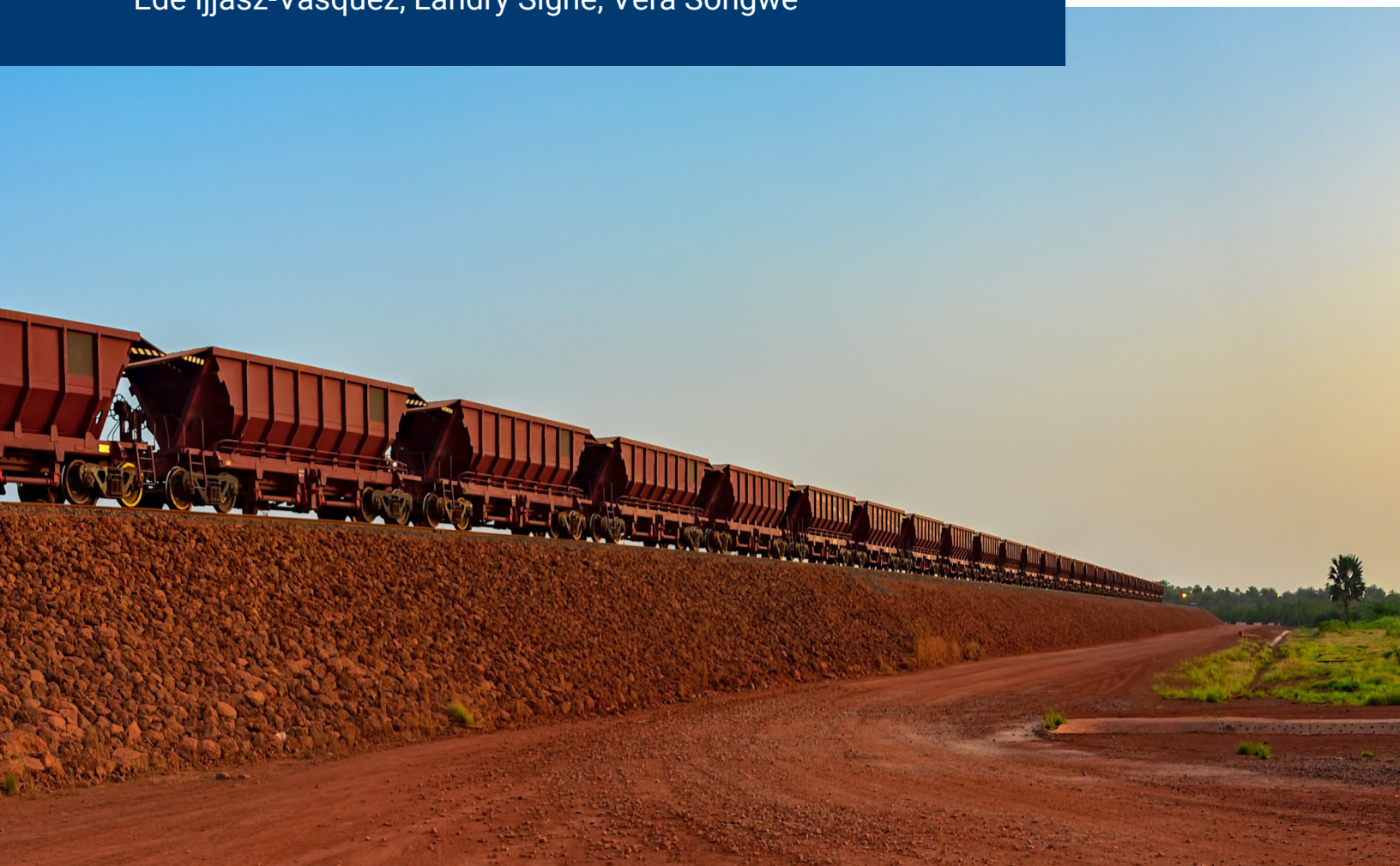
Africa Growth Initiative at BROOKINGS

REPORT
SEPTEMBER 2025

LEVERAGING US-AFRICA CRITICAL MINERAL OPPORTUNITIES

STRATEGIES FOR SUCCESS

Ede Ijjasz-Vasquez, Landry Signé, Vera Songwe



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ACKNOWLEDGEMENTS

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The authors of this report would like to express their sincere appreciation to all those who have made this work possible, including participants to the roundtables organized by Brookings AGI in October 2024 and April 2025. In particular we would like to thank our peer reviewers: Brahima Coulibaly, Pierre Nguimkeu, Marit Kitaw, Witney Schneidman, Hannah Wanjie Ryder, and Didier Tatoutchoup. We would also like to acknowledge Izzy Taylor for her detailed copyediting and Dafe Oputu for his fact-checking, feedback, and comments.

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EXECUTIVE SUMMARY

The U.S. is highly dependent on imports of critical minerals that are indispensable for some of the most important manufacturing industries in the country. The vulnerability of supply chains for these critical minerals requires new approaches and partners. Africa is uniquely positioned to be a strong partner of the U.S. in this realignment. This paper reviews the landscape of critical minerals in Africa, the unique opportunities the region offers to U.S. investors, and the benefits possible for both regions given strong critical minerals, energy, and infrastructure investment partnerships.

Critical minerals are defined differently by each country. In the United States, "the Energy Act of 2020 defined critical minerals as those that are essential to the economic or national security of the United States; have a supply chain that is vulnerable to disruption; and serve an essential function in the manufacturing of a product, the absence of which would have significant consequences for the economic or national security of the U.S." (United States Geological Survey (USGS). As of 2024, 50 minerals are considered "critical" by the U.S. (Mineral Resources Program 2024).

Critical minerals like aluminum have broad uses in many industries. Magnets made out of rare earth elements are used in industrial motors, generators, and wind turbines (IERE 2025). Other critical minerals are used in the defense, energy, electronics, and healthcare industries (Mineral Resources Program 2024).

The U.S. is entirely dependent (100%) on imports for 12 critical minerals. For another 28, it is more than 50% net import reliant. This dependency has existed for the last 20 years (USGS 2025).

Globally, demand for critical minerals is set to grow significantly: For example, lithium demand is projected to grow 4.5 times its current level, graphite 2.3 times, nickel and rare earth elements 1.6 times by 2040 (IEA 2025a). Recent policy and market changes in the U.S. under the second Donald Trump administration make it difficult to project U.S. demand for critical minerals.

On the one hand, increased domestic manufacturing will lead to an increase in demand for critical minerals, particularly from the electronics and heavy industries. On the other hand, changes in tax credits to clean energy projects have led to numerous cancellations (E2 2025a, 2025b). Nevertheless, given the widespread use of critical minerals in diverse industries, the demand will most probably grow. The U.S. should be prepared to have greater control over its supply chains.

For most critical minerals, the concentration of mining production of the top three countries is very high, above 50% (IEA 2025a). This situation is difficult to change rapidly, as the average lead time for new mines to begin production is about 18 years. (Manalo 2025). The geographical distribution of critical minerals processing is even more pronounced than that of mining. China is the dominant producer of critical minerals, except nickel (although it plays a

significant role in the ownership of nickel refining facilities in Indonesia) (IEA 2025a).

The challenge of global concentration of mining and processing of critical minerals has not changed much in the last five years. Only lithium mining concentration has seen a significant decrease due to new mines in Argentina and Zimbabwe, and rare earth elements have seen a modest decline in concentration as their production volumes are much smaller. Nickel mining and refining have seen a greater concentration due to recent policies and investments in Indonesia and production declines in other markets (IEA 2025a).

Prices for critical minerals have seen wild swings in recent years, making investors cautious. A portion of this volatility is caused by the rapid ramp-up of production to respond to high prices (IEA 2025a). Another portion is linked to the high concentration of refining and market manipulation practices by China (USTR 2025).

The U.S. continues to take measures to diversify its suppliers of critical minerals. On March 20, 2025, the Trump administration issued an executive order aimed at increasing U.S. domestic mineral production (The White House 2025b). These efforts are essential but may be insufficient to cover the current and future demand for critical minerals in the U.S.

Africa can play a critical role in being a reliable partner to strengthen the value chain of critical minerals for the U.S. The region has three important advantages at play for new potential partnerships with the U.S. First, significant reserves of several critical minerals; second, existing mining and refining operations with the potential for expansion; and third, considerable business opportunities in infrastructure and energy with reliable sources of revenue based on expanding mining extraction and potential critical minerals refining. In addition, African countries have made significant progress in the governance of their mining sectors, and there is a political consensus in the region to move forward decisively on a rapid expansion of mining and ancillary business opportunities to respond to the rapid growth in the demand for critical minerals.

Africa is estimated to hold about 30% of proven critical minerals reserves, and several countries are global leaders in reserves (Mo Ibrahim Foundation 2022). There are 35 African countries that produce at least one critical mineral (Development Reimagined 2024). In fact, these numbers are probably underestimates, given the low level of exploration, which dropped 3.4% in 2023 as compared to 2022 (except for lithium) (S&P Global 2023).

Africa has shown that it can ramp up mining production quickly. Cases like manganese in Gabon, cobalt in the Democratic Republic of the Congo (DRC), bauxite in Guinea, and lithium in Zimbabwe can serve as examples to other African countries (Federal Ministry Republic of Austria Finance 2025).

The investment needs in energy and infrastructure in Africa present a unique opportunity when combined with mining development. Mining is a highly energy-intensive industry. In countries like Zambia, 52% of electricity in 2018 was consumed by mining operations, and in the DRC 55% (Imasiku and Thomas, 2020). Investments in energy and transport infrastructure are attractive to the private sector. In 2023, the region closed $3.5 billion of infrastructure investment deals with the private sector, encompassing 66 projects (World Bank 2024b).

Finally, Africa has the political will to establish effective partnerships for the development of its critical minerals sector. The December 2024 African Union Green Minerals Strategy is a testament to this policy commitment, with clear investments identified in mining and the value chain of critical minerals. (African Union 2024).

In a highly competitive global environment for critical minerals mining, Africa should enhance its comparative advantages. The race for critical minerals is global and intense. North American and Latin American existing and prospective mines tend to be viewed as safer investments for U.S. mining companies due to their proximity and familiarity. The comparative advantages of Africa described above should be at the core of Africa's marketing of its critical minerals.

Today, African countries face a different political environment in the U.S. The new directions under the Trump administration have changed from regional to individual country engagements. The elimination of USAID and the reorientation from aid to trade should inform the approaches to be taken by African governments.

This report proposes five actions for African governments to be better positioned in their negotiations with the U.S. for critical minerals.

First, a single, high-level national coordinator per government is needed for a whole-of-government approach for the critical minerals, infrastructure, energy, and value chain sectors. A single point of entry for engagement and negotiation of specific deals will be highly attractive and efficient. Furthermore, coordinated actions are necessary in value chains and economic activities linked to development corridors around mining and transport infrastructure projects.

Second, an efficient review process and speedy approvals, from exploration to production, are key to competing in the global critical minerals market. The benchmark for the development of new mines is about 18 years. Africa can reduce the initial phase of mine development by several years, and this will position the region as an attractive investment destination.

Third, African governments can identify sub-standard mining operations causing environmental damage and take action by requiring sales to more qualified operators that can comply with the necessary environmental and social standards.

Fourth, regional coordination that leverages the Africa Continental Free Trade Agreement (AfCFTA) is indispensable. With 35 African countries having critical mineral resources, and the strong priority of AfCFTA implementation in the region, regional coordination to continuously expand markets for the integrated development of value chains, skills, and regional infrastructure projects is critical.

Fifth, job generation strategies should be integrated into overall critical minerals projects through a well-designed corridor development plan, regional partnerships, and value chain strategies. Infrastructure corridors and new energy generation also offer opportunities for new export-oriented industries to flourish in the wake of these investments (Columbia Center on Sustainable Investment 2017). Well-designed special economic zones will generate jobs that align with a given country's economic vocation and opportunities along the development

corridors (Zeng 2021).

In concert with these five recommendations, investment promotion agreements or critical minerals agreements can be explored with the U.S. In addition to continuing engagements for the reauthorization (and expansion to the critical minerals sector) of the African Growth and Opportunity Act (AGOA), due to expire on September 30, 2025, African governments can also explore individual investment promotion agreements or critical minerals agreements with the U.S. (Egyin 2024).

Conversely, the U.S. foreign policy towards Africa should include a well-organized minerals diplomacy. China has used a multi-pronged engagement in African countries for years. Other countries, such as India, Saudi Arabia (Magid and Dahan 2024), and the European Union (EU) (Acheampong 2024) are beginning to explore entries into the African critical minerals sector. The U.S. cannot be left behind.

A coordinated inter-agency effort from the U.S.' side is required, including the Development Finance Corporation (DFC) on financing of infrastructure and mining investments, the U.S. Export Import Bank (EXIM) on financing the export of equipment and goods together with the import of minerals, the U.S. Trade and Development Agency (USTDA) on financial support to upstream studies, the USGS on exploratory geological work, the DOE on energy policies and investments, the Treasury on financial and fiscal instruments, the Commerce Department on trade barriers elimination, and the State Department on a range of assistance on trade, energy, and economic development.

The U.S. faces several risks with critical minerals that can be resolved through well-designed partnerships with African countries. Through these partnerships, the U.S. can secure the supply of refined critical minerals independent from supply chains linked to China; have faster access to large deposits of critical minerals; develop new opportunities for U.S. businesses in mining, refining, and infrastructure sectors in Africa; and support stable, growing economies with reduced national and regional conflicts.

1. INTRODUCTION

This paper provides an analysis of the rapidly changing landscape of trade policies, critical minerals, and mining investments in Africa. The recent changes in U.S. policy direction and the urgency to develop reliable sources of critical minerals require a fresh perspective from African countries. The change in U.S. engagement in Africa from aid to trade and the growing concerns of the critical mineral supply chain vulnerability due to the concentration in mining and refining opens new opportunities for Africa to leverage its resources for strong business partnerships and new opportunities for sustainable economic development.

This paper reviews in detail the global landscape of critical minerals and the specific vulnerabilities several U.S. manufacturing sectors face with critical minerals supply. Then it reviews the critical minerals resources available in Africa and recent developments in mining and refining in the region and globally to understand the competitive landscape Africa is facing.

The paper then focuses on actions that the current U.S. administration and African countries could take to strengthen partnerships that accelerate the development of the critical minerals sector in Africa as a stable source for U.S. industries, and to foster rapid and sustainable development and job creation in Africa leveraging these resources.

Finally, the paper analyzes the economic potential for Africa, particularly in job creation in the mining and refining of critical minerals, the development of ancillary energy and infrastructure projects, and the growth of export-oriented businesses linked to development corridors connected to mining operations.

Rather than focusing on the technical issues of the mining sector in Africa, the paper offers a broader cross-sectoral and cross-institutional perspective, including the infrastructure-energy-mining nexus, institutional arrangements, and policy changes.

The analysis is based on a literature review, expert interviews, and discussions. Its conclusions are also informed by roundtable conversations organized by the Africa Growth Initiative at the Brookings Institution in October 2024 and April 2025.

The paper is organized into six sections, beginning with this introduction as Section 1. Section 2 presents the current state and trends of critical minerals globally, including the most significant challenges faced by the industry and the downstream industries that rely on these minerals. Section 3 reviews the factors that make Africa an attractive partner for the U.S. in the critical minerals arena. Section 4 presents specific recommendations for African and U.S. stakeholders, respectively, to strengthen partnerships and investment opportunities in the region's critical minerals sector. Section 5 presents the potential benefits for the U.S. and Africa that can emerge from stronger business partnerships in the critical mineral sectors. Section 6 summarizes critical actions that Africa can take to implement the suggestions offered.

The conclusions and recommendations of this paper are solely those of its authors, and do not reflect the views of the Brookings Institution, its management, or its other scholars.

2. CRITICAL MINERALS: GLOBAL AND U.S. DEMAND

2.1 Minerals defined as critical in the U.S.

The U.S. Energy Act of 2020 uses three criteria to identify minerals as critical. The USGS is responsible for revising the roster of critical minerals on a triennial basis, and to complete resource assessment for each of them. The most recent list of critical minerals published in 2022 includes 50 minerals (Mineral Resources Program 2024). Annex 1 presents the current U.S. list of critical minerals and key industries that use them. Other countries have different criteria for critical minerals, such as Canada (Natural Resources Canada 2024) and the EU (European Union 2024).

BOX 1. U.S. DEFINITION OF CRITICAL MINERALS

The U.S. Energy Act of 2020 (United States, 2020) defines minerals as critical based on three criteria. A critical mineral must:

1. Be "essential to the economic or national security of the United States."
2. "[S]erve an essential function in the manufacturing of a product… the absence of which would have significant consequences for the economic or national security of the United States."
3. Have a supply chain that is "vulnerable to disruption (including restrictions associated with foreign political risk, abrupt demand growth, military conflict, violent unrest, anti-competitive or protectionist behaviors, and other risks through-out the supply chain)."

Some critical minerals, like aluminum, are used in nearly every sector of the U.S. economy. Others are used for batteries, semiconductors, ceramics, superalloys, high-strength magnets, and fiber optics, making them indispensable in the defense, energy, electronics, and health-care industries (Mineral Resources Program 2024).

Of special interest are the rare earth elements, a group of 17 metallic elements that play an essential role in a wide range of electronics, from mobile phones to computer hard drives, electric vehicles, and flat-screen monitors. Magnets made out of rare earths are indispensable for industrial motors and generators, wind turbines, and speakers (IERE 2025).

It is notable that copper is not included among the critical minerals identified by the U.S., even though it is used in a wide range of U.S. industries. The significant levels of domestic production mitigate the vulnerability of its supply chain (see criterion three in box 1), although this may be revised in the future (US Department of Commerce 2021).

2.2 Current consumption of critical minerals in the U.S.

Table 1 shows the apparent consumption for critical minerals in the U.S., as calculated by the USGS for 2024 and 2023.[1] Figure 1 presents the change in critical minerals consumption from 2023 to 2024. The 2024 consumption for many critical minerals decreased from that in 2023. There are many possible reasons for this variation, including export restrictions of the critical mineral to the U.S., substitution of the critical mineral, or variation in the domestic production of products that use the raw critical minerals.

TABLE 1

Critical minerals consumption in the U.S. (2024, 2023)

Critical mineral	U.S. consumption (apparent 2023)	U.S. consumption (apparent 2024)	Unit
Aluminum	4,150	4,300	1000 metric tons
Antimony	20,300	24,000	metric tons
Arsenic	6,430	9,100	metric tons
Beryllium	144	170	metric tons
Bismuth	1,450	760	metric tons
Chromium	429	440	1000 metric tons
Cobalt	6,440	8,500	metric tons
Fluorspar	392	430	1000 metric tons
Gallium	19,200	19,000	kg
Graphite	62,700	52,000	metric tons
Indium	219	250	metric tons

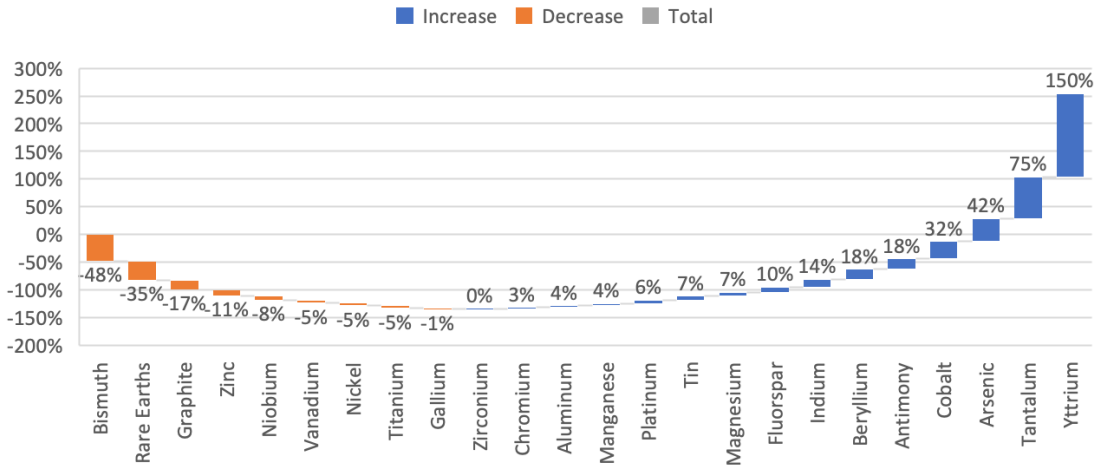
1 Information for critical minerals not shown in Table 1 is not available or not reliable. The data for rare earth elements include lanthanides and yttrium but exclude most scandium. Apparent consumption is "defined as primary production + secondary production from old scrap + imports – exports ± adjustments for stock changes; excludes imported scrap." (USGS 2023)

Critical mineral	U.S. consumption (apparent 2023)	U.S. consumption (apparent 2024)	Unit
Magnesium	830	890	1000 metric tons
Manganese	653	680	1000 metric tons
Nickel	190,000	180,000	metric tons
Niobium	9,100	8,400	metric tons
Platinum	67,000	71,000	kg
Tantalum	440	770	metric tons
Tin	34,700	37,000	metric tons
Titanium	42,000	40,000	metric tons
Vanadium	14,800	14,000	metric tons
Yttrium	200	500	metric tons
Zinc	921	820	1000 metric tons
Zirconium	<100,000	<100,000	metric tons
Rare Earths	10,100	6,600	metric tons

SOURCE: Adapted from USGS (2025)

FIGURE 1

Change in U.S. consumption of critical minerals from 2023 to 2024

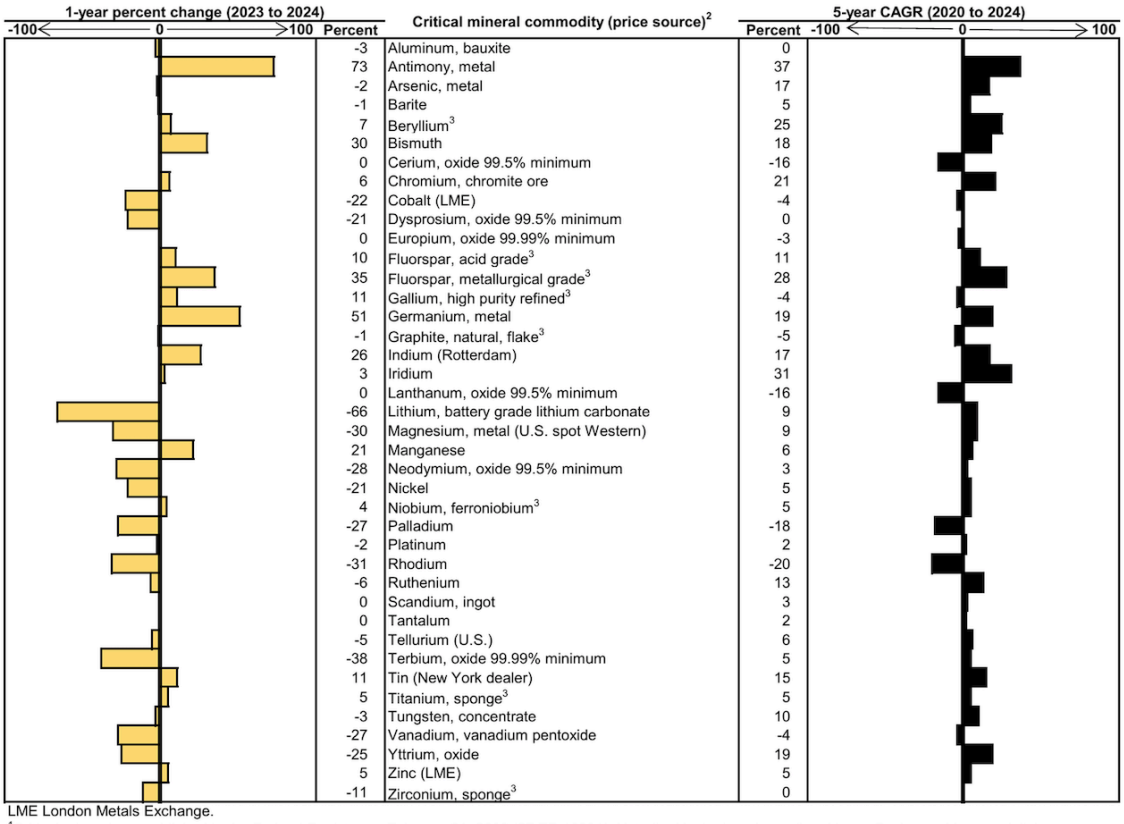


SOURCE: Adapted from USGS (2025) Figure 11

Figure 2 shows the price variation from 2023 to 2024 and the five-year compound growth rate (CAGR). Like in figure 1, there are several critical minerals with price increases, but also many others with price decreases from 2023 to 2024. Antimony and Germanium, for example, saw price increases of 73 and 51%, respectively, due to export restrictions. The price of Lithium decreased by 66%, while the price of cobalt went down by 22%. Over the last five years, the CAGR has increased for 28 critical minerals and decreased for seven.

FIGURE 2

Estimated one-year percent change and five-year CAGR in U.S. prices of critical minerals



LME London Metals Exchange.
[1]Critical minerals as published in the Federal Register on February 24, 2022 (87 FR 10381). Not all critical minerals are listed here. Cesium, erbium, gadolinium, hafnium, holmium, lutetium, praseodymium, rubidium, samarium, thulium, and ytterbium are not shown because available information regarding prices was inadequate.
[2]Price source is only included for those commodities that have multiple price sources in their Salient table. For those commodities with a single price source, please refer to that commodity chapter's Salient Statistics table.
[3]Average annual unit value of imports.

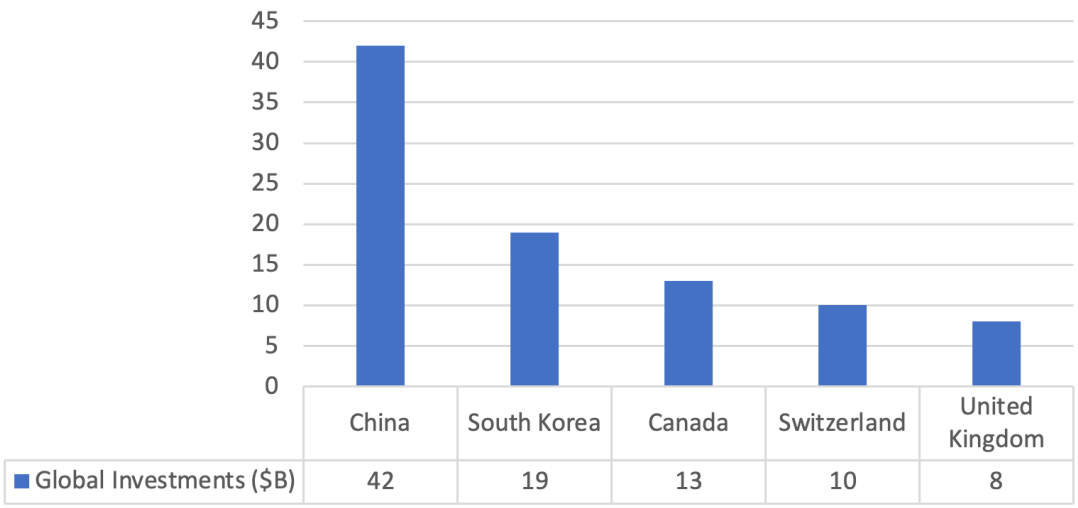
SOURCE: USGS (2025)

2.3 Current and future global demand for critical minerals

The critical minerals market has grown rapidly over the last decades, attracting large investments in production. Figure 3 shows the largest investments in production by estimated capital expenditure in the critical minerals industry (U.S. Department of Trade 2024). China has been a consistent investor globally and domestically, cementing its leadership position.

FIGURE 3

Top markets by estimated capital expenditure in the critical minerals industry (2014-2023)

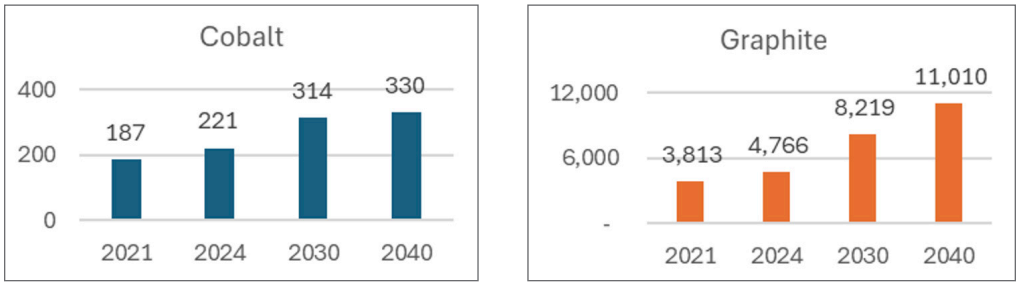


SOURCE: Adapted from the U.S. Department of Trade (2024)

Global investments are already high, and projections from the International Energy Agency (IEA) predict a sharp rise in critical mineral requirements over the next several decades. Figure 4 shows the projected global demand for cobalt, graphite, lithium, nickel, and rare earths. [2] Except for cobalt, rapid growth continues until 2040 for all critical minerals analyzed, with the growing adoption of lithium iron phosphate chemistries for batteries projected to stymie future demand for cobalt (IEA 2025a). Lithium demand grows 4.5 times from current levels, graphite 2.3 times, nickel and rare earths 1.6 times. Battery demand for energy storage and electric vehicles will drive the demand for lithium, graphite, nickel, and cobalt. The multiple uses of rare earth minerals in the electronics, defense, automotive, and wind energy industries—including technologies that rely on permanent magnets—will drive their rapid demand growth (IEA 2025a). ments in production. Figure 3 shows the largest investments in production by estimated capital expenditure in the critical minerals industry (U.S. Department of Trade 2024). China has been a consistent investor globally and domestically, cementing its leadership position.

FIGURE 4

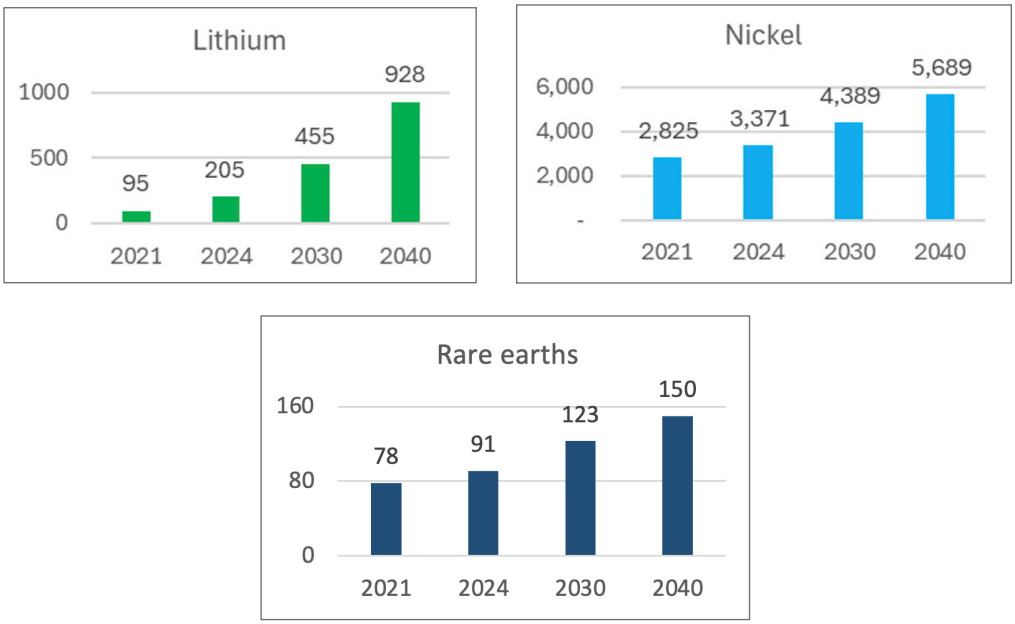
Global demand outlook for selected critical minerals (in kilotons)



2 The IEA analysis focuses on these critical minerals, which are of greater importance to the energy transition.

FIGURE 4

Cont. Global demand outlook for selected critical minerals (in kilotons)



SOURCE: Adapted from IEA (2025a)

The IEA estimates that the market value[3] of mining for the five critical minerals shown in figure 3, plus copper, will grow 1.5 times by 2040, reaching about $500 billion in the base case (see figure 5). This base case includes "production from existing assets and those under construction, along with projects that have a high chance of moving ahead." (IEA 2025a) Latin America leads the growth of the mining market, while Africa sees a drop in this base case given the limited outlook (compared to other regions) of confirmed new projects and projected production in existing assets, particularly in cobalt and lithium after 2030. Given these projections, Africa would benefit from growing its mining sector to compete with other regions and capitalize on the increasing demand for the selected minerals that it possesses.

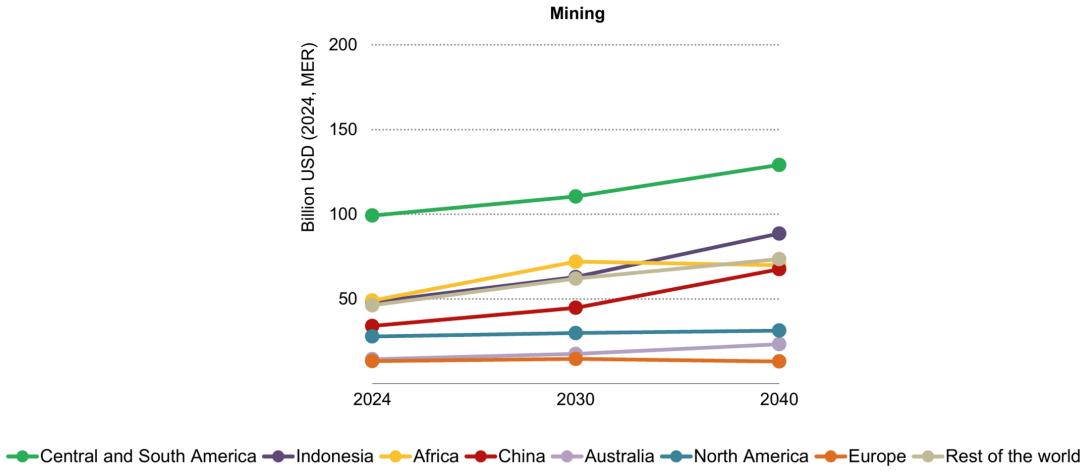
While, as figure 4 indicates, global demand is set to rise for select critical minerals, recent policy and market changes in the U.S. under the second Trump administration make it difficult to isolate the projected U.S. demand for critical minerals. On the one hand, new policies designed to increase domestic manufacturing will likely lead to an increase in demand for critical minerals, particularly from the electronics and heavy industries. The global increase in defense spending may also result in growth of the U.S. aeronautics and defense industry (see box 2), as will the exponential growth of the Artificial Intelligence industry (Barclays 2025).

On the other hand, recent policy changes to the federal clean energy tax credits have led to numerous cancellations of projects using critical minerals. After the approval of the Inflation Reduction Act in 2022, which codified clean energy tax credits, the private sector announced 404 new clean energy projects, of which 80% were in manufacturing (with a value of more

3 IEA (2025) calculates market value by multiplying the production volume in each region by the market price at the time of report preparation.

FIGURE 5

Market value of mining for selected critical minerals plus copper



SOURCE: IEA (2025a)

than $120 billion). The main sectors covered included electric vehicles, solar energy, and battery and storage manufacturing. In the first half of 2025, businesses canceled or scaled back more than $22 billion of projects in anticipation of the end of the federal clean energy tax credits (E2 2025a, 2025b). Indeed, the One Big Beautiful Bill Act, signed by President Trump on July 4, 2025, introduced several reductions to these tax credits.[4] The impact of these changes on critical mineral demand is uncertain, but will likely lead to a reduction.

BOX 2. CRITICAL MINERALS' ROLE IN THE U.S. DEFENSE INDUSTRY

Almost all critical minerals play an indispensable role in the U.S. defense industry. For example, cobalt is used in the high-performance superalloys at the core of fighter jet engines, as well as in batteries used by drones and portable power packs. Tungsten is used in kinetic energy penetrators and munitions. Gallium is used in advanced radar systems and ultra-high efficiency power electronics. Rare earth minerals are used in powerful, lightweight, permanent magnets for missiles, drones, and sonar systems. The potential for rapid deployment of new technologies such as Artificial Intelligence and Advanced Air Mobility will lead to a growth in critical minerals demand (Deloitte 2024a, 2024b).

The combined effect of the above policy changes is unclear. Nevertheless, given the widespread use of critical minerals in diverse industries, the demand will most probably grow, and the U.S. should be prepared to strengthen the supply chains of these minerals for strategic reasons.

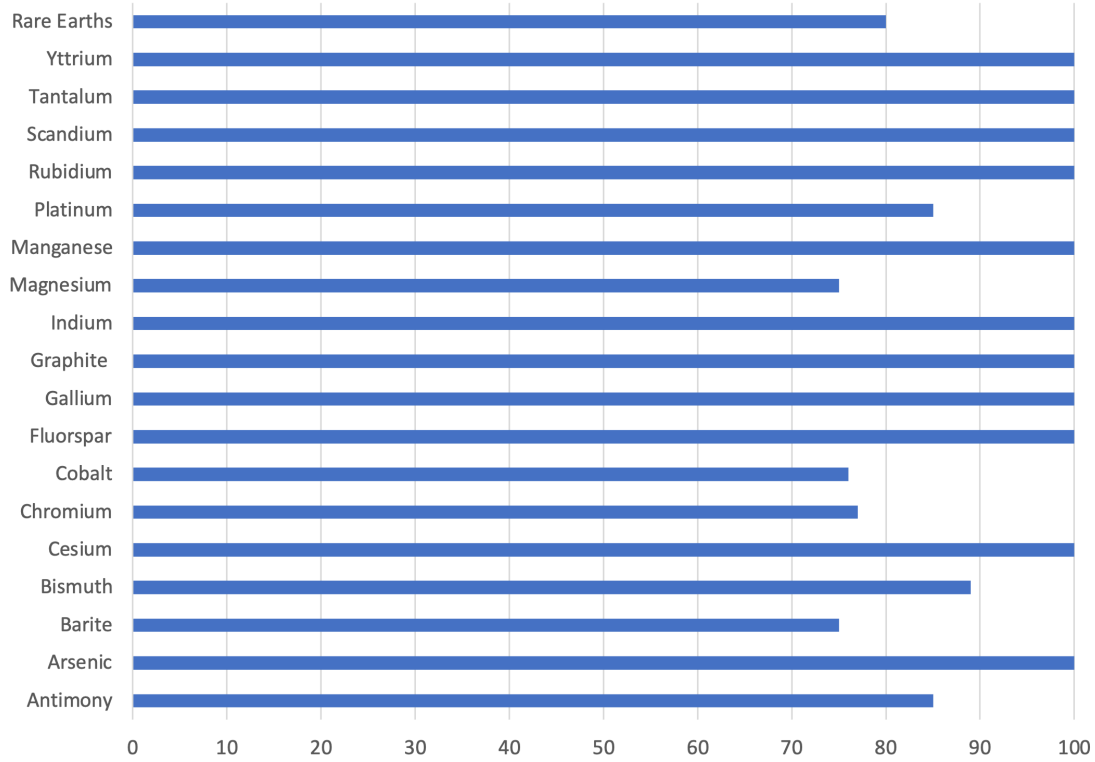
4 Projects in solar and wind that start after July 4, 2026 lose eligibility for production and investment tax credits, except if they are completed by December 31, 2027. Battery storage and other clean energy generation projects remain eligible if their construction begins before 2034 (Simpson and Thacher 2025).

2.4. The magnitude and risks of U.S. dependency on imported critical minerals

The U.S. cannot meet its critical minerals needs with domestic production. It is entirely dependent (100%) on imports for 12 of the 50 minerals defined as critical. For another 28 critical minerals, it is more than 50% net import reliant.[5] Figure 6 shows the level of dependency on critical minerals of which the U.S. imports more than 75% of its consumption. This is not a recent problem, either; for the last 20 years, the U.S. has been heavily reliant on imports to meet its critical minerals needs (USGS 2025).[6]

FIGURE 6

U.S. net import reliance of critical minerals (as a percentage of apparent consumption 2024) above 75%



SOURCE: Adapted from USGS (2025)

In addition to the high level of dependency the U.S. faces on its critical minerals requirements, three constraints imply significant risks for the U.S. economy: concentration of mining opera-

5 This includes 14 lanthanides, of which 22 are listed under rare earths.

6 It is interesting to note that until the 1990s, the U.S. was the leading global provider of rare earth minerals mined out of the Mountain Pass mine in California. The mine provided rare earth minerals for the electronic needs of the Cold War economy (NASA 2022).

tions, concentration of critical minerals processing, and price volatility that deters new investments in exploration, mining, and processing. A discussion of these constraints follows.

2.4.1. CONCENTRATION OF MINING OPERATIONS

The concentration of critical mineral mining can be seen at three different levels: location of geological reserves, location of mining production, and mine ownership. High levels of concentration pose risks for purchasers—be they geopolitical conflicts, supply chain disruptions, or changes in trade conditions.

Geological reserves: The location of geological reserves depends on the level of investments in exploration, the quality of deposits, and the feasibility of extraction given current technologies. Figure 7 shows the top three countries with the largest identified reserves of several critical minerals.

For many countries and regions, including Africa, geological reserves are underestimated due to insufficient exploration. A worrisome trend is that nonferrous exploration budgets worldwide declined in 2024 after another drop in 2023, according to S&P Global. The budgets for early exploration (called grassroots) and late-stage exploration went down 8% and 5%, respectively in 2024. Explorers are focusing more on existing mines, which affects the rate of discoveries. This trend is the consequence of volatile metal prices and unfavorable financing conditions (Pastrana 2024).

FIGURE 7

Top three countries holding known deposits of key critical minerals

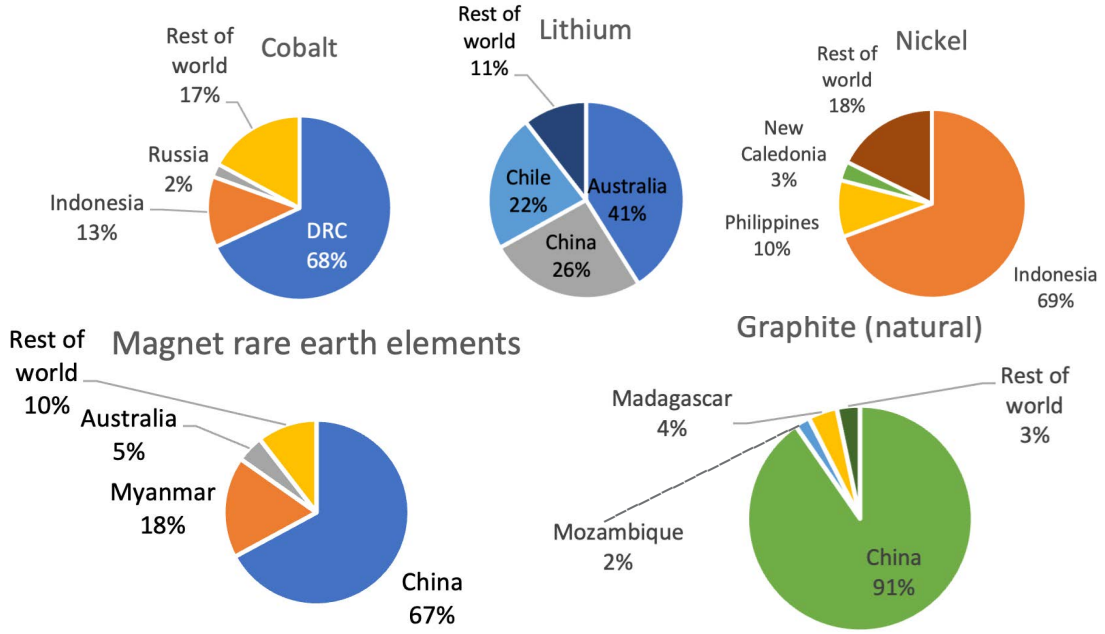
SOURCE: Adapted from Ritchie and Rosado (2024), using 2023 data (USGS, 2024b)

Mining production: The geographical distribution of mining production is different from that of reserves. Figure 8 shows the top three countries in terms of mining production for several critical minerals. For some minerals, countries with the largest deposits also extract the largest volumes from their mines, such as cobalt in the DRC, nickel in Indonesia, or rare earths in China. The proportion changes significantly for other minerals such as lithium, with Australia and China mining more than Chile, which has the largest deposits, as a result of larger investments in the former two countries.

What is important to note is that for most critical minerals, the concentration of mining production of the top three countries is very high, above 50% (IEA 2025a). This situation is difficult to change rapidly. The average lead time for new mines is currently about 18 years. This lead time has been increasing over the last two decades, and mines that became operational between 2020 and 2024 took, on average, 17.8 years to achieve this (Manalo 2025). Most of this time corresponds to discovery, exploration, and studies (averaging 13.6 years, an increase from 7.8 years for mines in the 2000–2009 period) (Manalo 2025).

FIGURE 8

Top three providers of raw key critical minerals by global mining volume (percent)



SOURCE: Adapted from IEA (2025b)

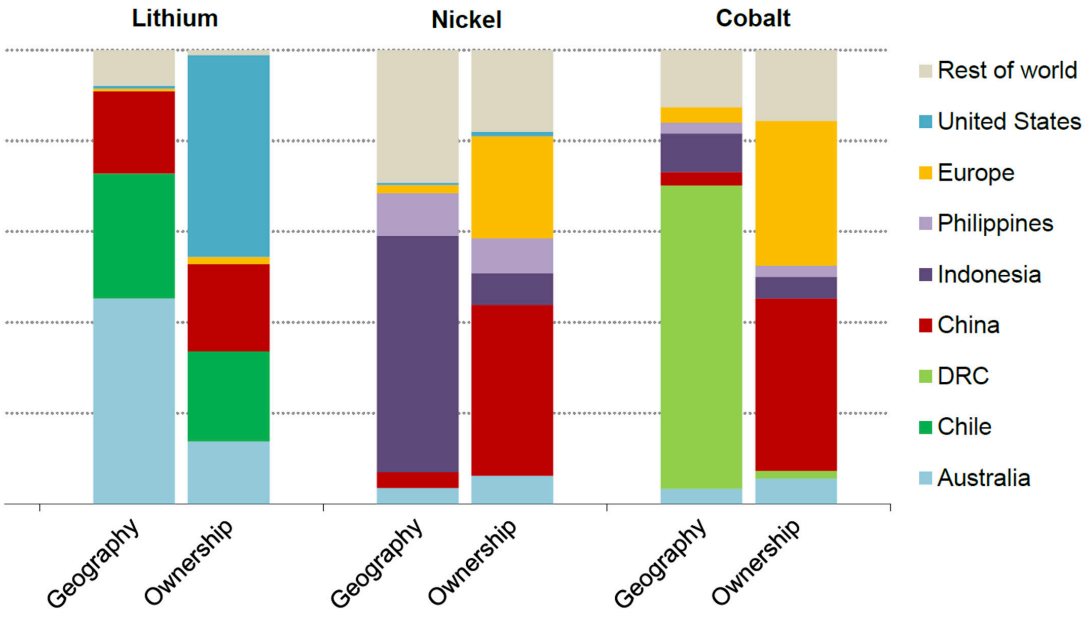
Mine ownership: The geographical distribution of mining production and reserves are quite dif-ferent from that of mine ownership. In 2024, the IEA analyzed the production of some critical minerals by ownership[7] (see figure 9). The results show that U.S. and European companies play very prominent ownership roles compared to their meager geographical holdings. Taking lithium as an example, American firms like Albemarle are major players, with

7 The IEA analysis considers ownership based on company headquarters location. When mines are owned by several companies, the IEA analysis assigns it to the company with the largest share. The company ownership data covers 100% of lithium production, 93% of nickel production, and 97% of cobalt production (IEA 2024a).

holdings exceeding 40% of the sector's mines. For nickel, Chinese mining companies own 40% of production while companies from Indonesia (which produces 69% of nickel worldwide) hold less than 10%. In the DRC, which produces the most cobalt, about one-third of mines are owned by Chinese companies like CMOC and another third by European players such as Glencore (IEA 2024a).

FIGURE 9

Critical minerals mining concentration by geography and ownership



SOURCE: IEA (2024a)

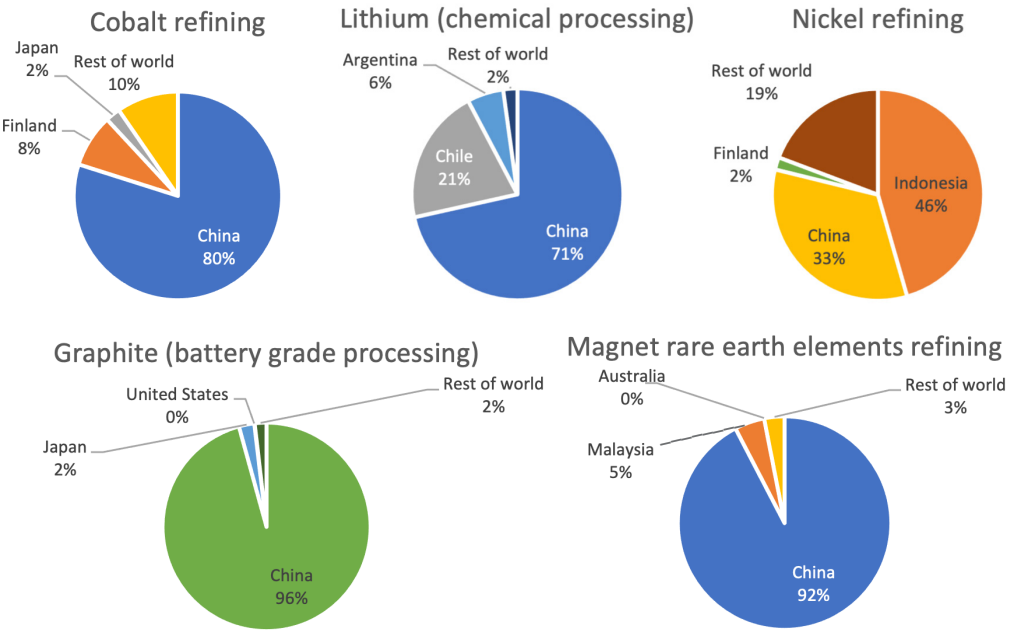
2.4.2. CONCENTRATION OF CRITICAL MINERALS PROCESSING

The geographical concentration of critical minerals processing is even more pronounced than that of mining. It poses a risk for buying countries (such as the U.S.) due to potential geopolitical challenges, supply chain disruptions, or trade conflicts with critical mineral-processing countries. Figure 10 shows the top three countries processing selected critical minerals (IEA 2024a). China is the dominant producer of critical minerals, except nickel (although it plays a significant role in the ownership of nickel refining facilities in Indonesia). At the same time that China has been increasing its processing capacity, it continues to diversify its raw materials sourcing (see figure 11) to reduce supply chain risks (IEA 2023a).

The challenge of global concentration of mining and processing of critical minerals has not changed much in the last five years. The analysis conducted by IEA in 2023 and 2025 shows that changes are modest for most critical minerals. Figure 12 shows the change in geographical concentration from 2019 to 2024 for mining and production of selected critical minerals. Only lithium mining has seen a significant decrease in concentration (observed via a decrease in holdings of its top three countries) due to new mines in Argentina and Zimbabwe. We also observe a modest decrease in rare earth elements. Nickel mining and refining, on the other hand, have seen an increase in concentration due to recent policies and investments in

FIGURE 10

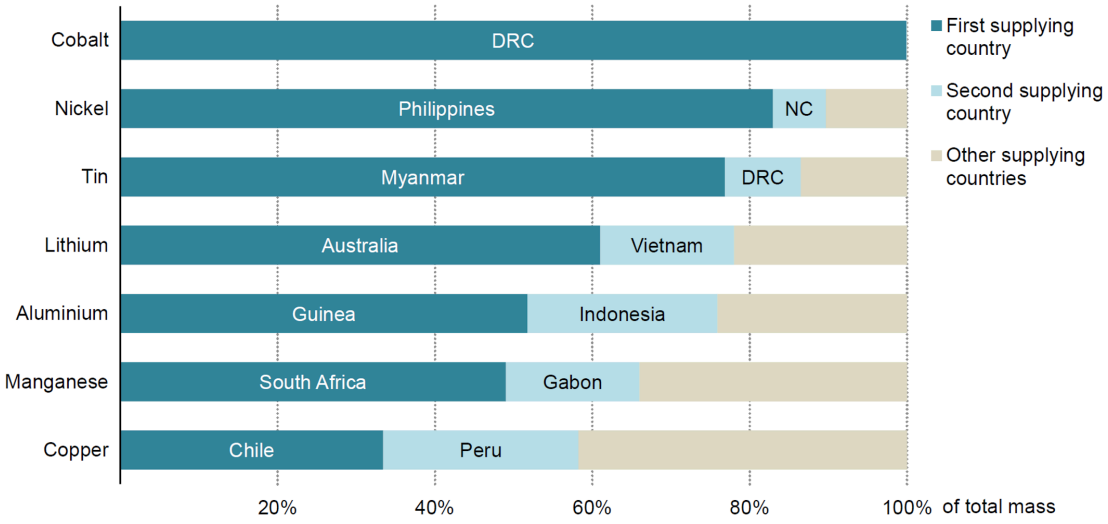
Top three processors of key critical minerals by global processing volume (percent)



SOURCE: Adapted from IEA (2024a)

FIGURE 11

Composition of China's unrefined raw material imports by origin



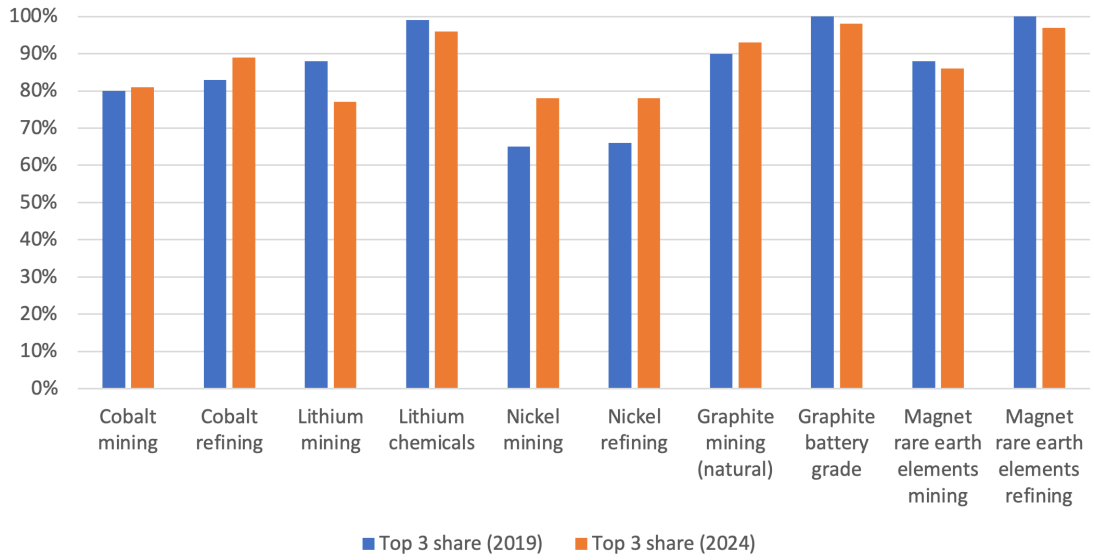
SOURCE: IEA (2023a)

Indonesia, as discussed later in this report.

The IEA analyzed future mining and refining projects announced to project changes in geographical concentration by 2035.[8] While mining is projected to become more diversified for lithium, graphite, and rare earth elements, the opposite is projected for nickel and cobalt (see figure 13a). In refining, the projections show modest improvements with less geographical

FIGURE 12

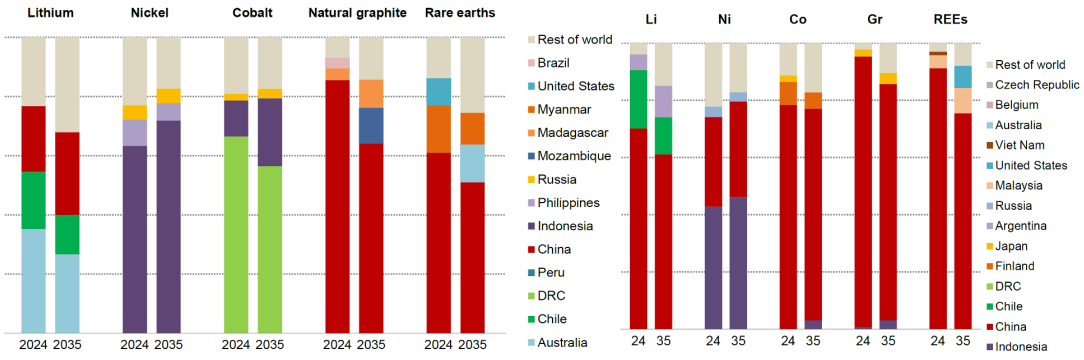
Change in concentration of critical minerals mining and production by top three producers' share (2019 to 2024)



SOURCE: Adapted from IEA (2023a) and IEA (2025b)

FIGURE 13 A-B

Projected geographical distribution of mined and refined critical minerals by 2035: Top three producers



SOURCE: IEA (2025a)

8 This analysis includes mining projects operating and under construction with all permits and financing (or established offtake contracts).

concentration for cobalt and lithium, and more progress in the refining of rare earth elements thanks to announced investments in the U.S. and Malaysia (see figure 13b).

2.4.3. PRICE VOLATILITY

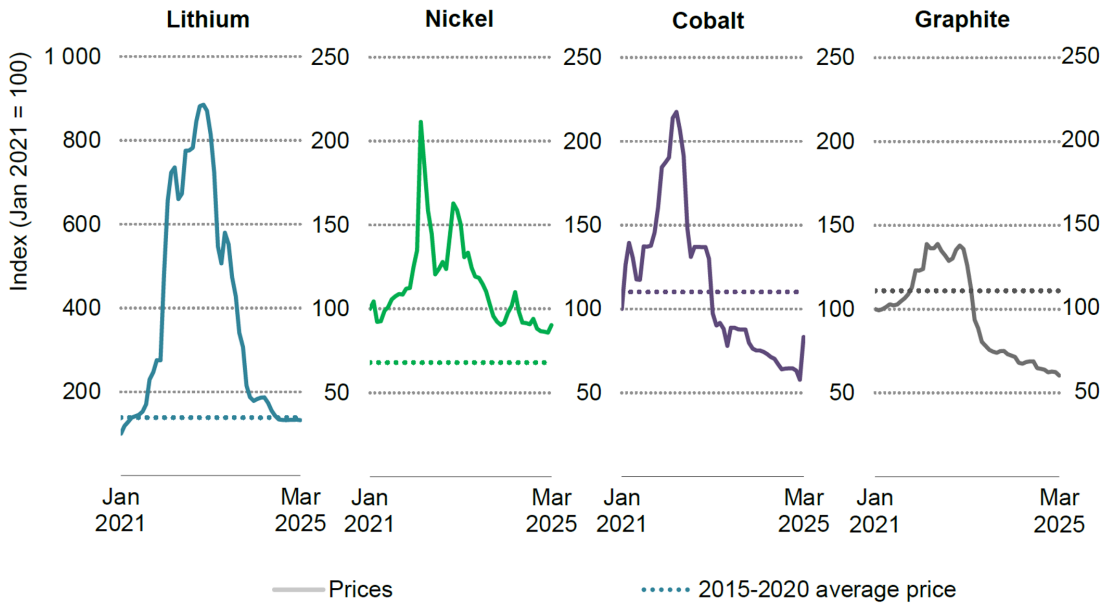
The global critical minerals market has seen wide swings in demand, supply, and prices. For example, in 2024, demand for cobalt, graphite, and nickel each grew by between 6% and 8%. The demand for lithium increased nearly 30% due to growth in electric vehicles and battery storage production (IEA 2025a).

At the same time, the industry was able to scale up supply of critical minerals, with increases between 2021 and 2024 ranging from 8.5% for graphite and 10% for rare earths to as high as 34% for lithium (IEA 2025a).

As a result, prices for critical minerals declined rapidly, as shown in figure 14. These swings have made investors cautious. Most expansion of critical minerals production has been done by the leading refiner (Indonesia was responsible for 90% of supply growth of refined nickel and China close to 80% for lithium).

FIGURE 14

Price trends for selected critical minerals



SOURCE: IEA (2025a)

Furthermore, a portion of the global market volatility is linked to the high concentration of mining and refining (as explored above) as well as market manipulation practices. In its 2024 report to the U.S. Congress on China's World Trade Organization compliance, the U.S. Trade Representative (USTR) highlights the Chinese enterprises' strategy to purchase controlling interests in mines to refine the output in a vertically integrated market to the disadvantage of foreign competitors that produce downstream products using raw critical minerals. When

other countries try to develop competing mines, USTR claims that China lowers the prices, rendering these efforts economically unviable (USTR 2025).[9]

Even if the critical minerals market demand is reasonably covered today, the high degree of geographic concentration means enormous supply vulnerabilities, whether from weather shocks, trade disruptions, or geopolitical disputes. In line with this concern, the IEA has conducted an "N-1" analysis to understand the market implications if the top producer stops supplying to the global market. They found that if the largest supplier and its demand of a given mineral are excluded, the remaining countries could cover only about 40% of graphite and rare earths demand in 2035, 53% for nickel, and around 65% for cobalt and lithium. This type of shock would have significant impacts on the price of electronics, batteries, and electric vehicles. It would make the price and competitiveness gap between China and the U.S. and Europe in the manufacturing of these products even larger than it is today (IEA 2025a).

2.4.4. IMPLICATIONS OF SUPPLY CHAIN CONSTRAINTS FOR THE U.S.

As described in the previous sections, the U.S. faces a variety of risks from all steps in the supply chain of critical minerals, as illustrated in figure 15. At the extraction level, large capital requirements, uncertainty given the speed of change of mining technologies (especially for minerals like lithium and rare earths), and export quotas and related restrictions (given the geographical concentration of reserves and mines), all pose risks.

In terms of processing, the concentration of facilities leads to a quasi-monopoly that can be used for price and market manipulation to prevent new entries unless specific policy support measures are taken. Table 2 presents a list of recent restrictions imposed by critical minerals producers and refiners.

The changes in critical mineral end uses due to technological, policy, and demand changes (for example, in electric vehicles support policies and demand or battery technological changes) further add uncertainty to the market. Finally, the option of recycling many of the critical minerals, while attractive, still faces substantial technical and market barriers that will require proactive regulatory support.

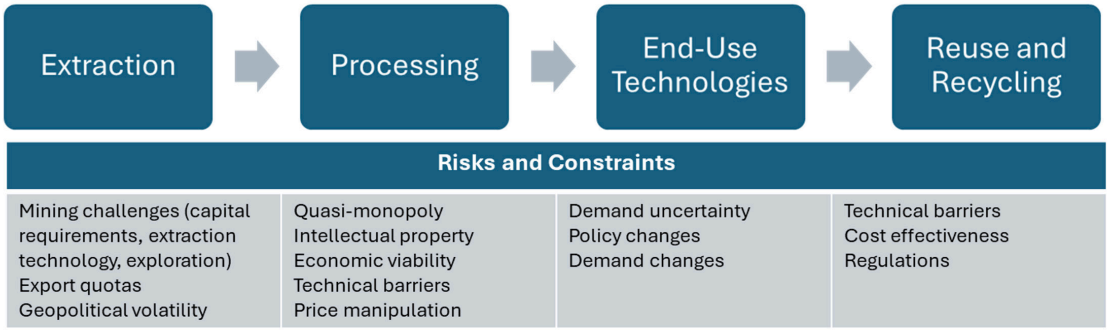
The U.S. continues to take measures to diversify its suppliers of critical minerals, even though it is still highly dependent on China. Figure 16 presents recent data on the percentage of imports that are sourced from China. This dependency has been recently used by China as a tool in trade negotiations with the U.S. (AP 2025). Table 3 presents the diverse primary sources from which the U.S. imports critical minerals.

Furthermore, on March 20, 2025, the Trump administration issued an executive order aimed at increasing U.S. domestic mineral production. This order establishes a priority list of mining projects; aims to increase access to domestic mineral resources on federal lands; tasks the Department of Defense with creating a forum for financiers, businesses, and government

9 China has historically used its dominance in rare earth minerals as a bargaining tool in trade negotiations. In April 2025, the country's Ministry of Commerce and Customs Authority announced restrictions on exports of items involving seven medium and heavy rare earth elements, in response to newly imposed U.S. tariffs (China Ministry of Commerce 2025). These restrictions are part of intense negotiations, and the situation is quite fluid.

FIGURE 15

Critical minerals supply chain risks to the U.S



SOURCE: Adapted from U.S. Department of Energy (2010) Figure 9-1

TABLE 2

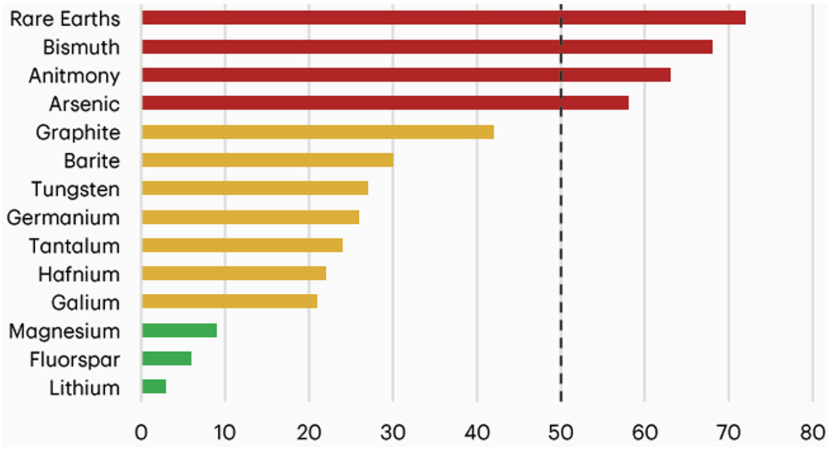
Recent restriction measures on critical minerals exports

Country	Critical mineral	Restriction
China	Antimony, gallium, germanium	Export ban to the U.S. in December 2024
China	Rare earths	Export requirements in November 2023
China	Bismuth, indium, molybdenum, tellurium	Export licensing in February 2025
China	Graphite	Export licensing in December 2023
DRC	Cobalt	4-month halt to exports in February 2025
Zimbabwe	Lithium	Ban on raw lithium ore exports in December 2022

SOURCE: Adapted from IEA (2025a).

FIGURE 16

Percentage of U.S. imports of critical minerals sourced from China



NOTE: Red:>50%, Yellow: 20-49%, Green: <20%, **SOURCE:** TD Economics, 2024

TABLE 3

Primary import source by the U.S. for critical minerals

Primary import country	Number of critical minerals	Critical minerals
China	23	Antimony, arsenic, bismuth, graphite, rare earths, tantalum, tungsten, yttrium
African countries		
South Africa	3	Chromium, platinum, zirconium
Gabon	1	Manganese
Other countries		
Canada	2	Nickel, vanadium
Japan	2	Gallium, scandium
Belgium	1	Germanium
Brazil	1	Niobium
Chile	1	Lithium
India	1	Barite
Israel	1	Magnesium
Jamaica	1	Aluminum
Kazakhstan	1	Barite
Mexico	1	Fluorspar
Norway	1	Cobalt
Russia	1	Palladium
South Korea	1	Indium

SOURCE: Adapted from USGS (2025)

offices to facilitate these developments; and directs the DFC to finance domestic mining projects (The White House 2025b). These efforts, while important steps to expanding domestic mining, may be insufficient to cover the current and future demand for critical minerals in the U.S.

3. OPPORTUNITIES IN THE CRITICAL MINERALS SECTOR IN AFRICA

Africa has four important opportunities in the critical minerals sector. First, significant reserves of several critical minerals; second, existing mining and refining operations with the potential for expansion; and third, significant business opportunities in infrastructure and energy with reliable sources of critical mineral revenue, and finally, the vital role of these minerals in the global goal of climate action. In addition, African countries have made significant progress in the governance of their mining sectors, and there is a political consensus in the region to move forward decisively on a rapid expansion of mining and ancillary business opportunities to respond to the rapid growth in the demand for critical minerals.

3.1 Critical mineral reserves in Africa

Africa holds an important portion of global critical minerals reserves. The region is estimated to be home to about 30% of proven critical minerals reserves, and several countries are global leaders in reserves (Mo Ibrahim Foundation 2022). There are 35 African countries that produce at least one critical mineral, and for 24 of these countries mining is a significant part of their economy (Development Reimagined 2024). Table 4 presents the critical minerals for which Africa has more than 10% of global reserves.

It is important to note that these numbers are probably underestimates given the low level of exploration in many countries. In 2023, the exploration budget in Africa was $1.27 billion (of which $0.67 billion was for gold). This is an overall drop of 3.4% compared to 2022 (although lithium exploration increased 32.4%). Unfortunately, early-stage exploration investments only reached $0.22 billion, with most resources devoted to minesite and late-stage exploration (S&P Global 2024). Also, the exploration budgets in Africa are the second lowest in the world (Baskaran 2023). In 2022, Canadian, Australian, and U.K. companies led exploration in Africa, with 30%, 22%, and 20%, respectively (S&P Global 2023).

3.2 Mining and processing of critical minerals in Africa

The distribution of critical minerals mining volumes is different from the known reserves. Table 5 presents the African share of global critical minerals mining. Annex 2 presents the information by country. The difference between reserves and production gives a lower bound of possibilities for growth in mining production. Many critical minerals have mining levels below their global reserves (unlike cobalt and manganese, for example, with a global share of production above their global share of reserves). While many factors are considered for mine development and extraction decisions, there is ample room to expand production in Africa.

TABLE 4

Africa's share of select critical minerals' global reserves

Critical mineral	Share of global reserves in Africa (above 10%)	African Countries with significant reserves
Platinum group metals	92%	South Africa, Zimbabwe
Cobalt	56%	DRC, South Africa, Zambia, Madagascar
Manganese	54%	Gabon, South Africa, Cote d'Ivoire, Ghana
Chromium	36%	South Africa, Zimbabwe
Bauxite	24%	Guinea
Graphite	22%	Madagascar, Mozambique, Tanzania
Zirconium (ores and concentrates)	15%	South Africa, Senegal, Mozambique
Vanadium	13%	South Africa

SOURCE: Adapted from Zero Carbon Analytics (2024)

TABLE 5

Africa's share of global critical minerals mine production

Critical mineral	African share 2023 (%)		
Arsenic	12.0	Niobium	0.7
Bauxite	32.1	Platinum	80.6
Beryllium	14.5	Rare Earths	1.0
Chromium	58.4	Tantalum	72.0
Cobalt	73.5	Tin	10.5
Fluorspar	6.7	Titanium	40.9
Graphite	10.4	Vanadium	7.4
Manganese	64.0	Zinc	3.4
Nickel	3.5	Zircon	44.9

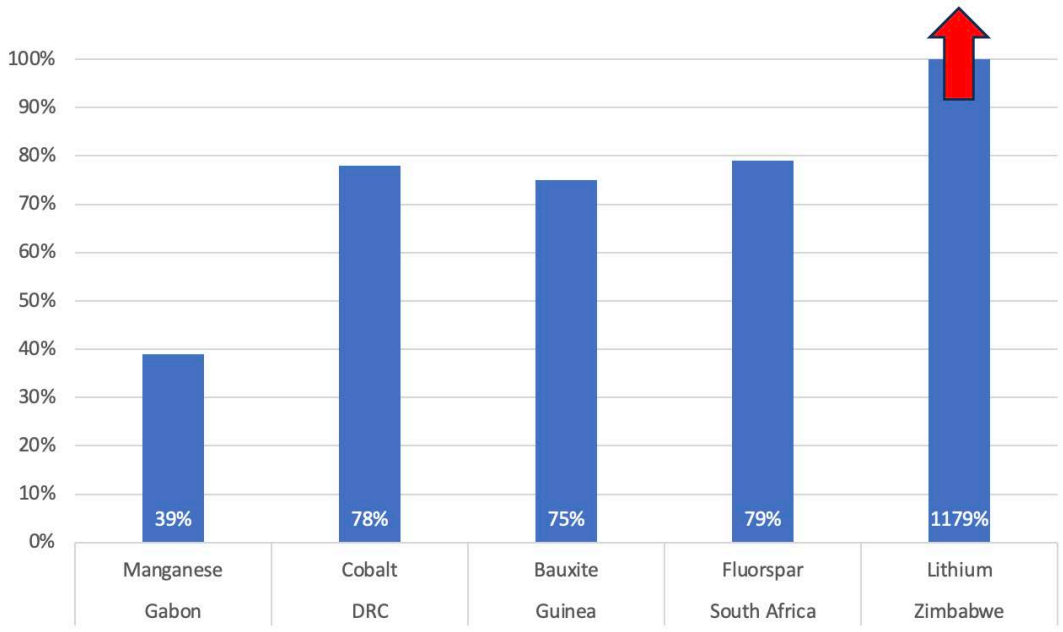
SOURCE: Federal Ministry of Finance, Austria 2025

Significant growth in mining production is possible within a few years. Figure 17 shows a few examples of African countries that have significantly grown their extraction of critical minerals

within four years (2019 to 2023). These experiences can serve as examples to other African countries.

FIGURE 17

Growth in production of critical minerals in Africa from 2019 to 2023



SOURCE: Federal Ministry of Finance, Austria 2025

The mining sector in Africa is one of the most attractive in the merger and acquisition (M&A) market. Data from the last two years, analyzed by KPMG, shows that deal flow has been strong despite macroeconomic challenges. Mining was the focus of four of the top ten transactions in Africa in 2023, and two of the top ten in 2022, in terms of amount spent (see table 6). The deal value in the mining sector in 2023 increased 140% from 2022 (from $2.1 billion to $5 billion). Francophone Africa was the subregion with one-third of deals, followed by East Africa with about 21 percent. In a KPMG survey, over half of respondents (53%) indicated that an attractive valuation was among the top three reasons for closing their deals. However, the data collected by KPMG also showed that currency volatility, regulatory uncertainty and complexity, and subpar quality of information were among the most critical challenges (KPMG 2023, 2024).

Unfortunately, new projects and mine expansions announced in Africa with reasonably confirmed financing and preparation steps are not commensurate with the full potential of the region. The IEA has compiled and analyzed these new projects as of early 2025. From the current market value of mining and refining of $66 billion per year, the IEA sees a growth to about $83 billion by 2040, a rate that is smaller than that projected for other regions like Latin America. The increase in mining comes from copper and cobalt in the DRC, graphite in Madagascar and Mozambique, and lithium in Zimbabwe. For refining, growth is driven by copper in the DRC and nickel in Madagascar and South Africa. Section 3.4 summarizes potential lessons that Africa can learn from Latin America and Indonesia on the expansion of mining

and refining operations.

TABLE 6

Mining deals among top ten deals by value, 2022 and 2023

Target company	Country of Assets	Acquirer	Country	Deal Value ($million)
2022				
Royal Bakofeng Platinum Limited	South Africa	Northam Platinum	South Africa	1787
Lifezone Metals	Tanzania	GoGreen Investments	USA	878
2023				
Khoemacau Copper Mining	Botswana	MMG	UK	2083
Vendanta Limited	South africa	Hindustan Zinc	India	1046
Williams Mineral	Zimbabwe	China Natural Resources	China	1003
Mopani Copper Mines	Zambia	International Resources Holding RSC	UAE	620

SOURCE: KPMG (2023, 2024)

3.3 Business opportunities in infrastructure and energy for Africa

Infrastructure investments in sub-Saharan Africa continue to attract private investors. In 2023, the region saw $3.5 billion of investment deals closed with the private sector, encompassing 66 projects (World Bank 2024b). South Africa led this engagement with private investors, holding about 30% of the region's portfolio, followed by Senegal and Tanzania (World Bank 2024b). Figure 18 presents the trends for private sector investments in electricity, ports, airports, and roads between 2021 and 2023.

The investment needs in infrastructure in Africa present a unique opportunity when combined with mining development. Mining is a highly energy-intensive industry. Roughly 38% of the world's industrial energy demand and about 15% of total electricity consumption can be attributed to it (Igogo et al. 2021). In countries like Zambia, 52% of electricity in 2018 was consumed by mining operations, and in the DRC 55% (Imasiku and Thomas, 2020)

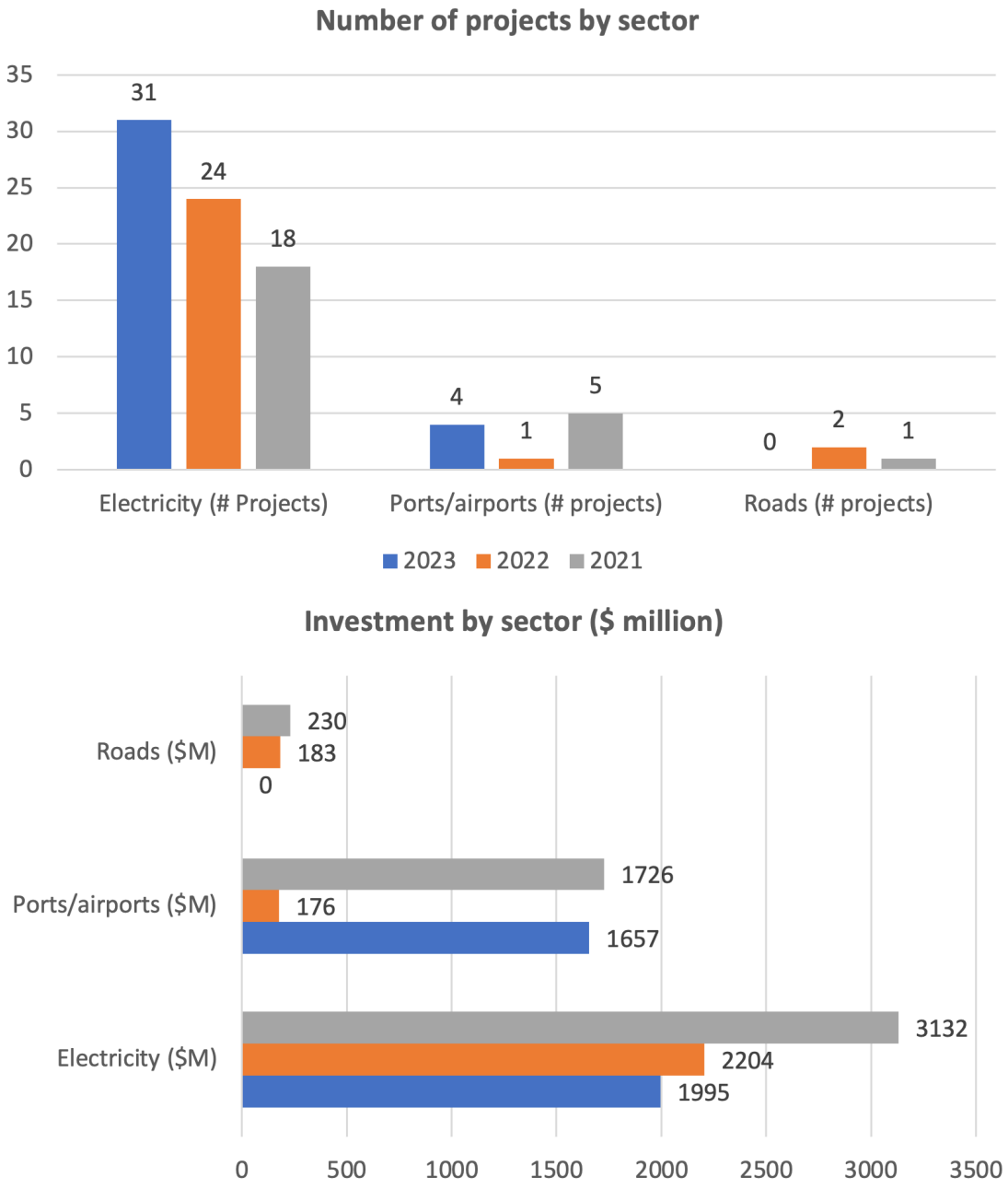
The investment opportunities linking energy supply to mining operations (with the added effect of energy for households and businesses) are significant. China generally aligns infrastructure and mining investments in resource-for-infrastructure deals; however, this approach presents numerous challenges[10] and progress in access to electricity has been

10 These challenges include: (i) high levels of indebtedness in countries such as Djibouti, Ethiopia, Kenya, and Zambia, linked in part to Chinese loans to enhance their infrastructure (Sakhri 2024); (ii) low use of local labor in construction, particularly in less democratic countries (Ghiselli and Morgan 2022; Morgan and Ghiselli 2023); (iii) variable quality of construction (Cisse 2024); and (iv) inadequate environmental and social standards, "as projects often fall short of China's own recommended ESG guidelines - the Green Development Guidance for Belt and Road Initiative (BRI) projects." (Springer et al. 2024)

meager.[11] An approach combining mining with energy provision for mines and the population would position the U.S. to align with African countries' energy demands (see box 3).

FIGURE 18 A-B

Private investments in infrastructure in Africa, 2021 to 2023



SOURCE: World Bank (2024b)

11 The number of people without access to electricity in sub-Saharan Africa has barely changed from 588 million in 2010 to 597 million in 2021 (Statista 2025d).

BOX 3. ENERGY AND MINING IN AFRICA

The energy service gap in Africa is enormous, not only for households but also for enterprises that suffer the consequences of unreliable service and the additional costs of backup generators. The mining sector, with its significant demand for power, can serve as a key anchor to provide a stable revenue that would allow the expansion of energy services in countries with critical minerals resources. There are several possible arrangements between full grid supply and full self-supply that can be considered in each specific case. The integration between the power and mining sectors, with strong private sector participation, can reduce costs and benefit communities and businesses (World Bank 2016).

For example, the African Development Bank recently approved a "$150 million loan to the Mauritanian state-owned iron ore firm Société Nationale Industrielle et Minière (SNIM) to increase its logistics capacity and strengthen the country's mining sector." The investment includes support to build a 12 MW PB solar power plant (African Development Bank 2024).

Initiatives such as the recently launched Mission 300, which aims "to connect 300 million people to electricity in Sub-Saharan Africa by 2030," can be important platforms to expand market opportunities (Herscowitz, 2024). Furthermore, energy-mining integration can help with much-needed regional power integration in Africa. However, risk mitigation mechanisms will be necessary to capitalize on the enormous opportunities that mining and energy offer to U.S. companies.

3.4. The role of Africa's critical minerals in global climate action

Decisive global climate action requires substantial transformation of societies towards electrification of industries and sectors and a shift towards clean energy. The production of electric vehicles, renewable energy generation systems, and revamped industrial processes requires scaled-up production and processing of critical minerals for decades to come. The new technologies that will underpin this transition towards low-carbon growth—from IoT to AI—will also require critical minerals for sensors and data centers. In addition, the growing energy demands of mineral extraction and processing and the expanding footprint of critical minerals mines in water-stressed areas and forested lands will require a rethink of the mining cycle towards a green and clean future. Table 7 shows a list of critical minerals where Africa can play a significant role in the global low-carbon transition with today's technologies. New developments may change this list in the future.

The Africa Minerals Development Centre, an entity of the African Union (AU), in partnership with the African Development Bank, prepared the AU's "Mineral Resources Strategy for the Just Transition and Decabonising Future" in December 2024. The strategy highlights that, in

addition to the substantial known reserves and the even greater potential resources of critical minerals for the global low-carbon transition, Africa has large and diverse renewable energy potential (which is essential for green mining), a large unmet market for electrification of households and industries, a large youthful workforce, and great industrialization potential (African Union 2024). All of these factors make Africa a unique region in the global critical minerals landscape. The AU's Mineral Resources Strategy is based on four pillars (see box 4).

TABLE 7

Critical minerals for Africa's contribution to the global low-carbon transition

Mineral	Mineral	Solar PV	Hydrogen and fuel cells	Energy Storage	Electric Vehicles
Aluminium	✓	✓		✓	
Chromium	✓				✓
Cobalt			✓	✓	
Copper	✓	✓		✓	✓
Graphite				✓	✓
Iron - steel	✓	✓		✓	
Lithium			✓	✓	✓
Manganese	✓			✓	
Nickel	✓	✓		✓	✓
Platinum group metals			✓		✓
Rare earth elements	✓		✓		
Vanadium				✓	✓
Zinc	✓	✓			

SOURCE: African Development Bank (2022).

The AU Mineral Resources Strategy also discusses the opportunities in renewable energy and value chain linkages with the critical minerals mining industry. The strategy highlights the opportunity to strengthen a range of linkages—backward, forward, spatial, fiscal, and knowledge—to underpin a "resource-based industrialization and equitable development." African Union (2024) The development of refining and processing of minerals in Africa can be a win-win for the U.S. and African countries through strong joint ventures.

The AU Mineral Resources Strategy highlights two important factors. First, the need to leverage the AFTCA to provide the largest possible market to African manufacturers and reduce the currently very high intra-African logistics costs. Second, the need for a decisive push to strengthen skills and research capabilities linked to the specific opportunities in the value chain.

Finally, the strategy identifies four markets with the greatest opportunities for development in Africa: renewable energy generation equipment, hydrogen production and fuel cells, battery storage, and two- and three-wheeler electric vehicles.

BOX 4. FOUR PILLARS OF THE AFRICAN UNION MINERAL RESOURCES STRATEGY (2024)

"1. Advancing Mineral Development by increasing geological knowledge, conducting feasibility studies to attract investment, building infrastructure for an enabling environment, establishing a Mineral Value Chain Investment Fund and aligning mineral resource management with the aspirations of the African Mining Vision.

2. Developing People and Technological Capability by identifying skills and technologies needed to capitalize on green minerals opportunities and building the institutions to develop the skills to anchor the required research, development and innovation

3. Developing Mineral Value Chains to achieve equitable resource-based industrialisation (ERBI) through supply chain development, beneficiation and value addition and access wider regional and continental markets through the African Continental Free Trade Area (AfCFTA).

4. Mineral Stewardship to responsibly guide the environmental, social and governance aspects of green minerals exploitation and utilisation together with material reuse and recycling."

BOX 5. AN EXAMPLE OF OPPORTUNITIES FOR VALUE ADDITION IN THE COPPER AND COBALT VALUE CHAINS IN THE DRC

The World Bank (2023b) analyzed potential value chains related to critical minerals in the DRC, with a deep dive into copper and cobalt, which are essential elements for the energy transition. The first option proposed is copper-based manufacturing in the ex-Katanga region. Compared to smelting and refining, the processes related to copper product manufacturing are less energy-intensive and technically feasible in the DRC. These products initially include copper wires and cables, and eventually electric motors and transformers, progressing to copper foils used in EV battery cells.

For cobalt, the precursor production of cobalt hydroxide is a possible first step, although it requires the development of specific technical capabilities.

The analysis highlights the need to improve infrastructure and logistics, develop the Kinsevere special economic zone for the processing and manufacturing of copper and cobalt, enhance skills and workforce development, strengthen environmental and social standards, enhance access to financing, and support market development through collaborative arrangements across the Southern African Development Community.

3.5 Progress in governance

Several countries in Africa have made important progress in the governance of their natural resources—including in the mineral and extraction sectors—according to the 2021 Resource Governance Index. For example, Guinea's mining sector has improved its governance composite score from poor in the 2017 evaluation to satisfactory in 2021. Other countries, such as Ghana, the DRC, Nigeria, and Tanzania, have made substantial progress in the value of the governance composite score (which includes an analysis of revenue management, value realization, and enabling environment) (Natural Resource Governance Institute 2021). Much remains to be done, but the importance of progress in transparency, governance, and stability is recognized by decisionmakers across the continent (box 6).

BOX 6. THE EXTRACTIVE INDUSTRIES TRANSPARENCY INITIATIVE (EITI) IN AFRICA

Founded in 2003, EITI seeks to ensure that mineral, oil, and gas resources are managed in a transparent, accountable, and open manner. It has developed the EITI Standard by which all implementing countries are assessed. EITI members commit to disclose information along the value chain, including contracts, revenues, and public benefits. A key requirement of EITI is to set up a multi-stakeholder group to support the implementation of the EITI Standard.

In 2024, the EITI Board evaluated 14 countries using common validation guidelines. African countries with moderate validation outcomes from the 2024 review include Ghana, Mauritania, Togo, and Uganda.

The analysis showed good examples of progress in Africa. For example, Ghana's "strong progress on licenses, contracts and ownership disclosure has laid the foundation for innovative data use to enhance sector integrity." Mauritania has "improved the timeliness and relevance of its reporting, enabling stakeholders to better understand revenue drivers in the extractive sector."

Africa has the political will to establish effective partnerships for development of its critical minerals sector. The December 2024 African Union Green Minerals Strategy is a milestone document in the region's journey towards sustainable industrialization, energy security, and sustainable development (see box 7). In addition to specific proposals to develop the critical minerals sector, the strategy identifies potential investments in the following areas: "(i) production of nickel, manganese, and cobalt precursor anode material; (ii) production of lithium-ion ferrous phosphate precursors and manufacture of LFP batteries; (iii) manufacturing of solar photovoltaic panels; and (iv) manufacturing of electric motorcycles (2 or 3 wheelers) and commuter busses." (African Union 2024)

BOX 7. THE AFRICAN UNION GREEN MINERALS STRATEGY

The African Union, together with its member states, has crafted the African Green Minerals Strategy in 2024—a continent-wide framework designed to advance the objectives outlined in the Africa Mining Vision as "a transparent, equitable and optimal exploitation of mineral resources to underpin broad-based sustainable growth and socio-economic development." With respect to green minerals specifically, the strategic vision is: "an Africa that harnesses green mineral value-chains for equitable resource-based industrialization and electrification, creating green technologies and sustainable development to enhance the quality of life of its people."

The strategy is based on four pillars: (i) geological knowledge and feasibility studies; (ii) people and technological capability; (iii) mineral value chain development; and (iv) mineral stewardship.

3.6 Review of competitor regions: Latin America and Indonesia

As Africa defines new ways to grow its mining and refining sectors, it is important to understand and learn from competitors. This section reviews the mining and refining landscapes of Latin America and Indonesia, where recent policy and investment changes provide lessons that African governments can adapt, and, in some cases, errors that can be avoided.

3.6.1 LATIN AMERICA'S MINING SECTOR

Latin America has had a long tradition of mining. Figure 19 shows its global share of mining and reserves. Latin America holds about 30% of global copper reserves and 45% of lithium. Latin America produces 40% of the global copper supply and 30% of lithium. However, production is still below potential for many critical minerals.

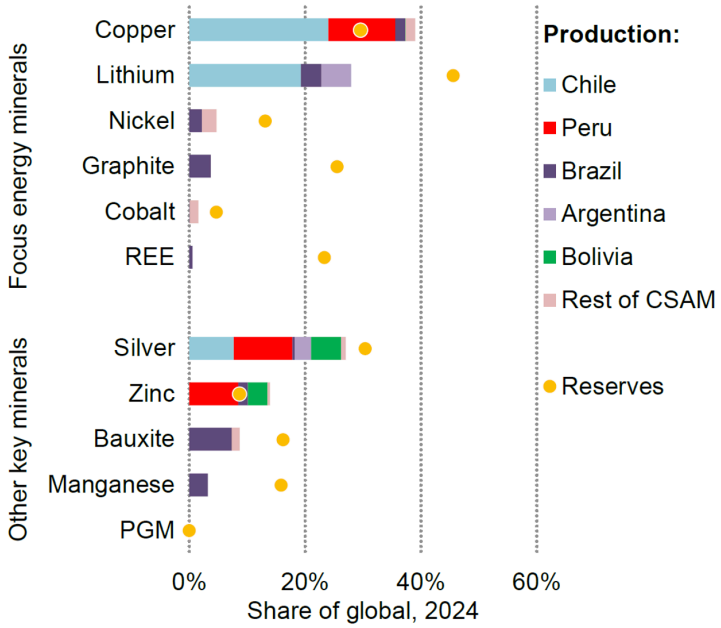
Bolivia, Chile, and Argentina represent close to half of global lithium reserves—a coordinated alliance could operate like a "lithium OPEC." (Mining Technology, 2023) Brazil alone has close to 20% of reserves in graphite, manganese, and rare earths, but produces very small amounts (7% for graphite and just 0.2% of rare earths) (IEA, 2023). The growth potential is enormous.

Projections by the IEA indicate that the current market value of copper, lithium, nickel, cobalt, graphite and rare earth elements in Latin America would grow 30% (from $100 billion to $130 billion) by 2040. Refining activities are expected to reach an estimated 7% share of the worldwide market by 2040, with growth concentrated in copper and lithium operations across Argentina, Brazil, and Chile (IEA 2025a).

The full mining and refining potential of critical minerals in Latin America has not been met

FIGURE 19

Latin American share of mining production and reserves, 2024



SOURCE: IEA (2025a)

due to a historically inconsistent regulatory environment, changing political directives, and some episodes of social unrest (EIU, 2024). The Economist Intelligence Unit has completed a critical minerals readiness map to identify future opportunities considering mineral potential, mining sector confidence, specialized labor, infrastructure services, and expropriation risk. Chile has the highest score with good ratings in all criteria except expropriation risks, where ratings are average. Argentina and Brazil follow closely, with Brazil receiving lower scores on labor and infrastructure. Mexico's recent announcements have led to a high perception of expropriation risk, although it has high ratings for other categories. Other countries with high critical mineral potential, like Bolivia, Colombia, the Dominican Republic, Ecuador, and Panama have low ratings in many other categories (EIU 2024).

Recent political decisions in the region indicate a leaning towards more state ownership of the mining industry. In 2023, Chile's president announced a plan to nationalize the lithium industry (Mining Technology, 2023b), and Mexico has declared the country's lithium deposits as national property and created a state company (LitioMX) to handle the resource.

3.6.2 INDONESIA'S MINING SECTOR

Indonesia has used several policy tools to increase its global market dominance of nickel and strengthen the value-added refining activities in the country.

In the past, most nickel was used for stainless steel and non-ferrous applications. Recently, the growth in batteries and wind energy equipment production has comprised about 20% of demand. The future demand growth of renewable energy equipment and electric vehicle

growth will impact nickel demand: Indeed, these technologies were responsible for most of the 6% growth in global nickel demand in 2024 (IEA 2025a).

Beginning in 2009, Indonesia has progressively banned the export of unprocessed nickel ore to promote the establishment of domestic processing facilities, expanding the country's role in the value chain. The ban has been fully implemented since 2020 (IEA 2024b). In addition, the country has provided tax incentives to electric vehicles and buses using 40% or more domestic components to attract investments upstream in the value chain (Government of Indonesia, 2023).

By many accounts, these policies have been highly successful. Indonesia is now the dominant nickel producer with 60% of the global supply in 2024, a production increase of 16 times since 2015. IEA projections indicate that the country's nickel ore output will grow by 25% by 2030, and the country will continue to be the dominant player with 75% of global supply by 2040 (IEA 2025a).

Furthermore, the net value of activities related to the nickel value chain increased from $1.4 billion in 2020 to $34.8 billion in 2023, and more than one-quarter of foreign direct investment in metals-related industries was in nickel processing (most of it by Chinese companies ($14.2 billion)) (Tahir, 2025). In 2024, Indonesia had 44 nickel smelters in operation, with an additional 26 under study or construction (Subarna, 2024).

Chinese companies involved in the nickel mining sector were ready from the beginning when Indonesia announced the export ban. Chinese companies invested heavily in the development of the high-pressure acid leach process that makes the processing of Indonesian nickel ore economically viable (Wood Mckenzie, 2023). This technology gives them a comparative advantage. This has led Ford Motors, for example, to partner with Vale Indonesia and Zhejiang Huayou Cobalt in its local nickel processing facility (Indonesia Business Post 2023).

For these reasons, Chinese companies control about 75% of the nickel processing production in Indonesia (Reuters, 2025). The lower costs of mining, labor, coal used in smelters, and electricity make the refining process highly competitive globally and an attractive option for Chinese companies. The large market concentration of Indonesia and China, with 75% of global nickel production in 2024, makes it effectively an "OPEC of nickel." (Financial Times, 2025).

This successful strategy is not without challenges. The high production in Indonesia has led to an oversupply and a significant drop in prices. Prices ended 2024 roughly 30% below the 2023 average and have remained depressed into 2025. The low prices have reduced Indonesian government revenues and forced the closure of nickel plants in Australia, Canada, and New Caledonia (IEA 2025a).

In addition to low prices, there is a concern of overexploitation of high-quality ores and depletion over the next few years (Financial Times 2025). In response, the Indonesian government lowered its 2025 mining production quota of about 200 Mt (Benchmark 2025). To deal with overproduction and falling revenues, the government announced plans to increase royalty rates progressively (IEA 2025a). All these factors are putting pressure on miners and smelters, particularly those with high production costs.

4. WAYS TO HARNESS AFRICA'S CRITICAL MINERAL POTENTIAL THROUGH STRONG U.S.-AFRICA PARTNERSHIPS

This section proposes recommendations to modify or design new frameworks, institutions, mechanisms, tools, and policies in Africa and the U.S. to develop and strengthen mutually beneficial partnerships on critical minerals. The section is organized into two parts. The first one reviews actions that African governments can take to attract U.S. investments in the critical mineral sectors, both in mining and refining, as well as the ancillary sectors of infrastructure and energy. The second section presents recommendations for productive U.S. engagement with African governments in a complex geopolitical environment where many other actors are ahead in building relations and developing investments in the critical minerals of Africa.

4.1 Recommendations for African government actions to attract U.S. investments in critical minerals and related sectors

In a highly competitive global environment for critical minerals mining, Africa should enhance its comparative advantages. The race for critical minerals is global and intense. The challenges described in section 2 of this report tend to favor countries with good infrastructure and institutional governance. North American and Latin American existing and prospective mines tend to be viewed as safer investments for U.S. mining companies due to proximity and familiarity. The comparative advantages of Africa, as described in section 3, should be highlighted by African governments and, where possible, specific weaknesses should be identified for correction with the support of partners.

African countries face a different political environment in the U.S. in 2025. The new Trump administration has changed tack when dealing with Africa from a regional perspective to individual country engagements. The elimination of USAID and the reorientation from aid to trade

should inform the approaches to be taken by African governments.

Our recommendations are organized into four groups: domestic institutional arrangements, regional coordination, private sector and jobs, and partnerships.

4.1.1 DOMESTIC INSTITUTIONAL ARRANGEMENTS

In any given country wishing to attract U.S. engagement, a single, high-level national coordinator is needed for a whole-of-government approach for the critical minerals, infrastructure, energy, and value chain sectors. The attractiveness of an African government to U.S. investors will be enhanced by simplifying the points of entry for engagement and negotiation of specific deals. A strong, coordinating leader with clear authority will help to mobilize the different ministries and agencies involved. The coordination role cannot be limited to the mining sector: Given the infrastructure and energy needs, a strong platform is required that seamlessly integrates the project offerings with permitting, land acquisition, and approval processes. African governments should also see critical minerals as a springboard for job creation and economic development. Coordinated actions are necessary in value chains and economic activities linked to critical minerals and infrastructure projects.[12] This high-level coordinator—or "czar"—can engage with multilateral development banks and other partners to identify and mobilize the technical and capacity-building efforts needed for the success of the overall endeavor. The engagement of this high-level coordinator with other countries in terms of regional infrastructure projects and leveraging the AfCFTA is indispensable. Regardless of each African country's approach to engaging with the U.S. on tariffs, strong regional coordination will be needed. The initial announcement of U.S. tariffs in April 2025 exempted certain minerals that are not available in the United States (The White House 2025a).

KEY EXAMPLE

One of the measures introduced by Zimbabwe as part of its "Open for Business" policy is the Zimbabwe Investment Development Agency. This was established as a "one-stop shop" to streamline bureaucracy and provide business facilitation (World Bank 2024).

In parallel to the critical minerals, infrastructure, energy, and value chain coordinating czar, African governments can consider naming a national governance coordinator at the highest level. The long-term success and social license to operate mines depend on a strong institutional and governance system in the country. This coordinating authority can ensure that national and sub-national governments as well as various government agencies are involved to increase transparency in the development and implementation of a national roadmap for critical minerals and supporting infrastructure. The coordinating authority can look at issues such as engagement with civil society organizations and communities, transparency and disclosure efforts, child labor exploitation in value chains, labor conditions, sexual exploitation, and security and peace efforts, among others. These areas of engagement are as important

12 The African Union in its March 2025 Forum on Mining, for example, issued a call to launch high-level African critical minerals diplomacy (African Union 2025).

as the technical, financial, and economic aspects of the critical minerals sector.

An efficient process and speedy approvals, from exploration to production, are key to program success. As discussed, the current global average lead time for new mines is about 18 years. The majority of this time is taken up by exploration, studies, and the permitting process. Many of these steps are entirely within the government's control. In their search for a comparative advantage in the global critical minerals development arena, many governments are devising institutional arrangements for dedicated monitoring and rapid review and approval. The coordinating "czar" proposed above will be uniquely placed to make this process speedy by cutting red tape, breaking through institutional silos, and ensuring the availability of trusted advisors and experts ready to review and support the government. Ancillary infrastructure and energy investments need to move at the same pace. It is quite possible to cut the initial phase of mine development by several years, and these efforts will position Africa as an attractive destination for U.S. investments.

African governments can also identify sub-standard mining operations and take action. Currently, many mining operations in Africa are causing substantial environmental damage and have negative impacts on surrounding communities. The overall performance of these mines is sub-optimal and detrimental to the economies and livelihoods of African countries and citizens (USIP 2024). Governments in the region can mobilize technical expertise to identify these weaknesses and explore solutions, including requiring the sale to more qualified operators that can comply with the necessary environmental and social standards.

4.1.2 REGIONAL COORDINATION

Regional coordination that leverages the AfCFTA is indispensable. With 35 African countries having critical mineral resources, and the strong priority of AfCFTA implementation in the region, regional coordination to continuously expand markets for the integrated development of value chains, skills, and regional infrastructure projects is critical.

African governments can identify the specific development corridors linked to new mines to leverage development and jobs, especially those within the African Union's Programme for Infrastructure Development in Africa. The transportation links from mines to ports, as well as the energy transmission infrastructure from power generation sources to mines, are integral to the success of new operations (African Development Bank 2025). Combined packages of investments can be more attractive to investors if they are coordinated well and promoted in an integrated manner. Some of these investments may span multiple borders and early engagement across countries is necessary to identify investments linked to fair, benefit-sharing arrangements (African Union Development Agency - NEPAD. 2023). The development of clear contract arrangements for U.S. investors and the speedy approval of all mine development steps are key factors for success. In many cases, a lack of attention to the supporting energy and infrastructure projects will delay the overall mining development process.

4.1.3 PRIVATE SECTOR AND JOBS

African private enterprises must be an integral part of each country's strategy and action plan. A collaborative and coordinated approach between African governments and mining

companies is needed to provide the basis for the development of local suppliers and downstream value chains. Promotion of joint ventures with U.S. companies can be beneficial to all parties. It is critical to speed up the usual long timelines for suppliers, support the whole spectrum of companies and not exclusively small and medium-sized enterprises (SMEs), and provide support for local suppliers and manufacturers to meet the high standards required of mining companies (Atta-Quayson 2022). For example, the African Development Bank examined the potential for value chains linked to rare earth elements. These value chains can have a wide range of investment requirements (from $10 million–$1 billion), opening up opportunities for local investors to participate in the lower end such as processing rare earth elements into concentrates, while larger companies could be incentivized for the bigger and more complex elements of the value chain (Africa Natural Resources Center 2021).

KEY EXAMPLE

After passing local procurement mining regulations in 2012 in Zimbawbe, a collaborative approach between the government and mining companies identified 27 manufacturing opportunities and a supplier development program was put in place. Locally manufactured inputs have steadily grown since then (World Bank 2015).

Job generation strategies should be integrated into overall critical minerals projects through a well-designed corridor development plan, regional partnerships, and value chain strategies. The African Union's Green Minerals Strategy (African Union 2022) is explicit about the opportunities that value chains associated with the critical minerals sector can offer to African countries and their youth. The development of these value chains requires advanced work in parallel with the preparation of critical minerals, infrastructure, energy transactions, and skills development. Infrastructure corridors and new energy generation also offer opportunities for new export-oriented industries to flourish in the wake of these investments (Columbia Center on Sustainable Investment 2017). Well-designed special economic zones will generate jobs that align with the country's economic vocation and opportunities along the development corridors.

Vibrant cities surrounding mining projects and associated development corridors are a vital element for sustainable economic development and job creation. Effective mines require well-run cities that provide essential public services to their residents (World Bank 2008). The Organisation for Economic Co-operation and Development has provided recommendations for good practices in urban development around mines (OECD 2023). Healthy and safe employees are indispensable to a well-run operation. Services to the mine and its employees can serve as the basis for SME generation and job creation. Innovative institutional arrangements may be necessary for the sustainable development of these cities, ensuring they are well-run and integrated into the regional economic development surrounding the mine and its associated development corridors.

4.1.4 PARTNERSHIPS

Early mobilization of the World Bank, the African Development Bank, and the IMF (Albertin et al. 2021) is necessary for a range of technical assistance and capacity-building initiatives. The complexity of the multiple moving parts described in this section requires the mobilization of trusted partners. Strong support teams in areas such as contract design, regulatory environment, governance, transparency, and related matters will send a clear signal to potential investors that the country is committed to developing the critical minerals and related sectors. These support teams and advisors should ideally be independent of the investors and work exclusively on behalf of a given government. The speed and quality of engagement with the U.S. government and businesses depend on the strength of the African counterparts and their advisors. Furthermore, a modern, stable, and competitive tax regime can be developed with the support of global experts to attract U.S. investments. Table 8 (see below) illustrates the range of areas of support that the international financial institutions can provide.

KEY EXAMPLE

In 2021, mining tax reforms in Zambia were implemented. These aimed to end double taxation (mining royalties are now tax deductible), lower royalties to more competitive levels, and ensure a stable environment (previously royalties had been changing on a regular basis, often every 24 months, for nearly two decades) (World Bank 2023a).

Investment promotion agreements or critical minerals agreements can also be explored with the U.S. In addition to continuing engagements for the reauthorization (and expansion to the critical minerals sector) of the African Growth and Opportunity Act, due to expire on September 30, 2025, African governments can also explore individual investment promotion agreements or critical minerals agreements with the U.S. (Egyin 2024). Individual trade and investment agreements can be prepared more quickly, be targeted to specific critical minerals and related infrastructure and energy investments, and cover opportunities in value chain businesses linked to the critical minerals available in the country.[13] Export-oriented investments in development corridors can also be part of the investment promotion agreement for ease of coordination.

4.2. Recommendations for U.S. engagement in the African critical minerals sector

As described in Section 3, Africa provides unique opportunities in the critical minerals sector

13 Early indications from the Trump administration's engagement with Latin America seem to indicate the willingness to explore investment promotion agreements (Buenos Aires Herald 2025).

to help the U.S. deal with the uncertainty in supply chains, geopolitical risks, competition, and economic risks described in Section 2.

This section presents recommendations for the U.S. in its engagement with African nations. The recommendations are organized in three categories: domestic institutional arrangements, private sector, and partnerships.

4.2.1 DOMESTIC INSTITUTIONAL ARRANGEMENTS

U.S. foreign policy towards Africa should include well-organized minerals diplomacy. A concerted and sustained effort in U.S. foreign policy engagement with key African countries is required to open up opportunities for U.S. companies to access the critical minerals resources needed by the defense, communications, energy, and related sectors. For example, China has used a multi-pronged engagement in African countries for years. While China only controls about 8% of Africa's mining sector, it is focused on specific countries with significant critical minerals reserves—the DRC, Zambia, and Zimbabwe—giving it unique access to cobalt and lithium (Egyin 2024). Furthermore, most of the critical minerals mined in Africa are exported to China for processing (Development Reimagined 2024). Other countries, such as India,[14] Saudi Arabia (Magrid and Dahan 2024), and the European Union (EU) (Acheampong 2024) are also beginning to explore entries into the African critical minerals sector. The U.S. cannot be left behind. This diplomacy requires coordinated efforts by the public and private sectors (Baskaran and Schwartz 2024; Baskaran and Wood 2025). The April 2025 visit to the DRC by the U.S. Special Advisor for Africa is an example of the initial efforts of mineral diplomacy.[15]

A coordinated inter-agency effort is also required. The U.S. has several agencies that should work in a coordinated manner as part of critical minerals engagement with Africa. The DFC, State Department, U.S. Trade Development Agency (USTDA), EXIM Bank, DOE, Treasury, Commerce Department, and USGS, among others, must work closely and seamlessly with clear objectives and a common platform.[16] Each agency has a clear and complementary mandate that can make the platform a powerful vehicle for engagement with Africa, including the DFC on financing of infrastructure and mining investments, EXIM on financing the export of equipment and goods together with the import of minerals, USTDA on financial support to upstream studies, USGS on exploratory geological work, DOE on energy policies and investments, Treasury on financial and fiscal instruments, the Commerce Department on trade barrier elimination, and the State Department on a range of assistance on trade, energy, and economic development. Given the multiple needs in mining, infrastructure, and energy investments, no single agency has the expertise and instruments to make deals materialize. A coordinated approach to financial and trade support (guarantees, targeted subsidies, risk-sharing instruments, etc.)

14 Khanij Bidesh India Limited (KABIL) is a joint venture created in 2019 to secure strategic minerals like lithium and cobalt from overseas. KABIL handles the identification, acquisition, exploration, and processing of these minerals to meet India's commercial needs, and has begun to look for partnerships in countries like Tanzania, Zimbabwe, the DRC, and Zambia (Insights IAS 2024).

15 The U.S. Special Advisor for Africa, Massad Boulos, visited the DRC to discuss a possible mineral deal that could mobilize billions of dollars. Boulos confirmed an agreement on "a path forward for [the mineral deal] development," including a promise for transparency and investments in the local economies (Business Insider Africa 2025).

16 Similar instructions have been provided in a recent United States President's Executive Order instructing agencies to work together to develop critical minerals in the country (The White House 2025c).

will be required for American companies to develop critical minerals resources in Africa. The U.S. Congress has a critical role to play (box 8).

BOX 8. POSSIBLE FOCUS AREAS FOR U.S. CONGRESS TO SUPPORT STRONGER PARTNERSHIPS WITH AFRICA FOR CRITICAL MINERALS

Several House subcommittees can work on coordinated areas of support to strengthen commercial relations between the U.S. and specific African countries, thereby enhancing critical minerals partnerships. The House Subcommittee on Energy and Mineral Resources and the Senate Subcommittee on Energy can explore supportive policies for U.S. private investment in critical minerals in Africa. The Senate Subcommittee on Africa and Global Health Policy and the House Subcommittee on Africa, Global Health, and Global Human Rights can play a critical role in building strategic relations between the U.S. and Africa . The Subcommittee on Trade of the House Committee on Ways and Means can utilize its mandate on trade partnerships and incentives to support U.S. companies in critical minerals in Africa, and the Subcommittee on State, Foreign Operations, and Related Programs of the House Committee on Appropriations can explore funds to support the extraction, processing, and transport of critical minerals from Africa to the U.S. Overall, Congress could explore legislation providing incentives (including tax and tariff benefits) for investments in critical minerals and recommend and appropriate resources for programs aiming at supporting stronger partnerships with Africa for critical minerals.

The U.S. Geological Survey (USGS) can expand its operations and work with mining companies to understand the critical minerals landscape in Africa. While the current estimates of critical minerals reserves in Africa make it an attractive proposition, mining investments can only be decided with much deeper information on ore grade, size of deposits, quality of byproducts, and many other factors (USGS 2024).[17] The trend of diminishing budgets for exploration needs to change to open up important opportunities for the U.S. A decisive push to develop a deep understanding of the region's critical minerals resources will give the U.S. a unique advantage.[18]

17 For example, the USGS in 2021 prepared a report to "inform on the extractive resources of the African region and expand the NMIC's understanding of the mineral industry of African nations." (USGS, 2021) However, the work is at a general level and further analyses are required.

18 Ukraine faces a parallel difficulty: there is little contemporary evidence to confirm the economic feasibility of extracting rare earths and other critical minerals. Much of the geological information still in use dates back several decades to Soviet-era surveys, which were conducted with outdated exploration techniques (Baskaran and Schwartz 2025).

KEY EXAMPLE

There is much work needed in updating geological data in Africa. For example, Zambia's geological mapping dates from the 1970s. This mapping only covers about 55% of the country. With reforms to licensing and governance and better geological data, copper production could more than double to 1.5 million MT by 2030 (World Bank 2025).

4.2.2 THE PRIVATE SECTOR

Integrated engagement and leadership of the American private sector is indispensable. Government agencies alone cannot identify and tackle the critical bottlenecks that corporations will face in the mining, infrastructure, and energy sectors. The private sector will be able to pinpoint the most significant risks (ranging from governance, financing, social vulnerabilities, and bureaucratic hurdles) as well as untapped investment opportunities. Mining corporations can identify, with sufficient granularity, the specific support needed country by country, either for upstream support on public goods information or for downstream instruments such as guarantees and trade barrier elimination. Finally, the private sector can identify opportunities and challenges in developing joint ventures with African partners that would lead to deeper and more secure long-term partnerships that cannot be easily dismantled and reestablished with other countries.

The infrastructure and energy gaps in Africa should be seen as an opportunity for the U.S. private sector to invest. The integrated development of infrastructure corridors (ADB 2025) (including railways, roads, ports, and airports) and energy generation assets linked to mining operations can expand business opportunities for U.S. investors (World Bank 2016). Mining revenues can provide a stable source of financial resources, making these infrastructure and energy investments more attractive to U.S. infrastructure asset developers and managers (see box 9).[19] These investments serve as crucial components of effective U.S. mineral diplomacy.

The U.S. private sector should be ready to engage in mine acquisitions to assist Africa with upgrades to mine performance, as well as improvements to environmental and social components. The operational, environmental, and social performance of many mines in several African countries is suboptimal today (African Ministerial Conference on the Environment 2023). Frequent incidents of environmental damage, undue pressure on natural resources, conflicts with communities, and unsafe operations have been reported.[20] African countries should not accept these conditions and are entitled to search for better and safer mining operators. The U.S. can step into this arena and acquire mines to improve their performance levels.

19 For example, a consortium of France's EDF Renewables and the local Pele Green Energy was awarded a contract in 2022 to develop a 100MW solar independent power producer (IPP) project for Anglo American Platinum's Mogalakwena mine in South Africa (Energy and Utilities 2025). China has also used a resource-for-infrastructure model in some African countries. For example, the Sino-Congolais des Mines agreement.

20 For example, recent environmental disasters have been reported in Zambia (BirdLife International 2025) and DRC (RAID 2024).

U.S. private mining companies have ample experience with programs that create the conditions for a strong social license to operate in Africa. The continued operation of mines requires transparency, engagement with surrounding communities, proactive resolution of disputes, and a structured set of measures to develop and expand the social license to operate (Wall and Pelon 2011; Chuhan-Pole, et al. 2017).

BOX 9. THE LOBITO CORRIDOR PROJECT

An example of development corridors linked to export of critical minerals is the Lobito Corridor project. This project emerged from the cross-border agreement signed by Zambia, Angola, and the DRC in January 2023. The project includes the construction of a 350 mile new rail line in Zambia connecting the southern part of the DRC and linking to Angola. Additionally, the project includes feeder roads and renovating the old Benguela railway (Atlantic Council 2024).

This regional agreement received the support of the U.S. (including the USTDA and the DFC), the European Union, the African Development Bank, and the Africa Finance Corporation (AFC). The total funding allocation has surpassed $3 billion for the railway and complementary investments in energy, transportation, logistics, and agriculture through a variety of public-private partnerships. For example, the AFC signed concession agreements for the railway project with Angola and Zambia (Atlantic Council 2024; Lobito Corridor Investment Promotion Authority 2024).

This type of regional development corridor leverages the opportunities offered by the AfCFTA, one of the largest regional blocks in the world, bringing together 55 African Union member states and eight Regional Economic Communities in a single continental market.

The Trump administration has reaffirmed its commitment to the project, given its role in accessing critical minerals from the DRC and Zambia (U.S. Embassy to Angola and Sao Tome and Principe, 2025).

4.2.3 PARTNERSHIPS

The U.S. should work to mobilize, through their stakeholders in these organizations, multilateral development banks (MDBs) and the IMF. The World Bank, African Development Bank, and IMF can provide a range of financial instruments and technical assistance that would make engagements of U.S. companies in critical minerals viable in Africa (see table 8). They can work with national development banks, Africa's export-import bank, and sovereign wealth funds to provide coordinated platforms of concessional and blended finance as well as innovative financial instruments. Global experience has shown that strong capacity and technical support in countries with mining resources accelerates the development of mining deals by reducing the potential for mistakes by government officials (Mann 2015).

TABLE 8

The role of MDBs and IMF in supporting African critical minerals sector and U.S.-Africa partnership

Areas of work	World Bank Group	African Development Bank	International Monetary Fund
Loans and credits	✔	✔	✔
Grants and trust fund mobilization	✔	✔	
Guarantees	✔ (Multilateral Investment Guarantee Agency)		
Private sector investments (including SMEs and value chains)	✔ (IFC)		
Technical assistance and capacity building for mining/infrastructure/energy sector reforms	✔	✔	
Capacity building for mining/infrastructure/energy contract design, negotiations, and management	✔	✔	
Fiscal management	✔	✔	✔
Economics, value chains, jobs, and sector analytics	✔	✔	✔
Capacity strengthening for civil society engagement and environmental management	✔	✔	
Engagement with national development banks and sovereign wealth funds for coordinated finance platforms and syndications	✔	✔	

SOURCE: Authors

In conclusion, table 9 presents the recommended priority actions for U.S. and African policy decisionmakers to develop a productive and mutually beneficial partnership on critical minerals for Africa's development and U.S. demand for critical minerals. Section 5 expands on these benefits for each partner.

TABLE 9

Recommended priority actions for U.S. and African policy decisionmakers

United States	Africa
Define a clear foreign policy agenda for critical minerals in Africa.	Coordinate highest levels of government leadership in the critical minerals sector, including heads of state; a coordinating czar for critical minerals, energy, infrastructure, and value chains; and a coordinating czar for governance.
Establish mechanisms for coordinated engagement of all relevant U.S. government agencies (e.g., USGS, DFC, USTDA, EXIM Bank, State, Commerce, etc.).	Launch a platform that serves as single entry point for engagement with U.S. partners and expedites processes and approvals.
Establish a platform for public-private engagement of relevant stakeholders, including mining companies, infrastructure asset developers, multilateral development banks, and others.	
Explore investment promotion agreements or trade agreements that serve as an overarching framework for bilateral or multilateral engagements in the critical minerals and supporting sectors (infrastructure, energy, value chains).	
Engage proactively with multilateral development banks to mobilize funds and partnerships.	

SOURCE: Authors

5. BENEFITS OF STRONG CRITICAL MINERALS PARTNERSHIPS TO AFRICA AND THE U.S.

This section reviews the market outlook for the mining and refining of critical minerals in Africa, the importance of the mining sector to African economies, current and projected direct and indirect jobs in the mining and refining sectors, and benefits to the U.S. economy.

5.1 The market outlook for critical minerals mining and refining in Africa

The IEA in its Global Commodities 2025 report presents the results of a detailed review of publicly available information on mining and refining projects worldwide. The analysis works around two cases. The base case includes projects under operation, under construction, and in advanced stages of preparation (permits obtained, financing secured, offtake contracts in place). The high case includes, in addition to projects in the base case, other projects at a reasonable stage of development. Neither case includes potential projects that could be developed, given the availability of mineral resources according to the reserves information (IEA 2024a, 2025a).

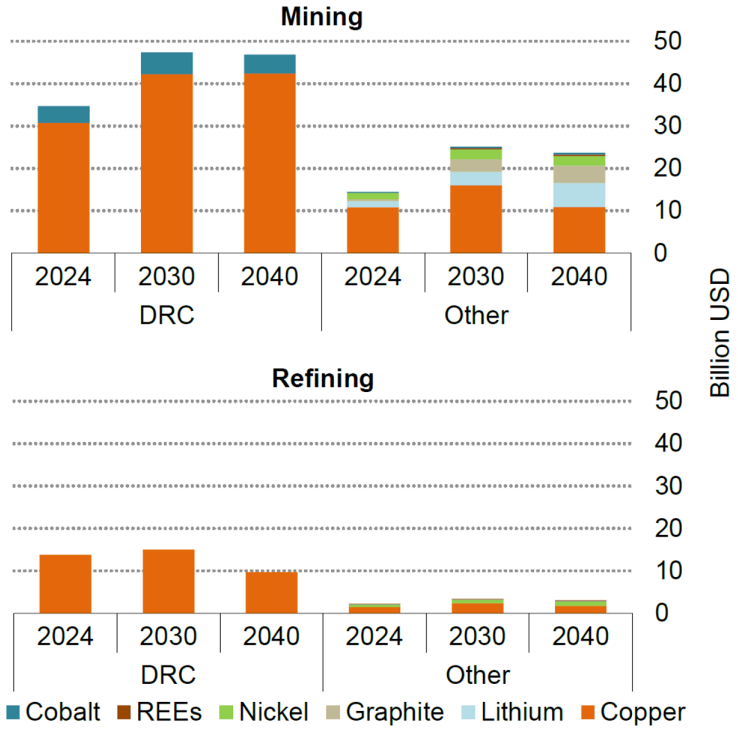
Figure 20 shows projections given base case calculations of the IEA for Africa's mining and refining sectors for a selected group of minerals. The figure is divided between the DRC and other countries given the large mining and refining baseline in the DRC. The current market value of mining for the minerals shown in figure 20 is about $50 billion, and for refining, about $16 billion. The total for both mining and refining is projected to grow to about $83 billion by 2040, or about 66% higher (IEA 2025a).

Compared to Africa's potential reserves, it is important to reiterate that the reserves are most probably an underestimate due to insufficient exploration projects, and these mining and refining projections will be insufficient to capitalize on them fully by 2040.

There are, however, bright spots in these projections, like lithium—with projects already online in Zimbabwe, and possibilities in Ethiopia, Mali, and Namibia. Total production of lithium in the region grows to 53 kt in the base case, and to 70 kt in the high case.

FIGURE 20

Africa's projected mining and refining market value in selected minerals



SOURCE: IEA (2025)

On the other hand, given Indonesia's rapid growth in the production of nickel (see Section 3.5.2), and the fact that cobalt is generated as a by-product of nickel, the country is projected to double its cobalt production by 2030 (50 kt) in the base case, and increase its production by as much as 80 kt in the high case (23% of global cobalt supply). Cobalt in the DRC is produced as a by-product of copper. The declining ore quality in the cobalt-copper mines operating today in the DRC implies that its production is projected to go down after 2030 (see Figure 20).

The projections shown in Figure 20, and even those indicated by IEA's high production case, can be substantially surpassed in Africa for critical minerals if the recommendations in Section 4.1 are implemented. New discoveries with expanded exploration programs and speedy approval of mining permits and agile engagement with investors can make the region a more attractive destination for new mining and refining, while the benefits of a secure supply of critical minerals can significantly improve the outlook of the high case.

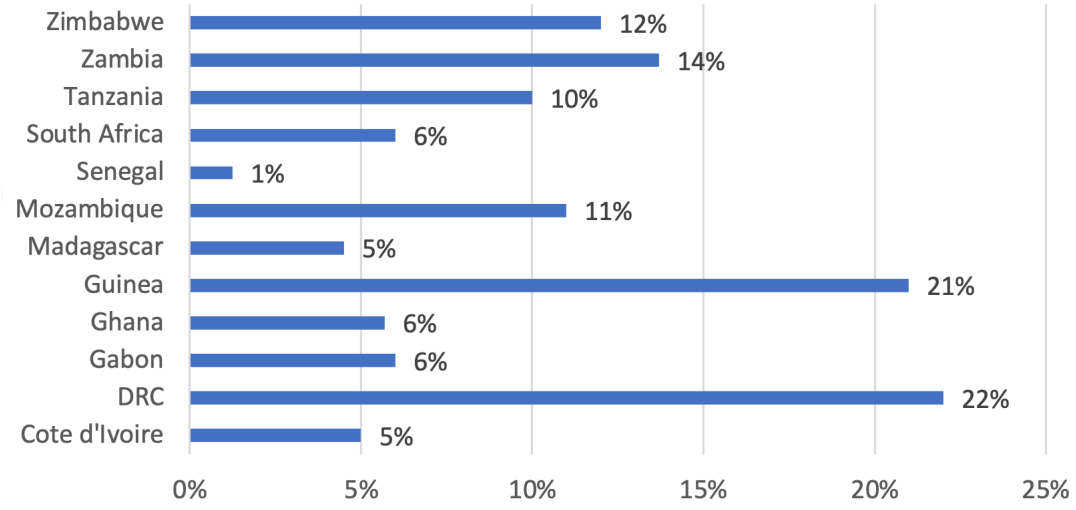
5.2 The mining sector's contribution to African economies

While there is no consistent data on the mining sector's contribution to African economies, Figure 21 provides an estimate based on a compilation of sources for recent years across

the region. For 11 countries, the mining sector contributes more than 5% to their economy. In many cases, mining is a substantial portion of their exports (for example, 95% for DRC).

FIGURE 21

Contribution of mining to GDP in selected African countries



SOURCE: Various references, see Annex 3 for complete list

The opportunities for rapid expansion of the mining and refining industries in Africa could yeild an even higher contributions to GDP in countries with critical mineral resources.

5.3 Jobs in the mining sector

5.3.1 DIRECT JOBS IN MINING AND REFINING

Reliable data on formal employment in the mining sector in Africa is limited. Figure 22 summarizes a review of diverse sources to estimate the number of formal jobs in the mining sector in a selected group of African countries. The total number of formal jobs in the region is about 750,000, although some sources put this number as high as one million.

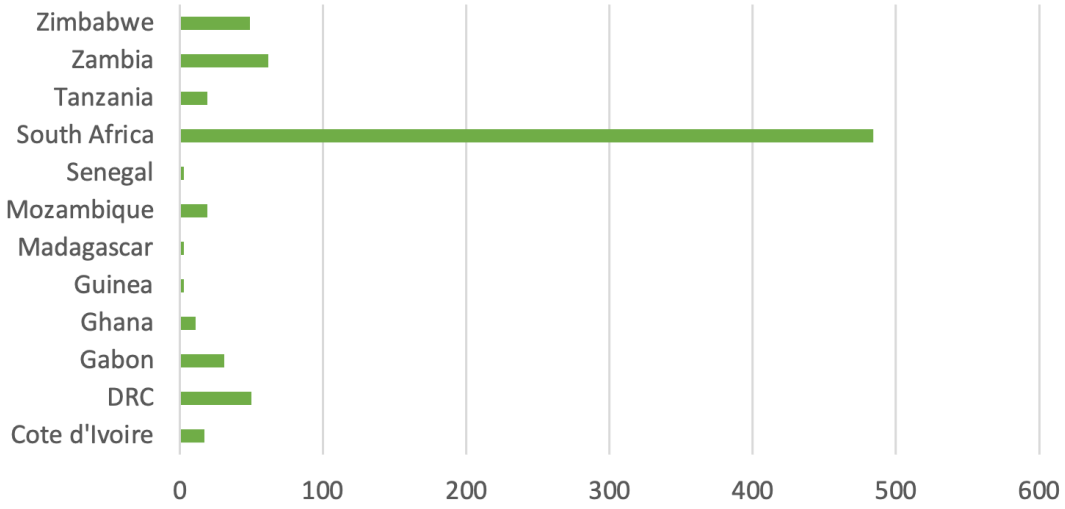
The IEA estimates that about 800,000 people were formally employed in the copper, cobalt, nickel, and lithium industry globally in 2022, of which about half were in Africa (IEA, 2023b). If the 66% projected increase in market value assumed by the IEA base case by 2040 (IEA, 2025a) has a corresponding increase on employment, we should expect the creation of 268,000 new jobs in the mining of these four minerals.

The below estimates do not include informal workers in the artisanal mining industry. According to some estimates, there may be as many as 10 million artisanal miners in sub-Saharan Africa (World Bank, 2019). In 2018, artisanal mining in the DRC contributed around 10% to the country's cobalt production. With the significant drop in prices, this number has gone down to about 2% (Cobalt Institute, 2024). The complex issue of artisanal mining requires a separate in-depth discussion beyond the scope of this report. However, its importance for employment

cannot be underestimated, and this segment of the mining sector requires special attention.

FIGURE 22

Number of direct formal jobs in mining in seleted African countries (1000s)



SOURCE: Various references, see Annex 3 for complete list

KEY EXAMPLE

"President Ramaphosa highlighted that beneficiation and local processing of critical minerals could increase the continent's GDP by 12% or more by 2050. He cited estimates suggesting that African countries could generate USD 24 billion annually in GDP and create 2.3 million jobs by investing in mining beneficiation and domestic processing." (South Africa Government News Agency, 2024)

The Minerals Council of South Africa studied the female labor participation in the mining industry. Their study found that the number of women working in critical minerals mining in 2019 was about 25,000 (close to 20,000 in platinum group metals, 3,000 in chromium, and 2,000 in manganese, ranging between 12% and 17% of the labor force, respectively). Safety, equipment, and discrimination were some of the challenges identified to increase female labor participation in the critical minerals industry (Minerals Council South Africa, 2020).

5.3.2 INDIRECT JOBS LINKED TO MINING AND ANCILLARY INVESTMENTS

There is no information on the indirect jobs associated with mining operations. Estimates vary widely. For example, a study commissioned by the International Finance Corporation in a gold mining operation in Ghana showed that for each direct mining job, as many as 28 indirect jobs can be created in the economy in areas such as transport and logistics, catering and camp services, financial and legal services, equipment maintenance, and other local procurement

(IFC 2012, 2013). The International Labor Organization (ILO) "estimated that each job created by a mining company in Zambia generates two to four jobs in the local economy." (ILO, 2012) ILO noted that the potential for indirect job creation in the country has been underutilized. Most of these jobs were created in low-skilled camp services or in local companies importing goods procured by the mines (ILO, 2012). Therefore the range would go from 2 indirect jobs for a low-impact pro-jobs policy environment to as many as 28 for a high-impact policy environment.

KEY EXAMPLE

Benshaul-Tolonen and Fernandez-Musso (2025) surveyed 1,055 firms in the town of Kitwe, located in the Copperbelt province in Zambia. The survey's objective was to understand the backward linkages of mining companies with SMEs in surrounding communities. 9.1% of the firms had supplied a mine in the last five years. Micro-enterprises (with less than 10 employees) were 10% less likely to be in the mining supply chain. Low demand from mines, high competition, and lack of connections were identified as the main obstacles by firms.

For a typical mine anywhere in the world, 50% of their spending within a country has been shown to be procurement of goods and services. 50%-70% of a typical mine's spending is also in-country, galvanizing the local economy. The amount mines pay to these suppliers is much higher than what they typically pay to governments in taxes and royalties and what they pay to communities in wages and investments combined (World Gold Council, 2013, and Natural Resources Governance Institute, 2022).

Overall, spending on goods and services in a given country typically represents 50% to 70% of a mine's total expenditures in host countries, often exceeding the combined outlays for government payments, employee compensation, and community investments.

The creation of indirect jobs linked to the mining industry is not automatic. They require proactive government and mining company policies to strengthen linkages to the local economy, improve access to finance, develop skills, implement strong local content policies, and support vibrant SME ecosystems around mining and refining operations (UN Trade and Development, 2015). Depending on the range of policies and programs and their effectiveness, the indirect jobs linked to mining operations of critical minerals could grow between 0.5 million by 2040 in a low-impact policy environment and as much as 7 million in a high-impact policy environment in that time period.

The recommendations put forward in Section 4.1 recommend African governments to have a broader view of the economic opportunity that expansion of critical minerals mining can present. These opportunities can be grouped in three categories: 1) ancillary transport, electricity, and related development corridor infrastructure to serve the mines; 2) special economic zones along those development corridors to take advantage of the new or upgraded infrastructure to produce export-oriented goods; and 3) new business opportunities (in areas such as agribusiness) along the development corridor.

With well-coordinated policies and investment actions implemented in coordination with the growth of the critical minerals mining sector, the jobs and enterprise creation opportunities multiply (see figure 23).

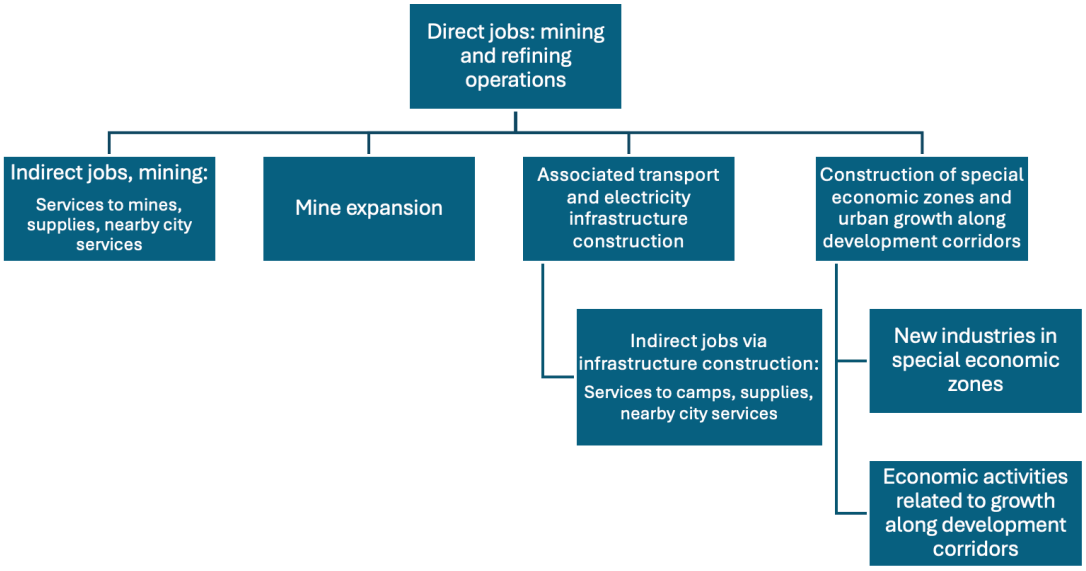
First, the construction of ancillary infrastructure and development corridors (ports, railways, roads, and electricity generation and distribution) to serve the mine and surrounding communities and businesses would generate a significant number of direct and indirect jobs.

Second, the construction of special economic zones and the expansion of urban infrastructure for growing cities along these development corridors would add to the direct and indirect job growth.

Finally, the enterprises located in these special economic zones and in urban centers along the development corridors (agribusiness, tourism, and other export-oriented businesses) would amplify further the economic growth that can be generated by expanding mines.

FIGURE 23

Jobs and enterprise opportunities in a coordinated pro-jobs policy and investment environment linked to mining sector



SOURCE: Authors

As discussed in Section 4.1, achieving these opportunities requires a coordinated whole-of-government approach and the mobilization of international financiers and private partners with the expertise and resources to implement these actions from the regional to the local level. These programs can generate, over time, several million more jobs and tens of thousands of new and expanded enterprises.

5.4 The benefits to the U.S. economy of critical mineral partnerships with African countries

As discussed throughout this report, the U.S. is facing several risks with critical minerals that can be resolved through well-designed partnerships with African countries. Through these partnerships, the U.S. can:

- Secure the supply of refined critical minerals independent from supply chains linked to China
- Have faster access to large deposits of critical minerals
- Increase the reliability of the supply chains of significant industries in the U.S., from defense to electronics and energy, as well as downstream sectors like AI that jointly represent a considerable portion of the U.S. economy
- Develop new opportunities for U.S. businesses in mining, refining, and infrastructure sectors in Africa
- Sign new trade agreements with African nations, opening up new markets in economies with higher purchasing power thanks to growing mining and ancillary sectors
- Support stable growing economies with reduced national and regional conflicts

6. A CALL FOR ACTION

This paper has shown the vulnerabilities of the critical minerals supply chain and the implications for the U.S. manufacturing industry and its economy. The substantial concentration of mining and refining of critical minerals poses a significant risk to the U.S. Diversifying the supply chain and working with reliable partners is no longer a desirable change but an urgent challenge.

Africa has three significant advantages as a partner of choice for the U.S. in critical minerals. First, the region has significant reserves of several critical minerals; second, several countries have existing mining and refining operations with the potential for rapid expansion; and third, Africa offers considerable business opportunities in infrastructure, energy, and new economic opportunities along development corridors, all linked to mining.

The political will of Africa to establish effective partnerships for the development of its critical minerals sector cannot be underestimated, and the recent Africa Union Green Minerals Strategy is a testament to this policy commitment.

However, the global critical minerals landscape is highly competitive. Other regions may look more favorable to investors, but Africa should do everything in its power to potentiate its comparative advantages. Furthermore, African countries face a different diplomatic and business environment in the U.S. The reorientation from aid to trade can be an advantage in developing effective partnerships for critical minerals.

Time is of the essence. Having strong high-level national coordinators in select African countries that can mobilize the entire government and the private sector to prepare and negotiate investment programs in mining, infrastructure, and energy is indispensable. Efficient review process and speedy approvals, from exploration to mine production, are key to competing in the global critical minerals market.

Job generation strategies should be integrated into overall critical minerals projects through a well-designed corridor development plan, regional partnerships, and value chain strategies. Infrastructure corridors and new energy generation also offer opportunities for new export-oriented industries to flourish. Some estimates indicate that African formal jobs in critical minerals could number about 400,000. With decisive investments and the policy recommendations put forward in this report, direct jobs could increase by 268,000, and indirect jobs as much as 4 to 27 times this amount. New jobs to build the ancillary infrastructure and in new businesses along development corridors could run in the millions. Africa cannot lose this opportunity.

The creation of indirect jobs linked to the mining industry is not automatic. They require proactive government and mining company policies to strengthen linkages to the local economy, improve access to finance, develop SMEs and skills, implement strong local content policies, and support vibrant SME ecosystems.

ANNEX 1. THE U.S. CRITICAL MINERALS 2022 LIST

The 2022 list of critical minerals compiled by the US Geological Survey (USGS 2022), including their main use in the US economy, is copied directly below:

- Aluminum, used in almost all sectors of the economy
- Antimony, used in lead-acid batteries and flame retardants
- Arsenic, used in semi-conductors
- Barite, used in hydrocarbon production.
- Beryllium, used as an alloying agent in aerospace and defense industries
- Bismuth, used in medical and atomic research
- Cerium, used in catalytic converters, ceramics, glass, metallurgy, and polishing compounds
- Cesium, used in research and development
- Chromium, used primarily in stainless steel and other alloys
- Cobalt, used in rechargeable batteries and superalloys
- Dysprosium, used in permanent magnets, data storage devices, and lasers
- Erbium, used in fiber optics, optical amplifiers, lasers, and glass colorants
- Europium, used in phosphors and nuclear control rods
- Fluorspar, used in the manufacture of aluminum, cement, steel, gasoline, and fluorine chemicals
- Gadolinium, used in medical imaging, permanent magnets, and steelmaking
- Gallium, used for integrated circuits and optical devices like LEDs
- Germanium, used for fiber optics and night vision applications
- Graphite , used for lubricants, batteries, and fuel cells
- Hafnium, used for nuclear control rods, alloys, and high-temperature ceramics
- Holmium, used in permanent magnets, nuclear control rods, and lasers
- Indium, used in liquid crystal display screens
- Iridium, used as coating of anodes for electrochemical processes and as a chemical catalyst
- Lanthanum, used to produce catalysts, ceramics, glass, polishing compounds, metallurgy, and batteries
- Lithium, used for rechargeable batteries
- Lutetium, used in scintillators for medical imaging, electronics, and some cancer therapies
- Magnesium, used as an alloy and for reducing metals
- Manganese, used in steelmaking and batteries
- Neodymium, used in permanent magnets, rubber catalysts, and in medical and industrial lasers
- Nickel, used to make stainless steel, superalloys, and rechargeable batteries

- Niobium, used mostly in steel and superalloys
- Palladium, used in catalytic converters and as a catalyst agent
- Platinum, used in catalytic converters
- Praseodymium, used in permanent magnets, batteries, aerospace alloys, ceramics, and colorants
- Rhodium, used in catalytic converters, electrical components, and as a catalyst
- Rubidium, used for research and development in electronics
- Ruthenium, used as catalysts, as well as electrical contacts and chip resistors in computers
- Samarium, used in permanent magnets, as an absorber in nuclear reactors, and in cancer treatments
- Scandium, used for alloys, ceramics, and fuel cells
- Tantalum, used in electronic components, mostly capacitors and in superalloys
- Tellurium, used in solar cells, thermoelectric devices, and as alloying additive
- Terbium, used in permanent magnets, fiber optics, lasers, and solid-state devices
- Thulium, used in various metal alloys and in lasers
- Tin, used as protective coatings and alloys for steel
- Titanium, used as a white pigment or metal alloys
- Tungsten, primarily used to make wear-resistant metals
- Vanadium, primarily used as alloying agent for iron and steel
- Ytterbium, used for catalysts, scintillometers, lasers, and metallurgy
- Yttrium, used for ceramic, catalysts, lasers, metallurgy, and phosphors
- Zinc, primarily used in metallurgy to produce galvanized steel
- Zirconium, used in the high-temperature ceramics and corrosion-resistant alloys.

ANNEX 2. AFRICAN SHARE OF WORLD PRODUCTION OF CRITICAL MINERALS 2023

The following table presents the production of critical minerals in African countries that produce more than 0.2% of global production for a given mineral. For each country, the 2023 production (and corresponding units) is included, its global rank, and the global share of its production. For each critical mineral, the total share of global production for all African countries is included. The list of critical minerals used is the one defined by the U.S. as presented in Annex 1. Critical minerals not listed in this table do not have African countries producing more than 0.2% of the global total output.

TABLE A-1

Significant production of critical minerals in African countries, by mineral

Arsenic				
Rank 2023	Country	Unit	Production 2023	Global share (%)
3	Morocco	metr. t	7700	11.96
	Total Africa			11.96
Bauxite				
Rank 2023	Country	Unit	Production 2023	Global share (%)
1	Guinea	metr. t	123067415	31.48
13	Sierra Leone	metr. t	1353708	0.35
15	Ghana	metr. t	959601	0.25
	Total Africa			32.07
Beryllium				
Rank 2023	Country	Unit	Production 2023	Global share (%)
3	Mozambique	metr. t	882	11.54
4	Nigeria	metr. t	189	2.47
5	Madagascar	metr. t	20	0.26
6	Rwanda	metr. t	20	0.26
	Total Africa			14.54
Chromium				

Rank 2023	Country	Unit	Production 2023	Global share (%)
1	South Africa	metr. t	7968350	54.82
5	Zimbabwe	metr. t	484800	3.34
16	Madagascar	metr. t	33700	0.23
	Total Africa			58.38
Cobalt				
Rank 2023	Country	Unit	Production 2023	Global share (%)
1	The DRC	metr. t	139840	70.81
5	Madagascar	metr. t	3387	1.72
12	Morocco	metr. t	1506	0.76
16	Zimbabwe	metr. t	386	0.20
	Total Africa			73.49
Fluorspar				
Rank 2023	Country	Unit	Production 2023	Global share (%)
4	South Africa	metr. t	452000	5.21
8	Morocco	metr. t	101369	1.17
15	Nigeria	metr. t	23960	0.28
	Total Africa			6.65
Graphite				
Rank 2023	Country	Unit	Production 2023	Global share (%)
3	Mozambique	metr. t	97346	5.88
4	Madagascar	metr. t	60720	3.67
9	Tanzania	metr. t	13475	0.81
	Total Africa			10.35
Manganese				
Rank 2023	Country	Unit	Production 2023	Global share (%)
1	South Africa	metr. t	7058600	34.90
2	Gabon	metr. t	4386300	21.69
5	Ghana	metr. t	870500	4.30
8	Cote d'Ivoire	metr. t	470100	2.32
18	Zambia	metr. t	73560	0.36
19	Kenya	metr. t	44100	0.22
20	Morocco	metr. t	41850	0.21
	Total Africa			64.00
Nickel				
Rank 2023	Country	Unit	Production 2023	Global share (%)
12	Cote d'Ivoire	metr. t	37210	1.01
13	Madagascar	metr. t	36085	0.98
15	South Africa	metr. t	29750	0.81
19	Zimbabwe	metr. t	17784	0.48
21	Zambia	metr. t	7848	0.21
	Total Africa			3.49
Niobium				
Rank 2023	Country	Unit	Production 2023	Global share (%)
3	The DRC	metr. t	560	0.48
5	Rwanda	metr. t	310	0.26

	Total Africa			0.74
Platinum				
Rank 2023	Country	Unit	Production 2023	Global share (%)
1	South Africa	kg	124870	69.84
3	Zimbabwe	kg	19180	10.73
	Total Africa			80.57
Rare earths				
Rank 2023	Country	Unit	Production 2023	Global share (%)
5	Madagascar	metr. t	4000	1.04
	Total Africa			1.04
Tantalum				
Rank 2023	Country	Unit	Production 2023	Global share (%)
1	Congo, D.R.	metr. t	630	29.86
2	Rwanda	metr. t	475	22.51
4	Nigeria	metr. t	190	9.00
5	Ethiopia	metr. t	120	5.69
7	Mozambique	metr. t	82	3.89
11	Sierra Leone	metr. t	22	1.04
	Total Africa			71.99
Tin				
Rank 2023	Country	Unit	Production 2023	Global share (%)
7	The DRC	metr. t	18460	6.39
10	Nigeria	metr. t	7680	2.66
13	Rwanda	metr. t	3210	1.11
14	Namibia	metr. t	876	0.30
	Total Africa			10.47
Titanium				
Rank 2023	Country	Unit	Production 2023	Global share (%)
2	Mozambique	metr. t	1829500	20.23
3	South Africa	metr. t	1010000	11.17
6	Madagascar	metr. t	308800	3.41
8	Senegal	metr. t	239960	2.65
9	Kenya	metr. t	169980	1.88
12	Sierra Leone	metr. t	142490	1.58
	Total Africa			40.92
Vanadium				
Rank 2023	Country	Unit	Production 2023	Global share (%)
3	South Africa	metr. t	8667	7.42
	Total Africa			7.42
Zinc				
Rank 2023	Country	Unit	Production 2023	Global share (%)
12	South Africa	metr. t	197630	1.58
16	Eritrea	metr. t	116829	0.93
26	Morocco	metr. t	36320	0.29
27	Namibia	metr. t	35621	0.28
28	Nigeria	metr. t	33270	0.27

	Total Africa			3.35
Zircon				
Rank 2023	Country	Unit	Production 2023	Global share (%)
2	South Africa	metr. t	289479	21.86
3	Mozambique	metr. t	143505	10.84
6	Senegal	metr. t	73325	5.54
7	Madagascar	metr. t	34376	2.60
8	Sierra Leone	metr. t	27776	2.10
9	Kenya	metr. t	21153	1.60
16	Nigeria	metr. t	4980	0.38
	Total Africa			44.90

SOURCE: http://www.world-mining-data.info/

ANNEX 3: SOURCES FOR CRITICAL MINERAL CONTRIBUTIONS TO SELECTED AFRICAN ECONOMIES (FIGURES 21 AND 22)

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