strategic vulnerability in global supply chains and a reality that African and Western governments seek to change. In response to China’s comprehensive approach—combining government sectoral prioritization and support with resource security investment strategies—nearshoring and friendshoring have emerged as bipartisan strategic priorities in the United States and Europe with hundreds

**Figure 3: China dominates processing globally**



IEA. CC BY 4.0.

Note: Graphite is based on spherical graphite for battery grade. Rare earths are magnet rare earths only.

11 China commands two-thirds of the world’s aluminum refining and smelting capacity, 80 percent of global lithium refining capacity, two-thirds of global cobalt refining capacity, and over 80 percent of global graphite production and mining.

12 “China’s Critical Mineral Supply Chains in Africa,” Asia Center, United States Institute of Peace, June 29, 2023, <https://www.usip.org/events/chinas-critical-mineral-supply-chains-africa>.

13 Patrick Ilunga, “DR Congo to Audit and Review ‘Unfair’ Chinese Mining Contracts,” *EastAfrican*, April 11, 2023, [https://www.theeastafrican.co.ke/tea/business/drc-moves-to-terminate-skewed-china-contracts-4194276#google\\_vignette](https://www.theeastafrican.co.ke/tea/business/drc-moves-to-terminate-skewed-china-contracts-4194276#google_vignette).

of billions of dollars being put to the effort in both jurisdictions. Landmark initiatives such as the US Inflation Reduction Act (IRA) and the CHIPS and Science Act, and both the EU's Net-Zero Industry Act and its batteries regulation of 2023, seek to make progress toward net zero and shift the competitive landscape away from China. Concurrently, China is doubling down on EV battery manufacturing, wind turbine production, and solar panel manufacturing—with an estimated \$890 billion invested in domestic clean-energy sectors in 2023, up 37 percent from 2022.<sup>14</sup>

**“China’s rise in power is aided by its monopolization of raw materials and we’re putting our national security and economic vitality at risk by relying on countries like China for critical minerals,” said Senator Mitt Romney in June 2023 upon introduction of the Critical Mineral Independence Act of 2023. “The U.S. and our allies must rapidly and strategically invest in the mining and processing of critical minerals that are needed to meet current security challenges.”**

*Source:* Office of Senator Mitt Romney, “Romney, Sullivan, Peters Introduce Bill to Promote U.S. Critical Mineral Independence from China,” June 20, 2023, <https://www.romney.senate.gov/romney-sullivan-peters-introduce-bill-to-promote-u-s-critical-mineral-independence-from-china/>. Note: The bill was referred to the Committee on Armed Services and has not been passed.

These far-reaching government initiatives will, in the near term, buoy demand for African primary minerals to feed new processing facilities in the United States. For example, the Department of Energy (DOE) gave a \$102 million loan to Syrah Technologies for its new Syrah Vidalia processing facility in Louisiana, which is the only large-scale producer of natural graphite active anode material (needed for lithium-ion batteries) outside of China.<sup>15</sup> As the United States is 100 percent dependent on imported graphite, the new facility sources graphite from Syrah’s Balama Operation in Mozambique,

which received a \$150 million loan from the US International Development Finance Corporation (DFC),<sup>16</sup> and is expected to produce enough material for nearly 2.5 million EVs by 2040, selling to Tesla, Ford, and others.<sup>17</sup> Moving up the value chain from input minerals that supply processing located in the United States, China, or Europe will be far more difficult for African countries and require billions in investment. While the global shift to clean energy technologies has triggered investment in Africa’s mining sector to rise in recent years, mainly by Chinese firms, the continent’s share of global mineral investment has decreased, nearly halving from 15 percent in 2014 to 8 percent in 2023.

At the most basic level, attracting value-added investment in processing and battery production requires affordable and reliable power and minimal infrastructure. The power constraints are enormous given the continent is home to 600 million people who already lack access to reliable electricity and companies regularly use diesel generators for industrial power at prices up to \$0.47 per kWh. African countries that are rich in minerals, such as the DRC and Zambia, also face logistical nightmares as products have to be trucked thousands of miles to port. Cobalt from the eastern part of the DRC travels two

**Figure 4: Mining production by African nation**

Rank	Country	Total Mineral Production in Million USD (excl. Mineral Fuels & Diamonds)
1	South Africa	144,390
2	Congo, D.R.	32,287
3	Gabon	14,410
4	Zimbabwe	12,369
5	Ghana	9,865
6	Guinea	8,950
7	Zambia	7,665
8	Cote D’Ivoire	4,689
9	Mali	4,182
10	Morocco	3,883

*Source:* <https://www.world-mining-data.info/wmd/downloads/PDF/WMD%202024.pdf>

<sup>14</sup> Lauri Myllyvirta, “Analysis: Clean Energy Was Top Driver of China’s Economic Growth in 2023,” *Carbon Brief*, January 25, 2024, <https://www.carbonbrief.org/analysis-clean-energy-was-top-driver-of-chinas-economic-growth-in-2023/>.

<sup>15</sup> US Department of Energy, “DOE Announces First Advanced Technology Vehicles Manufacturing Loan in More than a Decade,” DOE website, n.d., <https://www.energy.gov/articles/doe-announces-first-advanced-technology-vehicles-manufacturing-loan-more-decade>.

<sup>16</sup> Sybil Pan, “Syrah Gets Nod on \$150-mln US Govt Loan for Anode Grade Graphite Production,” *Fastmarkets*, September 12, 2023, <https://www.fastmarkets.com/insights/syrah-gets-nod-on-150-mln-us-govt-loan-anode-grade-graphite-production/>.

<sup>17</sup> “Australia’s Syrah Expands US Plant to Boost EV Production,” *Asia Financial News Group*, October 20, 2022, <https://www.asiafinancial.com/australias-syrah-expands-us-plant-to-boost-ev-production>.

weeks over 1,200 kilometers of road<sup>18</sup> to reach the Tanzanian port of Dar es Salaam.<sup>19</sup> African countries bear the highest average logistics costs globally, with logistics expenses constituting approximately 35 percent of the final cost of goods in parts of the continent—much higher than the global average of around 13 percent. Going beyond limited processing to create integrated Africa-wide value chains is hugely complex. No single African country has all the minerals required to produce batteries, meaning that logistics costs would increase as mineral supplies are moved regionally to achieve the minimum scale and reliability. These high costs could be justified if there were a large market for EV batteries in the region. Affordability issues and a dearth of grid-scale charging infrastructure are expected to limit the growth of local EV demand for at least five to ten years. Thus, African countries are more likely to be producers of battery precursor products for export within the nickel manganese cobalt (NMC) battery value chain in the medium term.

There is more near-term viability for the manufacture of LFP batteries used in two- and three-wheel vehicles and stationary power storage, requiring investment in cell manufacturing plants. Load shedding in South Africa has created an explosion of demand for battery storage and construction is currently in progress for a Solar MD facility; the South African company's facility will be Africa's first dedicated gigawatt battery storage manufacturing plant.<sup>20</sup> Additional investment could be facilitated by support for domestic two- and three-wheeled EV manufacturers, infrastructure investments, more lithium discoveries, and regional coordination of lithium refining. Moving up the value chain holds immense promise for African economies, promising to catalyze job creation, bolster tax revenues, and substantially augment export income. But it is a race against time, unrealistic expectations, misperceived risks, and stark challenges of lacking infrastructure.

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18 Alexandre Larouche-Maltais, "Why Is the Transit of Goods So Expensive in Central Africa?," United Nations Conference on Trade and Development (UNCTAD), June 7, 2022, <https://unctad.org/news/why-transit-goods-so-expensive-central-africa>.

19 Annie Kahozi and Lucien Thomas, "Highway Nightmare: DR Congo's Export Route for High-Value Metals," Agence France-Presse via *Barron's*, March 9, 2022, <https://www.barrons.com/news/highway-nightmare-dr-congo-s-export-route-for-high-value-metals-01646807108>.

20 Remeredzai Joseph Kuhudzai, "Construction Has Started at Africa's First Dedicated Gigawatt-Hour Battery Factory in Cape Town," *CleanTechnica*, August 23, 2023, <https://cleantechnica.com/2023/08/23/construction-has-started-at-africas-first-dedicated-gigawatt-hour-battery-factory-in-cape-town/>.

## Morocco successfully attracts investment in battery production

Given its strategic geographic position in terms of trade, Morocco has long had an export-oriented automotive industry, surpassing South Africa in 2018 as Africa's largest automobile manufacturer. Valued at \$3.91 billion in 2021, the sector is projected to expand significantly to approximately \$5.5 billion by 2027. The foreign direct investment in transport equipment manufacturing has contributed to the creation of over 100,000 jobs. With an existing annual production capacity of around 700,000 vehicles, the Moroccan government is working to hit one million a year by 2030 and has orders from prominent car manufacturers from both the European Union and the United States. The surge in global demand for passenger vehicles has spurred notable players such as Dacia, Renault, and Peugeot, alongside newcomers like the Chinese manufacturer BYD and the German giant Volkswagen, to establish robust production plants in the country.

Building on its success in auto parts and vehicles, Morocco has been positioning itself as a key global player in the EV battery production industry, leveraging its free trade agreements (FTAs) with the United States and the European Union while trying to balance Chinese interest in the sector. In 2023, the government and China's Gotion initiated discussions to establish an EV battery plant in the country, with potential investment reaching \$6.3 billion. Negotiations are also underway with five additional manufacturers for similar ventures, indicating Morocco's commitment to advancing its EV infrastructure.

Earlier this year, the government granted approval for Chinese electric battery giant BTR New Material Group to construct a factory near Tangier, focusing on producing essential cathode components. Additionally, CNGR Advanced Material is slated to establish a cathode plant with about \$2 billion in investment in Jorf Lasfar, just south of Casablanca, where the government has allocated nearly 300 hectares to electric battery industries. Production is slated to commence in 2025.

Sources: Antonio Andreoni and Elvis Avenyo, "August 2023 Critical Minerals and Routes to Diversification in Africa: Linkages, Pulling Dynamics and Opportunities in Medium-High Tech Supply Chains," United Nations Conference on Trade and Development (UNCTAD), 2023, [https://unctad.org/system/files/non-official-document/edar2023\\_BP1\\_en.pdf](https://unctad.org/system/files/non-official-document/edar2023_BP1_en.pdf); "Morocco Automotive Industry Market Size," Mordor Intelligence, 2024, <https://www.mordorintelligence.com/industry-reports/morocco-automotive-industry-outlook/market-size>; and Ahmed Eljehtimi, "Morocco Expects More EV Battery Investments, Minister Says," Reuters, April 4, 2024, <https://www.reuters.com/business/autos-transportation/morocco-expects-more-ev-battery-investments-minister-says-2024-04-04/>.

## SECTION 2: THE MINING INVESTMENT CHALLENGE REFLECTS THE INFRASTRUCTURE INVESTMENT CHALLENGE

Africa, as a region, clearly has vast potential to build value-added mining industries, but as is often said, one cannot eat potential. Delivering tangible economic progress to young Africans will require billions of dollars of investment. Despite the imperative of the energy transition and the growing geoeconomic competition between the United States and China, the high-risk, capital- and time-intensive nature of critical minerals extraction and processing has hindered investment. It typically takes fifteen to twenty years for new mines to be developed and commence production, thus timing weighs heavily on the minds of investors.<sup>21</sup> Long and often delayed project timelines, commodity price fluctuations, uncertainty around elections and regulations, rising environmental, social, and governance (ESG) concerns, and a myriad of other challenges now intersect with the lacking infrastructure, leading to a cautious approach. Commodity price volatility and geopolitical factors further complicate investment decisions, as evidenced by the fluctuating demand for lithium driven by the EV industry. The “timing problem” also exists in the United States as permitting and regulatory approvals within a federal system can take between five and ten years to complete.

Western countries have resurrected industrial policy in a big way, ramping up financing and guarantees for mining projects. Concerned about long-term competitiveness and the geopolitical consequences of reliance on China, the United States, EU, and their allies aim to increase recycled content in the production of clean energy technologies; boost exploration of domestic mineral reserves; and expand local refining, processing, and manufacturing capacity. Major US legislation—including the IRA (2022), Infrastructure Investment and Jobs Act (2021), and the CHIPS and Science Act (2022)—provide for nearly half a trillion dollars of funding for domestic production of clean energy technologies and related supply chain processes.<sup>22</sup> For example, the Infrastructure Investment and Jobs Act (IIJA) appropriated \$64 million annually, starting in 2022, to the US Geological Survey (USGS) for the Earth Mapping Resources Initiative (Earth MRI) to map

and assess potential critical mineral resources in the United States by 2031.<sup>23</sup> Meanwhile, the EU’s Net-Zero Industry Act and batteries regulation, Canada’s Critical Minerals Research, Development and Demonstration program,<sup>24</sup> and Australia’s Critical Minerals Strategy<sup>25</sup> offer a combination of strategic planning and stick-and-carrot mechanisms to encourage onshoring.

These deeply bipartisan programs anchored in legislation deploy tax credits, grants, loan guarantees, and competitive awards during the full critical minerals life cycle: from mining, processing, and recycling to developing alternative chemistries for batteries. Key US government agencies—most notably the US Department of Defense (DOD) and the DOE, but also the DFC, the US Trade and Development Agency (USTDA), the US Agency for International Development (USAID), and others—have billions of dollars of implementation authority, which they are actively using to support projects along critical minerals supply chains. DOD’s role is unique given the relevance of critical minerals to national security and its ability to operate with speed and scale. The chart below provides a snapshot of the operationalization of some of these funds into domestic projects. African governments can in no way match the level of resources being mobilized in Western capitals. On a continent in which nearly 600 million people still lack access to reliable electricity and debt burdens are rising, governments are simply unable to direct meaningful funding to develop mining supply chains.<sup>26</sup> They must rely on global investors and mining companies to develop, derisk, and bring projects to financial close, commence production, and manage operations.

As investment attraction is necessary to bridge the financing gap for value-added mining across African markets, a lot can be learned from the infrastructure dialogue that has been taking place over the past two decades. Despite the massive financing coming from China and the continued investment from African governments, the continent has a staggering demand for infrastructure investment, with the African Develop-

21 Paul Manalo, “Average Lead Time Almost 18 Years for Mines Started in 2020–23,” S&P Global, April 10, 2024, <https://www.spglobal.com/marketintelligence/en/news-insights/research/average-lead-time-almost-18-years-for-mines-started-in-2020-23#:~:text=This%20study%20includes%20gold%2C%20copper>.

22 Major US legislation—including the Inflation Reduction Act (IRA) of 2022, the Infrastructure Investment and Jobs Act (IIJA) of 2021, and the CHIPS and Science Act of 2022—provides nearly half a trillion dollars of funding for domestic production of clean energy technologies and related supply chain processes. The IRA allocates \$369 billion toward addressing climate change, as outlined in a Treasury Department fact sheet. The IIJA includes over \$62 billion for modernizing the grid and deploying clean energy, while the CHIPS Act earmarks \$52.7 billion for American semiconductor research, development, manufacturing, and workforce development.

23 Linda R. Rowan, “Critical Mineral Resources: The U.S. Geological Survey (USGS) Role in Research and Analysis,” Congressional Research Service, April 5, 2024, <https://crsreports.congress.gov/product/pdf/R/R48005#:~:text=The%20USGS%20research%20and%20analysis,minerals%20in%20its%20resource%20assessments>.

24 Natural Resources Canada statement, March 26, 2024, <https://www.canada.ca/en/natural-resources-canada/news/2024/03/government-of-canada-announces-funding-to-support-domestic-critical-minerals-value-chains-and-create-good-jobs-in-the-northwest-territories.html>.

25 *Critical Minerals Strategy: 2023-2030*, Commonwealth of Australia, updated July 7, 2023, <https://www.industry.gov.au/publications/critical-minerals-strategy-2023-2030>.

26 IEA, “Africa Energy Outlook 2022.”

ment Bank estimating an annual requirement of \$130 billion to \$170 billion. Despite numerous initiatives aimed at bridging this gap, the failure rate of projects is high: only 10 percent or so reach financial close.<sup>27</sup> While there are many reasons for this, five key insights can be gleaned from the infrastructure dialogue that can inform the strategies to attract the investment required to fully capitalize on its critical minerals opportunity in African markets:

- **Western governments cannot provide billions in financing and Western investors see Africa primarily through a lens of risk.** The United States and the EU are unable to finance infrastructure projects through government-to-government lending, as is typical for the Chinese; thus, large-scale investments from Western firms must be financed from their balance sheets and/or through the capital markets.<sup>28</sup> Yet due to embedded negative narratives about African markets and people, and heightened scrutiny of global brands by nongovernmental organizations, Western companies view African markets first through a lens of risk. Thoughts of political risk and corruption concerns permeate the assessment of opportunities. This is in sharp contrast with Chinese or Turkish companies that first see the opportunity in African economies created by demographic, digitalization, and diversification trends, and then consider the risks. When an investor focuses on the opportunity first, he or she is motivated to address the risks as they emerge. When the risks are paramount, the investor must be convinced of the opportunity and tends to give up when encountering challenges.
- **Innovative financial structures are needed to diversify risk and create platforms into which institutional capital can flow.** Infrastructure bonds, green bonds, geographically diversified infrastructure funds, and infrastructure investment trusts are mechanisms for facilitating the flow of Western capital into African markets. Innovation in structure is critical to create platforms that match the size and scale of institutional capital and the risk profile. Infrastructure bonds, for example, allow multiple investors to share the financing burden of large-scale projects. Geographically diversified infrastructure funds pool resources across emerging markets, mitigating the risk associated with Africa. Similarly, infrastructure investment trusts, listed on stock exchanges, offer a liquid way for institutional investors to participate in African infrastructure development. The emergence of these structures in jurisdictions familiar to pension funds, insurance companies, and other large-scale investors seeking both impact and returns al-

lows them to balance risk and reward, while contributing to the sustainable development of critical infrastructure in African countries.

- **Projects have long development cycles and development financing is needed.** The extended timelines of infrastructure development create a significant challenge: financing the initial stages of project development, which includes the feasibility studies, permitting, impact assessments, engineering designs, and stakeholder consultations necessary to derisk the project. In developed markets, there are robust markets for municipal bonds and subsidized government programs that support project development. In contrast, in African markets project developers have to rely on their own resources or raise funds within a network, with traditional lenders hesitant to provide capital upfront on projects characterized by extended development cycles that span years or even decades.

These long timelines are due to a variety of challenges, including regulatory hurdles, complex land acquisition processes, cross-border complexities, and the necessity for extensive feasibility studies to ensure project viability. In response, several African development financial institutions (DFIs), including Africa50 and the Africa Finance Corporation, have created facilities to support project developers. Africa50, for example, recently marked a significant milestone with the successful first close of its Infrastructure Acceleration Fund, raising \$222.5 million from a diverse array of institutional investors for African infrastructure projects. While great progress, the fund size is small compared to the financing gap that continues to define infrastructure development efforts.<sup>29</sup> Given that 10 percent of project value is spent on project development costs on average globally, it would take at least forty-five acceleration funds like Africa50 to begin to dig out of decades of underinvestment.

- **Regulatory uncertainty, inconsistent implementation and talent constraints continue to deter investors and limit African government technical policymaking and negotiating capacity.** Investor interest in Africa is dampened by regulatory ambiguity, inconsistent policy enforcement, and a shortage of skilled professionals.<sup>30</sup> Based on regulatory impact assessments, the World Bank ranks sub-Saharan and North African countries low in regulatory transparency and stakeholder consultations in policymaking.<sup>31</sup> Such uncertainties around the “rules of the game” amplify risk perceptions, which have historically plagued

27 K. Lakmeeharan et al., *Solving Africa's Infrastructure Paradox*, McKinsey & Co., March 6, 2020, <https://www.mckinsey.com/capabilities/operations/our-insights/solving-africas-infrastructure-paradox>.

28 Aubrey Hruby, “Escaping China's Shadow: Finding America's Competitive Edge in Africa,” Atlantic Council, September 7, 2017, <https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/escaping-china-shadow/>.

29 “An African First: Africa50 Infrastructure Acceleration Fund Achieves First Close, Securing \$222.5 Million Primarily from African Institutional Investors,” Africa50, January 9, 2024, <https://www.africa50.com/news-insights/news/an-african-first-africa50-infrastructure-acceleration-fund-achieves-first-close-securing-2225-million-primarily-from-african-institutional-investors/>.

30 Mansoor Afzali et al., “Economic Uncertainty and Corruption: Evidence from Public and Private Firms,” *Journal of Financial Stability* 57 (2021), <https://doi.org/10.1016/j.jfs.2021.100936>.

31 “Global Indicators of Regulatory Governance,” World Bank, accessed April 22, 2024, <https://rulemaking.worldbank.org/en/key-findings>.

**Figure 5: Snapshot of US government funds for domestic projects**

Agency	Date	Amount	Recipient	Source	Project Type	Use of Funds
DOD	9/2023	\$90 million	Albemarle	IRA	Extraction (lithium)	Reopening Kings Mountain lithium mine in North Carolina
DOD	7/2023	\$37.5 million	Graphite One	IRA	Extraction and processing (graphite ore); manufacturing (battery anodes)	Developing graphite supply chain in Alaska
DOE	2/2023	\$2 billion (conditional loan commitment)	Redwood Materials	IRA	Recycling and manufacturing (battery materials)	Deploying closed loop lithium-ion battery production (recycling + anode copper foil and CAM production) in Nevada
DOE	1/2023	\$700 million (conditional loan commitment)	Ioneer Rhyolite Ridge	IRA	Mining and processing (lithium)	Financing a processing facility in Nevada for lithium carbonate extracted from North America's largest lithium-boron deposit
DOE	8/2023	\$398.6 million (conditional loan commitment)	Eos Energy Enterprises	IRA	Manufacturing (batteries)	Building zinc-bromine battery energy storage systems

Sources: <https://www.defense.gov/News/Releases/Release/Article/3522657/dod-enters-agreement-to-expand-domestic-lithium-mining-for-us-battery-supply-ch/>  
<https://www.defense.gov/News/Releases/Release/Article/3459556/dod-enters-agreement-to-expand-capabilities-for-domestic-graphite-mining-and-pr/>  
<https://www.energy.gov/lpo/articles/lpo-offers-conditional-commitment-redwood-materials-produce-critical-electric-vehicle>  
<https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rhyolite-ridge-advance-domestic-production>  
<https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-eos-energy-enterprises-produce-next-generation>

the continent with companies operating outside the region perceiving it as more risky than those doing business in African countries.<sup>32</sup> The macro challenges of 2024—high interest rates to battle inflation, the ongoing conflict in Ukraine, currency devaluations and looming debt service obligations, and sluggish growth—have intensified the investment-attraction challenge. Global economic uncertainty has always had a strong dampening effect on investment into African markets, and opaque policymaking and variable implementation on the continent amplify rather than mitigate the effect.<sup>33</sup> One reason for regulatory uncertainty is a lack of capacity within African governments to engage and manage complex project finance and in-

frastructure investment negotiations.<sup>34</sup> Recognizing this challenge, the African Development Bank established the African Legal Support Facility (ALSF) in 2008 to provide legal and technical expertise from leading global law firms to African nations in negotiations with creditors (particularly the vulture funds) as well as investors in projects that require complex commercial structuring. Since it became operational fourteen years ago, the ALSF has helped African governments close commercial investments of more than \$75 billion.<sup>35</sup> This, however, is overshadowed by the huge infrastructure investment needs and the ALSF itself needs to be scaled up and other complementary initiatives launched to support the ambitions of African gov-

32 Ajen Sita et al., *Africa Attractiveness Report*, EY, November 2023, [https://assets.ey.com/content/dam/ey-sites/ey-com/en\\_za/topics/attractiveness/africa-attractiveness-2023/graphics/new-graphics/ey-com-en-za-2023-ey-africa-attractiveness-report-nov.pdf](https://assets.ey.com/content/dam/ey-sites/ey-com/en_za/topics/attractiveness/africa-attractiveness-2023/graphics/new-graphics/ey-com-en-za-2023-ey-africa-attractiveness-report-nov.pdf).

33 Oliver E. Ogbonna et al., "Global Uncertainty, Economic Governance Institutions and Foreign Direct Investment Inflow in Africa," *Economic Change and Restructuring* 55 (2022), <https://doi.org/10.1007/s10644-021-09378-w>.

34 Asmita Parshotam and Cyril Prinsloo, "54 States and Infrastructure Financing Challenges in Africa," *World Commerce Review*, via South African Institute of International Affairs website, December 15, 2016, <https://saiia.org.za/research/54-states-and-infrastructure-financing-challenges-in-africa/#:~:text=While%20there%20are%20multiple%20examples>.

35 "African Legal Support Facility Celebrates Achievements as It Begins New 14-Year Mandate," African Legal Support Facility, September 23, 2021, <https://africanlegalsupportfacility.com/new/african-legal-support-facility-celebrates-achievements-as-it-begins-new-14-year-mandate/#:~:text=African%20Legal%20Support%20Facility%20celebrates%20achievements%20as>.



Roads on the way to graphite deposits outside of Antsirabe, Madagascar, in April 2024. Photo by Aubrey Hruby

ernments in the mining sector. The African Development Bank has recognized the imperative to enhance both human and technical capabilities as a fundamental pillar of the African Green Minerals Strategy, which is set to be formally adopted by the African heads of state in 2024.<sup>36</sup>

- **Capital market constraints leave project developers in search of financing.** Capital markets serve as vital platforms for financing infrastructure and corporate growth globally. Yet African governments and companies lack access to large pools of capital via exchanges. African capital markets—outside of the Johannesburg Stock Exchange (JSE)—are small, shallow, and illiquid. Of the total market capitalization of Africa’s exchanges of \$1.4 trillion

(less than 2 percent of the global number), the JSE constitutes 75 to 80 percent.<sup>37</sup> For comparison, India’s Bombay Stock Exchange has nearly four times the market capitalization and the London Stock Exchange is similar, exceeding \$3 trillion. This limited depth translates to a smaller pool of potential investors and restricts the total amount of capital available for infrastructure projects. Thus, African governments have returned to issuing Eurobonds in 2024 (after the macro challenges of the COVID-19 pandemic and the Ukraine war supply-chain disruptions), with Côte d’Ivoire, Kenya, and Benin collectively raising nearly \$5 billion. This avenue is limited, however, by governments’ capacities to service growing debt, particularly denominated in dollars. According to the International Monetary

36 “Approach Paper towards Preparation of an African Green Minerals Strategy,” African Development Bank (ADB), February 27, 2023, <https://www.afdb.org/en/documents/approach-paper-towards-preparation-african-green-minerals-strategy>.

37 Tom Minney, “Are Africa’s Stock Exchanges Lagging?,” African Capital Markets News, December 9, 2022, <https://africancapitalmarketsnews.com/are-africas-stock-exchanges-lagging/>.



Fund, 40 percent of African public debt is borrowed externally, which heightens currency risk in repayment and deepens debt burdens, reducing the capital that governments have in the medium term to invest in social programs and infrastructure.<sup>38</sup>

These lessons should inform the context and content of discussions around mining investment as infrastructure projects—road, bridge, rail, port, power projects, etc.—which are similarly long-term, capital-intensive endeavors and require regular engagement with government agencies and communities. By understanding the ongoing efforts to close the financing gap in infrastructure, governments and investors can save time, energy, and resources in supporting the growth of the mining industry in the coming decade.

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38 Laurent Kemoe, “African Currencies Are Under Pressure amid Higher-for-Longer US Interest Rates,” International Monetary Fund (IMF), May 15, 2023, <https://www.imf.org/en/Blogs/Articles/2023/05/15/african-currencies-are-under-pressure-amid-higher-for-longer-us-interest-rates#:~:text=About%2040%20percent%20of%20public>.

## SECTION 3: INTERNATIONAL COMPETITION FOR INVESTMENT

Just as African nations are working to secure investment in mining critical minerals, so are many other countries in the rest of the world. Established mining powerhouses such as Australia, Canada, Chile, and Indonesia, alongside emerging contenders like the Gulf States, are all actively competing for international capital in this rapidly expanding sector. To Africa's potential detriment, many of these other participants in the investment race possess superior infrastructure and more developed industries, potentially granting them a competitive advantage over the continent.

Currently, investment is increasing in regions abundant in mineral reserves, and six of the top ten destinations for FDI in critical minerals are also some of the largest exporters of minerals: Australia, Canada, Chile, China, Indonesia, and the United States.<sup>39</sup> Additionally, countries with ample reserves but limited mining activity are actively pursuing strategies to attract more FDI. Argentina, for instance, has emerged as the third most sought-after destination for critical minerals FDI, owing largely to its investor-friendly policies. The nation's proactive approach has enticed major industry players such as Glencore and Lundin Mining to establish a presence within its borders.<sup>40</sup>

New players are rapidly entering the fray. Saudi Arabia, for example, introduced a new mining law making it easier for companies to explore for and extract minerals, and offers financial incentives. The country also increased the activities of the Saudi Geological Survey, which recently awarded a \$207 million contract to the Chinese Geological Survey as part of a bid to complete, by 2025, 50 percent of the survey of Saudi Arabia's Arabian Shield, a more than 230,000 square mile area of Precambrian rocks located in western Saudi Arabia. Looking outside its borders, Saudi Arabia announced plans to invest \$15 billion in acquiring mining stakes globally to secure essential minerals from nations like Namibia, Guinea, and the DRC. These efforts align with Saudi Arabia's ambitious goal of manufacturing 500,000 electric vehicles annually by 2030.

Saudi Arabia, the UAE, and other Gulf countries have a history of leveraging their geographical location, robust infrastructure, efficient regulatory frameworks (which enable swift permitting processes), and the strategic investment capacity of their sovereign wealth funds to invest in pivotal sectors and ascend supply chains. They have successfully processed var-

ious commodities such as diamonds, coffee, and tea sourced from African countries. Now they are poised to venture into the processing of critical minerals. This strategic shift underscores their commitment to diversifying their economies and capitalizing on emerging opportunities in high-value sectors. For instance, Oman is in the process of constructing what is anticipated to be the world's largest green steel plant, intending to utilize iron ore resources from Cameroon.<sup>41</sup> Meanwhile, the UAE is investing in its downstream processing capacity, recently signing a fifty-year lease agreement with Khalifa Economic Zones Abu Dhabi and UAE-based Titan Lithium to establish a lithium processing plant in Khalifa Industrial Area at the cost of about \$1.36 billion.<sup>42</sup>

The strong focus of Gulf States on critical minerals and battery production is a double-edged sword for African economies. In the short term, there will be increased demand for minerals and new international commercial partnerships formed, but in the longer term, Gulf countries will chip away at the dominant value-added refining role that currently belongs to China, leaving little but the basic processing for African nations.

39 Laura Hill, "Developing Strategies to Attract Critical Mineral Supply Chains," OCO Global, March 26, 2024, <https://www.ocoglobal.com/general/developing-strategies-to-attract-critical-mineral-supply-chains/>.

40 "Argentina Aims to Become One of the World's Top Ten Copper Producers by 2030, Its Investor-Friendly Stance Has Attracted Global Players such as Glencore and Lundin Mining | Shanghai Non Ferrous Metals," Shanghai Metals Market, May 9, 2023, <https://news.metal.com/newscontent/102207849/argentina-aims-to-become-one-of-the-worlds-top-ten-copper-producers-by-2030-its-investor-friendly-stance-has-attracted-global-players-such-as-glencore-and-lundin-mining>.

41 Halina Yermolenko, "Oman Begins Construction of Key Green Steel Plant," GMK Center, December 3, 2023, <https://gmk.center/en/news/oman-begins-construction-of-key-green-steel-plant/>.

42 Craig Guthrie, "UAE Enters Lithium Race with \$1.4Bn Plant," *Mining Magazine*, Aspermont Media, February 19, 2024, <https://www.miningmagazine.com/environment/news/4175743/uae-enters-lithium-race-usd-5bn-processing-plant-plans#:~:text=The%20Khalifa%20Economic%20Zones%20Abu>.

## SECTION 4: TECH INNOVATION AND US ONSHORE TRENDS AND POTENTIAL IMPACTS ON THE AFRICAN MINING SECTOR

**Figure 6: US domestic production versus foreign imports**

Mineral	Domes- tic mine production (metric tons) 2022	Approximate import reli- ance (2020)	Top three import sources (2022)
Lithium	5,000	50%	Argentina, 51%; Chile, 40%; China, 4%
Nickel	18,000	50%	Primary nickel: Canada, 45%; Norway, 9%; Australia, 8%
			Nickel-containing scrap: Canada, 38%; Mexico, 26%; UK, 9%
Manganese	None	100%	Manganese ore: Gabon, 67%; South Africa, 19%; Mexico, 12%
			Ferromanganese: Australia, 19%; Malaysia, 18%; South Africa, 17%
			Silicomanganese: Georgia, 28%; South Africa, 22%; Australia, 21%
Cobalt	500	76%	Metal, oxide, and salts: Norway, 25%; Canada, 15%; Finland, 13%

Sources: The majority of data here is based on USGS fact sheets: lithium, <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-lithium.pdf>; nickel, <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-nickel.pdf>; manganese, <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-manganese.pdf>; and cobalt, <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-cobalt.pdf>; along with DOE data from the Vehicle Technologies Office, Fact of the Week #1225, February 14, 2022, <https://www.energy.gov/eere/vehicles/articles/fotw-1225-february-14-2022-2016-2019-over-90-us-lithium-imports-came>.

**A**s demand for critical minerals increases in the race to scale clean energy technologies, efforts to bring critical mineral supply chains to their own shores have become increasingly integral to strategic public- and private-sector planning. The United States, Canada, Australia, and the European Union have announced large-scale plans to “onshore” and “reshore” key processes to limit dependence on China. Undergirded by wide-reaching federal and supranational policy actions, these plans both align and compete with African ambitions in the mining sector. New projects and technologies developed in Western countries have the potential to reduce reliance on not only Chinese extraction and processing but also African mineral reserves over time. These technological and substitution risks to the development of value-added investment in African markets come in two categories:

- Deployment of new technologies and methods to reduce the cost of new mining projects, extend the life of existing mines, and reopen shuttered ones.

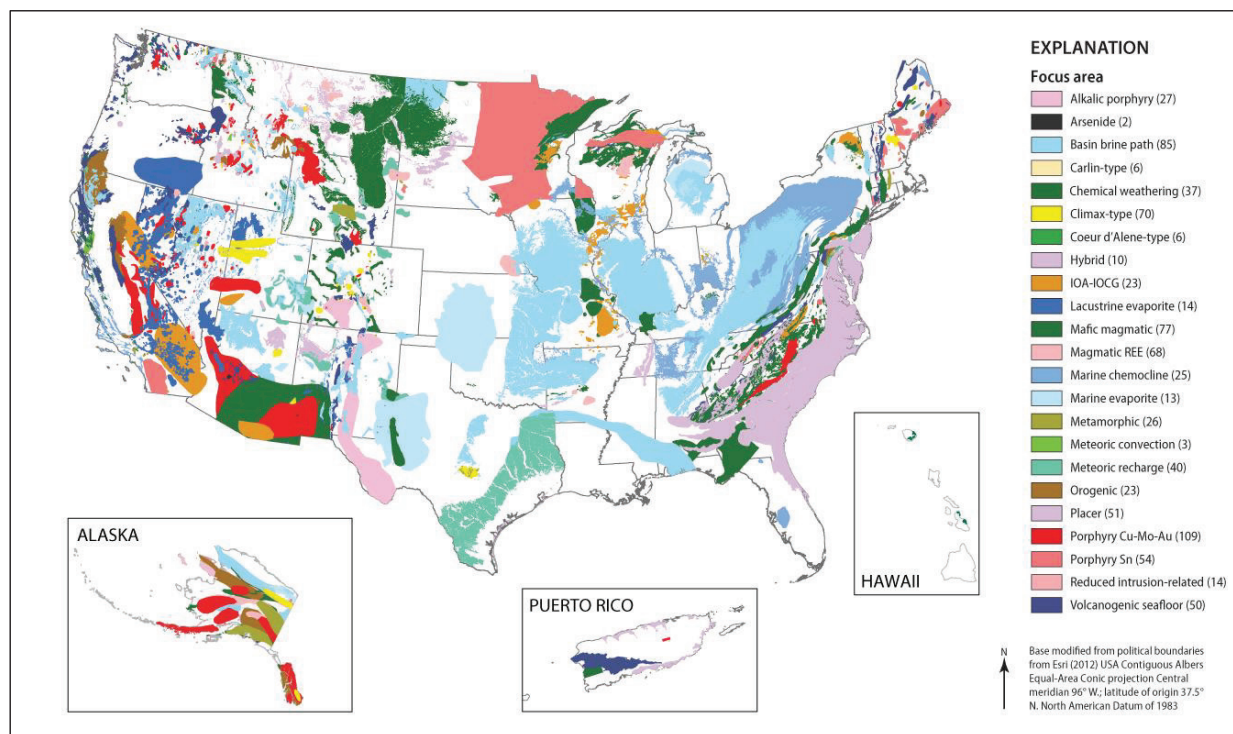
- Development of novel battery chemistries that reduce reliance on virgin materials.

### Technological risks: New mining methods and technologies

Public-private partnerships and corporate R&D initiatives aided by substantial federal funding are spurring new extraction and processing methods that improve the efficiency, longevity, and production costs of mines for the energy transition. Processes such as direct lithium extraction, hydrometallurgical leaching, advanced automation, computer modeling and use of AI, and metal extraction from mine waste are already expanding opportunities for key critical minerals including lithium, nickel, and cobalt.

Direct lithium extraction, which separates lithium from brine using adsorption and thereby reducing the time, costs, carbon emissions, and water usage associated with traditional methods, is improving the potential for US-based companies to recover lithium locally and is thus a threat to African lithi-

Figure 7: US Domestic Critical Mineral Resources



Source: Jane M. Hammarstrom et al., National Map of Focus Areas for Potential Critical Mineral Resources in the United States, U.S. Geological Survey, USGS Fact Sheet 2023-3007, February 2023, <https://doi.org/10.3133/fs20233007>

Notes: The maps show about 800 focus areas for 23 types of mineral systems that could host one or more critical mineral resources in the states and Puerto Rico. A mineral system describes a general way that a mineral resource may form, such as from a volcanic eruption. In the figurekey, the numbers in parentheses indicate the number of focus areas identified in the United States for each mineral system.

um players.<sup>43</sup> US startups Livent, Lilac Solutions, and EnergyX all focus on advancing and commercializing the technology, while project developers BHE Renewables, Controlled Thermal Resources, and EnergySource Minerals are putting the technology to use in their operations.<sup>44</sup> In one major win for the technology, US mining giant Albemarle—which owns the only commercial-scale lithium operation in the United States at its Silver Peak Mine in Nevada—announced the construction of a pilot plant in Arkansas in 2023.<sup>45</sup>

Hydrometallurgical leach technologies—which use aqueous solutions to dissolve and recover metals from ores or recycled materials, offering an environmentally friendlier alternative to high-temperature pyrometallurgical methods—are also ramp-

ing up alternative resource streams. The US Department of Energy Advanced Research Projects Agency-Energy (ARPA-E) awarded Columbia University a grant to use hydrometallurgical leach technologies to extract key metals—including nickel, copper, and cobalt—at a lower cost than traditional methods.<sup>46</sup> The project uses feedstocks from the Tamarack Project—a joint venture between Talon Metals Corp. and Rio Tinto—to extract nickel, copper, and cobalt in Minnesota. Columbia's leaching process, combined with digital solutions like Talon's Advanced Exploration System—a set of geophysical mapping tools to accelerate identification of high-grade nickel and copper deposits—are expanding both miners' geological reach within the United States and precision.<sup>47</sup>

43 Holly Stower, "Direct Lithium Extraction: New Technologies to Disrupt Traditional Refining and Mining," Cleantech Group, July 25, 2023, <https://www.cleantech.com/direct-lithium-extraction/>.

44 White House, "Securing a Made in America Supply Chain for Critical Minerals," White House Fact Sheet, February 22, 2022, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/22/fact-sheet-securing-a-made-in-america-supply-chain-for-critical-minerals/>.

45 Ernest Scheyder, "Albemarle Jumps into Global Race to Reinvent Lithium Production," Reuters, August 4, 2023, <https://www.reuters.com/markets/commodities/albemarle-le-jumps-into-global-race-reinvent-lithium-production-2023-08-03/>.

46 "Columbia University: Hydrometallurgical Production of Domestic Metals for Energy Transition," project award listing, MINER program, Advanced Research Projects Agency-Energy (ARPA-E), 2023, <https://arpa-e.energy.gov/technologies/projects/hydrometallurgical-production-domestic-metals-energy-transition>.

47 "Moving Forward: Discovering & Developing the USA's Only High-Grade Nickel Resources for the Domestic Battery Supply Chain," Talon Metals Corp., January 2024, [https://talonmetals.com/wp-content/uploads/2024/01/Talon-Moving-Forward\\_January\\_2024.pdf](https://talonmetals.com/wp-content/uploads/2024/01/Talon-Moving-Forward_January_2024.pdf).

Additionally, methods to extract metals from tailings, a byproduct of mining, help existing mines maximize their output while minimizing environmental impact—a growing concern among global mining companies under pressure to improve their ESG metrics. In a separate grant, ARPA-E awarded Michigan Technological University funds to recover 80 percent of energy-relevant minerals from nickel-bearing minerals in mine tailings and to store carbon dioxide in the tailings.<sup>48</sup> The university is partnering with Lundin Mining’s Eagle Mine in Michigan—the site of the only commercial nickel recovery operation in the United States—and NewRange Copper Nickel, which is developing a new copper nickel mine in Minnesota.<sup>49</sup> According to ARPA-E, the university’s carbon negative metal extraction technology has the potential to recover twelve to fifteen million pounds of nickel annually in the United States, which can satisfy nickel needs for approximately 150,000 EV batteries at comparable costs when factoring in energy use and carbon emissions to current production methods. This combination of new technologies, strategic planning, and national urgency to scale domestic supply chains not only encourages investment

in new mines but also extends the life of existing operations and facilitates the reopening of retired mines. Notable examples include Eagle Mine’s extension of its operations in Michigan<sup>50</sup> through 2029 and Albemarle’s planned reopening of its Kings Mountain lithium mine in North Carolina.<sup>51</sup>

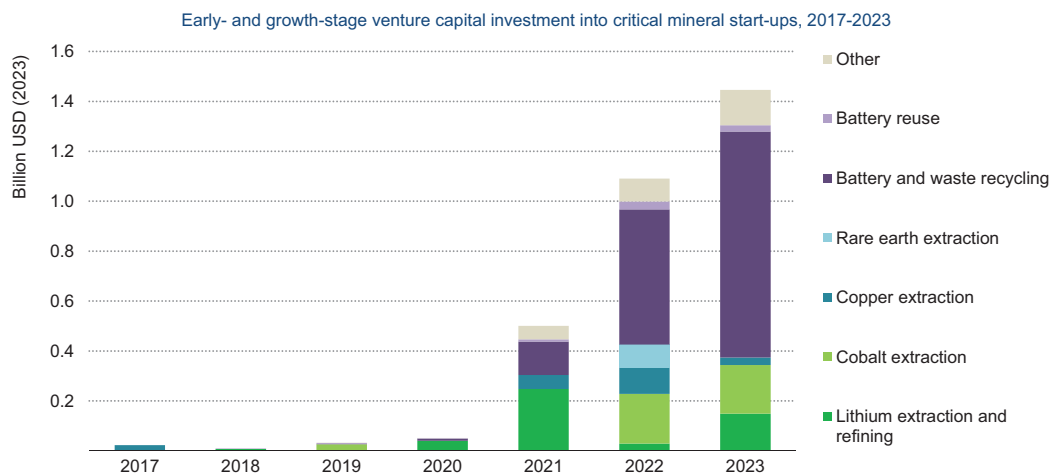
### Substitution risks: Novel battery chemistries

In addition to focusing on domestic mines, government agencies and investors are backing innovations in battery chemistry to meet the demand for minerals from EVs and battery storage.<sup>52</sup> While the US government is investing billions in on-shoring lithium-ion battery production,<sup>53</sup> venture capital (VC) funding for energy storage reached a historic \$9.2 billion in 2023, with eighty-six deals globally—many of which involved nonlithium and next-generation storage solutions.<sup>54</sup> VC in extraction and recycling also increased, growing by \_\_\_ % between 2022 and 2023.

The dominant chemistry for EV batteries currently is NMC, which entails significant reliance on foreign mineral reserves and processing capacity. (See table below for domestic pro-

**Figure 8: VC investment trends in refining and recycling**

**Venture capital investment in the critical mineral sector continued to rise in 2023, with significant growth in battery recycling offsetting reductions in mining and refining start-ups**



IEA. CC BY 4.0.

Note: The USD 450 million deal for Energy Exploration Technologies was excluded from the 2022 records as it was subject to the initial public offering process in 2024. This adjustment resulted in a lower 2022 figure compared with the previous year’s [Critical Minerals Market Review 2023](#).  
Source: IEA analysis based on Cleantech Group i3 database.

48 “Michigan Technological University: Energy Reduction and Improved Critical Mineral Recovery from Low-Grade Disseminated Sulphide Deposits and Mine Tailings,” project award listing, MINER program, ARPA-E, 2023, <https://arpa-e.energy.gov/technologies/projects/energy-reduction-and-improved-critical-mineral-recovery-low-grade>.  
49 Kim Geiger, “Michigan Tech Awarded \$2.5 Million to Unlock Net-Zero Emission Mineral Extraction Technologies in Mining Industries,” Michigan Technological University, January 16, 2023, <https://www.mtu.edu/news/2023/01/michigan-tech-awarded-25-million-to-unlock-netzero-emission-mineral-extraction-technologies-in-mining-industries.html>.  
50 Tristen Kendrick, “Eagle Mine Receives Amendment Permit for Mining Expansion in Upper Eagle East,” WLUC TV6, Gray Television, December 22, 2023, <https://www.upper-michiganssource.com/2023/12/22/eagle-mine-receives-amendment-permit-mining-expansion-upper-eagle-east/>.  
51 “DoD Enters Agreement to Expand Domestic Lithium Mining for U.S. Battery Supply Chains,” US Department of Defense, n.d., <https://www.defense.gov/News/Releases/Release/Article/3522657/dod-enters-agreement-to-expand-domestic-lithium-mining-for-us-battery-supply-ch/>.  
52 IEA, “Executive Summary: The Role of Critical Minerals in Clean Energy Transitions—Analysis,” 2021, <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/executive-summary>.  
53 “Biden-Harris Administration Awards \$2.8 Billion to Supercharge U.S. Manufacturing of Batteries for Electric Vehicles and Electric Grid,” Department of Energy, October 19, 2022, <https://www.energy.gov/articles/biden-harris-administration-awards-28-billion-supercharge-us-manufacturing-batteries>.  
54 Kavya Balaraman, “Energy Storage Venture Capital Funding Soared to Record \$9.2B in 2023, Mercom Reports,” *Utility Dive*, accessed April 15, 2024, <https://www.utilitydive.com/news/energy-storage-venture-capital-funding-zenobe-mercom-/705954/>.

duction and dependency data for key metals.) Even as NMC will continue to command market share over the near term, automakers are demanding decreasing cobalt and increasing nickel content in their batteries to address sourcing challenges and improve energy density.

The federal government, automakers, battery manufacturers, and venture capital firms have all made significant investments in the last three years. In November 2023, the US DOE Office of Manufacturing and Energy Supply Chains announced up to \$3.5 billion from the IJA to increase production of advanced batteries that rely on next-generation technologies and battery chemistries.<sup>55</sup> The announcement came on the heels of various federal initiatives to advance solid-state and flow battery manufacturing, invest in companies developing zinc-based, long-duration storage and LFP batteries, and advance R&D efforts to improve alternative battery chemistries at national laboratories.<sup>56</sup> In the midst of these historic injections of capital, a number of legacy automakers and EV manufacturers—including Tesla, Ford, Toyota, and Stellantis—are mitigating mineral supply concerns by investing directly in companies and production processes focused on alternative chemistries like LFP, solid-state, and sodium-ion. Additionally, as EV batteries, storage systems, and consumer electronics retire in the coming years, the incorporation of recycled content into new and incumbent chemistries further reduces reliance on virgin materials.

As mining companies adopt new technologies that make domestic mineral extraction easier, faster, and cheaper in developed markets, the global race to attract investment into mining becomes dramatically more competitive, and African nations risk missing out as investors focus on lower-risk markets. However, despite limited processing capacity and risk- and ESG-related challenges, African markets have an opening to stay competitive through a combination of new technologies and lag times for the rollout of new sourcing methods in Western countries.

Artificial intelligence (AI), large language models (LLMs), satellite data, and drone-based monitoring equipment have the potential to dramatically reduce the costs of exploration and compliance in African markets, allowing African countries, with innovative partners, to get ahead of projects in the United States that can be delayed by years of permitting. Ultimately, the same technologies that facilitate increased domestic sourcing in the United States help African miners and investors identify, extract and process. Because 100 percent onshoring will be neither feasible nor cost effective in the United States, African mines will play a significant role in the global push to meet new mineral demand in the medium term. The question remains how to secure and then transform the near-term mining interest into long-term, value-added, and sustainable investment to drive broader economic development.

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55 "Biden-Harris Administration Announces \$3.5 Billion to Strengthen Domestic Battery Manufacturing," Department of Energy, November 15, 2023, <https://www.energy.gov/articles/biden-harris-administration-announces-35-billion-strengthen-domestic-battery-manufacturing>.

56 "Department of Energy Announces \$16 Million to Boost Domestic Capabilities in Solid-State and Flow Battery Manufacturing," Department of Energy, September 14, 2023, <https://www.energy.gov/eere/ammto/articles/department-energy-announces-16-million-boost-domestic-capabilities-solid-state>.

## RECOMMENDATIONS

Critical minerals are poised to remain a central theme in US government policy, irrespective of the upcoming presidential election. The bipartisan recognition of the strategic importance of these minerals is evident from initiatives such as the IRA, which has catalyzed significant private investment into domestic mining and processing projects—projects that will require sustained imports from African nations in the minerals that the United States lacks.<sup>57</sup>

The specific form that this commitment to critical minerals takes may vary depending on the results of the 2024 US election. If there's a change in leadership, the Minerals Security Partnership (MSP) led by the State Department, which currently focuses on encouraging investment across the critical minerals supply chain, might evolve into a different program. Nonetheless, the underlying goal of ensuring US national security and competitiveness in sectors reliant on these minerals will remain a priority. The balance between international cooperation and self-reliance in North America could also shift under a new administration. A greater focus on self-sufficiency could exacerbate the investment challenges faced in African markets, as the United States seeks to reduce dependence on imports through domestic investment and technological advancement. This evolving landscape necessitates a robust strategy to enhance investment attractiveness in the critical minerals sector of African markets.

The strategy should be to broaden, accelerate, sustain, and enhance (BASE) the trends that favor, in the near term, the African mining industry at play in the global market:

- **Broaden:** To overcome the historical sins of Western mining companies in African countries, the economic benefits derived must be broadened to include local communities, national companies, environmental groups, universities, and training platforms. The mechanisms are varied, but the approach must go beyond traditional corporate social responsibility (CSR) requirements to functionally align incentives over the lifetime of the project.
- **Accelerate:** To actually realize the economic benefits of larger mining industries in African markets, efforts made by the US government and African governments to facilitate investment in the sector must be accelerated immediately or African nations will miss out on large amounts of the global capital flows seeking opportunities in critical minerals.
- **Sustain:** To reduce regulatory uncertainty and consolidate investor confidence, governments must sustain the policy

prioritization of mining and investment promotion efforts, thereby building a globally strong brand in the sector, reducing political risk factors, and incentivizing investors to overcome the challenges of lacking infrastructure.

- **Enhance:** To expedite and derisk exploration, governments and investors should embrace partnerships that give them access to new satellite and AI technologies. Technology-enhanced project development will help to reduce the long time frames involved in realizing exports and earnings from mining investment.

Stakeholder-specific recommendations built on a solid BASE strategy are below.

### US government

If the current or future US administration really wants to counter Chinese influence in critical mineral supply chains, it has to find ways to mobilize and support investment in greenfield projects in African markets in order to reform value chains from the ground up. This is no easy feat given the head start China has in the form of greater risk appetite among Chinese mining firms, the ability to coordinate government agencies and mobilize the private sector, the goodwill established with African governments after two decades of financing infrastructure projects, and a decade of providing scholarships in technical fields for young Africans. China also leverages moral suasion on the continent, routinely reiterating its policy of noninterference in political matters within African countries and emphasizing its position as a successful development model for many, having lifted the most people out of poverty in human history. To neutralize this advantage in a strategic sector such as critical minerals, the United States should double down on areas of competitive advantage, including in technology, tertiary education, and capital markets through new initiatives, and also make existing efforts in US-Africa collaboration more meaningful.<sup>58</sup>

**Prioritize investment facilitation and strengthen the role of Prosper Africa.** The United States will never match China with direct government financing in African markets, thus capital mobilization among US private and institutional investors is vital. Given the IRA and CHIPS Acts, and the national security considerations around critical minerals, the number of government agencies and offices with relevance to the market has multiplied significantly. As the designated coordinator of government efforts to increase US trade and investment with African countries, Prosper Africa's role is even more paramount. Coordinating among seventeen US agencies—from the Air Force and DOE to the Export-Import Bank—and trying to understand the rules and processes that govern the use of US resources to derisk investments that are in the security interests of the nation imposes a high cost on investors, particu-

57 The United States is 95 percent import dependent on thirteen of the fifty minerals deemed critical, and 50 percent or more import reliant for forty-three of these minerals. For more information, see: "Charted: America's Import Reliance of Critical Minerals," Mining.com, Northern Miner Group, August 8, 2023, <https://www.mining.com/web/chart-ed-americas-import-reliance-of-critical-minerals/#:~:text=Of%20the%20most%20important%20minerals>.

58 Aubrey Hruby, "Consumers and Competition: America's Business Edge in Africa," Atlantic Council, September 7, 2017, <https://www.atlanticcouncil.org/event/consumers-and-competition-americas-business-edge-in-africa/>; and Hruby, "Deconstructing the Dragon: China's Commercial Expansion in Africa," Issue Brief, Atlantic Council's Africa Center, July 2019, [https://www.atlanticcouncil.org/wp-content/uploads/2019/09/Deconstructing\\_the\\_Dragon-Chinas\\_Commercial\\_Expansion\\_in\\_Africa.pdf](https://www.atlanticcouncil.org/wp-content/uploads/2019/09/Deconstructing_the_Dragon-Chinas_Commercial_Expansion_in_Africa.pdf).

larily the vast majority with no office or representation in Washington. To be an effective adviser and concierge within the US government system, Prosper needs to be able to hire quickly, offering competitive compensation to those with industry experience and project finance backgrounds; it also needs to build its brand through strategic communications within the US government and in the broader US marketplace. The communication effort could be modeled on the Department of Energy's newly launched Critical Materials Collaborative, which aims to centralize communication and collaboration among interested US government and private-sector stakeholders with a focus on domestic opportunities.

**Organize US government resources within a project finance framework to enhance speed and coordination.** Fundamentally, mining projects reflect the dynamics of infrastructure projects, thus there is a need to derisk a deal over the lifetime of a project. Project finance in frontier markets requires: a pre-feasibility study; often subsidized project development funding given the long development cycles; early-stage risk capital in the form of equity; guarantees and political risk insurance to help mobilize follow-on capital; and debt at concessional rates to move a greenfield project through financial close into operations over fifteen to twenty years. As such, the US government should adopt this framing into its critical minerals strategy, understanding how each agency and its resources fit within a project development life cycle. A similar approach is emerging within the Department of the Navy as it promotes an investment horizons approach to financing new technologies.<sup>59</sup> It is not often the *volume* of financing available that matters, but rather *how and when* the funds can be deployed, the risk appetite behind the funds, and the market signal that is conveyed by a US government financial commitment.

Prosper Africa should lead this analysis, identifying which agencies have early-stage capital available, etc., all the way through to large-scale debt facilities. This way, Prosper will be able to better guide interested US investors through the maze of US government critical mineral resources that could support US-African mining partnerships.

US government resources go beyond financial resources. Leveraging the power of the podium, senior administration officials can signal US government support for a project by talking about it in the media, thereby signaling federal support and derisking it in the mind of potentially interested investors. The United States also has technical influence that should be better coordinated. Given the capacity constraints in African ministries of mines and regulatory bodies, the World Bank plays a significant role in shaping local mining policies. As the largest donor to the World Bank Group, the United States could better advance policies and projects that facilitate sustainable investment into the African mining sector. Prosper Africa, working with the Department of Treasury, should better

understand World Bank activities in the sector and actively explore synergies.

**Replicate successful models.** To become more competitive with not only the Chinese but also the French, Turkish, Saudis, etc. in battery supply chains, the US government will need to accelerate its support of projects. Timelines within the US development finance institutions, even at their fastest, take nearly a year. By piggybacking on the success of some of the flagship initiatives of the Biden administration, agencies such as the DFC will reduce the internal learning curve and expedite pipeline and partnership development. Models to be considered include:

- **US-African DFI partnerships.** In areas in which US capital lacks the experience and risk appetite (such as in early-stage mining project development), partnerships with African DFIs can prove essential. In the case of the Lobito Corridor project, the Africa Finance Corporation (AFC) is the lead developer on the \$2.3 billion railway and road project to link Zambia and the DRC to Angola's port of Lobito. Given that the DFC lacks the on-the-ground manpower and capacity to develop projects, working with local organizations such as the AFC enables the United States to engage in greenfield projects. Additionally, AFC's history and organizational setup enable it to manage political risk in a manner that the United States cannot—having thirty-seven African countries as members, boasting an A3 credit rating from Moody's, and deploying nearly \$10 billion since its establishment in 2007.<sup>60</sup> As an African institution, it has long-term interests aligned with the development of value-added industries and the relationships to ensure sustained influence.
- **Vertically integrated US-Africa plays.** To actively support greenfield projects in African markets and ensure new production does not just increase volume for Chinese processors, the United States should seek out deals similar to the Syrah Resources deal, which connects graphite mining in Mozambique to processing in Louisiana.<sup>61</sup> Given that the US Ex-Im Bank's new Make More in America (MMIA) program has the ability to finance projects in the United States that can lead to increased US exports and a focus on critical minerals, DFC and Ex-IM Bank collaboration and coordination would create multiple levels of support for US investors seeking to invest across an entire value chain.
- **Support diversified funds and investment platforms.** The DFC recently increased its commitment to TechMet—an investment company founded in 2017 that invests in businesses across the critical metals value chain—by \$50 million in equity, boosting its investment above \$100

59 "Investment Horizons Charts Released," US Department of the Navy Chief Information Officer, April 4, 2024, <https://www.doncio.navy.mil/ContentView.aspx?id=16717>.

60 "Africa Finance Corporation Tops US\$10 Billion Target One Year Early," Africa Finance Corporation, April 5, 2023, <https://www.africafc.org/news-and-insights/news/africa-finance-corporation-tops-us-10-billion-target-one-year-early>.

61 "Australia's Syrah Resources Signs Graphite Supply Deals with US Firms," Reuters, August 3, 2023, <https://www.reuters.com/article/idUSKBN2ZE024/>.



million. TechMet is currently raising a new \$300 million round of financing and is valued at over a billion dollars.<sup>62</sup> DFC has also invested at the project level with TechMet in Brazil. TechMet invests across geographies—Europe, the United States, Africa, and Latin America, thereby offering investors a diversified platform which offsets the risks of any one region—a critical innovation when it comes to attracting institutional investment to African projects. To unleash one of the United States’ greatest strengths—its deep capital base—the DFC should do many more TechMet-type deals to present US institutional investors with derisked funds that meet their size, risk-profile, and liquidity needs. Africa-only funds struggle to raise significant amounts of capital and continue to be seen as too risky by mainstream US investors.

**Deepen and expand existing strategic partnerships.** The Biden administration’s flagship platform for international collaboration in battery supply chains, the Minerals Security Partnership (MSP), currently lacks clarity and transparency. If the United States continues the MSP after the 2024 election and moves it beyond its conceptual phase into a more structured program, the United States should expand the grouping of fifteen nations to include major African producers and ensure transparent project selection. With the DRC producing 70 percent of the world’s cobalt, the exclusion of African nations is a fundamental flaw. Furthermore, the process by which the seventeen priority projects are identified, evaluated, and advanced needs to become far more transparent or the initiative will lose credibility. There is no single source of information on the projects and how to propose new ones.

In bilateral relationships, the United States should pursue even stronger collaboration with Canada, given its proximity and deep history in mining. Canadian production and processing are considered domestic under the National Defense Authorization Act and the US government should coordinate joint investment missions, conference attendance, and a development finance co-investment agreement whereby the United States and Canada share and accept each other’s due diligence in order to fast-track investment decisions.<sup>63</sup>

**Transform the DRC-Zambia MOU into a meaningful investment program.** In December 2022, the United States signed a memorandum of understanding with the DRC and Zambia aimed at “strengthening the electric vehicle battery

value chain” and committed to supporting feasibility studies and providing technical assistance to promote US private-sector engagement because there are no US companies that are currently operational in that sector in the two countries. Nearly a year later, stakeholder workshops were held in Lusaka to begin to draft a road map to success, but little action has emerged from the US side. If the United States is serious about doing meaningful things under the MOU, it should apply the lessons learned from the Millennium Challenge Corporation (MCC), a development innovation launched twenty years ago. The MCC operates under a country-led structure whereby a grant recipient country, once qualified, develops an investment plan that is implemented by a procurement agency with strong oversight. In 2018, the MCC received the authority to do regional compacts. To advance the US-DRC-Zambia project, accelerate African regional economic integration, and encourage US firms to invest, the DRC and Zambia should be supported in their effort to codevelop a proposal for an investment program.<sup>64</sup> Prosper Africa could take the lead in the facilitation process, bringing in MCC expertise and resources from the DFC, Ex-Im Bank, USTDA, DOD Office of Strategic Capital, USGS at the Department of the Interior, and other agencies. Encouraged by the US government, investment bankers with deep experience in project finance could be seconded to work with the DRC and Zambian teams as is currently being done with Bank of America in Ukraine.<sup>65</sup> A similar approach was used in the Marshall Plan to encourage European economic integration and lend US private-sector expertise.<sup>66</sup> Working with the investment bank, Prosper Africa can support and coordinate US investment roadshows with the projects jointly developed by Zambia and the DRC.

**Ensure DFC flexibility.** As the primary agency tasked with mobilizing private investment to advance US foreign policy and development goals, the creation of the DFC through the bipartisan Better Utilization of Investment Leading to Development (BUILD) Act in 2018 was a major step forward in modernizing US development finance authorization by enlarging what had been the Overseas Private Investment Corporation and expanding its tools.<sup>67</sup> The DFC’s authorization expires in September 2025 and reauthorization provides an opportunity to enhance its ability to advance national security priorities in the realm of critical minerals. In reauthorization, Congress should do three things: fix problems stemming from the incomplete execution of the BUILD Act—namely addressing the accounting

62 “TechMet Receives Further \$50 Million Commitment from U.S. International Development Finance Corporation at COP28,” TechMet Press Release via Business Wire, December 1, 2023, <https://www.businesswire.com/news/home/20231201346504/en/TechMet-Receives-further-50-Million-Commitment-From-U.S.-International-Development-Finance-Corporation-at-COP28>.

63 National Defense Authorization Act for Fiscal Year 2024, Pub. L. No. 118-31 (2023), <https://www.govinfo.gov/app/details/BILLS-118hr2670enr>.

64 In May 2022, the DFC and Zambia signed a bilateral agreement establishing the DRC and Zambia Battery Project, fostering collaboration between the University of Zambia and the Copper Belt University. The project aims to cultivate the skills and competencies required by the battery industry and facilitate the development of a competitive battery, electric vehicle, and renewable energy value chain in Africa. The center is actively engaging with industry to identify skill and research needs, and is designing master’s degree and PhD programs to advance research and foster expertise in these fields.

65 Samantha Power, “Administrator Samantha Power at Ukraine House,” Remarks, US Agency for International Development, April 18, 2024, <https://www.usaid.gov/news-information/speeches/apr-18-2024-administrator-samantha-ukraine-house>.

66 Benn Steil, *The Marshall Plan: Dawn of the Cold War* (New York: Simon & Schuster Paperbacks, 2019).

67 Aubrey Hruby, “The Future of Development Finance,” Atlantic Council, November 5, 2018, <https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/aubrey-hruby-2/>.

issues that prevent the DFC from accessing its full power to invest equity in projects and deliver political risk insurance,<sup>68</sup> encourage greater risk-taking (equity is core to that as well), and embed flexibility within the DFC's mandate and processes.

This flexibility could take the form of Congress giving the DFC "notwithstanding authority," which allows for exceptions for compelling foreign policy needs.<sup>69</sup> This authority could allow for increased flexibility in geographic mandate (not just lower income countries) and the ability to fast-track strategic projects. The DFC should also be given the flexibility to quickly hire staff and advisers, and pay them market competitive salaries, pay legal fees, rapidly deploy technical assistance, particularly for feasibility studies in cases where projects do not meet USTDA requirements (e.g., the grant going to an African entity), and forgo burdensome reporting to Congress that slows larger deals.<sup>70</sup> Eligibility requirements for US development finance, while necessary to be rule-bound, should not restrict US competitiveness. Maintaining flexibility, recognizing that mining occurs in difficult places, and understanding the near-term difficulty in having projects be 100 percent independent of Chinese infrastructure or entities.<sup>71</sup> Despite the Lobito Corridor project, the United States is not meaningfully going to build infrastructure in Africa at scale; thus, US programs should not disqualify projects that benefit from Chinese-built infrastructure outright, but rather decide on eligibility on a deal-by-deal basis.

Overall, the DFC needs to be encouraged, if not mandated, by Congress to be more proactive, more forward-leaning, and more risk tolerant. To advance US competitiveness in mining production and processing, which takes place in difficult markets and rural places globally, the DFC needs to be willing to absorb losses in the name of capital mobilization and early-stage project development. If it continues to emphasize its money-making track record, it is failing at its job of serving as the tip of the spear of US development finance.

**Use renewal of the African Growth and Opportunity Act (AGOA) to support US-African battery supply-chain commercial collaboration.** As AGOA's twenty-fifth anniversary draws near, a strategic lens is required. When it was rolled out in 2001, it was a game changer: a strong recognition of the move from aid to trade, and differentiating the United States

from Europe and China. A generation later, the United States once again has the opportunity to innovate while staying true to AGOA's core principle of providing African producers a preferential place in the US market. AGOA can go beyond its success in the trade of apparel and artisanal goods from African markets to the United States to include provisions that support US-African partnerships in strategic mineral supply chains. Most importantly, AGOA renewal offers the window through which to ensure that US companies are not disadvantaged in sourcing from African producers. This can be done by allowing AGOA-eligible countries to qualify as FTA countries under the rules of the IRA so that EV battery tax credits are given to companies that source from African countries. Exceptions as such have precedent in the 2023 Critical Minerals Agreement with Japan.<sup>72</sup> Going into AGOA's renewal process next year, the US Congress should secure AGOA-eligible countries' tax treatment under the IRA, ensuring that American companies that source African minerals are not penalized but incentivized to do so, particularly in the critical mineral types for which the United States is import-dependent.<sup>73</sup>

**Expand US educational exports, capacity building for African mining engineers and African regional organizations, and US soft power:** China surpassed the United States in 2014 in the number of English-speaking African students it hosts (with many in engineering), despite US strength in tertiary education and the legacy of programs such as the Kennedy-Mboya Africa Student Airlifts Program,<sup>74</sup> which brought hundreds of students from East Africa to the United States and Canada for university education between 1959 and 1963, including President Barack Obama's father.<sup>75</sup> To start investing in the people-to-people ties that are created through education and result in future access in the political and business realms, the US administration, in partnership with African institutions such as the Organization of African Geological Surveys and the African Union's Africa Mining Development Center, should launch a specialized scholarship and training program focused on mining in order to train the next generation of African mining engineers. The program could be cocreated with leading mining schools such as the Colorado School of Mines and Virginia Tech and include fellowships at North American mining and technology firms. This type of training program would be especially valuable in African countries that lack

68 Clemence Landers et al., "Memo to Congress: A Nine-Point Plan for DFC's Reauthorization," Center for Global Development, March 14, 2024, <https://www.cgdev.org/blog/memo-congress-nine-point-plan-dfcs-reauthorization>.

69 Andrew Herscovitz, "Ten Recommendations to Help DFC Better Execute on Its Development Mandate," February 21, 2024, ODI, <https://odi.org/en/insights/ten-recommendations-to-help-dfc-better-execute-on-its-development-mandate/>.

70 Katie Auth and Todd Moss, "BUILDing a DFC Fit for Purpose: Eight Recommendations for a Robust Reauthorization of America's Development Finance Institution," Energy for Growth Hub, November 14, 2023, <https://energyforgrowth.org/article/building-a-dfc-fit-for-purpose/>.

71 USIP Senior Study Group on Critical Minerals in Africa, "Critical Minerals in Africa: Strengthening Security, Supporting Development, and Reducing Conflict amid Geopolitical Competition," United States Institute of Peace, April 9, 2024, <https://www.usip.org/publications/2024/04/critical-minerals-africa-strengthening-security-supporting-development-and>.

72 Zainab Usman and Alexander Csanadi, "How Can African Countries Participate in U.S. Clean Energy Supply Chains?," Carnegie Endowment for International Peace, October 2, 2023, <https://carnegieendowment.org/2023/10/02/how-can-african-countries-participate-in-u.s.-clean-energy-supply-chains-pub-90673>.

73 Tom Moerenhout and Kevin Brunelli, "Q&A | The Debate Over the 45X Tax Credit and Critical Minerals Mining," Center on Global Energy Policy blog, Columbia University School of International and Public Affairs, February 27, 2024, <https://www.energypolicy.columbia.edu/qa-the-debate-over-the-45x-tax-credit-and-critical-minerals-mining/>.

74 "John F. Kennedy and the Student Airlift," John F. Kennedy Presidential Library and Museum, accessed April 16, 2024, <https://www.jfklibrary.org/learn/about-jfk/jfk-in-history/john-f-kennedy-and-the-student-airlift>.

75 Victoria Breeze, "China Has Overtaken the US and UK as the Top Destination for Anglophone African Students," Quartz, June 30, 2017, <https://qz.com/africa/1017926/china-has-overtaken-the-us-and-uk-as-the-top-destination-for-anglophone-african-students>.

large mining industries and struggle with skills constraints. It would also enhance efforts to deepen regional integration by creating pan-African networks in the mining industry to share lessons learned and best practices.

The International Finance Corporation/Milken Institute capital markets program provides a good model for a mining training initiative. Launched in 2016, this program brings mid-career capital market regulators and other financial professionals in emerging markets to the United States for courses at Georgetown University and internships at leading financial firms. Given the linkages between capital market maturation and overall economic development, the United States should also seek to support and scale the IFC/Milken program as local capital markets can offer innovative ways to secure community ownership and create healthy national mining companies through local listings.

Sustained secondment programs also can be used strategically to build significant capacity. The USGS, created in 1879 and housed in the Department of Interior, mostly operates domestically, but has a long history of international engagement. While USGS has programs in Africa, they are mainly short-term assignments and focused on water issues in the Sahel funded by USAID. To advance US and African interests in critical mineral value chains, USGS should model a program on its efforts in Brazil and Saudi Arabia. Over the past forty years, USGS managed long-term technical assistance programs in Brazil and Saudi Arabia, involving 180 temporary duty assignments and over 200 long-term and 400 temporary assignments, respectively.<sup>76</sup> The USGS also provided an embedded adviser in the US embassy in Kabul for two years. Based on these precedents, the United States should send USGS advisers to key African government partners and embed them in the African Continental Free Trade Area (AfCFTA) secretariat and the African Mining Development Center to build capacity to coordinate regional value chains and find data efficiencies as under-resourced ministries of mines across the continent take on the massive exploration challenge.<sup>77</sup>

**Apply US technology and VC problem-solving to systemic challenges in the African mining sector.** Given the potential for technology to dramatically reduce the cost of exploration in Africa, USAID should resurrect the “Geeks on a Plane” program to deploy tech experts to explore how VC-backed companies can operate in two spaces: formalizing and improving artisanal mining practices and using technology to map African resources.<sup>78</sup> KoBold Metals, a US VC-backed firm, has already had success using AI in Zambia to find one of the world’s largest copper deposits.<sup>79</sup> African countries need dozens more KoBolds working actively on exploration. In partnership with 500 start-ups, Geeks on a Plane last went to Africa in 2017, just as the African

tech ecosystem was beginning to mature. On a focused mining mission, Prosper Africa, which sits within USAID, could coordinate, working with USGS and groups such as KoBold, Breakthrough Energy, Bezos Earth Fund, Google, and others.

African minerals play a central role in US onshoring efforts and a more concerted, coordinated, and consolidated effort needs to be made to advance US-African commercial partnerships in this and future administrations. US policymakers should approach partnership building with a tone and position that acknowledges the role that Western mining companies played in colonial history and recognizes and engages African aspirations for value-added investment. An anti-China bipartisan support base for US national security and competitiveness in battery supply chains creates a foundation in Washington for a rapid scaling of successful models and innovative initiatives. This moment—a combination of political will and technical advancement—should not be wasted.

## African governments

To achieve their ambitions of mining contributing significantly to sustainable economic growth, African governments need diverse global partners such as the United States, Japan, Gulf States, etc.—and all the responsible investment they can attract. Given the increased Chinese interest in mining over the past ten years, namely as traders actively buying on the continent, African governments are seeking diversified investment and would like to see more US players active on the continent. Slow progress in transforming the African Union’s African Mining Vision of 2009 into the African Green Minerals Strategy (AGMS), due to be adopted this year, does not reflect the urgency that is necessary. Successfully attracting responsible investment in the near term will require a clear prioritization of the mining sector that recognizes the competitive landscape globally and the urgent need for innovation in project development and promotion.

**Seek partnerships to fast-track technology-supported exploration.** Investors cannot invest in what they do not see or understand. Given the historical underinvestment in exploration on the continent, there are major gaps in data that hinder effective investment promotion. The AGMS emphasizes the need for increasing geological knowledge and enhancing government capacity to conduct prefeasibility studies that provide baseline information on mining opportunities and identify project-level dependencies such as lacking regulation or infrastructure.<sup>80</sup> As suggested in the AGMS, African governments and regional institutions should leverage importing countries’ interest in sources of critical minerals to develop capacity-building and data-sharing partnerships. This strategy should go beyond the traditional bilateral players in the space

76 National Research Council, *International Science in the National Interest* at the U.S. Geological Survey (Washington: The National Academies Press, 2012), <https://doi.org/10.17226/13302>.

77 Usman and Csanadi, “How Can African Countries Participate?”

78 “When Geeks Fly,” US Agency for International Development, May 10, 2017, <https://medium.com/usaaid-2030/when-geeks-fly-ad282e28b00d>.

79 Taonga Mitimangi, and Matthew Hill, “AI-Powered Zambian Copper Mine May Become World’s Third Largest,” BNN Bloomberg, February 9, 2024, <https://www.bnnbloomberg.ca/ai-powered-zambian-copper-mine-may-become-world-s-third-largest-1.2033092>.

80 “Approach Paper towards Preparation,” ADB.

such as the USGS and the major mining companies to include large tech players with access to satellite data and big data/LLM capabilities such as Google, Amazon, SpaceX, and myriad AI start-ups. Governments—particularly those with emerging critical mineral mining sectors such as Nigeria, Tanzania, Madagascar, Zimbabwe, and others—have the opportunity to be pioneering in embedding tech-enabled exploration into their mining development strategies, building best-in-class data rooms, in partnership with private-sector players who can form the basis of roadshows and other global investment promotion efforts.

**Take a critical look at the Indonesian model.** While Indonesia has built a robust nickel processing industry based on dominant reserves, and the resultant Chinese investment interest, its journey has been neither linear nor smooth—and not all the lessons are applicable to African countries. African governments should resist export bans as nascent industries need global markets to fuel development and trade often proceeds investment. In an effort to force investment in value addition, Namibia and Zimbabwe recently banned lithium exports, and Ghana is making moves in that direction for bauxite, iron ore, and other critical minerals.<sup>81</sup> Past export bans in African markets have paradoxically led to a reduction in production levels of both processed and basic minerals.<sup>82</sup> Because the Indonesian model is a mixed one, African governments should look at it critically: they need to maximize the impact of policy innovations that will attract and not deter much-needed foreign investment.

**Pioneer new approaches to making artisanal and small-scale mining (ASM) more productive.** ASM has proven a major challenge globally since the nineteenth-century gold rush days of Australia and the American West. It emerged again as a focus of the development sector in the 1980s in gold mining in the Brazilian Amazon, given its linkages with deforestation and the dangerous use of mercury in gold refining. Since then, four decades of trying to formalize the ASM sector to stop the release of mercury through miner education and training, gov-

ernment enforcement, and land rights innovations have largely failed.<sup>83</sup> Formalization through cooperatives has been used in Brazil, Colombia, the DRC, and Ethiopia with mixed results. Today, more than sixty million Africans depend on artisanal mining for their livelihoods.<sup>84</sup> ASM constitutes 70 percent of the Nigerian mining sector,<sup>85</sup> and 65 percent of Ethiopian foreign exchange earnings.<sup>86</sup> Fundamentally a pursuit of the poor (often women and children), artisanal mining has a negative impact on the environment, proven to contribute significantly to deforestation and soil degradation in African markets, as individuals prioritize day-to-day subsistence income over longer-term concerns.<sup>87</sup>

A sixteen-country assessment of the costs of formalizing gold ASM, which included twelve African countries, estimated the costs of \$350 million per country.<sup>88</sup> Given that governments lack these resources and international pledges prove unreliable, African governments and their partners must become pioneers in new models for enhancing the productivity of ASM, developing ways for small-scale miners to sustainably benefit in industrial development. The models must take a systemic approach as mines must operate in the middle of food, energy, and rural ecological and cultural systems, and key stakeholders' interests must be aligned over the long-term life of mining projects. Famed Peruvian economist Hernando de Soto is advancing a blockchain-based approach to community mining rights in Peru, allowing indigenous groups to list their mining rights on exchanges so that they become owners of projects or sell their rights for market value compensation.<sup>89</sup> While the proposal is in the early days of feasibility, it constitutes an important effort to create new ownership structures that generate long-term local wealth.<sup>90</sup>

Alongside such market-oriented structural innovations, African governments can make near-term progress in making the ASM sector more productive by enabling, supporting, and facilitating technology platforms. Studies of the challenges of the ASM sector in East Africa highlight the stark need

- 81 Kiran Pandey, "Green Minerals Race: Ghana Approves Policy to Reap Maximum Benefits from Mining Projects," *Down To Earth* magazine, August 9, 2023, <https://www.downtoearth.org.in/news/africa/green-minerals-race-ghana-approves-policy-to-reap-maximum-benefits-from-mining-projects-91096#:~:text=This%20significant%20policy%20action%20by>.
- 82 IMF, "Digging for Opportunity: Harnessing Sub-Saharan Africa's Wealth in Critical Minerals," in *Regional Economic Outlook: Sub-Saharan Africa—A Tepid and Pricey Recovery*, April 2024.
- 83 Graham Prescott et al., "Formalizing Artisanal and Small-Scale Gold Mining: A Grand Challenge of the Minamata Convention," *One Earth* 5, no. 3 (2022), <https://doi.org/10.1016/j.oneear.2022.02.005>.
- 84 "Shining a Light on a Hidden Sector," World Bank, June 19, 2019, <https://www.worldbank.org/en/news/feature/2019/06/19/shining-a-light-on-a-hidden-sector#:~:text=Sub%2DSa-haran%20Africa%20is%20home>.
- 85 "Beaming the Light on a Hidden Sector: Artisanal and Small-Scale Mining (ASM) as a Vital Sector for Sustainable Development in Nigeria," United Nations Development Programme, December 30, 2023, <https://www.undp.org/nigeria/blog/beaming-light-hidden-sector-artisanal-and-small-scale-mining-asm-vital-sector-sustainable-development-nigeria>.
- 86 Cornelia Havel, "The Formalization of Artisanal and Small-Scale Gold Mining in Colombia and Its Contribution to the Sustainable Development Goals," (master of science diss., University of London, 2017), [https://www.responsiblemines.org/wp-content/uploads/2018/06/HAVEL\\_CORNELIA DISSERTATION-on-formalization.pdf#:~:text=As%20a%20result%20the%20Colombian%20government%20started](https://www.responsiblemines.org/wp-content/uploads/2018/06/HAVEL_CORNELIA DISSERTATION-on-formalization.pdf#:~:text=As%20a%20result%20the%20Colombian%20government%20started).
- 87 Victoire Girard, Teresa Molina Millan, and Guillaume Vic, "The Role of Artisanal Mining in Deforestation: New Insights from Africa-Wide Data," *VoxDev* platform, March 13, 2023, <https://voxdev.org/topic/energy-environment/role-artisanal-mining-deforestation-new-insights-africa-wide-data#:~:text=New%20data%20shows%20the%20potential>.
- 88 Prescott et al., "Formalizing Artisanal and Small-Scale Gold Mining."
- 89 Maria Cervantes, "An Influential Economist Has a Market Solution for Resolving Tensions Over Mining in Peru," *Bloomberg*, November 4, 2022, <https://www.bloomberg.com/news/articles/2022-11-04/influential-economist-has-a-market-solution-to-community-tensions-in-peru>.
- 90 Patrick Wieland, "Hernando de Soto, the Lone Prospector and the Formalization of Artisanal and Small-Scale Mining: A Case Study from La Rinconada, Peru," *UC Davis School of Law's *Environs** 43, no. 1 (2020): 1-66, <https://environs.law.ucdavis.edu/archives/43/1/hernando-de-soto-lone-prospector-and-formalization-artisanal-and-small-scale-mining>.

that the miners have for better data.<sup>91</sup> So much of their effort is wasted trying to get lucky on where they choose to mine. Open data platforms with geological and geospatial information, made accessible through government extension agents or cooperatives, could eliminate millions of man hours spent in dangerous work. Tech-enabled platforms could also help governments better assess, monitor, and engage ASM miners in order to build a basis for access to social services, credit, and reforestation programs. Platforms that allow for the fractionalization of equipment—such as Hello Tractor has done in agriculture<sup>92</sup>—would also be relevant to cut out exploitative middlemen in ASM that miners pay to crush their rocks.

Industrial growth built on a mining base, as has occurred all over the world over the past 200 years, is disruptive and often destructive to the environment as well as cultural and social traditions. African governments have to balance often-conflicting imperatives of poverty alleviation and good stewardship in the mining sector, as outlined in the AGMS. A realistic approach with urgency and acknowledged trade-offs is essential. Prioritizing investment and tech-enabled innovation will support the development of a more inclusive, sustainable mining and processing industry in African markets.

### African investors and Africa-interested investors

There will not be any significant development in African mining without both local and global investors. Only the private sector can mobilize the hundreds of billions it will take to reform battery supply chains over the next ten years. New US-African partnerships that leverage the power of the IRA and other Western programs can fast-track progress in securing green supply chains necessary for future competitiveness.

**Invest in the United States and cut out the Chinese middlemen.** African mining companies should consider investing in processing facilities in the United States to have fully vertically integrated operations, thereby “Atlanticizing” the supply chain. They can take advantage of the US Ex-Im Bank’s MMIA program, which can provide debt financing to critical mineral projects in the United States if they create jobs and export 15 percent of their production over the life of the program. Greenfield projects also can be considered through the Ex-IM project finance window. African countries and companies cannot wait for US investors to develop the risk appetite and pioneering spirit needed for new investments in mining on the continent. If US investors lack the risk appetite for African markets, African investors can flip the script and invest in the United States, thereby bypassing Chinese processors all together, accessing US federal and state government industrial policy programs that seek to support new investments in criti-

cal minerals and capturing a greater share of the value within the supply chain.

**Become pioneers in sustainable mining practices and community ownership models.** Given the emergence of climate and ESG investing, twenty-first-century Western mining companies have to conform to increasingly stringent social and environmental standards. Historically, Western mining firms were key colonial actors, guilty of exploitative practices, corruption, and unmitigated environmental damage. Ghana was first known to Europeans as da Mina (the Mine), following Portuguese discoveries of gold in 1471, and was called the Gold Coast until 1957. After the blood diamonds era of the 1990s and early 2000s, irresponsible mining is no longer an option for Western companies.

Eight of the top ten largest mining companies in the world are publicly traded and the twenty-eight-member International Council on Mining and Metals, which counts as members the vast majority of Western mining companies, have pledged net-zero emissions by 2050. Given that the character of the capital that invests in them and at the project level is changing, mining companies must create new models to address environmental and social challenges in African markets. Despite the recent pushback on ESG investing in the United States, this trend is becoming structural. ESG assets are anticipated to surge to over \$40 trillion by 2030 and over 25 percent of total assets under management, up from about \$30 trillion in 2022 and just \$195 billion in 2010.<sup>93</sup> Climate funds have grown even faster, with a proliferation of funds with clear climate-related strategies evident worldwide. As of mid-2023, more than 1,400 such funds were identified. Even with the fall in global venture funding in 2023, climate-focused funds have maintained a robust trajectory, with over 200 new climate investment funds emerging since 2021 and raising additional capital to fuel the clean energy transition. Europe leads the push, dominating the market with approximately 84 percent of global climate fund assets.

This translates into a lot of capital chasing a few projects.<sup>94</sup> Funds dedicated to climate investing are estimated to hold approximately \$33 billion in dry powder, ready to be deployed toward sustainable endeavors—but require structures that build in environmental stewardship, traceability, and community engagement. Given the focus on critical minerals at COP and other climate gatherings, the nexus between climate investing and mining is deepening, and thus global mining companies will face new pressures to operate responsibly in African countries.

Investors in African mining need to become leaders in sustainable mining practices and community ownership mod-

91 Bernard Limo, “Best Mining Practices for Small Scale and Artisanal Mining in East Africa Region,” January 2023, [https://www.researchgate.net/publication/367142886\\_Best\\_Mining\\_Practices\\_for\\_Small\\_Scale\\_and\\_Artisanal\\_Mining\\_in\\_East\\_Africa\\_Region](https://www.researchgate.net/publication/367142886_Best_Mining_Practices_for_Small_Scale_and_Artisanal_Mining_in_East_Africa_Region).

92 “Hello Tractor,” Solve at MIT, Massachusetts Institute of Technology, accessed April 29, 2024, <https://solve.mit.edu/challenges/circular-economy/solutions/9522>; and Hello Tractor, homepage, n.d., <https://hellotractor.com/home/?wmc-currency=NGN>.

93 “Announcement: Global ESG Assets Predicted to Hit \$40 Trillion by 2030, despite Challenging Environment, Forecasts Bloomberg Intelligence,” Bloomberg Finance Release, February 8, 2024, <https://www.bloomberg.com/company/press/global-esg-assets-predicted-to-hit-40-trillion-by-2030-despite-challenging-environment-forecasts-bloomberg-intelligence/>.

94 Alyssa Stankiewicz, “Assets in Global Climate Funds March Steadily Higher,” Morningstar, September 26, 2023, <https://www.morningstar.com/sustainable-investing/assets-global-climate-funds-march-steadily-higher>.

els, embedding sustainability and government engagement experts in project development teams from day one. Investors must build into their financial models the costs of public goods—due to geological realities— as they must operate in rural areas that often exist outside of day-to-day government services in countries lacking technical capacity and skills in key ministries. Partnerships with a broad base of constructive nongovernmental organizations, development agencies, environmental organizations, and community/traditional leaders are not just nice to have, but rather a core success factor. Innovations that allow for rapid engagement, stakeholder education, and consensus building and tracking are much needed. As much as mining is about hard rocks and big machines, it is the soft skills that can make or break a project. Investors must work with African governments and communities to secure long-term alignment of economic interests in the financial, environmental, and social sustainability of mining projects.

## CONCLUSION

**B**y implementing these recommendations, the United States and African nations can establish a mutually beneficial and secure critical minerals supply chain for the future. There is a moment of opportunity to align US strategic interests with the development goals of African nations. This endeavor requires an integrated approach that combines investment facilitation, technological innovation, capacity building, and the fostering of an environment that encourages transparent, equitable, and sustainable practices.

To counterbalance China's dominance in battery supply chains, the United States must leverage its strengths in technology, education, and capital markets. Initiatives such as Prosper Africa need to be dynamically scaled and optimized to provide meaningful support, ensuring that US investors can more easily and rapidly navigate the complex landscape of Washington. African nations may have an increasingly diverse set of global partners to choose from, but their leaders must act with urgency in order to attract the necessary investment in critical minerals to deepen, broaden, and accelerate the move from greenfield projects to green supply chains.

## About the Author



Aubrey Hruby is a nonresident senior fellow with the Atlantic Council's Africa Center and co-founder of Insider and Tofino Capital. Hruby is an active investor in African start-ups, has consulted extensively in over thirty African markets, and regularly advises senior policymakers and Fortune 500 companies on doing business in the region. Hruby has led CEO-level delegations to African countries and has coordinated presidential visits to the United States. She consistently works to ensure Africa is kept on the US foreign-policy agenda. She is the former managing director of the Whitaker Group, an Africa-focused advisory firm that has helped facilitate well over two billion dollars in capital flows to the continent.

Hruby teaches at Georgetown University and is the co-author of the award-winning book *The Next Africa: An Emerging Continent Becomes a Global Powerhouse* (Macmillan, 2015). She earned an executive MBA from the Wharton School at the University of Pennsylvania, an MA from the School of Foreign Service at Georgetown University, and BAs in economics, political science, and international relations from the University of Colorado.





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