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Critical Minerals in Africa

Strengthening Security, Supporting Development, and
Reducing Conflict amid Geopolitical Competition

USIP SENIOR STUDY GROUP FINAL REPORT



UNITED STATES
INSTITUTE OF PEACE
Making Peace Possible

The United States Institute of Peace convened a nonpartisan senior study group in the spring of 2023 to explore the role Africa plays in the United States' efforts to diversify US critical mineral supply chains and how new investment in partnerships with African countries could help drive economic development and strengthen peace and security on the African continent. The study group—comprising nine senior leaders experienced in US-Africa policy and relations—participated in four exploratory meetings from June through October 2023. During the course of the study, multiple interviews with relevant technical, operational, and policy experts were also conducted. Through these activities, the study group developed a set of 13 consensus recommendations for the United States to support mutually beneficial public and private partnerships with African countries as the United States endeavors to diversify its access to minerals deemed critical to US economic and national security.

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Executive Summary

The United States Institute of Peace convened a senior study group to explore the role Africa plays in the United States' efforts to diversify US critical mineral supply chains and how new investment in partnerships with African countries could help drive economic development and strengthen peace and security on the African continent. Based on meetings and interviews with relevant technical, operational, and policy experts, the study group developed multiple recommendations for the United States to support mutually beneficial public and private partnerships with African nations. These partnerships could help diversify critical mineral supply chains; strengthen the rule of law, transparency, and environmental and labor standards around African critical minerals; and foster peace and stability through greater US commercial engagement.

Principal Findings

US economic and national security depends on a reliable supply of critical minerals that underlie an array of products and services important to ever-changing modern economies. Yet for many critical minerals (e.g., cobalt, graphite, and manganese), the United States is heavily dependent on imports. Especially concerning is that the United States is at or near 100 percent reliant on “foreign entities of concern”—mainly the People’s Republic of China—for key critical minerals.

Global demand for many critical minerals is growing rapidly. Accelerated demand forecasts are largely based on assumptions regarding a global transition to nonfuel-based energy sources, including high-end batteries for electric vehicles and power storage. However, critical minerals are also essential to powering all manner of consumer electronics, medical supplies, and high-performance metals and engines, including those used for defense and military applications. Consequently, regardless of how market and policy factors may change the trajectory of an energy transition, demand for key critical minerals is very likely to grow as economies worldwide increasingly electrify and modernize. To avoid being shorthanded and vulnerable to export controls and potential market manipulation by geopolitical competitors, it is imperative for the United States to diversify its critical minerals supply chains.

Africa can play an important role in strengthening US critical minerals supply chain security. The United States and allied countries already depend on many critical minerals that are sourced from African countries. But increasing supply is not a simple matter. The development of natural resources on the continent has had a checkered past, and critical minerals are no exception. Ventures of the Russian-led paramilitary Wagner Group in Mali, Sudan, and elsewhere are cases in a long history of predatory mining activities in Africa. Thus, it should not be assumed that the global rush for critical minerals will be beneficial to African development and security. Here, the United States, its allies, and the private sector can play a positive role—including by offering a better alternative to an approach to extracting Africa’s critical minerals common to Chinese companies, which too often has offered little local value and has resulted in corruption and human rights abuses, including child labor exploitation. US mining and related companies could be much more engaged, however, as they remain largely absent from the continent.

While the Biden administration and Congress have stepped up efforts to support US companies in African markets—by de-risking and otherwise supporting investments—progress is relative, and there is no indication that China and other competitors are retreating. In fact, the list of economic competitors in Africa is growing, with Gulf States and others intensifying their interest in African critical minerals. If the United States wants to remain competitive on the global stage, it must step up its efforts to diversify US critical minerals supply chains, including in Africa.

Priority Recommendations

The study group reviewed US policy initiatives and explored key challenges, issues, and opportunities associated with meeting US critical minerals objectives, primarily with a focus on further engaging Africa and challenging China’s dominance. The group’s overarching conclusion is that the US government should act with increased speed, focus, and decisiveness to support Africans in equitably and responsibly developing critical minerals. In doing so, it should engage African countries in mutually beneficial partnerships aimed at bringing peace, prosperity, and community stability to African citizens. Forging such partnerships will not be easy, but doing so could establish the United States and its allies as Africa’s preferred partners in supporting the continent’s critical minerals development.

Following is a list of 13 broad policy recommendations and actions developed by the study group to further US-Africa partnerships on critical minerals development and supply chain diversification:

- **Sharpen US-Africa policy with a focus on critical minerals.** Given their importance to US economic and national security and African economic development, critical minerals merit being a top priority for US policy toward Africa. To execute this priority, the United States should design a comprehensive critical minerals strategy that aims to build mutually beneficial partnerships with Africans.
- **Empower African civil society and the media.** The United States could bolster the involvement of African civil society in its efforts to build transparency and accountability in the critical minerals

sector, including by providing more support for US Agency for International Development (USAID) activities and other US government programs.

- **Prioritize and leverage existing USAID programs to assist Africans with rule-of-law and fiscal transparency efforts.** The United States should enhance ongoing USAID efforts such as those supported through the Fiscal Transparency Innovation Fund. It could help African governments and civil society strengthen the rule of law, improve the business climate for responsible investors, and foster greater peace and community stability through better financial management of activities associated with critical minerals development.
- **Tactically address Chinese mining in Africa.** Although the United States is competing with China, using tactical nuance in investment decision-making could further US policy goals. Of course, all potential relationships with companies must be thoroughly vetted to ensure compliance with human rights, child labor, environmental, and other high standards and laws, but a tangential Chinese connection alone—particularly involving basic services or infrastructure—should not necessarily disqualify a US firm from receiving US government support.
- **Prioritize prompt and full development of the Memorandum of Understanding (MOU) between the United States, the Democratic Republic of the Congo (DRC), and Zambia.** The US-DRC-Zambia MOU should be prioritized to fully realize its potential benefits. Transforming the memorandum into a productive partnership will require a significant US effort and dedicated resources. To be most successful, the MOU will also need the full engagement and guidance of the US private sector across the battery supply chain. Commercial diplomacy can play an important role in this effort.
- **Strengthen the impact of the US International Development Finance Corporation (DFC).** To make the most of its tools in the African critical minerals sector, the US government should sharpen the DFC's impact by, for example, emphasizing strategic investments that will also meet developmental priorities and increase the corporation's presence in Africa.
- **Mobilize the private sector to strengthen African infrastructure.** Although budget constraints and other factors limit the United States' ability to improve African infrastructure, tools exist to mobilize private US resources. For example, the United States could better utilize the Partnership for Global Infrastructure and Investment, DFC, Export-Import Bank, and US Trade and Development Agency to boost countries' abilities to attract private infrastructure investment.
- **Invest in commercial diplomacy.** The US government should practice more vigorous commercial diplomacy with a keen eye toward building critical minerals partnerships in Africa. Increasing the physical presence of diplomatic and commercial officers in mining centers is of utmost importance. For example, the United States should reopen a consulate in the city of Lubumbashi in the DRC and better resource the US Commercial Service.

- **Expand membership of the Minerals Security Partnership (MSP) to include African partners.** The United States is involved in several multinational partnerships involving critical minerals, including the MSP. The MSP was established in 2022 to generate public and private investment in critical minerals production, processing, and recycling, with the ultimate goal of diversifying and securing critical minerals supply chains. Currently, no African countries are included in the MSP.
- **Expand support for the Young African Leadership Initiative (YALI).** The US Department of State and USAID should aggressively pursue increased private and public support for YALI—a highly competitive executive program for young Africans interested in leadership and entrepreneurial training. The program could enhance US-Africa critical minerals policy goals by better engaging US mining and engineering universities in exchange programs and the US diplomatic corps.
- **Assist Africans in building technical capacity in the mining sector.** The United States should partner with Africans to support local critical minerals processing. This could be done in part by helping to establish technical assistance and training centers and regional processing centers—all while being alert to counterproductive critical minerals export policies.
- **Prioritize US national security interests in the context of US trade and investment policy.** Policymakers should explore the extent to which US mining engagement efforts in Africa may be undercut by the Inflation Reduction Act, disincentivizing critical minerals investment and exports to the United States—exports US processing and manufacturing facilities will rely on for the foreseeable future.
- **Support efforts to address artisanal mining challenges.** The United States should support efforts to increase benefits for artisanal workers and limit harm from artisanal mining. Yet it should do so while recognizing that formalization and punitive measures can be counterproductive—inadvertently harming artisanal miners and their communities if not carefully managed.

Global critical minerals markets are rapidly evolving, driven by new policies and technologies. Africans often express a sense of urgency when discussing their major opportunity to tap natural resources and fuel positive development—as the critical minerals of today may not be critical tomorrow. Given this sense of urgency and the United States’ strong interest in furthering its engagement on the continent, the potential for critical minerals partnerships that work for both Americans and Africans is high. For these partnerships to be successful, though, much more work is needed.

Introduction

The demand for critical minerals that power the world's renewable energy technologies, consumer electronics, and defense applications is skyrocketing. Forecasts for critical minerals demand vary and are subject to change due to technological evolution, public policy changes, and market fluctuations, but even conservative demand forecasts and supply imbalances pose economic and national security challenges for the United States. These challenges are heightened by China's dominance in critical minerals production and the processing of raw materials.

China has been actively mining in Africa for more than two decades, outpacing the United States and other countries in terms of speed, amount of production, and investment in mining-related infrastructure. China also dominates the processing of critical minerals, many sourced from Africa. Notably, Chinese companies working in Africa have enjoyed heavy backing by their government—a commercial model for minerals development that sharply contrasts with that employed by most Western countries. China's strong presence and investment in the African minerals sector have helped it become the world's leading manufacturing country. Beijing's infrastructure push through its Belt and Road Initiative and other economic activities has established China as the leading commercial partner of many African countries.

Yet Chinese mining activities fall short in benefiting African host countries, because they often result in environmental degradation, labor abuses, and social inequities that tend to foster resentments in already fragile environments. The intensification of minerals development also has at times led to community upheaval, corruption, and even violent conflict. While the challenges of responsible mining are applicable worldwide, they are particularly acute in many African countries suffering from the “natural resources curse”—conditions where the mineral wealth potential is high but weaknesses in the rule of law, accountability, public institutions, and civil society have resulted in resource and human exploitation.



A locally employed surveyor at an open-pit copper mine in Zambia peers through a theodolite to record the daily changes in the mine and to help guide mining activities. (Photo by mabus13/iStock)

Despite these issues, Africans have generally welcomed Chinese investment, including in the mining and infrastructure sectors. Numerous African countries suffer from a severe infrastructure shortage, which Chinese investment has addressed in part. Many Africans view Chinese commercial engagement in a positive light, especially because China has been “the only game in town,” with other countries largely avoiding these markets. Beijing also moves swiftly: “China gets things done” is a refrain often heard on the continent. Moreover, Africans understandably do not view China through the United States’ adversarial geopolitical lens. What many Africans strongly desire, though, regardless of China’s engagement, are solid commercial partnerships with the United States and other Western countries, including in the critical minerals sector. Many Africans seek US and allied mining-sector investment not only for the capital and technology that it brings, but also for environmental, labor, and human rights operational standards that are typically higher than those they have experienced with Chinese and other companies.

There is little US mining presence in Africa today, but recent global developments have heightened US and allied attention to African critical minerals. Of great concern, the Russian-led paramilitary

It is clear that Africa’s critical minerals will be developed regardless of the risks. . . . The question is *how* will critical minerals be developed and to whose benefit?

Wagner Group expanded its predatory mining activities in Africa through much of 2023. Also of concern are supply chain weaknesses exposed by the COVID-19 pandemic and US geopolitical competition with China, including growing apprehensions about reliance on key Chinese inputs. These dynamics, among others, have spurred US policymakers to increasingly seek partnerships with African countries to diversify critical minerals supplies. The Biden administration has launched several new critical minerals initiatives that engage African partners. Indeed, US officials speak confidently about Western-backed mining and related infrastructure projects helping to transform African economies. These projects include an ambitious Lobito Corridor expansion to establish a Zambia-Lobito (Angola) rail line, a graphite project in Mozambique, and a battery supply chain initiative with the Democratic Republic of the Congo (DRC) and Zambia.

The United States’ increased focus on developing Africa’s critical minerals and processing potential could help lead to a more prosperous and stable continent. But a rush to develop these natural resources could have the opposite effect and worsen economic inequalities, increase corruption, and fuel instability and conflict. Natural resource exploitation, with devastating consequences, has occurred many times throughout Africa’s history. However, it is clear that Africa’s critical minerals *will* be developed regardless of the risks. If the current trend continues, China will largely lead this development, in cooperation with African host countries. The DRC, Zambia, and other countries are among the most geologically rich in the world, and their leaders are eager to take advantage of growing global demand for critical minerals. The question is *how* will critical minerals be developed and to whose benefit?

In answering this and other questions associated with African critical minerals development, a senior study group assembled by the United States Institute of Peace identified a series of recommendations that the United States could follow to establish mutually beneficial critical minerals partnerships with African countries. The group concluded that the United States should work with Africans to strengthen the rule of law, transparency, and environmental and labor standards and should seek to foster development and peace through greater US commercial engagement. The US private sector must play a central role in these efforts. Such recommendations do not negate the importance of pursuing domestic critical minerals production and processing, but rather support an “all of the above” approach to broadening supply chains that are critical to US economic and national security.

Building mutually beneficial critical minerals partnerships will be a major challenge. First, the United States has lacked a significant presence in the African critical minerals sector in recent decades. Second, mining is a financially, technically, and politically complex endeavor involving myriad issues that touch on the rule of law, transparency, human rights, community stability, health and safety, and

the environment. Mining also requires access to reliable energy and transportation infrastructure, which is in severe shortage in many African countries. And third, geopolitical competitors such as China and Russia play by different rules, largely ignoring international labor, environmental, and social development standards.

However, taking on these obstacles is worth the effort. The ability to increase trade in Africa's critical minerals and diversify supply chains will increasingly have a direct impact on US economic and national security. The mining of critical minerals will also significantly determine how African countries develop, which will in turn affect the full range of US interests on the continent, including peace and stability. This analysis reflects the underlying reality that these critical minerals belong to the countries in which they are found and, as such, they should be developed in a way that most benefits the people of the continent.

Critical Minerals and Why They Matter

Countries and institutions define the term “critical minerals” differently, using a variety of criteria such as security risks due to domestic supply, demand factors and supply chain vulnerability, and potential level of trade and economic impact. Lists of critical minerals also are influenced by political factors and interest group advocacy. They evolve as technology changes, new resources are discovered, and materials science develops.

The United States’ critical minerals list is based on definitions and criteria found in the Energy Act of 2020.¹ The act requires the US Geological Survey (USGS) to update the list every three years. It further “defines a ‘critical mineral’ as a nonfuel mineral or mineral material essential to the economic or national security of the U.S. and which has a supply chain vulnerable to disruption. Critical minerals are also characterized as serving an essential function in the manufacturing of a product, the absence of which would have significant consequences for the economy or national security.”²

The most recent USGS list was published in February 2022. It includes 50 minerals and elements of critical importance—an increase from the 35 listed previously.³ The additions include nickel and zinc, as well as a category of “rare-earth elements.”⁴ The US Department of Energy (DOE) also publishes a list of critical *materials* (emphasis added) essential for energy. The most recent list, published in August 2023, comprises 18 critical materials, including many minerals also on the USGS list.⁵ Notably, copper—essential to virtually everything involving electricity and electronics—is on the DOE list; however, it is not on the USGS list because its supply chain is deemed to be relatively secure.⁶

A small subset of critical minerals on both the USGS and DOE lists is receiving increased attention from US policymakers and industry leaders due to the minerals’ roles in the production of everyday consumer goods, nonfuel-based energy, and transportation technologies, and their importance to defense and military applications.⁷ These minerals include cobalt, graphite, lithium, manganese, and nickel, as well as rare earth elements (see table 1, page 14).

TABLE 1.

Five key critical minerals and rare earth elements essential to the modern economy

CRITICAL MINERAL	APPLICATIONS	US IMPORT RELIANCE ^a	MAIN IMPORT SOURCE	LEAD PRODUCER	% OF WORLD TOTAL
Cobalt	Batteries and metallurgy	67%	Norway	DRC ^b	74%
Graphite	Batteries, fuel cells, and lubricants	100%	China	China	77%
Lithium	Batteries	>25%	Argentina	Australia	48%
Manganese	Batteries and metallurgy	100%	Gabon	South Africa	36%
Nickel	Batteries and metallurgy	57%	Canada	Indonesia	50%
Rare earth elements	Aerospace alloys, catalytic converters, ceramics, data storage devices, fiber optics, fuel cells, lasers, medical imaging and therapies, metallurgy, magnets, solid state devices, etc.	>95%	China	China	69%

Source: United States Geological Survey (USGS), *Mineral Commodity Summaries 2024* (Reston, VA: USGS, 2024), 17 (table 4), 23 (table 5), <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf>.

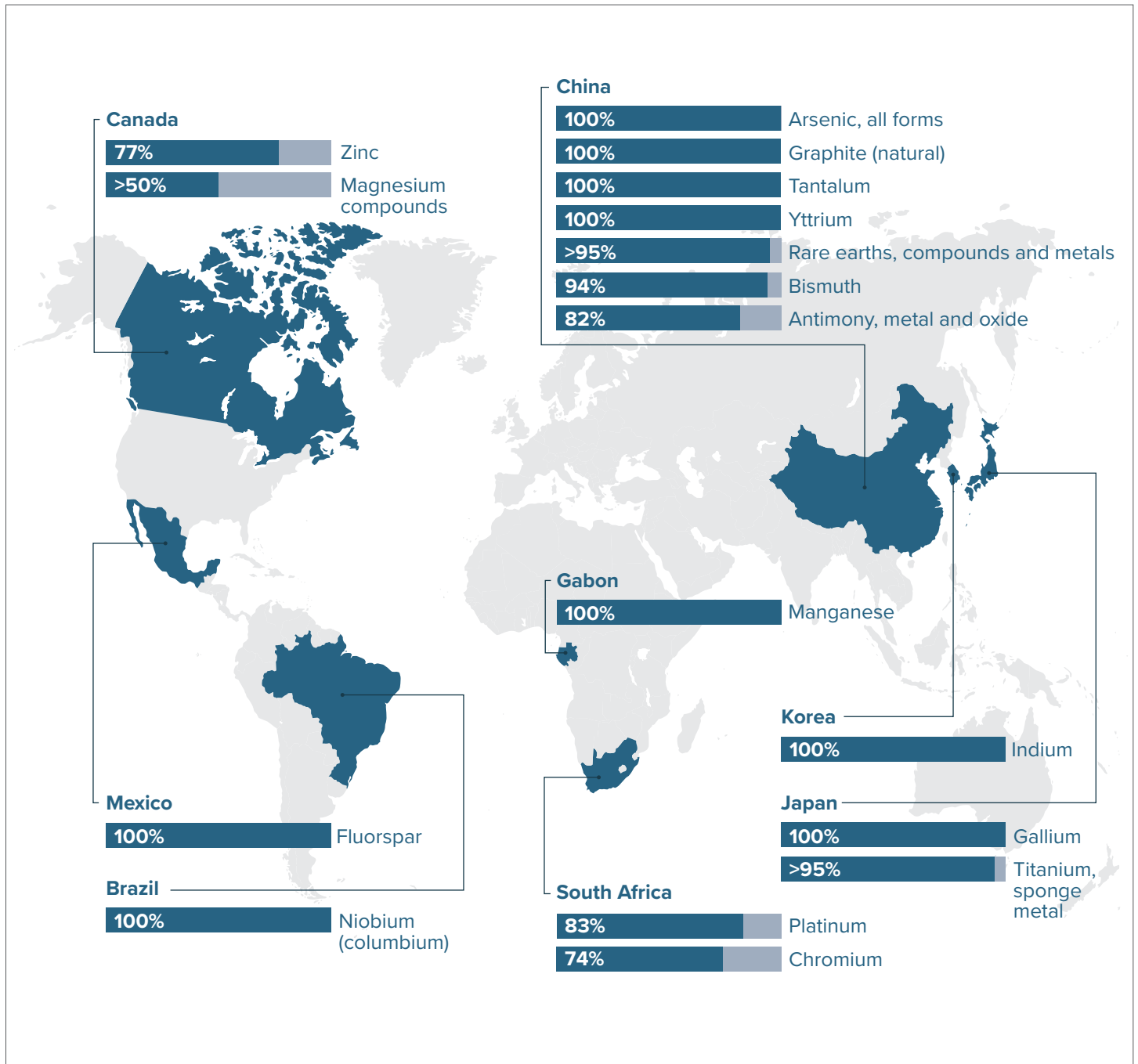
a. Percentage of estimated US consumption that relies on imports.

b. Although the DRC is listed as the lead producer of cobalt, most cobalt mining in the country is controlled by China or Chinese companies.

The supply chains for all minerals on the critical list have been deemed vulnerable and, in some cases, may rely on imports from a single country—a “single point of failure.” Table 1 shows the degree to which the United States relies on imports (import reliance) and sources of supply for five key critical minerals and rare earth elements essential to modern economies, as well as the top country producers of each. The United States is more than 50 percent reliant on imports for four of the five minerals. On the facing page, figure 1 shows selected critical minerals for which the United States is more than 50 percent reliant on imports, as well as the primary countries from which those minerals are imported. Concentrated reliance on one or even a few countries heightens the United States’ vulnerability to export bans or other trade restrictions on a critical mineral. China’s October 2023 announcement of export controls on graphite—a critical mineral used in batteries, fuel cells, and many industrial applications—illustrates the danger of heavy import reliance and highlights the need to diversify sources, including sourcing from Africa.⁸

FIGURE 1.

Primary import source and net import reliance for selected critical minerals



Source: United States Geological Survey (USGS), *Mineral Commodity Summaries 2024* (Reston, VA: USGS, 2024), 7 (figure 2), 23 (table 5), <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf>. Map adapted from artwork by Rainer Lesniewski/Shutterstock.

Note: The percentage for each mineral indicates the United States' reliance on imports (from all countries) as a percentage of its consumption of that mineral. Highlighted countries indicate the primary source of US imports for that mineral.

Critical Minerals Are Fundamental to Modern Economies

Critical minerals and rare earth elements are fundamental to modern and transitional economies. Much of our everyday life depends on critical minerals extraction, production, and refinement. Consumer goods reliant on these minerals include cell phones, televisions, computers, and high-end batteries and engines. Critical minerals are also essential inputs for medical equipment and products, even pharmaceuticals. They are important components of transportation and energy networks and of broad applications underlying modern economies, including modern agriculture.

These minerals are also necessary for any transition from fuel-based economies to nonfuel- or noncarbon-based economies. Additionally, they offer opportunities for the countries where they are found, developed, and refined; when managed transparently and responsibly, mining and processing of the minerals have the potential to fuel economic development and improve community stability, peace, and security.

VITAL FOR NATIONAL SECURITY

Critical minerals—many of which are found in Africa—are especially important to US national and global security interests. In the defense and military spheres, they are used in jet engines, communications equipment, satellites, and virtually everything electronic. (See table 2, page 17.) For example, cobalt—of which the DRC is the world’s largest producer—is essential for batteries used in military equipment, as well as for hard, sturdy metals such those used in aerospace industries. And antimony—for which South Africa is one of the world’s largest producers—is needed to produce ammunition and flame-retardant material.⁹ Growing global demand for these resources and the increasing concentration of supply into few hands have led many to conclude that being without secure and reliable supplies of, or access to, these resources exposes the United States and its allies to economic, strategic, and security vulnerabilities.¹⁰

An accessible and reliable supply of these minerals is especially important to the defense industrial base. Critical minerals shortages can significantly degrade US military capability and place national security at risk. To minimize such risk, the United States maintains the National Defense Stockpile, managed by the Defense Department’s Defense Logistics Agency. The agency assesses defense and essential civilian supply chain risk for strategic materials (including critical minerals) and secures and tracks their quantities.¹¹

Critical minerals will continue to be essential as the Defense Department’s plans for the future. Yet some critical minerals required for national defense (e.g., antimony and graphite) are not yet found or processed (or produced at scale) in the United States. (See Challenges Facing the United States and Africa, page 21.) In response, congressional guidance has shifted in recent years from reducing critical minerals stockpiles to aggressively pursuing options to increase them. A sense of urgency was reflected in both House and Senate versions of the National Defense Authorization Act for Fiscal Year 2024.¹² In the final version, section 1414(b)(1) of Public Law 118-31 establishes a statement of policy “to expand secure sources of supply of critical minerals . . . in the United States and

TABLE 2.

Percentage of US reliance on imports for selected African critical minerals used in defense applications

U.S. IMPORT RELIANCE	MINERAL	DEFENSE APPLICATION	MINERAL DEPOSITS IN AFRICA	PRC LEAD PRODUCER	PRC % OF WORLD PRODUCTION
100%	ARSENIC, all forms	Semiconductors, lumber	Morocco		
100%	CESIUM	Research, development	Namibia, Zimbabwe		
100%	FLUORSPAR	Manufacture of aluminum, cement, steel, gasoline	South Africa	●	65%
100%	GRAPHITE (natural)	Lubricants, batteries	Madagascar, Tanzania, Mozambique	●	77%
100%	MANGANESE	Steelmaking, batteries	Côte d'Ivoire, Gabon, Ghana, and South Africa		
100%	NIOBIUM (COLUMBIUM)	Steel, superalloys	Rwanda, DRC, Mozambique		
100%	RUBIDIUM	Research, development in electronics	Namibia		
100%	SCANDIUM	Alloys, ceramics, fuel cells	Guinea, Madagascar, South Africa	●	n/a
100%	TANTALUM	Electronic components, superalloys	Burundi, DRC, Ethiopia, Mozambique, Rwanda, Zimbabwe		
>95%	TITANIUM, sponge metal	White pigment, metal alloys	Kenya	●	67%
83%	PLATINUM	Catalytic converters	South Africa, Zimbabwe		
82%	ANTIMONY, metal and oxide	Lead-acid batteries, flame retardants	South Africa	●	48%
77%	ZINC	Metallurgy to produce galvanized steel	Zambia, Zimbabwe, Madagascar, South Africa, Côte d'Ivoire		
>75%	BARITE	Hydrocarbon production	Morocco		
75%	TITANIUM, mineral concentrates	White pigment, metal alloys	Mozambique, Senegal, Kenya	●	n/a
74%	CHROMIUM	Stainless steel	South Africa		
74%	TIN	Coatings, alloys for steel	DRC, Nigeria, Rwanda	●	23%
67%	COBALT	Rechargeable batteries, superalloys	DRC, South Africa, Zambia		
57%	NICKEL	Stainless steel, rechargeable batteries	South Africa, Madagascar, Zimbabwe, Zambia		
>50%	TUNGSTEN	Wear-resistant metals	Rwanda	●	81%

Source: United States Geological Survey (USGS), *Mineral Commodity Summaries 2024* (Reston, VA: USGS, 2024), 7 (figure 2), 23 (table 5), <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf>; and Cliff D. Taylor et al., *Geology and Nonfuel Mineral Deposits of Africa and the Middle East* (Reston, VA: USGS, 2009).

in countries that are allies or partners . . . to meet the needs of the United States defense sector so that the Department of Defense will achieve critical mineral supply chain independence from covered countries [including China].”¹³ The act also requires the secretary of defense to submit to Congress a “strategy to develop supply chains for the Department of Defense that are not dependent on mining or processing of critical minerals in or by covered countries, in order to achieve critical mineral supply chain independence from covered countries . . . by 2035.”¹⁴

The Biden administration has indicated a desire to “expand sustainable, responsible critical minerals production and processing in the United States.”¹⁵ Recent administration activities have focused on critical minerals partnerships with African countries where approximately 32 critical minerals important to the defense industrial base are found.¹⁶ Potential partners for mining expansion include the DRC, Mozambique, and Zambia. Developing partnerships with these and other African countries could help the United States safeguard its national security interests and, at the same time, bring added development benefits to African communities if mining and processing activities are managed openly and responsibly.

ESSENTIAL INPUTS FOR AN ENERGY TRANSITION

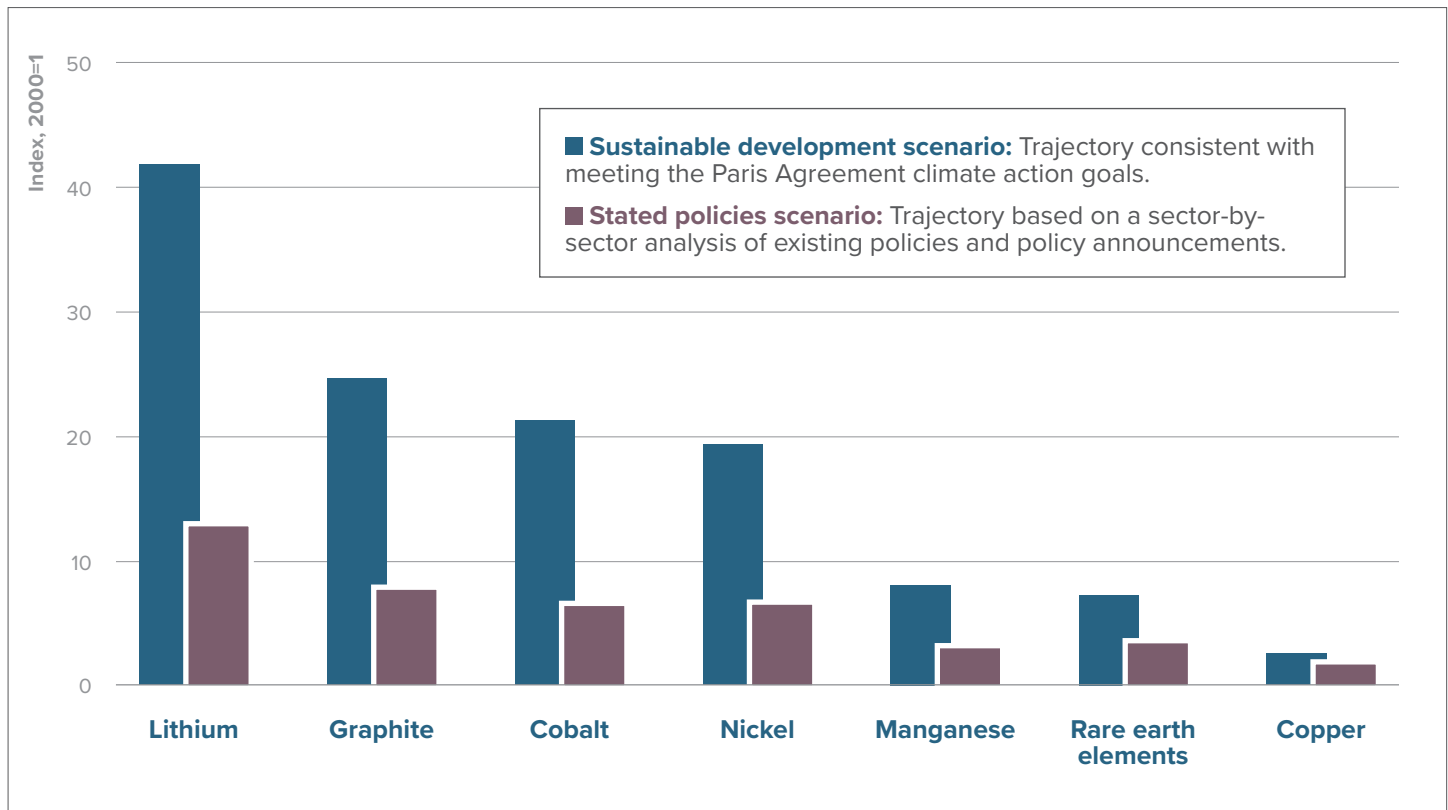
Critical minerals also are vital for the production of high-capacity batteries and for any transition from fossil fuel–based power and transportation sources to nonfuel-based sources—commonly referred to as an “energy transition.” For example, they are used for solar and wind power technologies, electric and hybrid vehicle batteries, and batteries with long-term storage capacity.

Global demand for these minerals is surging as countries continue to adopt and implement carbon-reduction policies and transition to renewable power sources and as consumers and governments invest in battery-operated vehicles. According to the International Energy Agency (IEA), “From 2017 to 2022, demand from the energy sector was the main factor behind a tripling in overall demand for lithium, a 70% jump in demand for cobalt, and a 40% rise in demand for nickel. Propelled by rising demand and high prices, the market size of key energy transition minerals doubled over the past five years, reaching USD 320 billion in 2022.”¹⁷ The IEA estimates that electric cars require six times the mineral inputs of conventional cars and that onshore wind plants require nine times more mineral resources than gas-fired power plants.¹⁸ The agency further estimates that the quantity of minerals needed for each “new unit of power generation capacity has increased by 50 percent” since 2010—roughly the time frame in which the use of renewable wind and solar power sources has increased.¹⁹ The United States and its allies are especially attuned to the increasing global demand for these minerals, as domestic production in many cases is small or nonexistent.

Figure 2 shows the IEA’s demand projections for key critical minerals (and copper) from 2020 to 2040 under two scenarios: one that is based on “sustainable development” policies consistent with meeting goals under the Paris Agreement on climate action; and one that is more conservative, based on existing policies and pronouncements. The former scenario shows a more than 40-fold

FIGURE 2.

Demand projections for key critical minerals from nonfuel-based energy technologies, by scenario, 2040 relative to 2020



Source: International Energy Agency (IEA), *The Role of Critical Minerals in Clean Energy Transitions* (Paris: IEA, 2021; revised March 2022), 47, 50–51, <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>.

increase in the demand for lithium and roughly 20-fold increases in the demand for graphite, cobalt, and nickel. It is unclear whether this more dramatic scenario is feasible given the ambitious time frames set out under various country climate goals; however, the bottom line is that a transition to nonfuel-based economies cannot happen without key critical minerals and rare earth elements.²⁰ Most importantly, regardless of any future US position on policies to accelerate an energy transition (or not), the US economy will be dependent on these minerals for many purposes, including defense and military applications; and it will likely continue to be affected by factors outside its control, including increases in global demand, rapidly changing technology, and increasingly electrified modern economies.²¹

IMPORTANT SOURCE OF INCOME FOR AFRICAN COUNTRIES

The potential benefit of critical minerals mining and production to the local, regional, and national economies of the host countries cannot be overstated, particularly with regard to Africa. According

to the IEA, minerals account for over 30 percent of total product exports in 23 African countries and at least 75 percent in Botswana, the DRC, Guinea, and Zambia.²² Critical minerals production in many African countries generates hundreds of millions of dollars—in some cases, billions—annually.²³ Yet many African countries are among the poorest in the world. Even in the resource-rich DRC, “nearly 60 million Congolese live on less than \$2.15 per day.”²⁴ Granted, many factors contribute to low African incomes, but notwithstanding the vast stores of minerals wealth in the DRC and other African countries, most of what is mined is exported elsewhere for processing—compounding mineral value overseas instead of locally.

In fact, local communities are not only missing much of the benefit, some are also suffering from corruption, rampant pollution, and exploitation of child labor due to, in many cases, Chinese and other companies’ mining practices and legacy issues from past exploitation.²⁵ African countries could see much greater benefits if their mineral resources were developed responsibly and transparently with input by Africans and if they received investment and training to support at least some degree of local processing and product development.

Where Critical Minerals Are Found, Mined, and Processed

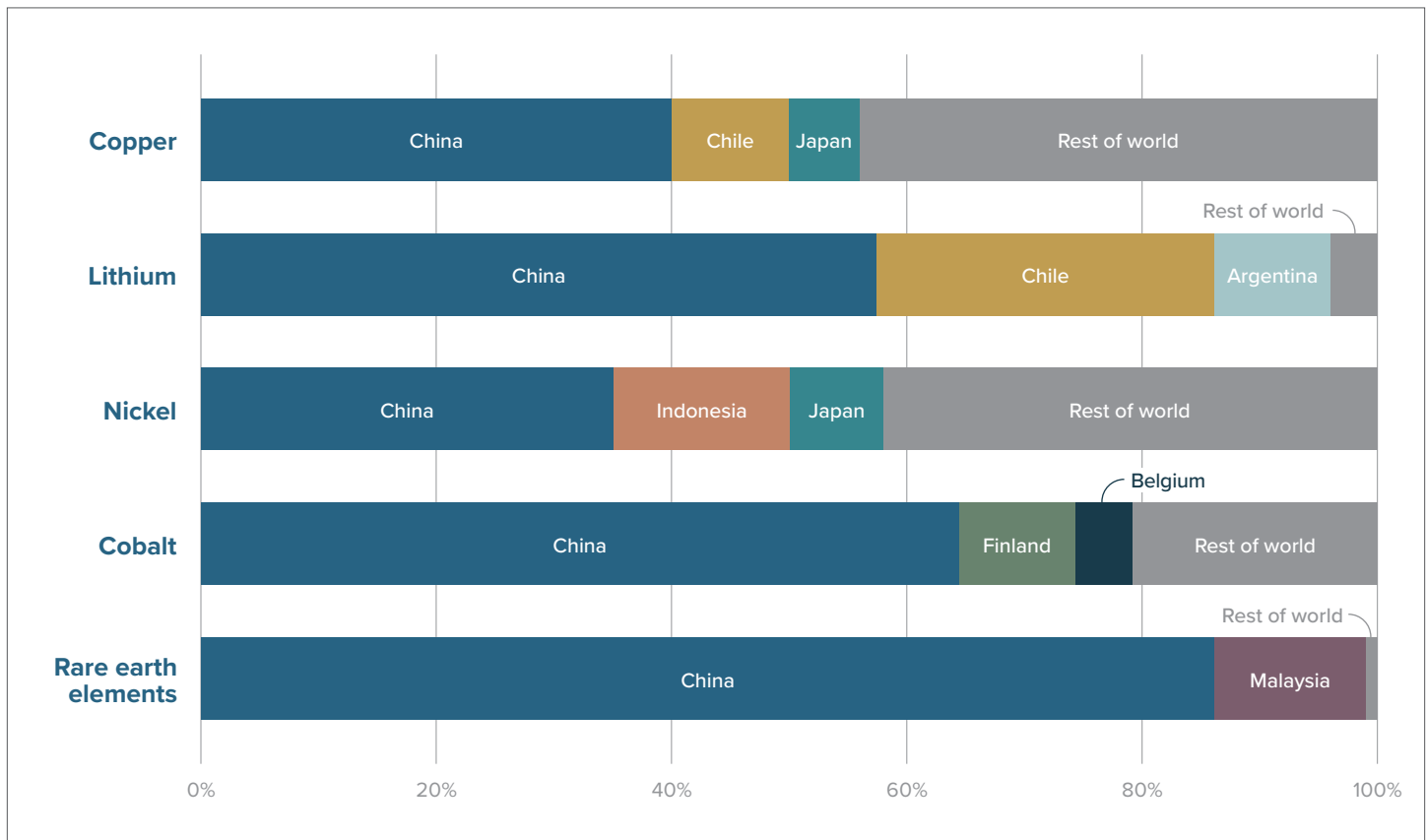
Critical minerals and rare earth elements are found all over the world; however, certain areas stand out. For example, Africa—home to about one-third of the world’s mineral resources—contains more than 50 percent of global cobalt, manganese, and platinum group metals reserves.²⁶ Africa is also a top source for critical minerals production—although, notably, Chinese or Chinese-connected companies are carrying out much of the production.²⁷ According to a 2022 IEA report, “In the cases of lithium, cobalt and rare earth elements, the world’s top three producers control well over three-quarters of global output. In some cases, a single country is responsible for around half of worldwide production.”²⁸

Globally, the top producers of cobalt, lithium, and rare earth elements are the DRC, Australia, and China, respectively.²⁹ As of 2019, the DRC and China were responsible for more than half of the world’s global production of cobalt and rare earth elements, respectively. Gabon, Madagascar, Morocco, and South Africa rank among the top sources of critical minerals for which the United States is 100 percent import reliant.³⁰ Guinea, Mali, Mozambique, and Zambia also have substantial stores of critical minerals resources. Further, Ghana, Guinea, Mali, Namibia, South Africa, and Tanzania are endowed with critical minerals deemed essential for an energy transition, and the minerals sector already constitutes more than 25 percent of exports for each of these counties.³¹

The industrial practice of refining these raw materials for their eventual use in products and goods is known as “processing.” With the exception of South Africa, the full processing of raw critical minerals in Africa is rarely done on site. Rather, raw or minimally processed minerals are typically exported for full processing and refining. The IEA notes that China has a “strong presence” when it comes to processing African critical minerals, stating that “China’s share of refining was around 35% for nickel, 50–70% for lithium and cobalt, and nearly 90% for rare earth elements [in 2019].”³² (See figure 3, page 21.)

FIGURE 3.

China's processing of key critical minerals and rare earth elements



Source: International Energy Agency (IEA), *The Role of Critical Minerals in Clean Energy Transitions* (Paris: IEA, 2021; revised March 2022), 31, <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>.

More recent processing estimates appear to be even higher. According to the Peterson Institute for International Economics, in 2022, China “refined 95% of manganese, roughly 70% of cobalt and graphite, two-thirds of lithium, and over 60% of nickel.”³³ In response, several African countries have imposed or considered export bans or export restrictions to facilitate local processing and better realize local economic benefits. The United States—while aiming to diversify its supply chains—has embarked on a mission to assist African countries in realizing these benefits. For example, the United States has launched several initiatives, including the US Strategy Toward Sub-Saharan Africa (announced in 2022), a tripartite battery supply chain initiative, and other programs. (For more on this topic, see *US Policy and African Critical Minerals*, page 27.)

Challenges Facing the United States and Africa

Although the United States faces rising global demand for critical minerals essential to its economic and national security, it is challenged by a lack of domestic production. For example, according to the USGS, the United States is 100 percent reliant on imports for at least 12 critical and strategic minerals and more than 50 percent reliant for many more (for example, see table 1, page 14, and



This forested site in Kisanfu, Democratic Republic of the Congo, on April 27, 2021, is thought to be one of the largest cobalt reserves in the world. It was acquired in December 2020 by China Molybdenum for \$550 million. (Photo by Ashley Gilbertson/New York Times)

table 2, page 17).³⁴ Furthermore, the United States has only approximately 11 sustainable deposits of the 50 critical minerals listed by the USGS.³⁵ Meanwhile, China is listed as one of the “major import sources” for 31 of the 50 minerals deemed critical by the USGS and is noted as the primary import source for 17 of these minerals.³⁶ China is also the primary import source for 26 of 31 critical minerals for which the United States is more than 50 percent import reliant.³⁷

The United States is also challenged by the long time frame required to develop critical minerals domestically—no less than 10 years, according to some accounts.³⁸ According to the IEA, it takes over 16 years on average to develop mining projects from discovery to production.³⁹ Project time frames are even longer in the United States, where mine development often generates controversy and where planning, permitting, and regulatory processes alone—often involving local, state, and federal levels—take 7 to 10 years on average to complete.⁴⁰ Once permitted, further planning and construction can add more years, delaying production. Even the reopening or reorientation of existing mining sites in the United States can generate resistance from local communities and Indigenous groups, resulting in lawsuits, permitting delays, and permit revocation.⁴¹

With key critical minerals production concentrated in only a few areas and processing dominated by China, the United States and its allies are exposed to multiple supply chain vulnerabilities. This became particularly evident when supply chains for microchips and other products important to consumers were disrupted during the initial years of the COVID-19 pandemic. Shortages of these goods heightened policymakers' awareness that any number of future geopolitical upheavals could increase the uncertainty and unreliability of critical minerals supply chains.

These domestic production and supply chain vulnerabilities underlie an increased policy focus on the African countries containing many minerals that the United States is producing at relatively low levels or not at all. The United States' approximate 100 percent reliance on graphite imports, for example, has sparked US government support for a project in Mozambique that will supply material for a graphite processing facility in the United States.⁴² China's 2023 export restrictions on graphite and the potential for trade restrictions on other critical minerals will likely intensify US and allied interest in Africa.

Development of African critical minerals could help ease US supply chain shortages, but natural resources extraction in Africa poses many challenges—not only for the United States and its allies, but also for Africans. Historically, resource extraction has often resulted in exploitation, environmental destruction, and missed development opportunities. This “resource curse” has also fueled violent conflict. As two scholars noted in 2017, “There’s a lot of literature on the links between natural resources and conflict. Examples include cases where conflict is driven by a desire to capture a particular resource and sell it for profit, or where the conflict itself is financed through the sale of certain natural resources: diamonds, gold, coltan, timber. Unfortunately, it’s a long list.”⁴³ The mining of diamonds—known as “blood diamonds”—financed a devastating war in Sierra Leone in the 1990s.

More recent examples include violence related to bauxite mining in Guinea; violent extremism fueled by lithium mining in Mali; and rogue operations, crime, and corruption spawned by a rush of cobalt mining in the eastern part of the DRC.⁴⁴ To help temper these conflicts, several governmental initiatives were established—including the Extractive Industries Transparency Initiative, the Kimberley Process, and the US Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010—as well as industry-led volunteer principles.⁴⁵ Yet resource extraction difficulties persist in many areas.

Local nonindustrial and informal mining sites (known as artisanal mining sites) have sometimes been overtaken by corrupt or criminal enterprises, with the profits used for personal gain or, in extreme cases, used to finance violent conflict.⁴⁶ At the same time, many communities depend on artisanal mining for much-needed income. Some advocates have pushed for the formalization and professionalization of artisanal mines to ensure continued local revenue and to stave off corrupt or criminal management of the mines; however, others note that even this approach has its downsides. (For more on this topic, see Key Issue: Artisanal Mining Challenges, page 57.)

Such violent and criminal outcomes pose governance challenges that make it difficult for companies to invest because the rule of law, transparency, and accountability are weak. Mining in Africa

BOX 1.

Mining industry challenges

Mining projects are large, complex undertakings. They require land and mineral rights, numerous permits, adherence to various regulations, and access to reliable transportation and power networks. As such, significant up-front costs are necessary for each project phase. Finance at the international level plays a large role, often involving many actors and complexities. Mines are often opposed due to concerns over negative environmental impacts, population displacement, and loss of quality of life for surrounding communities.

Mining has long been viewed as a “dirty business” as it typically involves moving large amounts of dirt and blasting rock, and it often uses heavy equipment. In this way, mining can fundamentally alter the surrounding environment. For example, open-pit mining disrupts landscapes—sometimes dramatically when vegetation is stripped from the surface and deep holes are dug. Such disruptions result in land, water, and air pollution—the effects of which can last decades and are often difficult and expensive to mitigate.

To combat these issues, some major Western mining companies are committing to new standards that pursue “responsible mining.” Their endeavors aim to not only minimize negative environmental impacts but also maximize improvements in worker health and safety and government accountability. One approach is the Initiative for Responsible Mining Assurance (IRMA), which has been auditing a number of mines across sub-Saharan Africa to

measure compliance with several metrics for responsible mining.^a These mines include Anglo American Platinum’s Unki mine in Zimbabwe (one of the first mines in the world to receive IRMA accreditation) and the Balama graphite mine in Mozambique.^b Operational mining standards also vary across the globe, with many standards duplicating one another or using different terms and requirements, making compliance complicated and cumbersome. Some in industry are consequently working to harmonize several voluntary standards.^c

Complicating matters for the development of new mines, the markets for many critical minerals are extremely volatile, opaque, and subject to large price swings—sometimes over very short time frames. This undermines financial certainty for projects that typically take decades to complete. For instance, Indonesian cobalt available on the market dropped in price from \$40 per pound in 2022 to approximately \$15 as of June 2023.^d

Evolving technologies also complicate future revenue calculations and make long-term investment decisions even more challenging. Although not necessarily an issue in the short term, rapidly changing battery chemistry and materials science are likely to change the composition of the batteries and other materials essential to consumer goods, electric vehicles, and solar and wind power facilities. Even medium-term uncertainties associated with changing technology and battery chemistry are challenging for investors.

Note: See page 70 for citations.

also presents logistical hurdles, such as a lack of adequate transportation and energy infrastructure, which limit production, processing, and manufacturing opportunities (see box 1, page 24).

Other issues leading Western companies to exercise caution include fear of abrupt changes in a country's trade policy; potential of a government takeover of mines or mining companies, as has recently happened in Mexico;⁴⁷ and general "resource nationalism." For example, some countries—including Ghana, Namibia, Tanzania, and Zimbabwe—have instituted bans on raw lithium exports.⁴⁸ Complicating matters is that some African governments and leaders are hesitant to work with Western companies or governments, particularly those from former colonizing nations.⁴⁹ These attitudes could lead to more restrictive trade policies that aim to stem the flow of resources from African countries without local benefit.

Additional challenges in Africa include the potentially devastating environmental impact of critical minerals mining. The long-term effects of poorly managed mining on water quality and supplies, forest and range ecology, and human health are well known. While the United States has relatively strong environmental protection laws and regulations—and has avenues for public comment on large projects with potential major environmental impacts—this is not the case for many African countries. Consequently, some experts criticize the rush by some countries to develop foreign minerals when domestic laws effectively restrict development at home. Still, others note that modern, technologically advanced mining practices can forestall and mitigate many of the environmental hazards of the past.

US Policy and African Critical Minerals

Over the past decade, US concern has been growing over its near 100 percent reliance on imports for many critical minerals and rare earth elements essential to economic and national security. Building on a series of executive orders that recognize reliance on China for many imports, often sourced from Africa, the Biden administration and Congress have undertaken several diverse initiatives to secure critical minerals supply chains.⁵⁰ Examples of these efforts include enacting legislation to increase domestic production and processing of critical minerals and related products, advancing funding for research and development, and diversifying import sources with a heightened focus on Africa.⁵¹

In August 2022, the Biden administration released a US Strategy Toward Sub-Saharan Africa. Regarding critical minerals, the strategy aims to “assist African countries to more transparently leverage their natural resources, including energy resources and critical minerals, for sustainable development while helping to strengthen supply chains that are diverse, open, and predictable.”⁵² In support of this strategy, the administration signed a memorandum of understanding (MOU) with the DRC and Zambia in December 2022 to cooperate in developing the two countries’ nascent battery industries. In 2023, top administration officials made multiple trips to key African mineral-producing countries—including South Africa, Tanzania, and Zambia—and announced investments by the US International Development Finance Corporation (DFC) in critical minerals and infrastructure.

The administration also has been actively developing broader international partnerships to address critical minerals issues. In 2022, it banded together with several allies to establish the Minerals Security Partnership (MSP). The partnership “aims to ensure that critical minerals are produced, processed, and recycled in a manner that supports countries in realizing the full economic development benefit of their mineral resources.”⁵³ In addition, the United States spearheaded creation of the Partnership for Global Infrastructure and Investment (PGII, also known as PGI) with G7 partners;

among its efforts, the group is investing in the development of the Lobito Corridor in Angola, the DRC, and Zambia (see box 4, page 42).

Congress also has recently addressed the issue of critical minerals, in part by focusing on domestic production and processing through the Better Utilization of Investments Leading to Development Act (BUILD Act), the Creating Helpful Incentives to Produce Semiconductors for America Act (CHIPS Act), and the Inflation Reduction Act (IRA).⁵⁴ Legislation introduced in the 118th Congress includes proposals to reauthorize the DFC and to address China's "influence over the DRC's mining sector."⁵⁵ The Building Relationships and Increasing Democratic Governance through Engagement (BRIDGE) to DRC Act of 2023 specifically notes that China's "output and processing [of cobalt] is of concern to the economic and national security of the United States." If enacted, it would require development of an interagency plan to increase US investment in the DRC's critical minerals sector.

The Biden administration also has made particular note of China's role in Africa. The United States' 2022 Africa strategy maintains that China views the continent "as an important arena to challenge the rules-based international order, advance its narrow commercial and geopolitical interests, undermine transparency and openness, and weaken U.S. relations with African peoples and governments."⁵⁶ The Trump administration similarly spoke of China's role in Africa in an executive order titled "Addressing the Threat to the Domestic Supply Chain from Reliance on Critical Minerals From Foreign Adversaries [e.g., China] and Supporting the Domestic Mining and Processing Industries."⁵⁷ With Congress being equally concerned about China's geopolitical ambitions, there is now consensus on the need to compete aggressively with China throughout the globe, including for critical minerals. Yet effectively checking China's influence in Africa—including in the mining sectors most important to US supply chains—will require an intensified focus by the United States.

The United States' resources and ability to influence events in Africa are naturally limited. Nevertheless, there are institutions that can help US companies build and operate infrastructure to support mining and processing facilities in Africa while also providing more localized benefits. These include the DFC, Export-Import Bank, embassies with commercial officers, and the US Trade and Development Agency. The US Agency for International Development (USAID) also operates programs to help build productive commercial climates. These institutions and their programs were profiled at the December 2022 US-Africa Leaders Summit, which emphasized promoting the United States' private sector in Africa.⁵⁸ Whether this US focus on African mining will be sustained remains to be seen.

Key Issues, Opportunities, and Policy Recommendations

Several complex and challenging issues that could make or break the United States' ability to achieve its African critical minerals policy goals are explored in this section of the report. Opportunities for increased engagement with Africans and other partners are also highlighted, as are recommendations for how the United States might better support mutually beneficial critical mineral partnerships in Africa. US governmental institutions and the private sector should work together to help Africans build significant capacity in the mining sector and infrastructure development and to strengthen the rule of law, transparency, and environmental and labor standards—ultimately fostering development and peace through greater US commercial engagement.

Key Issue: Insufficient US Policy Focus on African Critical Minerals

US economic and national security depends on securing a reliable supply of critical minerals, including from Africa. At the same time, the effective and responsible development of these minerals is important to the economic well-being—and even stability—of many African countries. Critical minerals are bound to become even more important as global demand surges. In response, US policymakers have increased attention toward critical minerals, vulnerability in supply chains, and the potential of win-win partnerships with Africa.

But the United States is not alone in focusing on critical minerals found in Africa—particularly those essential to everyday life, an energy transition, and national security. Other countries exploring increased investment and activity in African critical minerals include Japan and the United Kingdom.⁵⁹ The Russian-led paramilitary Wagner Group also engaged in mining on the continent through much of 2023.⁶⁰ Its activities have included opaque gold mining and smuggling ventures in the Central African Republic, Mali, Sudan, and elsewhere—efforts that have sown conflict and been targeted by US sanctions.⁶¹ Meanwhile, China remains a dominant foreign investor in African mining, with activities concentrated in the DRC, Guinea, South Africa, Zambia, and Zimbabwe.⁶² Critical minerals development is a growing policy priority for many African countries as well, as they seek to take advantage of increasing demand for their natural resources. One such country is Nigeria, which is aiming to diversify away from its petroleum-dominant economy.

The Biden administration has taken steps to advance the United States’ economic and national security interests by partnering with African countries to develop their critical minerals resources. Its flagship effort focuses on the Lobito Corridor, a multifaceted facility for transporting critical minerals and other products. Yet critical minerals are still not a central element of US policy toward Africa.⁶³ To date, US policy attention and resources spent on critical minerals have been concentrated on the DRC, Zambia, and to some extent Mozambique—even though many other African countries have significant critical minerals potential (e.g., Gabon, Ghana, Guinea, Namibia, and Tanzania).⁶⁴

Although engagement with African countries on critical minerals is building, the study group learned through multiple meetings and interviews that the United States is not sufficiently coordinated in its policy approach or swift in its implementation. For example, DFC project approval timelines are viewed as being too long for the private sector. Further, many of the core issues highlighted in this report are handled by different departments and agencies, making it difficult for industry leaders, nongovernmental organizations (NGOs), local officials, and others to understand where to turn for assistance. The “stovepiped” and slow nature of the US response and assistance could be improved with better focus and more resources devoted to African critical minerals policy.⁶⁵ US and other Western mining companies lament that the United States is not making up lost ground in Africa due in part to a lack of focus and urgency.

RECOMMENDATION 1: HEIGHTEN CRITICAL MINERALS ATTENTION IN US-AFRICA POLICY

Given their importance to US economic and national security and African economic development, critical minerals merit being a top priority for US policy toward Africa. Clearly, the United States is far behind China and others in building critical minerals partnerships on the continent. Progress on a critical minerals agenda will require prioritization and added resources to (1) better practice commercial diplomacy on behalf of US mining and other companies in Africa and (2) share technological and other capacity-building tools that could benefit Africans. Many US embassies in African countries rich in critical minerals have very limited resources to conduct these important activities. The United States should act promptly and decisively to coordinate various policies in support of critical minerals development in Africa.

- **The United States should develop a more comprehensive critical minerals strategy that aims to build mutually beneficial partnerships with Africans and allies,** particularly with an eye toward strengthening the rule of law, transparency, and environmental and labor standards and fostering development and peace through greater US commercial engagement. The challenges confronting Africa’s development of natural resources are significant, and the commercial competition from China and others is formidable. In short, the US government has good reasons to advance a comprehensive, private sector–driven strategy toward Africa’s critical minerals development. To be successful, any strategy considered must fully integrate the perspectives of Africans and private mining and related companies, which together will ultimately determine the level of US mining-sector engagement.
- **A critical minerals strategy for Africa should have a comprehensive implementation plan, taking into consideration all US government work in critical minerals.** A strategic implementation plan is especially important given the number of US departments and agencies involved in critical minerals, making stronger coordination essential to achieving US-Africa policy goals. A comprehensive strategy for critical minerals sourced from the DRC has been introduced in the 118th Congress (July 2023).⁶⁶ This type of strategic approach could cover Africa more broadly.
- **An interagency task force—preferably led by the National Security Council—should be established to guide implementation of a comprehensive strategy.** To achieve US policy goals, the task force could monitor and synchronize initiatives on African critical minerals as well as coordinate the implementation of relevant recommendations from the administration’s 100-day supply chain review report and the recently announced White House Council on Supply Chain Resilience.⁶⁷ The task force could (1) help ensure the unity and efficiency of US agency efforts and the alignment of these efforts with US policy objectives; (2) facilitate information flow throughout the government; and (3) ideally bring more urgent, strategic attention to critical minerals in Africa. The Australia-United States Taskforce on Critical Minerals, established in spring 2023, may offer relevant lessons.⁶⁸ The US task force could be co-led by the National Security Council directors for African affairs and international economics.
- **Critical minerals that represent the greatest vulnerability for the United States should be prioritized in the comprehensive strategy and implementation plan.** Given limited resources, the United States should focus on diversifying the critical minerals supplies for which it is most import dependent, especially from China.⁶⁹
- **The strategy must account for Chinese and Russian activities that undermine US critical minerals partnerships in Africa.** Chinese companies generally operate in Africa with a level of state support and operational influence that far surpasses the relationship between the US government and American companies. Chinese companies also have undercut US mining interests in Africa, including by working with Congolese cooperatives to illicitly extract resources.⁷⁰ The Russian-led paramilitary Wagner Group also struck opaque critical minerals deals with



Cobalt mined at this Chinese-owned cobalt and copper mine in Kisanfu, Democratic Republic of the Congo, is a vital input for the batteries that power electric vehicles and many other products important in modern economies. (Photo by Ashley Gilbertson/New York Times)

repressive African governments, using the proceeds to fund its operations.⁷¹ Environmental and labor conditions are of little concern to Russian operators. In contrast to Chinese and Russian operators, US companies cannot and should not compete as extensions of the US government or as irresponsible actors. Fortunately, many Africans desire US investment because of its high operating standards. But realistically, in some cases, transparency and other responsible business practices will not be enough to obtain a mining concession. A US critical minerals policy that wields commercial diplomacy and other support can help level the playing field against geopolitical competitors who have their own rules, but only if it is strategic and adequately resourced.

- **More investment and diplomatic resources should be devoted to advancing US interests in African critical minerals.** The United States is simply not on, or even near, par in competing with China and other foreign competitors in Africa in terms of critical minerals investment and diplomacy. To advance critical minerals partnerships in Africa, the US Departments of State and Commerce, DFC, Export-Import Bank, and other departments and agencies should dedicate resources for staffing and capacity building, especially to support in-country programs and personnel.

- **USAID’s capacity in African countries should be a central part of the strategy, homing in on the critical minerals sector and its potential to improve Africans’ lives.** USAID has a presence, resources, and experience in several African countries where key critical minerals are being developed (e.g., the DRC, Gabon, Mozambique, and South Africa). These factors make it well situated to strengthen US-Africa critical minerals partnerships. If provided with targeted funding for critical minerals work, the agency could take on a bigger role in implementing relevant US policies.

For more than 15 years, USAID has supported mining-related programs focused on conflict minerals, the formalization of artisanal and small-scale mining, and illegal mining. It has also funded cross-cutting efforts that integrate “mining-focused activities into other sectors such as labor rights, civil society capacity building, environmental protection, economic growth and democracy and governance activities.”⁷² However, the study group learned that without more targeted funding toward critical minerals development, the agency would need to significantly reorient some of its staffing and programming—for example, by increasing the economic and financial expertise of its workforce and assigning more personnel to African posts to better boost commercial climates in the minerals sector. But this would likely be a challenge since USAID has limited flexibility in shifting resources among programs due to congressional directives.

Using USAID’s strengths in addressing labor rights, civil society capacity building, economic growth, environmental protection, and governance, the United States could better foster the conditions that will incentivize US and other companies to invest in and create mutually beneficial partnerships.

- **US trade policy should be another central element of the strategy.** US trade and domestic economic policy are fundamentally reshaping markets for critical minerals globally. Africans and others are expressing concern about the impact of the IRA on critical minerals development in Africa. At a recent US-sponsored critical minerals event in Zambia, this impact was “all anyone wanted to talk about,” the study group was told. Additionally, the centerpiece of US trade policy toward the continent, the African Growth and Opportunity Act (AGOA), is set to expire in 2025, with some in industry and policy circles calling for it to be updated to account for US interest in African critical minerals (also see Recommendation 12, page 56). To be most effective, a US strategy on African critical minerals should account for how US trade policy impacts global critical minerals markets and incentivizes or disincentivizes private-sector investment in African mining and mineral processing projects. Too often, the impact of such broad US policies on the continent is overlooked.
- **The composition of the President’s Advisory Council on Doing Business in Africa and the US Trade Representative’s Trade Advisory Committee on Africa should reflect the priority of securing supply chains of critical minerals.** Currently, neither advisory group has a mining industry representative.⁷³ It is important for a strategy to reflect political, economic, and technological realities on the ground in Africa and to leverage state-of-the-art knowledge in responsible mining and processing technologies. Both advisory committees should be briefed and consulted as a new comprehensive critical minerals strategy is developed.

- **The strategy must account for the impact of mining activities on conflict and vice versa.**

Recent political upheaval in Burkina Faso, Mali, and Niger underscores challenges associated with mining in zones threatened by violent extremism. US policymakers must be alert to the conflict dynamics associated with developing critical minerals in Africa. For example, vigorous US diplomacy, including implementation of the Global Fragility Act, is needed to reduce resource-driven conflict in Mozambique and other mineral-rich African countries and should be a strategic priority.

Key Issue: Weak Rule of Law and Strained African Capacity

Mining and mineral processing are energy-intensive activities, and most African countries already struggle to provide their citizens with reliable electricity. Unsurprisingly, this reality creates politically charged competing demands for scarce power resources. African road and rail networks also are limited, are sometimes dangerous, and often lack security. The young and growing African labor force requires skills development and technical training. But perhaps one of the largest impediments to critical minerals development in Africa is weaknesses in the rule of law in many mineral-rich countries. Granted, there is debate over *perceived* risk versus *real* or *relative* risk for mining investment in Africa, but without better-enforced laws on property rights, transparency, anti-corruption, and operational standards, African mining sectors will likely struggle to attract high-quality and responsible foreign investment.⁷⁴ Western firms need confidence that their investments will not be suddenly nationalized, arbitrarily renegotiated, or subject to unwanted partnerships with national or international companies of questionable credibility.

Unfortunately, Chinese state-owned and state-backed companies have a history of exploiting lax oversight in places where the rule of law is weak, and such conduct affords Chinese operators significant pricing advantages over Western competitors. This practice is pronounced in African mining sectors where Chinese companies have operated for decades. Chinese mining companies often negotiate confidential mining licenses and frequently operate without active government oversight and regulation.⁷⁵ These activities, while not unique to China, have contributed to an unfavorable legal and financial environment for commercial activity on the continent.

The DRC has especially suffered: Chinese mining companies contributed to large-scale corruption under President Joseph Kabila (2001–2019) while establishing their dominant position in the country's cobalt sector.⁷⁶ The government of President Felix Tshisekedi in spring 2023 challenged China, pledging to renegotiate mining agreements struck by Kabila; however, the outcome of these negotiations is unclear.⁷⁷ The DRC remains an extremely challenging business environment, with irregular practices impeding foreign investment in the Chinese-dominant mining sector. The US International Trade Administration reports that “corruption and bureaucracy are a constant brake on business activity” in the DRC.⁷⁸ This assessment tracks with the study group's findings.

BOX 2.

Raising mining standards in Africa

Unlike Chinese businesses operating in Africa, US companies are subject to stringent anti-corruption and related measures, including, for example, the US Foreign Corrupt Practices Act (FCPA) and the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. The companies are also responsible to shareholders and often operate under company guidelines that are typically consistent with international norms and standards and, where applicable, reporting requirements under state law (e.g., those in California).^a According to an International Energy Agency report, “In many countries, corporations can be prosecuted for failing to prevent bribery within their overseas operations. The potential liability can be enormous, with fines reaching hundreds of millions of dollars and potential imprisonment for executives. Even short of prosecution, responding to an investigation can be extremely costly. The average investigation under the US Foreign Corrupt Practices Act lasts 38 months and costs USD 1.8 million per month.”^b Although not a hundred percent effective, by one account the FCPA “has proven to be one of the most powerful and effective transnational anti-corruption laws in the world.”^c

US companies also must consider the laws of countries to which they export materials or goods. For example, the European Union’s Conflict Minerals Regulation “requires EU companies to ensure they import minerals and metals from responsible sources only.”^d Western companies operating internationally also typically follow human rights and business practice guidelines established by international governing or advisory bodies, such as those of the United Nations and the Organisation for Economic Co-operation and Development.^e

Obviously, while US and other Western companies may struggle to compete with disreputable businesses in African mining sectors, they cannot and should not lower their standards. Through meetings and interviews, including with Africans, the study group often heard that US investment is desired because it generally brings higher operating standards. Nevertheless, lower-standard and corrupt operators too often prevail in securing mining concessions, rail and port access, and other commercial opportunities in African countries.

The United States recognizes this challenge, as evidenced by the 2021 US Strategy on Countering Corruption.^f The strategy aims to strengthen the rule of law, governance, and anti-corruption efforts. The recently enacted 2024 National Defense Authorization Act also calls for a “Global Cooperative Framework to End Human Rights Abuses in Sourcing Critical Minerals.”^g Numerous efforts led by both industry and nongovernmental organizations also address the environmental, fair labor, and human rights effects of critical minerals mining operations. A recent multilateral push to harmonize the multitude of existing voluntary industry standards aims to provide a baseline for mining-sector operations.^h And while building a better investment climate for high-standard mining operators may seem like a daunting task, especially as Chinese mining companies are deeply situated in many African countries, the United States has allies in African civil society, many of whom have been bravely working to combat corruption for decades.

Note: See page 70 for citations.

RECOMMENDATION 2: EMPOWER AFRICAN CIVIL SOCIETY AND THE MEDIA

Citizens of African countries are among the most effective advocates for sound governance and management of natural resources. No voice is more authentic and powerful than the local voice pressing for equitable economic development in Africa.⁷⁹ But civil society advocacy can be challenging, especially as democracy is receding in many African countries and opportunities for public criticism are shrinking. Increased US support in this area could serve many important policy objectives.

African institutions have long recognized the importance of civil society in establishing accountability. In 2009, the African Union adopted an Africa Mining Vision “for peaceful and inclusive societies based on the prudent and sustainable use of mineral resources.”⁸⁰ The vision is described as “Africa’s overarching framework for achieving inclusive, sustainable mineral-based structural transformation.”⁸¹ More than 120 civil society organizations were involved in developing the African Minerals Governance Framework—a tool to address weaknesses in the rule of law that were undermining the Africa Mining Vision. More recently, from 2018 to 2022, the Towards Enforcement of African Commitments against Corruption project worked to reduce corruption by supporting civil society in its efforts to monitor the implementation of the African Union Convention on Preventing and Combating Corruption.⁸² The project’s efforts included empowering civil society and the media—particularly investigative journalism—to demand government accountability. The many African civil society organizations pressing for greater transparency and accountability from their governments in managing natural resources are often doing risky work. They could greatly benefit from substantial US support.

Besides pushing for greater transparency and accountability, civil society plays an important role in a range of critical minerals sector activities. For mining to be successful and to avoid pitfalls, operators will need to work with local governments, communities, and civil society to address land use, environmental, and human health and safety issues—a tall order. The US government can facilitate these partnerships, as acknowledged in a September 2023 speech by Secretary of State Antony Blinken: “We’re determined to work with any country—including those with whom we disagree on important issues—so long as they want to deliver for their citizens, contribute to solving shared challenges, and uphold the international norms that we built together. This involves more than just partnering with national governments—but also local governments, civil society, the private sector, academia, and citizens, especially young leaders.”⁸³

- **The US government could better emphasize African civil society and the media in its efforts to advance the rule of law and build transparency and accountability in the critical minerals sector.** The United States should build upon and strengthen its efforts to support civil society and the media. USAID has a track record and rich experience in supporting civil society and media. With more of a strategic focus, additional resources, and coordination with other agencies and task forces, USAID efforts could be even more impactful.



People and machinery move along a road rebuilt by a Chinese contractor near the Tenke Fungurume mine, in southeastern Democratic Republic of the Congo, on April 29, 2021. Most African countries face acute infrastructure shortages that challenge mining and mineral processing development. (Photo by Ashley Gilbertson/New York Times)

RECOMMENDATION 3: PRIORITIZE AND LEVERAGE EXISTING USAID PROGRAMS TO ASSIST AFRICANS WITH FISCAL TRANSPARENCY EFFORTS

USAID helps strengthen transparency and anti-corruption policies through the Fiscal Transparency Innovation Fund.⁸⁴ The fund works with more than 65 countries to “enhance budget transparency, advance public financial management, and improve the transparency of licensing and contracting in natural resource extraction.”⁸⁵ According to the agency, US embassies largely manage these efforts, which range from small projects “aimed at training civil society and the media on budget transparency, to larger projects that assist government officials in strengthening budgeting and auditing processes.”⁸⁶ The US Department of State, as part of this fund, annually reviews whether countries are meeting the minimum standards of fiscal transparency, including in awarding mining concessions. Of the 53 African countries reviewed most recently, 14 were assessed as meeting the “minimum requirements of fiscal transparency,” while 20 were categorized as making “no significant progress” toward this goal, including major mining countries South Africa and Zambia. Substantial productive work is clearly needed in the transparency area.⁸⁷

- **The United States should do more to assist African governments and civil society with anti-corruption and fiscal transparency efforts.** Enhancing the Fiscal Transparency Innovation Fund and other ongoing efforts could help African governments improve the business climate for responsible investors. Moreover, improved financial management of critical minerals development could pave the way for greater peace and community stability. For example, the United States should continue to work with Mozambican civil society to empower media, social groups, businesses, and other organizations to hold the government more accountable, particularly related to the management of an anticipated natural gas windfall that promises to come with major offshore development in the Cabo Delgado Province. Among its several aid efforts, the United States should do more to support mutually beneficial, transparent, and equitable resources management. Equitable resource management is essential to peace in eastern DRC, Mozambique, and beyond. (See box 6, page 51.)

Key Issue: China’s Head Start in African Critical Minerals Development and Supply Chains

China, with its Belt and Road Initiative and other commercial activity in Africa, is far ahead of the United States in the mining and processing of Africa’s critical minerals. China has been actively investing in the region’s transportation, power, and mining sectors for over 20 years: from 2000 to 2022, the government and its affiliates (“Chinese financiers”) “signed 1,243 loan commitments worth \$170.1 billion with African governments”—of which \$109.1 billion (64 percent) was for projects in these three sectors.⁸⁸ Most of the transportation and power investments were made in the DRC and Zambia, while most of the mining investment was made in Angola and Kenya.⁸⁹

Although its government-backed infrastructure investment has waned somewhat in recent years, China remains a dominant player in the African mining sector, including in critical minerals supply chains. Most mines in the cobalt-rich DRC are controlled by Chinese state-owned or state-backed companies. By one count, 15 of 19 active mines in the DRC are operated by China-related entities.⁹⁰ According to the IEA, the DRC and China accounted for about 70 percent and 60 percent of global production of cobalt and rare earth minerals, respectively, in 2019.⁹¹ In 2023, China announced its plan for a \$2.8 billion energy and mining complex to tap lithium deposits in Zimbabwe.⁹² And China continues to dominate the processing of raw minerals into forms usable for multiple industrial and consumer applications—many of which the United States has come to depend upon.

China’s domination of the supply chains for many key critical minerals the United States relies on and the United States’ current lack of domestic mineral production pose enduring economic and national security challenges in the short to medium term—that is, until domestic supplies are more readily available or technological advances change the composition of minerals needed for high-end batteries and other products.⁹³ Further, supply chains for essential critical minerals and their products are notoriously long, complex, and difficult to untangle. While it is tempting to assume that new chains can be established free of Chinese influence, that is unrealistic for the foreseeable future. As Cullen Hendrix of the Peterson Institute for International Economics remarked in May

2023, “The idea that you can have a truly made-in-America supply chain for all of these minerals is a fiction. . . . No amount of political will is going to generate deposits where they don’t exist. . . . The question is really the degree to which we can usefully separate China—the People’s Republic of China—and then Chinese firms.”⁹⁴ Although the United States has pledged to assist Africa with leveraging its natural resources while also working to diversify supply chains, China’s preeminent position has developed over decades and will not be altered quickly.⁹⁵

Commercial competition in Africa should be considered in the broader historical and political context. China’s activities on the continent began with its support of liberation movements fighting against colonial rule—a legacy still earning China goodwill among Africans. For decades, China has coupled its booming economic engagement with aggressive, well-resourced diplomacy on the continent. This includes robust military, academic, and media personnel exchanges aimed at building Chinese influence throughout Africa.⁹⁶ China also supports propaganda campaigns designed to influence African opinion.⁹⁷ These diplomatic efforts appear to have served the country well. Polling indicates that most Africans (roughly 60 percent) view China favorably.⁹⁸ In sum, these competitive advantages will make it difficult for the United States and others to increase engagement in mining and related development in Africa without some overlap with Chinese-owned entities.

RECOMMENDATION 4: TACTICALLY ADDRESS CHINESE MINING IN AFRICA

US and other Western mining companies are largely on the outside looking in at an African continent where Chinese companies are often dominant. At least in the medium term, successful US efforts in Africa’s complex critical minerals sector may require utilizing Chinese-supported transportation, mineral offtake, or other services. While the United States is in geopolitical competition with China, rigid avoidance of Chinese commercial interaction may be impractical—and not just for logistical reasons. Many Africans resent great power competition, viewing it as harmful to Africa’s development needs. If forced into a choice, they may select the Chinese partner for a proposed project. The United States should be prepared to adopt a nuanced, tactical approach to investment decision-making to best further its policy goals, including increased benefits for Africans.

- **Instead of applying a blanket standard, the US government should assess potential minerals investments on a case-by-case basis.** While all potential projects should be thoroughly vetted to ensure compliance with human rights, child labor, environmental, and other high standards and laws, a tangential Chinese company connection alone—particularly involving transportation or other basic services—should not necessarily disqualify a US firm from receiving support from the DFC or other US government departments and agencies.

RECOMMENDATION 5: PRIORITIZE PROMPT AND FULL DEVELOPMENT OF THE US-DRC-ZAMBIA MOU

The US-DRC-Zambia Memorandum of Understanding to Strengthen the Electric Vehicle Battery Value Chain is a positive initiative that should be prioritized and better resourced to fully realize its potential benefits (see box 3, page 40). Although unlikely to result in the United States matching

BOX 3.

US-DRC-Zambia MOU: A promising partnership?

A keystone of US-Africa critical minerals policy is the Memorandum of Understanding to Strengthen the Electric Vehicle Battery Value Chain, signed by the United States, the Democratic Republic of the Congo (DRC), and Zambia in December 2022.^a The MOU aims to reduce supply chain vulnerabilities by promoting the development of integrated electric vehicle battery supply chains in the two African countries. The DRC produces close to 70 percent of the world's cobalt, essential to electric vehicle batteries, while Zambia is Africa's second-largest producer of copper, a critical electrical component.

The MOU is consistent with the African Green Minerals Strategy—developed by the African Development Bank—which prioritizes electric vehicle manufacturing, starting with two- and three-wheeled vehicles and commuter buses, and establishes battery supply chains.^b Under the MOU, US government agencies are committed to providing feasibility studies and other technical assistance to the two countries to promote US private-sector engagement in the battery sector. Currently, no US companies operate in this sector in these countries.

The MOU is designed to jump-start an earlier agreement with similar objectives signed by the DRC and Zambia in 2020. While the MOU does not mention China, the agreement aims to help the DRC and Zambia move beyond an extractive resource economy by launching a joint battery industry that can compete with the dominant Chinese processing and battery companies. In discussions with the study group, many Africans familiar with Zambian critical

minerals challenges indicated a clear preference for higher-standard US investment, citing concerns about environmental and labor practices in Chinese-owned mines. Though also not mentioned in the MOU, the development of the Lobito-Zambia greenfield rail line is central to this battery development vision (see box 4, page 42).

Concerns have been raised that the MOU, while widely welcomed, does not identify specific US technologies or the levels of financial assistance to be provided; the agreement includes a cautionary note that “all activities pursued under this MOU are subject to the availability of funds.” As a sign of commitment to the MOU, in fall 2023, the US Department of State held workshops in the DRC and Lusaka, Zambia, bringing together industry experts, academics, companies, government officials, and civil society to start fleshing out the agreement by creating a roadmap to success.

The United States has solid and improving relations with the government of Zambian President Hakainde Hichilema. The president was democratically elected, has engaged the United States after his predecessor had built deep relations with China, and has undertaken economic reforms and anti-corruption measures. Nevertheless, the Zambian government will certainly maintain close critical minerals ties with Chinese companies. Hichilema visited Beijing in September 2023, and a large Zambian delegation participated in the Belt and Road Forum China hosted in October 2023.

Note: See page 70 for citations.

Chinese mining operations in these two countries, the initiative could spur more responsible development with local and regional benefits. Many Africans inside and outside of the DRC and Zambia have high expectations and are closely watching MOU-related developments. The agreement is seen as a welcome measure of the United States' commitment to African industrialization, even though it will be challenging to fulfill. Much will depend on implementation: it could remain a "paper MOU"—one that establishes laudable objectives but falls short of achieving them—or it could create lasting efforts that help diversify US supply chains and increase local benefits to Africans. Some Zambians have expressed frustration that the United States is acting too slowly, in contrast to fast-moving Chinese investors; however, the study group also understands that Zambia has been slow to engage on some aspects of the MOU.

- **The US Departments of State and Commerce, DFC, Export-Import Bank, and US Trade and Development Agency should prioritize the US-DRC-Zambia MOU and provide dedicated resources.** A productive partnership will require significant US effort and dedicated resources. It also requires working effectively with the DRC and Zambia to create a more favorable investment climate—one built on mutual trust that addresses the many challenges that have deterred Western investment, especially in the manufacturing sector. To be most successful, the MOU should incentivize investment immediately and be implemented with the full engagement and guidance of the US private sector across the battery supply chain. To date, US and other Western mining companies have largely stayed away from this region; however, with aggressive MOU implementation, companies may find that the benefits outweigh the risks. Commercial diplomacy can play an important role here. (See Recommendation 8, page 47).
- **The MOU should include a roadmap with concrete benchmarks, a timetable, and an oversight mechanism.** At least one scholar has recommended such a step.⁹⁹ Importantly, these instruments would help measure progress. And if the Congolese and Zambian partners were to lead the roadmap's development—with US encouragement and support—the roadmap could be especially helpful in better coordinating the visions and efforts of the DRC and Zambia.

Key Issue: Limited Infrastructure for African Minerals Development

African countries suffer from transportation and power networks that are often limited or nonexistent. Roads can be steep, narrow, and poorly maintained, and therefore difficult to navigate. Heavy truck travel to and from existing mining sites in the DRC, Zambia, and elsewhere are known to hit choke points, resulting in delays that can last weeks. Rail infrastructure in many countries is lacking. Existing rail lines in the DRC, for example, are often poorly maintained and unreliable, as is much of the rolling stock. Derailments are common, leading to fatal accidents and long delays.¹⁰⁰ Some rail lines have fallen into disrepair due to past war and neglect. Security in transportation corridors is also often lacking. Similarly, power networks are often poorly maintained, have low voltage, and are unreliable. Even in South Africa, home to the continent's most developed infrastructure, there are power failures and theft and vandalism of transportation components.¹⁰¹ These deficiencies limit mining capacity as well as local and regional processing opportunities.

BOX 4.

Lobito Corridor: Building momentum

The Biden administration plans to invest \$250 million (through the US International Development Finance Corporation, or DFC) in a rail line between the Angolan port city of Lobito and the Zambia/Democratic Republic of the Congo (DRC) Copperbelt, known as the Lobito Corridor.^a The project would significantly cut transportation times; reduce trucking of minerals, a heavily polluting bottleneck in the region; and ease shipping times to the United States by utilizing Lobito's Atlantic Coast location (see map, page 43). According to the administration, the "open access" rail line would also facilitate investment in other sectors, including "agriculture, digital infrastructure, and expanded access to electricity."^b Supporting this type of African infrastructure project is a departure from traditional US aid priorities.

The White House announced in September 2023 that the European Union (EU) has joined the project.^c President Biden noted the potential for partnering on transportation corridors to yield multiple economic benefits, including a Trans-African Corridor extending from Lobito through the DRC, Zambia, and Tanzania to the Indian Ocean: "It's a project that's about—far from just laying tracks. It's about creating jobs, increasing trade, strengthening the supply chains, boosting connectivity . . . for people across multiple countries. This is a game-changing regional investment."^d

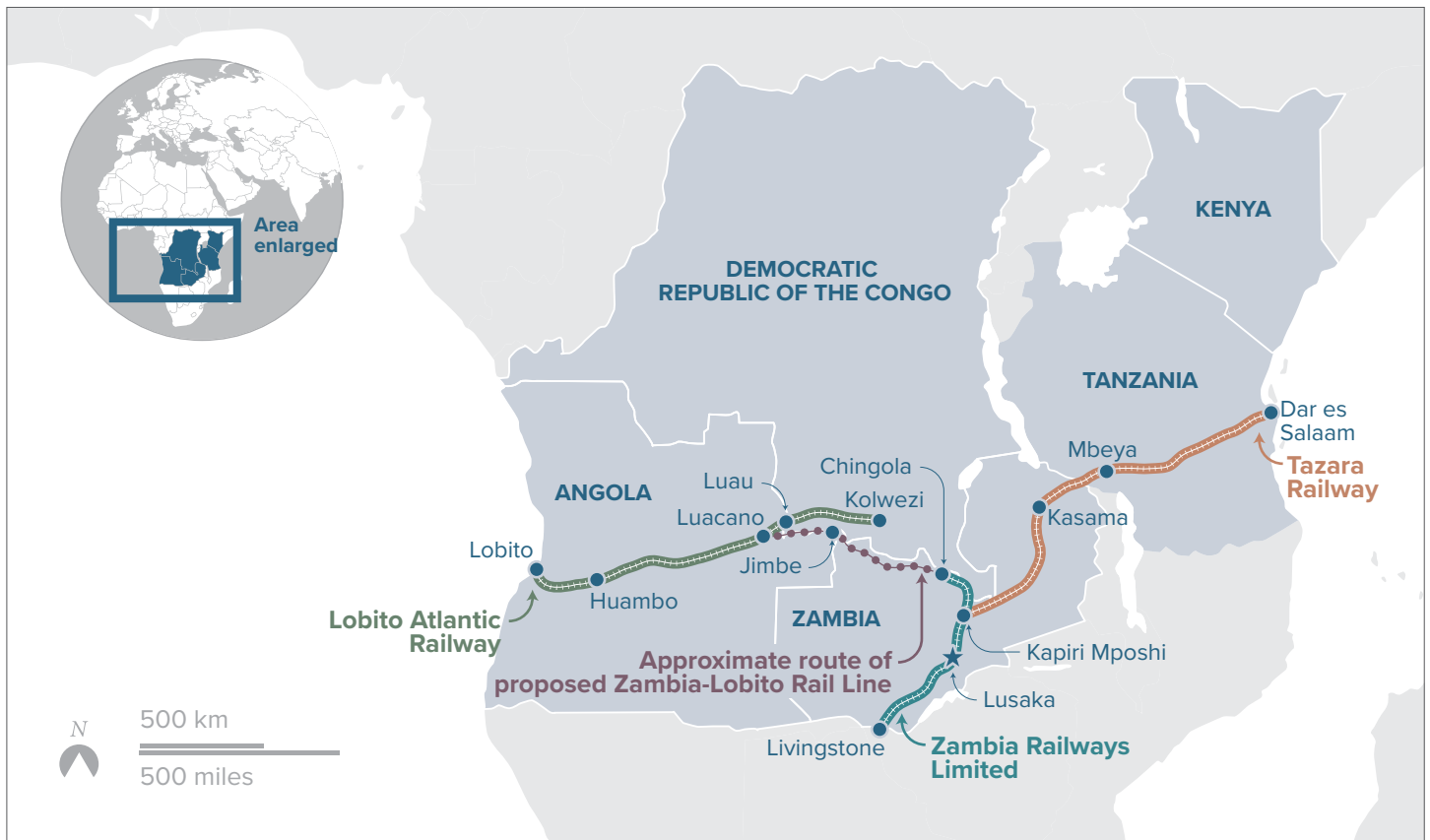
In October 2023, the administration announced US and EU efforts to advance such a trans-continental corridor:

the Lobito Economic Corridor and the Zambia-Lobito greenfield railway.^e "This represents the most significant transport infrastructure that the US has helped develop on the African continent in a generation," said the acting special coordinator for the US Department of State's Partnership for Global Infrastructure and Investment (PGII or PGI). The initiative was launched through a new memorandum of understanding signed by the African Finance Corporation, the United States, the EU, the African Development Bank, Angola, the DRC, and Zambia.^f Development of the Zambia-Lobito greenfield line will eventually provide connected, open-access transport from the Atlantic to the Indian Ocean.

The investment and subsequent activities by the PGII follow a tripartite accord among Angola, the DRC, and Zambia that will govern the movement of multiple goods along the Lobito Corridor. The Lobito Atlantic Railway, a largely Western-led consortium of multinational companies, will lead the operation, management, and maintenance of the corridor and equipment.^g The United States and its African partners are betting that the corridor will attract enough users to be economically viable and that it will spur additional economic growth and investment, including robust minerals and agricultural development.^h

Note: See pages 70 and 71 for citations.

Map of the Lobito Corridor and potential trans-Africa connections



Source: US Department of State (INR), 2841, November 2023. Map adapted from artwork by Rainer Lesniewski/Shutterstock.

Large capital expenditures are required to build the power and transportation infrastructure needed for mining, transporting raw materials, and processing minerals. Building this capacity takes time—a challenge for investment regimes with short time horizons, such as those with the need to pay quarterly dividends. There are also challenges around economies of scale, as African mining operations may lack the production levels needed to support the establishment of a critical minerals processing plant. Further, Western companies and their shareholders and customers are particularly sensitive to environmental and labor conditions and will largely avoid (or attempt to avoid) sourcing product from mines where even the perception of poor standards exists.

Although China has made considerable infrastructure and mining investments in recent decades (albeit at a reduced level since their height in 2016), many African countries still suffer from a significant lack of transportation and power infrastructure.¹⁰² The United States has an opportunity to further the dual goals of helping Africans to benefit from critical minerals development and de-risking US critical minerals supply chains by assisting African countries with their infrastructure needs.

The United States has an opportunity to further the dual goals of helping Africans to benefit from critical minerals development and de-risking US critical minerals supply chains.

Indeed, infrastructure investments have led to broader economic development opportunities and growth in the United States and elsewhere, but such investments are risky. Supply-driven approaches to industrial development have often failed. Investors taking on projects may default, and market conditions may change and alter transportation demand. Weak or changing governance structures and lax environmental, health, and safety standards further contribute to investment uncertainty.

The study group heard from several interviewees with close knowledge of the mining industry that operating in Africa is too risky and that more attractive opportunities exist in mineral-heavy regions outside of Africa. Other interviewees, however, stated that the higher “perceived risk” in Africa is not really warranted. Either way, government and private-sector investment in infrastructure projects do not guarantee success. Use of the infrastructure will largely be a function of private-sector demand. Will large investments in the Lobito Corridor, for example, generate sufficient cargo volumes? Will there be enough demand from non-mining sectors to maintain the corridor’s economic viability? (See box 4, page 42.)

These issues underlie several US and international initiatives—including by the DFC, MSP, and PGII—to address infrastructure needs in Africa. The United States should intensify its efforts to partner with other countries to improve infrastructure, but doing so will require working closely with private-sector actors and Africans to ensure project success.

RECOMMENDATION 6: STRENGTHEN THE DFC’S IMPACT

In 2018, a bipartisan majority in Congress passed the BUILD Act to consolidate, strengthen, and expand the US government’s development financing tools into a new agency—the International Development Finance Corporation, or DFC. The DFC provides loans, guarantees, equity financing, and political risk insurance to private sector–led projects in the developing world. Its services are intended to encourage investment that businesses otherwise would not make because of the higher risks associated with developing economies.

The BUILD Act recognizes the United States’ need to provide a viable alternative to the state-directed, debt-heavy economic model that China has used to gain a strong position in many African economies, including mining sectors. This interest in countering China has since only intensified throughout the US government. Yet after five years, businesses are concerned that the DFC remains slow moving and bureaucratic. As noted in recent congressional testimony, some DFC-backed projects finalized for investment in 2023 were initiated as far back as 2019.¹⁰³ Chinese investment operates far more quickly, and the US private sector expects and needs a shorter time frame to make a dent in supply chain diversification in a timely manner.

To make the most of its tools in the African critical minerals sector, the US government should sharpen the DFC's impact. Specifically, it should consider the following:

- **The White House, with input from Congress, should establish critical minerals as a clear DFC investment priority.** Sending a high-level signal in support of African critical minerals engagement could help focus the agency's energy and investments, ultimately working to disrupt China's dominance in critical minerals supply chains. Such signaling could mean the difference between DFC leadership supporting a proposed critical minerals project in Africa or backing away. And it could help unify the various US government agencies represented on the DFC's board of directors, which may sometimes inadvertently block or significantly slow DFC investments. The National Security Council task force recommended earlier in this report could reinforce this message (see Recommendation 1, page 30).
- **Treat “developmental” and “strategic” projects the same way.** During the creation of the DFC, significant emphasis was placed on ensuring that it be “developmental,” with its investments fitting into traditional categories of foreign aid activities, such as small-business lending and poverty alleviation. Tension between these types of projects and “strategic” investments in larger-scale, industrial infrastructure projects can delay or deprioritize mining and related infrastructure projects that otherwise would facilitate developmental goals and objectives. Sound strategic projects—such as those focused on improved energy and transportation infrastructure—can serve multiple developmental goals, including increased economic growth, local employment, and individual well-being. Such projects could be more aggressively supported, if not favored.
- **Consider streamlining environmental reviews through equivalency agreements.** Projects under DFC consideration undergo extensive environmental mitigation assessments, as is appropriate. Environmental assessment and review are necessary and are a benefit that high-standard investors can offer. But the current approach to these assessments can be time consuming, as well as duplicative when multiple investors conduct environmental due diligence on the same project. The DFC should explore working with other development finance institutions to tier environmental reviews or employ equivalency agreements that establish a common environmental review standard consistent with high US environmental standards.¹⁰⁴
- **Improve critical minerals knowledge through staff secondments.** The DFC comprises mainly staff with finance and development expertise—not necessarily minerals expertise. To help the DFC implement critical minerals projects, it should explore embedding US Department of the Interior mineral experts in its new energy transaction team. Conceivably, this would enable DFC staff to spend more time structuring financing transactions and less time struggling with mining technicalities. USAID also could better share its expertise as it relates to the issues facing African mining, including governance, environment, and labor issues.
- **Increase the DFC's physical presence in Africa.** Advancing projects requires strong personal engagements. Virtual meetings notwithstanding, successful deals require face-to-face attention.

During questioning at a 2023 Senate oversight hearing, the DFC’s chief executive officer noted that the corporation is aiming to increase overseas personnel to 3 or 4 percent, but that increase by many counts is still far from optimal.¹⁰⁵ Additional overseas DFC employees could better facilitate proposed deals and scout new investments. The DFC could also team up with the US Department of Commerce’s Commercial Service staff in sub-Saharan offices to extend its presence on the continent.

RECOMMENDATION 7: MOBILIZE THE PRIVATE SECTOR TO STRENGTHEN AFRICAN INFRASTRUCTURE

Although budget constraints and other factors limit the United States’ ability to strengthen African infrastructure, tools do exist to mobilize private US resources. For example, the PGII is a multilateral coordinating effort that relies on the existing resources of departments and agencies (e.g., the DFC, Export-Import Bank, and US Trade and Development Agency) to help African countries attract private infrastructure investment. As a sign of progress, some US investors, including pension funds, appear increasingly open to African infrastructure investment, especially in renewable energy, which can support African mining and mineral processing.

The financial and diplomatic support of the US government and its allies—the de-risking of an infrastructure investment—can often be decisive in positive investment decisions. At the same time, policymakers should proceed with “eyes wide open” and fully understand that support of private-sector investments will not always achieve the expected results in high-risk African environments. That said, the United States’ current reliance on imports for some of its most important critical minerals justifies taking such calculated risks.

- **The United States should develop infrastructure in a manner that maximizes African participation.** To build the most effective critical minerals partnerships, Africans must be primary participants and benefit from firsthand experience with infrastructure best practices. Such experience would no doubt compare favorably to the practices of Chinese companies and contribute to stability in the power, transportation, and mining sectors and, more broadly, to development and stability in African communities.

Key Issue: Insufficient US Commercial Diplomacy

US embassies can be valuable in addressing investment challenges by helping to advance business and broader economic interests. Government officials from various agencies serving under a US ambassador perform many functions, including staying abreast of commercial activities, identifying business opportunities, and in general practicing “commercial diplomacy” abroad. US consulates give the United States an added physical setting to provide consular and other services outside of a nation’s capital, where US embassies are located. Currently, the United States and China have a comparable number of embassies in Africa, but many US embassies are relatively understaffed and may be far from mining centers (see box 5, page 49).

With a limited US physical presence, it is difficult to practice commercial diplomacy on behalf of US businesses and also stay sharp on key issues in a region. Only so much can be done from Washington. The DFC’s chief executive officer, Scott Nathan, highlighted the importance of foreign posts in his testimony before a Senate Appropriations subcommittee hearing in June 2023.¹⁰⁶ Speaking of the DFC’s operations, he noted that overseas posts are needed for countering corruption and “knowing your customers.” He added, “We rely on posts around the world,” and then emphasized that posts are critical for “vetting potential partners, improving the structure of a deal,” and ensuring that high environmental and social standards are addressed. This type of on-the-ground information is important to the success of all US commercial diplomacy in Africa. On the same day as Nathan’s testimony, Assistant Secretary of State for Energy Resources Geoffrey Pyatt—in testimony before the House of Representatives Foreign Affairs Committee—also stressed the importance of diplomatic posts, highlighting gaps in expertise and difficulties in filling positions.¹⁰⁷

The United States has lagged behind its geopolitical and economic competitors in commercial diplomacy in recent decades. The US Department of State has not always prioritized this type of diplomacy. Instead, it has often concentrated on advancing political and other objectives—focusing on commercial diplomacy only by varying degrees, depending on changing administration policies, embassy priorities, and other factors.¹⁰⁸ The focus on commercial diplomacy has been elevated lately, though. The study group learned that the US Commercial Service of the Department of Commerce is standing up “industry teams” and slowly expanding its presence on the continent; however, no Commercial Service presence is currently planned for the mineral-rich DRC. Other initiatives in recent years include the Trump administration’s establishment of “deal teams” in US embassies in Africa.¹⁰⁹ The Championing American Business Through Diplomacy Act of 2019 makes promoting US economic and commercial interests a “principal duty” of US ambassadors.¹¹⁰ But this mandate is honored to varying degrees, depending on the commitments of individual ambassadors.

Active US government support can help overcome the many challenges that deter US businesses from investing in Africa. Mining and mineral processing operations can be tripped up by complex energy and transportation challenges, as well as rule-of-law and corruption issues. Mining license agreements, negotiated among companies and governments, are sometimes breached by abrupt changes in government policy, which can be a commercially perilous challenge for a US company. An active US ambassador with well-trained staff can help smooth some of the inevitable political tensions that arise in the mining sector, weighing in on behalf of US and allied commercial interests to better level uneven playing fields, especially against Chinese competition. In sum, US interest in African critical minerals warrants greater attention to commercial diplomacy; US businesses need the help to compete in challenging African environments where many of their competitors enjoy the full backing of their national governments.

RECOMMENDATION 8: INVEST IN COMMERCIAL DIPLOMACY

The United States should practice more vigorous commercial diplomacy in support of its interests in advancing critical minerals development in Africa. Stepped-up US commercial diplomacy is important

to counter China's head start in Africa's critical minerals sector. The US government is unlikely to match the resource levels and the mining ecosystem that China wields in winning mining contracts, but concerted US efforts to land US mining investment in Africa can succeed, as seen by the Lifezone Metals Project, a partnership between Lifezone Metals and DFC-backed TechMet. The project involves processing nickel and other critical minerals mined in Tanzania for export to the United States.

- **Given the proximity to critical minerals of Lubumbashi, DRC, and the high priority placed on the Lobito Corridor, the United States should reopen a consulate in the city.** Diplomacy of any sort is best practiced in person. A Foreign Service officer or two focused on critical minerals should be stationed in Lubumbashi—assuming acceptable security levels. Short of reopening a consulate in Lubumbashi, the US Department of State should establish a “light presence post,” serving as an extension of the embassy in Kinshasa. For example, the department once stationed an officer in Goma, the capital of North Kivu Province, until the posting ended in 2014 due to security concerns. Alternatively, the department could contract with a mining expert to station-in and report back from Lubumbashi. This could help the Department of State and other US government departments and agencies develop local relationships, build mutual trust, and better understand the issues that most affect local populations—while also helping to facilitate economic development, community stability, and US critical minerals access in the Zambia/DRC Copperbelt.
- **The United States should improve incentives for Foreign Service officers and other staff to serve in mineral-rich African countries.** With an urgent and heightened focus on critical minerals—related development, the United States should increase security and incentives for staff. Such incentives could include special hazard pay, support for local international schools, or other quality-of-life benefits; they may help draw career Foreign Service officers and their families to African diplomatic posts that are perceived to be less desirable.
- **The US Department of State should deploy more commercial field officers and provide technical training in minerals- and processing-related fields.** For example, the department could explore partnering with engineering and other technical schools to develop short courses for officers assigned to countries with critical minerals and processing needs.¹¹¹
- **The United States should consider extending USAID's Africa Trade and Investment Activity program beyond 2026.** Although relatively small, this program works with trade and investment partners to unlock business opportunities by providing market linkages and financial advisory and other services.¹¹² This program could assist with the stabilization of artisanal mining or other small critical minerals—related enterprises that have the potential to provide local benefits.
- **The US Department of Commerce should more substantially engage in Africa.** The United States could greatly sharpen its critical minerals focus by having a cadre of dedicated commercial officers present and engaged on the ground in key African countries. China has a large diplomatic and commercial diplomacy corps in Africa. This affords it an advantage in identifying critical commercial opportunities that American companies may not be aware of.

BOX 5.

Lubumbashi: Time for reengagement

Consulates provide services to Americans and host nationals, opportunities to develop relationships, and understanding of local issues and sentiments outside of a nation's capital (where US embassies are located). The United States has no physical diplomatic presence in the Democratic Republic of the Congo (DRC) outside the capital, Kinshasa, located in the far western part of the large country. Distance and limited transportation infrastructure contribute to the relative isolation of American diplomats from large swaths of the DRC.

In the mid-1990s, as the Cold War ended and interest and resources shifted elsewhere, the United States closed its consulate in Lubumbashi—the capital of the mineral-rich Katanga Province and the DRC's second largest city, located a thousand miles from Kinshasa.^a The Lubumbashi consulate was established in the late 1940s to, among other functions, monitor the copper industry.^b Gécamines, the Congolese state mining company, is headquartered in Lubumbashi, as are other mining companies. Lubumbashi was home to the violent Katangese separatist movement, which attempted to break away from the newly independent Republic of Congo in the early 1960s. Katanga remains a center of political activity.

There is little doubt that US commercial interests in the DRC are being shortchanged. Assistant Secretary of State for Energy Resources Geoffrey Pyatt, in testimony before the House of Representatives Foreign Affairs Committee, lamented the fact that only two US economic officers serve the entire DRC, “covering all of the issues in that large and consequential country, a country with the critical endowment of battery minerals.”^c

The importance of in-person diplomacy and the physical infrastructure needed to support it has not been lost on other countries. Turkey, with growing commercial interests in Africa, has increased its diplomatic posts in Africa from 12 to 43 since 2009.^d China has an established government presence in Katanga through its dominance of the mining sector. Although the US Department of State broke ground on a new embassy facility in Kinshasa in August 2023, the United States could better foster mutually beneficial, equitable, and responsible development of cobalt in the DRC by reestablishing a physical diplomatic presence in Lubumbashi, the heartland of Congolese mining.^e

Note: See page 71 for citations.

RECOMMENDATION 9: EXPAND THE MINERALS SECURITY PARTNERSHIP

The United States is involved in several multinational partnerships that touch on critical minerals policy, including the Minerals Security Partnership. The MSP was established in 2022 as a multilateral initiative led by the US Department of State to spur public and private investment in critical minerals production, processing, and recycling projects, with the goal of diversifying and securing critical minerals supply chains.¹¹³ The partnership also aims to support projects that “demonstrate responsible stewardship of the natural environment; engage in consultative and participatory processes with regard to land access and acquisition; . . . [and] provide economic benefit for workers, and local communities.”¹¹⁴ India, Italy, and Norway (in 2023) and Estonia (in 2024) joined original MSP members Australia, Canada, Finland, France, Germany, Japan, the Republic of Korea, Sweden, the United Kingdom, and the United States, plus the European Union. While there are no formal membership criteria, MSP members generally are developed democracies committed to the rules-based global trading system. There are currently no African MSP members.

The MSP countries, after convening in London in October 2023, announced that they are working to advance 17 projects, including seven in Africa.¹¹⁵ Only four of these projects were cited by name, and few details were provided. One was the Syrah Resources graphite project in Mozambique (see box 6, page 51).

- **The United States should offer select African countries membership in the MSP.** US policy toward Africa is centered on greater partnership, which many African countries desire, including in the critical minerals sector. Yet these countries are currently not included in the MSP despite critical minerals being a central element of many African economies. This sends a discordant message to Africans. While the MSP is relatively new and still closer to a concept than a robust program, its leaders should consider offering membership to mineral-rich African countries that have demonstrated support for its goals. The DRC, Mozambique, Namibia, Tanzania, and Zambia participated in the initial MSP dialogue and could be considered potential MSP members. African country membership could help facilitate the high-standard critical minerals and related infrastructure projects that the MSP promotes.

MSP expansion also could help promote positive mining investment climates. Several African countries have recently issued critical minerals export bans or restrictions intended to foster local value from production. With African MSP partners, the United States and other members could better address legitimate African desires to gain more value from critical minerals—an MSP objective—while helping to deter unintended fallout from restrictive African trade and investment policies. Expanded MSP membership could also facilitate greater US private-sector engagement in African critical minerals sectors by increasing dialogue and coordination among African governments and MSP countries committed to high-standard mining projects (see Key Issue: African Value-Added Challenges, page 53).

- **The MSP should lean toward the inclusion of African partners that share its vision.** African participation in the MSP would signal “partnership” in a way that Chinese engagement in Africa’s

BOX 6.

Big stakes in graphite mining in Mozambique

While the United States is late to the African critical minerals field, it is now committing substantial resources to select projects. For example, Washington is backing the graphite operations of the Australia-based company Syrah Resources, one of several beneficiaries of federal support to bolster US domestic critical minerals supply chains. Graphite is used in electric vehicle and other batteries, as well as in nuclear reactors, cell phones, laptop computers, industrial processes, and high-performance engines. Given its widespread applications, a secure graphite supply chain is crucial to the US defense industrial base, yet the United States in 2022 was 100 percent reliant on imports for its graphite needs.^a This project support is intended to provide an alternative to imports from China, the world's dominant producer and the United States' primary import source for natural graphite.

Syrah Resources has obtained approval for up to roughly \$470 million in grants and loans from the US Department of Energy and the US International Development Finance Corporation for graphite anode production.^b Graphite mined at Syrah's Balama facility in Mozambique will supply the company's new US Department of Energy-backed manufacturing plant in Vidalia, Louisiana.^c The company has deals to supply its graphite anode material to Tesla, a Ford joint venture with South Korea's SK On, and LG Energy Solution.^d US government support for this project is noteworthy for several reasons:

- The United States' support of Syrah Resources' graphite operations in Africa is unprecedented. This level of financial commitment is large in the context of US policy toward Africa. By comparison, the United States allocated some \$58.5 million last year for its

new Prevention and Stabilization Fund, designed to help seven African countries combat instability.^e

- The Syrah Resources graphite project could face security challenges, given its location in the violence-prone province of Cabo Delgado. Syrah Resources has suffered minor operations disruptions due to an Islamist insurgency. Security conditions have improved lately, but enduring stability will require economic development perceived as equitable by Mozambicans, with Syrah Resources and other foreign investors playing a key role.
- Instability in Cabo Delgado may limit the US embassy's ability to monitor the project's local impact. It may also limit the Mozambican government and private-sector partners' ability to foster a supportive commercial climate.
- China's dominance in key critical minerals sectors—such as graphite and lithium—positions it to manipulate markets by holding back supplies, instituting trade restrictions, or even flooding markets with product. For example, Syrah Resources halted production in April 2023 because of plummeting graphite prices attributed to high inventory in China and weak electric vehicle sales.^f How well can Syrah Resources withstand Chinese market pressure?

This new-style US government support for critical minerals development in Africa deserves close attention. Will this financial support prove successful and be worthy of replication elsewhere in Africa? And how will the success of US government support be defined and when?

Note: See page 71 for citations.

mining sector does not. Though unproven, the MSP is promising. There will likely be some inevitable strains on cooperation among its members, particularly those that have rival commercial interests. Yet this marquee initiative has strong potential to raise mining, processing, and related infrastructure standards to the benefit of the United States, its allies, African producers of critical minerals, and surrounding local mining communities.

- **At a minimum, African nations should be continually briefed on the MSP's priorities and evolution.** South Africa and Zambia joined the MSP session held in October 2023 in London. This engagement with Africa should be further developed.
- **The MSP could be better explained and more transparent.** The MSP is committing significant US public resources that benefit private interests. Yet information about the MSP is limited. Transparency is needed, including about the program's decision-making process for project selection—especially because the United States desires to see greater transparency in the African mining sector and elsewhere.

RECOMMENDATION 10: EXPAND SUPPORT FOR THE YOUNG AFRICAN LEADERSHIP INITIATIVE

For more than a decade, the US Department of State and USAID have co-led the Young African Leaders Initiative (YALI)—a highly competitive executive program for young Africans interested in leadership and entrepreneurial training. The initiative partners with American universities to provide skills development and leadership training in business, civic engagement, and public management through its Mandela Washington Fellowship exchange program. YALI programs also include four regional leadership centers in Africa and a robust networking program for YALI alumni, entrepreneurs, and business leaders seeking to engage with others and hone or learn new skills. Corporate sponsors play a large role in supporting these programs through funding public-private partnerships, providing experts, and hosting exchanges.

- **The US Department of State and USAID should more aggressively pursue increased private and public support for YALI.** The US government should consider giving more financial support to these exchange and scholarship programs, particularly for qualified young African engineering students. These students could spend time at US universities—such as the Colorado School of Mines and the Virginia Polytechnic Institute—that offer mining and related industry education, including programs in engineering, geology, minerals exploration and processing, and environmental management. Exchanges with US universities with science, technology, engineering, and mathematics (STEM) programs could also be pursued. Increased investment in exchange programs could complement other US government efforts to build capacity for local business development and could foster the healthy commercial climates needed to sustain responsible minerals development and associated businesses. YALI already provides the framework for such exchanges, assisting eager entrepreneurs and young professionals interested in public service and civic engagement through its fellowship

program. Tens of thousands of Africans apply each year for the fellowship program, yet only about 700 can be accommodated through existing grant funding.¹¹⁶ Increased engagement of private sponsors combined with a new focus on critical minerals could grow a cadre of seasoned mining and minerals-related professionals interested in working with US companies for decades to come.

- **Encourage US ambassadors to African countries to engage with YALI alumni and the YALI network.** A high-level spotlight on the important work these leaders are doing could foster goodwill and potentially fruitful commercial relationships. This could be achieved through increased US embassy engagement and recognition of YALI candidates and alumni. China is adept at this type of personal diplomacy. The United States could do better with higher diplomatic staffing levels in Africa and more support for the YALI program.

Key Issue: African Value-Added Challenges

Extracted raw or minimally processed minerals mined in Africa have mostly been shipped as commodities to be refined and fully processed abroad. The DRC, for example, produces some 70 percent of the world's cobalt, yet captures only 3 percent of the battery and electric vehicle value chain for which cobalt is used.¹¹⁷ China dominates much of the processing of African critical minerals, refining some 35 percent of nickel, 50–70 percent of lithium and cobalt, and nearly 90 percent of rare earth elements mined on the continent.¹¹⁸ Africa's dearth of local processing denies its economies revenue and employment opportunities.

The challenges to increasing local processing of critical minerals are similar to the challenges of attracting mining investment (see Key Issue: Limited Infrastructure for African Minerals Development, page 41, and box 2, page 35). Nevertheless, opportunities for greater critical minerals processing in Africa do exist. A 2021 report by the research organization BloombergNEF found that the DRC—by taking advantage of its abundant cobalt resources, inexpensive land, hydroelectric power, and relatively low construction costs—should be able to attract a new processing plant and become a producer of low-cost and low-emission lithium-ion battery cathode precursor materials (the intermediate materials between raw and finished cathode material).¹¹⁹ These DRC operations, the report assumed, would be the start of an electric vehicle battery supply chain that includes Poland and Germany and bypasses China. Another bright spot is the possibility of regional processing centers in countries with potential and/or existing hydropower resources, such as Namibia and Kenya.¹²⁰

Several US policy objectives in Africa, including promoting peace and stability, are served by economic development. Greater local value addition in this industrial sector promises economic growth and job creation in many African countries where unemployment rates are high—nearing 30 percent, for example, in South Africa—and fueling instability.¹²¹ Increased African participation in the critical minerals supply chain would chip away at China's current dominance, benefiting US security through supply chain diversification. Reducing the shipping of raw African critical minerals to China and elsewhere would also have environmental benefits.

To promote greater local value production and decrease domestic political pressure, several African governments are adopting aggressive trade policies, including banning or severely restricting the export of raw critical minerals by requiring that degrees of processing be done locally.¹²² Namibia and Zimbabwe have recently banned lithium exports.¹²³ Ghana is moving to prohibit the export of raw bauxite, iron ore, lithium, and other critical minerals.¹²⁴ Africa is not alone in this trend, with South American countries taking similar actions.

While export bans are understandable given the history of natural resource exploitation in Africa, these policies have the potential to deter much-needed foreign investment. African countries face strong competition from Argentina, Australia, Canada, Chile, Indonesia, and other countries with significant critical minerals reserves and plans to boost their processing and battery-building capacities.¹²⁵ Moreover, many potential investors already perceive African ventures as risky. Investment in African mining as a share of total global investment fell substantially between 2012 and 2022.¹²⁶ Mining policies that appear arbitrary will only worsen the risk perception, pushing investment elsewhere.

There is no single policy template for African countries to successfully increase benefits from the development of their critical minerals. As the chief executive officer of Andrada Mining noted in October 2023, “Beneficiation gets bandied about quite freely without understanding the complexities. There needs to be a huge investment, concurrent with the development of these facilities, in infrastructure, specifically, water, power and logistics. Those big projects don’t happen overnight.”¹²⁷

For industrial infrastructure development plans to be successful, African mining and foreign investment policies must be in sync with a competitive global landscape, serving to attract rather than deter needed foreign investment. To have a lasting impact, however, attention must be paid to investments that will also support the build-out of a larger, more diverse local economy to facilitate the long-term sustainability of communities in mining regions.

RECOMMENDATION 11: ASSIST AFRICANS IN BUILDING TECHNICAL CAPACITY IN THE MINING SECTOR

- **The United States should support local critical minerals processing in Africa while being alert to counterproductive critical minerals export policies.** US and other mining companies will negotiate and strike investment deals with African governments if they are beneficial. Export policies factor into these investment decisions. The US government does not play a role in developing or directing commercial transactions. But in promoting mutually beneficial partnerships between US commercial interests and African countries, the US government should advocate for mining-sector policies that encourage—rather than deter—US and other Western investment. US commercial diplomacy, in promoting pro-foreign investment policy in African critical minerals sectors, could illuminate the downsides of potentially counterproductive export policies.

- **The United States should consider supporting African capacity-building efforts through US- and allied-led training centers, exchange programs, and agency secondments.** Such efforts could harness the expertise of the US Departments of the Interior, Labor, Defense, and Energy to assist with technical training in the exploration and safe and efficient recovery of minerals. The Department of the Interior’s USGS would be the ideal lead of a US-backed training center, potentially providing geology-based policy, administrative, and technical guidance to African ministries responsible for their country’s respective mining-sector operations. This assistance could include expanded training in modern mapping, exploration, and recoverability assessment.¹²⁸ US agencies also could provide auxiliary training in areas such as battery technology and chemistry, transportation, and material handling to increase African worker safety, security, and productivity in the mining sector.
- **To enhance technical capacities in Africa, the US Department of Energy should explore establishing a framework similar to its Critical Minerals Collaborative.** The department currently has several initiatives to reestablish the breadth and depth of mining capability in the United States.¹²⁹ Based on US and partner country objectives, these development programs could be extended to African countries on a regional or bilateral basis.
- **The United States could assist Africans with developing regional processing centers.** This effort could help pool resources (including technical expertise), disperse risk, and build capacity for more robust local economies. South American nations recently announced plans to process lithium regionally, a move intended to enhance their global competitiveness.¹³⁰ Kenya is a possible location for a regional processing center, with adequate (renewable) energy supplies.¹³¹ Tanzania has expressed interest in serving as a processing hub. The US-DRC-Zambia MOU on promoting an electric vehicle value chain is also designed to advance local value-addition efforts. Regional approaches should theoretically gain momentum as the African Continental Free Trade Area Agreement—an initiative designed to reduce trade barriers among African countries—continues to be implemented.
- **The United States should explore providing capacity- and skills-building programs by tapping the technical expertise of Defense Department agencies.** The department has broad technical expertise in civil engineering, construction, material handling, and transportation security. It should explore providing related job training and skills building desired by Africans to increase value added in the critical minerals sector. For example, the US Army Corps of Engineers (USACE) has extensive expertise in civil engineering, project planning, feasibility, and evaluation that could be tapped to strengthen African capacity in the construction of transportation-, power-, and mining-related infrastructure.¹³² The US Africa Command (AFRICOM), which maintains extensive relationships with African countries (and at times relies on the USACE for construction project oversight), could also provide critical minerals–related training to select African partners. This would be consistent with AFRICOM’s mission to “employ a broad-reaching diplomacy, development, and defense approach to foster interagency efforts and help negate the drivers of conflict and extremism in Africa.”¹³³ Each potential Defense Department engagement should be carefully vetted and account for political sensitivities.

Key Issue: US Development and Trade Policies' Effect on African Critical Minerals Development

The IRA, which Congress passed and President Biden signed into law in 2022, has affected energy supply chains and other nations' policies worldwide. Its hundreds of billions of dollars of subsidies and tax incentives—intended to promote a clean energy transition—have spurred similar actions by the United Kingdom and other European countries. The IRA has dramatically accelerated renewable energy and battery storage investment in the United States, totaling \$270 billion from August 2022 to August 2023, according to one estimate, which is equal to eight years of previous investment.¹³⁴

A primary IRA provision is a consumer tax credit of approximately \$3,750 per vehicle that encourages electric vehicle manufacturers to use critical minerals extracted or processed in the United States or free trade agreement partner countries. This excludes every African country except Morocco, rendering African critical minerals less attractive to Western battery and auto manufacturers. While some observers have discounted the IRA's effect on African critical minerals production, pointing to offsetting rising demand, Africans and many others remain concerned that they will be disadvantaged by the policy.¹³⁵ Meanwhile, some African government officials in particular are expressing concerns about their exclusion from the IRA's electric vehicle tax credit, specifically because of how it may deter foreign investment badly needed for their mining sectors to take advantage of increases in demand for battery minerals.

Today, US trade and investment policy toward Africa is in flux. The Biden administration has moved away from pursuing free trade agreements to focus on alternative, "limited" trade arrangements such as the US-Kenya Strategic Partnership.¹³⁶ Hence, there are currently no prospects for African countries other than Morocco to benefit from the IRA's electric vehicle tax credit. Some analysts have called for the IRA's electric vehicle tax provision to be extended to include AGOA-eligible countries, now numbering 35.¹³⁷ (AGOA, which offers duty-free access to the US market for thousands of African goods, will expire in 2025 unless renewed by Congress.) For example, several scholars recently noted that "AGOA could be the starting point . . . of FTA [free trade agreement]-like reciprocal privileges specified in the IRA to qualifying African mineral producers."¹³⁸ How the Biden administration and Congress handle these policy issues will impact the development of critical minerals in Africa, especially the United States' engagement and investment in the African mining sector.

RECOMMENDATION 12: PRIORITIZE US NATIONAL SECURITY INTERESTS IN THE CONTEXT OF US TRADE AND INVESTMENT POLICY

The IRA's tax incentives and energy investment provisions affect the private sector's decision-making around critical minerals investment and sourcing. Yet, to date, there has been relatively little consideration of how this sweeping legislation impacts the development of African critical minerals essential to US economic and national security interests. Some critical minerals—for example, antimony, found in South Africa—are not found in the United States. While there is no doubt that the United

States should significantly increase its domestic production and processing of critical minerals, numerous experts told the study group that critical minerals investment should simultaneously occur where key minerals are found overseas, including in Africa. In other words, domestic production and processing should proceed on a dual or parallel track alongside investment and diversification of imported supplies if the United States is going to reduce its critical minerals supply chain dependence on China and others.

- **The IRA should be more closely considered in the context of creating stronger links between African critical minerals and US supply chains, particularly in the short to medium term.**

Coordination could be greatly improved among the US Departments of State, Energy, and Treasury (the last of which implements the IRA), as well as the Office of the United States Trade Representative and Congress. Traditionally, these departments and offices have not worked closely together on Africa policy. Policymakers should explore the extent to which US mining engagement efforts in Africa may be undercut by the IRA, disincentivizing investment and exports to the United States—exports US processing and manufacturing facilities will rely on for the foreseeable future. This could be done within the context of discussions on the future of AGOA, set to expire in 2025.¹³⁹ Such analysis would help inform policy decisions to best reflect US economic and national security interests related to playing a larger role in African mining, including countering China's dominance of many critical minerals supply chains.

Key Issue: Artisanal Mining Challenges

Artisanal mining can be “defined as mining conducted by an individual miner and family members” and “involves mainly manual labor, has no financial support, and is usually not formalized.”¹⁴⁰ The accessibility and breadth of valuable mineral deposits on the continent have led many Africans to mine deposits by hand or with other low-tech and mostly unorganized means—commonly known as artisanal (or informal) mining. Approximately 40 to 45 million people participate in artisanal mining worldwide and indirectly support the livelihood of as many as 270 million people—150 million in the Global South alone.¹⁴¹

Artisanal mining poses many challenges. Artisanal and “small-scale mining” sites are largely unregulated, are often illegal, and pose many safety hazards for those involved, including children.¹⁴² It is believed that “an estimated 40,000 children toil in non-regulated artisanal mines under hazardous conditions. Environmental degradation is a corollary byproduct.”¹⁴³ Yet these sites offer much-needed income for individuals and communities struggling with endemic poverty.¹⁴⁴ Regulating artisanal and small-scale mining or instituting marketplace bans and disincentives can be difficult and even counterproductive when these actions do not consider the impacts on artisanal workers and their families and communities, such as income loss.

Artisanal mining sites in eastern and southeastern DRC employ labor by children, youth, and even pregnant women. These workers—typically operating without protective equipment—are exposed to radiation, cobalt dust, toxins, and, in the case of small-scale mining, potentially deadly chemicals



At a mine in Nyabibwe, in the eastern part of the Democratic Republic of the Congo, a miner digs for cassiterite, a primary source of tin, on August 17, 2012. Tin is one of 50 minerals and elements on the US Geological Survey's critical minerals list. (Photo by Marc Hofe/AP)

from the explosives used to dislodge mineral-laden rock and earth.¹⁴⁵ They are also at risk of physical injury due to falls, flying debris, lack of safety training, and rudimentary or poorly maintained equipment. Although Congolese law and international standards prohibit child labor, the income potential for these individuals and their families is often an irresistible draw, leading some mine operators, traders, and security forces to actively exploit the situation or turn a blind eye.¹⁴⁶

Developing effective safeguards for artisanal mine workers and surrounding communities has been extremely difficult. Simply banning or discouraging artisanal mining altogether has had downsides. For example, abrupt cancellation of mining permits can put thousands out of work, with few alternatives and no social safety net.¹⁴⁷ Moreover, government efforts to formalize artisanal mines have led to uprisings, the displacement of workers and communities, and reduced access to land and resources due to consolidation. Destabilizing events in northern Mozambique illustrate these effects.¹⁴⁸

Despite the DRC mining code prohibiting use of child labor and foreign ownership of artisanal mines, reports persist of Chinese operators using child labor and cutting deals with Congolese mining cooperatives to illicitly extract resources for export.¹⁴⁹ Community uprisings over resultant

pollution, the loss of agricultural land and fishponds, and other community health and environmental impacts have resulted in violence between Chinese mine workers, or others involved in the trade, and community residents.¹⁵⁰ “The African researcher Rigobert Minani Bihuzo, in remarks before a congressional panel in 2022, noted that “for more than 25 five [*sic*] years now, central African experts . . . have identified the looting of mineral resources as a structural cause” of conflict in eastern DRC.¹⁵¹ The lack of oversight and enforcement of local and national laws has been facilitated by underpaid Congolese security forces acting on behalf of Chinese operators.¹⁵²

Recent DRC government support and private investment commitments to build capacity for the refining of copper and cobalt sourced from artisanal workers appear to be positive developments. These actions were spurred by US support of the DRC-Zambia-US agreement to back development of an electric battery supply chain.¹⁵³ Yet it remains to be seen how successful this and other efforts to formalize or professionalize artisanal mining will be in raising safety and environmental health standards and increasing economic benefits for artisanal miners and their communities.

RECOMMENDATION 13: SUPPORT EFFORTS TO ADDRESS ARTISANAL MINING CHALLENGES

The United States should support efforts to increase benefits for artisanal workers and limit harm from artisanal mining while recognizing that formalization and punitive measures can inadvertently disadvantage artisanal miners and their communities if not carefully managed. The United States could specifically increase its work with NGOs, African civil society, industry, and governments to support human rights and environmental safeguards. This work could be facilitated by ongoing engagement in multi-stakeholder initiatives, such as the Fair Cobalt Alliance and others, that work to develop acceptable standards of operation, including fair currency and minerals valuation guidelines.¹⁵⁴ Efforts similar to the now-completed Combatting Child Labor in the Democratic Republic of the Congo’s Cobalt Industry (COTECCO) project should be considered.¹⁵⁵

- **Support for African-led efforts, such as the Africa Mining Vision and its African Minerals Governance Framework, should be considered for prioritization.** A key tenet of the Africa Mining Vision is a “mining sector that harnesses the potential of artisanal and small-scale mining to stimulate local and national entrepreneurship, improve livelihoods and advance integrated rural social and economic development.” The framework envisions incorporating this and several other tenets into national “policies, laws, regulations, standards and procedures.”¹⁵⁶ The United States could help support development of the tools necessary to implement this vision and framework through USAID, US Department of Labor, or other relevant agency programs.
- **The United States should explore ways to mitigate the downsides associated with the formalization or professionalization of artisanal mines.** Although strongly supported by some advocates, others caution that if these actions are not done with the well-being of artisanal workers squarely in mind, the number of people being employed in production may decline, and revenues may be diverted to intermediaries or companies, with little benefit to artisanal workers and local communities. While supporting the formalization or professionalization of artisanal and small-scale mining and the protection of workers and their communities, the United States

should increase its work with international NGOs, African civil society, governments, industry, and others to guard against unintended consequences of such efforts.

Conclusion

The United States' economic and national security will increasingly depend on critical minerals not always found, produced, or processed at scale domestically. Such minerals are essential to modern economies, as they power cell phones, computers, and satellites, and are vital inputs in high-end batteries, jet engines, and various medical, military, and defense applications. Many of these critical minerals—including some for which the United States is at or near 100 percent reliant on imports—are found in Africa.

African countries have an exceptional opportunity to boost their economic development given the growing global demand for critical minerals. Leveraging this opportunity means developing local processing capacity, moving beyond the traditional extraction-and-export model of African mining. But to achieve this goal, challenges such as weak infrastructure and rule of law and harmful environmental and social effects need to be addressed. Critical minerals development must be perceived as being broadly beneficial throughout African societies, or it risks becoming a source of contention and even violent conflict. Moreover, strategies to overcome the challenges must be continually assessed in the face of ever-changing critical minerals markets and rapidly evolving technology; demand can change in unpredictable ways.

Many Africans are eager to move quickly in developing their critical minerals and are already managing partnerships with multiple foreign investors. China is likely to continue its strong focus on the continent, including the mining sector. But while Africans may generally welcome this ongoing investment, they are increasingly concerned about Chinese mining-sector practices, especially regarding labor, the environment, and transparency. Africans are seeking more investment by other partners to make the most of the continent's critical minerals potential. The United States tops the list of desired investors for many African countries.

The US government has taken encouraging steps to build critical minerals partnerships with African countries, but much more can be done. Of course, there are reasons that so few US and other Western companies are active in African mining: it is challenging to operate and compete in the region. Unlike Chinese investment, US engagement will be driven by private-sector decisions. The US government has tools to encourage and help mining and related companies with high operating standards to invest in Africa. This study group report offers recommended actions to sharpen these tools and build on the United States' burgeoning efforts.

Vigorous US commercial diplomacy and other backing of US companies is warranted and needed given the United States' national interest in African critical minerals and fostering peace and security on the continent. The United States must do more over a sustained period to develop a significant number of mutually beneficial critical minerals partnerships in Africa. For decades now, recognizing Africa's potential, China has been investing in the region, prioritizing the continent, and outcompeting the United States. China is playing the long game on African critical minerals. Will the United States?

Notes

1. Energy Act of 2020, Pub. L. No. 116-260 (Division Z, § 7002), 134 Stat. 2419, (2020), <https://www.congress.gov/116/plaws/publ260/PLAW-116publ260.pdf>.
2. Jason Burton, "US Geological Survey Releases 2022 List of Critical Minerals," United States Geological Survey (USGS), February 22, 2022, <https://www.usgs.gov/news/national-news-release/us-geological-survey-releases-2022-list-critical-minerals>. See specifically Division Z, § 7002(a)(3) and § 7002(c)(4)(A) of the Energy Act of 2020.
3. 2022 Final List of Critical Minerals, Fed. Reg. 10381-10382 (February 24, 2022), <https://www.govinfo.gov/content/pkg/FR-2022-02-24/pdf/2022-04027.pdf>.
4. For the purposes of this United States Institute of Peace study group report, the term "critical minerals" will assume the inclusion of rare earth elements on the USGS 2022 list.
5. Notice of Final Determination on 2023 DOE Critical Materials List, Fed. Reg. 51792-51798, (August 4, 2023), <https://www.govinfo.gov/content/pkg/FR-2023-08-04/pdf/2023-16611.pdf>.
6. Copper was among 11 mineral commodities excluded from the USGS 2022 list because its supply chain vulnerability was found to be mitigated by other factors, such as "domestic production, lack of import dependence, and diverse, secure sources of supply" (in other words, not having a "single point of failure"). See the 2021 Draft List of Critical Minerals, Fed. Reg. 62199-62203 (November 9, 2021), <https://www.govinfo.gov/content/pkg/FR-2021-11-09/pdf/2021-24488.pdf>.
7. James M. Lindsay, "Critical Minerals and China, with Morgan Bazilian," *The President's Inbox* (podcast), Council on Foreign Relations, April 25, 2023, <https://www.cfr.org/podcasts/critical-minerals-and-china-morgan-bazilian>. Morgan Bazilian is the director of the Payne Institute and a professor of public policy at the Colorado School of Mines in Golden, CO.
8. Gracelin Baskaran, "China's Use of Graphite Export Restrictions Encourages Diversification," Center for Strategic and International Studies (CSIS), October 24, 2023, <https://www.csis.org/analysis/chinas-use-graphite-export-restrictions-encourages-diversification#>.
9. USGS, *Mineral Commodity Summaries 2023* (Reston, VA: USGS, 2023), 33, <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf>.
10. Daniel F. Runde and Austin Hardman, "Elevating the Role of Critical Minerals for Development and Security," CSIS, September 1, 2023, <https://www.csis.org/analysis/elevating-role-critical-minerals-development-and-security>.
11. US Department of Defense, "About Strategic Materials," Defense Logistics Agency, <https://www.dla.mil/Strategic-Materials/About/>.
12. National Defense Authorization Act (NDAA) for Fiscal Year 2024, S. 2226, 118th Cong. (2023); and H.R. 2670, § 1415(c)(1), 118th Cong. (2023), <https://www.congress.gov/118/bills/hr2670/BILLS-118hr2670rds.pdf>.
13. NDAA for Fiscal Year 2024, Pub. L. No. 118-31 (2023), <https://www.congress.gov/bill/118th-congress/house-bill/2670/text>. Covered countries listed in section 1414(b)(1) include China, Iran, North Korea, and Russia.
14. Pub. L. No. 118-31, § 1414(c).
15. The White House, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth*, (Washington DC: The White House, 2021), 15, <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf>.
16. USGS, *Mineral Commodity Summaries 2023*.
17. International Energy Agency (IEA), "Key Findings," Critical Minerals: The Role of Critical Minerals in Clean Energy Transitions, <https://www.iea.org/topics/critical-minerals#key-findings>.
18. IEA, *The Role of Critical Minerals in Clean Energy Transitions* (Paris: IEA, 2021; revised March 2022), 5, <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>.
19. IEA, *The Role of Critical Minerals in Clean Energy Transitions*, 6.
20. IEA, *The Role of Critical Minerals in Clean Energy Transitions*, 50.
21. See, for example, Macdonald Amoah et al., "What if America's Mineral-Intensive Military Runs Out of Minerals?," Modern War Institute at West Point, November 10, 2023, <https://mwi.westpoint.edu/what-if-americas-mineral-intensive-military-runs-out-of-minerals/>. For more information on global demand projections, see IEA, *The Role of Critical Minerals in Clean Energy Transitions*.
22. IEA, *The Role of Critical Minerals in Clean Energy Transitions*, 227.

23. Caitlin McKennie, Al Hassan Hassan, and Mama Nissi Abanga Abugnaba, "Africa's Energy Transition & Critical Minerals," Payne Institute for Public Policy, Colorado School of Mines, November 3, 2022, <https://payneinstitute.mines.edu/wp-content/uploads/sites/149/2022/11/Payne-Institute-Commentary-Africas-Energy-Critical-Minerals.pdf>.
24. Tegan Blaine, Chris Collins, and Claire Doyle, "Moving toward a Just Transition in Green Minerals," United States Institute of Peace, November 15, 2022, <https://www.usip.org/publications/2022/11/moving-toward-just-transition-green-minerals>; and World Bank, "The World Bank in DRC," last updated September 25, 2023, <https://www.worldbank.org/en/country/drc/overview#1>.
25. *Child Labor and Human Rights Violations in the Mining Industry of the Democratic Republic of Congo, Hearing before the Tom Lantos Human Rights Commission*, 117th Cong. (2022) (statement of Rigobert Minani Bihuzo, SJ, regional coordinator of the Ecclesial Network for the Congo Basin Forest and head of the research department of the Jesuit Center for Study and Social Action), https://humanrightscorrection.house.gov/sites/evo-subsites/humanrightscorrection.house.gov/files/documents/220712%20DRC%20Testimony_Rigobert%20Minani.pdf; and "Child Labor and Human Rights Violations in the Mining Industry of the Democratic Republic of Congo," Tom Lantos Human Rights Commission, United States Congress, July 14, 2022, <https://humanrightscorrection.house.gov/events/hearings/child-labor-and-human-rights-violations-mining-industry-democratic-republic-congo>. For more on child labor and artisanal mining, see Michele Fabiola Lawson, "The DRC Mining Industry: Child Labor and Formalization of Small-Scale Mining," *Africa Up Close* (blog), Wilson Center, September 1, 2021, <https://www.wilsoncenter.org/blog-post/drc-mining-industry-child-labor-and-formalization-small-scale-mining>.
26. African Natural Resources Center, "Catalyzing Growth and Development through Effective Natural Resources Management," African Development Bank Group, 2016, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/anrc/AfDB_ANRC_BROCHURE_en.pdf; and "Africa – Mining by the Numbers, 2022," S&P Global Market Intelligence, <https://www.spglobal.com/marketintelligence/en/news-insights/research/africa-mining-by-the-numbers-2022>.
27. Many mining activities in Africa are dominated by quasi-state and quasi-military China-supported entities. See "China's Critical Mineral Supply Chains in Africa, How China's Critical Minerals Supply Chains Impact Peace and Security on the Continent" (event), United States Institute of Peace, June 29, 2023, <https://www.usip.org/events/chinas-critical-mineral-supply-chains-africa>. However, Eric Olander, editor-in-chief at the China Global South Project, notes the importance of distinguishing between China state-owned entities and Chinese entities (ones owned by Chinese nationals)—the latter of which, according to Olander, are often independent (not state sanctioned) and illegal. The study group report attempts to make this distinction when feasible.
28. IEA, *The Role of Critical Minerals in Clean Energy Transitions*.
29. IEA, *The Role of Critical Minerals in Clean Energy Transitions*.
30. USGS, *Mineral Commodity Summaries 2023*.
31. Zainab Usman and Alexander Csanadi, "How Can African Countries Participate in US Clean Energy Supply Chains?," Carnegie Endowment for International Peace, October 2023, 10, <https://carnegieendowment.org/2023/10/02/how-can-african-countries-participate-in-us-clean-energy-supply-chains-pub-90673>.
32. IEA, *The Role of Critical Minerals in Clean Energy Transitions*.
33. Cullen Hendrix, "China Dominates the EV Battery Industry. Can the Rest of the World Catch Up?," interview by Jackie Northam, Weekend Edition Saturday, National Public Radio, July 22, 2023, <https://www.npr.org/2023/07/22/1189580644/china-dominates-the-ev-battery-industry-can-the-rest-of-the-world-catch-up#>.
34. USGS, *Mineral Commodity Summaries 2023*, 7, 20.
35. Analysis by Lt. Col. Haywood McMillan, based on data in USGS, *Mineral Commodity Summaries 2023*; and Jane M. Hammarstrom, Laurel G. Woodruff, and Connie L. Dicken, "Critical Mineral Deposits of the United States," USGS (data release), July 18, 2023, <https://www.sciencebase.gov/catalog/item/6464de5bd34ec179a83d9e6c>.
36. USGS, *Mineral Commodity Summaries 2023*, 7 (figure 2).
37. Hammarstrom, Woodruff, and Dicken, "Critical Mineral Deposits of the United States"; and The White House, *Building Resilient Supply Chains*, 173.
38. USGS, *Mineral Commodity Summaries 2023*, 6, 20.
39. IEA, *The Role of Critical Minerals in Clean Energy Transitions*.
40. SNL Metals & Mining, "Permitting, Economic Value and Mining in the United States," June 19, 2015, 7, https://nma.org/wp-content/uploads/2016/09/SNL_Permitting_Delay_Report-Online.pdf; "Delays in the U.S. Mine Permitting Process Impair and Discourage Mining at Home," Minerals Make Life, June 25, 2016, <https://mineralsmakelife.org/resources/delays-in-the-u-s-mine-permitting-process-impair-and-discourage-mining-at/>; and The White House, *Building Resilient Supply Chains*, 173.
41. Alex Hargrave and Hannah Northey, "Energy Future Clashes with Watershed Worries in Minnesota," *E&E News by Politico*, September 6, 2023.
42. The White House, "Fact Sheet: Delivering on the Next Generation of Innovation and Partnership with Australia," press release, October 25, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/25/fact-sheet-delivering-on-the-next-generation-of-innovation-and-partnership-with-australia/>.
43. Alec Crawford and Christian Ledwell, "Digging Out of Conflict: Can Artisanal Mining Support Peacebuilding?," *Insight* (blog), International Institute for Sustainable Development, September 29, 2017, <https://www.iisd.org/articles/insight>

/digging-out-conflict-can-artisanal-mining-support-peacebuilding.

44. Crawford and Ledwell, "Digging Out of Conflict."
45. Kathryn Sturman et al., *Mission Critical: Strengthening Governance of Mineral Value Chains for the Energy Transition* (Queensland: University of Queensland, 2022) with the Extractive Industries Transparency Initiative and US Agency of International Development (USAID), <https://eiti.org/sites/default/files/2022-10/EITI%20Mission%20Critical%20Report%202022.pdf>; "What is the Kimberley Process?" Kimberley Process, <https://www.kimberleyprocess.com/en/what-kp>; and Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Pub. L. No. 111-203, § 1502, 124 Stat. 1376, 2213-18 (2010), <https://www.congress.gov/111/plaws/publ203/PLAW-111publ203.pdf>.
46. Crawford and Ledwell, "Digging Out of Conflict"; and IEA, *The Role of Critical Minerals in Clean Energy Transitions*.
47. "Mexico – Country Commercial Guide," US International Trade Administration, November 5, 2023, <https://www.trade.gov/country-commercial-guides/mexico-mining-and-minerals>.
48. David Whitehouse, "Exclusive: Tanzania to Ban Unrefined Lithium Exports from May 2024," *The Africa Report*, November 2, 2023, <https://www.theafricareport.com/326733/exclusive-tanzania-to-ban-unrefined-lithium-exports-from-may-2024/>.
49. Gerrit van Rooyen, "Africa Risks Squandering Its Critical Mineral Opportunity," Oxford Economics, March 31, 2023, <https://www.oxfordeconomics.com/resource/africa-risks-squandering-its-critical-mineral-opportunity/>.
50. A series of executive orders beginning in 2017 include the following: Executive Order 13817, 82 Fed. Reg. 60835, December 26, 2017 (issued by the White House on December 20, 2017), <https://www.federalregister.gov/documents/2017/12/26/2017-27899/a-federal-strategy-to-ensure-secure-and-reliable-supplies-of-critical-minerals>; Executive Order 13953, 83 Fed. Reg. 62539 (October 5, 2020 (issued by the White House September 30, 2020), <https://www.federalregister.gov/documents/2020/10/05/2020-22064/addressing-the-threat-to-the-domestic-supply-chain-from-reliance-on-critical-minerals-from-foreign>; Executive Order 14017, 86 Fed. Reg. 11849, March 1, 2021 (issued by the White House on February 24, 2021), <https://www.federalregister.gov/documents/2021/03/01/2021-04280/americas-supply-chains>. Congressional actions are referenced in the following endnote, as well as in the body of the report.
51. For example, Creating Helpful Incentives to Produce Semiconductors for America Act (CHIPS Act), Pub. L. No. 116-283 (National Defense Authorization Act of 2021, Title XCIX), <https://uscode.house.gov/statutes/pl/116/283.pdf>; and Building Relationships and Increasing Democratic Governance through Engagement to DRC Act of 2023 (BRIDGE to DRC Act of 2023), H.R. 4548, 118th Cong. (2023), <https://www.congress.gov/118/bills/hr4548/BILLS-118hr4548ih.pdf>.
52. The White House, "US Strategy Toward Sub-Saharan Africa," August 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/08/US-Strategy-Toward-Sub-Saharan-Africa-FINAL.pdf>.
53. US Department of State, "Minerals Security Partnership Convening Supports Robust Supply Chains for Clean Energy Technologies," press release, September 22, 2022, <https://www.state.gov/minerals-security-partnership-convening-supports-robust-supply-chains-for-clean-energy-technologies/>.
54. Better Utilization of Investments Leading to Development Act of 2018 (BUILD Act), Pub. L. No. 115-254 (Division F), (2018) 132 Stat. 3186, <https://www.congress.gov/bill/115th-congress/house-bill/302/text>; CHIPS Act; BRIDGE to DRC Act of 2023; and Inflation Reduction Act of 2022, Pub. L. No. 117-169 (2022), 136 Stat. 1818, <https://www.congress.gov/117/plaws/publ169/PLAW-117publ169.pdf>.
55. BRIDGE to DRC Act of 2023.
56. The White House, "US Strategy Toward Sub-Saharan Africa."
57. Executive Order 13953, 83 Fed. Reg. 62539.
58. "U.S.-Africa Leaders Summit," US Department of State, <https://www.state.gov/africasummit/>.
59. Anna Nishino, "Japan and U.K. to Jointly Invest in Critical Minerals in Africa," *Nikkei Asia*, September 4, 2023, <https://asia.nikkei.com/Politics/International-relations/Japan-and-U.K.-to-jointly-invest-in-critical-minerals-in-Africa>.
60. More recently, the Wagner Group has reportedly been replaced by the Russia Africa Corps. See Elliot Smith, "Russia's Wagner Group Expands into Africa's Sahel with a New Brand," CNBC, February 12, 2024, <https://www.cnbc.com/2024/02/12/russias-wagner-group-expands-into-africas-sahel-with-a-new-brand.html>.
61. US Department of the Treasury, "Treasury Sanctions Illicit Gold Companies Funding Wagner Forces and Wagner Group Facilitator," press release, June 27, 2023, <https://home.treasury.gov/news/press-releases/jy1581>. For reference to the Wagner Group's "predatory" practices, see Congressional Research Service, "Russia's Wagner Group in Africa: Issues for Congress," *In Focus*, IF12389: version 5, August 3, 2023, <https://crsreports.congress.gov/product/pdf/IF/IF12389>.
62. Magnus Ericsson, Olof Löf, and Anton Löf, "Chinese Control over African and Global Mining—Past, Present and Future," *Mineral Economics* 33, (2020): 153–181, <https://link.springer.com/article/10.1007/s13563-020-00233-4#citeas>; and "Chinese Loans to Africa Database," Boston University Global Development Policy Center, 2023, <https://www.bu.edu/gdp/chinese-loans-to-africa-database/>.
63. Much of US-Africa policy in recent decades has been centered on an aid donor-recipient model, while many African voices have increasingly called for a partnership approach, especially for natural resources extraction. The US Department of State's current stated US-Africa policy objectives are the following: (1) advancing trade and commercial ties with key African states to increase US and African prosperity; (2) protecting the United States from cross-border health and security threats; and (3) supporting key African states' progress toward stability, citizen-responsive governance, and self-reliance. "Our Mission," Bureau of African Affairs, US Department of State, <https://www.state.gov/bureaus-offices/under-secretary-for-political-affairs/bureau-of-african-affairs/>.

64. These countries are among a number of African countries enriched with energy “transition minerals” and for which the minerals sector constitutes more than 25 percent of country exports. Usman and Csanadi, “How Can African Countries Participate in US Clean Energy Supply Chains?”
65. Usman and Csanadi, “How Can African Countries Participate in US Clean Energy Supply Chains?”
66. BRIDGE to DRC Act of 2023.
67. The White House, *Building Resilient Supply Chains*, 17; and The White House, “Fact Sheet: President Biden Announces New Actions to Strengthen America’s Supply Chains, Lower Costs to Families, and Secure Key Sectors,” press release, November 27, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/11/27/fact-sheet-president-biden-announces-new-actions-to-strengthen-americas-supply-chains-lower-costs-for-families-and-secure-key-sectors/>.
68. The White House, “Australia-United States Climate, Critical Minerals and Clean Energy Transformation Compact,” press release, May 20, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/20/australia-united-states-climate-critical-minerals-and-clean-energy-transformation-compact/>.
69. The United States relies on China and others for several minerals critical to economic and national security that are not found domestically (e.g., antimony), are not produced at scale in the United States, or are *not yet* produced at scale for US needs (for example, graphite) but are found and produced in Africa (e.g., cobalt in the DRC, manganese in Gabon and South Africa, and platinum group metals in South Africa). USGS, *Mineral Commodity Summaries 2023*.
70. Johanna Malm, “‘China-Powered’ African Agency and Its Limits: The Case of the DRC 2007–2019,” *Policy Insights* no. 96, SAIIA, November, 2020, <https://saiia.org.za/research/china-powered-african-agency-and-its-limits-the-case-of-the-drc-2007-2019/>.
71. US Department of the Treasury, “Treasury Sanctions Illicit Gold Companies Funding Wagner Forces.”
72. Terah U. De Jong, *Mining and the Green Energy Transition: Review of International Development Challenges and Opportunities* (Washington, DC: USAID, prepared by Tetra Tech, 2021), https://www.land-links.org/wp-content/uploads/2021/11/Green-Energy-Minerals-Report_FINAL.pdf.
73. See “About the PAC-DBIA,” President’s Advisory Council on Doing Business in Africa, US International Trade Administration, US Department of Commerce, <https://www.trade.gov/presidents-advisory-council-doing-business-africa>; and “Trade Advisory Committee on Africa (TACA),” Office of the United States Trade Representative, Executive Office of the President, <https://ustr.gov/about-us/advisory-committees/trade-advisory-committee-africa-taca>.
74. Closely related to these factors is political instability, which has been cited as a reason Western companies are cautious about investing in the African minerals sector. Anni Coonan, “Africa and the Global Race for Critical Minerals,” Bradley Intelligence Report, August 31, 2023, <https://www.bradley.com/insights/publications/2023/08/africa-and-the-global-race-for-critical-minerals>.
75. Brian Sabbe, “IPIS Briefing December 2021-January 2022: Grievances, Governance, and Gold in the Eastern DRC,” International Peace Information Service, February 1, 2022, <https://ipisresearch.be/weekly-briefing/ipis-briefing-december-2021-january-2022-grievances-governance-and-gold-in-the-eastern-drc/>.
76. Thomas Fessy, “Congo Investigation a Chance to Fight Corruption,” *Human Rights Watch*, December 1, 2021, <https://www.hrw.org/news/2021/12/02/congo-investigation-chance-fight-corruption>.
77. Kate Bartlett, “Whether DRC-China Mining Deal Will Be Restructured Remains Uncertain,” Voice of America, June 1, 2023, <https://www.voanews.com/a/whether-drc-china-mining-deal-will-be-restructured-remains-uncertain-7118892.html>; and Rédaction Africanews with AFP, “Felix Tshisekedi Visits China to Renegotiate Mining Contracts,” Africanews, May 26, 2023, <https://www.africanews.com/2023/05/26/felix-tshisekedi-visits-china-to-renegotiate-mining-contracts/>.
78. “Democratic Republic of the Congo - Market Challenges,” Congo, the Democratic Republic of the - Country Commercial Guide, US International Trade Administration, December 14, 2022, <https://www.trade.gov/country-commercial-guides/democratic-republic-congo-market-challenges>.
79. See Gustavo de Carvalho, Paul Nantulya, and Thomas P. Sheehy, “In Africa, US Should Focus More on Democracy, Less on China,” United States Institute of Peace, October 14, 2021, <https://www.usip.org/publications/2021/10/africa-us-should-focus-more-democracy-less-china>.
80. United Nations Economic Commission for Africa (UNECA), “Africa Mining Vision: African Minerals Governance Framework,” UNECA and African Union, 2017, v, <https://repository.uneca.org/bitstream/handle/10855/24172/b11875884.pdf>.
81. UNECA, “Africa Mining Vision,” v.
82. “Towards Enforcement of African Commitments against Corruption,” Transparency International, <https://www.transparency.org/en/projects/enforcement-of-african-commitments-against-corruption>.
83. Antony J. Blinken, “The Power and Purpose of American Diplomacy in a New Era” (speech), US Department of State, September 13, 2023, <https://www.state.gov/secretary-antony-j-blinken-remarks-to-the-johns-hopkins-school-of-advanced-international-studies-sais-the-power-and-purpose-of-american-diplomacy-in-a-new-era/>.
84. “Fiscal Transparency Innovation Fund,” Division of International Finance and Development, Bureau of Economic and Business Affairs, US Department of State, <https://www.state.gov/fiscal-transparency-innovation-fund/>.
85. “Fiscal Transparency Innovation Fund.”
86. “Fiscal Transparency Innovation Fund.”

87. “2023 Fiscal Transparency Report,” Bureau of Economic and Business Affairs, US Department of State, June 27, 2023, <https://www.state.gov/reports/2023-fiscal-transparency-report/>.
88. Loans for transportation projects totaled \$49.1 billion, energy projects \$59.9 billion, and “nonenergy mining” projects \$144.7 million (\$65.3 million in Angola alone). This is in a sharp contrast to prior Boston University reporting, which showed loans for mining projects totaling \$18 billion (\$17.6 billion in Angola alone). “Chinese Loans to Africa Database.”
89. “Chinese Loans to Africa Database.”
90. Robert Bociaga, “Minerals and China’s Military Assistance in the DR Congo,” *The Diplomat*, October 31, 2022, <https://thediplomat.com/2022/10/minerals-and-chinas-military-assistance-in-the-dr-congo/>.
91. IEA, *The Role of Critical Minerals in Clean Energy Transitions*, 23–41.
92. Ray Ndlovu and Godfrey Marawanyika, “China to Invest 2.8 Billion in Zimbabwe in Lithium, Energy,” Bloomberg, November 1, 2023, <https://www.bloomberg.com/news/articles/2023-11-01/china-to-invest-2-8-billion-in-zimbabwe-in-lithium-energy>.
93. Cobalt mined in the DRC and antimony in South Africa are prime examples. USGS, *Mineral Commodity Summaries* 2023. Also, because battery technology is rapidly evolving and the United States is investing in technologies less reliant on cobalt, these particular supply limitations may be less acute in the long run than they are in the short to medium term (5 to 10 years).
94. Sara Schonhardt and Phelim Kine, “‘It’s Just Crazy’: How the US-China Energy Race Imperils the Climate Fight,” Politico, May 18, 2023, <https://www.politico.com/news/2023/05/18/us-china-energy-fossil-fuels-00097207>.
95. For more on this topic, see “China’s Critical Mineral Supply Chains in Africa, How China’s Critical Minerals Supply Chains Impact Peace and Security on the Continent” (event), United States Institute of Peace.
96. Paul Nantulya, “China’s ‘Military Political Work’ and Professional Military Education in Africa,” Spotlight (blog), Africa Center for Strategic Studies, October 30, 2023, <https://africacenter.org/spotlight/china-pla-military-political-work-pme-africa/>.
97. Joshua Eisenman, “*China’s Media Propaganda in Africa: A Strategic Assessment*,” Special Report no. 516, United States Institute of Peace, March 2023, <https://www.usip.org/publications/2023/03/chinas-media-propaganda-africa-strategic-assessment>.
98. Thomas P. Sheehy and Joseph Asunka, “Countering China on the Continent: A Look at African Views,” United States Institute of Peace, June 23, 2021, <https://www.usip.org/publications/2021/06/countering-china-continent-look-african-views>.
99. Folashadé Soulé, “What a US-DRC-Zambia Electric Vehicle Batteries Deal Reveals about the New US Approach toward Africa,” Carnegie Endowment for International Peace, 6, https://carnegieendowment.org/files/Folashade_DRC-Zambia.pdf.
100. “At Least 7 Dead in a Train Derailment in DR Congo,” *Africanews* video, April 4, 2022, <https://www.africanews.com/tag/train-derailment/>.
101. Nelson Banya, “South Africa’s Mining Output Falls Further below Pre-Pandemic Levels,” Reuters, August 7, 2023, <https://www.reuters.com/markets/commodities/south-africas-mining-output-falls-further-below-pre-pandemic-levels-2023-08-07/>.
102. “Chinese Loans to Africa Database,” 2023.
103. *Build Act Reauthorization and Development Finance Corporation Oversight, Before the Senate Committee on Foreign Relations*, 118th Congress (October 4, 2023) (statement of Scott A. Nathan, CEO, DFC), <https://www.foreign.senate.gov/hearings/build-act-reauthorization-and-development-finance-corporation-oversight>.
104. Equivalency agreements are sometimes used between states and the federal government for environmental impact and other environmental reviews—not without controversy, however, when a chosen standard is perceived by some stakeholders as being less protective or too stringent.
105. *Build Act Reauthorization and Development Finance Corporation Oversight* (statement of Scott A. Nathan).
106. *Enhancing American Competitiveness Through the US International Development Finance Corporation, Before the Senate Appropriations Committee, Subcommittee on State, Foreign Operations, and Related Programs*, 118th Congress (June 14, 2023) (statement of Scott A. Nathan, CEO, DFC), <https://www.appropriations.senate.gov/hearings/enhancing-american-competitiveness-through-the-us-international-development-finance-corporation>.
107. *Assessing US Efforts to Counter China’s Coercive Belt and Road Diplomacy, Before the House Foreign Affairs Committee*, 118th Congress (June 14, 2023) (statement of Geoffrey Pyatt, US Department of State Assistant Secretary, Bureau of Energy Resources), <https://foreignaffairs.house.gov/hearing/assessing-u-s-efforts-to-counter-chinas-coercive-belt-and-road-diplomacy/>.
108. According to the US Department of State website, “The Commercial and Business Affairs division provides assistance to U.S. firms seeking help with business problems abroad by coordinating the Department’s advocacy efforts on behalf of U.S. companies, connecting American firms to resources at U.S. embassies, and identifying commercial information and market opportunities for the U.S. business community.” However, it’s not clear how robust this activity is or whether the activity is present in Africa. See “Commercial Diplomacy,” Commercial and Business Affairs Division, US Department of State, <https://www.state.gov/key-topics-office-of-commercial-and-business-affairs/commercial-diplomacy/>.
109. “Frequently Asked Questions – Deal Teams,” US Department of State, <https://www.state.gov/frequently-asked-questions-deal-teams/>.

110. Further Consolidated Appropriations Act of 2020, Pub. L. No. 116-94 (Division J, Title VII), 133 Stat. 2534 (2019), <https://www.congress.gov/116/plaws/publ94/PLAW-116publ94.pdf>.
111. Although mining engineering programs have been on the decline in recent decades, the United States has several schools with robust mining engineering and research programs (e.g., the Colorado School of Mines, University of Arizona, University of Utah, and Virginia Polytechnic Institute). See “Maintaining the Viability of U.S. Mining Education,” Society for Mining, Metallurgy & Exploration, updated June 2022, <https://www.smenet.org/What-We-Do/Technical-Briefings/Maintaining-the-Viability-of-U-S-Mining-Education>.
112. “Africa Trade and Investment Activity,” USAID, <https://www.usaid.gov/ati>.
113. US Department of State, “Minerals Security Partnership Convening Supports Robust Supply Chains for Clean Energy Technologies,” press release, Office of the Spokesperson, September 22, 2022, <https://www.state.gov/minerals-security-partnership-convening-supports-robust-supply-chains-for-clean-energy-technologies/>; and US Department of State, “Joint Statement on the Minerals Security Partnership Announce Support for Mining, Processing, and Recycling Projects,” press release, Office of the Spokesperson, October 10, 2023, <https://www.state.gov/joint-statement-on-the-minerals-security-partnership-announce-support-for-mining-processing-and-recycling-projects/>.
114. US Department of State, “Minerals Security Partnership Governments Engage with African Countries and Issue a Statement on Principles for Environmental, Social, and Governance Standards,” press release, Office of the Spokesperson, February 7, 2023, <https://www.state.gov/minerals-security-partnership-governments-engage-with-african-countries-and-issue-a-statement-on-principles-for-environmental-social-and-governance-standards/>.
115. US Department of State, “Joint Statement on the Minerals Security Partnership Announce Support for Mining, Processing, and Recycling Projects.”
116. “Mandela Washington Fellowship,” Young African Leaders Initiative, US Department of State, <https://yali.state.gov/mwff/>.
117. UNECA, “Producing Battery Materials in the DRC Could Lower Supply-Chain Emissions and Add Value to the Country’s Cobalt,” press release, November 24, 2021, <https://www.uneca.org/stories/producing-battery-materials-in-the-drc-could-lower-supply-chain-emissions-and-add-value-to-netzero2050>.
118. IEA, *The Role of Critical Minerals in Clean Energy Transitions*.
119. UNECA, “Producing Battery Materials in the DRC Could Lower Supply-Chain Emissions.”
120. The possibility of supporting regional processing centers in countries with potential and/or existing hydropower resources came up repeatedly in presentations before and during discussions among the study group.
121. Saifaddin Galal, “Unemployment Rate in Africa as of 2024, by Country,” Statista, November 14, 2023, <https://www.statista.com/statistics/1286939/unemployment-rate-in-africa-by-country/>.
122. Gracelin Baskaran, “Prospects for U.S. Minerals Engagement in Africa,” CSIS, August 29, 2023, <https://www.csis.org/analysis/prospects-us-minerals-engagement-africa>.
123. David McKay, “Zimbabwe, Namibia ‘Playing with Fire’ after Unveiling Lithium Export Bans, Says Attorney,” Miningmx, June 11, 2023, <https://www.miningmx.com/news/battery-minerals/53783-zimbabwe-namibia-playing-with-fire-after-unveiling-lithium-export-bans/>.
124. Kiran Pandey, “Green Minerals Race: Ghana Approves Policy to Reap Maximum Benefits from Mining Projects,” *Down to Earth*, August 9, 2023, <https://www.downtoearth.org.in/news/africa/green-minerals-race-ghana-approves-policy-to-reap-maximum-benefits-from-mining-projects-91096>.
125. Van Rooyen, “Africa Risks Squandering Its Critical Mineral Opportunity.”
126. “Total investment in mineral production on the continent fell from \$1.5 billion in 2012 to just \$470 million in 2022. Meanwhile, other regions are ramping up investment quickly to seize a position in lucrative electric-vehicle supply chains—so Africa’s share of the global total has fallen to 8%. To clear the way for more investment, the IEA advises, African governments need to carry out more detailed geological surveys of their resources, and strengthen oversight of environmental and human rights abuses at mines to avoid deterring ESG-conscious investors.” Tim McDonnell, “SEMAFOR Net Zero,” *Net Zero* (newsletter), SEMAFOR, September 8, 2023, <https://www.semafor.com/newsletter/09/08/2023/mandatory-corporate-climate-disclosures-are-inevitable>.
127. Nelson Banya Nyasha Nyaungwa, “Namibia’s Battery Metal Ambitions Rest on Infrastructure, Miners Say,” Reuters, October 25, 2023, <https://www.reuters.com/markets/commodities/namibias-battery-metal-ambitions-rest-infrastructure-miners-say-2023-10-25/>. According to Reuters, Andrada Mining “recently commissioned a lithium pilot plant at its Uis mine in western Namibia, said the country could use its collaboration with the EU to develop the large-scale infrastructure projects needed to support local processing of battery metals.”
128. The USGS is already involved in evaluating critical mineral resources in Botswana, the DRC, and South Africa; monitoring conflict minerals in cooperation with the US Department of State; and providing science and technology training and expertise in other sectors (e.g., agriculture and forest cover, water supply, droughts, and flood hazards). “International Programs: Africa,” USGS, <https://www.usgs.gov/international-programs/africa>.
129. “Critical Materials Collaborative,” US Department of Energy, <https://www.energy.gov/cmm/critical-materials-collaborative>.
130. James Attwood, Jonathan Gilbert, and Mariana Durao, “South America Steps Up Efforts to Turn Lithium into Batteries,” Bloomberg, March 6, 2023, <https://www.bloomberg.com/news/articles/2023-03-06/south-america-steps-up-efforts-to-turn-lithium-into-batteries>.

131. “Kenya Revs Up to Lead on Electric Vehicles,” *Africa UpFront* (blog), Africa Practice, September 20, 2023, <https://africa.practice.com/insights/kenya-revs-up-to-to-lead-on-evs/>.
132. The US Army Corps of Engineers has some authority to provide such technical expertise and assistance to other commands working in African countries. For example, it is working with the US Africa Command to oversee construction projects, including small humanitarian projects such as schools. See Alfredo Barraza, “U.S. Army Corps of Engineers Establishes Enduring Presence in Africa to Support Key Missions on Continent,” US Army Corps of Engineers, Europe District, March 2, 2021, <https://www.nau.usace.army.mil/Media/News-Stories/Article/2529749/us-army-corps-of-engineers-establishes-enduring-presence-in-africa-to-support-k/>.
133. “Our Mission,” United States Africa Command, <https://www.africom.mil/military-presence>.
134. Roberto Bocca, “What to Know about the Impact of the US Inflation Reduction Act,” Centre for Energy and Materials, World Economic Forum, August 29, 2023, <https://www.weforum.org/agenda/2023/08/us-inflation-reduction-act-energy-news-stories-august-2023/>.
135. Usman and Csanadi, “How Can African Countries Participate in US Clean Energy Supply Chains?”
136. William Alan Reinsch and Joyce Bongongo, “U.S.-Kenya STIP in Light of Other Approaches to Trade with Africa,” CSIS, July 27, 2023, <https://www.csis.org/analysis/us-kenya-stip-light-other-approaches-trade-africa>.
137. Witney Schneidman and Vera Songwe, “Africa’s Critical Minerals Could Power America’s Green Energy Transition,” *Foreign Policy*, August 3, 2023, <https://foreignpolicy.com/2023/08/03/africa-minerals-biden-ira-green-energy-agoa/>.
138. Usman and Csanadi, “How Can African Countries Participate in US Clean Energy Supply Chains?”
139. Usman and Csanadi, “How Can African Countries Participate in US Clean Energy Supply Chains?”
140. Philip Landrigan et al., “Reducing Disease and Death from Artisanal and Small-Scale Mining (ASM)—The Urgent Need for Responsible Mining in the Context of Growing Global Demand for Minerals and Metals for Climate Change Mitigation,” *Environmental Health* 21, no. 78 (2022), <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-022-00877-5>.
141. Vidette Bester and Tina Uys, “Artisanal Mining and Its Drivers in the South African Context,” *The Extractive Industries and Society* 15 (September 2023): 915–39; and “Artisanal Miners: A Critical but Hidden Force in the Global Economy,” *Pact* (blog), January 25, 2023, <https://www.pactworld.org/blog/artisanal-miners-hidden-critical-force-global-economy>. Other sources note that there may be more than 100 million artisanal miners worldwide: see, for example, Landrigan et al., “Reducing Disease and Death from Artisanal and Small-Scale Mining.”
142. “‘Small-Scale Mining’ is defined as mining conducted by small companies with limited financial resources and limited numbers of miners. These mines typically use some forms of technology—mainly low-end and inexpensive technologies.” Landrigan et al., “Reducing Disease and Death from Artisanal and Small-Scale Mining.”
143. *Child Labor and Human Rights Violations in the Mining Industry of the Democratic Republic of Congo, Hearing before the Tom Lantos Human Rights Commission*, 117th Cong. (July 14, 2022), <https://humanrightscommission.house.gov/events/hearings/child-labor-and-human-rights-violations-mining-industry-democratic-republic-congo>.
144. Despite vast stores of mineral wealth, these resources have not translated to public prosperity; in 2022, for example, nearly 60 million Congolese lived on less than \$2.15 per day. See Blaine, Collins, and Doyle, “Moving toward a Just Transition in Green Minerals”; and World Bank, “The World Bank in DRC.”
145. Landrigan et al., “Reducing Disease and Death from Artisanal and Small-Scale Mining.”
146. *Child Labor and Human Rights Violations in the Mining Industry of the Democratic Republic of Congo, Hearing before the Tom Lantos Human Rights Commission*, 117th Cong. (2022) (statement of Rigobert Minani Bihuzo).
147. Nik Stoop, Marijke Verpoorten, and Peter Van der Windt, “More Legislation, More Violence? The Impact of Dodd-Frank on the DRC,” *PLoS One* 13, no. 8 (2018): <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6084930/>. This report noted the “local backfiring of the conflict-minerals legislation (Dodd-Frank, § 1502). Not only did the legislation lead to a de facto ban on artisanal mining that deprived hundreds of thousands of artisanal mining communities from their livelihoods, it was argued that the legislation also failed to address the root causes of the violence.” See also Laura Seay, “What’s Wrong with Dodd-Frank 1502? Conflict Minerals, Civilian Livelihoods, and the Unintended Consequences of Western Advocacy,” working paper no. 284, Center for Global Development, January 5, 2012, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2009350.
148. Emilia Columbo, “Stabilizing Mozambique,” Preventive Action Insight no. 2, Center for Preventive Action, Council on Foreign Relations, August 29, 2022, <https://www.cfr.org/report/stabilizing-mozambique>.
149. Malm, “‘China-Powered’ African Agency and Its Limits,” 5.
150. Although many of the documented artisanal mining abuses have focused on gold, the same problems are occurring with the artisanal mining of minerals in the southern and eastern parts of the DRC. See Sabbe, “Grievances, Governance, and Gold in the Eastern DRC.”
151. *Child Labor and Human Rights Violations in the Mining Industry of the Democratic Republic of Congo* (statement of Rigobert Minani Bihuzo).
152. Sabbe, “Grievances, Governance, and Gold in the Eastern DRC”; and US Government Accountability Office, “Conflict Minerals: Overall Peace and Security in Eastern Democratic Republic of the Congo Has Not Improved since 2014,” GAO-22-105411, September 14, 2022, <https://www.gao.gov/products/gao-22-105411>.

153. Michael J. Kavanaugh, "Congo Plans New Copper-Cobalt Smelter to Serve Informal Miners," Bloomberg, September 25, 2023, <https://www.bloomberg.com/news/articles/2023-09-26/congo-plans-new-copper-cobalt-smelter-to-serve-informal-miners>.
 154. "About Fair Cobalt Alliance," Fair Cobalt Alliance, <https://www.faircobaltalliance.org/about-us/about-us/>.
 155. Mei Celesta Regina Zegers, "Final Evaluation: Combatting Child Labor in the Democratic Republic of the Congo's Cobalt Industry (COTECCO)," US Department of Labor, Bureau of International Labor Affairs, July 2022, <https://www.dol.gov/sites/dolgov/files/Gayar.Arwa.T%40dol.gov/DRC-CO~2.PDF>.
 156. UNECA, "Africa Mining Vision," 2.
-

BOX 1. MINING INDUSTRY CHALLENGES

- a. Initiative for Responsible Mining Assurance, "Standards that Dig Deeper & Assurance at Every Level," <https://responsiblemining.net/>.
- b. Anglo American, "Anglo American's Unki Mine Achieves IRMA 75 on Responsible Mining Standard," press release, February 18, 2021, <https://www.angloamerican.com/media/press-releases/2021/18-02-2021>.
- c. International Council on Mining and Metals, "Collaboration Underway to Develop Consolidated Standard for Responsible Mining," press release, November 28, 2023, <https://www.icmm.com/en-gb/news/2023/convergence>.
- d. Henry Dempsey, "Indonesia Emerges as World's Second-Largest Cobalt Producer," *Financial Times*, May 10, 2023, <https://www.ft.com/content/aae97af3-02ac-4723-a6fd-dbb0e5de55ff>.

BOX 2. RAISING MINING STANDARDS IN AFRICA

- a. State of California, Department of Justice, "The California Transparency in Supply Chains Act," <https://oag.ca.gov/SB657>.
- b. IEA, *The Role of Critical Minerals in Clean Energy Transitions*, 230.
- c. "Foreign Corrupt Practices Act," National Whistleblower Center, <https://www.whistleblowers.org/foreign-corrupt-practices-act/>.
- d. "Conflict Minerals Regulation," European Commission, accessed September 9, 2023, https://policy.trade.ec.europa.eu/development-and-sustainability/conflict-minerals-regulation_en.
- e. United Nations Human Rights, Office of the High Commissioner, "Guiding Principles on Business Practices and Human Rights: Implementing the United Nations 'Protect, Respect and Remedy,' Framework," 2011, https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinesshr_en.pdf; Organisation for Economic Co-operation and Development (OECD), "OECD Due Diligence Guidance for Responsible Business Conduct," 2018, <https://mneguidelines.oecd.org/OECD-Due-Diligence-Guidance-for-Responsible-Business-Conduct.pdf>; and OECD, *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas*, Third Edition, (Paris: OECD Publishing, 2016), <https://mneguidelines.oecd.org/mining.htm>.
- f. US Department of State, "US Strategy on Countering Corruption Implementation Plan," September 6, 2023, <https://www.state.gov/wp-content/uploads/2023/09/US-Strategy-on-Countering-Corruption-Implementation-Plan-9.5.2023-FINAL.pdf>.
- g. Pub. L. No. 118-31, § 5411.
- h. International Council on Minerals and Metals, "Collaboration Under Way to Develop Consolidated Standard for Responsible Mining," press release, November 28, 2023, <https://www.icmm.com/en-gb/news/2023/convergence>.

BOX 3. US-DRC-ZAMBIA MOU: A PROMISING PARTNERSHIP?

- a. US Department of State, "The United States Releases Signed Memorandum of Understanding with the Democratic Republic of Congo and Zambia to Strengthen Electric Vehicle Battery Value Chain," press release, January 18, 2023, <https://www.state.gov/the-united-states-releases-signed-memorandum-of-understanding-with-the-democratic-republic-of-congo-and-zambia-to-strengthen-electric-vehicle-battery-value-chain/>.
- b. Africa Natural Resources Management and Investment Center, "Approach Paper towards Preparation of an African Green Minerals Strategy," African Development Bank Group, December 2022, <https://www.afdb.org/en/documents/approach-paper-towards-preparation-african-green-minerals-strategy>.

BOX 4. LOBITO CORRIDOR: BUILDING MOMENTUM

- a. The White House, "Fact Sheet: Partnership for Global Infrastructure and Investment at the G7 Summit," press release, May 20, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/20/fact-sheet-partnership-for-global-infrastructure-and-investment-at-the-g7-summit/>.

- b. The White House, “Fact Sheet: Partnership for Global Infrastructure and Investment at the G7 Summit.”
- c. The White House, “Fact Sheet: President Biden and Prime Minister Modi Host Leaders on the Partnership for Global Infrastructure and Investment,” press release, September 9, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/09/09/fact-sheet-president-biden-and-prime-minister-modi-host-leaders-on-the-partnership-for-global-infrastructure-and-investment/>.
- d. The White House, “Fact Sheet: President Biden and Prime Minister Modi Host Leaders”; and The White House, “Remarks by President Biden at Meeting for Partnership for Global Infrastructure and Investment,” press release, September 9, 2023, <https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/09/09/remarks-by-president-biden-at-meeting-for-partnership-for-global-infrastructure-and-investment/>.
- e. “United States Strengthens Investment in Lobito Corridor,” US Embassy in Zambia, October 23, 2023, <https://zm.usembassy.gov/united-states-strengthens-investment-in-lobito-corridor/>.
- f. Africa Finance Corporation, “Africa Finance Corporation to Lead US-Backed Development of the Lobito Corridor and Zambia-Lobito Rail Line,” October 26, 2023, <https://www.africafc.org/news-and-insights/news/africa-finance-corporation-to-lead-us-backed-development-of-the-lobito-corridor-and-zambia-lobito-rail-line>.
- g. “Lobito Atlantic Railway Concession Launched,” Railway Gazette International, July 5, 2023, <https://www.railwaygazette.com/freight/lobito-atlantic-railway-concession-launched/64446.article>.
- h. As of the September 2023 deadline to apply for long-term user contracts with the consortium (led by a large commodities supplier, Trafigura Group), only one company had signed a nonbinding contract to utilize the corridor. See Julian Luk, “Trafigura-Led Lobito Rail Upgrade Has Yet to Find Users,” Reuters, September 9, 2023, <https://www.reuters.com/world/africa/trafigura-led-lobito-rail-upgrade-has-yet-find-users-2023-09-01/>.

BOX 5. LUBUMBASHI: TIME FOR REENGAGEMENT

- a. Second Supplemental Appropriations and Rescissions Act, H.R. 1864, 104th Congress (June 15, 1995), <https://www.congress.gov/104/bills/hr1864/BILLS-104hr1864ih.pdf>.
- b. Edward Marks, “Letter from Lubumbashi,” *American Diplomacy*, September 2010, <https://americandiplomacy.web.unc.edu/2010/09/letter-from-lubumbashi/>.
- c. *Assessing US Efforts to Counter China’s Coercive Belt and Road Diplomacy, Before the House Foreign Affairs Committee*, 118th Congress (June 14, 2023) (statement of Geoffrey Pyatt, Assistant Secretary of State, Bureau of Energy Resources), <https://foreignaffairs.house.gov/hearing/assessing-u-s-efforts-to-counter-chinas-coercive-belt-and-road-diplomacy/>.
- d. “Turkey Is Making a Big Diplomatic and Corporate Push into Africa,” *The Economist*, April 23, 2022, <https://www.economist.com/middle-east-and-africa/2022/04/23/turkey-is-making-a-big-diplomatic-and-corporate-push-into-africa>.
- e. US Department of State, “Department of State Begins Construction on New U.S. Embassy in Kinshasa, Democratic Republic of the Congo,” press release, Office of the Spokesperson, August 29, 2023, <https://www.state.gov/department-of-state-begins-construction-on-new-u-s-embassy-in-kinshasa-democratic-republic-of-the-congo/>.

BOX 6. BIG STAKES IN GRAPHITE MINING IN MOZAMBIQUE

- a. USGS, *Mineral Commodity Summaries 2023*, 82–83. Although natural graphite is found in the United States, it is not found in abundance. According to the USGS, three companies were preparing to mine natural graphite in 2023, including two in Alabama and one in Alaska. Other graphite facilities were preparing to come online in 2023, including in Alabama and Louisiana, but they are not expected to produce enough to meet growing US demand for natural graphite in the near future.
- b. The US government has made a considerable commitment via the Development Finance Corporation to the Australia-based company Syrah Resources to support a graphite project in Mozambique’s conflict-prone Cabo Delgado Province; the goal is to source Department of Energy–financed anode production in the United States. See “Australia’s Syrah to Expand U.S Graphite Plant after \$220 Mln Grant,” Reuters, October 20, 2022, <https://www.reuters.com/business/energy/australias-syrah-expand-us-graphite-plant-after-220-mln-grant-2022-10-20/>; and The White House, “Fact Sheet: Delivering on the Next Generation of Innovation and Partnership with Australia.”
- c. “Australia’s Syrah to Expand U.S. Graphite Plant,” Reuters; and The White House, “Fact Sheet: Delivering on the Next Generation of Innovation and Partnership with Australia.”
- d. Reuters, “Syrah Resources Hits Record Graphite Output, US Plant on Track,” *Mining.com*, March 30, 2023, <https://www.mining.com/web/syrah-resources-hits-record-graphite-output-u-s-plant-on-track/>.
- e. The White House, “Fact Sheet: U.S.-Africa Partnership in Promoting Peace, Security, and Democratic Governance,” press release, December 15, 2022, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/12/15/fact-sheet-u-s-africa-partnership-in-promoting-peace-security-and-democratic-governance/>.
- f. Elouise Fowler, “Syrah Resources Sheds \$100m Market Cap on Production Pause,” *Financial Review*, July 18, 2023, <https://www.afr.com/companies/mining/syrah-resources-sheds-100m-market-cap-on-production-pause-20230718-p5dtpb0>.

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About the Critical Minerals in Africa Senior Study Group

The United States Institute of Peace convened a nonpartisan senior study group in the spring of 2023 to explore the role Africa plays in the United States' efforts to diversify US critical mineral supply chains and how new investment in partnerships with African countries could help drive economic development and strengthen peace and security on the African continent. The study group—comprising nine senior leaders experienced in US-Africa policy and relations—participated in four exploratory meetings from June through October 2023. During the course of the study, multiple interviews with relevant technical, operational, and policy experts were also conducted. Through these activities the study group developed a set of 13 consensus recommendations for the United States to support mutually beneficial public and private partnerships with African countries as the United States endeavors to diversify its access to minerals deemed critical to US economic and national security.



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